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The relationship between Instagram activity and female body concerns: The serial mediating role of appearance-related comparisons and internalization of beauty norms

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Abstract

Recent research showed that body image concerns (i.e., drive for thinness and body dissatisfaction) may be associated with exposure to images on social networking sites. We analysed this relationship by taking into account the possible mediating role of both the appearance-related comparisons (i.e., the comparison with others on a specific dimension) and the internalization of beauty standards (i.e., the acceptance of the predominant physical-attractiveness societal standards) in the Italian context. In two studies, we showed that Instagram-photo activity was positively associated with both drive for thinness and body dissatisfaction through the mediating role of appearance-related comparisons on Instagram. We further showed that the association between Instagram-photo activity and body image concerns was sequentially mediated by appearance-related comparisons on Instagram and the internalization of beauty standards. Female participants who engaged in Instagram-photo activity also expressed greater concerns about their bodies as they were highly likely to make more comparisons relative to the appearance dimension and show high levels of internalization of beauty standards. These findings are

discussed within theoretical and applied implications in the social media domain. Please refer to the Supplementary Material section to find this article's Community and Social Impact Statement.

1 | GENERAL INTRODUCTION

People are frequently exposed to media images of sexually attractive women, typically portrayed with idealized and unrealistic bodies (e.g., tall and extremely thin; Grabe, Ward, & Hyde, 2008; Mills, Musto, Williams, & Tiggemann, 2018; Tiggemann & Anderberg, 2020). Studies concerning traditional media (e.g., TV, magazines, billboards) have shown that women who are exposed to higher levels of appearance-related content were highly likely to report strong concern about their bodies (Grabe et al., 2008; Huang, Peng, & Ahn, 2020). More recently, the popularity and use of social networking sites such as Instagram among young women is surpassing that of traditional media (Muscanell & Guadagno, 2012; Perloff, 2014). The steadily increasing popularity of new media calls for a recasting of the analysis of the relationship between appearance-related content and body concerns in the context of social networking sites.

Instagram is the second-most commonly used social networking site (Anderson & Jiang, 2018) with over 1 billion monthly active users who post over 95 million photos daily (Instagram, 2018). Given that the primary use of Instagram is posting and sharing photos, several studies have begun to analyse the psychological consequences of such activities (Ridgway & Clayton, 2016), Specifically, Instagram-photo activity (i.e., the extent to which individuals were exposed to images of others), compared to the use of other social networking sites (e.g., Facebook), might negatively affect women's wellbeing, likely diminish self-esteem and increase anxiety (Primack et al., 2017). Also, Instagram-photo activity can have negative effects on women's body perceptions, by increasing their body dissatisfaction and drive for thinness (Engeln, Loach, Imundo, & Zola, 2020; Fardouly & Vartanian, 2015; Hendrickse, Arpan, Clayton, & Ridgway, 2017). The current research aims to broaden the understanding of the association between women's Instagram-photo activity and body concerns by analysing this relationship from two theoretical vantage points, namely Social Comparison Theory (Festinger, 1954) and Sociocultural Standards of Beauty (Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999).

1.1 | Social comparison theory and appearance-related comparisons

Social comparison (i.e., comparing oneself to others along specific dimensions) appears to be an ineluctable outcome of almost every interaction (Festinger, 1954). Individuals engage in comparisons in particular when there are no objective means for evaluation, and they are uncertain about their own standing (Buunk, Cohen-Schotanus, & van Nek, 2007). In doing so, individuals may gain information concerning, for example, whether or not they perform a given task adequately. Individuals can learn more from their performance especially by engaging in comparisons with those perceived of as being 'superior' (e.g., those who performed better; Buunk et al., 2007). Such an upward comparison may also be threatening as it can lead to decreased self-evaluation (Buunk et al., 2007). Individuals may compare themselves to others to preserve or boost their self-evaluation, as in the case in which others are thought to be worse off (i.e., downward comparison; Buunk et al., 2007).

One dimension through which women are highly likely to compare themselves with other women is physical appearance (i.e., *appearance-related comparison*; Festinger, 1954; Hendrickse et al., 2017; Piccoli, Foroni, & Carnaghi, 2013). Evidence demonstrated that women's appearance-related comparison is highly likely to lead to negative outcomes such as body dissatisfaction and drive for thinness (Hendrickse et al., 2017; Myers & Crowther, 2009; Saunders & Eaton, 2018). Although some studies have suggested that such negative outcomes were particularly associated with upward comparisons (Bailey & Ricciardelli, 2010; Ridolfi, Myers, Crowther, & Ciesla, 2011), other studies have shown that women's appearance-related comparisons (upward or downward) are associated with both body dissatisfaction and drive for thinness (Fardouly & Vartanian, 2015; Fardouly, Willburger, & Vartanian, 2018; Vartanian & Dey, 2013).

1.2 | Sociocultural standards of beauty

Beauty standards define the ideals of physical attractiveness within a culture and prescribe 'what to look like' and approve that 'look' (Calogero, Boroughs, & Thompson, 2007). Such standards stress the significance of women's body appearance over body competence (Fredrickson & Roberts, 1997) and suggest idealized and unrealistic body shapes (e.g., thinness; Tiggemann & Zaccardo, 2015). Sociocultural standards of beauty imply both the recognition (i.e., *awareness*) and acceptance (i.e., *internalization*) of the predominant physical-attractiveness and appearance benchmarks in a societal context (Heinberg, Thompson, & Stormer, 1995). While awareness indexes one's knowledge of beauty standards (Thompson, Van Den Berg, Roehrig, Guarda, & Heinberg, 2004), internalization represents one's endorsement of these standards as personal beliefs and goals (Thompson et al., 2004; Thompson & Stice, 2001). Most individuals are aware of beauty standards but not everyone internalizes these standards to the same degree. Women who strongly internalize these unrealistic standards are also compelled to achieve these ideals (Feltman & Szymanski, 2018; Lee & Lee, 2021) and are highly likely to experience body concerns (Cafri, Yamamiya, Brannick, & Thompson, 2005; Thompson & Stice, 2001). By contrast, awareness of beauty standards does not necessarily contribute to the development of body dissatisfaction (Cafri et al., 2005). Cusumano and Thompson (1997) found that women's concerns about their bodies were better predicted by their levels of internalization rather than awareness of beauty standards.

1.3 | The influence of traditional media and social networking sites on body image: The mediating role of social comparison and the sociocultural standards of beauty

Research has demonstrated that the association between exposure to idealized images and women's body dissatisfaction can be accounted for by women's tendencies to engage in appearance-related comparisons with such unrealistic portrayals (Tiggemann & McGill, 2004; Tiggemann & Miller, 2010).

Recently, scholars have begun analysing the mediating role of appearance-related comparisons also in relation to the usage of new media and body concerns. For example, Tiggemann and Miller (2010) showed that in a sample of Australian women, greater Internet use was associated with greater appearance-related comparisons, which in turn were associated with a greater drive for thinness. Similarly, Hendrickse et al. (2017); Fardouly and colleagues (2018) reported that in a sample of American women, higher levels of Instagram-photo activity were associated with higher appearance-related comparisons (i.e., *appearance-related comparisons on Instagram*), which in turn were associated with higher levels of participants' body image concerns.

Traditional media plays also a significant role in defining and perpetuating an idealized body image for women (Mills et al., 2018). Through repeated exposure to idealized and unrealistic media content, women are not only aware of and learn societies' ideal body benchmarks but may also assimilate such standards. In a relevant study, Stice and Shaw (1994) found that internalization of beauty standards mediates the relationship between media exposure and

body dissatisfaction. Furthermore, Arroyo (2015); see also Tiggemann (2003) demonstrated that internalization of beauty standards accounted for the association between exposure to fashion, health and beauty magazines and body dissatisfaction.

As for social networking sites, Bair, Kelly, Serdar, and Mazzeo (2012) showed that in a sample of American women, the association between exposure to Internet images and body dissatisfaction was mediated by the internalization of beauty standards. Recently, Fardouly et al. (2018) reported that in a sample of Australian women, higher levels of Instagram-photo activity were closely associated with internalization of beauty standards, in turn associated with higher levels of body concerns.

1.4 | Rationale and overview of the current research

The current research aims to deepen the analyses of the association between Instagram-photo activity and body concerns. We reasoned that although appearance-related comparisons and the internalization of beauty standards may be both unique and distinct mediator variables in the relationship between social network use and body concerns (Fardouly et al., 2018; for a review see Saiphoo & Vahedi, 2019), they are both highly likely to work together in mediating the association between Instagram-photo activity and body concerns. We suggest that appearance-related comparisons and the internalization of beauty standards could mediate the relationship between Instagram-photo activity and body image concerns in a serial fashion. Theoretical and empirical efforts concerning traditional media back the idea that appearance-related comparisons could precede the internalization of beauty standards in the serial mediation model (Halliwell & Harvey, 2006; Karazsia & Crowther, 2009; Thompson et al., 1999). The Tripartite Influence Model (Thompson et al., 1999) suggests that societal expectations regarding women's physical appearance could lead to engaging in social comparisons on appearance with other women. Such social comparisons are highly likely to drive women to internalize culturally prevailing standards of beauty. From an empirical perspective, appearance-related comparisons mediated the relationship between media usage and the internalization of beauty standards (Halliwell & Harvey, 2006; Karazsia & Crowther, 2009).

Until now, no studies have tested appearance-related comparisons and the internalization of beauty standards in a serial mediational model in the domain of social networking sites and specifically in an image-based social media platform such as Instagram.

To this end, we planned a two-step verification. First, in Study 1, we replicated (see Hendrickse et al., 2017) whether appearance-related comparisons on Instagram mediated the relationship between the frequency of Instagram-photo activity and both drive for thinness and body dissatisfaction in the Italian context. In Study 2, we then aimed to contribute to the existing literature by examining whether appearance-related comparisons on Instagram and internalization of beauty standards might co-play a serial mediating role in the relationship between Instagram-photo activity and female body concerns.

The need to replicate whether appearance-related comparisons mediated the relationship between the frequency of Instagram-photo activity and body image concerns in a sample of young women within the Italian context is twofold. First, previous studies included samples of young American and Australian women (Fardouly et al., 2018; Hendrickse et al., 2017), thus limiting the generalizability of the findings to these cultural contexts. Findings from cross-cultural research (Schaefer et al., 2019) showed that in the Italian context, women reported lower levels of internalization of beauty standards but higher levels of body dissatisfaction compared to American and Australian women (Al Sabbah et al., 2009; Schaefer et al., 2019). Given the existence of the considerable variability of the constructs of interest among these cultural contexts, it is of pivotal importance to ascertain the validity of Instagram-photo activity on body concerns through the mediating role of appearance-related comparisons on Instagram in the Italian context. Second, the need to test the above-mentioned model is a necessary precondition for testing the hypothesized and more complex model, which comprises the internalization of beauty standards as an additional mediating variable in a serial mediation model.

1.5 | Hypotheses

In Study 1, we predicted:

> **Hypothesis 1.** *Instagram-photo activity is positively associated with appearance-related comparisons on Instagram.*

> **Hypothesis 2.** *Appearance-related comparisons on Instagram are positively associated with drive for thinness (Hypothesis 2a) and with body dissatisfaction (Hypothesis 2b).*

> **Hypothesis 3.** *Appearance-related comparisons on Instagram mediate the relationship between Instagram-photo activity and both drive for thinness (Hypothesis 3a) and body dissatisfaction (Hypothesis 3b).*

In Study 2, we confirmed *Hypotheses 1, 2a, 2b, 3a, 3b* and then tested the following predictions:

> **Hypothesis 4.** *Appearance-related comparisons on Instagram and internalization of beauty standards sequentially mediate the association between Instagram-photo activity and both drive for thinness (Hypothesis 4a) and body dissatisfaction (Hypothesis 4b).*

We also tested the role of awareness of beauty standards in place of internalization in the above-mentioned serial mediation model (see Data S1).

To replicate Hendrickse's findings Hendrickse et al. (2017) in the Italian context, we followed the same statistical procedures outlined by the authors and assessed participants' relationship status and age, thus including these variables as covariates in the statistical analyses. The use of such covariates is motivated by evidence indicating that body concerns can be stronger in younger than older women (Tiggemann & Lynch, 2001) and more in single women than those in a romantic relationship (Laus, Almeida, & Klos, 2018). Finally, as outlined by Fardouly and colleagues (2018), a general measure of Instagram usage was used as a covariate in order to control for the time participants spent on the social network.

2 | STUDY 1

2.1 | Participants and procedure

One hundred and fifty participants took part in the research. Only women with an Instagram account were eligible for the study. Eleven women who did not have an Instagram profile and 24 women who completed less than 80% of the survey were excluded from the main analyses, leaving a final sample of $n = 115$ women. Participants' ages ranged from 19 to 33 ($M = 25.42$, $SD = 2.56$; $n = 1$ not reporting). One hundred and thirteen participants indicated they were Italian, whereas n = 2 participants reported being non-Italian. 93.3% ($n = 112$) of participants identified as heterosexual, 1.7% ($n = 2$) bisexual and 0.8% ($n = 1$) gay. Also, 26.7% ($n = 32$) of participants were single and 69.2% ($n = 83$) were in a romantic relationship.

This study received ethical approval from the University Ethics Committee. Data were collected through an anonymous self-report questionnaire via a web survey (i.e., SurveyMonkey). The advertisement for the survey and the survey itself were in Italian. Participants were asked to fill out the questionnaire individually after providing informed written consent. The questionnaire took approximately 10 min to complete. This research was run prior to the SARS-Cov2 lockdown.

2.2 | Measures

Instagram-photo activity. Participants' Instagram-photo activity was assessed by the Instagram-photo activity measure (Hendrickse et al., 2017; Meier & Gray, 2014). This scale was comprised of six statements. Two items were related to the passive exposure to pictures of others (e.g., 'Browse photos (or videos) of friends'). Four items measured both the exposure to pictures of others as well as interaction with other people's profiles on Instagram (e.g., 'Comment on photos (or videos) of others'). Participants rated their answers on a 5-point scale ranging from 1 (*never*) to 5 (*always*).

Appearance-related comparisons on Instagram. This measure comprised of three items: 'When using Instagram, I compare my physical appearance to the physical appearance of others'; 'When using Instagram, I compare how I am dressed to how other people are dressed' and 'When using Instagram, I sometimes compare my figure to the figures of other people'; Fardouly & Vartanian, 2015; Hendrickse et al., 2017; Thompson, Heinberg, & Tantleff-Dunn, 1991). Participants rated their answers on a 4-point scale ranging from 1 (*never*) to 4 (*always*).

Body image concerns. Two scales of the Eating Disorder Inventory (EDI; Garner, Olmstead, & Polivy, 1983; for the Italian version see Rizzardi, Trombini, & Trombini, 1995) were used: drive for thinness and body dissatisfaction. The drive for thinness scale consisted of seven items to assess excessive concern with dieting, preoccupation with weight (e.g., 'I am terrified of gaining weight'). The body dissatisfaction scale was comprised of nine items that measure dissatisfaction with one's own body (e.g., 'I think my stomach is too big'). Participants provided their answers on a 4-point Likert scale ranging from 1 (*never*) to 4 (*always*).

Instagram usage. Two items were used to assess participants' Instagram usage: 'How often do you check Instagram (even if you are logged on all day)?' and 'Overall, how long do you spend on Instagram in a typical day?' (Fardouly et al., 2018). The two items were correlated, $r(114) = .70$, $p < .001$, we standardized and then averaged these items to form a single index of Instagram usage.

3 | RESULTS

3.1 | Statistical approach

Data were analysed by means of the R package *lavaan* framework (R Core Team, 2019; Rosseel, 2012). We examined the relationship between the predictor variable X = Instagram-photo activity, through the mediating variable M = appearance-related comparisons on Instagram on two outcome variables, Y1 = drive for thinness, Y2 = body dissatisfaction, which were first entered into the model separately and then simultaneously. This analytical procedure allowed us to test specific equality constraints imposed on indirect paths (Figure 1a). Instagram usage, age and relationship status (dummy code) were entered as covariates. The results described below considered the effects of such covariates.

To overcome potential issues related to the size of the examined sample, we compared the results issued by the frequentist and Bayesian approaches (Nuijten, Wetzels, Matzke, Dolan, & Wagenmakers, 2015).

3.2 | Preliminary analyses

Means, standard deviations, response range, Cronbach's alpha and correlations between variables are presented in Table 1.

Given the high correlation between drive for thinness and body dissatisfaction scales ($r = .70$), we ran a discriminant validity analysis, which suggested that these scales tapped into two distinct, albeit correlated, constructs (see Data S1).
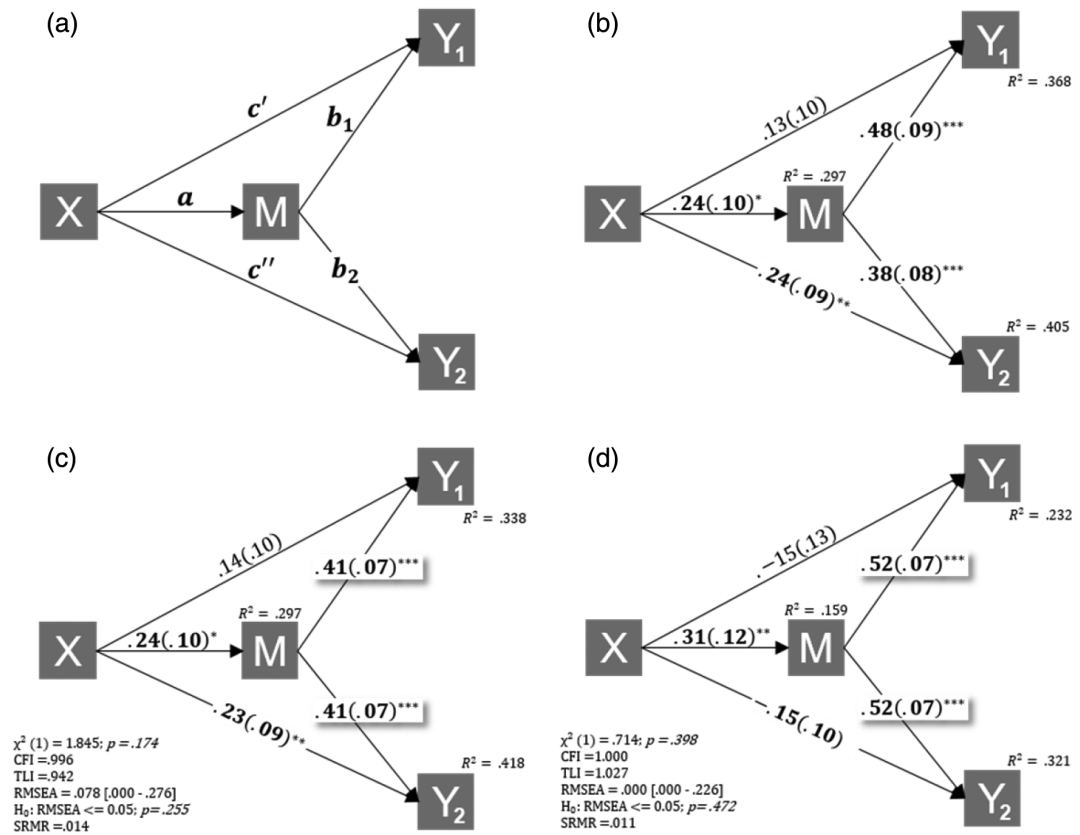
FIGURE 1 (a) X = Instagram-photo activity; M = appearance-related comparisons on Instagram; Y1 = drive for thinness and Y2 = body dissatisfaction. (b) appearance-related comparisons on Instagram as a mediator in the relationship between Instagram activity and drive for thinness and body dissatisfaction for Study 1 (n = 115). (c) equality constraints applied to indirect effects of Instagram-photo activity on drive for thinness and on body dissatisfaction for Study 1 (n = 115). (d) equality constraints applied to indirect effects of Instagram activity on drive for thinness and on body dissatisfaction for Study 2 (n = 120). Standardized parameter estimates; the standard errors are computed by using the Delta method; participants' age, Instagram usage and relationship status were entered as covariates. ***p ≤ .001; **p ≤ .01; *p ≤ .05

3.3 | Mediational analyses

In line with *Hypothesis 1*, Instagram-photo activity was positively associated with appearance-related comparisons on Instagram, $a = 0.24$, $SE = 0.10$, $p = .02$. Confirming *Hypothesis 2a*, appearance-related comparisons on Instagram were positively associated with drive for thinness, $b_1 = 0.48$, standard error $[SE] = 0.09$ and $p < .001$. The direct effect of Instagram-photo activity on drive for thinness was not significant, $c' = 0.13$, $SE = 0.10$ and $p = .22$. The total effect was significant, $c = 0.24$, $SE = 0.11$ and $p = .04$.

In line with *Hypothesis 3a*, appearance-related comparisons on Instagram mediated the relationship between Instagram-photo activity and drive for thinness, $a \cdot b_1 = 0.12$, $SE = 0.05$ and $p = .03$ (Figure 1b).

Participants' age was positively associated with drive for thinness, $B = 0.06$, $SE = 0.03$ and $p = .04$, but relationship status was not associated with drive for thinness, $B = 0.08$, $SE = 0.15$ and $p = .54$.

As for the body dissatisfaction outcome measure, appearance-related comparisons on Instagram were positively associated with body dissatisfaction, $b_2 = 0.38$, $SE = 0.08$ and $p < .001$, thus confirming *Hypothesis 2b*.

TABLE 1 Means, standard deviations, response range, Cronbach's alpha and correlations of the measures used in Study 1

Measures	Mean/SD	Response range	α	1.	2.	3.	4.
1. Instagram-photo activity	2.88/0.77	1–5	.77				
2. Appearance-related comparisons on Instagram	2.18/0.83	1–4	.91	.44**			
3. Drive for thinness	2.08/0.84	1–4	.93	.37**	.57**		
4. Body dissatisfaction	2.51/0.72	1–4	.91	.44**	.55**	.70**	
5. Instagram use (in terms of hour per day)	3.87/1.85	1–11	—	.53**	.45**	.32	.27*

**$p < .001$;
*$p < .005$.

The direct effect of Instagram-photo activity on body dissatisfaction was significant, $c'' = 0.24$, $SE = 0.09$ and $p = .01$. The total effect was significant, $c = 0.33$, $SE = 0.09$ and $p < .001$.

Moreover, and in line with *Hypothesis 3b*, appearance-related comparisons on Instagram mediated the relationship between Instagram-photo activity and body dissatisfaction, $a·b_2 = 0.09$, $SE = 0.04$ and $p = .03$ (Figure 1b).

Participants' age $B = 0.06$, $SE = 0.02$ and $p = .02$ and relationship status, $B = -0.26$, $SE = 0.12$ and $p = .03$ were both associated with body dissatisfaction, showing that older (compared to younger) and single women (compared to those in a romantic relationship) showed higher levels of body dissatisfaction.

Bayes factors (BF_{10}), calculated separately for the two mediation models, qualified the indirect effect paths as *extremely* supported by the data for drive for thinness and body dissatisfaction ($BF_{10} > 100$, see Data S1).

As for the two indirect effects of Instagram-photo activity on both outcome variables through the mediating role of appearance-related comparisons, they did not significantly differ from each other, $a·b_1 – a·b_2 = 0.03$, $SE = 0.02$ and $p = .26$, thus suggesting an equality constraint could be imposed and tested. The equality constraint applied to indirect effects led to no significant change in the model fit (Scaled Chi square difference test: $\Delta\chi^2 = 1.845$, $df = 1$, $p = .17$; difference between Bayesian Information Criterion: $\Delta BIC = 3.04$). Hence, the indirect effect of Instagram-photo activity on outcome variables through the mediating role of appearance-related comparisons on Instagram was equally strong in the current sample, $a·b_1 = a·b_2 = 0.10$, $SE = 0.05$ and $p = .03$ (Figure 1c).

A post-hoc Monte Carlo power analysis for mediation models (Schoemann, Boulton, & Short, 2017) indicated that our sample achieved sufficient power: 1.00 and 1.00 for drive for thinness and body dissatisfaction scales, respectively, based on conventional power values (power = .80; Cohen, 1988).

4 | DISCUSSION

The aim of Study 1 was to replicate Hendrickse and colleagues' findings (Hendrickse et al., 2017) within the Italian context. Results showed that Instagram-photo activity was positively associated with appearance-related comparisons on Instagram (*Hypothesis 1*), and that women who engaged in appearance-related comparisons on Instagram reported a higher drive for thinness (*Hypothesis 2a*) and higher body dissatisfaction (*Hypothesis 2b*). The relationship between Instagram-photo activity and both drive for thinness and body dissatisfaction was mediated by appearance-related comparisons on Instagram (*Hypotheses 3a and 3b*). Also, the indirect effects of Instagram-photo activity on both outcome variables through the mediating role of appearance-related comparisons on Instagram did not differ from each other, indicating that the mediational role of appearance-related comparisons on Instagram in the relationship between Instagram-photo activity on outcome variables was equally strong.

The replication of Hendrickse and colleagues' results (Hendrickse et al., 2017) in the Italian context allowed us to test *Hypothesis 4* in Study 2.

5 | STUDY 2

5.1 | Participants and procedure

One hundred and fifty female participants took part in the research. As in Study 1, only women with an Instagram account participated in the study. Four women who did not have an Instagram profile and 26 women who completed less than 80% of the survey were excluded from the main analyses, leaving a final sample of $n = 120$ women. Participants' age ranged from 18 to 29 ($M = 21.38$, $SD = 2.30$). One hundred eighteen participants indicated they were Italian, whereas $n = 2$ participants reported being non-Italian. 87.5% ($n = 105$) of the participants identified as heterosexual, 10.8% ($n = 13$) as bisexual, 0.8% ($n = 1$) gay and 0.8% ($n = 1$) other. In the sample, 32.5% ($n = 39$) of participants were single, and 67.5% ($n = 81$) of women were in a romantic relationship. The procedures in Study 2 were identical to those of Study 1.

5.2 | Measures

The measures were identical to those of Study 1 with the only exception being The Sociocultural Attitudes Towards Appearance Questionnaire used in the current study. This measure comprised of two subscales: the awareness subscale, which contained six items (e.g., People think that the thinner you are, the better you look in clothes), and the internalization of beauty standard subscale, which comprised of eight items (e.g., I believe that clothes look better on thin models; Heinberg et al., 1995; for the Italian version see Puvia & Vaes, 2013). Participants rated their answers on a 5-point scale ranging from 1 (*totally disagree*) to 5 (*totally agree*).

The two questions regarding Instagram usage were correlated, $r(120) = .55$, $p < .001$ and responses on these two items were standardized and then averaged to form a single measure of Instagram usage.

6 | RESULTS

6.1 | Preliminary analyses

Means, standard deviations, response range, Cronbach's alpha and correlations between variables are presented in Table 2. The drive for thinness and body dissatisfaction scales were highly correlated ($r = .69$). A discriminant validity analysis suggested that both measures assessed two distinct, albeit correlated, constructs (see Data S1 for details).

6.2 | Mediational analyses

We performed the same mediational analyses as in Study 1 (Figure 1a).

Instagram-photo activity was positively associated with appearance-related comparisons on Instagram, $a = 0.31$, $SE = 0.12$ and $p = .01$. Appearance-related comparisons on Instagram were positively associated with drive for thinness, $b_1 = 0.57$, $SE = 0.10$ and $p < .001$. The direct effect of Instagram-photo activity on drive for thinness was not significant, $c' = -0.16$, $SE = 0.13$ and $p = .20$ as well as the total effect $c = 0.02$, $SE = 0.14$ and $p = .93$. Moreover, appearance-related comparisons on Instagram mediated the relationship between Instagram-photo activity and drive for thinness, $a \cdot b_1 = 0.18$, $SE = 0.07$ and $p = .02$.

The same mediational analysis was performed for the body dissatisfaction measure. Appearance-related comparisons on Instagram were positively associated with body dissatisfaction, $b_2 = 0.50$, $SE = 0.08$ and $p < .001$. The direct effect of Instagram-photo activity on body dissatisfaction was not significant, $c'' = -0.15$, $SE = 0.10$ and

TABLE 2 Means, standard deviations, response range, Cronbach's alpha and correlations of the measures used in Study 2

Measures	Mean/SD	Response range	α	1.	2.	3.	4.	5.	6.
1. Instagram-photo activity	3.20/0.64	1.33–4.83	.69						
2. Appearance-related comparisons on Instagram	2.48/0.76	1–4	.85	.28**					
3. Drive for thinness	2.27/0.87	1–4	.93	−.03	.47**				
4. Body dissatisfaction	2.65/0.70	1.33–4	.80	−.06	.48**	.69**			
5. Internalization of beauty standards	2.88/0.96	1–5	.89	.07	.67**	.60**	.54**		
6. Instagram use (in terms of hour per day)	4.96/2.10	1–13	—	.39**	.19*	−.05	−.05	.01	

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

$p = .14$, as well as the total effect $c = 0.01$, $SE = 0.11$ and $p = .93$. Appearance-related comparisons on Instagram mediated the relationship between Instagram-photo activity and body dissatisfaction, $a \cdot b_2 = 0.16$, $SE = 0.06$ and $p = .01$.

Participants' relationship status was negatively associated with body dissatisfaction, $B = −0.25$, $SE = 0.12$ and $p = .04$.

Bayes factors qualified the indirect effect paths as *moderately* supported by the data for drive for thinness and for body dissatisfaction ($BF_{10} = 7.46$, see Data S1). The two indirect effects of Instagram-photo activity on both outcome variables through the mediating role of appearance-related comparisons on Instagram did not significantly differ from each other, $a \cdot b_1 - a \cdot b_2 = 0.02$, $SE = 0.03$ and $p = .43$. The two indirect effects can be constrained to be equally strong without significant loss of model fit (scaled Chi square difference test: $\Delta \chi^2 = .714$, $df = 1$ and $p = .40$; difference between Bayesian Information Criterion: $\Delta BIC = 4.09$; $a \cdot b_1 = a \cdot b_2 = .16$, $SE = .06$ and $p = .01$; Figure 1d).

A post-hoc Monte Carlo power analysis for mediation indicated our sample achieved sufficient power: .86 and .79 for drive for thinness and body dissatisfaction scales, respectively.

6.3 | Serial mediation analyses

We examined the indirect effects of Instagram-photo activity on drive for thinness and body dissatisfaction through appearance-related comparisons on Instagram and through the internalization and of beauty standards (Figure 2a).

As regards drive for thinness, Instagram-photo activity was positively associated with appearance-related comparisons on Instagram, $a_1 = 0.31$, $SE = 0.12$, $p = .01$. Instagram-photo activity was not associated with the internalization of beauty standards, $a_2 = −0.09$, $SE = 0.1$ and $p = .43$. Appearance-related comparisons on Instagram were positively associated with internalization of beauty standards, $d_{21} = 0.87$, $SE = 0.09$ and $p < .001$. The relationship between internalization of beauty standards and drive for thinness was also positive, $b_{12} = 0.44$, $SE = 0.09$ and $p < .001$, while appearance-related comparisons on Instagram were not associated with drive for thinness, $b_{11} = 0.19$, $SE = 0.12$ and $p = .11$. The direct effect of Instagram-photo activity on drive for thinness was not significant, $c' = −0.12$, $SE = 0.12$ and $p = .29$.
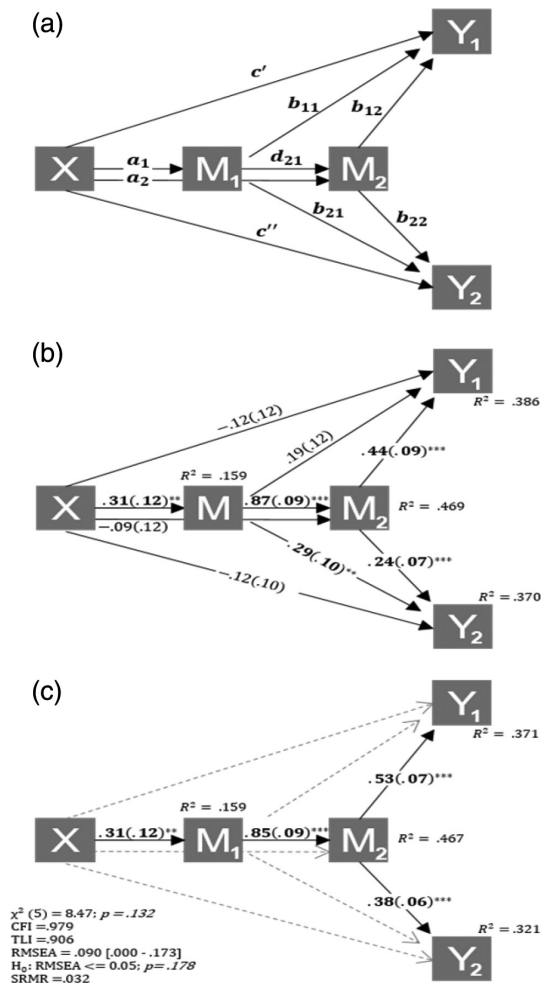
FIGURE 2 (a) X = Instagram-photo activity; $M1$ = appearance-related comparisons on Instagram; $M2$ = Internalization of beauty standards; $Y1$ = drive for thinness and $Y2$ = body dissatisfaction. (b) appearance-related comparisons on Instagram and internalization of beauty standards as serial mediators in the relationship between Instagram-photo activity and drive for thinness and body dissatisfaction for Study 2 (N = 120). (c) constrained serial mediation model without parallel mediation pathways, as well as direct effects. Fixed to zero parameters appear as dashed lines. Standardized parameter estimates; the standard errors are computed by using the Delta method; participants' age, Instagram usage and relationship status were entered as covariates. ***$p \leq .001$; **$p \leq .01$; *$p \leq .05$

According to *Hypothesis 4a*, the indirect effect of Instagram-photo activity on drive for thinness, first through appearance-related comparisons on Instagram and then, through internalization of beauty standards, was significant, $a_1 \cdot d_{21} \cdot b_{12} = 0.12$, $SE = 0.05$ and $p = .02$ (Figure 2b).

As for body dissatisfaction, both appearance-related comparisons on Instagram, $b_{21} = 0.29$, $SE = 0.10$ and $p = .003$ and internalization of beauty standards, $b_{22} = 0.24$, $SE = 0.07$ and $p = .001$ were positively associated with body dissatisfaction. The direct effect of Instagram-photo activity was not significant, $c'' = -.012$, $SE = 0.10$ and $p = .20$.

In line with *Hypothesis 4b*, the indirect effect of Instagram-photo activity on body dissatisfaction, first through appearance-related comparisons on Instagram then through internalization of beauty standards, was

significant, $a_1 \cdot d_{21} \cdot b_{22} = 0.07$, $SE = 0.03$ and $p = .04$ (see Figure 2b and Data S1 for results concerning other indirect paths).

Internalization of beauty standards had a significantly greater effect on drive for thinness than body dissatisfaction ($b_{12} - b_{22} = 0.20$, $SE = 0.08$, $p = .01$). Parallel mediation paths involving appearance-related comparisons on Instagram and internalization of beauty standards, as well as direct effects of Instagram-photo activity on both outcome variables, could be set to zero (i.e., $a_2 = b_{11} = b_{21} = 0$; $c' = c'' = 0$) without any significant loss of model fit (scaled Chi square difference test: $\Delta\chi^2 = 8.47$, $df = 5$ and $p = .13$; difference on Bayesian Information Criterion: $\Delta BIC = 14.1$; Figure 2c).

A post-hoc Monte Carlo power analysis for serial mediation models indicated that our sample achieved sufficient power: .93 and .94 for drive for thinness and body dissatisfaction scales, respectively.

7 | DISCUSSION

In this study, we replicated the results of Study 1: appearance-related comparisons on Instagram mediated the association between Instagram-photo activity and both drive for thinness and body dissatisfaction. Moreover, Study 2 showed that Instagram-photo activity was related to both drive for thinness and body dissatisfaction mainly through appearance-related comparisons on Instagram and internalization of beauty standards (*Hypotheses 4a and 4b*). Together, these findings demonstrated that women who had more intense Instagram-photo activity were more likely to strongly engage in appearance-related comparisons, which in turn were associated with enhanced levels of body concerns. This pattern of results was confirmed when we estimated a serial mediation model for drive for thinness and body dissatisfaction simultaneously.

8 | GENERAL DISCUSSION

Previous studies have shown that women exposed to idealized and unrealistic bodies through social media are more likely to feel worse about their own bodies (Perloff, 2014). Other studies have found that women exposed to this type of content engaged in appearance-related comparisons (Fardouly et al., 2018; Hogue & Mills, 2019) and internalized 'idealized standards' (Feltman & Szymanski, 2018). In line with this evidence, we found that appearance-related comparisons on Instagram mediated the association between women's photo-activity on Instagram and concerns regarding their bodies. To our knowledge, this is the first research that replicated Hendrickse et al.' (2017) findings in the Italian context.

More importantly, in Study 2, we found that female participants who engaged in a greater level of photo-activity on Instagram also engaged in more comparisons relative to the appearance dimension as well as exhibiting higher levels of internalization of beauty standards and consequently reported greater concerns about their bodies.

Our results theoretically contribute to the Tripartite Influence Model by demonstrating that in the context of both social and traditional media, appearance-related comparisons and internalization of beauty standards worked together in a serial fashion.

Some limitations of the current work should be acknowledged. First, our data were from a correlational design, which does not allow us to infer any causal relation among variables. Although our results showed that in line with previous theoretical and empirical efforts (Karazsia & Crowther, 2009; Thompson et al., 1999), appearance-related comparisons may be assumed to precede the internalization of beauty standards; future studies with either an experimental or a longitudinal design would help corroborate the idea that Instagram-photo activity and appearance-related comparisons reinforce the internalization of beauty standards over time. Specifically, and by using a longitudinal design, it might be possible to estimate whether increasing levels of Instagram-photo activity elicit appearance-related comparisons, which then reinforces the internalization of beauty standards over the alternative model

(i.e., Instagram-photo activity boosts the internalization of beauty standards, which promotes appearance-related comparisons).

Second, the small size of samples used may limit the generalizability of our findings. Future studies with a larger sample would provide a more reliable test of our predictions.

Third, these studies were run in the Italian context, which has a long history of 'idealized and unrealistic bodies' (CENSIS, 2006; Valtorta, Sacino, Baldissarri, & Volpato, 2016) on television programs and advertisements (Guastini, Cosenza, Colombari, & Gasparri, 2014). The generalization of the current results to young women of different cultural and social contexts should be made with caution. Future investigation should be carried out in cultural contexts where, differently from Italy, media policy has successfully discouraged the unrealistic representation of women's bodies on Instagram such as the #filterdrop campaign in the United Kingdom (BBC, 2021), thus enhancing the external validity of our findings.

Fourth, in contrast to the original work by Hendrickse et al. (2017), we did not record participants' ethnicity. Subsequent studies in the Italian context could rely on a more diverse sample in terms of ethnicity, thus estimating the contribution of such a variable in the association of Instagram-photo activity and body concerns.

Future research could also extend the analyses of our proposed serial mediational model to men. Indeed, at least in certain cases, men are also concerned with body image and are subjected to the internalization of the muscular-ideal (Karazsia & Crowther, 2009). It could be plausible that Instagram-photo activity is associated with men's body dissatisfaction and the desire to be muscular, and that muscular-related comparisons and the internalization of the muscular ideal may account for such a relationship.

Our findings may have applied implication. Body concerns are common among young women and may develop into clinically disordered eating behaviour (Stice & Shaw, 1994). The current findings support the importance of promoting 'body-positive' content on Instagram. 'Body-positive' content conveys a diverse and inclusive representation of women's bodies via a diverse array of bodies of different shapes, sizes and abilities with the aim of challenging unrealistic body standards (Cwynar-Horta, 2016). Evidence shows that 'body-positive' content is effective in promoting both the development of a positive body image and preventing women from having body concerns (Cohen, Irwin, Newton-John, & Slater, 2019; Tylka & Wood-Barcalow, 2015). Hence, campaigns aimed at informing Instagram influencers of the damaging effects of posting and sharing images of idealized women's bodies might constitute an initial step that may interrupt the unrealistic representation of women. Also, given that young women are well-disposed to follow hashtags related to body positive content (Cohen et al., 2019), the advertising of accounts supporting body positive content could be enhanced on various social networking platforms.

CONFLICT OF INTEREST

The authors report no conflict of interest.

DATA AVAILABILITY STATEMENT

The data and materials that support the findings of this study are available on request to the corresponding author.

ETHICS STATEMENT

All the studies presented in this article received ethical approval from the University of Trieste. The research was conducted in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki. All the

independent and dependent variables included in the studies are presented in the Method section. Criteria for participant inclusion in the studies are described in the Participant Section of each study. Data analyses were performed only when data collection was finished.

PARTICIPANTS CONSENT STATEMENT

All participants provided their informed written consent before to participating in the research.

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