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The effect of #enhancement-free Instagram images and hashtags on women's body image

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Abstract

Instagram is a popular social networking site where users can post and share photos. One increasing trend on the site is the posting of natural and unaltered images. The present study aimed to experimentally investigate the effect of enhancement-free (i.e., no makeup, no digital alteration) Instagram images and their accompanying hashtags on women's body image. Participants were 204 female undergraduate students who were randomly assigned to view one of three sets of Instagram images: standard (i.e., idealised) images, enhancement-free images, or the same set of enhancement-free images with hashtags indicating their enhancement-free nature. As predicted, exposure to enhancement-free images resulted in significantly lower facial dissatisfaction than exposure to the standard images. However, the addition of hashtags resulted in significantly greater facial dissatisfaction than the same enhancement-free images with no hashtags. There were no significant effects for body dissatisfaction. Effects on facial dissatisfaction were moderated by self-photo manipulation, whereby the difference between standard and enhancement-free images was greater for women who digitally manipulate their own photos. Overall, the findings suggest that, under some conditions, enhancement-free images have the potential to protect Instagram users against appearance concerns.

Keywords: body image; social media; Instagram; selfie; body positive; digital alteration

1. Introduction

An extensive research literature has concluded detrimental effects of exposure to idealised images presented in fashion magazines or on television for women's body dissatisfaction and disordered eating (for meta-analyses, see Grabe, Ward, & Hyde, 2008; Groesz, Levine, & Murnen, 2002; Want, 2009), although one meta-analysis has limited effects to the subgroup of women with pre-existing body image concerns (Ferguson, 2013). A more recent but growing body of research has demonstrated similar effects for social media, most commonly Facebook (for a systematic review, see Holland & Tiggemann, 2016). However, social media differ from traditional print or televised media in that the content is largely peer-generated: users create their own personal profiles, share and distribute information, and form online relationships and interact with others in their networks. The research identifies photo-based activity, such as posting photos or viewing and commenting on others' photos, as particularly problematic for body image (Cohen, Newton-John, & Slater, 2018; Holland & Tiggemann, 2016; Meier & Gray, 2014).

Accordingly, research attention has turned to the photo-based social networking site of Instagram. Instagram is a platform dedicated purely to the posting and sharing of photos with friends or the wider public. As of June 2018, Instagram has more than one billion active users globally (Statista, 2019). In Australia, the site has increased markedly in popularity, especially among 18 to 29-year-olds (Sensis, 2018). Emerging correlational research has shown that Instagram use is related to a variety of body image concerns (Ahadzadeh, Sharif, & Ong, 2017; Cohen, Newton-John, & Slater, 2017; Fardouly, Willburger, & Vartanian, 2017; Feltman & Szymanski, 2018; Hendrickse, Arpran, Clayton, & Ridgway, 2017). Initial experimental research has also confirmed that acute exposure to idealized Instagram images has a detrimental impact (compared to control images) on body image, allowing the drawing

of more causal inferences (Brown & Tiggemann; 2016; Cohen, Fardouly, Newton-John, & Slater, 2019; Tiggemann, Hayden, Brown, & Veldhuis, 2018; Tiggemann & Zaccardo, 2015).

Just as is the case for traditional media (Levine & Murnen, 2009; Want, 2009), the negative effect of social media has generally been attributed to the process of social comparison. Young women and girls report that they compare their appearance to both close friends and distant peers on social media (Chua & Chang, 2016; Fardouly, Diedrichs, Vartanian, & Halliwell, 2015; Fardouly & Vartanian, 2015) and that such comparisons are most often upward in direction (Fardouly, Pinkus, & Vartanian, 2017). It is likely that this comes about because users tend to upload only their “best” photos, ones in which they look good or are doing something noteworthy (Manago, Graham, Greenfield, & Salimkhan, 2008; Tiggemann & Slater, 2014). Certainly, many women and girls report spending considerable time and effort in taking and selecting the photos that they post on Instagram, which can then be further enhanced with Instagram’s filter tool and digitally altered using Photoshop or other editing software (Chua & Chang, 2016; Dumas, Maxwell-Smith, Davis, & Giulietti, 2017). As a result, even though it consists largely of peers, the Instagram environment presents unrealistic and idealized images for women and girls.

Correlational research has shown that certain aspects of online self-presentation, namely investment in self-photos and their digital manipulation, are related to body dissatisfaction and eating concerns among samples of adolescent girls (McLean, Paxton, Wertheim, & Masters, 2015) and young adult men and women (Lonergan et al., 2019). Similarly, Mills, Musto, Williams, and Tiggemann (2018) have demonstrated that the taking and posting of self-photos on social media leads to feelings of increased anxiety and lower physical attractiveness. In addition, Veldhuis, Alleva, Bij de Vaate, Keijer, and Konijn (2018) provide evidence to suggest that negative body image may serve as motivation and precede engagement in various “selfie” behaviours, such as preoccupation with and editing of self-

photos. In one experimental study, Kleemans, Daalmans, Carbaat, and Anschutz (2018) applied filters and digitally altered female self-portrait images to remove eye bags and wrinkles, and to reshape legs to be thinner and waists slimmer. They found that exposure to the digitally manipulated images led to more body dissatisfaction among adolescent girls than did the original images, especially for girls high in social comparison tendency. Taken together, these results suggest that both the editing of photos and viewing of edited photos are associated with body image concerns. However, research is yet to examine whether photo investment and editing affect the relationship between viewing edited images and body dissatisfaction. It seems likely that women who are highly invested in and edit their own photographs might also pay more attention to the idealised and edited aspects of the photographs posted by others and, in turn, be more susceptible to the detrimental effects of viewing edited images.

In response to the plethora of idealised images found on Instagram and other social media sites, recent years have seen the emergence of the 'body positive' movement. This is an online social movement that seeks to challenge current dominant and narrow beauty ideals and to promote body acceptance (Cwynar-Horta, 2016; Sastre, 2014). One strategy is for women to celebrate their bodies exactly as they are, by posting natural photographs of themselves, that is, without makeup, in natural poses, and without any filters or digital enhancement. The logic is that viewing such natural photos will lead to normalization and acceptance of real bodies and less upward comparison, in turn lowering women's insecurities about their own appearance (Sastre, 2014). Only one study has examined any aspect of such natural images. Recently, Fardouly and Rapee (2019) compared the effect of makeup and no-makeup selfies as posted by three makeup artists. They found that exposure to a small number of no-makeup selfies interspersed with a larger number of makeup selfies did not decrease facial satisfaction, whereas viewing only makeup selfies did. Here we sought to

examine the effect of viewing enhancement-free photographs more broadly, in comparison to the typically idealised photographs posted on Instagram.

Users who upload enhancement-free photographs most often include an accompanying hashtag (e.g., #nomakeup, #noedit). As well as allowing other Instagram users to search for such content, these hashtags explicitly inform viewers that the photo is enhancement-free in order to normalise a natural appearance and fight rigid beauty ideals. However, it is possible that these hashtags have consequences in their own right. Indeed, according to the logic of social comparison theory (Festinger, 1954), the drive for self-evaluation means that people seek out comparisons with others who are most similar to themselves. To the extent that the hashtags point to the images as more natural and realistic, their perceived similarity and self-relevance may be increased. In addition, the presence of the hashtag may directly draw attention to the physical appearance of the woman in the photo. Thus hashtags might, somewhat paradoxically, serve to encourage appearance comparison and thereby result in greater body dissatisfaction.

Thus far, no research has examined the effect on body image of #enhancement-free hashtags attached to Instagram images. However, one study has examined a parallel phenomenon within fashion magazines. Specifically, Tiggemann, Slater, and Smyth (2014) found that adding a label to fashion images that explicitly stated that the image had *not* been digitally altered had no effect (positive or negative) on women's body dissatisfaction. However, Instagram hashtags differ from fashion magazine labels in that they are individualized and written by the woman herself, who is also a peer (similar other), whereas the labels on magazine images are written by a third person about the model (a dissimilar other). Hence hashtags may carry more salience and elicit greater attention.

Thus the present study had two major aims. The first was to experimentally investigate the effect of enhancement-free images on body and facial dissatisfaction. Based

on the logic of social comparison theory, the reasoning of the body positive movement, and Fardouly and Rapee's (2019) initial result, we predicted that enhancement-free images would lead to less upward social comparison, body dissatisfaction and facial dissatisfaction than would standard Instagram images of the same women. The second aim was to investigate the effect of #enhancement-free hashtags. Based on our own reasoning above, we tentatively predicted that enhancement-free images with hashtags would elicit greater body and facial dissatisfaction than those same images without hashtags. Finally, we tested whether the effect of image type and hashtag might be moderated by self-photo investment and self-photo manipulation.

2. Method

2.1. Design

The study employed a between-subjects experimental design with three levels of the independent variable of Instagram image type (standard, enhancement-free, and enhancement-free plus hashtag). The dependent variables were body and facial dissatisfaction (controlling for baseline scores) and amount and direction of social comparison. Self-photo investment and self-photo manipulation were tested as potential moderating variables.

2.2. Participants

Participants were 204 female undergraduate students from Flinders University, aged between 17 and 30 years ($M = 20.26$, $SD = 2.62$). The majority identified as Caucasian/White (75.5%), with 22.5% Asian, 1.5% African, and 0.5% 'other.' Participants were randomly allocated to one of the three conditions of the experimental design (subject to equal n), resulting in 68 participants per condition. According to Cohen's (1992) guidelines, this provided sufficient statistical power to detect a medium-sized effect at $\alpha = .05$ with power .80. Existing Instagram experimental studies (e.g., Brown & Tiggemann, 2016; Cohen et al.,

2019; Tiggemann et al., 2018) have returned medium effect sizes for differences between idealized and other images.

2.3. Materials

2.3.1. Stimulus materials. Three sets of stimulus materials were constructed for the study. One set consisted of standard Instagram images, one of enhancement-free images (of the same women), and one of the same enhancement-free images with the addition of hashtags. The standard images showed thin and attractive women with smooth skin wearing make-up and the colours of the photo were bright (implying digital colour alteration). The enhancement-free images depicted the same women wearing little to no make-up, their skin had some blemishes, and the colours of the photo appeared natural. Each set contained 15 images, consisting of three images (close up “selfie,” upper body, full body) of five different women.

All images were sourced from public Instagram profiles. First, individual enhancement-free images were located using the hashtags #nomakeup, #makeupfreeday, #nofilter, and #noedits. The image was then traced back to the profile of the user to source the remainder of the enhancement-free images (as indicated by hashtag or caption) and the standard images (no enhancement-free hashtags or captions) of that particular woman. In this way, a total of six images (three standard, three enhancement-free) for each of five women were selected. Pilot testing (three independent raters from the target age group, 5-point scales) confirmed that the enhancement-free images (without any hashtag) were judged as wearing significantly less make-up (enhancement-free $M = 2.04$, $SD = 0.74$; standard $M = 4.58$, $SD = 0.66$), $t(88) = 17.21$, $p < .001$, $d = 3.62$, and as being significantly less edited than the standard images (enhancement-free $M = 2.17$, $SD = 0.81$; standard images $M = 4.22$, $SD = 0.67$), $t(88) = 13.08$, $p < .001$, $d = 2.76$. In addition, each woman was rated on the basis of all

six photographs as attractive ($M = 4.17$, $SD = 0.80$), thin ($M = 4.07$, $SD = 0.70$), and having an attractive face ($M = 4.00$, $SD = 0.76$).

Each image was presented within the Instagram frame with the Instagram logo, default profile picture icon, and a different mock profile name (e.g., gemma_xo) for each of the five women above the photo. In the enhancement-free plus hashtag condition, hashtags were placed directly below the image (as in Instagram). The wording of the hashtag was identical or similar to that accompanying the original Instagram image (e.g., #makeupfreeselfie, #filterfreefriday, #noediting). Images were presented to participants in a slideshow format via the PowerPoint application on an Apple iPad.

2.3.2. Body dissatisfaction and facial dissatisfaction. Following Heinberg and Thompson (1995), visual analogue scales (VAS) were used to obtain measures of mood and body dissatisfaction before and after viewing the Instagram images. The five mood items (not analysed here) were included to divert the focus from appearance. The two body dissatisfaction items were ‘weight dissatisfaction’ and ‘appearance dissatisfaction.’ Following Tiggemann et al. (2018), two facial dissatisfaction VAS (‘facial feature dissatisfaction’ and ‘facial skin dissatisfaction’) were also included, as of increased relevance in the posting and viewing of “selfies.” Each scale consisted of a 100-mm horizontal line, with endpoints labelled *none* and *very much*. Participants were instructed to indicate how they feel “right now” by placing a vertical mark on the line. Responses were measured from the left-hand pole to the nearest millimetre. Body dissatisfaction and facial dissatisfaction were calculated by averaging scores on their two respective items to produce indices ranging from 0 to 100, with higher scores indicating greater dissatisfaction. VAS carry the advantage that precise responses are difficult to recall and they are sensitive to small changes. They also have demonstrated reliability and validity as a measure of body dissatisfaction (Heinberg & Thompson, 1995). In the present sample, internal reliability was high for body dissatisfaction

at pre- ($\alpha = .83$) and post-exposure ($\alpha = .87$), and acceptable for facial dissatisfaction at pre- ($\alpha = .72$) and post-exposure ($\alpha = .78$).

2.3.3. Amount of appearance comparison. The amount of appearance comparison participants engaged in while viewing the images was assessed by Tiggemann and McGill's (2004) State Appearance Comparison Scale. The scale comprises three items which ask participants to rate on a 7-point Likert-type scale the extent to which they thought about their appearance when viewing the Instagram photos (1 = *no thought about appearance*, 7 = *a lot of thought*), and the extent to which they compared their overall appearance and specific body parts, respectively, with those of the people they saw in the photos (1 = *no comparison*, 7 = *a lot of comparison*). The three items were averaged to produce a score ranging from 1 to 7, with higher scores indicating greater state appearance comparison processing. Tiggemann and McGill (2004) reported good internal reliability ($\alpha = .91$), as was found in the present sample ($\alpha = .91$). To address facial comparison in particular, an additional item asked participants to indicate how much (1 = *no comparison*, 7 = *a lot of comparison*) they compared their face to the faces of the women in the images.

2.3.4. Direction of appearance comparison. An adaptation of Tiggemann and Polivy's (2010) social comparison measure was used to determine direction of comparison. Using three 7-point Likert scales, participants were asked to rate the attractiveness, thinness, and facial attractiveness of the women in the photos in comparison to themselves (1 = *much less attractive/thin*, 4 = *about the same*, 7 = *much more attractive/thin*). Higher scores indicate upward comparison, with lower scores indicating downward comparison.

2.3.5. Manipulation check. To assess whether the hashtags were noticed and attended to among those who viewed them, participants were asked to indicate how many of the images had a hashtag (*none*, *about a quarter*, *about one third*, *about half*, *about two thirds*, *about three quarters*, *all of them*). To reduce focus on the experimental hashtag

manipulation, this question was preceded by two others, asking how many of the images they viewed were “selfies” and how many were full-body shots.

2.3.6. Instagram use. Participants were asked to indicate whether or not they had an Instagram account, how much time on average they spend on Instagram per day (*0-10 minutes, 10-30 minutes, 30-60 minutes, 1-2 hours, 2 or more hours*), how many people they follow, and how many followers they have on Instagram (*0-5, 5-10, 10-100, 100-500, >500*).

2.3.7. Self-photo investment. Participants’ investment in the photos they upload of themselves on Instagram was assessed by the 8-item Self Photo Investment Scale of McLean et al. (2015). The scale consists of 8 visual analogue scales, each with a statement at one end (e.g., “I don’t care about the photos I share/post”) and an opposing statement at the other end (e.g., “I carefully select the best photo to share/post”). Participants were asked to place a mark on the line to indicate their position on the pair of statements. Responses were measured from the left anchor, summed (three reverse-coded items), and divided by ten, to produce an overall photo investment score ranging from 0 to 80. The scale had acceptable internal reliability ($\alpha = .80$).

2.3.8. Self-photo manipulation. Four items from the Self Photo Manipulation Scale (McLean et al., 2015) were used to measure the extent to which participants digitally alter photos of themselves before posting them on Instagram. Participants were asked to indicate how often they “use a filter to change the overall look of your photo,” “make yourself look skinnier,” “use apps to smooth skin or hide blemishes” and “whiten teeth,” on a 5-point scale (*1 = never, 5 = always*). Responses were summed to produce a score ranging from 4 to 20. In the present sample, the scale had acceptable internal consistency ($\alpha = .71$).

2.4. Procedure

Following approval by the Institutional Research Ethics Committee, participants were recruited for a study entitled “Recreational Use of Instagram” and were tested individually or

in pairs in the Psychology and Media research laboratory. After reading the Letter of Introduction and providing consent, participants completed some introductory social media questions and the pre-exposure VAS measures of mood, body dissatisfaction, and facial dissatisfaction. Participants were then presented with an Apple iPad on which they viewed a slideshow of one of the three sets of 15 experimental Instagram images. Images were set to transition vertically, in line with the direction of naturalistic Instagram scrolling. Each image was displayed for 20 seconds. To ensure that participants attended to the images, they were asked to rate the visual quality (e.g., blurriness, composition) of each photograph (1 = *very poor*, 5 = *excellent*).

Following the slideshow, participants completed the post-exposure VAS, as well as the measures of amount and direction of appearance comparison and the manipulation check. Finally, participants completed the general trait-like measures of Instagram use, self-photo investment, and self-photo manipulation, before having their height and weight measured (with their permission). Testing sessions lasted 30-40 minutes and participants received course credit or were reimbursed \$15 for their participation. They were debriefed following completion of data collection through an online system.

3. Results

3.1. Characteristics of the Sample

Participants were aged between 17 and 30 years, with a mean age of 20.26 years ($SD = 2.62$). Mean body mass index (BMI) was 22.92, which is in the “normal” weight range. By far the majority (93.6%) had an Instagram account, with median use 30–60 minutes per day.

A series of one-way ANOVAs showed that the three experimental groups did not differ on age, $F(2, 201) = 1.65, p = .196, \eta_p^2 = .02$, BMI, $F(2, 199) = 0.58, p = .562, \eta_p^2 = .01$, or time spent on Instagram, $F(2, 201) = 0.24, p = .788, \eta_p^2 = .00$. Importantly, neither did they differ on pre-exposure levels of body dissatisfaction $F(2, 201) = 0.32, p = .728, \eta_p^2 = .01$, or

facial dissatisfaction, $F(2, 201) = 0.04, p = .961, \eta_p^2 = .00$, confirming that random assignment to experimental condition was successful. Finally, there were no differences on the trait measures of self-photo investment, $F(2, 201) = 0.57, p = .565, \eta_p^2 = .01$, and self-photo manipulation, $F(2, 201) = 0.16, p = .856, \eta_p^2 = .00$, demonstrating that these were not reactive to experimental manipulation.

3.2. Manipulation Check

An independent-samples *t*-test confirmed that participants who viewed (enhancement-free) images with hashtags attached ($M = 5.76, SD = 0.65$; mode = 6 = *all of them*) reported viewing significantly more hashtags than participants who viewed images (standard or enhancement-free) with no hashtags ($M = 1.26, SD = 0.84$; mode = 1 = *none*), $t(201) = 38.86, p < .001, d = 6.01$. This confirmed that participants had noticed the hashtags in the enhancement-free plus hashtag condition.

3.3. The Effect of Image Type on Body and Facial Dissatisfaction

An initial 3 (image type) \times 2 (time) repeated measures ANOVA showed that there was a significant main effect of time for both body dissatisfaction, $F(1, 201) = 9.83, p = .002, \eta_p^2 = .05$, and facial dissatisfaction, $F(1, 201) = 8.04, p = .005, \eta_p^2 = .04$. In the case of facial dissatisfaction, this was modified by a significant interaction, $F(2, 201) = 3.83, p = .023, \eta_p^2 = .04$. The means in Table 1 indicate that body dissatisfaction increased after viewing the images. Facial dissatisfaction also increased after viewing the standard and enhancement-free plus hashtag images, but decreased a little after viewing the enhancement-free images (without hashtags).

In order to test the specific predictions, an ANCOVA (pre-exposure score entered as covariate) with planned comparisons using the LMatrix subcommand was performed. The first planned comparison compared enhancement-free against standard images (contrast: +1 -1 0). The second planned comparison addressed the effect of hashtags and compared

enhancement-free images with and without hashtags (contrast: 0 +1 -1). The resulting adjusted means are also displayed in Table 1. For body dissatisfaction, neither the first, $F(1, 200) = 1.21, p = .272, \eta_p^2 = .01$, nor second planned comparison proved significant, $F(1, 200) = 0.74, p = .390, \eta_p^2 = .00$. There was no difference between the experimental groups on body dissatisfaction.

For facial dissatisfaction, however, the first planned comparison was significant. The adjusted means indicate that, as predicted, viewing enhancement-free images resulted in significantly less facial dissatisfaction than viewing standard images, $F(1, 200) = 5.18, p = .024, \eta_p^2 = .03$. The second planned comparison was also significant whereby, as predicted, enhancement-free images with hashtags led to greater facial dissatisfaction than viewing the same images with no hashtags, $F(1, 201) = 6.30, p = .013, \eta_p^2 = .03$. A post hoc comparison of standard and enhancement-free images with hashtags showed that they did not differ from each other, $F(1, 133) = 0.05, p = .823, \eta_p^2 = .00$.

3.4. The Effect of Image Type on Appearance Comparison

Table 2 presents the means for the comparison measures. In terms of amount of comparison, there was no significant difference between any of the groups on amount of general appearance comparison, $F(2, 201) = 0.51, p = .599, \eta_p^2 = .01$, or facial comparison, $F(2, 201) = 0.26, p = .773, \eta_p^2 = .00$.

The means for direction of comparison indicate that comparison was generally upward. However, planned comparisons showed that the enhancement-free images elicited relatively less upward comparison on the basis of general attractiveness, $t(201) = 2.90, p = .004, d = 0.47$, and facial attractiveness, $t(201) = 2.67, p = .008, d = 0.44$, than did the standard images. In addition, the enhancement-free plus hashtag images elicited relatively greater upward comparison on the basis of attractiveness, $t(201) = 2.19, p = .030, d = 0.35$, and approached significance for facial attractiveness, $t(201) = 1.85, p = .065, d = 0.32$, than

the same images without hashtags. The (upward) direction of comparison on the basis of thinness did not differ between the groups, $F(2, 201) = 0.10, p = .990, \eta_p^2 = .00$.

To test whether amount or direction of comparison predicted increase in body or facial dissatisfaction across conditions, two hierarchical regressions were conducted. Pre-exposure body/facial dissatisfaction was entered on Step 1, followed by the relevant comparison measures on Step 2. For body dissatisfaction, it was found that Step 2 explained significant additional variance over initial body dissatisfaction, $R^2_{\text{change}} = .022, F_{\text{change}}(3, 199) = 9.46, p < .001$, with amount of appearance comparison ($\beta = .12, t(199) = 3.84, p < .001$) and upward direction of attractiveness comparison ($\beta = .08, t(199) = 2.82, p = .005$) as independent predictors. Likewise, amount of facial comparison ($\beta = .16, t(199) = 4.74, p < .001$) and upward direction of facial comparison ($\beta = .08, t(199) = 2.53, p = .012$) both predicted an increase in facial dissatisfaction after viewing the images, $R^2_{\text{change}} = .034, F_{\text{change}}(3, 199) = 19.40, p < .001$.

3.5. Moderating Role of Self-Photo Investment and Self-Photo Manipulation

A series of hierarchical multiple regressions was conducted to test the potential moderating roles of self-photo investment and self-photo manipulation. As the independent variable of image type had three levels, two dichotomous dummy-coded variables were created; the enhancement-free condition served as the reference group. As recommended by Aiken and West (1991), moderators were centred around the mean to reduce multicollinearity. The pre-exposure score was entered on Step 1, the image type dummy variables and the moderator on Step 2 (main effects), and the product terms on Step 3 (interactions). Moderation is established when the product term(s) offer significant prediction over and above the prior variables.

For body dissatisfaction, neither Step 2, $R^2_{\text{change}} = .001, F_{\text{change}}(3, 199) = 0.50, p = .681$, nor Step 3, $R^2_{\text{change}} = .003, F_{\text{change}}(2, 197) = 1.87, p = .156$, accounted for significant

additional variance when testing self-photo investment as a moderator. This was also the case for self-photo manipulation (Step 2 $R^2_{\text{change}} = .001$, $F_{\text{change}}(3, 199) = 0.55$, $p = .648$; Step 3 $R^2_{\text{change}} = .002$, $F_{\text{change}}(2, 197) = 1.31$, $p = .273$). Thus there was no moderation of the effect of image type on body dissatisfaction.

For facial dissatisfaction, Step 2 of the analysis with self-photo investment was significant, $R^2_{\text{change}} = .019$, $F_{\text{change}}(3, 199) = 6.44$, $p < .001$, with self-photo investment an independent predictor, $\beta = .11$, $t(199) = 3.35$, $p = .001$. However, Step 3 was not significant, $R^2_{\text{change}} = .001$, $F_{\text{change}}(2, 197) = 0.60$, $p = .550$. This pattern of results indicates that self-photo investment did not moderate the effect of image type, but rather, was associated with an increase in facial dissatisfaction in response to viewing the images regardless of experimental condition. In the regression analysis with self-photo manipulation, Step 2 was significant, $R^2_{\text{change}} = .012$, $F_{\text{change}}(3, 199) = 3.95$, $p = .009$ (photo manipulation $\beta = .07$, $t(199) = 2.01$, $p = .045$). Here Step 3 also offered significant additional prediction, $R^2_{\text{change}} = .006$, $F_{\text{change}}(2, 197) = 3.32$, $p = .038$, indicating a significant interaction between image type and self-photo manipulation.

To determine the nature of the interaction, the results were graphed. Following the recommendation of Aiken and West (1991), low and high self-photo manipulation were calculated as one standard deviation below and above the mean respectively. Figure 1 shows that for participants who viewed standard images, self-photo manipulation was positively associated with increased facial dissatisfaction. By contrast, for participants who viewed enhancement-free images (with or without hashtags), the extent to which they manipulated their own photos had little effect. Looked at differently, the difference between standard and enhancement-free images (without hashtags) was greater for women high, rather than low, on self-photo manipulation. Such women seemed particularly vulnerable to the effects of viewing standard (i.e., enhanced) Instagram images.

4. Discussion

The present study sought to examine aspects of the contemporary social trend of posting natural and unaltered images on social media. In this, the study had two separate but inter-related aims. The first was to experimentally investigate the effect of enhancement-free images on body and facial dissatisfaction. As predicted, exposure to enhancement-free images resulted in lower facial dissatisfaction than did viewing standard Instagram images. The second aim was to investigate the effect of the hashtags most often accompanying enhancement-free images. Here it was found that enhancement-free images with hashtags led to greater facial dissatisfaction than those same images without hashtags. In neither case was there any effect on body dissatisfaction. In addition, effects on facial dissatisfaction were moderated by self-photo manipulation whereby the difference between the standard and enhancement-free image conditions was greater for women who manipulated their own photos. As a whole, the study extends existing research on Instagram and body image by offering particular insight into the effect of enhancement-free images and hashtags.

The first major finding that enhancement-free images resulted in lower facial dissatisfaction than standard Instagram images is an important one. It extends Fardouly and Rapee's (2019) finding for a small number of makeup-free images to enhancement-free images more broadly. It is also consistent with the result of Kleemans et al. (2018) who compared standard Instagram photos with more manipulated ones, whereas we compared standard Instagram images with less manipulated ones. Together, the studies both point to the negative effect of digitally manipulated and otherwise enhanced images and suggest that viewing more naturalistic and less manipulated images might offer one way to counter this negative effect. Furthermore, while the enhancement-free images did not evoke less facial comparison than the standard images, that comparison was less upward in direction, consistent with the reasoning of social comparison theory (Festinger, 1954). Accordingly,

enhancement-free images on Instagram potentially present women with more realistic representations, expectations, and comparison targets.

The second major finding addresses a separate more practical issue, namely the effect of #enhancement-free hashtags. Although #enhancement-free hashtags may be valuable in helping search for and identify content, the study shows that they can have a negative effect in their own right. Consistent with our tentative prediction, viewing enhancement-free images accompanied by hashtags led to greater facial dissatisfaction than viewing exactly the same images but without the hashtags. This contrasts with the null effect on women's body dissatisfaction of disclaimer labels (stating that the image had not been digitally altered) added to fashion magazine advertisements, as found by Tiggemann, Slater, and Smyth (2014). However, the latter study did not measure facial dissatisfaction. In addition, Instagram hashtags are likely to carry greater salience than fashion magazine labels because they are individualized and written by a peer. Interestingly, here the enhancement-free images with hashtags also resulted in comparisons that were more upward in direction. That is, the women in the images were perceived as relatively more attractive when the image was accompanied by a hashtag indicating that it was a natural image. This carries the implication that viewers expect images to be enhanced in some way, what Marwick (2015) refers to as the "normative presumption of digital manipulation," and then when they are explicitly made aware that the image has not been altered, mentally recalibrate their judgements of attractiveness. Relatedly, the means indicate that the enhancement-free images with hashtags resulted in the same level of facial dissatisfaction as did the standard Instagram images. Thus it appears that the presence of the hashtag effectively "undoes" the benefits of posting an enhancement-free image. The finding also illustrates how features unique to social media (in this case hashtags) can impact body image in quite different ways from traditional media like fashion magazines.

The third finding that the effect of image type was moderated by self-photo manipulation indicates that those women who digitally modify their own photos were more reactive to the experimental manipulation. In particular, they experienced relatively greater facial dissatisfaction in response to the standard (enhanced) Instagram images than the enhancement-free images. It is possible that these women may have been more attuned to the extent of digital alteration on the viewed images. Alternatively, as suggested by Velhuis et al. (2018), level of photo-manipulation may reflect pre-existing body dissatisfaction and so act as a vulnerability factor, in line with general media effect studies (Ferguson, 2013; Groesz, Levine, & Murnen, 2002; Want, 2009). In addition, regardless of experimental condition, both self-photo investment and self-photo manipulation predicted an increase in facial dissatisfaction after viewing the images. And here effects were obtained following only brief (approximately 5 minutes) exposure. It seems plausible that, with continued exposure, such momentary increases in facial dissatisfaction in response to viewing Instagram images might cumulate to make vulnerable individuals increasingly dissatisfied over time, as suggested by Hargreaves and Tiggemann (2003) for media more generally. This would then play out at the trait level, consistent with correlational findings that investment in self-photos and their digital manipulation are related to trait levels of body dissatisfaction (Lonergan et al., 2019; McLean et al., 2015).

All the above results pertained to facial dissatisfaction and not to body dissatisfaction. It may simply be that the face is more salient in Instagram images where self-portraits (“selfies”) are common. Fardouly and Rapee (2019) likewise found differences on facial dissatisfaction but not overall appearance dissatisfaction. However, while all their images were focused on the face, here one-third of images were full-body shots and another third showed some body. It might also be that all forms of enhancement, whether it be makeup, filters (e.g., to smooth and brighten skin and eyes), or digital alteration (e.g., to remove spots

and other blemishes), are most frequently applied to the face, and thus there may have been relatively less alteration of body size or shape. In addition, Kleemans et al. (2018) found that facial enhancement was readily noted by their participants, but digital alterations of body size (reshaping legs to be thinner and waist to be slimmer) largely went unnoticed. Further, all the women in the viewed experimental images were thin and perceived thinness (as indicated by direction of comparison) did not differ between the experimental groups. It may be that enhancement-free images of thin women do not effectively challenge the thin ideal, as the body positive movement aims to do. Indeed, one of the recent feminist critiques of the body positive movement is that it has been appropriated by thin (and attractive and white) women (Cwynar-Horta, 2016; Sastre, 2014).

It needs to be noted that although there were no experimental effects of image type on body dissatisfaction, participants in all three conditions nevertheless reported an increase in body dissatisfaction after viewing the Instagram images. The observed significant main effect of time adds one more study to the growing body of experimental research showing negative effects of viewing attractive Instagram images on body satisfaction (Brown & Tiggemann, 2016; Cohen et al., 2019; Tiggemann & Barbato, 2018; Tiggemann et al., 2018; Tiggemann & Zaccardo, 2015). In addition, both state appearance comparison and an upward direction of comparison predicted increase in body dissatisfaction as is usually found (e.g., Tiggemann & Polivy, 2010), and consistent with general sociocultural models of body dissatisfaction (Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999; Tiggemann, 2011).

Taken together, the results have some important practical implications. The most obvious is that women should be encouraged to post more natural and enhancement-free images. It may well be that this act of 'reclaiming embodiment' is empowering for the woman herself (Cwynar-Horta, 2016), but more importantly, here we showed that it negated the usually obtained negative effects of viewing (standard) Instagram images on facial

dissatisfaction. The posting of enhancement-free images does seem an effective way to challenge, or at least decrease the power of, narrow beauty ideals and to normalize ‘normal’ appearances. However, the study also demonstrated one important caveat. The use of an accompanying hashtag to indicate explicitly to viewers that the image was not enhanced appeared to offset the benefit of viewing enhancement-free images. This of course represents a dilemma for individuals who wish to post such images. It likely would prove difficult to discourage women who upload enhancement-free images of themselves from adding hashtags to that effect, as these women need to distinguish the images from standard Instagram images in order to educate their viewers. At a broader societal level, we would be better served by an Instagram world where natural enhancement-free images are normal, rather than ‘special’ or ‘educational.’ This would go a considerable way to rendering the Instagram environment both more realistic and more benign.

On the basis of their result, Kleemans et al. (2018) suggest the possibility of a disclosure when opening an Instagram account that would remind viewers that the images on Instagram are often retouched and manipulated. Future research should test this suggestion. In addition, the coverage of media literacy programs, which have shown some efficacy (for a systematic review, see McLean, Paxton, & Wertheim, 2016), will need to be extended to include aspects unique to social media. Specifically, women and girls might be educated about the potentially detrimental impact of viewing idealized and edited Instagram images, and positive impact of viewing unedited images. Such programs will also need to include content on the appearance pressures inherent in posting one’s own photos, and the potential effects of the ‘social’ aspects of social media, such as ‘likes’, hashtags, and comments. Recently, McLean, Wertheim, Masters, and Paxton (2017) showed some success with a pilot social media literacy program. The present study also identifies investment in self-photos as a particular vulnerability factor. Thus women and girls should be dissuaded from judging their

own attractiveness or worth on the basis of the reception (e.g., number of ‘likes’) received by their posted photos. More generally, interventions aimed at decreasing levels of social comparison (with Instagram images and more generally) would also be helpful in reducing the negative effect of exposure to Instagram images.

Like in all studies, there are a number of limitations warranting acknowledgement. First, the sample consisted of Australian young adult women and thus results may not generalize to other groups. In particular, although young adults (the present sample) comprise the biggest users of Instagram (Sensis, 2018), Instagram is also used by a large number of adolescents who may be more vulnerable to the effects of both posting and viewing digitally enhanced images. Second, although the experimental protocol was designed to have high ecological validity (images and hashtags sourced from public Instagram accounts and viewed vertically on an iPad), the study took place in a laboratory setting. Third, there was no particular cover story and so there is the possibility of some demand effects. Fourth, findings are limited to the specific type of image presented. Here all images were of thin and attractive women. Logically, one might expect larger positive effects of viewing natural and enhancement-free images of women who are further from the societal beauty ideal. Fifth, the use of a set of real Instagram images meant that the extent and relative influence of specific forms of enhancement on body or facial dissatisfaction could not be determined, nor the effect of any differences in clothing or pose across conditions. Future research might investigate the independent effects of makeup, filters, and digital manipulation. Sixth, we used only one simple hashtag in the hashtag condition. In actuality, people often post multiple hashtags and may also include captions (text) accompanying their body positive natural images.

Despite the above limitations, the present study provides a novel contribution to the small but growing experimental literature surrounding social media and women’s body

image. In particular, the findings suggest that naturalistic enhancement-free Instagram images have the potential for considerable positive benefit, providing explicit attention is not brought to their enhancement-free nature by means of a hashtag. Accordingly, the findings well illustrate the complexity and elusive nature of contemporary social media processes and identify a number of avenues for future research.

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Table 1

Means (SD) and Adjusted Means (SE) for Body Dissatisfaction and Facial Dissatisfaction by Image Type

	Image Type		
	Standard	Enhancement-free	Enhancement-free plus hashtag
Body Dissatisfaction			
Pre-exposure	42.81 (22.77)	41.43 (23.29)	44.65 (24.57)
Post-exposure	45.87 (24.31)	42.63 (23.90)	47.20 (25.60)
Adjusted Mean	46.01 (1.25)	44.08 (1.25)	45.60 (1.25)
Facial Dissatisfaction			
Pre-exposure	39.56 (23.39)	39.11 (21.38)	40.20 (22.91)
Post-exposure	43.14 (26.09)	38.27 (22.82)	44.18 (25.33)
Adjusted Mean	43.18 ^a (1.37)	38.79 ^b (1.37)	43.63 ^a (1.37)

Note. Different superscripts denote a significant ($p < .05$) difference.

Table 2

Means (SD) for Amount and Direction of Comparison by Image Type

	Condition		
	Standard	Enhancement-free	Enhancement-free plus hashtag
Amount of Comparison			
Appearance	3.99 (1.74)	3.85 (1.69)	3.69 (1.74)
Facial	4.04 (1.97)	4.19 (1.80)	4.00 (2.02)
Direction of Comparison			
Attractiveness	5.74 ^a (1.13)	5.13 ^b (1.43)	5.59 ^a (1.04)
Thinness	5.44 (1.24)	5.44 (1.52)	5.47 (1.40)
Facial attractiveness	5.70 ^a (1.19)	5.16 ^b (1.23)	5.53 ^a (1.04)

Note. Different superscripts denote a significant ($p < .05$) difference.

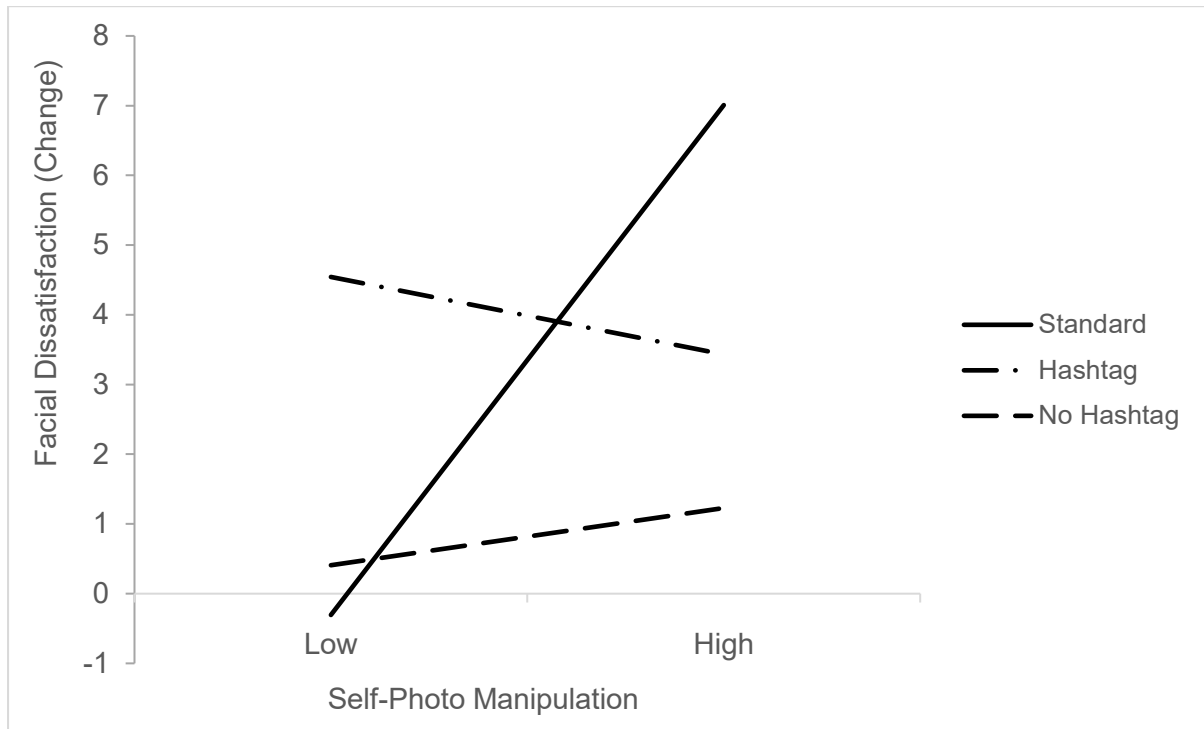


Figure 1. The relationship between self-photo manipulation and facial dissatisfaction by image type.