

The association between social comparison in social media, body image concerns and eating disorder symptoms: A systematic review and meta-analysis

Rubinia Celeste Bonfanti^{a,*}, Francesco Melchiori^{b,2}, Arianna Teti^{a,3}, Gaia Albano^{a,4}, Stéphane Raffard^{c,5}, Rachel Rodgers^{c,d}, Gianluca Lo Coco^{a,6}

^a Department of Psychology, Educational Science and Human Movement, University of Palermo, Palermo, Italy

^b Faculty of Psychology, University Niccolò Cusano, Rome, Italy

^c Department of Adult Psychiatry, Montpellier University Hospital, Montpellier, France

^d Department of Applied Psychology, Northeastern University, 360 Huntington Avenue, Boston, MA 02115, United States

ARTICLE INFO

Keywords:

Social comparison
Social media
Body image
Eating symptoms
Positive body image

ABSTRACT

Research has found that high social media use is associated with a greater tendency to compare oneself with others, which in turn may heighten body image concerns and problematic eating behaviours. The aim of this systematic review and meta-analysis was to examine the mean association between online social comparison and body image concerns, eating disorder behaviours and positive body image. Eligible articles published between 2008 and 2024 were searched for in scientific databases. A random-effects meta-analysis was conducted to investigate the direct correlation between social comparison and body image and eating disorder outcomes. Results from 83 studies with 55,440 participants indicated that the weighted average correlation between higher online social comparison and greater body image concerns was significant ($r = .454$; 95 % CI = 0.409–0.498), as was the correlation between higher social comparison and eating disorder symptoms ($r = 0.36$; 95 % CI: 0.28–0.43). The mean association between higher social comparison and lower positive body image was also significant ($r = -0.242$; 95 % CI: -0.329 to -0.155). Meta-regression analysis revealed that the quality of studies, type of social media, country, type of social comparison, percentage of female participants moderated the associations. Findings revealed a moderate size association between higher online social comparison tendencies and worse body image and eating disorder symptoms outcomes, highlighting the need to develop interventions and policies to minimize appearance comparisons on social media.

1. Introduction

Social comparison theory (Festinger, 1954) posits that individuals compare themselves to others due to a need for self-evaluation. Within this comparison process, others can be viewed as better than oneself (i.e. upward social comparison), worse than oneself (i.e. downward social comparison), or equal (lateral comparison) (Buunk & Gibbons, 2007).

Prior evidence has highlighted that, in the majority of settings, most individuals tend to compare themselves to someone who outperforms them on the dimension of interest, resulting in lower self-appraisal, envy and a worsening of mood (Gerber et al., 2018). Recently, scholars have suggested that social media platforms can provide particularly salient opportunities for online social comparison (Verduyn et al., 2017), given the number of and ease of potential comparisons, including in terms of

* Corresponding author at: Department of Psychology, Educational Science and Human Movement, University of Palermo, Viale delle Scienze, Edificio 15, Palermo 90128, Italy.

E-mail address: rubiniaceleste.bonfanti@unipa.it (R.C. Bonfanti).

¹ <https://orcid.org/0000-0003-3119-7013>

² <https://orcid.org/0000-0002-5266-7443>

³ <https://orcid.org/0000-0003-2110-1655>

⁴ <https://orcid.org/0000-0002-6981-6273>

⁵ <https://orcid.org/0000-0001-5563-0323>

⁶ <https://orcid.org/0000-0001-9027-1899>

<https://doi.org/10.1016/j.bodyim.2024.101841>

Received 7 May 2024; Received in revised form 4 December 2024; Accepted 14 December 2024

Available online 24 December 2024

1740-1445/© 2024 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

appearance. Both cross-sectional and longitudinal research has supported that greater social media use was most strongly associated with comparisons between oneself and others that were evaluated as unfavorable (upwards) vs favorable or equal (Bonfanti et al., 2021; Appel et al., 2015; Fox & Vendemia, 2016; Schmuck et al., 2019; Vogel et al., 2014). There is also evidence that social comparison on social media (mostly Facebook) may represent an underlying mechanism explaining the negative effect of greater social media use on decreased individual well-being (de Vries et al., 2016; Yoon et al., 2019; Yang et al., 2019). Social media use has been shown to be particularly harmful for body image and related eating disorder symptoms in particular (de Valle et al., 2021; Fardouly & Vartanian, 2016; Mannino et al., 2021; Tigge-mann et al., 2018). Therefore, the present systematic review aimed to add to the current literature by summarizing the data regarding the association between social comparison on social media and body image concerns.

1.1. Online social comparison processes and body image

The increasing global use of social media has prompted research into the consequences of social media use on people's body image (McCabe et al., 2023; Rodgers et al., 2023; Saiphoo & Vahedi, 2019). Previous work has suggested that media-related factors such as exposure to, and internalization of, idealized images may contribute to body dissatisfaction and eating-related pathology (Stice et al., 1994) and highlighted the effects of appearance-related social comparison on body image (Schaefer & Thompson, 2018). More recent findings from reviews of the literature suggest that much of the negative effect of social media on body image is due to repeated exposure to idealized imagery portraying thin-and-toned (female) and lean-and-muscular (male) bodies that are positioned as appearance ideals (Rodgers et al., 2021; Saiphoo & Vahedi, 2019). Idealized appearance-focused content can foster the internalization of appearance ideals, self-objectification and lead to unfavourable upwards appearance comparisons (Vandenbosch et al., 2022). Indeed, a previous meta-analysis of experimental studies showed that exposure to social media appearance-ideal images had a moderate negative effect on body image (de Valle et al., 2021). A number of studies have similarly suggested that photo-based social media (e.g., Instagram) may particularly promote appearance comparison processes, which can in turn result in greater body dissatisfaction (Fardouly & Vartanian, 2016; Tigge-mann et al., 2018). Indeed, the pervasiveness of idealized images of bodies on social media may shift perceived appearance norms while fostering an impression of proximity and accessibility (Verduyn et al., 2020). Consistent with this, Instagram users have shown more appearance comparisons and body dissatisfaction than users of a non-visual platform (i.e. Twitter) (Engeln et al., 2020). Moreover, a recent review of experimental studies (Fioravanti et al., 2022) showed that viewing idealized photos on social media leads to increased body dissatisfaction among young people, and supported the role of appearance comparison as underlying these effects.

To date, substantial evidence of the relationship between higher appearance comparison on social media and higher body image concerns exists (Fardouly et al., 2015; Tigge-mann & Slater, 2013). Moreover, a recent review of the experimental literature documented a negative impact of exposure to upward comparison targets on mental health outcomes, including body image (McComb et al., 2023). Taken together, these research have highlighted an association between upwards appearance comparison and increased levels of body dissatisfaction, weight and shape preoccupation, appearance ideal internalization, and decreased levels of physical attractiveness, body-esteem and positive body image perceptions (Brown & Tigge-mann, 2016; De Vries & Kühne, 2015; Feingold & Mazzella, 1998; Leahey & Crowther, 2008; Meier & Gray, 2014). Thus, previous research has supported a relationship between engaging in social comparison on social media and increased body image concerns.

Notably, recent research has distinguished between negative body

image (feelings of body dissatisfaction, negative appraisals and behaviours aimed at changing the body) and positive body image. The latter is a multidimensional construct that refers to love, respect, and acceptance of one's body, and is aligned with an appreciation of the non-appearance dimensions of the body (Rodgers et al., 2021; Tylka & Wood-Barcalow, 2015). Furthermore, it is conceptualized as a distinct construct from negative body image and multifaceted, including body appreciation, body acceptance and respect, broadly conceptualizing beauty, body esteem, a self-worth that is not tied to appearance (Wood-Barcalow et al., 2024). A recent scoping review (Rodgers et al., 2021) investigated the types of social media content which can help to support positive body image, and showed that both images that do not contain individuals and images that portray appearances that diverge from appearance ideals were less detrimental to body image outcomes. Thus, the direction of comparison is important for understanding the effects of appearance comparison on body image. Idealized social media images can elicit upward appearance comparison and body dissatisfaction (Fardouly et al., 2017), whereas online comparisons with more realistic images depicting less thin and less attractive women can lead to greater body esteem and satisfaction (Tigge-mann & Anderberg, 2020).

Finally, it has also been highlighted that appearance comparison are associated with disordered eating behaviors (Corning et al., 2006; Saunders & Eaton, 2018; Stice & Whitenton, 2002), and thus this relationship has also been investigated in the context of social media (Fardouly & Vartanian, 2016; Rodgers & Melioli, 2016). As with traditional media, the highly edited images on social media expose users to unrealistic appearances (Fardouly et al., 2015), and comparisons to seemingly perfect or having more attractive bodies lead to desires for a different and thinner body, through weight loss behaviours and restriction (Fardouly et al., 2017). Moreover, it has been shown that the endorsement of appearance ideals for women was related to higher social comparison online and intentions to engage in extreme weight-loss behaviours (Lewallen et al., 2016). Individuals may go online to compare their own eating habits with the "successful" eating habits of celebrities, models, and #fitspiration profiles (Raggatt et al., 2018). When they engage in comparisons with unrealistic physical appearance or diet and exercise regimes, they tend to feel worse about themselves and their own appearance and try to reduce their weight by limiting their food consumption (Bonfanti et al., 2022; Joshi et al., 2004; Mills et al., 2002). Thus, evidence also exists for a relationship between appearance comparisons on social media and greater disordered eating behaviors (Holland & Tigge-mann, 2016).

Although prior studies have shown a relationship between higher engagement in appearance comparison and greater body image and ED symptoms, no previous research has provided a meta-analytic synthesis of the average size of association among these variables. A seminal meta-analysis documented the relationship between upward appearance comparisons and body dissatisfaction in women (Myers & Crowther, 2009), however, this study was not specific to social media comparisons. Similarly, McComb et al.'s (2023) review of the relationship between social comparison and mental health only included studies that induced social comparison via exposure to a manipulated upward comparison target, and its effects on body satisfaction/dissatisfaction, without examining positive body image and dysfunctional eating behaviors. Given that social media is a context of particular interest due to its high rates of use in everyday life, the saturation in idealized imagery, and the way in which platforms afford appearance comparison, increasing the understanding of the relationships among appearance comparisons and body image and eating variable specifically in the context of social media is an important research direction.

1.2. Overview of the current study

The aim of the present systematic review and meta-analysis was therefore to examine the mean association between online social comparison (general social comparison and physical appearance

comparison, upward and downward) and body image concerns, ED symptoms and positive body image, across several social media platforms and to identify potential moderators of these relationships. The current study expanded on previous recent reviews on the negative effect of social media use on body image outcomes (de Valle et al., 2021; Saiphoo & Vahedi, 2019) through focusing on the role of social comparison as an underlying mechanism. It was hypothesized that (a) higher levels of online social comparison would be associated with higher levels of both body image concerns and ED symptoms, and (b) higher online social comparison would be associated with lower levels of positive body image (i.e. body esteem, body appreciation, perceived attractiveness). These hypotheses were based on prior literature supporting the link between social media use and body image outcomes (de Valle et al., 2021; Fioravanti et al., 2022; Holland & Tiggemann, 2016). Based on the results of previous reviews (de Valle et al., 2021; Saiphoo & Vahedi, 2019), we examined the following variables as potential moderators of the correlation between body image and social comparison: type of social media, direction of comparison, study robustness, and percentage of female participants in each sample (see Data Analyses for more detail). Specifically, we predicted that studies investigating the relationships of interest on Instagram would have larger effect sizes than studies focusing on other platforms, because Instagram is the most highly used image-oriented social media platform (to the exclusion of video-based ones) (Eftekhari et al., 2014), and it is well documented that pictures may have a stronger influence on impressions of the body than words (Van Der Heide et al., 2012). Furthermore, based on previous literature (de Vries & Kühne, 2015) we predicted that in studies that measured upward social comparison (general and physical appearance) the relationship between such comparisons and higher body image concerns and ED symptoms would be stronger than in studies measuring downward or lateral comparison. Lastly, given previous evidence showing that women experience stronger appearance pressures and are exposed to more idealized imagery than their male counterparts (Grabe et al., 2008; McComb & Mills, 2021; Perloff, 2014), we predicted that the relationship between higher online social comparison and greater body image concerns and ED symptoms would be stronger in studies with higher percentages of female participants. Finally, we explored the role of the following additional moderator variables: country, BMI, year of publication and type of sample (above/under 18 years) without formulating specific hypotheses, given the lack of clear previous research evidence.

2. Methods

The review and meta-analysis were conducted according to the preferred reporting items for systematic reviews and meta-analyses (PRISMA) statement (Moher et al., 2015). The review protocol was registered with the International Prospective Register of Systematic Reviews (PROSPERO) (ID number: CRD42023401630).

2.1. Search strategy and study selection

A systematic and comprehensive search was performed using the following databases: PubMed/Medline, ISI Web of Science, PsychInfo, EMBASE, and SCOPUS. Searches were limited to studies published between 1 January 2008 and 31 June 2024. The search terms employed are described in [Supplementary Table 1](#). All empirical studies that investigated the association between social comparison processes (general social orientation and physical appearance comparison, upward and downward) on social media and: a) body image concerns (e.g., body image dissatisfaction, appearance evaluation, appearance orientation, overweight preoccupation, muscle ideal, thin ideal, internalization, internalize, sociocultural attitudes, media pressure, family pressure, peer appearance pressure, stereotypical beauty ideals, internalization of thinness, internalization of low body fat, internalization of the muscular body, internalization of the athletic body, drive for

muscularity, drive for leanness, body dissatisfaction, appearance concerns, appearance preoccupation, shape concerns, weight concern); b) eating disorders symptomatology (e.g., eating disorders, anorexia, bulimia, binge, orthorexia, vigorexia, bigorexia); and c) positive body image characteristics (e.g., body image satisfaction, body appreciation, body acceptance, body respect, body esteem) were considered eligible if they were: (1) original research articles, (2) reporting correlational quantitative data for the examined variables. Exclusion criteria were: (1) not being published empirical articles (e.g., conference paper, opinion paper, dissertation, case series or case report), and (2) not assessing the relationship between social comparison processes and target outcomes in the social media context (e.g., studies that have been conducted in real life and do not examine the effect on social media), (3) assessing the relationship between social comparison processes and target outcomes only after experimental manipulations, (4) papers related to eating disorders symptomatology and/or body image concerns on social media with no inclusion of social comparison.

2.2. Data extraction and analyses

Search results from each database were initially exported to EndNote and duplicates were identified and removed. Thereafter, records were manually screened for titles and abstracts, and irrelevant titles were excluded. Finally, full-text articles were checked for eligibility criteria, and references of included studies were manually screened to obtain additional articles. The following information from studies was extracted: authors, year of publication, country, research design, sample characteristics (country of the study, sample size, type of sample, mean age, percentage of female subjects, BMI), type of social media used, type of social comparison, data collection method, type of outcome measure, and study findings. In cases of missing data, authors of the included studies were contacted for additional information.

A meta-analysis was conducted to assess the association between social comparison processes on social media and positive body image characteristics, body image concerns and ED behaviours. Pearson correlation coefficients (r) between social comparison processes and positive body image, body image concerns and EDs behaviours were extracted to estimate pooled correlation with 95 % confidence interval (CI). The R^2 and β coefficients were converted to r (Peterson & Brown, 2005) when zero-order correlations were not available in the paper or upon request to authors. For the purposes of this review, we only examined correlations at baseline in studies with multiple assessment waves. Given the presence of several studies with multiple outcomes, when a study reported data on more than one association, and the conditions to apply the procedure were met (e.g., correlation for various similar outcome measures, same sample etc.), data were first aggregated on single study-level. To ensure the independence of the data, only one effect size per study was included in the analyses. This was only done when the measures were theoretically similar and therefore combinable, allowing us to aggregate correlations within a category (e.g. body image concerns), in which case the dependence of the data (Borenstein et al., 2009) was considered and set at $r = .75$, taking into account the theoretically very strong association between them, as determined by the strict criteria used to determine which outcomes to aggregate. Thus, only one effect size estimate per study was included in the analysis. All correlations were transformed to Fisher's z (using the formula in Cooper et al. (2019) for the combination, and transformed back to r coefficients for interpretation. Where measures were conceptually distinct or belonged to different categories (e.g. negative body image and eating disorder symptoms), separate effect sizes were analyzed independently.

A random-effect model with restricted maximum-likelihood (REML) was conducted. By using a random-effects model, we treated the observed effect sizes as being drawn from a distribution of true effects, rather than assuming that all studies share a common true effect. This allows the results to be more generalizable, as the model takes into account heterogeneity between studies, and is therefore more appropriate

when the studies included in the meta-analysis are not identical or perfectly comparable. Meta-regression analyses were performed to assess the influence of the following categorical/ordinal moderators: robustness of the studies (low, medium and high risk of bias), regional areas (Europe, America, Asia, Africa, Australia, Mixed), type of sample (adolescents and young adults), type of Social Media (Instagram, Instagram plus others, all except Instagram), comparison direction (no direction, upward, downward) as factor variables. The mean age and percentage of female participants, BMI and year of publication were evaluated as continuous moderating variables. Only outcomes with data available from at least $k = 3$ studies or samples were included for meta-analysis. Between-study heterogeneity was tested with the χ^2 -test (Cochrane's Q) and quantified using I-squared (I^2) statistics, assuming 0 %–25 %, 25 %–50 %, and 50 %–75 % I^2 values corresponding to low, moderate, and high heterogeneity, respectively (Higgins et al., 2003). Publication bias was assessed via visual examination of the funnel plot, looking for asymmetry that might suggest specific omission of non-significant results. Moreover, Egger's regression intercept (Egger et al., 1997) was used to assess publication bias. No extreme outliers were identified and therefore no outcomes were excluded in this analysis. All analyses were performed using Jamovi software 2.3.26 and JASP (Version 0.19.1; 2024).

2.3. Quality assessment and priori power analysis

The methodological quality of the included papers was assessed with a modified version of the Newcastle-Ottawa Scale (Wells et al., online)

for correlational studies with eight items (see [Supplementary Table 2](#) for a description of the domains of study quality). In the checklist, a maximum of nine points were awarded. Studies were evaluated to be at high risk of bias if scored equal or lower than four, at moderate risk of bias if scored five or six, and at low risk of bias if scored seven to nine. Quality assessment was conducted by RBC, AT and GA. Any divergence between reviewers was discussed until an agreement was reached, if needed the senior authors were consulted (GLC, SR, FM and RR). We conducted sensitivity analyses to confirm the robustness of findings by excluding approximated effect sizes, effect sizes set to zero (because of insufficient statistical information in the studies). Analyses were conducted grouping the outcomes in three sections considering the robust number of included studies. In addition, a priori-power calculation was conducted by applying the formulas illustrated in Cafri et al. (2010). We expected the effect size of the association between social comparison and both body image perception and ED behaviours to be $r = 0.2$, as an approximation of few of the most cited individual study results present in the literature (de Valle et al., 2021; Holland & Tiggemann, 2016). For each section, we expected to include 25 studies and expected the average sample size per study to be 150. Heterogeneity was expected to be high, while the power of the meta-analysis was estimated to be 0.99.

3. Results

A total of 1122 records were identified through databases and manual search (see the flow diagram in Fig. 1). After removing duplicates, 830 remaining titles and abstracts were screened, and 289 full-text

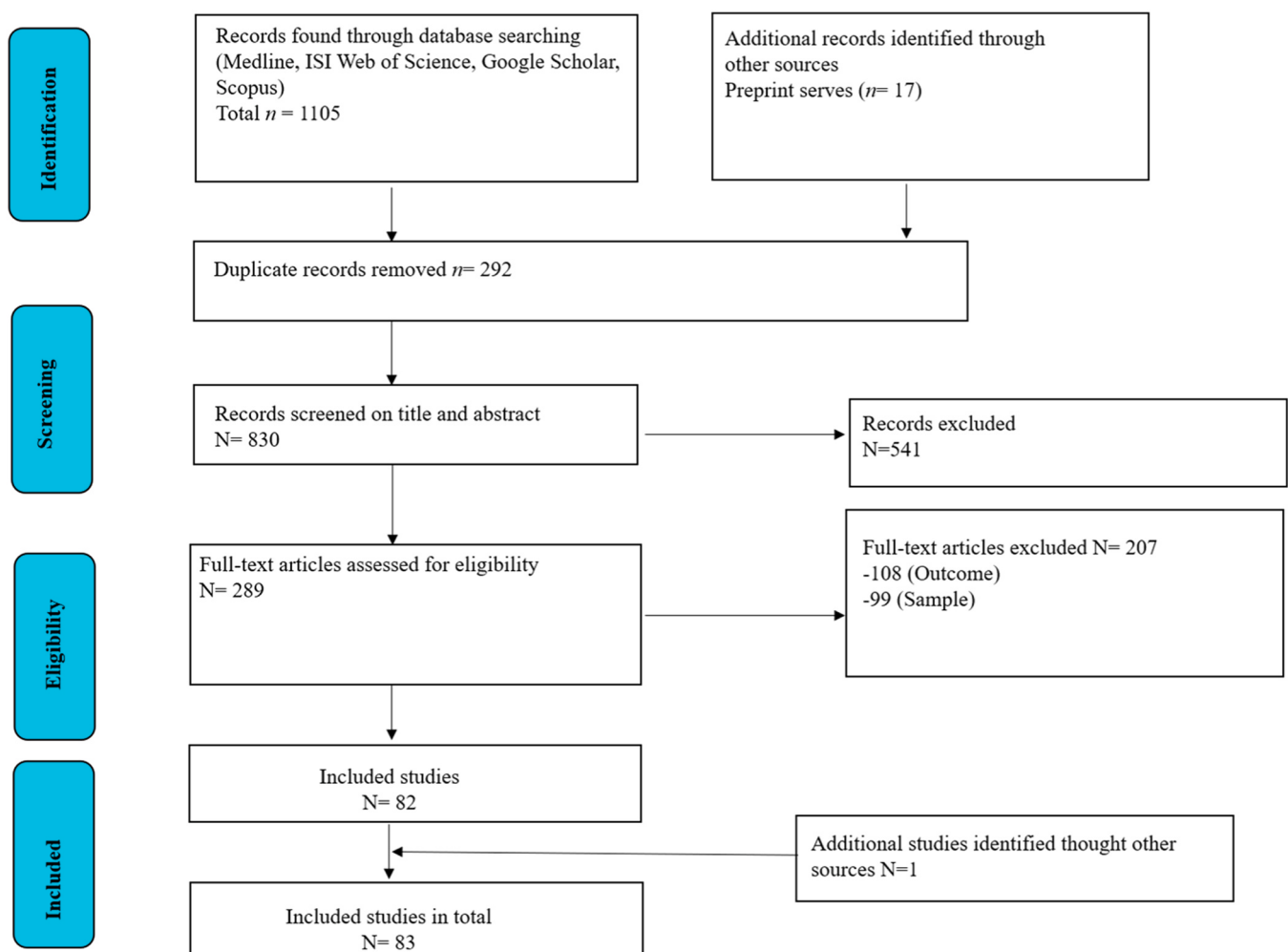


Fig. 1. Preferred reporting items for systematic reviews and meta-analyses (PRISMA) flowchart of study selection.

articles were assessed for eligibility. Finally, 83 articles met the inclusion criteria and were included in quantitative analyses.

3.1. Quality appraisal

Supplementary Table 2 shows the quality ratings of the included studies. Eighteen percent were evaluated as presenting a low risk of bias, 58 % a medium risk of bias, and a 24 % a high risk of bias. Most studies revealed a high selection bias, with 67.4 % of the studies presenting inadequate recruitment strategies (e.g., convenience sample), and 75.9 % reporting unjustified or unsatisfactory sample size (e.g. not supported by a power calculation). All the studies used validated tools to assess the outcome and provided appropriate statistical tests (i.e., includes both the statistics and p value/ 95 % CI). A total of 43.3 % of studies controlled the analysis for basic socio-demographic variables and another 41 % for additional potential confounders (e.g., Body Mass Index).

3.2. Characteristics of the studies

The characteristics of the included articles are reported in Supplementary Table 3. The total sample included 55,440 participants, ($F\%$ = 85.61 %; mean age = 19.38 (SD = 5.4), range 12.69–35.79), and a mean BMI = 22.75 (SD = 2.32) (range 19.05–27.77). Central tendency statistics of the variables included in the meta-regression were: Type of sample (mode = young adults, 78 %), Risk of Bias (median = medium, 57 %), Comparison direction (mode = no direction, 84.2 %), Country of the study (mode = America, 32.2 %), Type of social media (mode = all, 37.4). The majority of studies, n = 63 (90 %) included young adult participants belonging to the general population. For readability, results are reported in three separate sections, according to type of outcome: (a) studies examining the association between social comparison and body image concerns; (b) studies examining the association between social comparison processes and ED behaviours; and (c) studies examining the association between social comparison processes and positive body image.

3.3. Association between social comparison and body image concerns

Sixty-three studies examined the relationship between social comparison processes and body image concerns (see Supplementary Figure 1). A total of K = 150 observed correlations were retrieved from the studies. Consequently, one hundred-nineteen outcomes were included in the meta-analysis after aggregation of dependent outcomes (Borenstein et al., 2009). The observed correlation coefficients ranged from r = -.67 to .99, with the majority of estimates being positive (96 %) (see Supplementary Figure 1). Overall, the weighted average correlation coefficient based on the random-effects model showed a medium positive correlation between social comparison processes and body image concerns. Specifically, the average outcome differed significantly from zero (z = 20.05, p < .001) and with an estimated effect of r = .454 (95 % CI = 0.409–0.498) (see Table 1). Both the rank correlation and the regression test indicated potential funnel plot asymmetry (T = 0.277 p < .001 and Z = -2.84 p < .001, respectively), but the visual assessment of the funnel plot (see Supplementary Figure 2) showed that most of the divergent cases were the aggregate ones (because of the extremely low SE). To be conservative, all of these bias checks were run on the full sample (K = 126) and no distortions were evident.

An examination of the studentized residuals revealed that two studies (Jarman et al. (2021).1; Vartanian et al., 2023.3) had values larger than $\pm$ 3.5271 and may be potential outliers in the context of this model. According to the Cook's distances, several studies (Burke and Rains (2018).4; Hai and Yang (2022).2; Jarman et al. (2021).1; Wang et al. (2022).1; Vartanian et al., 2023.3) could be seen as overly influential.

The true outcomes appeared to be heterogeneous, $Q(118)$

Table 1
Association between online social comparison and body image concerns, eating symptoms and positive body image.

Outcome					
Domain	K	ES (95 % CI)	p	Q (p)	I ²
Online social comparison and body image concerns	119	0.454 (0.409; 0.498)	<.001	(118) = 33522.688 (<.001)	99.65 %
Online social comparison and eating symptoms	29	0.355 (0.278; 0.432)	<.001	(28) = 651.006 (<.001)	95.32 %
Online social comparison and positive body image	60	-0.242 (-0.329; -0.155)	<.001	(59) = 4235.691 (<.001)	98.47 %

Note: The table shows that online social comparison is moderately associated with increased body image concerns (ES = 0.464) and eating symptoms (ES = 0.355), and is negatively linked to positive body image (ES = -0.242). All relationships are statistically significant (p < .001). However, the high heterogeneity (I^2 = 95.32–99.70 %) suggests substantial variability across studies, likely due to differing methodologies or populations. These findings highlight the importance of understanding the nuanced effects of online social comparison on body image and related behaviors.

= 33522.68, p < 0.01, τ^2 = 0.05, I^2 = 99.65 %. A 95 % prediction interval for the outcome parameter was estimated to be -0.0227–0.9309. Hence, even though some heterogeneity may have existed, the true outcomes of the studies were generally in the same direction as the estimated average outcome (Table 1; Supplementary Figure 2). An examination of the studentized residuals revealed that two studies (Jarman et al. (2021).1; Vartanian et al., 2023.3) had values larger than $\pm$ 3.5271 and may be potential outliers in this model. According to the Cook's distances, several studies (Burke and Rains (2018).4; Hai and Yang (2022).2; Jarman et al. (2021).1; Wang et al. (2022).1; Vartanian et al. (2023).3) might also be overly influential. Considering the substantial number of studies within this group and the pronounced heterogeneity, a subgroup analysis was executed. This analysis differentiated between studies assessing general social comparison outcomes and those assessing appearance comparison specifically, to examine differences in the strength of the relationship according to type of social comparison (Richardson et al., 2019). However, the divergence in the pooled effect estimates across each subgroup did not reach statistical significance (Z = -0.76, p = 0.44). Consequently, it can be inferred that the type of comparison did not modify the weighted average correlation coefficient.

The multiple meta-regression did not determine a statistically significant model, $Q(14)$ = 19.753 p = .138), as detailed in Supplementary Table 4. In fact, the only moderator that revealed a significant influence on the association between social comparison processes and body image concerns was gender ratio. The analysis revealed that the association between social comparison and body image concerns was stronger in studies including a higher ratio of female participants (z = 2.666, p = .008). The variance of true effects about the regression line (τ^2) was 0.059, and the standard deviation of true effects around the regression line (τ) was 0.243. The I^2 statistic was 98.04, meaning that about 98 % of the observed variance about the regression line reflected variation in true effects rather than sampling error. The test for heterogeneity yielded a Q -value of 2222.43 (df = 33, p < 0.001). Thus, the predictors in the model did not explain the variation in effects.

3.4. Association between social comparison and ED symptoms

Nineteen studies examined the relationship between social comparison processes and ED (eating disorder) symptoms, with a total of k = 29 outcomes included in the analysis. The observed correlation coefficients

ranged from $r = -0.12$ – 0.71 , with the majority of estimates being positive (93 %), as illustrated in the forest plot (Supplementary Figure 3). The estimated average correlation coefficient, based on the random-effects model, was $r = 0.36$ (95 % CI: 0.28 – 0.43), which differed significantly from zero ($z = 9.05$, $p < .001$) (Table 1). Neither the rank correlation test nor the regression test indicated any funnel plot asymmetry ($p = 0.34$ and $p = 0.11$, respectively). Similar findings were obtained from a visual examination of the funnel plot (Supplementary Figure 4), although the outcomes plotted by SE did not follow the expected pyramidal distribution.

The Q-test suggested that the true outcomes were heterogeneous, $Q(28) = 651$, $p < 0.001$, $\tau^2 = 0.04$, $I^2 = 95.32$ %. Additionally, the 95 % prediction interval for true outcomes indicated variability, ranging from -0.06 to 0.77 (Table 1; Supplementary Figure 4). An examination of the studentized residuals revealed no values larger than ± 3.13 , indicating no outliers in the model. Cook's distances showed that none of the studies were overly influential. A test of the model yielded a Q-value of 261.230 ($p < .001$), indicating that the variation of observed effects about the regression line could not be explained by sampling error alone.

The predictor variables were significantly related to the magnitude of the correlation between social comparison processes and eating disorder (ED) symptoms, contributing to the explained variance in the model (see Supplementary Table 5). Specifically, studies that focused on "Instagram and others" social media platforms and those with a low risk of bias showed stronger positive associations ($z = 3.466$, $p < .001$, and $z = 2.386$, $p = .017$, respectively). Likewise, studies examining "upward" social comparisons revealed a stronger positive correlation ($z = -4.02$, $p = .001$) (see Supplementary Table 5). The variance of true effects about the regression line (τ^2) was 0.016 , and the standard deviation of true effects about the regression line (τ) was 0.125 . The I^2 statistic indicated that about 88.34 % of the observed variance about the regression line reflected variation in true effects rather than sampling error. In this case BMI and country of the studies were not included as predictors due to missing data and multi-collinearity. The test for heterogeneity yielded a Q-value of 10.437 ($p < 0.001$), suggesting that the model fully explained the variation in effects. The R^2 analog was 0.619 , indicating that the model explained about 62 % of the variance in true effects.

3.5. Association between social comparison and positive body image characteristics

Thirty-nine studies examined the association between social comparison processes and positive body image (Supplementary Figure 5). A total of $K = 60$ observed correlations were included in the analysis. The estimated average correlation coefficient based on the random-effects model was $r = -0.242$ (95 % CI: -0.329 to -0.155) supporting the hypothesis of a negative correlation (i.e. higher social comparison is associated with lower positive body image) since the average outcome differed significantly from zero ($z = -5.45$, $p < 0.001$) (Table 1). Nevertheless, according to the Q-test, the true outcomes appear to be heterogeneous ($Q(59) = 4235.69$, $p < 0.001$; $\tau^2 = 0.115$; $I^2 = 98.47$ %; 95 % CI: 97.86 – 98.97). The rank correlation test indicated funnel plot asymmetry ($p = 0.018$) but not the regression test ($p = 0.624$). Visual assessment of the funnel plot (Supplementary Figure 6) suggested that the asymmetry was mostly present among studies with lower SE (i.e., more numerous sample) with few very positive observed outcomes (around 0.5). Although a skewed funnel plot and discordant statistics are unclear in their implications, the possibility of publication bias should not be excluded.

An examination of the studentized residuals revealed that none of the studies had a value larger than ± 3.267 and hence there was no indication of outliers in this model. Similarly, according to Cook's distances, none of the studies seem overly influential. Supplementary Table 6 shows the results of the moderator analysis. A test of the model yielded a Q-value of 94.154 ($df = 14$; $p < .001$), i. e. the variation of observed

effects about the regression line did not fall within the range that could be explained by sampling error alone. The following moderators significant modified the association between higher social comparison processes and lower positive body image (see Supplementary Table 6): year of publication, average age of participants, type of social media and country. Specifically, the type of social media assessed resulted as a relevant moderator of the relationship between social comparison and lower positive body image, as the category of "All except IG" determined a stronger negative association ($z = 3.107$ and $p = .002$). Moreover, a significantly stronger negative association between social comparison and positive body image ($z = 1.989$, $p = .047$) was found in more recently published studies and in studies with older participants ($z = 2.229$, $p = .026$). Finally, the negative association between social comparison and positive body image was stronger in studies conducted in America, Australia and Asia than those from European countries (see Supplementary Table 6). The variance of true effects about the regression line (τ^2) was 0.017 , and the standard deviation of true effects about the regression line (τ) was 0.129 . The I^2 statistic was 93.74 , which tells us that about 93.74 % of the observed variance about the regression line reflected variation in true effects rather than sampling error. The test for heterogeneity yielded a Q-value of 500.606 ($p < 0.001$) and the model partially explained the variation in effects. The R^2 analog was 0.861 , meaning that the model explained 86,1 % of the variance in true effects.

4. Discussion

Social media platforms have become an important context for people's social behavior, providing multiple opportunities for online social comparison (Fardouly & Vartanian, 2016; Verduyn et al., 2017), particularly while viewing others' photos and posts. The current meta-analysis is the first to estimate the mean association between online social comparison and body image and eating outcomes. The results showed moderate associations between higher social comparison on social media, and higher body image concerns and ED behaviours, and small associations with low positive body image. These findings are consistent with prior evidence showing that social media use can facilitate unfavourable social comparison processes, which may in turn lead to negative psychological outcomes (Appel et al., 2016; de Vries et al., 2018; Feinstein et al., 2013).

Prior research has consistently found that social media use is associated with high levels of body image concerns, such as body dissatisfaction, overweight preoccupation, appearance concerns, and disordered eating (De Vries et al., 2016; Fardouly & Vartanian, 2016; Huang et al., 2021; Meier & Gray, 2014; Tiggemann & Slater, 2014). One of the mechanisms understood to account for these harmful effects is social comparison as social media facilitates appearance comparisons with peers, media celebrities, and influencers (de Valle et al., 2021; Fioravanti et al., 2022; Tiggemann & Zaccardo, 2015). Indeed, social media content disproportionately portrays idealized and unrealistic content that may be interpreted as appropriate comparison targets (Cohen et al., 2017; Vogel et al., 2015). Our findings provide additional support for the association between higher social comparisons on social media and poor body image and extend previous work showing that social comparison may increase the risk for negative impacts of social media on body image (de Valle et al., 2021).

The current study also documented a moderate effect relationship between greater online social comparison and higher ED behaviors. This result is in line with previous evidence supporting an association between higher body-related social comparison and greater disordered eating behaviors such as binge eating or dietary restrictions (Fitzsimmons-Craft, 2011; Rodgers et al., 2011). In addition, some prior research using ecological momentary assessment has suggested that social comparison orientation may be associated with later disordered eating thoughts and behaviors in the natural environment, and that body comparisons may predict certain disordered eating thoughts (i.e., thoughts about restriction and exercise) (Fitzsimmons-Craft et al.,

2015). Moreover, prior research has suggested that individuals may compare their own eating behaviors and consumption to that of others and draw conclusions from these comparisons about how much they should eat (Polivy, 2017). Our findings add to this literature by highlighting the potential negative association between social comparison and eating disorder symptoms such as disordered eating, shape and weight concerns, eating concerns, in the context of social media. However, the correlational nature of the included studies prevents us from establishing causal links. A fundamental tenet of social comparison theory is that self-uncertainty heightens the drive to compare oneself with others (Festinger, 1954). Prior research has shown that women with greater eating concerns are more likely to experience negative reactions to upward and downward comparison in terms of eating attitudes and body dissatisfaction (Laker & Waller, 2022). Thus, it may also be that individuals with ED symptoms who have distorted self-perceptions and inaccuracies regarding their own bodies may report greater online appearance comparison with targets perceived as better looking (Corning et al., 2006). Thus, further longitudinal or experimental research is necessary to clarify the nature and direction of these relationships.

Finally, the findings from this meta-analysis revealed that online social comparison was associated with lower levels of positive body image. This is consistent with previous research that has suggested that higher appearance media consumption was related to lower body appreciation and that social comparison might mediate this relationship (Andrew et al., 2016). Viewing online images that emphasize the thin ideal may lead to higher body dissatisfaction (De Vries et al., 2016; Tiggemann et al., 2018). Thus, it is likely that comparing oneself to idealized images on social media is associated with fewer positive feelings about one's body. However, our moderation analysis showed that on social media other than Instagram (e.g., Facebook, TikTok or YouTube) the link between higher social comparison and lower levels of positive body image was stronger than on Instagram, suggesting that social comparison processes which take place on Instagram may be less detrimental for body appreciation and satisfaction. Short-narrative stories and reels have become the most popular content format on Instagram, with the greatest reach, but their impact on positive body image has been under-researched to date. A recent scoping review suggested that visual content such as images that do not contain individuals and images that portray appearances that diverge from appearance ideals may be capable of supporting positive body image (Rodgers et al., 2021). Furthermore, an experimental study of women exposed to 'Instagram vs. Reality' images (i.e. containing side-by-side photographs of the same woman, one an idealized representation and the other a more natural representation) showed that appearance comparison predicted a decrease in body appreciation in response to viewing the ideal images on Instagram, but not in response to viewing real or paired images (Tiggemann et al., 2020). Thus, further research is needed to investigate whether some types of social media content containing images of individuals may be less detrimental to body appreciation (Nelson et al., 2022).

Our meta-regression results suggested that studies involving a higher percentage of female participants showed a stronger relationship between online social comparison and body image concerns. Although prior studies have suggested that the relationship between the use of photo-based social media and dysfunctional body image was similar across gender (Åberg et al., 2020), the negative impact of online social comparison processes on body image could be more detrimental in women than men, possibly because girls and women seem more strongly embedded in appearance culture (Karazsia et al., 2017; Thompson et al., 1999). However, it is worth noting that the studies included in this meta-analysis recruited a disproportionate number of female participants and more research focusing on the relationship between online social comparison and body image among men, and other genders, is warranted to examine gender effects. Our findings are in line with those reported in the review by de Valle et al. (2021), which found that the

majority of included samples were female, and it remains unclear whether a sample with a very high proportion of female participants might inflate the effects for the association between social comparison and body image concerns.

Regarding the role of upward and downward comparison processes, we only found a significant moderating effect of the upward comparison in the association between online social comparison and eating symptoms, consistent with previous literature showing that upward social comparison has negative consequences on body dissatisfaction rather than downward comparison (Fox & Vendemia, 2016; van den Berg & Thompson, 2007). Upward comparisons to "ideal" social media images have been shown to be detrimental to body dissatisfaction (Fardouly et al., 2017), and our results suggest that they may also have a negative impact on eating disorder symptoms. Contrary to our hypotheses, we found that the relationship between higher social comparison and greater eating symptoms was stronger in studies that examined social media in general compared to unique Instagram use. Although previous studies have shown that users of Instagram may experience more appearance-related pressures as compared to those who use only Facebook (Åberg et al., 2020; Engeln et al., 2020), new popular platforms such as Snapchat, TikTok or Tinder have been extensively used in the past years and it is likely that they offer a platform for engaging in appearance-related social comparisons. For example, the TikTok app is one of the video-based social media platforms that is currently increasing in popularity and commonly used by teenagers (Bossen & Kottasz, 2020). Concerns have been raised that some videos on this platform may feature content that is likely to contribute to body dissatisfaction and dysfunctional eating behaviours, as individuals may find it difficult to distinguish between unrealistic portrayals and reality (Ibn Auf et al., 2023; Klug et al., 2022). Thus, future research focusing on social comparison on specific social media platforms, and its impact on body dissatisfaction and dysfunctional eating is needed (Valkenburg et al., 2022). The type of comparison (appearance or general) did not moderate the relationship between social comparison and body image concerns. However, almost all of the included studies examined trait components of comparison (i.e., the general tendency to engage in social comparison or appearance comparison), and it cannot be excluded that experimental research focusing on state comparisons (i.e., engaging in social comparison while viewing images) might yield a different pattern of findings.

Our findings revealed no differences in the relationship between social comparison and body image concerns across geographic areas. However, regarding the relationship between higher online social comparison and lower levels of positive body image, we found that studies conducted in Asia, Australia and North America have revealed stronger effects, suggesting that individuals in those countries are most susceptible to poor positive body image when engaging in high social comparison on social media. Overall, although some studies have suggested that the frequency of social comparison on social media may vary across countries, with, for example, Facebook comparisons more likely to occur in Eastern (more collectivist) than Western (more individualist) countries (Burke et al., 2020), systematic evidence on the role of cultural differences for the relationship between social media use and body image is still lacking (Vandenbosch et al., 2022). Neither participants' age nor developmental period (adolescents/young adults) moderated the relationship between social comparison and body image concerns and ED symptoms, suggesting that this association appears to be similar across age groups. Overall, these findings align with prior evidence suggesting that nuanced conclusions about the impact of general social media use on well-being, particularly within specific age groups such as adolescents or older individuals, have been limited (Valkenburg et al., 2022). The current findings differ, however, from those reported in a previous meta-analysis (Myers & Crowther, 2009), which found that the association between social comparison and body image dissatisfaction was inversely related to age. However, that previous meta-analysis did not focus on social comparison in social media.

Many individuals develop a more positive body image as they move towards emerging adulthood, likely due to increasingly stable sense of self and critical awareness of unrealistic appearance ideals (Gattario & Frisen, 2019). The finding that the relationship between social comparison and lower positive body image was strongest in order individuals may therefore suggest that engaging in such comparisons is more normative and potentially developmentally appropriate in younger people, and a signal of more problematic body image in older ones.

It is worth noting that the studies in the current meta-analysis do not have a large age range and it is possibly due to the fact that social media are primarily popular among young people. Our findings appear to be consistent with those reported in the review by de Valle et al. (2021) and Ryding and Kuss (2020), which also included participants with a restricted age range. However, given the prevalence of social media use at different developmental stages, research on the association between online social comparison and body image with samples other than adolescents and emerging adults is strongly recommended.

Finally, it should be noted that many studies in this area have not examined direct correlations between appearance comparisons and body image or eating behavior outcomes, but included social comparisons as a mediator or moderating variable. For example, the Tripartite Influence model (Thompson et al., 1999) posits that appearance comparison tendencies (along with the internalization of the societal ideals of appearance) represents a mediator connecting social pressures from peers, family and media and body image and eating dysfunction (Keery et al., 2004; van den Berg et al., 2002; Rodgers et al., 2015). There is evidence that this model may be usefully applied to the influence of social media. For example, it was shown that girls who were exposed to retouched Instagram selfies showed worse body image and this effect was stronger for girls who reported higher social comparison tendencies (Kleemans et al., 2016). Furthermore, appearance comparisons to peers on Facebook mediated the relationship between Facebook usage and women's body image concerns (Fardouly & Vartanian, 2015). It was also shown that comparisons to celebrities on Instagram mediated the relationship between Instagram usage and self-objectification among young women (Fardouly et al., 2017). Although the current meta-analysis supports a small to moderate direct association between online social comparison and body image and eating symptoms, further research is needed to address the complex relationships between social media social comparison and body image by disentangling the direct and indirect effects (Jarman et al., 2021).

4.1. Strengths and limitations

This systematic review and meta-analysis presents several strengths. To the authors' knowledge, this is the first comprehensive, quantitative review to isolate a specific aspect of social network sites usage, namely online social comparison, (Choukas-Bradley et al., 2022; de Valle et al., 2021), or only addressed a single component of body image (Saiphoo & Vahedi, 2019). Though our systematic review and meta-analysis fills a gap the extant literature, it is also characterized by certain limitations. Firstly, the analysis only included cross-sectional and correlational studies, thus limiting the possibility of inferring causality. Consequently, it is not possible to interpret whether higher tendency to engage in online social comparison results in greater body image concerns, ED behaviours and lower positive body image, or if pre-existing body image concerns and ED behaviors may lead to heightened tendencies to online social comparison. Secondly, it cannot be excluded that other variables that were not included in this analysis may have an impact on the association between social comparison and body image outcomes. Therefore, it is possible that these estimations may be influenced by additional dimensions that were not assessed here. For example, viewing others' selfies or engaging in photo-editing can heighten the risk of appearance comparison and body image concerns (McGovern et al., 2022; Zimmer-Gembeck et al., 2021). Further studies are needed to

explore whether specific body-related online activities can offer up an ideal *milieu* for social comparison to take place. In addition, almost all included studies measured the association between trait appearance comparison and body image outcomes, but further studies should provide a clearer picture of the associations between body image and the different components of online appearance comparison, such as trait (i.e., the general tendency to engage in social comparison) and state comparison (i.e., engaging in social comparison while viewing images). Future research using more sophisticated longitudinal assessments (e.g., Ecological Momentary Assessment or Experience Sampling Method) may provide further insights into the relationship between state social comparison and everyday experiences of body image concerns. Regarding the moderator analysis, only moderator variables with a sufficient number of studies were included in the analyses, but further research is needed to explore the role of additional variables, such as trait-state appearance comparisons, appearance self-monitoring, and types of appearance comparison targets (Fardouly et al., 2018; Fuller-Tyszkiewicz et al., 2019; Tiggemann et al., 2020). Finally, the high representation of young adult and female participants in the majority of the studies makes unclear whether the effects of online social comparison processes may differ in older samples, males, or people of diverse genders.

5. Conclusion

In conclusion, the results of this meta-analysis suggest that higher online social comparison is associated with greater body image concerns, ED behaviors and lower levels of positive body image. Although Holland and Tiggemann (2016) suggested that appearance-based social comparison may be an important underlying factor in the relationship between social media use and body image, the current study is the first to provide a small to moderate estimate of the strength of the association between greater online social comparison and higher body image concerns and ED behaviors. Consistent with previous meta-analyses of the association between social media use and body image (de Valle et al., 2021; Saiphoo & Vahedi, 2019), the effects are not large, suggesting that a complex matrix of bidirectional relationships should be explored in future research (Vandenbosch et al., 2022), particularly the role of appearance comparison as a mediator between social media use, body image, and dysfunctional eating behaviours. The adoption of prospective or experimental research designs (de Valle et al., 2021; Maes & Vandenbosch, 2022) can help to address the question of causation between online social comparison and body image outcomes. Moreover, research that can account for differences in social media use, as well as inter-individual characteristics that may modulate the likely bidirectional relationships among social media use and body image and eating outcomes is needed.

CRedit authorship contribution statement

Rachel Rodgers: Writing – review & editing, Conceptualization. **Gianluca Lo Coco:** Writing – review & editing, Writing – original draft, Validation, Data curation, Conceptualization. **Rubinia Celeste Bonfanti:** Writing – review & editing, Writing – original draft, Data curation, Conceptualization. **Francesco Melchiorri:** Writing – review & editing, Software, Methodology. **Arianna Teti:** Writing – review & editing, Data curation. **Gaia Albano:** Data curation. **Stéphane Raffard:** Writing – review & editing, Conceptualization.

Ethics

The study was conducted in accordance with the ethical standards of the Italian Psychological Association (AIP), as well as the Helsinki Declaration of 1975 and its later amendments.

Compliance with ethical standards

None.

Funding

No funding was received for conducting this study.

Declaration of Competing Interest

The authors declare no conflict of interest.

Acknowledgments

We thank all participants.

Author contributions

R.C.B, R. R., S. R. and G. L. contributed to the study conception and design. Material preparation and data collection were performed by R.C. B, A. T. and G.A. Analyses were performed by F. M. The first draft of the manuscript was written by R.C.B, R. R., S. R. and G. L. and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at [doi:10.1016/j.bodyim.2024.101841](https://doi.org/10.1016/j.bodyim.2024.101841).

Data availability

Data will be made available on request.

References*

- Aberg, E., Koivula, A., Kukkonen, I., et al. (2020). A feminine burden of perfection? Appearance-related pressures on social networking sites. *Telematics and Informatics*, 46, Article 101319. <https://doi.org/10.1016/j.tele.2019.101319>
- (*) Acar, M., Akgul, S., Kizilkan, M. P., Tuzun, Z., Derman, O., & Kanbur, N. (2020). 115. Eating attitudes and physical appearance comparison with others in daily life versus on social media in adolescents. *Journal of Adolescent Health*, 66(2), S59–S60. <https://doi.org/10.1016/j.jadohealth.2019.11.118>
- Andrew, R., Tiggemann, M., & Clark, L. (2016). Predicting body appreciation in young women: An integrated model of positive body image. *Body Image*, 18, 34–42. <https://doi.org/10.1016/j.bodyim.2016.04.003>
- Appel, H., Crusius, J., & Gerlach, A. L. (2015). Social comparison, envy, and depression on Facebook: A study looking at the effects of high comparison standards on depressed individuals. *Journal of Social and Clinical Psychology*, 34(4), 277–289. <https://doi.org/10.1521/jscp.2015.34.4.277>
- Appel, H., Gerlach, A. L., & Crusius, J. (2016). Social Comparison, envy, and depression on Facebook: A study looking at the effects of high comparison standards on depressed individuals. *Journal of Social and Clinical Psychology*, 34(4), 277–289. <https://doi.org/10.1521/jscp.2015.34.4.277>
- Bonfanti, R. C., Lo Coco, G., & Ruggieri, S. (2021). Social comparison on Facebook and its effects on individual's well-being. In W. J. Kahn (Ed.), *Social media in the 21st century* (pp. 43–83). New York: Nova Science Publishers.
- Bonfanti, R. C., Lo Coco, G., Salerno, L., & Di Blasi, M. (2022). The thin ideal and attitudes towards appearance as correlates of exercise addiction among sporty people during the COVID-19 pandemic. *Behavioral Sciences*, 12(6), 187. <https://doi.org/10.3390/bs12060187>
- Borenstein, M., Hedges, L. V., Higgins, J. P. T., & Rothstein, H. (2009). *An Introduction to Meta-Analysis*. John Wiley & Sons.
- Bossen, C. B., & Kottasz, R. (2020). Uses and gratifications sought by pre-adolescent and adolescent TikTok consumers. *Young Consumers*, 21(4), 463–478. <https://doi.org/10.1108/yc-07-2020-1186>
- Brown, Z., & Tiggemann, M. (2016). Attractive celebrity and peer images on Instagram: Effect on women's mood and body image. *Body Image*, 19, 37–43. <https://doi.org/10.1016/j.bodyim.2016.08.007>
- Burke, M., Cheng, J., & de Gant, B. (2020). *Social comparison and Facebook: feedback, positivity, and opportunities for comparison*. Proceedings of the 2020 CHI conference on human factors in computing systems, Honolulu HI USA.
- (*) Burke, T. J., & Rains, S. A. (2018). The paradoxical outcomes of observing others' exercise behavior on social network sites: Friends' exercise posts, exercise attitudes, and weight concern. *Health Communication*, 34(4), 475–483. <https://doi.org/10.1080/10410236.2018.1428404>
- Buunk, A. P., & Gibbons, F. X. (2007). Social comparison: The end of a theory and the emergence of a field. *Organizational Behaviour and Human Decision Processes*, 102(1), 3–21. <https://doi.org/10.1016/j.obhdp.2006.09.007>
- Cafri, G., Kromrey, J. D., & Brannick, M. T. (2010). A meta-meta-analysis: Empirical review of statistical power, type I error rates, effect sizes, and model selection of meta-analyses published in psychology. *Multivariate Behavioral Research*, 45(2), 239–270. <https://doi.org/10.1080/00273171003680187>
- Choukas-Bradley, S., Maheux, A. J., Roberts, S. R., Hutchinson, E. A., Lu, C., Ladouceur, C. D., & Silk, J. S. (2022). Picture perfect during a pandemic? Body image concerns and depressive symptoms in U.S. Adolescent Girls During the COVID-19 Lockdown. *Journal of Children and Media*, 16(4), 481–492. <https://doi.org/10.1080/17482798.2022.2039255>
- (*) Cohen, R., Newton-John, T., & Slater, A. (2017). The relationship between Facebook and Instagram appearance-focused activities and body image concerns in young women. *Body Image*, 23, 183–187. <https://doi.org/10.1016/j.bodyim.2017.10.002>
- Cooper, J. O., Heron, T. E., & Heward, W. L. (2019). *Applied Behavior Analysis* (3rd Edition). Hoboken, NJ: Pearson Education.
- Corning, A. F., Krumm, A. J., & Smitham, L. A. (2006). Differential social comparison processes in women with and without eating disorder symptoms. *Journal of Counseling Psychology*, 53(3), 338–349. <https://doi.org/10.1037/0022-0167.53.3.338>
- de Valle, M. K., Gallego-García, M., Williamson, P., & Wade, T. D. (2021). Social media, body image, and the question of causation: Meta-analyses of experimental and longitudinal evidence. *Body Image*, 39, 276–292. <https://doi.org/10.1016/j.bodyim.2021.10.001>
- (*) de Vries, D. A., & Kühne, R. (2015). Facebook and self-perception: Individual susceptibility to negative social comparison on Facebook. *Personality and Individual Differences*, 86, 217–221. <https://doi.org/10.1016/j.paid.2015.05.029>
- de Vries, D. A., Möller, A. M., Wieringa, M. S., Eigenraam, A. W., & Hamelink, K. (2018). Social comparison as the thief of joy: Emotional consequences of viewing strangers' Instagram posts. *Media Psychology*, 21(2), 222–245. <https://doi.org/10.1080/15213269.2016.1267647>
- de Vries, D. A., Peter, J., de Graaf, H., & Nikken, P. (2016). Adolescents' social network site use, peer appearance-related feedback, and body dissatisfaction: Testing a mediation model. *Journal of Youth and Adolescence*, 45(1), 211–224. <https://doi.org/10.1007/s10964-015-0266-4>
- Eftekhar, A., Fullwood, C., & Morris, N. (2014). Capturing personality from Facebook photos and photo-related activities: How much exposure do you need? *Computers in Human Behavior*, 37, 162–170. <https://doi.org/10.1016/j.chb.2014.04.048>
- Egger, M., Davey Smith, G., Schneider, M., & Minder, C. (1997). Bias in meta-analysis detected by a simple, graphical test. *BMJ*, 315(7109), 629–634. <https://doi.org/10.1136/bmj.315.7109.629>
- Engeln, R., Loach, R., Imundo, M. N., & Zola, A. (2020). Compared to Facebook, Instagram use causes more appearance comparison and lower body satisfaction in college women. *Body Image*, 34, 38–45. <https://doi.org/10.1016/j.bodyim.2020.04.007>
- (*) Fardouly, J., Diedrichs, P. C., Vartanian, L. R., & Halliwell, E. (2015). Social comparisons on social media: The impact of Facebook on young women's body image concerns and mood. *Body Image*, 13, 38–45. <https://doi.org/10.1016/j.bodyim.2014.12.002>
- Fardouly, J., Pinkus, R. T., & Vartanian, L. R. (2017). The impact of appearance comparisons made through social media, traditional media, and in person in women's everyday lives. *Body Image*, 20, 31–39. <https://doi.org/10.1016/j.bodyim.2016.11.002>
- (*) Fardouly, J., & Vartanian, L. R. (2015). Negative comparisons about one's appearance mediate the relationship between Facebook usage and body image concerns. *Body Image*, 12, 82–88.
- Fardouly, J., & Vartanian, L. R. (2016). Social media and body image concerns: Current research and future directions. *Current Opinion in Psychology*, 9, 1–5. <https://doi.org/10.1016/j.copsyc.2015.09.005>
- (*) Fardouly, J., Willburger, B. K., & Vartanian, L. R. (2018). Instagram use and young women's body image concerns and self-objectification: Testing mediational pathways. *New Media Society*, 20(4), 1380–1395. <https://doi.org/10.1177/1461444817694499>
- Feingold, A., & Mazzella, R. (1998). Gender differences in body image are increasing. *Psychological Science*, 9(3), 190–195. <https://doi.org/10.1111/1467-9280.00036>
- Feinstein, B. A., Hershenberg, R., Bhatia, V., Latack, J. A., Meuwly, N., & Davila, J. (2013). Negative social comparison on Facebook and depressive symptoms: Rumination as a mechanism. *Psychology of Popular Media Culture*, 2(3), 161–170. <https://doi.org/10.1037/a0033111>
- Festinger, L. (1954). A theory of social comparison processes. *Human Relations*, 7, 117–140. <https://doi.org/10.1177/001872675400700202>
- Fioravanti, G., Bocci Benucci, S., Ceragioli, G., & Casale, S. (2022). How the exposure to beauty ideals on social networking sites influences body image: A systematic review of experimental studies. *Adolescent Research Review*, 7, 419–458. <https://doi.org/10.1007/s40894-022-00179-4>
- Fitzsimmons-Craft, E. E. (2011). Social psychological theories of disordered eating in college women: Review and integration. *Clinical Psychology Review*, 31(7), 1224–1237. <https://doi.org/10.1016/j.cpr.2011.07.011>

* References marked with an asterisk indicate studies included in the meta-analyses.

- Fitzsimmons-Craft, E. E., Bardone-Cone, A. M., Wonderlich, S. A., Crosby, R. D., Engel, S. G., & Bulik, C. M. (2015). The relationships among social comparisons, body surveillance, and body dissatisfaction in the natural environment. *Behavior Therapy*, 46(2), 257–271. <https://doi.org/10.1016/j.beth.2014.09.006>
- (*) Fox, J., & Vendemia, M. A. (2016). Selective self-presentation and social comparison through photographs on social networking sites. *Cyberpsychology, Behavior and Social Networking*, 19(10), 593–600. <https://doi.org/10.1089/cyber.2016.0248>
- Fuller-Tyszkiewicz, M., Chhouk, J., McCann, L. A., Urbina, G., Vuo, H., Krug, I., Ricciardelli, L., Linardon, J., Broadbent, J., Heron, K., & Richardson, B. (2019). Appearance comparison and other appearance-related influences on body dissatisfaction in everyday life. *Body Image*, 28, 101–109. <https://doi.org/10.1016/j.bodyim.2019.01.002>
- Gattario, K. H., & Frisén, A. (2019). From negative to positive body image: Men's and women's journeys from early adolescence to emerging adulthood. *Body Image*, 28, 53–65. <https://doi.org/10.1016/j.bodyim.2018.12.002>
- Gerber, J. P., Wheeler, L., & Suls, J. (2018). A social comparison theory meta-analysis 60+ years on. *Psychological Bulletin*, 144, 177–197. <https://doi.org/10.1037/bul0000127>
- Grabe, S., Ward, L. M., & Hyde, J. S. (2008). The role of the media in body image concerns among women: A meta-analysis of experimental and correlational studies. *Psychological Bulletin*, 134(3), 460–476. <https://doi.org/10.1037/0033-2909.134.3.460>
- (*) Hai, R., & Yang, Y. (2022). Social network site appearance comparison's prediction of anxiety among Chinese females: The mediation effect of body area satisfaction, overweight preoccupation, and self-esteem. *Frontiers in Psychiatry*, 13, Article 775782. <https://doi.org/10.3389/fpsyt.2022.775782>
- Higgins, J. P., Thompson, S. G., Deeks, J. J., & Altman, D. G. (2003). Measuring inconsistency in meta-analyses. *BMJ (Clinical Research ed)*, 327(7414), 557–560. <https://doi.org/10.1136/bmj.327.7414.557>
- Holland, G., & Tiggemann, M. (2016). A systematic review of the impact of the use of social networking sites on body image and disordered eating outcomes. *Body Image*, 17, 100–110. <https://doi.org/10.1016/j.bodyim.2016.02.008>
- Huang, Q., Peng, W., & Ahn, S. (2021). When media become the mirror: a meta-analysis on media and body image. *Media Psychology*, 24(4), 437–489. <https://doi.org/10.1080/15213269.2020.1737545>
- Ibn Auf, A. A., Alblowi, Y. H., Alkhalidi, R. O., Thabet, S. A., Alabdali, A. A. H., Binshalhoub, F. H., Alzahrani, K. A. S., & Alzahrani, R. A. I. (2023). Social comparison and body image in teenage users of the tiktok app. *Cureus*, 15(11), Article e48227. <https://doi.org/10.7759/cureus.48227>
- (*) Jarman, H. K., Marques, M. D., McLean, S. A., Slater, A., & Paxton, S. J. (2021). Social media, body satisfaction and well-being among adolescents: A mediation model of appearance-ideal internalization and comparison. *Body Image*, 36, 139–148. <https://doi.org/10.1016/j.bodyim.2020.11.005>
- Joshi, R., Herman, C. P., & Polivy, J. (2004). Self-enhancing effects of exposure to thin-body images. *International Journal of Eating Disorders*, 35, 333–341. <https://doi.org/10.1002/eat.10253>
- Karazsia, B. T., Murnen, S. K., & Tylka, T. L. (2017). Is body dissatisfaction changing across time? A cross-temporal meta-analysis. *Psychological Bulletin*, 143(3), 293–320. <https://doi.org/10.1037/bul0000081>
- Keery, H., van den Berg, P., & Thompson, J. K. (2004). An evaluation of the Tripartite Influence Model of body dissatisfaction and eating disturbance with adolescent girls. *Body Image*, 1(3), 237–251. <https://doi.org/10.1016/j.bodyim.2004.03.001>
- Kleemans, M., Daalman, S., Carbaat, I., & Anshütz, D. (2016). Picture perfect: The direct effect of manipulated Instagram photos on body image in adolescent girls. *Media Psychology*, 21(1), 93–110. <https://doi.org/10.1080/15213269.2016.1257392>
- Klug, D., Evans, M., & Kaufman, G. (2022). How TikTok served as a platform for young people to share and cope with lived COVID-19 experiences. *MedieKultur: Journal of Media and Communication Research*, 38(73), 152–170.
- Laker, V., & Waller, G. (2022). Does comparison of self with others influence body image among adult women? An experimental study in naturalistic settings. *Eating and Weight Disorders*, 27, 597–604. <https://doi.org/10.1007/s40519-021-01196-3>
- Leahey, T. M., & Crowther, J. H. (2008). An ecological momentary assessment of comparison target as a moderator of the effects of appearance-focused social comparisons. *Body Image*, 5(3), 307–311. <https://doi.org/10.1016/j.bodyim.2008.03.002>
- Lewallen, J., Miller, B., & Behm-Morawitz, E. (2016). Lifestyles of the rich and famous: Celebrity media diet and the cultivation of emerging adults' materialism. *Mass Communication Society*, 19(3), 253–274. <https://doi.org/10.1080/15205436.2015.1096945>
- Maes, C., & Vandenbosch, L. (2022). Adolescent girls' Instagram and TikTok use: Examining relations with body image-related constructs over time using random intercept cross-lagged panel models. *Body Image*, 41, 453–459. <https://doi.org/10.1016/j.bodyim.2022.04.015>
- Mannino, G., Salerno, L., Bonfanti, R. C., Albano, G., & Lo Coco, G. (2021). The impact of Facebook use on self-reported eating disorders during the COVID-19 lockdown. *BMC Psychiatry*, 21(1), 611. <https://doi.org/10.1186/s12888-021-03628-x>
- McCabe, M., Alcaraz-Ibanez, M., Markey, C., Sicilia, A., Rodgers, R. F., Aimé, A., Dion, J., Pietrabissa, G., Lo Coco, G., Caltabiano, M., Strodl, E., Bégin, C., Blackburn, M., Castelnovo, G., Granero-Gallegos, A., Gullo, S., Hayami-Chisuwa, N., He, Q., Maiano, C., Manzoni, G. M., Mellor, D., & Fuller-Tyszkiewicz, M. (2023). A longitudinal evaluation of a biopsychosocial model predicting BMI and disordered eating among young adults. *Australian Psychologist*, 58(2), 57–79. <https://doi.org/10.1080/00050067.2023.2181686>
- McComb, S. E., & Mills, J. S. (2021). Young women's body image following upwards comparison to Instagram models: The role of physical appearance perfectionism and cognitive emotion regulation. *Body Image*, 38, 49–62. <https://doi.org/10.1016/j.bodyim.2021.03.012>
- McComb, C. A., Vanman, E. J., & Tobin, S. J. (2023). A meta-analysis of the effects of social media exposure to upward comparison targets on self-evaluations and emotions. *Media Psychology*, 26(5), 612–635. <https://doi.org/10.1080/15213269.2023.2180647>
- McGovern, O., Collins, R., & Dunne, S. (2022). The associations between photo-editing and body concerns among females: A systematic review. *Body Image*, 43, 504–517. <https://doi.org/10.1016/j.bodyim.2022.10.013>
- Meier, E. P., & Gray, J. (2014). Facebook photo activity associated with body image disturbance in adolescent girls. *Cyberpsychology, Behavior and Social Networking*, 17(4), 199–206. <https://doi.org/10.1089/cyber.2013.0305>
- Mills, J., Polivy, J., Herman, C. P., & Tiggemann, M. (2002). Effects of exposure to thin media images: Evidence of self-enhancement among restrained eaters. *Personality and Social Psychology Bulletin*, 28, 1687–1699. <https://doi.org/10.1177/01461670223765>
- Moher, D., Shamseer, L., Clarke, M., Ghersi, D., Liberati, A., Petticrew, M., Shekelle, P., Stewart, L. A., & PRISMA-P Group. (2015). Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015 statement. *Systematic Reviews*, 4(1), 1. <https://doi.org/10.1186/2046-4053-4-1>
- Myers, T. A., & Crowther, J. H. (2009). Social comparison as a predictor of body dissatisfaction: A meta-analytic review. *Journal of Abnormal Psychology*, 118(4), 683–698. <https://doi.org/10.1037/a0016763>
- Nelson, S. L., Harriger, J. A., Miller-Perrin, C., & Rouse, S. V. (2022). The effects of body-positive Instagram posts on body image in adult women. *Body Image*, 42, 338–346. <https://doi.org/10.1016/j.bodyim.2022.07.013>
- Perloff, R. M. (2014). Social media effects on young women's body image concerns: Theoretical perspectives and an agenda for research. *Sex Roles*, 71, 363–377. <https://doi.org/10.1007/s11199-014-0384-6>
- Peterson, R. A., & Brown, S. P. (2005). On the Use of Beta Coefficients in Meta-Analysis. *Journal of Applied Psychology*, 90(1), 175–181. <https://doi.org/10.1037/0021-9010.90.1.175>
- Polivy, J. (2017). What's that you're eating? Social comparison and eating behavior. *Journal of Eating Disorders*, 5, 18. <https://doi.org/10.1186/s40337-017-0148-0>
- Raggatt, M., Wright, C. J. C., Carrotte, E., Jenkinson, R., Mulgrew, K., Prichard, I., & Lim, M. S. C. (2018). "I aspire to look and feel healthy like the posts convey": Engagement with fitness inspiration on social media and perceptions of its influence on health and wellbeing. *BMC Public Health*, 18(1), 1002. <https://doi.org/10.1186/s12889-018-5930-7>
- Richardson, M., Garner, P., & Donegan, S. (2019). Interpretation of subgroup analyses in systematic reviews: A tutorial. *Clinical Epidemiology and Global Health*, 7(2), 192–198. <https://doi.org/10.1016/j.cegh.2018.05.005>
- Rodgers, R. F., Chabrol, H., & Paxton, S. J. (2011). An exploration of the Tripartite Influence Model of body dissatisfaction and disordered eating among Australian and French college women. *Body Image*, 8(3), 208–215. <https://doi.org/10.1016/j.bodyim.2011.04.009>
- Rodgers, R. F., Laveway, K., Campos, P., & de Carvalho, P. H. B. (2023). Body image as a global mental health concern. *Global Mental Health*, 10, Article e9. <https://doi.org/10.1017/gmh.2023.2>
- Rodgers, R. F., McLean, S. A., & Paxton, S. J. (2015). Longitudinal relationships among internalization of the media ideal, peer social comparison, and body dissatisfaction: implications for the tripartite influence model. *Developmental Psychology*, 51(5), 706–713. <https://doi.org/10.1037/dev0000013>
- Rodgers, R. F., & Melioli, T. (2016). The relationship between body image concerns, eating disorders and internet use, part I: A review of empirical support. *Adolescent Research Review*, 1, 95–119. <https://doi.org/10.1007/s40894-015-0016-6>
- Rodgers, R. F., Paxton, S. J., & Wertheim, E. H. (2021). #Take idealized bodies out of the picture: A scoping review of social media content aiming to protect and promote positive body image. *Body Image*, 38, 10–36. <https://doi.org/10.1016/j.bodyim.2021.03.009>
- Ryding, F. C., & Kuss, D. J. (2020). The use of social networking sites, body image dissatisfaction, and body dysmorphic disorder: A systematic review of psychological research. *Psychology of Popular Media*, 9(4), 412–435. <https://doi.org/10.1037/ppm0000264>
- Saiphoo, A. N., & Vahedi, Z. (2019). A meta-analytic review of the relationship between social media use and body image disturbance. *Computers in Human Behavior*, 101, 259–275. <https://doi.org/10.1016/j.chb.2019.07.028>
- (*) Saunders, J. F., & Eaton, A. A. (2018). Snaps, selfies, and shares: How three popular social media platforms contribute to the sociocultural model of disordered eating among young women. *Cyberpsychology, Behavior and Social Networking*, 21(6), 343–354. <https://doi.org/10.1089/cyber.2017.0713>
- Schaefer, L. M., & Thompson, J. K. (2018). The development and validation of the Physical Appearance Comparison Scale-3 (PACS-3). *Psychological Assessment*, 30(10), 1330–1341. <https://doi.org/10.1037/pas0000576>
- Schmuck, D., Karsay, K., Matthes, J., & Stevic, A. (2019). Looking Up and Feeling Down". The influence of mobile social networking site use on upward social comparison, self-esteem, and well-being of adult smartphone users. *Telematics Informatics*, 42. <https://doi.org/10.1016/j.TELE.2019.101240>
- Stice, E., Schupak-Neuberg, E., Shaw, H. E., & Stein, R. I. (1994). Relation of media exposure to eating disorder symptomatology: An examination of mediating mechanisms. *Journal of Abnormal Psychology*, 103(4), 836–840. <https://doi.org/10.1037/0021-843x.103.4.836>
- Stice, E., & Whitenton, K. (2002). Risk factors for body dissatisfaction in adolescent girls: A longitudinal investigation. *Developmental Psychology*, 38(5), 669–678. <https://doi.org/10.1037/0012-1649.38.5.669>

- Thompson, J. K., Heinberg, L. J., Altabe, M., & Tantleff-Dunn, S. (1999). *Exacting beauty: Theory, Assessment and Treatment of Body Image Disturbance*. American Psychological Association. <https://doi.org/10.1037/10312-000>
- Tiggemann, M., & Anderberg, I. (2020). Social media is not real: The effect of 'Instagram vs reality' images on women's social comparison and body image. *New Media Society*, 22(12), 2183–2199. <https://doi.org/10.1177/1461444819888720>
- Tiggemann, M., Anderberg, I., & Brown, Z. A. (2020). Uploading your best self: Selfie editing and body dissatisfaction. *Body Image*, 33, 175–182. <https://doi.org/10.1016/j.bodyim.2020.03.002>
- Tiggemann, M., Hayden, S., Brown, Z., & Veldhuis, J. (2018). The effect of Instagram "likes" on women's social comparison and body dissatisfaction. *Body Image*, 26, 90–97. <https://doi.org/10.1016/j.bodyim.2018.07.002>
- Tiggemann, M., & Slater, A. (2013). Netgirls: The Internet, Facebook, and body image concern in adolescent girls. *International Journal of Eating Disorders*, 46(6), 630–633. <https://doi.org/10.1002/eat.22141>
- Tiggemann, M., & Slater, A. (2013). Netgirls: The internet and body image concerns in preteenage girls. *The Journal of Early Adolescence*, 34(5), 606–620. <https://doi.org/10.1177/0272431613501083>
- Tiggemann, M., & Zaccardo, M. (2015). Exercise to be fit, not skinny: The effect of fitpiration imagery on women's body image. *Body Image*, 15, 61–67. <https://doi.org/10.1016/j.bodyim.2015.06.003>
- Tylka, T. L., & Wood-Barcalow, N. L. (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>
- Valkenburg, P. M., Meier, A., & Beyens, I. (2022). Social media use and its impact on adolescent mental health: An umbrella review of the evidence. *Current Opinion in Psychology*, 44, 58–68. <https://doi.org/10.1016/j.copsyc.2021.08.017>
- van den Berg, P., Thompson, J. K., Obremski-Brandon, K., & Covert, M. (2002). The Tripartite Influence model of body image and eating disturbance: A covariance structure modeling investigation testing the mediational role of appearance comparison. *Journal of Psychosomatic Research*, 53(5), 1007–1020. [https://doi.org/10.1016/s0022-3999\(02\)00499-3](https://doi.org/10.1016/s0022-3999(02)00499-3)
- van den Berg, P., & Thompson, J. K. (2007). Self-schema and social comparison explanations of body dissatisfaction: A laboratory investigation. *Body Image*, 4(1), 29–38. <https://doi.org/10.1016/j.bodyim.2006.12.004>
- Van Der Heide, B., D'Angelo, J. D., & Schumaker, E. M. (2012). The effects of verbal versus photographic self-presentation on impression formation in Facebook. *Journal of Communication*, 62(1), 98–116. <https://doi.org/10.1111/j.1460-2466.2011.01617.x>
- Vandenbosch, L., Fardouly, J., & Tiggemann, M. (2022). Social media and body image: Recent trends and future directions. *Current Opinion in Psychology*, 45, Article 101289. <https://doi.org/10.1016/j.copsyc.2021.12.002>
- (*) Vartanian, L. R., Nicholls, K., & Fardouly, J. (2023). Testing the identity disruption model among adolescents: Pathways connecting adverse childhood experiences to body dissatisfaction. *Journal of Youth and Adolescence*, 52, 134–148. <https://doi.org/10.1007/s10964-022-01683-5>
- Verduyn, P., Gugushvili, N., Massar, K., Täht, K., & Kross, E. (2020). Social comparison on social networking sites. *Current Opinion in Psychology*, 36, 32–37. <https://doi.org/10.1016/j.copsyc.2020.04.002>
- Verduyn, P., Ybarra, O., Résibois, M., Jonides, J., & Kross, E. (2017). Do social network sites enhance or undermine subjective well-being? A critical review. *Social Issues and Policy Review*, 11(1), 274–302. <https://doi.org/10.1111/sipr.12033>
- Vogel, E. A., Rose, J. P., Okdie, B. M., Eckles, K., & Franz, B. (2015). Who compares and despairs? The effect of social comparison orientation on social media use and its outcomes. *Personality and Individual Differences*, 86, 249–256. <https://doi.org/10.1016/j.paid.2015.06.026>
- Vogel, E. A., Rose, J. P., Roberts, L. R., & Eckles, K. (2014). Social comparison, social media, and self-esteem. *Psychology of Popular Media Culture*, 3, 206. <https://doi.org/10.1037/ppm0000047>
- (*) Wang, Y., Geng, J., Di, K., Chu, X., & Lei, L. (2022). Body talk on social network sites and body dissatisfaction among college students: The mediating roles of appearance ideals internalization and appearance comparison. *Cyberpsychology: Journal of Psychosocial Research on Cyberspace*, 16(3), Article 2. <https://doi.org/10.5817/CP2022-3-2>
- Wells, G.A., Wells, G., Shea, B., Shea, B., O'Connell, D., Peterson, J., Welch, Losos, M., Tugwell, P., Ga, S.W., Zello, G.A., & Petersen, J.A. (2014). The Newcastle-Ottawa Scale (NOS) for Assessing the Quality of Nonrandomised Studies in Meta-Analyses. Retrieved from https://www.ohri.ca/programs/clinical_epidemiology/oxford.asp. Accessed January 30, 2023.
- Wood-Barcalow, N. L., Alleva, J. M., & Tylka, T. L. (2024). Revisiting positive body image to demonstrate how body neutrality is not new. *Body Image*, 50, Article 101741. <https://doi.org/10.1016/j.bodyim.2024.101741>
- Yang, F. R., Wei, C. F., & Tang, J. H. (2019). Effect of Facebook social comparison on well-being: A meta-analysis. *Journal of Internet Technology*, 20, 1829–1836. <https://doi.org/10.3966/160792642019102006013>
- Yoon, S., Kleinman, M., Mertz, J., & Brannick, M. (2019). Is social network site usage related to depression? A meta-analysis of facebook–depression relations. *Journal of Affective Disorders*, 248, 65–72. <https://doi.org/10.1016/j.jad.2019.01.026>
- Zimmer-Gembeck, M. J., Hawes, T., & Pariz, J. (2021). A closer look at appearance and social media: Measuring activity, self-presentation, and social comparison and their associations with emotional adjustment. *Psychology of Popular Media*, 10(1), 74–86. <https://doi.org/10.1037/ppm0000277>