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The effects of exposure to social media images of thin and average size women on body satisfaction among young women: Emotion regulation and self-efficacy as modulating factors



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ABSTRACT

Although appearance comparison has emerged as an important mechanism underlying the detrimental effects of exposure to idealized social media images on body image among young women, little is known regarding the role of the direction of these comparisons. In addition, to date, little attention has been paid to the role of self-regulation processes in these effects. A sample of 260 female students ($M_{\text{age}} = 19.6$) from a University in Paris completed an online survey where they were randomly assigned to view thin-ideal or average size social media images of women. Participants reported on state body satisfaction before and after exposure, as well as state appearance comparison and direction of appearance comparison, and trait emotion regulation difficulties and self-efficacy. Findings revealed no main effect of condition. However, among participants who engaged in upwards appearance comparison the thin-ideal condition was associated with greater decreases in body satisfaction. In addition, three-way interactions revealed that emotional regulation difficulties and self-efficacy both further moderated these effects. These findings suggest that self-regulation processes may be important to account for in the effects of exposure to social media images on body satisfaction among young women.

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1. Introduction

Sociocultural models of the development of body image concerns highlight the ways in which exposure to unrealistic and unattainable media images is associated with lower body satisfaction through unfavorable appearance comparisons with the bodies portrayed in such images (Saiphoo & Vahedi, 2019; Want, 2009). These detrimental effects on body satisfaction are most pronounced in situations in which the images depict bodies that are consistent with appearance ideals, and when the individuals viewing the image find themselves to be distant from the bodies portrayed. In this way, both the nature of media images and the way individuals evaluate them vis-à-vis of themselves have been found to contribute to the effects of media images on body satisfaction (Want, 2009). In addition to

both of these dimensions, however, the ways in which individuals are generally able to self-regulate may also be relevant. To date however, little research attention has been paid to the role of self-regulation in the effects of exposure to media images on body satisfaction. The aims of this study were therefore to begin bridging this gap by exploring the combined effects of the nature of media images, direction of appearance comparison, and trait level self-regulation on body satisfaction among young women.

1.1. The role of appearance comparison in the negative effects of media exposure on body image

Exposure to media images of ultra-slender, youthful, and toned women has been shown to have a detrimental effect on the body satisfaction of young women (Huang, Peng, & Ahn, 2021; Levine & Murnen, 2009). In contrast, exposure to average sized more realistic bodies has been shown to have fewer detrimental effects (Clayton, Ridgway, & Hendrickse, 2017; Halliwell, Dittmar, & Howe, 2005). Although much of the research related to the effects of media

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exposure has been conducted in the context of traditional media (e.g., magazines, television, etc.), more recently these findings have been replicated in the context of social media, with exposure to unrealistic social media images of women associated with decreases in body satisfaction (Saiphoo & Vahedi, 2019) while more realistic images have fewer negative effects on body image (Rodgers, Paxton, & Wertheim, 2021). Together, therefore, mounting evidence exists for images of thin-ideal women to be more detrimental to body satisfaction as compared to more realistic images of average size women.

Sociocultural theories posit that appearance comparison is an important mechanism underpinning the effects of media exposure on body satisfaction (Want, 2009). Building upon social comparison theory (Festinger, 1954), appearance comparison is posited to occur with media images when individuals compare their own body with that portrayed. Such comparisons have been described as upwards, meaning the image is considered to be more attractive and closer to appearance ideals than oneself, downwards such that the individual considered themselves to be more attractive than the person portrayed in the image, or lateral in that the individual finds themselves to be equally attractive (Fuller-Tyszkiewicz et al., 2019). Unsurprisingly, upwards appearance comparisons have been found to be most closely associated with body image concerns (Fuller-Tyszkiewicz et al., 2019). A growing body of research has focused on exploring the extent to which individuals engage in comparison with images on social media, and the effects of such comparisons on body image (Fardouly, Diedrichs, Vartanian, & Halliwell, 2015; Rodgers et al., 2021). However, previous work has primarily focused on the type of comparison (i.e., appearance comparisons), or frequency, but has not examined the potentially differential effects of upward and downward, or even lateral, comparisons. In the context of traditional media, it has been shown that on average appearance comparisons made by women with media images are upwards (Tiggemann & Polivy, 2010). However, as social media may portray a range of appearances on social media, upwards appearance comparisons may not be the only direction in which comparisons to occur. This is an important gap as social media is a platform that exposes users to both commercially-generated and user-generated content and may therefore offer a wider variety of appearances that traditional media, leading to a greater range of appearance comparison experiences among users.

In correlational work, while upwards comparison with highly-visual social media has been found to be associated with greater body dissatisfaction, downwards comparison revealed no such association (Fox & Vendemia, 2016; Saunders & Eaton, 2018). In another correlational study, downwards comparisons to images of a range of targets on Facebook (family members, close and distant peers, and celebrities), was associated with higher levels of body dissatisfaction (Fardouly & Vartanian, 2015).

In the context of daily life, evidence has emerged for the detrimental role of upwards appearance comparison with social media images on the body image of women (Fardouly, Pinkus, & Vartanian, 2017). Similarly, in other studies exploring the direction of appearance comparisons in daily life (not specifically with media images) findings have revealed that upwards comparisons are more closely associated with poor body image, while downwards and lateral comparisons appear unrelated to body image (Fuller-Tyszkiewicz et al., 2019). These findings converge with those of other previous work utilizing daily life contexts, in which reporting engaging in downwards appearance comparisons with media images was associated with greater body dissatisfaction than upwards comparisons (Leahey & Crowther, 2008). Moreover, emerging evidence suggests that individual processing styles may strengthen the effects of upwards comparisons specifically with media images on greater body dissatisfaction (Ridolfi, Myers, Crowther, & Ciesla, 2011).

In the context of experimental work focused on media exposure, it is well established that increased frequency of appearance comparisons with media images is associated with greater increases of body dissatisfaction (e.g., Dougherty & Krawczyk, 2018; Want, 2009). However, to date investigations of the role of the direction of appearance comparison in the effects of social media images on body image are lacking. Therefore, an aim of this study was to examine the ways in which direction of appearance comparison may be related to the effects of exposure to social media images of women who more or less closely approximate appearance ideals.

1.2. Emotion regulation and self-efficacy as moderating mechanisms

Although appearance comparison has been identified as an important mechanism underlying the effects of media exposure on body image, other inter-individual characteristics may also play a role, such as emotion regulation and self-efficacy. The Differential Susceptibility to Media Model (DSMM, Valkenburg & Peter, 2013), posits that the impact of media exposure can be conceptualized as occurring through the cognitive and emotional effects of the exposure. Therefore, individuals' capacity to regulate the emotional impact of media exposure would be an important modulator of the effect of social media exposure on outcomes such as body image.

General self-efficacy is defined as the belief in one's own abilities to organize and execute sequences of actions to achieve certain outcomes (Bandura, 1997). Although self-efficacy can be defined in a domain-specific manner, the feeling of being able to achieve specific goals across a large number of domains is defined as General Self-Efficacy (GSE, Luszczynska, Scholz, and Schwarzer (2005)). GSE can be characterized as a trait construct, universal, present in all individuals to varying degrees; with little cross-cultural variability (Bandura, 2002). Feelings of self-efficacy can be used to employ coping strategies to regulate emotions (Gunzenhauser et al., 2013) and stress (Bandura, 1997).

Individuals' self-efficacy can enhance or inhibit their motivation to act. Furthermore, previous studies have shown that those with a low sense of self-efficacy may experience higher depression and anxiety and feelings of powerlessness and pessimistic thoughts (Muris, 2002). In general, GSE is positively associated with individuals' self-regulatory abilities, i.e., the effective ability of individuals to carry out and modulate their reactions and behavior and inhibit their impulsive responses to a stimulus or desired element (Luszczynska, Gibbons, Piko, & Tekozel, 2004).

Emotional regulation has been shown to play an important role in the modulation of the effects of body dissatisfaction induced by media exposure (Naumann et al., 2016; Wade, George, & Atkinson, 2009). Indeed, body dissatisfaction holds a strong affective component and therefore, the use of emotion regulation in the aftermath of media exposure participates in increasing or decreasing the impact of media images on body image. Similarly, self-efficacy represents a more cognitive component of self-regulation, and represents the thoughts and cognitive processes used to regulate negative states (Rudolph, Flett, & Hewitt, 2007). Given that body image also includes cognitive evaluative components, cognitive strategies may also contribute to modulating the effects of media image exposure on body image (McComb & Mills, 2021).

Although research is scant in this area, emerging findings support this theoretical pathway. In an interesting study, participants were allocated to either view unaltered social media images with which they were instructed to make appearance comparisons, or landscape social media images (McComb & Mills, 2021). As expected, those exposed to the images of women rather than landscapes reported greater increases in dissatisfaction related to weight and appearance. In addition, among those exposed to the images of women, higher levels of appearance perfectionism were associated with higher weight and appearance dissatisfaction after exposure to

the images and this relationship was accounted for by an indirect association via dimensions of self-regulation, specifically rumination and catastrophizing (McComb & Mills, 2021). In addition, among youth from Singapore, exposure to social media was found to be most strongly associated with perceptions of failing to meet peer norms (i.e., social standards) in terms of visible consumption among those with low ability to self-regulate (Ho, Shin, & Lwin, 2019). While not specific to body image these findings provide support for the role of self-regulation as a moderator of the relationship between social media use and perceptions of meeting peer and social standards. Furthermore, in an experimental study among young women, self-reported emotion regulation difficulties reported the greatest declines in mood after exposure to thin-ideal media images, providing further support for the moderating role of this dimensions (Humbel et al., 2018). Finally, in another experimental study, women with eating disorders were prompted to utilize adaptive or maladaptive emotional regulation strategies after viewing thin-ideal images (Neuman et al., 2016). As anticipated, findings revealed that employing the adaptive emotion regulation strategies minimized the effects of the media exposure, while the maladaptive strategy produced the opposite effect. Thus, further work is warranted exploring the role of self-regulation as a moderator of the effects of exposure to social media images on body image.

1.3. The current study

The aim of this study was therefore to explore both direction of appearance comparison, and self-regulation (emotion regulation and self-efficacy) as moderators of the effects of exposure to thin or average size women on social media on the body satisfaction of young women. Although body size is independent of perceived attractiveness, it is a key dimension upon which young women typically compare their appearance to that of others (Fuller-Tyszkiewicz et al., 2019). We hypothesized that (1) young women exposed to social media images of thin women (thin-ideal condition) would report larger decreases in body satisfaction as compared to young women exposed to social media images of average size women (average condition). In addition, we hypothesized that (2) changes in body satisfaction from pre to post exposure would be associated with the direction of appearance comparison with the women portrayed, such that participants who engaged in upward comparisons with the social media images would report larger decreases in body satisfaction compared to those who engaged in lateral or downward comparisons. Moreover, we hypothesized that (3) the direction of appearance comparison would moderate the effect of condition on changes in body satisfaction such that the greatest decreases in body satisfaction would be reported by participants exposed to social media images of thin women (thin-ideal condition). Finally, we sought to examine the role of self-regulation. Specifically, we hypothesized that (4) lower self-regulation (poorer emotion regulation and lower self-efficacy) would moderate the effects of condition on body satisfaction such that these effects would be greatest for participants with lower self-regulation. Moreover, we hypothesized the existence of a 3-way interaction such that the effects of condition on changes in body satisfaction would be greatest among participants who engaged in upward appearance comparisons and reported low self-regulation.

2. Methods

2.1. Stimuli selection

Two authors (OZ, MB) independently searched for images of women on Instagram on accounts open to the public based on the following criteria (i) the image had to contain a woman, seen from the front, (ii) only one person could be present in the photo, (iii) the

women had to be judged by both authors to illustrate the thin-ideal or to be of average body size. The two authors then agreed to keep only those images for which there was a consensus on these criteria. The images included were of women with typically White features although a range of skin tones were represented, and who were wearing revealing clothing such as swimwear (see [supplementary materials](#) for a full description of the stimuli). The resulting set of images was used for the pretest. A sample of $n = 118$ female first-year psychology students from the Université Paris Nanterre (Mean age = 20.1) was recruited to rate the preliminary stimulus set. Data from five participants who did not complete all the questionnaire were excluded.

The initial pool of thirty Instagram photos were rated using 6 questions: (1) Do you think this person corresponds to social standards of beauty? (on a scale ranging from 1 (*completely disagree*) to 6 (*completely agree*)); (2) How much would you like to look like the person in the photo? (on a scale ranging from 1 (*Absolutely not*) to 10 (*Absolutely*)); (3) How attractive does this person seem to you? (on a scale ranging from 1 (*Absolutely not*) to 10 (*Absolutely*)); (4) How likely do you think it is that this is an advertisement? (on a scale ranging from 1 (*completely disagree*) to 6 (*completely agree*)); (5) Do you think young women are the target audience for this product? (on a scale ranging from 1 (*completely disagree*) to 6 (*completely agree*)); (6) Do you think you are the target demographic for this product (on a scale ranging from 1 (*completely disagree*) to 4 (*completely agree*)). An exploratory factor analysis was conducted on mean the scores for each question for each picture. The overall model fit was a satisfactory fit to the data (TLI = 0.83, BIC = -1063.2, RMSEA = 0.07). In addition, our exploratory factor analysis showed a positive correlation between the latent thin-ideal and average size items, $r = 0.45$. Cronbach's alphas for both the thin ideal ($\alpha = 0.92$) and average ($\alpha = 0.92$) set of items showed excellent reliability. The analysis favored a 2-dimensional model grouping average size models with one dimension and thin ideal models on the other. The 10 images in each category with the highest average scores on these latent variables were retained as our final stimuli. The images used are available on request from the authors.

2.2. Participants and procedures

Our sample was composed of 260 female first-year psychology students at the Université Paris Nanterre ($M_{\text{age}} = 19.6$, $SD = 4.64$, 92.1% with a high school degree, 5.4% already had a bachelor degree from another specialty). Students were recruited via an online platform for psychological studies at University Paris Nanterre (Sona systems) for a study focused on "Opinions on Instagram." After providing informed consent, students were invited to complete an online survey. The study was approved by the appropriate University authorities and all procedures complied with the standards of the 1964 Helsinki declaration.

Participants were randomly allocated to view one of the two sets of images identified as described above, namely they viewed either thin-ideal images or average size women. In each experimental condition, participants were exposed to 10 photos of women from Instagram. For each image, participants were asked to answer the following question "Is the background of this picture ideal for an Instagram post?" as a filler task and to ensure they directed their visual attention towards the image. Each picture was presented on a separate page. Participants completed measures of state body satisfaction before and after viewing the images. In addition, they completed a state measure of appearance comparison and direction of appearance comparison, and trait measures of self-regulation after exposure to the images.

Table 1
Descriptive Statistics (n = 260).

	Condition	Mean per condition (Mean Overall)	SD per condition (Mean Overall)	Minimum	Maximum
Change in state body satisfaction	Thin-ideal	2.294 (2.09)	5.743 (6.36)	-10.63	19.25
	Average	2.112	7.542	-17.00	32.75
State appearance comparison	Thin-ideal	2.751 (2.63)	1.815 (1.81)	1.00	7.00
	Average	2.512	1.795	1.00	7.00
Emotion regulation	Thin-ideal	2.676 (2.64)	0.687 (0.69)	1.17	4.56
	Average	2.598	0.694	1.28	4.39
Self-efficacy	Thin-ideal	2.918 (2.96)	0.554 (0.54)	1.30	4.00
	Average	3.020	0.54	1.10	4.00
Social media use	Thin-ideal	3.518 (3.53)	0.706 (0.67)	1	4
	Average	3.521	0.660	2	4

2.3. Measures

2.3.1. State body satisfaction

State body satisfaction was assessed before and after being exposed to the images via three visual analog scales asking participants to estimate how satisfied they were with their weight, their appearance, and their muscularity ranging from 0 (*Not at All*) to 100 (*Extremely*), with higher scores indicating greater body satisfaction (Heinberg & Thompson, 1995). The mean score was calculated across the three items and good internal reliability was found $\alpha_{Pre} = 0.72$, $\alpha_{Post} = 0.75$. Body satisfaction difference scores were calculated by subtracting the post -exposure score from the pre-exposure score, such that negative scores indicated a decrease in state body satisfaction.

2.3.2. State appearance comparison

The State Appearance Comparison scale (Tiggemann & McGill, 2004) includes three items scored on a 7-point scale ranging from 1 = *No comparison* to 7 = *A lot of comparison*. An example item is "Please rate the extent to which you compared your appearance to that of the individuals in the images." Higher scores indicate greater state appearance comparison. In the current sample the internal reliability was high, $\alpha = 0.71$.

2.3.3. Direction of state appearance comparison

A single item was used to assess the direction of appearance comparison with the women portrayed in the images (i.e., Please rate how you think the individuals in the pictures compare to you in terms of attractiveness?). The item was rated on a Likert-type scale with responses ranging from 1 = *A lot less attractive than me* to 5 = *A lot more attractive than me*.

2.3.4. Self-efficacy

The French version of the General Self-Efficacy Scale (Dumont, Schwarzer, & Jerusalem, 2000; Saleh, Romo, & Camart, 2016) was used to assess participants' sense of self-efficacy, and their belief in their confidence in being able to engage in a behavior. This scale includes 11 items rated on a 4-point scale ranging from 1 = *Not at all true* to 4 = *Totally true*, with higher scores indicated greater self-efficacy. An example item is, "It is easy for me to maintain my focus on my goals and accomplish my goals." In the current sample the internal reliability was high, $\alpha = 0.86$.

2.3.5. Difficulties in emotion regulation

The French version of the Difficulties in Emotional Regulation Scale (Victor & Klonsky, 2016) was used to measure difficulties in emotion regulation. The 18 items are rated on a 5-point scale ranging from 1 = *Almost never* to 5 = *Almost always*, with higher scores indicating greater difficulties with emotion regulation. An example item is "I am confused about how I feel". In the current sample, the internal reliability was high, $\alpha = 0.87$.

2.3.6. Social media use

We measured the frequency of social media use with an item: "I spend time on social media (i.e., Facebook, Instagram, Twitter, etc.," rated on a Likert scale from 1 (*Never*) to 5 (*Always*).

2.4. Data analyses

Multiple linear regression models were employed to examine the study hypotheses. The model included the body satisfaction difference scores as the dependent variable.

All predictor variables were mean-centered. All of the variables were entered as main effects, controlling for state appearance comparison. For this variable, two scores were calculated. First, a median-split was performed to create two groups of participants: an upwards comparison group including those who felt less attractive than the women in the images (coded -0.5), and a downwards/lateral comparison group containing those who felt as or more attractive than the women in the photos (coded +0.5). This score was used for *main analyses*. The choice to dichotomize moderator variables was based on conceptual and theoretical reasoning. Indeed, the extant literature suggests that the relationships between appearance comparison and body image may be different for unfavorable (i.e., upward) comparisons, and more similar and less strong for lateral and favorable comparisons as mentioned in the introduction section.

Second, a score was computed with three categories: an upwards comparison group including those who felt less attractive than the women in the images (scores of 1 and 2), a lateral comparison group (score of 3, the midpoint) containing those who felt as attractive than the women in the photos and downward comparison (score of 4 and 5) for those who felt more attractive than the women in the photos. This score was used for *sensitivity analyses* in order to increase the reliability of our results despite the fact that the design of this study was not initially intended for this purpose.

In addition, the two-way interaction condition \times direction of appearance comparison, and both the condition \times emotion regulation, and condition \times self-efficacy interactions were included. Finally, two three-way interactions were included: condition \times direction of appearance comparison \times emotion regulation/self-efficacy. Only 7 participants had missing data on the variables of interest, and there were not replaced. We used the same analyses for both the main analyses and the sensitivity analyses.

3. Results

3.1. Descriptive statistics

Using the median-split scores, upwards or downwards/lateral comparisons were reported by $n = 62$ and $n = 69$ participants in the thin-ideal and average size conditions respectively, while $n = 77$ and $n = 52$ reported engaging in downwards/lateral comparisons. When using the three-categories scores, upwards comparisons were reported respectively by $n = 18$ and $n = 18$ participants in the thin-ideal

Table 2
Bivariate Correlations Among Study Variables (n = 260).

	1	2	3	4	5
1. Change in state body satisfaction					
2. State appearance comparison	0.27***				
3. Self-efficacy	0.17**	-0.17			
4. Emotion regulation	0.12*	0.25***	-0.38***		
5. Time spent on social media	-0.02	0.03	-0.11	0.09	
6. Upwards appearance comparison	0.09	0.18**	0.09	0.009	0.034

*p < .05 **p < .10. ***p < .001

and average size conditions respectively, while n = 67 and n = 76 reported engaging in downwards comparisons and n = 33 and n = 44 in lateral comparisons. All descriptive statistics and the bivariate relationships among study variables are available in Tables 1 and 2.

3.2. Main analyses

The overall model predicting change in body satisfaction was statistically significant, $F(13,239) = 2.53, p = .003, R^2_{adj} = 0.07$. As presented in Table 3, the main effect of condition was not significant, $b = 0.02, 95\% \text{ CI} [-0.22, 0.26], t(239) = 0.38, p = .93, \eta^2_p = .03$, therefore providing no support for our first hypothesis that women exposed to social media images of thin-ideal woman would report larger decreases in body satisfaction compared to those exposed to images of average sized women. In contrast, our findings did support the second hypothesis as the main effect of the direction of appearance comparison was significant, $b = 18.38, 95\% \text{ CI} [4.56, 32.50], t(239) = 2.56, p = .01, \eta^2_p = .025$. The contrasts were such that compared to those reporting lateral or downwards comparisons, those reporting upwards comparison revealed greater decreases in body satisfaction.

Regarding the third hypothesis, in contrast, a significant two-way condition × direction of appearance comparison interaction was found, $b = -0.32, 95\% \text{ CI} [-0.81, 0.17], t(239) = 3.20, p = .002, \eta^2_p = .04$, such that larger decreases in body satisfaction were reported by those who engaged in upwards appearance comparisons in the thin-ideal condition. Regarding hypothesis four, no significant condition × self-efficacy interaction existed, $b = -0.04, 95\% \text{ CI} [-0.31, 0.23], t$

$(239) = -0.28, p = .77, \eta^2_p = .001$. Similarly, no significant condition × emotion regulation interaction was present, $b = 0.38, 95\% \text{ CI} [-2.15, 2.91], t(239) = 0.30, p = .77, \eta^2_p = .001$.

Regarding the fifth hypothesis, findings from the three-way interactions, both the condition × direction of appearance comparison × emotional regulation interaction and the condition × direction of appearance comparison × self-efficacy interaction were significant, respectively, $b = 0.76, 95\% \text{ CI} [0.23, 1.28], t(239) = 2.83, p = .005, \eta^2_p = .034$ and $b = 0.68, 95\% \text{ CI} [0.13, 1.23], t(239) = 2.45, p = .015, \eta^2_p = .009$. Probing of the interactions showed that the simple effect of difficulty with emotional regulation was significant only among participants exposed to the images of average women who engaged in upwards appearance comparison with the images, $b = 3.88, 95\% \text{ CI} [-6.63, -1.13], t(232) = 2.77, p = .006$. In other words, among participants who viewed the average images and engaged in upwards appearance comparisons, higher difficulties in emotional regulation were associated with lower body satisfaction. All other simple effects were nonsignificant, ($ps > 0.11$), although the patterns descriptively matched our hypotheses (see Fig. 1).

Regarding self-efficacy, probing of the three-way interaction showed a significant effect only among participants allocated to the average condition who reported engaging in downwards/lateral appearance comparisons, $b = 5.23, 95\% \text{ CI} [2.35, 8.12], t(232) = 3.57, p < .001$. Thus, among women exposed to the images who engaged in downwards/lateral comparison, high self-efficacy was associated with a higher body satisfaction at posttest. All other simple effects were nonsignificant, ($ps > 0.24$), although the patterns descriptively matched our hypotheses (see Fig. 2).

3.3. Sensitivity analyses

Sensitivity analyses were conducted using the three-category coding of appearance comparison such that downwards, lateral, and upwards were represented by different scores. The overall model predicting change in body satisfaction was statistically significant, $F(14,238) = 1.89, p = .029, R^2_{adj} = 0.04$. As presented in Table 3, the main effect of condition was not significant, $b = 0.43, 95\% \text{ CI} [-1.51, 2.39], t(232) = 0.44, p = .65, \eta^2_p = .03$, therefore not providing support for our first hypothesis that women exposed to social media images of thin-ideal woman would report larger decreases in body satisfaction compared to those exposed to images of average sized women. Our findings did not support the second hypothesis as the main effect of

Table 3
Fixed Effects Parameter Estimates.

Effect	Estimate	SE	Lower	Upper	β	95% Confidence Interval		
						df	t	p
(Intercept)	2.261	0.476	1.324	3.199	0.000	232	4.752	< 0.001
State appearance comparison	-0.473	0.236	-0.938	-0.008	-0.134	232	-2.005	0.046
Emotion regulation	-1.233	0.726	-2.663	0.198	-0.134	232	-1.698	0.091
Self-Efficacy	0.499	0.995	-1.461	2.460	0.043	232	0.502	0.616
Social media use	0.576	0.601	-0.607	1.760	0.060	232	0.959	0.338
Thin - Average	0.33	0.952	-1.546	2.206	0.052	232	0.346	0.729
Downward - Lateral	-1.326	0.929	-3.157	0.505	-0.209	232	-1.427	0.155
Lateral - Upward	0.264	1.342	-2.38	2.907	0.042	232	0.197	0.844
Thin - Average x Downward - Lateral	-3.419	1.856	-7.075	0.237	-0.539	232	-1.843	0.067
Thin - Average x Lateral - Upward	-0.664	2.657	-5.899	4.571	-0.105	232	-0.250	0.803
Emotion regulation x Thin - Average	-1.088	1.418	-3.882	1.706	-0.119	232	-0.767	0.444
Self-efficacy x Thin - Average	-0.718	1.988	-4.635	3.199	-0.062	232	-0.361	0.718
Emotion regulation x Downward - Lateral	3.838	1.508	0.867	6.809	0.418	232	2.545	0.012
Emotion regulation x Lateral - Upward	-1.629	1.962	-5.495	2.238	-0.178	232	-0.830	0.407
Self-Efficacy x Downward - Lateral	4.044	1.882	0.337	7.751	0.351	232	2.149	0.033
Self-Efficacy x Lateral - Upward	-2.061	2.812	-7.603	3.48	-0.179	232	-0.733	0.464
Emotion regulation x Thin - Average x Downward - Lateral	4.811	3.024	-1.147	10.77	0.524	232	1.591	0.113
Emotion regulation x Thin - Average x Lateral - Upward	-2.397	3.936	-10.152	5.358	-0.261	232	-0.609	0.543
Self-Efficacy x Thin - Average x Downward - Lateral	6.905	3.783	-0.550	14.359	0.598	232	1.825	0.069
Self-Efficacy x Thin - Average x Lateral - Upward	-3.057	5.631	-14.152	8.038	-0.265	232	-0.543	0.588

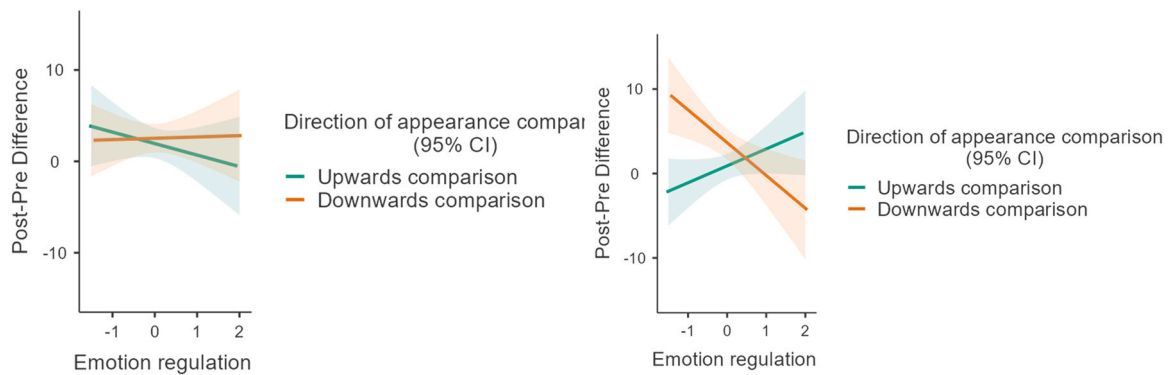


Fig. 1. Simple effects on change in body satisfaction for the condition × direction of appearance comparison × emotion regulation three-way interaction.

the direction of appearance comparison was not significant ($p > .83$).

Regarding the third and fourth hypothesis, we did not find a significant two-way condition × direction of appearance comparison interaction or condition × self-efficacy interaction ($p < .80$). Similarly, no significant condition × emotion regulation interaction was present ($p < .55$).

Regarding the fifth hypothesis, findings from the three-way interactions, the condition × direction of appearance comparison × self-efficacy interaction was significant only for the lateral-upward comparison, $b = -7.94$, 95% CI [-15.70, -0.18], $t(233) = -2.018$, $p = .045$. Probing of the three-way interaction showed that for the participants exposed to the "thin" pictures and who are in an upward comparison, the higher the self-efficacy, the higher the post-test body satisfaction, $b = 5.22$, 95% CI [2.31, 8.14], $t(233) = 3.53$, $p < .001$.

We found a marginally significant effect of the condition × direction of appearance comparison × DERS interaction for the lateral-upward comparison, $b = -5.28$, 95% CI [3.15, -11.49], $t(233) = -1.677$, $p = .095$. Probing of the three-way interaction showed that for the participants exposed to the "thin" pictures and are in lateral comparison, the less difficulties in regulating one's emotions, the higher the body satisfaction at post-test, $b = -4.85$, 95% CI [-8.28, -1.44], $t(233) = -2.79$, $p = .006$. All other simple effects were nonsignificant, ($ps > 0.24$), although the patterns descriptively matched our hypotheses (see Fig. 3).

Regarding self-efficacy, probing of the three-way interaction showed a significant effect only among participants allocated to the average condition who reported engaging in downwards/lateral appearance comparisons, $b = 5.23$, 95% CI [2.35, 8.12], $t(232) = 3.57$, $p < .001$. Thus, among women exposed to the images who engaged in downwards/lateral comparison, high self-efficacy was associated with a higher body satisfaction at posttest. All other simple effects were nonsignificant, ($ps > 0.24$), although the patterns descriptively

matched our hypotheses (see Fig. 4). A summary table of hypotheses is available in Table 4.

4. Discussion

The aim of this study was to explore the roles of the direction of appearance comparison as well as self-efficacy and emotional regulation in the effects of exposure to social media images of thin and average women on body satisfaction. Overall, our findings provide additional support for the direction of appearance comparison as a mechanism accounting for the effects of social media images on body satisfaction. In addition, our findings provide preliminary support for the role of regulatory processes such as self-efficacy and emotion regulation in the effects of social media exposure on body satisfaction among young women. Taken together, these results suggest that incorporating dimensions of self-regulation into theoretical models of media effects would be a fruitful direction, and that additional work in this area is warranted.

In our sample, no support was found for our first hypothesis, namely that the social media images of thin women would be associated with greater decreases in body satisfaction as compared to the images of average size women. This finding departs from previous work in traditional media (e.g., Clayton et al., 2017; Giorgianni, Danthinne, & Rodgers, 2020; Halliwell et al., 2005). It is also divergent from research that has suggested that body positive social media content is less detrimental to body satisfaction as compared to thin-ideal images (Rodgers et al., 2021). It may be that the difference in body size between the two types of stimuli was not sufficient to elicit different effects in a non-clinical population. Indeed, other work has found that the most favorable effects on body image are found when using substantially larger bodied stimuli (e.g., Clayton et al., 2017). Similarly, Halliwell et al. (2005) utilized stimuli that were ultra-thin and drawn from fashion magazines (therefore much thinner than average women), within a sample of women with

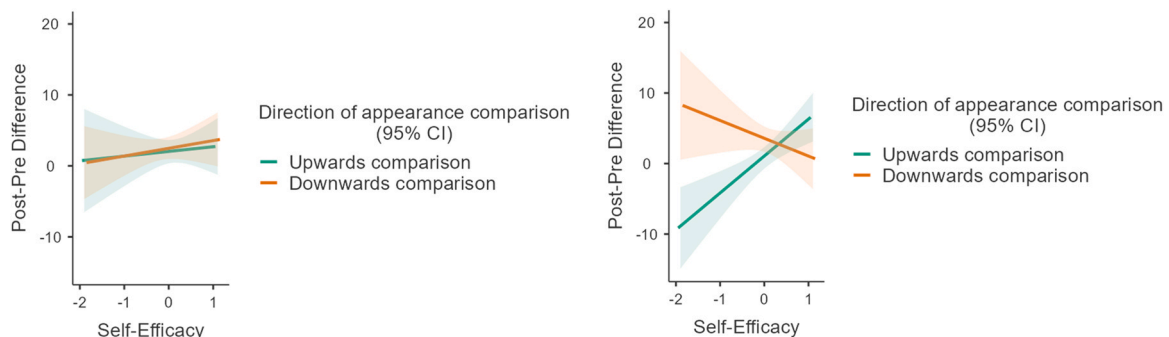


Fig. 2. Simple effects on change in body satisfaction for the condition × direction of appearance comparison × self-efficacy three-way interaction.

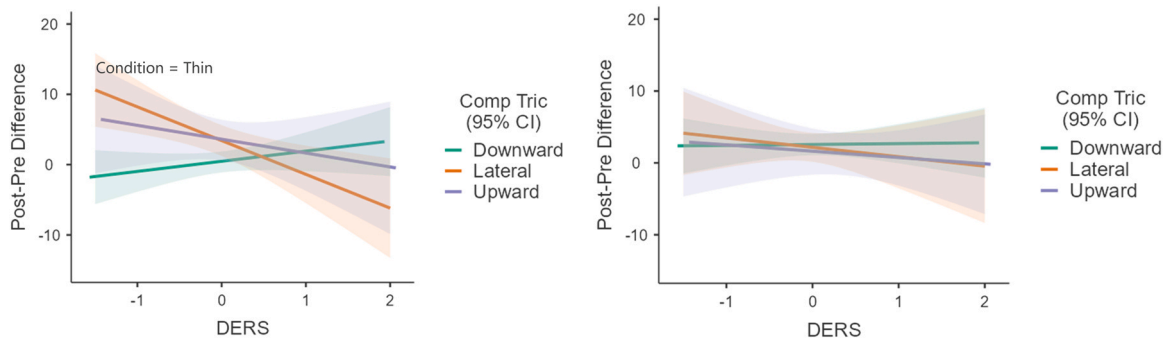


Fig. 3. Simple effects on change in body satisfaction for the condition × direction of appearance comparison × emotion regulation three-way interaction.

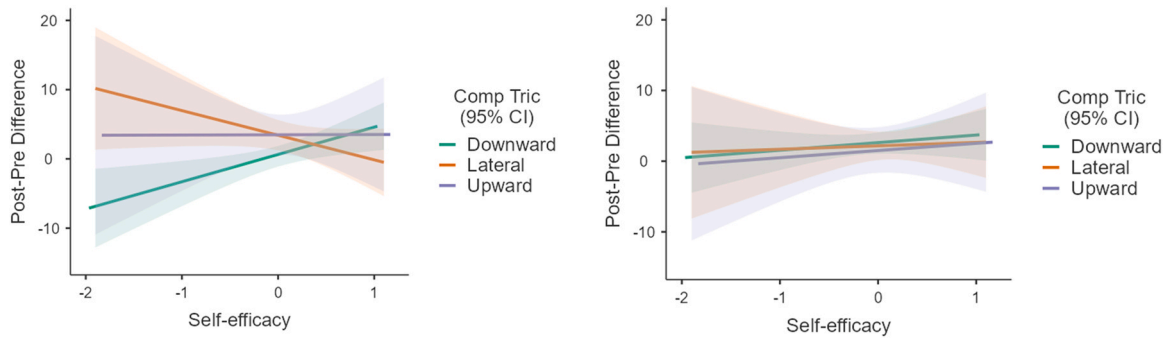


Fig. 4. Simple effects on change in body satisfaction for the condition × direction of appearance comparison × self-efficacy three-way interaction.

Table 4

Support for the hypotheses in the main and sensitivity analyses.

Hypothesis	Main Analyses (Status Median-Split)	Sensitivity Analyses (Status Three-Categories)
Hypothesis 1: Main effect of Condition	Not supported	Not supported
Hypothesis 2: Main effect of Direction of Appearance Comparison	Supported	Not supported
Hypothesis 3: Condition × Direction of Appearance Comparison interaction	Supported	Not supported
Hypothesis 4: condition × self-efficacy and condition × emotion regulation	Not Supported	Not Supported
Hypothesis 5: condition × direction of appearance comparison × emotional regulation and the condition × direction of appearance comparison × self-efficacy interaction	Supported	Supported

a current or past eating disorder. Thus, the previous work that found effects may have created a greater dose, and examined effects among groups that are more vulnerable to these effects. However, it may also be that with the rise of body positive content that adopts an explicit stance of aiming to dismantle pressures to attain the thin-ideal by highlighting aspects of appearance that are typically framed as “flaws,” posts that portray idealized if average sized bodies may still be experienced as constituting appearance pressures.

Regarding the second hypothesis, however, our findings provided confirmation of the role of appearance comparison as a predictor of change state body satisfaction following exposure to the social media images. In this way, in our sample upwards appearance comparison (as compared to downwards or lateral comparisons) was associated with greater decreases in body satisfaction after viewing the images. This is consistent with previous research highlighting engaging in appearance comparisons as a principal mechanism underlying the effects of exposure to social media images on body image (Want, 2009). However, more importantly it contributes to the smaller body of research to have explored the direction of appearance comparison (Fuller-Tyszkiewicz et al., 2019), as opposed to the extent to which individuals engaged in comparisons. While expected, this is a useful finding to confirm, particularly in the context of the null results for hypothesis 1. Thus, it may be that more than the body size per se of the women featured in the images, the participants’ perceptions of their attractiveness as compared to the

women portrayed was the greater predictor of change in body satisfaction.

It was further hypothesized that the direction of appearance comparison would moderate the effect of condition on changes in body satisfaction. Consistent with this, our findings revealed that the direction of appearance comparison moderated the effect of condition on body satisfaction such that the greatest negative effects on body satisfaction were observed among those allocated to the thin-ideal condition who engaged in upwards appearance comparisons. Again, these findings are consistent with previous work highlighting the role of appearance comparisons with unrealistic images in the detrimental effects of media exposure on body image, including in the context of social media (Saiphoo & Vahedi, 2019; Want, 2009).

Finally, we sought to examine the role of dimensions of self-regulation, specifically self-efficacy and emotional regulation as moderators of the effects of condition on body satisfaction. Our findings revealed no support for an interaction between condition and either of these dimensions. In contrast, a condition × direction of appearance comparison × self-regulation 3-way interaction did emerge, such that among participants allocated to viewing the average images, and engaging in upwards comparisons, poorer emotional regulation was associated with lower body satisfaction after exposure to the images. This provided partial support for our hypothesis, as the interaction was not entirely in the expected direction. The pattern suggests that emotional regulation may be most

implicated in situations in which individuals are conducting unfavorable comparisons with images that are further from the thin-ideal. This effect was mirrored in the findings for self-efficacy, where among participants allocated to viewing the average images, and engaging in upward comparisons, higher self-efficacy was associated with higher body satisfaction after exposure to the images. In other words, self-regulation emerged as a risk (poor emotional regulation) or a protective factor (self-efficacy) in situations in which upwards comparisons were being made with images to which responses might be more variable across individuals and/or the target was more ambiguous in terms of its attractiveness compared to the participant. In such situations, individual-level regulation contributed to changes in body satisfaction. In situations in which either downwards or sideways comparisons were being made (thus not constituting a threat to body image), or situations in which the target for comparison was clearly unrealistic, self-regulation played less of a role.

Should they be confirmed, these findings regarding self-regulation have important implications for theories of media exposure and the inclusion of emotional factors and individual risk and protective factors. As described above, the DSMM (Valkenburg & Peter, 2013), posits that the effects of media exposure can be conceptualized as occurring through the cognitive and emotional effects of the exposure. Our findings suggest that it may be that individual differences in the capacity to regulate such emotional effects may play a most important role in situations in which the level of emotional activation is low enough that some individuals may be able to regulate it effectively (i.e., an ambiguous body image threat as opposed to an extremely idealized image). Given that previous research has suggested that individuals with higher body image preoccupations are more likely to interpret ambiguous stimuli as body image threats (Rodgers & DuBois, 2016), this may therefore be most relevant to individuals who are most vulnerable.

Building on these findings, future research should seek to replicate and extend these results to other groups, as well as utilize stimuli that present an ever-wider array of body shapes and sizes. In addition, exploring these relationships using design able to capture in the moment emotional variations such as ecological momentary assessment procedures (Fuller-Tyszkiewicz et al., 2019). In addition, integrating these self-regulation effects with frameworks describing the benefits of mindfulness in the context of body image threats such as those provoked by media exposure would be a fruitful direction. Self-regulation has the potential to emerge as a modifiable intervention target and mindfulness may be a useful tool in helping individuals to be less cognitively and emotionally reactive to media images, and to better regulate heightened activation following media exposure thus limiting negative effects on body image (Fuller-Tyszkiewicz, 2019).

The results from the sensitivity analyses further illuminated these findings. In those analyses, only the hypothesis regarding the three-way interaction was supported. These findings may be interpreted as providing further support for the usefulness of considering upwards appearance comparisons as particularly relevant to body image (Leahey & Crowther, 2008). In addition, the fact that the three-way interaction was significant provides further support for the usefulness of considering the role of dimensions of self-regulation as central individual level moderators of the effects of exposure to media images. The robustness of these findings again highlights the potential for these variables to constitute useful targets for intervention.

The present study includes a number of limitations. First the sample included female college students in France, and this may limit the generalizability of findings, although it is also notably different from the predominantly English-speaking samples used in the extant literature. Second, despite having piloted the stimuli, the manipulation of thin versus average images was not entirely

successful based upon our manipulation question, although more directly assessing participants perception of how thin the women in the images were might have better capture the effect we were aiming to elicit. It should also be noted that a single exposure of a few minutes to images may constitute a relatively weak induction of the phenomenon we wanted to explore. However, we would like to emphasize that despite the relatively modest manipulation, changes in body satisfaction were observed although the effect sizes remain modest. Therefore, a daily and repeated exposure to this type of image may potentially produce much stronger effects on body satisfaction. Such effects of repeated exposure should be investigated in future studies aiming to quantify the impact of exposure to appearance-focused images in social media, including possible ceiling effects. Third, although we assessed the direction of appearance comparison as related to attractiveness, we did not assess comparison specifically related to body size, nor the extent to which participants thought that achieving the appearance portrayed was realistic for them or not was not assessed, and this might be important to examine in the future. Fourth, it should be noted that our study employed a self-report measure of appearance comparison rather than a direct manipulation of appearance comparison. Future studies should focus on (i) manipulating the direction of appearance comparison or (ii) using more refined measures of the direction and effects of appearance comparison. Moreover, social media use was assessed by a single item capturing frequency and it would be important to also be able to distinguish between time spent on photo-based platforms versus those that may be less appearance-focused. Moreover, our study focused on changes in state appearance satisfaction, and examining these relationships as related to other dimensions such as behavioral intentions to modify weight and shape would be useful. Finally, we used an emotional regulation scale to determine whether these were stronger or weaker, but it did not allow us to identify specifically which dimensions of emotional regulation were involved. Future studies may further address this issue.

Despite these limitations, this study makes a useful contribution to the literature by examining the role of self-regulation processes in the effects of exposure to social media images on body image among young women. Our findings suggest that self-regulation may play the greatest role in the context of media images that are less stereotypical depictions of the thin-ideal. Pending replication, these findings may provide support for emotional regulation as an intervention target in prevention and interventions efforts aiming to decrease the detrimental effects of social media use on body image.

CRediT authorship contribution statement

Oulmann Zerhouni: Conceptualization, Methodology, Software, Formal analysis, Supervision, Project administration, Writing – review & editing. **Valentin Flaudias:** Conceptualization, Data curation, Writing – review & editing, Methodology. **Maréva Barré:** Investigation, Resources, Software. **Rachel Rodgers:** Supervision, Writing – original draft, Writing – review & editing, Formal analysis, Conceptualization.

Data Availability

Data will be made available on request.

Declarations of interest

None.

Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at [doi:10.1016/j.bodyim.2022.09.011](https://doi.org/10.1016/j.bodyim.2022.09.011).

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