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The effect of viewing challenging "reality check" Instagram comments on women's body image☆

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ABSTRACT

One increasing trend on social media is the posting of challenging or "reality check" comments about idealized photos of thin and attractive women. The aim of the present study was to experimentally investigate the effect of viewing such reality check comments after a positive appearance comment on young women's body image. Participants were 192 women aged 17–25 years who were randomly assigned to view Instagram images accompanied by no comment, a positive appearance comment, or a reality check comment plus the positive appearance comment. In contrast to prediction, viewing positive appearance comments did not elicit more body dissatisfaction than viewing images with no comments. As predicted, however, adding a reality check comment did reduce body dissatisfaction relative to the positive appearance comment alone. It was concluded that making and viewing reality check comments provides a potential way for women to mitigate some of the negative effect of Instagram imagery.

1. Introduction

An increasing body of research has shown that social media use is related to body image concerns and disordered eating among women (for a systematic review, see Holland & Tiggemann, 2016). These findings parallel the well-documented negative impact on women's body image following exposure to idealized images in more traditional media formats, such as fashion magazines and television (for meta-analyses, see Grabe, Ward, & Hyde, 2008; Groesz, Levine, & Murnen, 2002; Want, 2009). However, social media differ from traditional media in two important ways. First, the content is largely peer generated. Second, the sites are interactive in nature. Users are able to create their own profiles and post their own material, they can browse the material posted by others, and they can interact with, "like," and respond to the posts of other users (Frison & Eggermont, 2017). The available research identifies activities surrounding the posting, viewing, and making comments on photos as particularly problematic for body image (Cohen, Newton-John, & Slater, 2018; Holland & Tiggemann, 2016; Meier & Gray, 2014). Accordingly, increasing research interest has turned to the photo-based platform of Instagram.

Worldwide, Instagram is an extremely popular social media platform with more than 500 million daily users (Statista, 2019). It is particularly popular among young adult women aged 18–29 years (Sensis, 2018). Instagram differs from other social media sites, such as Facebook and Twitter, in that it is specifically designed for the sharing and viewing of photographs as opposed to written content; indeed, more than 100 million photos are uploaded on Instagram each day (Aslam, 2019). Importantly, women and girls report spending considerable time and effort in taking and selecting their photos to be uploaded, for example, taking multiple photos, using flattering lighting, and posing in a manner that accentuates thinness (Chua & Chang, 2016; Dumas, Maxwell-Smith, Davis, & Giulietti, 2017). These photos can then be further enhanced by the application of filters or digital editing tools (Bij de Vaate, Veldhuis, Alleva, Konijn, & van Hugten, 2018; Lonergan et al., 2019; McLean, Paxton, Wertheim, & Masters, 2015). As a result, although many images are ostensibly of peers rather than models or celebrities, Instagram presents unrealistic ideals for its users. In support, Instagram use has been linked to a range of body image concerns in correlational studies (Cohen, Newton-John, & Slater, 2017; Fardouly, Willburger, & Vartanian, 2017; Feltman & Szymanski, 2018; Frison & Eggermont, 2017; Hendrickse, Arpan, Clayton, & Ridgway, 2017; Lup, Trub, & Rosenthal, 2015; Sherlock & Wagstaff, 2019). A smaller body of experimental research has also demonstrated an increase in state body dissatisfaction following exposure to idealized Instagram images of thin and attractive women relative to control images (Brown & Tiggemann, 2016; Cohen,

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Fardouly, Newton-John, & Slater, 2019; Tiggemann & Zaccardo, 2015; Tiggemann, Hayden, Brown, & Veldhuis, 2018).

Parallel to the case for traditional media (Levine & Murnen, 2009; Want, 2009), the detrimental impact of social media has most commonly been attributed to the process of social comparison. Social comparison theory (Festinger, 1954) argues that women evaluate their own appearance by comparison with the sociocultural ideals presented in the media. As almost always this will constitute an upward comparison by which women fall short, the end result is dissatisfaction with their own body and appearance (Strahan, Wilson, Cressman, & Buote, 2006; Want, 2009). It has been argued that social comparison may be even more pertinent to social media than it is to traditional media because of the speed and ease of making frequent, multiple and rapid comparisons (Tiggemann & Zaccardo, 2015). Further, in addition to the opportunity for comparisons with models and celebrities, social media provide the opportunity for comparisons with peers. According to social comparison theory (Festinger, 1954), the drive for self-evaluation leads individuals to seek out comparisons with similar others (e.g., peers) in preference to dissimilar others (e.g., fashion models). Certainly, young women and girls report that they compare their appearance to both close and distant peers on social media (Chua & Chang, 2016; Fardouly & Vartanian, 2015; Fardouly, Diedrichs, Vartanian, & Halliwell, 2015). Furthermore, these comparisons are most commonly upward in direction, resulting in decreased satisfaction with one's own appearance (Fardouly, Pinkus, & Vartanian, 2017).

Although interactivity is a major defining feature of social media (Perloff, 2014), little research has formally addressed the interactive or communicative functions (i.e., the 'social' aspects) of social media. These functions allow users to caption and hashtag their own images, as well as to "like" and comment on the photos of others. Indeed, some women and girls post photographs of themselves precisely to be liked and commented on (Baker, Ferszt, & Breines, 2019; Chua & Chang, 2016). These are then displayed under each image and become part of what is viewed by other users. In this way, Instagram provides a unique resource for examining the effect of peer comments, which do not feature at all in more traditional media formats such as fashion magazines or television. To our knowledge, only one study has explicitly examined the effect of viewing Instagram comments on women's body dissatisfaction. Tiggemann and Barbato (2018) found that viewing thin and attractive Instagram images with a positive appearance comment (the most common form of comment on Instagram, Wang et al., 2018) led to significantly greater body dissatisfaction than viewing precisely the same images but with a positive place comment. There was no neutral control condition. The authors conceptualized posting a picture of oneself on social media as a self-objectifying activity and interpreted their finding as supporting objectification theory's (Fredrickson & Roberts, 1997) contention that anything that focuses attention on external appearance, even a positive comment, can produce negative consequences. The finding is also consistent with two earlier studies showing negative effects of positive appearance commentary ('compliments') in offline environments (Calogero, Herbozo, & Thompson, 2009; Tiggemann & Boundy, 2008).

However, any one photo may evoke multiple comments. In particular, users are able to indicate their agreement with or challenge an initial comment. One increasing trend seems to be the posting of "reality check" comments that challenge the presentation of the women in the photos. For example, in addition to positive appearance comments, pictures of thin women might also evoke comments such as "this isn't realistic" or "this is too thin." This style of comment emphasizes the unrealistic or unattainable nature of the photograph and reminds viewers that what is pictured is not appropriate to compare with. As yet, there has been no explicit investigation into the effect of viewing such reality check comments on body image. More generally, such commenting behaviour aligns with the aims of the wider body positive movement which seeks to challenge dominant narrow ideals of beauty, discourage appearance-based social comparison, and promote body acceptance for all (Cwynar-Horta, 2016; Sastre, 2014).

One way of potentially understanding the operation of reality check comments, particularly after a positive appearance comment, is as a form of cognitive dissonance. Cognitive dissonance theory (Festinger, 1957) proposes that an individual who holds two inconsistent cognitions simultaneously will experience cognitive dissonance, which can be resolved by removing or decreasing the importance of one of the dissonant cognitions. This theory has informed the development of dissonance-based eating disorder prevention programs (e.g., McMillan, Stice, & Rohde, 2011), in which women with high levels of thin-ideal internalisation are asked to critique the thin ideal. These programs have shown some success across a number of studies in reducing body dissatisfaction and eating disorder symptoms (for a meta-analysis, see Stice, Marti, Shaw, & Rohde, 2019). A reality check comment that challenges a positive appearance comment can be thought of as an attempt to elicit a cognition dissonant with the initial positive cognition about the thin ideal. Thus reality check comments can be conceptualized as a brief peer-led online dissonance-based intervention.

The aim of the present study was to experimentally investigate the effect on women's body dissatisfaction of viewing Instagram images accompanied by challenging or reality check Instagram comments after a positive appearance comment. Based on Tiggemann and Barbato's (2018) result, we expected a positive appearance comment (alone) to lead to increased body dissatisfaction compared to no comment. Based on the logic of cognitive dissonance theory and the reasoning above, we predicted adding reality check comments to the positive appearance comment would decrease body dissatisfaction in comparison to the positive appearance comment alone. It was expected that this effect would be mediated by reduced social comparison. Finally, the effect of viewing reality check comments was expected to be larger for women high on thin-ideal internalisation, as has been shown for dissonance-based eating disorder prevention programs (Stice et al., 2019).

2. Method

2.1. Design

The study employed a 3-group (no comment, positive appearance comment, positive appearance comment plus reality check comment) between-subjects experimental design to investigate the effect of comment type on body dissatisfaction (after controlling for pre-exposure scores). Social comparison was tested as a potential mediating variable. Thin-ideal internalisation was tested as a potential moderating variable.

2.2. Participants

Participants were 192 female undergraduate students from Flinders University, aged between 17 and 25 years (M = 20.11, SD = 1.98). Their mean body mass index (BMI) was 23.33 (SD = 5.00), which is in the "normal" weight range (Garrow & Webster, 1984). The majority (63.5 %) identified as Caucasian/White, with 31.8 % Asian, 1.0 % Aboriginal/Torres Strait Islander, and 0.5 % African [3.1 % 'other']. They were randomly allocated to one of three experimental conditions with 64 participants per condition. This sample size was determined on the basis of the ability to detect a medium-sized effect with power .80 (Cohen, 1992).

2.3. Materials

2.3.1. Stimulus materials

One set of 14 images depicting thin and attractive women showing at least three quarters of the woman's body was constructed for the study. All images were of young adult women of Caucasian appearance, like the majority of the sample. They were sourced from public Instagram profiles, starting with the tag @Gooseberry Intimates, a fashion label that encourages consumers to post pictures of themselves wearing the product. Images posted by the same woman but wearing a variety of other clothes (e.g., swimsuits, dresses, jeans) were then selected from her account. The experimental images were chosen from an initial pool of 40 images on the basis of ratings of thinness (1 = *not at all thin*, 5 = *very thin*) and attractiveness (1= *not at all attractive*, 5 = *very attractive*) made by six independent female raters in the target age range ($M = 20.50$, $SD = 1.19$). The ratings confirmed that the final set of images were seen as both thin ($M = 4.40$, $SD = 0.13$) and attractive ($M = 4.06$, $SD = 0.35$). None of the women pictured were professional models; all had fewer than 5000 followers.

Three different versions of the images were created: one with no comment, one with a positive appearance comment (e.g., "you look so beautiful'; "you look so hot here"; "wow look at your bod"; "I wish I could look like this"), and one with a positive appearance plus reality check comment (e.g., "remember this is really posed"; "she needs to eat more"; "she's probably sucking in"; "she looks too fake"). An initial list of 40 positive appearance and 40 reality check comments was compiled from the public Instagram posts of thin and attractive women. One rater (the second author) deemed comments positive appearance if they complimented the woman's appearance or expressed a desire to look like her. Comments were deemed reality check if they challenged the realism or attainability of the woman's appearance. To assess their credibility, the comments were rated by the six independent raters as to how similar they were to comments they see posted on Instagram (1 = *not at all similar*, 5 = *very similar*). Ratings confirmed that the selected positive appearance comments ($M = 4.75$, $SD = 0.32$) and reality check comments ($M = 3.97$, $SD = 0.48$) were perceived as similar to comments made on Instagram. The complete list of positive appearance and reality check comments is provided in Supplementary Materials.

To create the stimuli, Adobe Photoshop was used to format each image into an Instagram frame. The Instagram logo, icons and a mock username (e.g., maria_n, nikoleta, georgia_xx) were presented at the top of the image. As in Instagram, positive appearance comments were placed directly below the image, with a different username "posting" the comment. Reality check comments were "posted" by a different username again, directly below the positive appearance comment. These were formatted as either a separate new comment or a direct reply to the previous comment, as both commenting styles are employed on Instagram. Images were presented via a PowerPoint slideshow on an Apple iPad.

2.3.2. Social networking use

Participants were asked to indicate which social networking sites they currently use and how much time they spend there per day (*0–10 min, 10–30 min, 30–60 min, 1–2 h, 2–4 h, over 4 h*). They were also asked how many friends they have on Facebook, and how many accounts they follow and are followed by on Instagram (*10-50, 50–200, 500–750, over 750).*

2.3.3. Body dissatisfaction

Following Heinberg and Thompson (1995), state body dissatisfaction was measured by visual analogue scales (VAS) before and after viewing the Instagram images. VAS hold the advantage that they are difficult to recall and sensitive to change over time. The two body dissatisfaction items ('weight dissatisfaction,' 'appearance dissatisfaction') were preceded by five mood items (not analysed here) to dilute the focus on appearance. Each VAS consisted of a 100 mm horizontal line, with endpoints labelled *none* and *very much*. Participants were asked to indicate how they feel "right now" by making a vertical mark at the corresponding point on the line. Responses were measured in mm from the left-hand pole. Scores on the two body dissatisfaction items were averaged to calculate a single index ranging from 0 to 100. Heinberg and Thompson (1995) have shown that VAS provide a reliable and valid measure of body dissatisfaction. In the present sample, internal reliability was adequate for both pre-exposure ($\alpha = .83$) and post-exposure body dissatisfaction ($\alpha = .91$).

2.3.4. State appearance comparison

The extent of appearance comparison engaged in while viewing the images was assessed by the State Appearance Comparison Scale (Tiggemann & McGill, 2004). Participants were asked to indicate how much they had thought about their own appearance and how much they compared their overall appearance and specific body parts to the women in the photographs on three 7-point scales (1 = *no thought about appearance/no comparison*, 7 = *a lot of thought/comparison*). An overall index of state appearance comparison was calculated by averaging scores on the three items. Tiggemann and McGill (2004) reported good internal reliability for the measure ($\alpha = .91$), as was the case in the present sample ($\alpha = .92$).

2.3.5. Perceived characteristics of the images

After they had viewed the images, participants were asked to rate the thinness and attractiveness of the women in the images (1 = *not at all thin/attractive*, 7 = *very thin/attractive*), in order to validate the categorization of stimulus materials. They were also asked to rate how similar the images were to images commonly seen on Instagram (1 = *not at all similar*, 7 = *extremely similar*).

In addition, participants were asked to recall how many of the images included the number of likes, comments, and/or were "selfies" (*none, about a quarter, about half, about three quarters, all of them*). The question about comments served as a manipulation check to ascertain whether participants who viewed images with comments had in fact noticed the comments. The questions on number of likes and selfies were included to reduce the focus on the experimental manipulation of comments.

2.3.6. Thin-ideal internalization

The extent to which participants had internalised the thin ideal for themselves was measured by the Thin/Low Body Fat subscale of the Sociocultural Attitudes Towards Appearance Questionnaire (SATAQ-4; Schaefer et al., 2015). Participants indicated their level of agreement on 5-point Likert scales (1 = *definitely disagree;* to 5 = *definitely agree*) with five statements (e.g., "I want my body to look very thin"; "I think a lot about having very little body fat"). Agreement scores on the five statements were averaged to produce an overall score ranging from 1 to 5. Schaefer et al. (2015) reported good internal reliability for the scale ($\alpha = .87$). In the present sample, internal reliability was acceptable ($\alpha = .79$).

2.4. Procedure

Participants were recruited for a study simply entitled "Student Use of Instagram" through an online research participation system. They were tested individually or in small groups of two or three in the Psychology and Media Research Laboratory. Testing sessions lasted approximately 30 min and participants received course credit or were reimbursed $15 for their participation.

After reading the Letter of Introduction and providing informed consent, participants completed the initial social media use measure and pre-exposure VAS (mood and body dissatisfaction). They were then given an Apple iPad on which to view the Instagram images. They were randomly allocated (by the roll of a die) to one of three experimental conditions (subject to equal *n*), such that the images were accompanied by either no comment, a positive appearance comment, or a positive appearance comment plus a reality check comment. These comment conditions will subsequently be referred to as none, appearance, and reality check, respectively. In all conditions, women viewed the same set of 14 Instagram images for 20 s each. As in Instagram, images scrolled downwards. To ensure attention, participants 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 state measure of appearance comparison and manipulation checks, and then the trait measure of thin-ideal internalisation. Lastly, participants provided demographic information (age, ethnicity) and, with their permission, height and weight were measured. Participants were thanked for their participation and subsequently provided with debriefing information via an online system on completion of data collection. This protocol had been approved by the Institutional Research Ethics Committee.

3. Results

3.1. Characteristics of the sample

Almost all participants had a Facebook account and an Instagram account (both 96.4 %). Only two women (1.0 %) had neither. Modal use of Facebook was 30–60 min per day and Instagram 1–2 h per day. Modal numbers of Facebook friends, Instagram followers, and Instagram accounts followed were all 200–500.

In order to check if there were any pre-existing differences between experimental groups, a series of one-way ANOVAs was conducted. These revealed no significant group differences on the demographic variables of age, $F(2, 189) = 0.44$, $p = .643$, $\eta_p^2 = .01$, BMI, $F(2, 189) = 0.15$, $p = .865$, $\eta_p^2 = .00$, and time spent on Instagram, $F(2, 189) = 1.80$, $p = .168$, $\eta_p^2 = .02$. Nor was there any significant difference between the three experimental conditions on initial level of body dissatisfaction, $F(2, 189) = 0.78$, $p = .458$, $\eta_p^2 = .01$. Finally, groups did not differ on thin-ideal internalization, $F(2, 187) = 0.82$, $p = .440$, $\eta_p^2 = .01$, indicating that the latter was not reactive to the experimental manipulation.

3.2. Manipulation check

Participants rated the images they had seen as both thin ($M = 6.27$, $SD = 0.82$) and attractive ($M = 6.06$, $SD = 1.08$). They also indicated that the images were similar to those seen on Instagram ($M = 5.84$, $SD = 1.22$).

In the appearance comment condition, the majority of participants (81.3 %) correctly reported seeing comments attached to all images, 10.9 % to three quarters of the images, 6.3 % to half the images; only one participant (1.6 %) reported seeing no comments. In the reality check condition, nearly all (98.4 %) participants reported seeing comments attached to all the images, and the remaining one person (1.6 %) to three quarters of the images. Independent-samples *t*-tests confirmed that participants in the appearance condition ($M = 3.70$, $SD = 0.73$) and in the reality check condition ($M = 3.98$, $SD = 0.13$) reported viewing significantly more comments than participants in the no comment condition ($M = 0.34$, $SD = 0.93$), respectively $t(126) = 22.77$, $p < .001$, $d = 4.02$; $t(126) = 31.05$, $p < .001$, $d = 5.49$. These results indicated that in general participants in the comment conditions did attend to the comments and thus the experimental manipulation was deemed successful.

Table 1
Means (SD) and adjusted means (SE) for body dissatisfaction and state appearance comparison by condition.

Comment Condition	None	Appearance	Reality Check
Body Dissatisfaction			
Pre exposure	52.22 (24.71)	49.46 (26.64)	46.52 (25.79)
Post exposure	57.14 (26.53)	58.29 (28.52)	50.31 (27.91)
Adjusted mean	54.45 (1.59)	58.23 (1.59)	53.07 (1.59)
State appearance comparison	4.67 (1.63)	4.80 (1.69)	4.58 (1.51)

3.3. Effect of comment on body dissatisfaction

An initial 3 (comment type) × 2 (time) repeated measures ANOVA showed a significant main effect of time on body dissatisfaction, $F(1, 189) = 40.66$, $p < .001$, $\eta_p^2 = .18$. There was no significant main effect of condition, $F(2, 189) = 1.10$, $p = .334$, $\eta_p^2 = .01$, nor interaction, $F(2, 189) = 2.77$, $p = .065$, $\eta_p^2 = .03$. As can be seen from the pre- and post-exposure means presented in Table 2, body dissatisfaction increased following exposure to the images across all conditions.

To formally test the specific hypotheses, an ANCOVA (pre-exposure score entered as covariate) was conducted with two planned comparisons using the LMatrix subcommand. The first planned comparison compared the appearance comment condition against the no comment condition (contrast: −1 + 1 0). Although the adjusted means in Table 1 suggest that resulting body dissatisfaction was higher in the appearance comment condition, the planned comparison failed to reach significance, $F(1, 188) = 2.83$, $p = .094$, $\eta_p^2 = .02$; there was no significant difference in body dissatisfaction between participants who viewed appearance comments and no comments.

The second planned comparison compared the reality check condition against the appearance condition (contrast: 0 + 1 − 1). This planned comparison proved significant, $F(1, 188) = 5.29$, $p = .023$, $\eta_p^2 = .03$. The adjusted means show that, as predicted, participants who viewed the reality check comments experienced less body dissatisfaction than those who viewed only the appearance comments. A post hoc comparison of the no comment and reality check conditions showed that they did not differ from each other, $F(1, 125) = 0.38$, $p = .538$, $\eta_p^2 = .00$.

3.4. Effect of comment on state appearance comparison

Table 1 also provides the means for state appearance comparison by condition. It can be seen that there was little difference between the conditions. Planned comparisons confirmed that there was no difference in reported appearance comparison between the appearance comment and no comment conditions, $F(1, 189) = 0.22$, $p = .638$, $\eta_p^2 = .00$, or between the reality check and appearance comment conditions, $F(1, 189) = 0.58$, $p = .447$, $\eta_p^2 = .00$. Accordingly, state appearance comparison did not mediate the observed difference in body dissatisfaction.

In order to see whether state appearance comparison predicted body dissatisfaction across conditions, a hierarchical regression was conducted. Pre-exposure body dissatisfaction was entered on Step 1, followed by state appearance comparison on Step 2. It was found that Step 2 explained a significant amount of additional variance over and above initial body dissatisfaction, $R^2_{change} = .041$, $F_{change}(1, 189) = 44.94$, $p < .001$. The positive sign ($\beta = .23$) indi-

cates that the amount of appearance comparison engaged in while viewing the images predicted the size of the increase in body dissatisfaction.

3.5. Moderating role of thin-ideal internalisation

To test the prediction that internalisation of the thin ideal would moderate the effect of comment type on body dissatisfaction, a hierarchical multiple regression analysis was performed. As the independent variable (comment condition) had three levels, two dummy variables (appearance: 0, 1, 0; reality check: 0, 0, 1) with the no comment condition as the reference group had to be created. As recommended by Aiken and West (1991), thin-ideal internalisation scores were centred by subtracting the mean from each score to reduce multicollinearity. Product terms were created to represent the interaction between condition and thin-ideal internalization. Pre-exposure body dissatisfaction was entered in Step 1, dummy variables and centred moderator (main effects) in Step 2, and the product terms (interaction) in Step 3. There is evidence of moderation when the product term(s) explain additional significant variance over and above the main effects.

The analysis showed that Step 2 of the regression explained significant additional variance in body dissatisfaction, $R^2_{change} = .028$, $F_{change}(3, 185) = 9.13$, $p < .001$. Specifically, thin-ideal internalisation emerged as a unique predictor, $\beta = .18$, $p < .001$. However, Step 3 was not significant, $R^2_{change} = .001$, $F_{change}(2, 183) = 0.58$, $p = .560$. This pattern of results indicates that internalisation of the thin ideal did not moderate the effect of comment type on body dissatisfaction, but rather was associated with an increase in body dissatisfaction regardless of experimental condition.

4. Discussion

The major aim of the present study was to investigate the effect on women's body dissatisfaction of viewing a challenging reality check comment following a positive appearance comment attached to idealized Instagram images. Although the appearance comment did not of itself increase body dissatisfaction, in support of our prediction, the addition of the reality check comment did result in a decrease in body dissatisfaction. There was no effect on state appearance comparison, nor moderation by thin-ideal internalization. The study extends existing research on Instagram use and body image to the examination of the role of particular forms of comment that individuals can make on their peers' photos. In so doing, it adds to the scant body of research investigating the interactive features of social media.

Although not the major purpose of the study, the finding that exposure to thin and attractive Instagram images (regardless of comments) led to greater body dissatisfaction is consistent with a growing body of experimental research likewise demonstrating negative effects of viewing idealized Instagram imagery (Brown & Tiggemann, 2016; Cohen et al., 2019; Tiggemann & Zaccardo, 2015; Tiggemann et al., 2018). Interestingly, as a whole, these effects seem at least as large and consistent, if not more so, than the earlier effects reported for traditional idealized media images, such as models in fashion magazines (Grabe et al., 2008; Groesz et al., 2002; Want, 2009). One sad consequence of women and girls increasingly turning to social media over traditional media formats (Fardouly et al., 2015; Sensis, 2018), is that they are liable to be exposed to many more Instagram images per unit of time than ever possible for fashion magazine images.

Our major finding of a beneficial effect for reality check comments is a novel one. We showed for the first time that viewing positive appearance plus reality check comments elicited significantly less body dissatisfaction than viewing the positive appearance comments alone. It seems that a reality check comment is able to effectively neutralize a positive appearance comment. This is an important finding because positive appearance comments are a common response to photographs on social media (Wang et al., 2018). Indeed, seeking positive peer feedback has been reported as the major motivator for the posting of photographs of oneself to Instagram (Baker et al., 2019; Chua & Chang, 2016). The positive result for reality check comments obtained here contrasts with the lack of effect consistently observed for "reality check" style comments (indicating that images have been digitally enhanced) added to fashion magazine images (e.g., Ata, Thompson, & Small, 2013; Bury, Tiggemann, & Slater, 2016; Frederick, Sandhu, Scott, & Akbari, 2016; Tiggemann, Slater, Bury, Hawkins, & Firth, 2013; Tiggemann & Brown, 2018). However, reality check comments on Instagram images are very different in a number of critical ways: they are made by peers in their own language and *in response to* a particular photo or comment, and thus serve as a very salient form of peer norms and social reinforcement.

Although we obtained the predicted effect for reality check comments, we did not find a significant effect for positive appearance comments alone. The means lay in the predicted direction, but the difference between the appearance comment and no comment conditions failed to reach significance. This contrasts with the finding of Tiggemann and Barbato (2018) who found that viewing thin and attractive Instagram images accompanied by positive appearance comments elicited greater body dissatisfaction than viewing the same images with place comments. While the lack of a neutral or no comment condition makes it difficult to directly compare the two studies, it seems likely that some of Tiggemann and Barbato's (2018) effect derives from the place comments actively diverting focus away from appearance. In this light, it is possible that the present study was underpowered to detect what would logically be a smaller effect size and future studies should utilize larger samples to provide a more robust test of the hypothesis.

We had also predicted that reality check comments would have their effect via reduced social comparison. Specifically, we expected that the reality check comments would serve to point out or remind women that the viewed images are unrealistic and unattainable, and therefore do not provide appropriate targets for comparison. However, we found no effect of comment on reported appearance-based comparison. Nevertheless, the amount of appearance comparison engaged in did predict increase in body dissatisfaction regardless of condition, as is usually found in studies of both traditional media (Bessenoff, 2006; Tiggemann & Polivy, 2010; Tiggemann, Polivy, & Hargreaves, 2009) and Instagram images (Brown & Tiggemann, 2016; Tiggemann & Zaccardo, 2015). It may be that such comparisons are largely automatic and spontaneous, and women may only consider their relevance or appropriateness after they have been made (Gilbert, Giesler, & Morris, 1995). Alternatively, as has recently been suggested for media images more generally (Tiggemann, Brown, & Anderberg, 2019), it may be that women choose to make these comparisons knowingly, despite their inappropriateness, because they set the standard against which women will be judged (Strahan et al., 2006). Whatever the case, as stated by Levine and Murnen (2009) over a decade ago, we still do not have a clear grasp of the "automatic, intentional, and motivational processes involved in the role of *social comparison* in media effects" (p. 34).

Theoretically, we conceptualized reality check comments as akin to a brief online dissonance-based intervention. It seems plausible that reality check comments would elicit cognitions dissonant with those elicited by positive appearance comments about a thin and attractive woman. To check this reasoning, future studies might attempt to gain access to what women actually think and feel while viewing the images through think-aloud or other verbal report protocols. On the basis of the findings for dissonance-based eating

disorder prevention programs (Stice et al., 2019), we also predicted that the effect of reality check comments would be greater for women who had internalised the thin ideal to a greater degree. This was found not to be the case, although thin-ideal internalisation did predict increased body dissatisfaction in response to viewing the images, irrespective of comment condition. The latter finding is consistent with the general conclusion that internalisation of the thin ideal is an important risk factor for body image disturbance (Thompson & Stice, 2001). It still remains possible that thin-ideal internalisation would moderate the effect (untested here) of reality check comments presented on their own, that is, without any preceding appearance comment.

The findings have practical implications. The most obvious is that women should be encouraged to seek out and view accounts that post reality check comments that challenge unrealistic and unhealthy beauty ideals. Indeed, actively critiquing narrow and rigid beauty ideals is a major part of general media literacy, as well as of social media literacy in particular, which have been shown to be protective against media influence for women (Levine & Murnen, 2009; McLean, Wertheim, Masters, & Paxton, 2017). The posting of reality check comments also constitutes a small part of the wider online body positive movement (Cwynar-Horta, 2016; Sastre, 2014). Consistent with the present result, Cohen et al. (2019) recently showed that exposure to a broad range of body positive material resulted in lower body dissatisfaction for women. It should be noted, however, that although all our reality check comments spoke to the unattainability of the image, some addressed the unrealistic nature of the image (e.g., pose, photoshop), and others addressed the thinness of the woman pictured. While this accurately reflects their usage on Instagram, care needs be taken to not engage in what has come to be called "skinny shaming," where a visibly thin person is criticised or humiliated for their appearance. Appearance-based teasing, from whatever source, is known to be detrimental to women's body image and self-worth (for a meta-analysis, see Menzel et al., 2010).

Like all studies, there are some limitations needing acknowledgement. First, the sample consisted of young adult women. Although these are the highest users of social media in general (Sensis, 2018), and highest posters of self-photographs in particular (Dhir, Pallesen, Torsheim, & Andreassen, 2016), other demographic groups also make and view comments on Instagram in large numbers. Given the importance they place on peers (e.g., Gorrese & Ruggieri, 2012), adolescents might be particularly responsive or susceptible to comments made on social media by their peers. Second, although experimental stimuli had high ecological validity in that they consisted of real Instagram images accompanied by real Instagram comments presented on an iPad, the experiment itself took place in a laboratory setting. Participants were required to attend to the images differently from how they would in more naturalistic settings. Third, we tested the effect of the addition of reality check comments to positive appearance comments. Given the frequency of positive appearance comments (Wang et al., 2018), this is indeed the likely natural context for reality check comments. Nevertheless, future research should investigate the effect of reality check comments alone, i.e., without positive appearance comments. Relatedly, our three comment conditions (none, appearance, reality check) contained zero, one, and two comments, respectively, and hence differed in attentional requirements. Future research might equate the amount of reading required by comparing reality check and positive appearance comments against the same number of neutral comments, although it is difficult to conceptualize a truly neutral comment. Finally, we tested the effect of viewing only one exemplar of each comment type. In fact, any one photo may evoke a whole string of comments and so future research will need to use creative methodologies to investigate more complex comment patterns.

Despite the above limitations, the present study has made a novel contribution to the emerging literature on the effects of the interactive features of social media, in this case, the viewing of different forms of comment. The findings illustrate the peer-mediated nature of social media and suggest that reality check comments do provide an effective means to counter positive appearance comments. However, questions remain as to the best way to implement such reality check comments in practice.

CRediT authorship contribution statement

Marika Tiggemann: Conceptualization, Methodology, Formal analysis, Writing - original draft, Supervision, Funding acquisition. **Vasiliki Georgia Velissaris:** Conceptualization, Methodology, Investigation, Formal analysis, Writing - review & editing.

Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:https://doi.org/10.1016/j.bodyim.2020.04.004.

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