What about young adults' photo manipulation activity? The predictive role of body shame and the mediating effect of body esteem

Francesca Gioia[1] · Siân A. McLean[2] · Valeria Rega[1] · Valentina Boursier[1]

Abstract

In recent years, the centrality of photos on Social Networking Sites (SNSs) dramatically increased among young adults. The particular attention addressed to visual self-presentation might lead to body shame, influencing individuals' body esteem and, likely, promoting photo manipulation (PM). Indeed, manipulating photos to alter how the body appears might be driven by the need to improve self-esteem and reduce body shame, albeit by digitally modified body image. Consequently, two studies were conducted. Study1 psychometrically evaluated the PM scale in a sample of Italian young adults (N = 922). Study2 verified the direct and indirect effect of body shame on PM, testing the mediating effect of body esteem and the moderating effect of gender (N = 595). The PM scale for young adults showed good psychometric properties. The tested mediation model revealed that body shame was both directly and indirectly associated with PM, via body esteem *appearance* in both male and female participants and via body esteem attribution among young men ($R^2 = 0.204$; $p < .001$). Implications for young adults' appearance-related issues are discussed.

Keywords Social media · Body image · Photo manipulation · Body shame · Body esteem · Young adults

Introduction

The centrality of photos and visual self-presentation via Social Networking Sites (SNSs) has grown substantially in recent years with widespread use of social media among adolescents and young adults (Kırcaburun et al., 2019; Lupton, 2021; Smahel et al., 2020). Engagement with online self-presentation has the potential to contribute to appearance concerns (Saiphoo & Vahedi, 2019) and problematic self-monitoring of appearance is enabled by features of social media platforms. This is reflected by investment of time and effort in curating one's online self-presentation (photo investment) and photo manipulation activities to enhance self-presentation (Fox & Vendemia, 2016; Gioia et al., 2021; McLean et al., 2015, 2019; Perloff, 2014).

Photo manipulation

Photo manipulation has been defined as the alteration and enhancement of photos - especially selfies - by using editing programs, software, or apps before sharing them on SNSs (Mascheroni et al., 2015; McLean et al., 2015). Alteration includes enlarging or shrinking body parts, smoothing skin, or adding interactive filters and affords the opportunity for individuals' to selectively present their ideal (albeit unrealistic) self in online environments (Chae, 2017). Furthermore, ideal online self-presentation may be undertaken to achieve positive feedback, and social acceptance through "likes" and supportive comments (Boursier & Manna, 2018; Chae, 2017; Chua & Chang, 2016; Rajanala et al., 2018). Although several studies posited that photo manipulation is more prevalent among females than males (Dhir et al., 2016; McLean et al., 2019; Mingoia et al., 2019), it has been recently shown that both females and males are

✉ Francesca Gioia
    francesca.gioia@unina.it

✉ Siân A. McLean
    s.mclean@latrobe.edu.au

✉ Valeria Rega
    valeria.rega@unina.it

✉ Valentina Boursier
    valentina.boursier@unina.it

[1] Department of Humanities, University of Naples "Federico II", Via Porta di Massa, 1 - 80133 Naples, Italy

[2] School of Psychology and Public Health, La Trobe University, Melbourne, VIC, Australia

inclined to modify their photos before sharing (Gioia et al., 2021; Mascheroni & Ólafsson, 2018), highlighting that young people who are particularly concerned about their own body image might be more engaged in social media activities that focus on appearance, thus exacerbating a vicious circle of body concerns and appearance monitoring (Gioia et al., 2021). However, further explorations involving young adults are needed.

Body image issues within the objectification framework

Body image refers to perceptions, thoughts, and feelings towards appearance (Cash, 2012), whereas body image concerns, also referred to as body dissatisfaction, result from negative evaluation of appearance, body size, shape, or weight, whereby individuals perceive a discrepancy between their actual and ideal appearance (Grogan, 2021). Body dissatisfaction is a significant health issue and has been associated with negative outcomes, such as depression and low self-esteem (Paxton et al., 2006), and disordered eating behaviors (Ferreiro et al., 2011; Goldschmidt et al., 2015; Neumark-Sztainer et al., 2006).

Socio-cultural influence exerted by mass media has been recognised as playing a pivotal role in shaping women's body concerns and dissatisfaction by promoting an unattainable "ideal" feminine body and appearance (Grabe et al., 2008; Tiggemann, 2011). In relation to this influence, *Objectification Theory* (Fredrickson & Roberts, 1997) provides a useful framework for understanding the effects of social media on body image. According to this perspective, individuals who self-objectify view their bodies as objects to be scrutinized and evaluated from an external (although internalized) point of view. Therefore, the self-objectification process is proposed to lead individuals - historically women - to internalize ideal standards of beauty that are culturally constructed and transmitted in society and control their own body appearance to align with those expectations, using their body to satisfy others' pleasure (Fredrickson & Roberts, 1997; Moradi & Huang, 2008). Three main components of Objectified Body Consciousness (OBC) have been identified in order to capture the experience of body objectification: *body surveillance* (persistent thinking about and monitoring one's own body as an object to be judged from an internalized outside-observer perspective), *body shame* (feelings of shame about the self as a result of failing to meet internalized appearance ideals), and *appearance control beliefs* (believing that physical appearance can be controlled and modified with sufficient effort) (McKinley & Hyde, 1996). Negative consequences for women's well-being due to self-objectification experiences have identified, including body dissatisfaction, poor self- and body esteem

and depressive symptoms, appearance anxiety, engagement in appearance monitoring, eating disorders and self-harming behaviors, and favourable attitudes for body manipulation via cosmetic surgery (Adams et al., 2017; Boursier et al., 2020b; Breines et al., 2008; Calogero et al., 2010; Fredrickson et al., 1998; Grabe et al., 2008; Moradi & Huang, 2008; Noser & Zeigler-Hill, 2014).

Scholars have widely posited that women have been the main target of sociocultural appearance pressures (e.g., Strahan et al., 2006). Consistent with this view, higher levels of self-objectification have been observed among women compared with men (see Daniels et al., 2020 for review). In addition, older girls experience higher levels of self-objectification than younger girls (Daniels et al., 2020) and, despite suggestions that self-objectification declines with age (Calogero, 2012; Tiggeman & Lynch, 2001), research has shown that objectifying experiences are widely prevalent among young and adult women (Brinkman & Rickard, 2009; Holland et al., 2017). However, many recent studies showed that young and adult men are also increasingly involved in body image-related concerns and self-objectification experiences (Boursier & Gioia, 2022; Dakanalis et al., 2012, 2015; Gioia et al., 2020; Holland & Tiggemann, 2016; Karsay et al., 2018; Vandenbosch & Eggermont, 2013).

Social media is increasingly being recognised as a source of sociocultural pressure that contributes to self-objectification (e.g., Holland & Tiggemann, 2016). Pervasive use of online platforms for creating and sharing self-focused visual content has been observed and many typical social media activities, such as posting "selfies" and asking others to rate body appearance, might contribute to sharing and encouraging self-objectification experiences (Manago et al., 2015; Salomon & Brown, 2019; Vandenbosch & Eggermont, 2012; Wang et al., 2021; Zheng et al., 2019). Research findings support this contention whereby higher involvement in photographic activities has been associated with self-objectification in adolescent girls and both young men and women (Gioia et al., 2020; Meier & Gray, 2014). Likewise, high frequency of objectified self-image sharing on SNSs has been linked to trait self-objectification in young women (Bell et al., 2018). Therefore, within the objectification theory framework (Frederickson & Roberts, 1997), several studies reported the predictive role of SNSs-related activities on self-objectification experiences (e.g., Bell et al., 2018; Cohen et al., 2018; Holland & Tiggemann, 2016; Manago et al., 2015; Vandenbosch & Eggermont, 2012). However, as recently highlighted in recent studies (Boursier et al., 2020a; Gioia et al., 2020) and relevant to studies from other frameworks (Casale & Fioravanti, 2017; Craparo et al., 2014) the objectification theory framework (Frederickson & Roberts, 1997), behavioral and bodily shame experiences might predict problematic SNSs-related

activities that allow ashamed individuals to hide negatively perceived personal characteristics and decrease the consequent negative feelings.

Body shame and body esteem

Body shame refers to the emotion that individuals feel whenever they evaluate themselves in relation to internalized ideals and perceive that they fail to meet their internalized standards (Noll & Fredrickson, 1998). Body shame is thus a consequence of the objectifying process of adopting an external point of view of the self and has been largely explored as a key component of body image satisfaction (Manago et al., 2015; Slater & Tiggemann, 2015; Tiggemann & Slater, 2013, 2015; Wang et al., 2020). The habitual tendency of body monitoring can lead to greater body shame for the failure in achieving appearance related expectations (Calogero et al., 2007; Dakanalis et al., 2015; Moradi & Huang, 2008; Schaefer et al., 2018). In this regard, the relationships between certain social media activities such as digital image monitoring, body image control in photos, and problematic social media and body shame have been the focus of recent exploration among women and girls (Casale & Fioravanti, 2017; Gioia et al., 2020). Furthermore, the key role played by social media, appearance comparison and appearance-related feedback from others in SNS activities for body image have been highlighted, particularly in young women's body esteem experience (Bunker & Gwalani, 2018; Chang et al., 2019; Modica, 2019).

Body esteem (BE) has been defined as self-evaluation of one's body or physical appearance and incorporates both perceived self- and other evaluations about one's body and appearance (Mendelson et al., 2001). Accordingly, body esteem consists of three components: *weight*, which refers to weight satisfaction; *appearance*, which includes general feelings about appearance, and finally, *attribution*, which comprises the evaluation attributed to others about one's own body appearance (Confalonieri et al., 2008; Mendelson et al., 2001). According to Strelan et al. (2003), women who self-objectify might more likely experience reduced body esteem, thus body esteem appears to be similar to self-objectified experiences since a core component of self-evaluation seems to depend on (the internalization of) an external point of view of the self (Bianchi et al., 2017). Therefore, body image-related concerns, body shame, and perceived attributions of others may reinforce poor body esteem and social media content may further worsen body esteem in young women (Davies et al., 2020; Modica, 2019).

The present study

The literature reviewed above has highlighted that social media provide means for engaging with self-objectification experiences, encouraging individuals to scrutinize their own body and compare it with images and ideals (Cohen et al., 2018; Gioia et al., 2021). Therefore, standards of appearance, internalized and commonly shared in the virtual arena, and the body image-related social media pressure contribute to the perception and construction of body esteem (Barlett et al., 2008; Boursier & Gioia, 2022). Particular attention should be addressed to the role of body shame which stems from the reiteration of objectification processes enhanced by the diffusion of online visual content sharing practices (Casale & Fioravanti, 2017; Gioia et al., 2020). Indeed, according to the literature, body shame may highly influence individuals' body esteem (Davies et al., 2020; Modica, 2019), and in the context of social media use, likely promoting image monitoring and photo manipulation activities. Additionally, it has been highlighted that the practice of photo manipulation to alter how the body appears (McLean et al., 2019), may be undertaken to improve self-esteem, albeit by digitally modified body image. Indeed, adolescents more dissatisfied with their own body image and appearance are more concerned about the quality of their online presentation, and concurrently engaged in photo manipulation activities in order to improve the best presentation of themselves (McLean et al., 2015, 2019; Lonergan et al., 2019). Overall, teenagers and young people have been identified as particularly prone to photo manipulation and control over body image via photos, responding to feelings of body shame that strongly predicted these behaviors (Casale & Fioravanti, 2017; Gioia et al., 2020, 2021), together with lower body esteem (Bunker & Gwalani, 2018; Chang et al., 2019; Davies et al., 2020; Shetty, 2019; Wang, 2019). Likewise, very recently high frequency of selfie-editing before online sharing has been found to be significantly associated with lower levels of self-esteem among young adults (Lau & Idang, 2022). Therefore, young adults increasingly represent an interestingly portion of the population still implicated in identity and self-definition processes, particularly engaged in the digital environment. Hence, the role that body shame and esteem may play in young men and women's attitudes towards photo manipulation deserves attention and should be investigated. However, to date, no validated measures to specifically assess young adults' photo manipulation exist, even though further research is needed to investigate the extent to which young people attempt to achieve better body esteem and self-presentation through digital modification of their self-image.

Therefore, this paper includes two related studies. The aim of the first study was to evaluate the psychometric

properties of the revised Photo Manipulation Scale (Gioia et al., 2021; McLean et al., 2015) in an Italian young adult sample. Involving a separate sample, the aim of the second study was to verify the direct and indirect effect of body shame on photo manipulation activities, testing the mediating effect of body esteem and the moderating role of gender. In light of the known associations among self-objectification experiences and body shame, lower body esteem, and social media use, (Hanna et al., 2017; Modica, 2019), it was hypothesized that greater body shame would be associated with greater use of photo manipulation. This relationship would be mediated by body esteem, whereby higher body shame would be associated with lower body esteem (weight, appearance, and attribution) and lower body esteem would in turn be associated with greater photo manipulation. Concerning the moderating role of gender, in accordance with self-objectification and objectified body consciousness frameworks, it was hypothesized that gender would moderate the relationship between body shame and body esteem with stronger relationships between these variables expected for females compared with males. Due gender-related differences concerning the relationship between body esteem and photo manipulation being understudied to date, a direction for these effects was not specified.

Study 1

The first study tested the psychometric properties of the Italian revised 8-item Photo Manipulation Scale (PMS; Gioia et al., 2021; McLean et al., 2015) in a sample of Italian young men and women. Previously, Gioia et al. (2021) tested the PMS among a large sample of Italian adolescent boys and girls and identified a three-factor model with 8 items (i.e., *photo filter use*, *body image modification*, and *facial image manipulation*). The optimal Cronbach's α value indicated good internal consistency and reliability of the instrument. Therefore, the aim of this first study was to evaluate the revised version of the PMS (Gioia et al., 2021; McLean et al., 2015) in a sample of Italian young adults.

Methods

Participants and procedure

A total of 922 young adults were recruited for an online survey. Following a snowball sampling method, participant recruitment was carried out by advertisements shared on Italian university web communities followed by many undergraduate and graduate students, and other online groups (via social media platforms). The groups' members were asked in turn to share the invitation to participate in the study. The advertisements contained a website link that participants could click to complete the survey. All participants were informed about the aims and nature of the research and information on the measures to be used in generating the data was also provided to potential participants prior to starting the survey. Participation was voluntary, confidential, and anonymous. All participants could withdraw from the study at any time. No course credits or remunerative rewards were given. The study was approved by the Research Ethics Committee of the University of Naples and was conducted according to the ethical guidelines for psychological research established by the Italian Psychological Association (AIP), and with the Helsinki Declaration of 1975, as revised in 2000.

Measures

Participants reported their gender and age and were asked to complete the revised version of the PMS (Gioia et al., 2021). The scale comprises 8 items corresponding to three different factors: photo filters use (e.g., "*How often do you adjust the light/darkness of the photo?*"), body image manipulation (e.g., "*How often do you make specific part of your body look larger or look smaller?*"), and facial image manipulation (e.g., "*How often do you edit to hide blemishes like pimples?*"). Participants' scores on the 8 items can be added up to create an overall photo manipulation score. Each item is answered on a five-point-Likert-type scale, from 1 (*Never*) to 5 (*Always*). Higher scores indicate higher engagement in photo manipulation strategies.

Statistical analysis

First, skewness and kurtosis were calculated revealing a non-normal distribution. Therefore, in all structural equation modeling analysis performed with Mplus 8 (Muthén & Muthén, 2012), the Yuan and Bentler (2000) correction for nonnormality MLR robust estimator was used. Moreover, for the identification model, on each first-order latent factors one indicator path loading was set to 1 and, in the second-order model, the second-order component was set to 1 (Byrne, 2012). Bartlett's test of sphericity prior to the confirmatory factor analysis (CFA) was conducted. To evaluate the overall model fit, several indices were used: the comparative fit index (CFI) and the Tucker-Lewis Fit Index (TLI), for which values higher than 0.90 are desired (Bentler, 1990); root mean square error approximation (RMSEA) for which values smaller than 0.08 are desired (Browne & Cudeck, 1993); and the standardized root mean square residuals (SRMR) for which values below 0.08 is considered a good fit (Kline, 2015). To evaluate the internal consistency of the scale, both Cronbach's α and Spearman-Brown coefficients
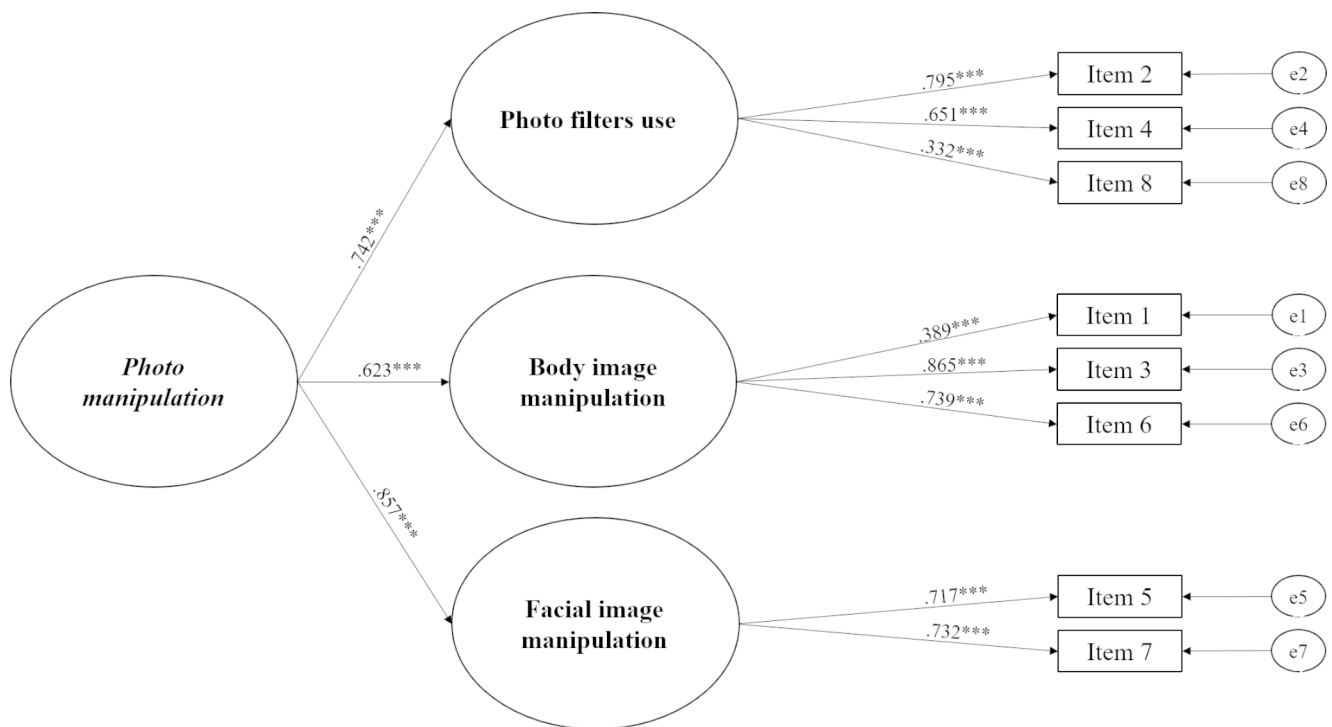
Fig. 1 First order three-factors model and second order factor tested with confirmatory factor analysis
Note, Errors associated three latent variables are not showed in order to improve figure readability.
***$p < .001$.

Table 1 Means, standard deviations, and bivariate correlations among factors of the PMS.

	Means (SD)	1	2	3
Photo filters use	2.49 (0.89)	-		
Body image manipulation	1.25 (0.56)	0.269***	-	
Facial image manipulation	1.72 (0.99)	0.441***	0.473***	-

*** $p < .001$

were computed. Means, standard deviations, and bivariate correlations among factors of the 8-item PMS were tested.

Results

The sample comprised 534 women (57.9%) and 388 men (42.1%) with a mean age of 24.21 years (SD = 5.44 years).

Bartlett's test of sphericity showed that the correlation matrix was suitable for factor analysis ($\chi^2 = 1829.88$, df = 28, $p < .001$). The first-order three-factor solution and the second-order CFA were tested. This model provided a very good fit to the data (MLRχ^2 [18] = 26.823, $p = .08$; CFI = 0.99; TLI = 0.98; RMSEA = 0.029, 90% C.I. [0.000,0.050]; SRMR = 0.036). The second-order CFA confirmed the second-order dimension labeled photo manipulation loaded on the three first-order dimensions. Loadings of the second-order dimension on the first-order dimensions ranged between 0.623 and 0.857 (Fig. 1). The PMS for young adults showed adequate internal consistency for

the first order dimension (Cronbach's α 0.75) and low to adequate internal consistency for 2- and 3-item PMS subscales (photo filter use α = 0.60; body image manipulation α = 0.68; facial image manipulation α = 0.72). Means, standard deviations, and bivariate correlations among factors of the 8-item PMS are shown in Table 1. Each of the photo manipulation components were significantly and positively correlated with one another at small to medium effect size.

Brief discussion

Consistent with Gioia et al.'s (2021) previous findings in an adolescent sample, the three-factor model of the eight-item PMS for young adults provided a good fit to the data and all items loaded significantly on their respective latent factors. The PMS showed adequate internal consistency reliability. Furthermore, photo filter use, body image modification, and facial image manipulation factors significantly and positively correlated with one another. A second-order dimension loaded on the three first-order dimensions indicating that a global score of photo manipulation might be reliably computed and used. Finally, the 8-item PMS for young adults showed a good Cronbach's α, indicating adequate internal consistency reliability of scores on the instrument.

Study 2

Although the centrality of visual content sharing and photo-related activities on social media among young people is well known (Anderson & Jiang, 2018; Bell, 2019), few studies have specifically focused on photo manipulation and its possible predictors or consequences (for exceptions see Bij de Vaate et al., 2018; Chae, 2017; Dhir et al., 2016; Lonergan et al., 2019; McLean et al., 2015, 2019). Gioia et al. (2021) showed that selfie expectancies positively predicted photo manipulation both directly and indirectly via body image control in photos among adolescents, especially boys. Moreover, although typically more frequently occurring among girls rather than boys (Dhir et al., 2016; Gioia et al., 2021; McLean et al., 2019; Mingoia et al., 2019), increased selfie-editing and photo manipulation activities can generally lead young individuals to experience lower self-esteem (Lau & Idang, 2022; Shetty, 2019). Additionally, lower levels of body esteem and self-esteem can result from body shame in adolescents (Cella et al., 2020; Iannaccone et al., 2016) as well as in young adults (Mercurio & Landry, 2008; Tylka & Sabik, 2010). Finally, within the objectification theory framework (Frederickson & Roberts, 1997), the association between SNSs use and objectification experiences has been largely reported (e.g., Bell et al., 2018; Cohen et al., 2018; Holland & Tiggemann, 2016; Manago et al., 2015; Vandenbosch & Eggermont, 2012), but only a few studies focused on body shame, especially as predictive of problematic SNSs-related activities (Boursier & Gioia, 2022; Gioia et al., 2020; Veldhuis et al. 2020). Therefore, the second study aimed to test a moderated mediation model to evaluate the effects of body shame on photo manipulation both directly and indirectly via body esteem and the moderating effect of gender. We hypothesized that body shame would be negatively associated with the three body esteem factors and directly and positively associated with photo manipulation. We also hypothesized that body esteem would mediate the relationship between body shame and photo manipulation. Specifically, higher body shame was expected to be associated with lower body esteem, which in turn would be associated with higher frequency of photo manipulation activities. Furthermore, given that internalization of beauty standards is known to be stronger among women than men, we hypothesized that the effects of body shame on body esteem would be stronger among women than men. On the contrary, the moderating effect of gender on the relationship between body esteem and photo manipulation was uncertain and a direction for these effects was not specified.

Participants and procedure

A separate sample of 595 young adults (40% men; mean age = 24.55 years, SD = 6.42) was recruited to participate in an online survey by means of advertisements shared on Italian university web communities followed by many undergraduate and graduate students, and other online groups (via social media platforms). General information about the aim of the study, nature of the research, and the measures to be used in generating the data were provided. Young adults' participation was voluntary and confidential, and participants could withdraw from the study at any time. All respondents agreed to participate and completed the online survey. No course credits or remunerative rewards were given for participation. The study was approved by the Research Ethics Committee of the University of Naples and was conducted in accordance with the Italian Psychological Association (AIP) ethical guidelines for psychological research, and with the Helsinki Declaration of 1975, as revised in 2000.

Measures

Sociodemographic information and social media use. In this section, information was collected about gender, age, sexual orientation, relationship status, and hours per day spent on social media.

Body Shame subscale of the Objectified Body Consciousness Scale. The Italian version of the Body Shame subscale of OBCS (Dakanalis et al., 2015; original English version by McKinley & Hyde, 1996) was used to assess body shame. This 8-item subscale (e.g., "*When I'm not the size I think I should be, I feel ashamed*") assesses body-related feelings of shame resulting from perceived failure in satisfying appearance ideals and expectations. The items were rated on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). Appropriate items were reverse-coded. In the present study, Cronbach's α value was 0.86.

Body Esteem Scale (BES). The 14-item Italian version of the BES (Confalonieri et al., 2008; original English version by Mendelson et al., 2001) was used to assess body esteem. The scale measures three factors: (1) weight (4 items), referring to satisfaction with one's weight ("*I am satisfied with my weight*"); (2) attribution (4 items), the evaluation attributed to others about one's own bodily appearance ("*Other people consider me good looking*"); and (3) appearance (6 items), referring to general feelings about one's own appearance ("*I worry about the way I look*"). Each item is answered on a five-point Likert-type scale ranging from 0 (never) to 4 (always), Appropriate items were reverse-coded. Cronbach's α values were 0.87 for weight, 0.60 for attribution, and 0.84 for appearance.

Table 2 Means, standard deviations, *t*-test, and effects sizes (Cohen's d) for both genders

	Total sample	Males	Females		
	Mean (SD)	Mean (SD)	Mean (SD)	*t*	*d*
Hours per day spent on social media	3.89 (1.38)	3.53 (1.31)	4.12 (1.38)	5.24***	0.44
Body shame	3.39 (1.37)	3.509(1.21)	3.58 (1.43)	4.39***	0.37
BES_Weight	2.22 (1.21)	2.51 (0.99)	2.03 (1.67)	-5.18***	0.43
BES_Attribution	2.18 (0.74)	2.15 (0.79)	2.2 (0.70)	− .68$^{n.s.}$	0.05
BES_Appearance	2 (0.90)	2.11 (0.83)	1.92 (0.93)	-2.57*	0.22
Photo manipulation	1.84 (0.63)	1.64 (0.58)	1.98 (0.63)	6.72***	0.56

Note. BES = Body esteem scale

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

Table 3 Bivariate correlations between all variables. Correlations for men below the diagonal and correlations for women above the diagonal

	1	2	3	4	5	6
1 h per day spent on social media	-	0.142**	− 0.021	0.196***	0.146**	0.245***
2 Body shame	− 0.002	-	− 0.769***	− 0.005	− 0.749***	0.251***
3 BES_Weight	0.129*	− 0.634***	-	0.140**	0.635***	− 0.186***
4 BES_Attribution	0.116	− 0.171**	0.320***	-	0.085	0.198***
5 BES_Appearance	0.004	− 0.635***	0.547***	0.384***	-	− 0.265***
6 Photo manipulation	0.151*	0.226***	− 0.088	0.302***	− 0.126*	-

Note. BES = Body esteem scale

* $p < .05$; ** $p < .01$; *** $p < .001$

Photo Manipulation Scale-Revised (PMS-R). The adapted version of the PMS for young adults was used to assess the frequency of photo manipulation. The PMS-R consists of 8 items rated on a 5-point-Likert-type scale, from 1 (*Never*) to 5 (*Always*) and evaluates participants' use of photo-editing strategies through photo filter use (e.g., "*How often do you adjust the light/darkness of the photo?*"), body image manipulation (e.g., "*How often do you make yourself look larger?*"), and facial image manipulation (e.g., "*How often do you edit or use apps to smooth your skin?*"). Cronbach's α for PMS total score was 0.74.

Statistical analysis

All statistical analyses were performed using the Statistical Package for Social Sciences SPSS (Version 26 for Windows). Means and standard deviations of the variables were assessed. Independent t-tests were used to detect gender differences. The effect sizes of the differences were evaluated with Cohen's d. Furthermore, bivariate Pearson's correlations were used to evaluate the strength of association between variables. Later, a mediation analysis was conducted by using Model 4 of Hayes's (2017) Process Macro for SPSS with 1000 bias-corrected bootstrap samples to test the mediating effect of body esteem between young adults' body shame and photo manipulation. Finally, a moderated parallel mediation analysis was conducted by using Model 58 of Hayes's (2017) Process Macro for SPSS with 1000 bias-corrected bootstrap samples. The present model tested the moderating role of gender, specifically on both direct

relationships between body shame and body esteem and between body esteem and photo manipulation. According to Preacher et al. (2007), a moderating effect is demonstrated by the significant interaction of the independent variable and the moderator variable with the bootstrapped confidence intervals not containing zero.

Results

Descriptive statistics and bivariate correlations

Among the participants, 57.5% were single, 85% were heterosexual, 4.9% were homosexual, 8.6% were bisexual, and 1.3% declared other sexual orientations. Means, standard deviations, and gender differences for the main variables are reported in Table 2. Statistically significant differences between men and women's scores were found. Women had higher mean scores than men in hours per day spent on social media, body shame, and photo manipulation. Effect sizes were medium. In contrast, men had higher mean scores than women for BES weight and BES appearance with medium and small effect sizes, respectively. No gender differences were observed for BES attribution. Bivariate correlations between all variables are shown in Table 3. Significant large negative correlations were observed between body shame and body esteem factors weight and appearance in both male and female samples. In addition, significant small positive correlations were observed between body shame and photo manipulation in both men and women.

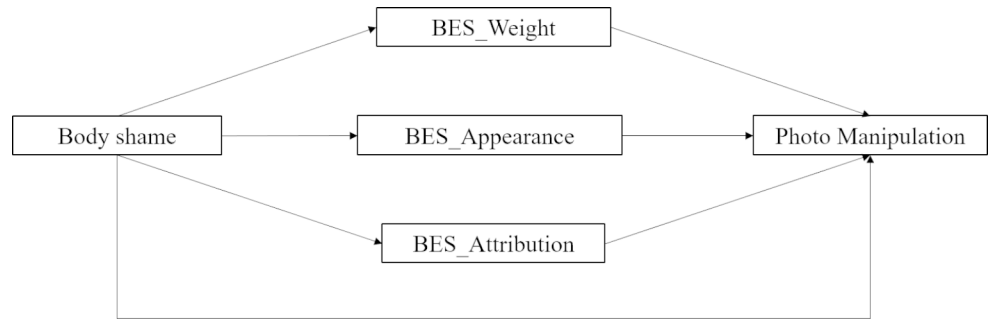**Fig. 2** Hypothesized parallel mediation model

Table 4 Models of the direct and indirect effect of body shame on photo manipulation via BES weight, attribution, and appearance factors

	Coeff.	SE	BCa 95% CI	
			Lower	Upper
Path estimates				
Body shame → BES_Weight	−0.603***	0.023	−0.648	−0.558
Body shame → BES_Attribution	−.034[n.s.]	0.022	−0.077	0.01
Body shame → BES_Appearance	−0.467***	0.019	−0.504	−0.430
BES_Weight → Photo manipulation	−.032[n.s.]	0.033	−0.096	0.032
BES_Attribution → Photo manipulation	0.249***	0.034	0.182	0.316
BES_Appearance → Photo manipulation	−0.111**	0.04	−0.189	−0.033
Total effect: Body shame → Photo manipulation	0.128***	0.018	0.092	0.164
Body shame → Photo manipulation	0.066*	0.03	0.006	0.125
			BCa 95% CI	
	Effect	SE	Lower	Upper
Indirect effects				
Total	0.063	0.028	0.007	0.120
M1	0.019	0.021	−0.021	0.059
M2	−0.008	0.006	−0.020	0.003
M3	0.052	0.020	0.011	0.091

Note. BES = Body esteem scale; M1 = BES_Weight; M2 = BES_Attribution; M3 = BES_Appearance.

* $p < .05$; ** $p < .01$; *** $p < .001$

Mediation analysis

The proposed parallel mediation model (Fig. 2) was tested to assess the direct and indirect effect of body shame on photo manipulation via the three dimensions of body esteem (weight, attribution, and appearance). As shown in Table 4, body shame had a significant direct effect on BES Weight ($t = -26.431$; $p < .001$) and BES Appearance ($t = -24.834$; $p < .001$), but a non-significant effect on BES Attribution ($t = -1.522$; $p = .129$, ns). Only BES Attribution ($t = 7.306$; $p < .001$) and BES Appearance ($t = -2.808$; $p < .05$) showed a significant direct effect on photo manipulation, whereas BES Weight ($t = -0.973$; $p = .331$, ns) had non-significant effect. Finally, the positive and significant direct effect of body shame on photo manipulation ($t = 2.159$; $p < .05$) increased in magnitude when mediators were included in the model ($t = 7.018$; $p < .001$). Analysis of the bias-corrected confidence intervals of the indirect effect of body shame on photo manipulation in the bootstrapped samples further revealed that the indirect effect via BES Appearance was significant. The total model accounted for a significant amount of variance in participants' photo manipulation [$R^2 = 0.16$; $F_{(4, 590)} = 27.285$, $p < .001$].

Moderated parallel mediation analysis

The moderated mediation test was conducted on the previously significant mediational model (Hayes, 2017) to examine whether gender moderated the mediation model, specifically the relationships from body shame to body esteem and from body esteem to photo manipulation (Fig. 3). As Table 5 showed, gender added to the model (females coded as 0 and males coded as 1) negatively directly predicted photo manipulation ($\beta = −0.45$; SE $= 0.173$; $t = −2.605$; $p < .01$). Concerning the association between body shame and body esteem, the interaction between gender and body shame showed a significant moderating effect on the association between body shame and BES Weight ($\beta = 0.107$; SE $= 0.049$; $t = 2.181$; $p < .05$) and between body shame and BES Attribution ($\beta = −0.109$; SE $= 0.048$; $t = -2.279$; $p < .05$). The 1000 bias-corrected bootstrapped estimates showed a significant indirect effect

Fig. 3 Hypothesized moderated parallel mediation model
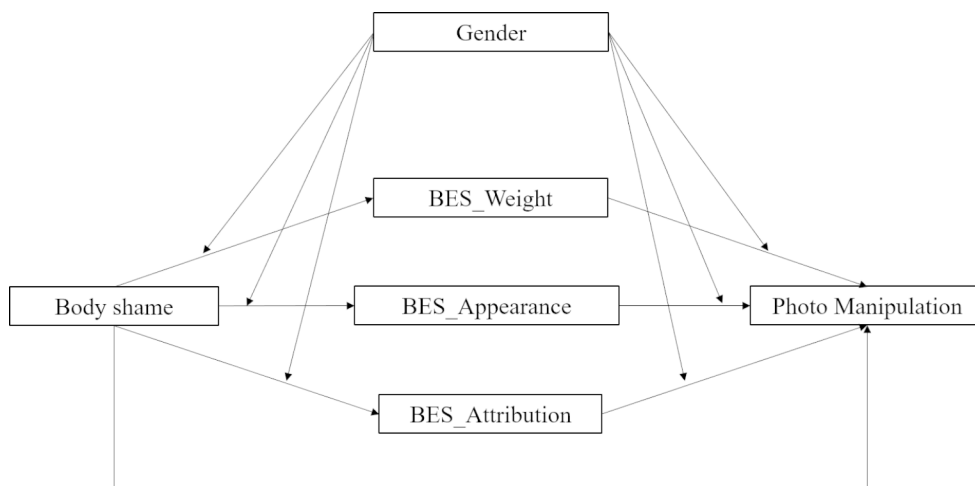Note. BES = Body esteem scale.

Table 5 Models of the direct and indirect effect of body shame on photo manipulation via BES weight, attribution, and appearance factors with the moderating effect of gender

			BCa 95% CI	
	Coeff.	SE	Lower	Upper
Path estimates				
Body shame → BES_Weight	− 0.626***	0.028	− 0.680	− 0.571
Gender → BES_Weight	− .165[n.s.]	0.172	− 0.503	0.173
Body shame * gender → BES_Weight	0.107*	0.049	0.011	0.204
Body shame → BES_Attribution	− .002[n.s.]	0.027	− 0.056	0.051
Gender → BES_Attribution	.294[n.s.]	0.168	− 0.035	0.623
Body shame * gender → BES_Attribution	− 0.109*	0.048	− 0.203	− 0.015
Body shame → BES_Appearance	− 0.486***	0.023	− 0.531	− 0.44
Gender → BES_Appearance	− .198[n.s.]	0.143	− 0.48	0.083
Body shame * gender → BES_Appearance	.048[n.s.]	0.041	− 0.032	0.129
Body shame → Photo manipulation	0.058*	0.03	0.0004	0.116
BES_Weight → Photo manipulation	− .003[n.s.]	0.039	− 0.073	0.078
BES_Attribution → Photo manipulation	0.192***	0.044	0.106	0.278
BES_Appearance → Photo manipulation	− 0.128**	0.047	− 0.219	− 0.036
Gender → Photo manipulation	− 0.45**	0.173	− 0.788	− 0.111
BES_Weight * gender → Photo manipulation	− .027[n.s.]	0.057	− 0.138	0.084
BES_Attribution * gender → Photo manipulation	.109[n.s.]	0.067	− 0.024	0.241
BES_Appearance * gender → Photo manipulation	.0002[n.s.]	0.069	− 0.136	0.136
			BCa 95% CI	
	Effect	SE	Lower	Upper
Indirect effects				
Body shame → BES_Weight → Photo manipulation				
Female	− 0.002	0.027	− 0.055	0.052
Male	− 0.013	0.022	− 0.03	0.055
Body shame → BES_Attribution → Photo manipulation				
Female	− 0.001	0.005	− 0.011	0.01
Male	− 0.034	0.015	− 0.065	− 0.007
Body shame → BES_Appearence → Photo manipulation				
Female	0.062	0.026	0.008	0.112
Male	0.056	0.024	0.01	0.104

Note. BES = Body esteem scale

* *p* < .05; ** *p* < .01; *** *p* < .001

of body shame on photo manipulation via BES Attribution ($\beta = -0.034$; SE $= 0.015$; Bootstrap 95% CI [-0.065, -0.007]) among male participants and via BES Appearance among both males ($\beta = 0.056$; SE $= 0.024$; Bootstrap 95% CI [0.01, 0.104]) and females ($\beta = 0.062$; SE $= 0.026$; Bootstrap 95% CI [0.008, 0.112]). The overall model was significant ($R^2 = 0.204$; SE $= 0.325$; $F_{(8,586)} = 18.750$; $p < .001$).

Brief discussion

The aim of this second study was to cross-sectionally test a moderated parallel mediation model in which the three dimensions of body esteem (*weight*, *attribution*, and *appearance*) mediated the association between body shame (as a component of the objectified body consciousness) and photo manipulation with the moderating effect of the gender in a sample of Italian young adults. The tested moderated mediation model revealed that body shame was both directly and indirectly associated with photo manipulation, via body esteem *attribution* among males and via body esteem *appearance* among both males and females. Although these data are cross-sectional, it is possible that higher body shame, the experience of a negative affective response to perceived failure to meet appearance expectations, might promote concerns about *appearance*-related body esteem, which in turn may lead to the use of photo manipulation and editing strategies, among male and female young adults. Furthermore, male young adults who feel ashamed about their own body might also have elevated attributions of negative perceptions by others about their appearance, which in turn might promote the use of photo manipulation strategies. Additionally, body shame was found to cross-sectionally positively predict photo manipulation. It may be that the more young adults feel body shame, the more prone they might be to manipulate photos. In addition, body shame negatively predicted body esteem *weight* and *appearance*. In this manner, the more young adults are ashamed of their body, the less likely they are to have positive body esteem related to *weight* and *appearance*. Finally, body esteem *attribution* and *appearance* predicted photo manipulation, suggesting that the more individuals' body esteem depends on *appearance* and *attribution*, the more they likely will manipulate their photos. The findings suggest that photo editing may be undertaken to attempt to present an ideal appearance aligned with internalised expectations to reduce feelings of body shame and improve body esteem. Experimental or prospective data are needed to confirm the direction of these effects.

General discussion

The aims of the current two studies were to first preliminarily test the psychometric properties of the revised PMS (Gioia et al., 2021) among young adults, and second to further investigate the association between body shame, body esteem and photo manipulation. First, the revised PMS showed good internal consistency reliability, thus confirming this measure as a reliable tool to assess specific visual and body photo manipulation strategies among young adults, as well as among adolescents. Furthermore, in light of the role that body shame may play on individual's body esteem and appearance-related behaviors, the second study aimed to evaluate the (cross-sectional) direct and indirect predictive effect of body shame on photo manipulation activity via body esteem, exploring the moderating effect of the gender.

Concerning the correlational analysis, the present findings showed moderated gender differences concerning the positive correlation between body shame and photo manipulation, whereas the negative correlations between body shame and body esteem factors, especially *weight* and *appearance*, were particularly prominent for women. Interestingly, only men showed a significant negative correlation between body shame and body esteem attribution. Likely, men's higher body esteem (relative to women for weight and appearance) is affected by the perceived evaluation attributed to others about their own bodily appearance, and this co-occurred with lower body shame. Body shame seems to overall impact individuals' concerns about their own body shape, thus confirming previous results on young adults' body esteem general experience (Mercurio & Landry, 2008; Tylka & Sabik, 2010; Boursier & Gioia, 2022). Moreover, body shame may act as a risk factor influencing self-photo-manipulation and this finding appears in line with previous results showing that body shame strongly promoted male and female body image control via photos (Gioia et al., 2020).

The moderated mediation model partially confirmed our hypotheses; the significant positive relationship between body shame and photo manipulation was mediated by body esteem appearance (in both males and females) and attribution (among males), but not by body esteem weight. These findings from the second study showed that body shame was directly and indirectly positively associated with photo manipulation and negatively associated with body esteem weight and appearance but not attribution. These findings are consistent with the objectification framework (Fredrickson & Roberts, 1997; Karsay et al., 2018) and suggest that the experience of body shame negatively affects appearance-related self-evaluation (e.g., body esteem *appearance*) and may encourage young people, both men and women, to manipulate their own image in photos in order to meet

socially and culturally imposed beauty standards. Furthermore, the mediating effect of body esteem attribution suggested that young men's perceptions about others' attribution towards one's appearance is affected by body shame and related to selective self-presentation on social media. Likely, according to the *appearance-based behavior-reward feedback loop* (Boursier et al., 2020a; Gioia et al., 2020; Hawk et al., 2019), male individuals ashamed by their bodies and who perceive them as objects of evaluation by others for their appearance might choose to manipulate their own photos in order to further improve their body esteem, confirming that young males are increasingly becoming engaged in self-objectification experiences (Boursier & Gioia, 2022; Gioia et al., 2020). Therefore, photo manipulation strategies before photo-sharing (by using photo-filters and editing software aimed at altering body parts) might enhance young people's engagement in online self-presentation, through which the building of an ideal (unrealistic) self-image is strengthened, compensating for feelings of shame and gaining social – and appearance-related – acceptance. This represents an unhelpful, vicious circle, cycling between experiences of high body shame, low body esteem appearance, and body image digital modification (Boursier et al., 2020b; Chae, 2017; Gioia et al., 2021; McLean et al., 2015, 2019).

Furthermore, body esteem *appearance*, but not body esteem *weight*, was negatively associated with photo manipulation, suggesting that the more young adult's body esteem is driven by general positive feelings about self-appearance (i.e., body esteem *appearance*), the less they will be involved in photo manipulation activities. Therefore, individuals with body dissatisfaction might be more prone to manipulate their own photos, whereas higher self-appearance-related body esteem seemed to reduce the use of photo manipulation strategies. Furthermore, males and females' body esteem *appearance* mediated the relationship between body shame and photo manipulation. This suggests that beliefs concerning how the body looks and should look contribute to this relationship. Although the findings cannot indicate directionality, it is possible that experiences of body shame led to poor appearance and (males') attribution esteem, and poor appearance/attribution esteem in turn leads to attempts to modify one's online self-presentation through photo editing. Overall, as Rudd and Lennon (2000) stated, physical appearance-related feelings of shame might promote higher engagement in several strategies of body improvement (such as body image control thorough photo manipulation) to improve their acceptance and achievement of social goals (Fox & Vendemia, 2016), often normalizing risky behaviors. Additionally, consistent with Strelan and Hargreaves' (2005) circle of self-objectification, the present study seems to strengthen the plausibility of the bidirectional nature of

SNSs-self-objectification pathway that appear to mutually affect and reinforce each other. Consequently, self-objectification not only represents a SNSs use outcome, but it could also predict individuals' engagement in SNSs use (Veldhuis et al., 2020), not without negative effects.

Finally, despite women in our sample who showed higher body shame reporting engaging in photo manipulation to a greater extent than men (Gioia et al., 2020), according to previous findings using the PMS among adolescents (Gioia et al., 2021), males appeared engaged in more photo manipulation than girls.

Practice implications

The findings of the present study have potential implications for prevention and intervention. In relation to prevention, observations that engagement in photo manipulation was associated with body shame via body esteem suggest that development and implementation of programs for both young men and women who are increasingly involved in self-objectification experiences could be beneficial to reduce engagement in online appearance-modifying activities (Gioia et al., 2020, 2021; Vandenbosch and Eggermont, 2013). Media literacy programs might also provide useful tools to inform young people about the reality of idealised appearance images on social media, about culturally and peer-to-peer promoted body standards, and about ways in which engagement with appearance-related online activities may promote unhelpful levels of investment in their own appearance (Fardouly et al., 2015; McLean et al., 2016). Findings may also inform the approaches by healthcare professionals working with young people affected by body image concerns who are noted to spend considerable time on social media. As young people are in a life stage during which development of sense of self and identity is progressing, consideration by healthcare professionals of the ways in which these processes, including development of identity surrounding body image (Markey, 2010), may be affected by social media engagement is likely to be an important focus of clinical intervention.

Limitations and further directions

Some limitations of the present study also need to be addressed. First, the present study involved a limited and convenience sample, thus the findings cannot be generalized, and the cross-sectional design limits the ability to formally test the causative effects. Furthermore, the study used a self-report survey that implies well-known potential method biases ranging from a misunderstanding of measures' purposes to social-desirability bias (Rosenman et al., 2011). Second, the participants involved in the study came

from a specific (Italian) cultural context and to test the effects of the variables here considered in other cultures and countries would be appropriate. Longitudinal studies are needed to evaluate the potential bidirectional nature of SNSs-self-objectification relationship (Strelan & Hargreaves, 2005). Furthermore, it would be interesting to consider the role that other factors may play in this dynamic, as predictors or mediators, especially individual and personality differences as well as the importance attributed to social comparison. Finally, the photo filter use subscale of the PMS and attribution subscale of the BES showed weak reliability.

However, despite these limitations our first study demonstrated sound psychometric properties of the revised PMS, thus providing an appropriate and helpful instrument to assess photo manipulation strategies. Furthermore, our general findings showed that body shame is associated with body esteem for both men and women and in combination, these variables are related to engagement in appearance control behaviors, specifically those that are used to modify how one appears in photos. Attention might also be directed not only to photo manipulation but also to those behaviors that may result in real bodily modifications, such as dieting, excessive exercise, or cosmetic surgery, or identity confusion and body dissociation. In addition, further research could also examine the consequences of engaging in photo manipulation strategies to determine the extent to which this focus on body appearance management enhances body dissatisfaction and potentially contributes to other problematic behaviours in the general as well as in clinical populations. Accordingly, Boursier et al. (2020a, 2020b), Casale and Fioravanti (2017), and Gioia et al. (2020, 2021) explored the association among body appearance concerns, monitoring, and potentially problematic engagement in social media body-related activities.

Conclusion

The current research outlined a field of scientific importance that needs to be further explored, as it has social and psychological implications. Young adults, including males, appear particularly concerned about their own body image, leading to a potential higher engagement in social media activities that focus on appearance. Health professionals and psychologists should consider the risks related to the experiences of body shame and low body esteem, increasingly linked to body image-related online activities, such as photo manipulation. Indeed, in line with previous findings (Gioia et al., 2020, 2021) concerns related to the pitfalls of body image control, photo-manipulation and editing via social media use and visual content sharing deserve particular attention. Unfortunately, a dominant model of body image

and appearance still seems to prevail among young people and it seems increasingly strengthened by the widespread diffusion of experiences of body objectification and body shaming perpetrated and shared online. Therefore, media literacy programs might educate social media users about the impacts and consequences that body image online comparison and approval, as well as photo-editing, may have on their own and the others' body concerns, body image/dissatisfaction and related behaviors. It seems imperative to attend to online appearance-related behaviours and the resultant promotion of unrealistic body standards that direct focus on appearance while simultaneously feeding feelings of shame, especially for the new generations.

Authors contribution All authors have read and approved the submitted manuscript. Francesca Gioia: Conceptualization, Data collection, Methodology, Formal analysis, Writing–review; Siân A. McLean: Writing–review, Validation; Valeria Rega: Writing–original draft, editing; Valentina Boursier: Conceptualization, Methodology, Validation, Writing–supervision, Project administration.

Data Availability The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

Declarations

Conflict of interest The Authors declare they have no conflict of interest.

Informed consent All procedures followed were in accordance with the ethical standards of the Research Ethics Committee of the University of [blinded] and was conducted according to the ethical guidelines for psychological research established by the Italian Psychological Association (AIP), and with the Helsinki Declaration of 1975, as revised in 2000. Informed consent was obtained from all patients for being included in the study.

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