Current Obesity Reports (2019) 8:18–32
https://doi.org/10.1007/s13679-019-0324-4

PSYCHOLOGICAL ISSUES (V DRAPEAU AND V IVEZAJ, SECTION EDITORS)

Women's Use of Social Media: What Is the Evidence About Their Impact on Weight Management and Body Image?

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Published online: 21 January 2019

Abstract

Purpose of the Review This review aims to summarize recent research on the effects of social media-delivered weight management interventions on weight loss and the impact of social media use on body image concerns in women and adolescent girls.

Recent Findings Evidence supports the feasibility, but not the efficacy, of studies using single-component social media-delivered weight management interventions (i.e., including no other modes of intervention delivery) in women. Studies conducted in adolescent girls and women suggest that the impact of social media on body image outcomes is mostly detrimental, but is dependent on the context (e.g., exposure to idealized social media appearance images), peers' feedback, and constructs, such as appearance comparison tendency.

Summary More research is needed to conclude on the efficacy of social media-delivered interventions on both weight and body image outcomes and to understand how and when exposure to social media could promote effective weight management and also advocate positive body image in women.

Keywords Social media · Weight management · Body image · Women's health · Adolescents · Review

Introduction

The obesity prevalence has substantially increased over the last four decades in most countries, affecting approximately two billion adults worldwide in 2016 [1]. Evidence shows that the patterning of obesity prevalence across countries is gendered [2, 3]: the prevalence of obesity in women is greater and more variable than the prevalence in men in most populations, representing a median sex gap in obesity of 6% across countries with average male and female obesity prevalence of 10 and 18%, respectively [3]. Obesity is an important risk factor for cardiovascular diseases, diabetes, and some cancers [4, 5] and is associated with heavy economic consequences, such as substantial medical costs [6]. Moreover, as early development of excess adiposity increases the likelihood of overweight classification tracking as a child grows into adulthood [7], obesity prevention represents an important public health priority in adults as well as in children.

In parallel to the increase in obesity prevalence, we are exposed to an abundance of advertisements promoting dieting messages and models who conform to unrealistic media appearance ideals [8]. Western sociocultural norms and expectations place an important focus on thinness in women [9]. Those have been shown to adversely impact body image perceptions in women [10], defined as a complex, multidimensional concept of the mental representation that an individual makes in relation to one's body [11]. Compared to men, women are more likely to experience their body shape and weight in a negative manner [12], and an accumulation of evidence shows that women's dissatisfaction with their bodies is stable across the life span [13], with elevated body mass index (BMI) playing an important influence on body image dissatisfaction in women [14]. Most body image research conducted to date has looked at attitudinal dimensions of body image due to the high availability of psychometric instruments used to measure

This article is part of the Topical Collection on *Psychological Issues*

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beliefs, perceptions, behaviors, and satisfaction with one's own body (e.g., body shape concerns and body image dissatisfaction). Evidence supports that positive body image is likely to be protective of physical health and psychological well-being, such as lower depressive symptoms, higher self-esteem, and fewer unhealthy dieting behaviors [15].

Social media, defined as Internet-based platforms (e.g., collaborative projects [e.g., wikis], blogs and microblogs [e.g., Twitter], content communities [e.g., Pinterest], social networking sites [SNSs] [e.g., Facebook], and virtual social worlds [e.g., Second Life; Linden Lab, San Francisco, California]) that allow the creation and exchange of user-generated content [16], are highly visible forums for the display of food and weight loss-related content such as "thinspiration" messages and images [17]. Such social media content may have adverse effects on the readers' body image and reach of a healthy weight by promoting weight loss in a way that encourages eating disordered behaviors. Given the high popularity of social media platforms among young adults [18] and adolescents [19], who visit these platforms several times a day, the potentially damaging impact of witnessing advertisements of unhealthy weight loss promotion content on social media in these populations is concerning. Thus, this review aims at summarizing the most recent scientific evidence regarding the impact of social media use by adolescent girls and adult women on weight management and body image concerns in order to identify gaps in the literature to inform future research.

Impact of Social Media Use on Weight Management

Findings from Intervention Studies

Each social media platform has specific characteristics as well as depth of user engagement and social interactions [16]. Thus, in order to isolate the effectiveness of these platforms to support their use by healthcare professionals to deliver effective behavior change interventions, this review summarizes findings from single-component social media-delivered weight management intervention studies. Most social media-delivered research on weight management conducted to date has evaluated the effectiveness of complex interventions. Those interventions used multiple modes of delivery, such as tracking devices (e.g., Fitbit Flex™ wearable wristband [20]), face-to-face individual [21], or group [22] educational sessions or phone counseling [23] in addition to one or more social media platforms. To our knowledge, few studies have examined the effects and mechanisms of action of interventions where the content is delivered to participants exclusively through only one social media platform (i.e., single-component social media-delivered interventions) on weight-related outcomes in adolescent girls and women (Table 1).

Most of the available literature on the topic consists of studies having evaluated the feasibility of using Facebook as a mode of delivery for self-management education, self-monitoring, and peer support during weight loss [24, 25•, 27, 28]. When compared to a control group who received no intervention (including no experimental social media exposure), the exposition to a private Facebook group, in an average dose of one posting per week for eight to 12 weeks, was found to be a feasible mode of intervention delivery, but was ineffective to produce significant body weight loss [24, 26, 27]. These findings must be interpreted with caution given their relatively short study duration which may not have allowed sufficient time to observe weight loss. More data is needed to confirm the efficacy of single-component social media-delivered weight loss interventions in achieving lasting weight loss. Additionally, the collateral impact that social media-delivered weight loss intervention may have on body weight concerns, either beneficial or detrimental, has not yet been explored.

On the other hand, two single-group intervention studies without a control group have provided findings supporting the acceptability of a Facebook-delivered weight loss intervention. These interventions were delivered at a dose ranging from one post per day to 3–4 posts per week, and their potential efficacy for promoting weight loss in adolescents with severe obesity (BMI ≥ 35 kg/m^2) [25•] and post-partum women [28] after 12 weeks was assessed, thus opening the door to further social media-enabled research among these specific population groups.

Findings from Cross-Sectional Studies: Use of Social Media and Weight-Related Outcomes

The cross-sectional relationship between the amount and/or frequency of social media use and weight management outcomes has been examined in adolescent girls, but to the best of our knowledge has not yet been studied in adult women. One study was conducted among Canadian adolescent girls [29], and no associations between the use of social networking platforms (Facebook, Twitter, MySpace, and Instagram) and self-reported BMI were found, before or after adjustment for age, sex, ethnicity, subjective socio-economic status, parental education, alcohol, tobacco and cannabis use, and unhealthy eating behavior outcomes (breakfast skipping and consumption of sugar-sweetened beverages and energy drinks).

Findings from Cross-Sectional Studies: Use of Social Media to Discuss Weight Loss

Higher positive social media influence for weight loss, diet, and exercise (e.g., comfort, helpfulness, supportive, informative) have been associated with greater self-reported weight loss among adult women who use Twitter, Facebook, and other online weight loss social networks to discuss a current weight

Table 1 Characteristics and main findings of studies investigating the impact of single-component social media-delivered weight loss interventions in women

Study ID	Country	Study design	Use(s) of social media	Single-component social media intervention	Control condition(s)	*N*	% females	Mean age	Mean BMI	Outcomes	Main findings
Napolitano et al. 2013 [24]	USA	RCT, pilot, 3 arms parallel	Self-monitoring and social support	Facebook-delivered weight-loss intervention. Frequency: once/week Duration: 8 weeks	Facebook Plus: access to a private Facebook group with the same content as the Facebook group with additional daily text messages, personalized feedback via weekly summary reports, and selection of a "buddy" to serve as a support person. Waiting list control group with no intervention	52	86.5% adult women	20.5 (SD:2.2)	31.4 (SD: 5.3)	Weight loss (kg)	At 4 weeks, Facebook plus weight losses were significantly different from waiting list control group ($p \leq 0.001$; 95% CI: 6.61–1.93), and Facebook ($p < 0.05$; 95% CI: 5.04, 0.37). At 8 weeks, Facebook plus weight losses were significantly greater than the waiting list control group ($p < 0.05$; 95% CI: 8.46, 0.77) and Facebook ($p < 0.05$; 95% CI: 7.70, 0.04) groups. Weight changes at 4 and 8 weeks were not significantly different between the Facebook and list control group.
Prout et al. 2018 [25•]	USA	Pilot, single group, pre-post design	Self-management education, self-monitoring and peer support for weight loss	Nutrition, physical activity and behavioral Facebook posts and videos, weekly challenges, weekly progress updates. Frequency: 3–4 times/week Duration: 12 weeks	None	13	69.2% adolescent girls	16.0 (SD: 1.3)	45.5 (SD: 7.3)	Weight loss (kg), BMI, BMIz scores	Mean changes were observed at 12 weeks for all participants for weight in kilograms (OR—1.01; 95% CI:—6.1, 4.08), BMI (OR—1.25; 95% CI:—2.99, 0.49), BMIz score (OR—0.03; 95% CI: − 0.1, 0.03).
Ruotsakainen et al. 2015 [26]	Finland	RCT, 3 arms, parallel	Self-management education and peer support for weight loss	Facebook-delivered lifestyle counseling without physical activity monitoring. Frequency: once/week Duration: 12 weeks	Control group with no intervention	44	70% adolescent girls	14.7 (SD: 0.8)	BMI: 28.1 (SD: 5.7)	BMI	No significant differences between the intervention group and control group in BMI from the baseline to the 12-week post-intervention measurements.

Table 1 (continued)

Study ID	Country	Study design	Use(s) of social media	Single-component social media intervention	Control condition(s)	*N*	% females	Mean age	Mean BMI	Outcomes	Main findings
Valle et al. 2013 [27]	USA	RCT, 2 arms, parallel	Self-management education, self-monitoring and peer support for weight loss	Self-help comparison group: Links to publicly available websites related to physical activity and/or cancer survivorship, weekly Facebook messages with basic information on physical activity. Frequency: once/week Duration: 12 weeks	FITNET Group: Facebook messages sent to FITNET participants during each of the 12 weeks was an expanded behavioral lesson with more specific guidance on physical activity and behavioral strategies, and password-protected access to a separate study website with a goal-setting tool and physical activity diary.	66	91% adult women	31.7 (SD: 5.1)	BMI: FITNET group: 28.4 (SD: 8.2); self-help comparison group: 29.1 (SD: 8.9)	Weight loss (kg)	Weight changes over time were not different between groups but approached significance ($p = 0.083$). At 12 weeks, the FITNET group had lost an estimated − 2.1 kg (95% CI: − 3.6, − 0.7; $p = 0.004$) compared to no significant weight loss in the Self-health comparison group (− 0.1 kg, 95% CI: − 1.9, 1.7; $p = 0.904$).
Waring et al. 2018 [28]	USA	Single-group, pre-post design	Self-management education, self-monitoring and peer support for weight loss	Lifestyle intervention based on the Diabetes Prevention Program adapted for the postpartum period via a secret Facebook group. Frequency: once/day Duration 12 weeks	None	19	100% post-partum women	31.5 (SD: 3.2)	BMI: 30.1 (SD: 4.2), Gestational weight gain in index pregnancy (lbs): 35.7 (SD: 14.1), Postpartum weight retention at baseline (lbs): 14.2 (SD: 18.0)	Weight loss (lb.), % of participants lost ≥ 5% body weight	Eighteen women lost weight and 1 gained weight. On average, women lost 7.7 lb. (3.5 kg) (SD 8.1 lb. [3.7 kg]; range, 16.9 lb. [7.7 kg] gained to 20.8 lb. [9.5 kg] lost), representing 4.8% of baseline weight (SD 4.2%; range, 6.7% gained to 11.8% lost). Fifty-eight percent of participants lost ≥ 5%.

RCT: randomized controlled trial, SD: standard deviation, BMI: body mass index, CI: confidence interval, OR: odds ratio, lb.: pounds

loss attempt [30]. In this study, no associations were found between positive social influence from friends and family with whom one interacts in person (e.g., getting support from friends and family about weight loss, diet, and/or exercise) and weight loss [30]. These cross-sectional findings suggest that online relationships may be valuable sources of positive social support for weight loss as opposed to in-person relationships, which may be a greater source of negative influence than online relationships, for instance via processes involving the social reinforcement of obesity-related behaviors, such as mirroring the eating practices and physical activity patterns [31, 32].

The use of blogs by adult women for testimonies and social support for weight loss efforts has been discussed in some studies [33–35]. Leggatt-Cook and Chamberlain [34] reported that, "through its use [weight-loss blogs], bloggers hope to create and build a community that will support them in their attempts to lose weight." In this community, particularly around more popular blogs, readers are strongly engaged as an active audience, with bloggers posting comments and linking to each other's blogs, therefore offering a highly supportive but also potentially challenging, critical, and judgmental environment for weight loss attempts, a finding also observed in much the same ways for other types of social media platforms and online support groups [36–38]. Moreover, blogging duration has been associated with the amount of weight loss reported since the start of blogging in female weight loss bloggers [35]. No associations were found between weight loss and the number of blog posts published per month, the total number of posts on the blog, the monthly page views, and the number of subscribers in this population [35]. Chung [33] found that having larger discrepancy between start and goal body weight, self-focus (i.e., the more that bloggers used first person singular pronouns), social support, the number of weeks for which there was at least one blog entry, the number of different bloggers commented to, and the use of positive emotion words significantly predicted more self-reported weight loss (%) in overweight or obese women who write public weight loss blogs. In this study [33], the content of the comments was not associated with body weight loss (%) in female bloggers. In lights of those preliminary findings, more research is needed to conclude on the impact of weight loss blogging on weight loss success and to identify the mechanisms of action through which blogs and other social media platforms may help their users achieve their weight loss goals.

Impact of Social Media Use on Body Image

Amount and Frequency of Social Media Use

Positive body image is a multidimensional construct, which has been recently argued [8] to involve more than body satisfaction and appearance evaluation (i.e., including also conceptualizing beauty broadly, adaptive investment in appearance, inner positivity interpreting information in a body-protective manner) and which is distinct from negative body image; in other words, it does not simply represent low levels of negative body image. Body image in the context of social media use is an emergent field of research, with studies on the subject conducted from 2013 in the USA [39–51], Australia [43, 52, 53, 54•, 55–62, 63•], UK [64, 65], Canada [66], the Netherlands [67], Sweden [68], Thailand [69], and Korea [40]. Most of these studies have examined various constructs related to attitudinal dimensions of body image using a wide variety of evaluation measures and questionnaires (Table 2).

Cross-sectional studies have pointed towards globally adverse impact of social media use on body image in adolescent girls and adult women. The use of SNSs has been negatively associated with body image satisfaction and positively associated with drive for muscularity behaviors and attitude in Thai adolescent girls [69]. Similarly, after adjustment for age, ethnicity, subjective socio-economic status, and parental education, results from logistic regression analysis showed that Canadian adolescent girls who use SNSs for more than 2 h per day had greater odds of dissatisfaction with body weight, to perceive themselves as overweight, and to be trying to lose weight compared with those who reported infrequent or no use of SNSs [66]. The total time reported spent on MySpace and Facebook combined has been positively associated with body surveillance (defined as the degree to which one experience himself/herself from an objectified perspective and monitored his/her appearance [84]) in Australian adolescent girls [55]. Australian adolescent girls who are Facebook users have scored significantly higher on all measures of body concern than their non-user counterparts [55]. Additionally, Strudel and Petrie [48] showed that female users of the social networking dating site Tinder reported engaging in significantly more body surveillance and more body shame and reported significant lower levels of face satisfaction and lower levels of upper body satisfaction than Tinder non-users.

Total time spent on Facebook was significantly related to paying attention to physical appearance [42] and positively associated with body dissatisfaction [46, 59] and drive for thinness [59] in U.S. and Australian adult women. Higher levels of emotional connection to Facebook and incorporation of Facebook into his or one's daily life (referred to as Facebook intensity) has been positively correlated with online physical appearance comparison, and in turn, online physical appearance comparison has been positively associated with greater disordered eating (a global measure of dietary restraint, bulimic episodes, and shape, and weight concerns) in U.S. adolescent girls [49]. On the other hand, Meier and Gray showed that total Facebook use, measured as the usual frequency of daily use, when controlling for BMI, was not associated with weight dissatisfaction, as opposed to Facebook appearance exposure (e.g., creating a photo album with photos

Table 2 Assessments and measures of body image in social media-enabled research among adolescent girls and adult women

Assessments Questionnaires	Measures[a]	Definitions and/or example items	Social media-enabled research
Multidimensional Body-Self Relations Questionnaire-Appearance Scales (Appearance Evaluation Subscale) [70]	Appearance evaluation	Measure of appearance satisfaction (e.g., item, "Most people would consider me good-looking.")	[58]
Appearance Schemas Inventory [71]	Appearance schematicity	Measure of the extent to which an individual allocates meaning and importance to one's appearance	[67]
Body Shape Questionnaire [72]	Body image	Measure of cognitive aspect of body image (e.g., items, "Have you felt that it is not fair that other women are thinner than you?"; "When in company, have you worried about taking up too much room?")	[42]
Eating Attitudes Test [73]	Body image	Measure of behavioral aspect of body image (e.g., item, "How often has looking at someone else's Facebook photos and posts made you feel negatively about your body in the past month?")	[42]
Body Appreciation Scale [74]	Body appreciation	Measure of positive body image (e.g., items, "I feel good about my body"; "I take a positive attitude towards my body.")	[68]
Body-Esteem Scale for Adolescents and Adults [75]	Body image satisfaction	Measure of general feelings about appearance, weight satisfaction, and evaluations attributed to others about one's body and appearance	[69]
Body Parts Satisfaction Scale-Females (body-factor and face-factor) [76]	Body satisfaction	Measure of satisfaction with body (e.g., hips) and face (e.g., complexion)	[48]
Body-Esteem Scale for Adolescents and Adults (Weight Satisfaction Subscale) [77]	Weight satisfaction	Measure of how one feels about his/her body and weight (e.g., item, "I really like what I weigh.")	[47]
Body-Esteem Scale for Adolescents and Adults (Appearance, Weight and Attribution subscales) [77]	Body image dissatisfaction	Measure of general feelings about appearance (e.g., item, "I like what I see when I look in the mirror."), weight satisfaction (e.g., item, "I really like what I weigh."), and evaluations attributed to others about one's body and appearance (e.g., item, "People my own age like my looks.")	[39]
Body Shape Questionnaire [78]	Body dissatisfaction	Measure of fears of weight gain, desires for weight loss, body dissatisfaction, and low self-esteem because of one's physical appearance (e.g., item, "Has seeing your reflection (e.g., in a mirror or shop window) made you feel bad about your shape?")	[46]
Eating Disorder Inventory (Body Dissatisfaction Subscale and/or Drive for Thinness Subscale) [79]	Body dissatisfaction	Measure of not being satisfied with one's physical appearance (e.g. items, "I think my belly is too fat."; "I am happy with my figure."; "I feel satisfied with the shape of my body.")	[40, 41, 43, 59, 61, 67]
	Drive for thinness	Measure of excessive concern with dieting, preoccupation with weight and entrenchments in an extreme pursuit of thinness (both an ardent wish to lose weight as well as a fear of weight gain)	[47, 55, 56, 58]
Multidimensional Body-Self Relations Questionnaire-Appearance Scales (Body Areas Satisfaction subscale) [80]	Body image dissatisfaction	Measure of perceptions of one's body image, asking participants to reflect on their level of satisfaction with nine aspects of their physical appearance	[53]
Self-Discrepancy Index [81, 82]	Weight and shape-related appearance discrepancy as well as face, hair, and skin-related appearance discrepancy	Participants are asked to describe three aspects of themselves that they would ideally like to change right now (e.g., "flatter stomach," "thinner arms," and "bigger breasts," or "better complexion," "longer and thicker hair," and "level of tan")	[64]
Body Shame Scale [83]	Body shame	Measure of feelings of shame associated with body shape and size	[48]
Objectified Body Consciousness Scale (Body Surveillance subscale) [84]	Body surveillance	Measure of the degree to which individuals experienced themselves from an objectified perspective and monitored their appearance (e.g., items, "I often worry about whether the clothes I am wearing make me look good."; "I am more concern with what my body can do than how it looks.")	[48, 58]

Table 2 (continued)

Assessments Questionnaires	Measures[a]	Definitions and/or example items	Social media-enabled research
Objectified Body Consciousness Scale for Youth [85]	Body surveillance	Measure of the degree to which individuals experienced themselves from an objectified perspective and monitored their appearance (e.g., items, "I often worry about whether the clothes I am wearing make me look good."; "I am more concern with what my body can do than how it looks.")	[55, 56]
Self-Objectification Questionnaire [86]	Self-objectification	Measure of the extent to which individuals view their body in terms of its appearance (objectified) or competence (non-objectified)	[41, 43, 47]
Objectified Body Consciousness Scale for Preadolescents and Adolescents [85]	Objectified body consciousness	Measure of preoccupation with how one body appears to others, which includes body surveillance (e.g., item, "I worry a lot about how others see me.") and body shame (e.g., item, "I would feel embarrassed for people to know how much I weigh.")	[67]
Sociocultural Attitudes Towards Appearance Questionnaire [87]	Internalization of the thin ideal	Measure of incorporation of appearance standards promoted by the media into one's self-identity to the point that an individual desire or strive to meet the ideals	[55, 56, 63•, 67]
Sociocultural Internalization of Appearance Questionnaire for Adolescents [88]	Internalization of the thin ideal	Measure of internalization of societal norms regarding appearance for adolescents	[47, 63•]
Sociocultural Attitudes Towards Appearance Scale—3 (Internalization-General and/or Pressure Subscales) [89]	Internalization of the thin ideal	Internalization-General Subscale: measure of the extent to which participants have internalized the beauty ideal portrayed within their society (e.g., items, "I would like my body to look like the models who appear in magazines."; "I compare my body to the bodies of people who are on TV."); Pressure subscale: Measure of perceived pressure from media to attain the thin ideal.	[43, 48, 53, 54•, 58, 65]
Sociocultural Attitudes Towards Appearance Questionnaire-4 (Thin/Low Body Fat Subscale and/or Muscular/Athletic Subscales) [90]	Internalization of the thin ideal	Muscular/Athletic subscale: Measure of a desire for an athletic physique; Thin/Low Body Fat subscale: Measure of the cognitive aspect of thin ideal internalization (e.g., item, "I want my body to look very thin."); Pressure Subscale: measure of perceived pressure from media to attain the thin ideal.	[61, 68]
Sociocultural Internalization of Media Ideals Scale (adapted from the Sociocultural Attitudes Towards Appearance Questionnaire [87]	Social comparison with media models	e.g., items, "I compare my body with the girls and women in magazines and TV." and "I would like to look like girls and women on TV and in movies."	[63•]
Drive for Muscularity Scale [91]	Drive for muscularity	Measure of behaviors and attitudes related to drive for muscularity	[69]
Extent Thoughts Questionnaire [92]	Appearance comparison	Measure of thoughts relating to social comparison, weight, and weight-reduction activities (e.g., item, "To what extent were your thoughts related to comparing yourself to something or someone in the ads?"; "To what extent did you think about thoughts related to aspects of body weight?" and "To what extent did you think about weight reduction activities (such as dieting and exercising)?")	[53]
Physical Appearance Comparison Scale [93]	Trait appearance comparison	Measure of how often one engages in appearance comparisons in social situations (e.g., item, "In social situations, I sometimes compare my figure to the figures of other people")	[47, 48, 57, 58, 65]
Physical Appearance Comparison Scale [93]	Facebook appearance comparisons in general	Measure of ones' tendency to compare their appearance to others on Facebook (e.g., "at parties or social events") (e.g., items, "When using Facebook, I compare my physical appearance to the physical appearance of others." "When using Facebook, I compare how I am dressed to how other people are dressed." and "When using Facebook, I sometimes compare my figure to the figures of other people.")	[59]
State Appearance Comparison Scale [94]	State appearance comparison	Measure of the amount of appearance comparison individuals engaged in (e.g., how much they thought about their appearance when viewing the images, the extent to which they compared their overall appearance and specific body parts with the people they saw in the images)	[52, 57]

Table 2 (continued)

Assessments Questionnaires	Measures[a]	Definitions and/or example items	Social media-enabled research
Upward and Downward Physical Appearance Comparison Scales [95]	General appearance comparison tendency	Measure of the tendency to make upward (e.g., item, "I compare myself to those who are better looking than me rather than those who are not.") and downward (e.g., item, "I tend to compare my body to those who have below average bodies.") physical appearance comparisons with others	[43, 54•, 64]
Online Physical Appearance Comparison Scale [96]	Physical appearance comparisons on Facebook	Measure of physical appearance comparisons on Facebook (e.g., item, "The best way for a person to know if they are overweight or underweight is to compare their figure to the figure of others in Facebook photographs.")	[49]
Physical Appearance Comparison Scale (adapted for Facebook) [97]	Facebook appearance comparisons in general	Measure of ones' tendency to compare their appearance to others on Facebook (e.g., "at parties or social events") (e.g., items, "When using Facebook, I compare my physical appearance to the physical appearance of others."; "When using Facebook, I compare how I am dressed to how other people are dressed." and "When using Facebook, I sometimes compare my figure to the figures of other people.")	[59]
Other			
Likert scales	Body image	Measure of the degree to which seven adjectives (proud, content, pleased, sad, disgusted, anxious, and distressed) described how one feels about his/her body	[44]
	Perceived weight	Responses ranging from "very underweight" to "very overweight"	[41]
	Downward and upward social comparison on social media	e.g., items, "When you are on social media sites and see unflattering photos of other [men or women], how do you feel about your own body?" and "When you are on social media sites and see photos of other [men or women] where they look great, how do you feel about your own body?"	[44]
	Body social comparison	Measure of general tendency to compare one's body with others (e.g., item, "How often do you compare yourself with other [men's or women's] bodies?")	[44]
	Weight importance	e.g., item, "During the past 6 months, how important has your weight and shape been in how you feel about yourself?"	[41]
	Feeling negatively after viewing posts/photos on Facebook	e.g., item, "How often has looking at someone else's Facebook photos and posts made you feel negatively about your body in the past month?"	[42]
	Comparisons to specific target groups on Facebook	e.g., items, "When looking at photos of the following people on Facebook, how often do you compare your body to theirs?" and "When comparing your body to each of the following people on Facebook, how do you rate yourself?"	[59]
	Comparisons to specific target groups/images on Instagram	e.g., item, "When looking at photos of the following people on Instagram, how often do you compare your appearance to theirs?"	[43]
	Attention to physical appearance	e.g., item, "When looking at someone else's photos on Facebook, how much attention do you pay to how they dress and their body?"	[42]
	Comparing to others	e.g., item, "While on Facebook, how often do you compare your own body or weight to those of your friends?"	[42]
Self-report measures	Wanting to lose weight	Current body weight > ideal body weight	[42]
	Perception of body weight	Whether individuals felt that they were too thin, about the right weight or too fat	[66]
Open-ended questions	Discussing weight/body image/diet through posting or commenting on others' posts/photos	e.g., item, "How often have you posted on your own Timeline about your own weight, body image, dieting, or weight loss in the past month?"	[42]
Closed questions	Intentions regarding body weight	Not doing anything, trying to lose weight, trying to keep from gaining weight, or trying to gain weight	[66]
Visual analogue scales	Body appreciation	e.g., items, "Despite my flaws, I accept my body for what it is," "My feelings towards my body are positive for the most part," and "My self-worth is independent of my body shape or weight"	[65]

Table 2 (continued)

Assessments Questionnaires	Measures[a]	Definitions and/or example items	Social media-enabled research
	Body satisfaction	Being satisfied with my weight, satisfied with my overall appearance, and satisfied with my body shape	[65]
	Body satisfaction	e.g., items, "I feel satisfied with my body shape" and "I feel satisfied with my appearance"	[54•]
	Body dissatisfaction	Weight dissatisfaction, appearance dissatisfaction, and facial features dissatisfaction	[52]
	Body dissatisfaction	Feeling currently physically attractive (reverse coded), fat, and satisfied with your body size and shape (reverse coded)	[64]
	Body dissatisfaction	How currently individuals felt relating to "weight dissatisfaction" and "appearance dissatisfaction"	[57]

[a] Terms used for body image measures are concordant with the ones used in the reviewed social media-enabled research on body image. Those may not always be identical to the original terminology used in questionnaires measuring those constructs

of oneself, updating profile photo, posting a photo, and commenting on friends' photo on Facebook), which was negatively correlated with weight satisfaction, in U.S. adolescent girls [47]. This is consistent with Cohen and Slater's findings [58] that Facebook appearance exposure, but not total SNSs use, was positively correlated with thin-ideal internalization and body surveillance in Australian College women.

As opposed to Facebook, the frequency of Instagram or Twitter use (no specification given on the types of accounts followed or pages viewed) was not associated with increased body dissatisfaction in U.S. college women [46]. Similarly, Cohen, Newton-John, and Slater [58] have found no significant differences between Instagram users and non-users on any body image variables (thin-ideal internalization, body surveillance, or drive for thinness) among Australian College women.

In contrast with cross-sectional studies, neutral effects of social media use on body image concerns have been demonstrated in prospective studies. Initial social media use did not predict body dissatisfaction 6 months later, nor did social media use interact with baseline body dissatisfaction in Hispanic U.S. adolescent girls [39]. Similarly, relationship across time between Facebook use and body image concerns in girls was explored by Tiggemann and Slater [56] who found that initial Facebook use was not predictive of subsequent body image concerns 2 years later in Australian adolescent girls, as opposed to the initial number of Facebook friends, which did predict an increase in drive for thinness, as well as internalization of beauty ideals. Additionally, while no body image concerns predicted an increase in time spent on Facebook, both internalization of thin ideals and body surveillance, but not drive for thinness, predicted an increase in the number of Facebook friends 2 years later among the girls [56].

A meta-analysis of intervention and cross-sectional studies conducted in females aged between 10 and 46 years old showed that more use of SNSs was associated with significantly higher internalization of a thin ideal and that females reported significantly greater internalization of a thin ideal when SNSs use was measured as a function of specific appearance-related features (e.g., the number of self-photos ["selfies"] a user posted on SNSs, how long a user spent viewing friends' photos on SNSs), rather than an overall measure of use, such as the average duration of time spent on SNSs over a specific period of time [63•].

The impressive number of body image constructs—and sometimes use of different questionnaires to assess the same construct—complexifies the synthesis and global interpretation of findings from studies which have assessed the association between social media use and body image in adolescent girls and women. Although no clear conclusion can be drawn, available evidence suggests that this association may be more complex than we would predict, as it appears to be modulated by the tendency to compare one's appearance to others online,

to differ depending on the social media platform and if appearance-related social media features are used.

Exposure to Idealized Social Media Appearance Images

The potentially adverse impact of viewing stereotyped idealized social media appearance images (e.g., thin in the case of women and lean vs. muscular in the case of men) on body image has been investigated in laboratory settings where participants were exposed to mock social media images (for 10 s per image to a total exposure time of 25 min) and completed pre- and post-exposure measures of body image. Young Australian women exposed to attractive celebrity and peer images (i.e., profiles who have fewer than 200 followers) on Instagram have experienced greater post-exposure body dissatisfaction compared to those exposed to control Instagram images (travel or alcohol and alcoholic drinks images) [52, 54•]. The authors concluded that appearance comparison, involving a direct comparison between societal and personal standards of appearance, mediated this effect [52]. These findings are consistent with previous studies [98, 99] that have shown a relationship between appearance comparison and body image dissatisfaction in women in the context of conventional media images (e.g., magazine and television images of thin models and celebrities).

Facebook exposition was not shown to intensify the effect of appearance comparison on body image dissatisfaction in the context of exposition to thin-ideal content [53] or post-exposure body dissatisfaction ratings [64] compared to conventional media exposition (i.e., images and advertisements found in popular magazines) in laboratory settings. Appearance comparison tendencies may be an important moderator of this effect; for young women who had a higher tendency to compare their overall appearance to others, spending time on Facebook has been shown to lead to more face, hair, and skin-related discrepancy (e.g., wanting "longer and thicker hair" or different "level of tan") than did spending time on an appearance-neutral control website [64].

Globally, exposure to idealized social media appearance images appears to have a negative impact on body image in women based on findings from laboratory studies. These findings remain to be confirmed in adolescent girls. Social media literacy, which implies being empowered with the knowledge and skills to analyze, evaluate, produce, and participate in social media (adapted from [100]), may protect against the negative impact of exposure to appearance ideal social media images in young women but not in men. Australian women with low commercial social media literacy who were exposed to appearance-ideal images (but not those with high commercial social media literacy) experienced a significant reduction in body satisfaction from pre- to post-exposure in laboratory settings [54•].

Exposition to Fitspiration Content on Social Media

A trend that has emerged on social media in recent years is the posting and following of "fitspiration" content (the combination of *fitness* and *inspiration*) intended to inspire people to achieve an empowered body image through exercise and healthy eating. Instagram is a popular platform to witness fitspiration images that typically depicts young women meeting the thin ideal or the athletic ideal, engaging in exercise, dressed in an exercise outfit, and/or eating healthy food, and that may be accompanied by general or fitness-related inspirational quotes [101].

Despite the apparent healthiness of fitspiration content, cross-sectional studies have reported negative associations of fitspiration images on various measures of body image. Holland and Tiggemann [60] demonstrated that women who post fitspiration images on Instagram scored significantly higher on drive for thinness, bulimia, drive for muscularity, and compulsive exercise, but not body dissatisfaction, compared to women who posted travel images on Instagram. In contrast, Fardouly, Willburger, and Vartanian [43] found that viewing fitspiration images on Instagram was positively associated with body dissatisfaction in U.S. and Australian women, as opposed to total Instagram use that was not correlated with body dissatisfaction and that both internalization and appearance comparison tendency mediated this effect. In line with Holland and Tiggemann's findings [60], the authors showed that viewing fitspiration images on Instagram was positively associated with drive for thinness, and the frequency of comparison to fitspiration images was a significant mediator of the association between frequency of viewing fitspiration images and body dissatisfaction and drive for thinness in this population [43].

Mixed findings have been observed in laboratory settings regarding the impact of viewing fitspiration social media content on body image in adult women. Tiggemann and Zacchardo [57] showed that exposure to fitspiration images on a mock Instagram profile had a positive effect on motivation to pursue healthy goals to improve fitness and eat healthily; however, it led to significantly greater negative mood and body dissatisfaction than exposure to control travel images in young Australian women [57]. Mediation analyses showed that the negative effect of fitspiration images on body image was fully mediated by appearance-based social comparison, a tendency to make global social comparisons on the basis of appearance [57]. In contrast, Slater, Varsani, and Diedrichs [65] found no effect of fitspiration images on women's body satisfaction and body appreciation compared to viewing neutral images on Instagram in college women in the U.K. The authors also found that self-compassion quotes accompanying fitspiration images (i.e., text that conveyed the basic principles of self-compassion, self-acceptance, and understanding one's own imperfections) had a positive impact on body satisfaction

and mood and thus, could counteract the adverse impact of viewing fitspiration images on body image [57]. In their study, thin-ideal internalization, namely the incorporation of appearance standards promoted by the media into one's self-identity to the point that an individual desires or strives to meet the ideals, moderated some effects; women high in thin-ideal internalization (but not women low in thin-ideal internalization) reported significantly greater body satisfaction at post-exposure after viewing self-compassion images compared to those who viewed control images [57]. Findings from cross-sectional and laboratory studies thus suggest that exposition to fitspiration images on social media may promote negative body image in women, especially in those who have a high tendency to compare their physical appearance with others and those who score highly on thin-ideal internalization.

Self-Photo Activities on Social Media

Compared to men, women have been shown to put more effort into cultivating a socially desirable physical appearance online by editing social media photos, and this behavior may be driven by social comparison tendencies [44]. Women would be more likely than men to feel negatively about their body and to socially compare their bodies to others, and this, in turn, would predict negative effects of upward social comparison [44]. Among Australian adolescent girls, those who share self-images on social media have been shown to have significantly higher scores for overvaluation of shape and weight, body dissatisfaction, and internalization of the thin ideal compared to non-sharers [61]. Additionally, among girls who shared photos of themselves on social media, higher investment and manipulation of these photos (e.g., editing to enhanced thinness or attractiveness) were associated with greater overvaluation of shape and weight and body dissatisfaction [61].

Influence of Peer Feedback and Fat Talk on Social Media

Social media provide, unlike conventional media, a highly visible tribune for virtual discussions about personal eating and exercise habits, weight concerns, and idealized body shapes. In laboratory setting, mixed results have been observed regarding the effects of viewing an underweight peer's desire to lose weight in a mock Facebook profile as opposed to witnessing an overweight peer's desire to lose weight, with studies showing either a negative [40] or a neutral effect [41] on body satisfaction in Korean and U.S. women. The effect of peer's comments on those fat talk in a social media profile, on the other hand, has been shown to produce neutral effects on body image concerns in this population [40, 41], regardless of the body size of a fat talker or the cultural background of the social media user [40].

Veldhuis, Konijn, and Seidell [67] found an interaction between exposure to thin-media models images and peer comments on social media on objectified body consciousness. Among adolescent girls from the Netherlands, peer feedback normalized the perceptions that an extremely thin model might be set as an attainable body shape, and this effect existed primarily for girls higher in appearance schematicity (the extent to which an individual allocates meaning and importance to one's appearance) who demonstrated the highest levels of body awareness and body shame.

Altogether, findings from those few studies show that the impact of peer comments on social media may be more influential than the simple exposure to fat talk narratives or social media images of unrealistically thin women on body image concerns in adolescent and women.

Implications for Future Research

Findings from this review first indicate that more studies are needed to generate clear conclusions regarding the positive and negative effects of social media-delivered interventions on weight management in women. This field of research is at the early stage and numerous methodological questions remain unanswered. For instance, given the potential access and daily exposure of research participants to numerous social media platforms, can a stand-alone single-component social media-delivered intervention promote changes in body weight?; can these changes be sustained over time?; and what minimum dose of the social media exposition (e.g., one posting per week) is needed to promote behavior change and clinically significant weight management outcomes? In addition, Facebook is the only platform that has been evaluated in the context of single-component social media-delivered interventions for weight management in women; thus, further studies are needed to expand conclusions on other social media platforms such as Instagram, Twitter, and blogs. This review also showed that, interestingly, no study has yet bridged the influence of social media use on both weight- and body image-related outcomes in women. Numerous studies have, on the other hand, investigated the influence of social media on body image in adolescent and adult women. Laboratory-based, prospective, and cross-sectional study findings vary depending on the social media context, for instance exposition to fitspiration content, and the influence of peers' feedback. Future research should be dedicated at expanding our understanding of the moderators and mediators of the relationship between social media use and body image such as the protective role of social media literacy, which represents a promising avenue for social media interventions promoting positive body image. Last, studies should be performed to establish if social media is a feasible mode of delivery for interventions to help adolescent girls and adult women lose weight while advocating a healthy relationship with food and one's body

including positive body image perceptions. There will be methodological challenges that researchers and clinicians will have to tackle, but some examples to explore such approach that could be studied in a social media-delivered format include Health at Every Size® [102] and mindful eating [103] interventions which have been found to be effective in improving physical and physiological outcomes in women such as significant weight loss and decrease in dietary restraint and dieting behaviors [104].

Conclusions

This review highlighted recent research on the use of social media on weight-related and body image outcomes in adolescent girls and adult women. So far, no study has investigated the joint effect of social media exposure or intervention on both weight management and body image in adolescent girls and adult women (for instance, can social media promote weight loss while also enhancing body acceptance?). Findings support the feasibility, but not yet the efficacy of single component social media-delivered weight loss interventions in women. The influence of social media on body image has been shown to be mostly detrimental in women, but impact has differed depending on social media contexts and has been modulated by peer feedback, appearance comparison tendencies, social media literacy, internalization of the beauty ideal, and appearance schematicity.

Compliance with Ethics Guidelines

Conflict of Interest The authors declare they have no conflict of interest.

Human and Animal Rights and Informed Consent This article does not contain any studies with human or animal subjects performed by any of the authors.

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

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