Uploading your best self: Selfie editing and body dissatisfaction

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ABSTRACT

Social media have given rise to new forms of self-presentation, in particular, the posting of self-portrait photos, commonly known as "selfies." The aim of the present study was to experimentally investigate the relationship between selfie editing and body dissatisfaction. Participants were 130 women aged 18–30 years who were asked to view Instagram images of thin women or of average-sized women, with a view to inducing body dissatisfaction in the former group. Participants were then asked to take a selfie on an iPad and were given 10 min. to edit the selfie. They completed state measures of mood, body dissatisfaction, and facial dissatisfaction at baseline, after viewing the images, and after editing their selfies. It was found that although viewing the thin images increased negative mood and body/facial dissatisfaction, experimental condition had no effect on the time spent or extent of editing of the selfie. However, taking and editing the selfie resulted in increased negative mood and facial dissatisfaction in both groups. Further, the observed extent of editing predicted the degree of increase in facial dissatisfaction. It was concluded that investing heavily in and editing one's self-presentation on social media is a detrimental activity for young women.

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1. Introduction

Although traditional media are still widely consumed, there has been a rapid rise in the use of Internet media, particularly social networking sites, such as Facebook, Instagram, and Twitter. Around 88 % of Australians now use social media, with over half of 18–29 year-olds accessing it more than five times every day (Sensis, 2018). Figures for the United States are similar, with 72 % of all Americans using social media (Pew Research Centre, 2019). A growing body of research has demonstrated that this use of social media is associated with body image concerns and disordered eating (for a systematic review, see Holland & Tiggemann, 2016). Just as is the case for traditional media, these effects have largely been explained in terms of two major theoretical perspectives. First, social comparison theory (Festinger, 1954) suggests that the drive for self-evaluation leads women to compare themselves with unrealistic and idealized media images, almost always constituting an upward comparison and resulting in dissatisfaction with their own body and appearance (Levine & Murnen, 2009; Want, 2009). Second, objectification theory (Fredrickson & Roberts, 1997) focuses on how media representations gradually socialize women to internalize an observer's perspective on themselves and come to view themselves in objectified terms, with such self-objectification being associated with a variety of negative body image outcomes (for a review, see Tiggemann, 2011). However, social media differ from traditional media formats like television and fashion magazines in that content is largely peer-generated: users can post their own photos and information on their personal profiles, they can browse material posted by others, and they can interact with others in their networks (via "likes" and comments). Of the many activities available on social media, it is those associated with the posting, viewing, and seeking feedback on photos that have been shown to be the most problematic for body image (Cohen, Newton-John, & Slater, 2017; Holland & Tiggemann, 2016; Meier & Gray, 2014).

One particular social media activity that has increased dramatically in recent years is the taking and posting of photos of oneself, commonly known as "selfies" (Jager, 2019). Selfies are defined as photos that one has taken of oneself with a smartphone or webcam that are usually shared to social media accounts (Oxford English Dictionary, 2014). A current search of the hashtag #selfie on Instagram yields 409 million posts (Instagram, Inc., 2019). The available research indicates that women post more selfies than men, and young adults and adolescents more than older adults (e.g., Dhir, Pallesen, Torsheim, & Andreassen, 2016). Selfie taking and posting have also been associated with a number of personality characteristics, specifically narcissism (for a review, see Weiser, 2017),

extraversion (Baiocco et al., 2017; Sorokowska et al., 2016), and social exhibitionism (Sorokowska et al., 2016).

More generally, selfies have been conceptualized as an important form of on-line self-presentation and impression management (Chae, 2017; Bij de Vaate, Veldhuis, Alleva, Konijn, & van Hugten, 2018). Accordingly, 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). Further, it has been argued that the very act of posting a picture of oneself on social media precisely to be looked at and commented on is inherently self-objectifying, as it definitionally involves considering oneself from an observer's perspective (Tiggemann & Barbato, 2018). In support, the number of selfies posted online has been related to trait levels of self-objectification (Lamp et al., 2019; Veldhuis, Alleva, Bij de Vaate, Keijer, & Konijn, 2018).

In this, it needs to be recognized that the actual posting of a selfie is more accurately considered as the endpoint of a lengthier and more complex process. Qualitative accounts indicate that many women and girls spend considerable time and effort in taking and selecting their selfies, for example, finding the best lighting and most flattering angle, which can then be further enhanced by filters or digital editing to maximize their appearance and appeal (Chua & Chang, 2016; Dumas, Maxwell-Smith, Davis, & Giulietti, 2017). Social networking sites like Instagram and Snapchat come with inbuilt filter tools, and there are now a large number of accessible smartphone applications ('apps') that can be easily downloaded to provide an array of editing features (e.g., remove blemishes, enlarge eyes). Survey data indicate that women report taking 2–5 selfies before choosing which one to upload, and spend about 10 minutes per day making selfies, with filters being the most popular editing tool (Bij de Vaate et al., 2018; Cohen, Newton-John, & Slater, 2018). In a recent focus group study, Baker, Ferszt, and Breines (2019) identified three themes in young women's overall use of Instagram: effortful posting (including time, effort, editing); promotion of self (the need to present their best self); and seeking engagement (the need to gain a desirable number of likes and/or comments).

In the first study to develop measures of these aspects of online self-presentation, McLean, Paxton, Wertheim, and Masters (2015) found that trait levels of self-photo investment (effort in choosing and concern about the photo's reception) and self-photo manipulation were related to body dissatisfaction and eating concerns among adolescent girls. These findings have been replicated subsequently with samples of young adult women (Cohen et al., 2018) and mixed-gender samples (Lonergan et al., 2019). In addition, Lamp et al. (2019) found that self-photo manipulation was correlated with feelings of disingenuous self-presentation which were, in turn, correlated with depressive symptoms. Chae (2017) found no relationship between facial appearance satisfaction and subsequent selfie editing one month later, and concluded that individuals do not engage in selfie editing because they are dissatisfied with their appearance, but rather because they desire a more ideal online self-presentation. In contrast, on the basis of their structural equation modelling, Veldhuis et al. (2018) suggested that negative body image may serve as motivation and precede engagement in selfie behaviours such as the editing of photos. In the above studies, the measures of selfie investment and editing were based on self-report. In addition, all studies are correlational in design and so cannot determine the directionality of relationships.

Some experimental research has shown that viewing idealized and edited Instagram images has a detrimental impact on appearance satisfaction relative to viewing unedited or unenhanced images (Fardouly & Rapee, 2019; Kleemans, Daalmans, Carbaat, & Anschütz, 2016; Tiggemann & Zinoviev, 2019), with the degree of negative impact predicted by the amount of appearance-based social comparison engaged in (Kleemans et al., 2016; Tiggemann &

Zinoviev, 2019). As yet, however, only one study has experimentally examined the effect on young women's body image of taking and posting a selfie. In line with the conceptualization of selfie posting as a self-objectifying act (Tiggemann & Barbato, 2018), Mills, Musto, Williams, and Tiggemann (2018) found that women who took and uploaded a selfie, irrespective of the opportunity to edit it, felt more anxious, less confident, and less physically attractive afterwards compared to a control group.

The overall purpose of the present study was to experimentally examine the relation between selfie editing and body image more closely. In particular, we first aimed to investigate the effect of experimentally-induced body dissatisfaction on actual selfie behaviour as observed in the laboratory. On the basis of Veldhuis et al.'s (2018) modelling, we predicted that the body dissatisfied group would engage in more selfie editing than the non-induced group. Second, we wished to determine any subsequent effects of selfie editing on state mood and body dissatisfaction. On the basis of Mills et al.'s (2018) result and the reasoning of objectification theory (Fredrickson & Roberts, 1997), we expected selfie editing to lead to increases in negative mood and body dissatisfaction. Third, in pursuing these aims, we also sought to present a more detailed account of the nature and extent of selfie editing.

2. Method

2.1. Participants

Participants were 130 female undergraduate students aged 17–29 years ($M = 21.17$, $SD = 2.85$) from Flinders University, recruited for a study entitled 'Social Media, Selfies and You'. Their mean BMI was 23.54 ($SD = 4.86$), which lies within the medium weight range (National Health & Medical Research Council, 2013). The majority identified as Caucasian (62.3 %), with the remainder as Asian (33.1 %) ['other' 4.6 %]. Half the participants ($n = 65$) were randomly assigned to view Instagram images of thin women, and half ($n = 65$) images of average-sized women, with a view to inducing body dissatisfaction in the former group.

2.2. Materials

2.2.1. Experimental manipulation: body dissatisfaction

Body dissatisfaction was manipulated by exposing participants to one of the two sets of 15 Instagram images constructed by Tiggemann, Hayden, Brown, and Veldhuis, 2018) containing thin or average-sized women. These authors, as well as a subsequent study (Tiggemann, Anderberg, & Brown, 2020), have shown that the thin images significantly increased body dissatisfaction relative to the average images, with a moderate-to-large effect size. The images had initially been sourced from public Instagram profiles using the hashtags #fashion, #beach, and #plussize, and contained a range of full-body to head-and-shoulder shots, matched across condition on clothing and degree of body shown. Pilot testing showed that the thin images were rated as significantly thinner and more attractive than the average images. Images were presented in the standard Instagram frame with the Instagram logo, icons and a mock profile name on an Apple iPad via a PowerPoint presentation for 10 seconds each.

2.2.2. Social media use

Participants were provided with a list of social networking sites and asked to indicate how often they used them. For Facebook and Instagram, they were asked whether they had an account and how much time they spend on each site per day (*less than 10 minutes, 10-30 minutes, 30-60 minutes, 1-2 hours, 2+ hours*). They were also asked how many Facebook friends and Instagram followers they have (*0-10, 10–50, 50–100, 100–500, 500–1000, 1000–2000, 2000+*).

To assess more specific social media behaviours, participants were asked how often (1 = *never* to 5 = *very often*) they post particular types of photographs: photos of food, friends and family, yourself/selfies, travel destinations, animals or pets, nature. Participants also rated the importance (1 = *not important*, 5 = *very important*) of the visual quality and the number of likes received for images that they themselves post and that others post, as well as the importance of the number of friends/followers they have.

2.2.3. Mood, body dissatisfaction, and facial dissatisfaction

Following Heinberg and Thompson (1995), visual analogue scales (VAS) were used to obtain state measures of mood, body dissatisfaction, and facial dissatisfaction at three time points: baseline, after viewing the Instagram images, and after editing the selfies. The scales consisted of 100 mm lines, with endpoints labelled *none* and *very much*. Participants were asked to indicate how they were feeling 'right now' by placing a mark at the appropriate point along each line, which was subsequently measured to the nearest mm from the left-hand pole. There were five mood dimensions ('anxiety', 'depression', 'happiness', 'anger', 'confidence'), scores for which were averaged (positive items reverse coded) to produce an overall score for negative mood ranging from 0 to 100. Likewise, the two body dissatisfaction items ('weight dissatisfaction', 'appearance dissatisfaction') were averaged to produce an overall score for body dissatisfaction. Finally, two facial dissatisfaction items ('facial feature dissatisfaction', 'facial skin dissatisfaction') from Tiggemann and Zinoviev (2019), included as of particular relevance to selfies, were averaged to create an overall score for facial dissatisfaction. The resulting measures of body and facial dissatisfaction ranged 0 to 100, with higher scores indicating greater dissatisfaction.

VAS carry the advantage that they are quick to administer, difficult to recall, and sensitive to small changes, making them particularly useful for repeated measurement as here. They also have demonstrated reliability and validity (Heinberg & Thompson, 1995). In the present sample, internal reliability was adequate for negative mood (αs = .69, .70, .74). Internal reliability was good at all time points for body dissatisfaction (αs = .89, .85, .91) and facial dissatisfaction (αs = .81, .86, .86).

2.2.4. Selfie taking and editing behaviours

Participants were asked to take up to five selfies on an Apple iPad. In addition to the number of selfies taken, the time (in seconds) to take and choose the selfie was recorded by the researcher.

Participants were then able to edit their chosen image using the application 'YouCam Perfect' (Perfect Corp, 2018) for up to 10 minutes. This application was chosen because it is readily available (and free) from the app store, easy to use, and includes a large range of editing functions. Furthermore, most of the editing is carried out by sliding a marker between 0 (far left) and 100 (far right) to choose the strength of the editing feature, providing a numerical index of the degree of change. The screen recording function on the iPad was used to create a real-time recording of the participant's use of the editing application. There were 15 editing functions available for use: an automatic beautifying function, adding a filter, skin smoothing, face shape alteration, skin tone, nose enhancement, eye bag/dark circle removal, enlarging eyes, acne and blemish removal, smile enhancement, removal of shine/oil on skin, contouring of the face, eye brightening, applying blush, and eyelid enhancement. Other than the automatic beauty and blemish removal functions (which were categorical and scored 0 if not used and 100 if used), the other functions were scored as the number (between 0 and 100) where participants had placed the marker. These scores were summed to create a total extent of editing score ranging between 0 and 1500. The total time (in seconds) spent editing the selfie was also recorded.

In addition to the above objective measure of extent of selfie editing, we also constructed a more subjective measure consisting of the perceived difference between images before and after editing. For each pair of images, two independent raters rated the difference ('How different is the second (after) image from the first (before) image?') on a 5-point scale (1 = *not at all different*, to 5 = *extremely different*). The correlation between the two sets of ratings was r = .60 and the scores were averaged. The resulting index for perceived difference was strongly correlated with the objective measure of extent of editing, r = .81, p < .001.

2.2.5. Editing task thoughts

Participants were asked to think back to what they were thinking and feeling during the editing task and answer a series of questions regarding the experience. The first four items asked participants to indicate how much they thought about 'wanting to look your best', 'making yourself feel better', 'how others would judge you', and 'making yourself look better than you do in real life', respectively, on a seven-point scale (1 = *no thought*, 7 = *a lot of thought*). These items were based on qualitative accounts of motivations for selfie editing (Baker et al., 2019).

The last four questions asked participants how happy they were with their selfie (1 = *not happy*; 7 = *extremely happy*) and how likely it is that they would post it to social media (1 = *not likely*; 7 = *extremely likely*). These were asked separately for the original selfie and the edited selfie.

2.2.6. Self-photo manipulation

Eight items adapted from the Self Photo Manipulation scale of McLean et al. (2015) were used to measure the extent to which participants usually digitally alter photos of themselves before posting them on social media. Participants were asked to indicate how often they use a number of different techniques in order to make themselves look better in photos (e.g., use photographic filters, make themselves look skinnier, edit to hide blemishes like pimples) on a 5-point scale (1 = *never*, 5 = *always*). Responses were summed to produce a score ranging from 8 to 40. McLean et al. (2015) reported good internal reliability for the scale (α = .85). Internal reliability was similar in the present sample (α = .81).

2.2.7. Self-photo investment

The Self Photo Investment Scale developed by McLean et al. (2015) was used to measure the amount of effort and concern participants invest in the photos they post to social media. The original scale consists of eight VAS, with opposing statements at each end (e.g., "I don't care which photos I share/post" versus "I carefully select the best photo to share/post"; "I worry about whether anyone will 'like' my photos" versus "I don't care whether anyone will 'like' my photos" [Reverse-coded]). In the present study, items were presented in a scale format ranging from 1 to 7. Scores on the eight items were averaged to produce an overall index, with higher scores indicating greater investment in the photos shared on social media. McLean et al. (2015) reported good internal reliability for the scale (α = .85). Internal reliability was also good for the present version of the scale (α = .83).

2.3. Procedure

Following approval by the Institutional Research Ethics Committee, participants were recruited via the university's research participation system for a study entitled 'Social Media, Selfies and You'. They were tested individually in sessions lasting approximately 30-45 minutes. Upon arrival at the Psychology and Media laboratory, participants read the study information (indicating that the study was about social media habits and individual differences and that they would be asked to complete questionnaires and take
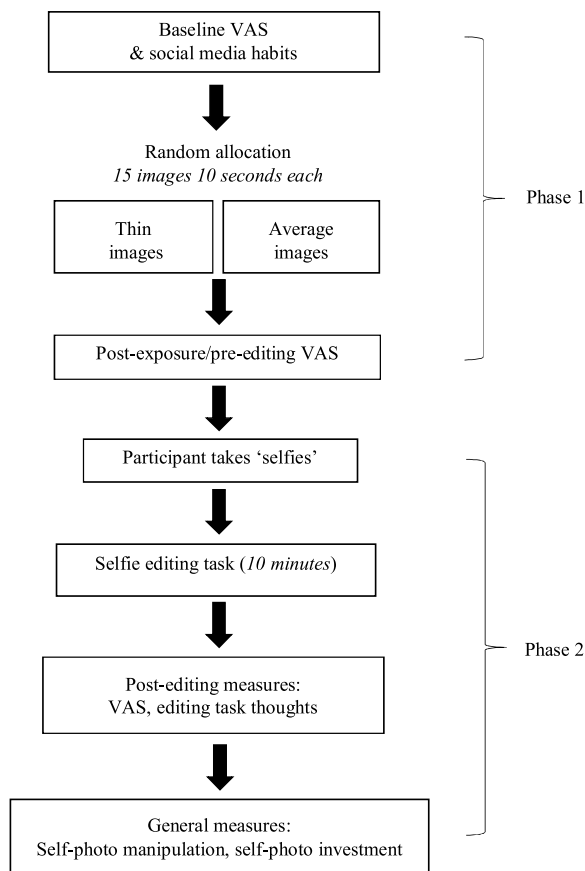
Fig. 1. Flow diagram of experimental protocol.

Table 1

Baseline and Post Image Means (SD) and Adjusted Means (SE) for Negative Mood, Body Dissatisfaction, and Facial Dissatisfaction by Image Type.

	Image type	
	Thin	Average
Negative mood		
Baseline	29.56 (12.59)	32.53 (15.78)
Post image exposure	30.96 (11.97)	31.39 (15.27)
Adjusted mean	32.24 (0.72)	29.87 (0.72)
Body dissatisfaction		
Baseline	48.75 (25.86)	50.59 (28.38)
Post image exposure	52.35 (28.38)	49.57 (29.08)
Adjusted mean	53.22 (1.59)	48.52 (1.60)
Facial dissatisfaction		
Baseline	44.81 (25.04)	47.20 (28.20)
Post image exposure	48.26 (26.50)	45.39 (29.25)
Adjusted mean	49.41 (1.29)	44.06 (1.30)

and edit a selfie) and provided informed consent. To begin the first phase of the study, they completed baseline VAS measures of mood and body/facial dissatisfaction, as well as the questions regarding social media use. They were then handed the iPad on which half the participants viewed the thin Instagram images and the other half viewed the average-sized images. To ensure that the images were attended to, participants were asked to rate each on its visual quality (1 = *very poor* to 5 = *excellent*). Following exposure to the images, participants completed another set of mood and body/facial dissatisfaction VAS. A schematic representation of the entire experimental protocol is provided in Fig. 1.

The second phase of the study involved participants taking photos of themselves and editing them using an application on the iPad. Participants were asked to use the front-facing camera function of the iPad to take up to five selfies. They were informed that they should take the photos as if they were going to upload one to their own social media account and that they would have the subsequent opportunity to edit it. Once participants had selected the one, the researcher (a female in the target age range) gave a short tutorial on how to use the application ('YouCam Perfect') to edit their chosen photo. Participants were told that they could have up to 10 minutes to use the application to edit their image. To provide privacy, the experimenter was stationed at a desk behind a screen while participants took and edited their selfies.

Upon completion of the editing task, participants completed post-editing VAS measures of mood and body/facial dissatisfaction, as well as their editing thoughts. Finally, they completed the habitual self-photo manipulation and investment measures, along with demographic information. To conclude the testing session, height and weight were measured (with their permission) in order to calculate BMI. Participants received course credit or were reimbursed

$15 for their participation. Following completion of data collection, they were debriefed through an online system.

3. Results

3.1. Social media use

Participants were frequent users of social media; 96.9 % had a Facebook account and 93.1 % had an Instagram account. Modal time spent on Facebook was 30-60 minutes and Instagram was 1−2 hours per day. Modal number of friends on Facebook and followers on Instagram was 100-500. Participants reported most frequently posting pictures of friends and family ($M = 3.51$, $SD = 0.97$), followed by travel destinations ($M = 3.16$, $SD = 1.29$), selfies ($M = 2.85$, $SD = 1.21$), nature ($M = 2.79$, $SD = 1.22$), food ($M = 2.55$, $SD = 1.19$), and pets ($M = 2.45$, $SD = 1.23$). Participants placed a great deal of importance on the visual quality of the photos that they themselves upload ($M = 4.16$, $SD = 0.83$), more so than on others' photos ($M = 3.47$, $SD = 0.94$). They also placed a moderate amount of importance on the number of likes their photos receive ($M = 3.21$, $SD = 1.02$). However, the number of likes on others' photos ($M = 2.35$, $SD = 1.06$) and the number of friends or followers they had ($M = 2.74$, $SD = 1.22$) were not perceived as particularly important.

3.2. Preliminary analyses and manipulation check

Independent samples *t*-tests confirmed that there were no differences between the two experimental conditions in age, $t(128) = 0.74$, $p = .462$, or BMI, $t(128) = 0.13$, $p = .893$. Neither were there any baseline differences in initial negative mood, $t(120.24) = 1.18$, $p = .241$, body dissatisfaction, $t(127) = 0.39$, $p = .701$, or facial dissatisfaction, $t(127) = 0.51$, $p = .613$. Finally, there were no differences in the trait-level variables of habitual self-photo manipulation, $t(128) = 0.19$, $p = .852$, and self-photo investment, $t(128) = 0.65$, $p = .520$.

To confirm that, as intended, exposure to the thin Instagram images elicited greater negative states than exposure to the average images in Phase 1, a series of ANCOVAs with baseline score as covariate were conducted. The means in Table 1 indicate that viewing the thin images resulted in an increase in negative mood, body dissatisfaction, and facial dissatisfaction, whereas there were slight decreases for viewing average images. The ANCOVAs confirmed significant effects of condition on each of negative mood, $F(1, 126) = 5.39$, $p = .022$, $\eta_p^2 = .04$, body dissatisfaction, $F(1, 126) = 4.36$, $p = .039$, $\eta_p^2 = .03$, and facial dissatisfaction, $F(1, 126) = 8.53$, $p = .004$, $\eta_p^2 = .06$. Thus the experimental manipulation was deemed successful.

Table 2
Means (SD) for Extent of Editing (0-100) and Percentage of Participants Using Selfie Editing Functions [Function Name].

	Mean (*SD*)	% sample
Auto-beautify (*yes/no*) [Auto]	3.85 (19.31)	3.8 %
Filter [Effects]	19.44 (31.61)	33.1 %
Smooth skin [Smoothener]	41.90 (32.35)	82.8 %
Shape face [Face Shaper]	42.03 (38.77)	64.3 %
Change skin tone [Tone]	34.60 (31.05)	66.7 %
Enhance nose [Nose Enhance]	20.28 (34.92)	31.8 %
Dark eye circle removal [Eye bag]	39.46 (35.63)	65.9 %
Enlarge eyes [Enlarger]	10.64 (18.92)	36.4 %
Blemish removal (*yes/no*) [Acne]	58.91 (49.39)	58.9 %
Blush application [Blush]	17.79 (24.34)	43.8 %
Lips to smile [Smile]	10.60 (21.01)	31.0 %
Oil/shine removal [Oil Free]	13.18 (27.34)	23.1 %
Face contouring [Contour]	9.47 (21.60)	27.7 %
Brighten eyes [Brighten]	19.48 (31.74)	32.3 %
Eyelid enhancement [Double Eyelid]	2.14 (10.82)	5.4 %

Table 3
Means (SD) for Selfie Task Measures by Image Type.

	Image type	
	Thin	Average
Number of selfies	3.63 (1.78)	3.77 (1.65)
Selfie time (*seconds*)	92.19 (56.92)	82.25 (53.29)
Editing time (*seconds*)	263.98 (124.58)	283.91 (112.47)
Extent of editing	363.82 (209.82)	320.09 (176.40)
Perceived difference	3.06 (0.92)	3.02 (0.82)

3.3. Effect of condition on selfie taking and editing

On average, participants took 3.70 selfies (*SD* = 1.71) and spent 87.22 seconds in total (*SD* = 55.14) doing so. All selfies featured the entire face, with the majority also containing shoulders, upper chest, and tops of their arms. On average, participants spent around 4 and a half minutes (*M* =273.95 secs, *SD* = 118.64) editing them. As can be seen in Table 2, which provides descriptive statistics of the editing process, the most popular functions used were smoothing and changing skin tone, followed by dark eye circle removal, face shaping, and blemish removal, each used by more than 50 % of the sample.

To test the first aim, a series of independent samples *t*-tests examined whether body dissatisfaction induced by the image task influenced the number of selfies and how long participants took taking them, as well as the time spent editing and the extent to which they edited their own selfies. As can be seen from the means in Table 3, condition did not have a significant effect on the number of selfies taken, $t(128) = 0.46$, $p = .645$, $d = 0.08$, or the time spent taking the photos, $t(126) = 1.02$, $p = .310$ $d = 0.18$. Nor was there any significant effect on any of the selfie editing measures: time, $t(128) = 0.96$, $p = .340$, $d = 0.17$, extent of editing, $t(128) = 1.29$, $p = .201$, $d = 0.23$, perceived difference, $t(128) = 0.25$, $p = .801$ $d = 0.05$. Overall, induced body dissatisfaction made no difference to the amount of editing on the selfies.

3.4. Effect of selfie task on negative mood, body dissatisfaction, and facial dissatisfaction

To test the second aim, a series of mixed 2 (image type: thin, average) × 2 (time: pre-editing, post-editing) ANOVAs was performed to determine whether the selfie taking and editing task impacted participants' mood or body and facial dissatisfaction and whether the type of image viewed previously had any influence. The means presented in Table 4 show that there was a slight increase in body dissatisfaction after editing for both groups, and a much larger increase in negative mood and facial dissatisfaction.

Table 4
Pre and Post Editing Means (SD) for Negative Mood, Body Dissatisfaction, and Facial Dissatisfaction by Image Type.

	Image type	
	Thin	Average
Negative mood		
Pre editing task	30.96 (11.97)	31.39 (15.27)
Post editing task	32.84 (13.86)	34.56 (17.43)
Body dissatisfaction		
Pre editing task	52.35 (28.38)	49.57 (29.08)
Post editing task	52.83 (28.05)	51.29 (29.04)
Facial dissatisfaction		
Pre editing task	48.26 (26.50)	45.39 (29.25)
Post editing task	52.48 (25.66)	51.55 (30.70)

Table 5
Means (SD) for Editing Task Thoughts and Correlation Coefficients with Extent of Editing.

	Mean (*SD*)	Correlation with extent of editing
Editing thoughts		
Looking your best	5.57 (1.36)	.35**
Making yourself feel better	4.60 (1.78)	.33**
Others judging you	5.31 (1.67)	.29**
Making yourself look better than in real life	5.07 (1.64)	.39**
Satisfaction with Selfie		
Happiness with original Selfie	3.40 (1.47)	−.34**
Likelihood of posting original Selfie	2.22 (1.63)	−.25*
Happiness with edited Selfie	4.71 (1.36)	.02
Likelihood of posting edited Selfie	3.52 (1.92)	.05

* $p < .05$.
** $p < .001$.

The results of the ANOVAs confirmed that there was a significant effect of time on negative mood, $F(1, 128) = 12.14$, $p = .001$, $\eta_p^2 = .09$, and facial dissatisfaction, $F(1, 128) = 12.33$, $p = .001$, $\eta_p^2 = .09$, but not on body dissatisfaction, $F(1, 128) = 0.58$, $p = .446$, $\eta_p^2 = .01$. The condition × time interaction was not significant for any variable: negative mood, $F(1, 128) = 0.78$, $p = .378$, $\eta_p^2 = .01$; body dissatisfaction, $F(1, 128) = 0.19$, $p = .666$, $\eta_p^2 = .00$; facial dissatisfaction, $F(1, 128) = 0.43$, $p = .513$, $\eta_p^2 = .00$. Thus, the selfie task increased negative mood and facial dissatisfaction regardless of the image type previously viewed.

To determine whether the extent of editing predicted the increase in negative mood and facial dissatisfaction, hierarchical regressions were conducted. The pre-editing score was entered in Step 1, and extent of editing in Step 2. Step 2 proved significant for facial dissatisfaction, R^2_{change} = .01, F_{change} (1, 127) = 4.22, $p = .042$, but not negative mood, R^2_{change} = .00, F_{change} (1, 127) = 0.86, $p = .355$. In other words, the observed increase in facial dissatisfaction was predicted by the extent of the actual editing undertaken by participants.

3.5. Editing thoughts

Our third aim was to detail more fully the nature of the selfie editing process. To this end, Table 5 presents the means for participants' reported thoughts during the selfie editing task. As can be seen, all thoughts were moderately highly endorsed, with participants thinking most about wanting to look their best. All thoughts were also moderately correlated with the extent of editing undertaken. Hierarchical multiple regressions were conducted to see whether these thoughts were associated with the observed increase in negative mood or facial dissatisfaction. Pre-editing mood/dissatisfaction was entered in Step 1 and editing thoughts in Step 2. Editing thoughts were found to predict the increase in both negative mood R^2_{change} = .03, F_{change} (4, 124) = 3.33, $p = .013$, and

Table 6
Correlations between Self-Photo Manipulation and Self-Photo Investment with Selfie Behaviours and Thoughts.

	Self-photo manipulation	Self-photo investment
Selfie task		
Number of selfies	.24**	.10
Selfie time	.13	.06
Editing time	.22*	.25**
Extent of editing	.21*	.22*
Perceived difference	.23**	.24**
Editing thoughts		
Looking your best	.39**	.40**
Feel better	.32**	.33**
Others judging	.26**	.47**
Looking better than real life	.37**	.33**

* $p < .05$.
** $p < .01$.

facial dissatisfaction, R^2_{change} = .05, F_{change} (4, 124) = 5.34, p = .001. There were no significant unique predictors for negative mood, but for the increase in facial dissatisfaction, thinking about how others would judge you, β = .14, sr^2 = .01, p = .035, and about making yourself look better than you do in real life, β = .14, sr^2 = .01, p = .038, emerged as unique predictors.

In terms of satisfaction with their selfies, Table 5 indicates that participants were happier with and more likely to post the edited selfie to social media compared to the original selfie. Paired samples t-tests confirmed that the edited selfie was associated with more happiness, $t(128)$ = 10.74, p < .001, and a greater likelihood of uploading, $t(128)$ = 9.02, p < .001, than the original selfie. Happiness and likelihood of posting the original selfie were also negatively associated with the extent of editing.

3.6. Editing behaviour, self-photo investment and self-photo manipulation

In order to see whether the trait-level measures of habitual self-photo manipulation and self-photo investment were related to actual behaviour observed in the laboratory, a series of correlations was conducted. As can be seen from Table 6, both habitual photo-manipulation and investment were related to the time spent and extent of editing, as measured objectively and subjectively. Self-photo manipulation was also related to the number of selfies initially taken. Finally, both variables were related to all the editing thoughts.

4. Discussion

The major aim of the study was to more thoroughly examine the relationship between selfie editing in the laboratory and state body dissatisfaction. The findings are relatively clear. In contrast to prediction, induced state body and facial dissatisfaction did not affect any selfie behaviour and, in particular, did not result in increased editing of the taken selfies. However, as predicted, the taking and editing of selfies led to increased negative mood and state facial dissatisfaction, regardless of experimental condition. In addition, the extent of editing predicted the increase in facial dissatisfaction, as did thoughts concerning making oneself look better. Together, these findings add to our understanding of the processes linking selfie editing to negative body image.

The finding that induced body dissatisfaction did not influence the amount of editing goes counter to our reasoning based on Veldhuis et al.'s (2018) modelling. This suggests that selfie editing is not a behaviour responsive to momentary fluctuations or induced states of dissatisfaction. Rather, the finding implies that selfie editing is a function of what participants bring with them into the laboratory, that is, of habitual practices and trait level characteristics. Future research should investigate the prediction of actual selfie behaviour by trait levels of body dissatisfaction and self-objectification, which have been found to correlate with trait levels of photo investment and manipulation (Cohen et al., 2018; Lonergan et al., 2019; McLean et al., 2015; Veldhuis et al., 2018). Another characteristic of potential relevance is perfectionistic self-presentation. This refers to the maladaptive desire to appear perfect to others, including the concealment of perceived imperfections (Hewitt et al., 2003). Posting a selfie on social media gives users a unique opportunity to promote a perfect version of themselves. Although perfectionistic self-presentation has itself been associated with body dissatisfaction and disordered eating (McGee, Hewitt, Sherry, Parkin, & Flett, 2005), somewhat surprisingly, there has been little investigation in the context of social media.

The finding that, as predicted, selfie taking and editing led to increased negative mood and facial dissatisfaction is consistent with the finding of Mills et al. (2018), who likewise showed that taking and uploading a selfie resulted in feelings of increased anxiety, decreased confidence, and less physical attractiveness. It is also consistent with the prediction based on objectification theory (Fredrickson & Roberts, 1997) that engaging in a self-objectifying activity (like selfie posting) results in negative body image outcomes. Although Mills et al. (2018) obtained their result irrespective of the opportunity to edit the selfie, our results highlight specifically the importance of the editing process. We found that the increase in facial dissatisfaction following the selfie task was a function of the extent of the editing undertaken. This demonstrates that the editing of selfies is not a benign process but has negative consequences, even though participants reported being much happier with their edited selfie than their original photo. It may be that selecting and editing photos of themselves makes women look at themselves especially critically and from a third-person viewpoint, the very essence of self-objectification (Fredrickson & Roberts, 1997). It may also be that extensive selfie editing leads to feeling disingenuous online, as suggested by Lamp et al. (2019), resulting in broader mood and satisfaction effects. Tellingly, these suggestions are respectively consistent with the two thoughts that emerged as unique predictors of increased facial dissatisfaction, namely, thinking about how others will judge you, and thinking about making yourself look better than you do in real life. These thoughts appear to reflect motivations for selfie editing that are harmful to women's well-being. Future qualitative research might more fully delve into what women think about and feel while editing their selfies.

It should be noted that the above findings pertain to facial dissatisfaction rather than body dissatisfaction. This is not surprising in that the selfies in the present study included only the face and at most upper body. In addition, all the editing functions pertained to facial features. While these represent the most common form of selfie, it is possible to take whole-body selfies by means of a selfie stick or to post whole-body photos taken by a third party. Future research should investigate the effects of editing (e.g., slimming thighs) and posting these types of whole-body selfies. One would then expect effects on body dissatisfaction. In the present study, the difference in obtained results between facial and body dissatisfaction can be thought of as providing some discriminant validation of the protocol.

In bringing selfie taking and editing into the laboratory, we were also able to offer a more detailed examination of what women actually do in this situation. The mean number of selfies taken before choosing one (M = 3.7) falls squarely into the range (2–5) reported in survey studies (Bij de Vaate et al., 2018; Cohen et al., 2018), although it needs to be acknowledged that participants here were limited to a maximum of five selfies. The most used editing functions were those to do with skin quality, for example, smoothing

skin and removing blemishes or dark eye circles. It seems likely that these are relatively normative ways in which women improve their selfies to present the 'best' version of themselves, consistent with the most highly endorsed thought ("wanting to look your best"), rather than changing structural features of how they look. To the best of our knowledge, the present study was the first to attempt to quantify the extent of editing undertaken. Both the objective measure and the perceptual measure (perceived difference between the edited and original selfies) were correlated with the trait measures of self-photo manipulation and self-photo investment. This demonstrates that habitual levels of selfie manipulation do translate into actual observable behaviour in the laboratory. At the same time, the results provide additional evidence for the validity of the Self Photo Manipulation and Self Photo Investment Scales developed by McLean et al. (2015).

The findings have some practical implications. Although posting selfies may be common everyday behaviour for young women (Dhir et al., 2016), it seems that it is the processes preceding and surrounding the activity that are crucial. In particular, investing time and effort into taking, selecting, and editing one's selfie before posting on social media are not harmless activities. In this, women appear to be motivated by the wish to present the best possible version of themselves (Lamp et al., 2019) and are correspondingly substantially happier with their edited selfie than the original photo. Yet, at the same time, these activities have detrimental effects in terms of poorer mood and facial dissatisfaction. It seems likely that such momentary state-level changes would accumulate to make selfie editors increasingly dissatisfied over time, as Hargreaves and Tiggemann (2003) have suggested for media exposure generally. Thus selfie editing and investment may act as important new vulnerability factors for body concern and related disordered eating. Accordingly, women and girls should be dissuaded from striving to post near-perfect versions of themselves online and investing too heavily in the reception (e.g., number of likes) their selfies receive. In particular, they might be advised against downloading and applying editing applications like You-Cam Perfect. These aspects of social media behaviour need to be explicitly addressed in social media literacy programs, which have shown some promise (McLean, Wertheim, Masters, & Paxton, 2017). Instead, women and girls might be advised to post more naturalistic images of themselves. Although some research has shown that viewing more naturalistic and unedited images has positive effects on body image (Fardouly & Rapee, 2019; Tiggemann & Anderberg, 2019; Tiggemann & Zinoviev, 2019), to the best of our knowledge, no research has formally investigated the benefits of *posting* these natural images. Body positive activists (e.g., Cwynar-Horta, 2016) suggest that such acts will be both empowering and liberating for women.

Like all studies, the present study has some limitations that should be acknowledged. First, the sample consisted of young adult women, who are the predominant posters of selfies. Other demographic groups may have different motives for posting selfies and so the present results may not generalize to them. Second, in bringing selfie taking and editing into the laboratory, the observed behaviour may be different from what would occur in the real world. Indeed, there were a variety of time and methodological constraints that would not normally apply. For example, our approved ethics protocol meant that participants knew that they would not actually have to upload their selfie to social media. Nevertheless, participants did seem to engage well with the task. In addition, the correlations with habitual levels of selfie editing and investment reassure that their observed selfie behaviour in the laboratory was at least somewhat representative of their normal selfie practices. Third, the present study did not include a control group who did not engage in editing their selfies. Future studies should investigate this question using more rigorous experimental designs.

Despite the above limitations, the present study has taken an important first step in investigating the effect of a very common behaviour on social media, namely the posting of selfies. In this, it makes a novel contribution to the emerging literature on active (as opposed to passive) social media use. The findings indicate that despite women feeling happier with their edited selfie, the very process of selecting and editing their selfie has negative consequences for their mood and appearance satisfaction. Thus the findings also illustrate the difficulties women encounter in negotiating the contemporary social media world.

CRediT authorship contribution statement

Marika Tiggemann: Conceptualization, Methodology, Formal analysis, Writing - original draft, Supervision, Funding acquisition. **Isabella Anderberg:** Conceptualization, Methodology, Formal analysis, Investigation, Writing - review & editing. **Zoe Brown:** Conceptualization, Methodology, Writing - review & editing.

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