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Engagement with social media content results in lower appearance satisfaction: An experience sampling study using a wrist-worn wearable and a physical analogue scale

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ABSTRACT

Social media use is consistently associated with more negative body image, but much of this literature is cross-sectional and/or lacks ecological validity. To overcome these limitations, we examined associations between everyday social media engagement and appearance satisfaction using an experience sampling method. Fifty participants from Central Europe completed a 14-day experience sampling phase in which they reported their appearance satisfaction at two random time-points each day, as well as following active engagement with social media content, using a wrist-worn wearable and a physical analogue scale (PAS; i.e., angle of a participant's forearm between flat and fully upright as a continuous response scale). Results indicated that engagement with social media content was significantly associated with lower appearance satisfaction. Additionally, we found that engagement with the content of known others was associated with significantly lower appearance satisfaction than engagement with the content of unknown others. These effects were stable even after controlling for participant demographics, active vs. passive daily social media use, and body image-related factors. These results provide evidence that everyday social media engagement is associated with lower appearance satisfaction and additionally provides preliminary support for the use of a PAS in body image research using an experience sampling method.

1. Introduction

Research on the effects of media exposure has been and remains an important subfield within scholarly work on body image (for a review, see Andersen & Swami, 2021). Indeed, an extensive body of research has shown that exposure to idealised images of appearance and beauty in traditional media formats (e.g., magazines, television) has a detrimental impact on body image outcomes (e.g., Grabe et al., 2008; Huang et al., 2021), with effects strongest in women who have high levels of pre-existing body image concerns (Ferguson, 2013). In their bibliometric review of research published in this journal, however, Andersen and Swami (2021) also noted a more recent shift in scholarly output toward understanding the impact of social media use on body image outcomes. This mirrors the rapid international growth of social media (Statista, 2020), which allow users to generate and share content, collaborate, and interact for a more socially connected and interactive web experience (Carr & Hayes, 2015). Indeed, social media has transformed societies and has become an integral part of personal lives, especially among young people (Orben, 2020).

Reviews and meta-analyses have consistently shown that social media use is negatively associated with body image outcomes (de Valle et al., 2021; Faelens et al., 2021a; Fardouly & Vartanian, 2016; Lonergan et al., 2021; Rounsefell et al., 2019). Notably, however, the direct association between overall time spent on social media and body image outcomes tends to be relatively weak. For instance, a recent meta-analysis of 63 independent samples reported that social media use was only weakly associated with negative body image (r = 0.17, CI =0.13,0.21; Saiphoo & Vahedi, 2019). In explanation, it has been suggested that not all social media platforms are equivalent (Fardouly & Holland, 2018), with use of photo- and video-based platforms (e.g., Instagram, Snapchat) being more reliably associated with negative body image than text-based platforms (e.g., Facebook, Twitter; Åberg et al., 2020; Engeln et al., 2020). Additionally, the manner of user engagement with social media platforms also

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appears to be important, with creating and editing self-images ("selfies") and exposure to appearance-focused content being strongly associated with negative body image (Burnell et al., 2022; Kim, 2021; Lonergan et al., 2020; Markey & Daniels, 2022; Veldhuis et al., 2020).

In short, research has highlighted the ways in which unique features of social media may trigger body image concerns in users (for a review, see Vandenbosch et al., 2022). These negative effects have been explained more broadly with respect to sociocultural models, particularly the Tripartite Influence Model (Thompson et al., 1999). While this model postulates a direct link between various forms of media exposure and body image outcomes, it also suggests that the direct pathway is mediated by two important factors. Specifically, the Tripartite Influence Model suggests that individuals engage in appearance-related social comparisons with (i.e., comparing one's appearance with that of models seen in mass media), and internalisation of (i.e., taking external cues about appearance ideals and making them available for one's internal views), beauty ideals depicted in mass media (Keery et al., 2004; Thompson et al., 1999). Both of these processes are proposed as mediators of the relationship between media consumption and negative body image (Hazzard et al., 2019; Schaefer et al., 2015).

Studies have broadly supported these assumptions when applied to social media use. For instance, some studies have shown that internalisation of appearance ideals (e.g., Feltman & Syzmanski, 2018) and engagement in social comparison processes (e.g., Fardouly et al., 2017; Hogue & Mills, 2019), respectively, mediate the relationship between social media use and negative body image. Support for the model as a whole is also available: in a study of Australian adolescents, Jarman et al. (2021) reported that appearance-focused social media use was weakly associated with lower body satisfaction. However, the authors also reported that greater appearance idealisation and social comparison mediated the relationship between social media use and body satisfaction. Similar findings have also been reported elsewhere (e.g., Jung et al., 2022; Roberts et al., 2022; Rodgers et al., 2020), and there is also evidence of a serial mediation between social media use and body dissatisfaction via thin ideal internalisation and social comparison in adolescent girls (Scully et al., 2022). Taken together, then, the available evidence suggests that social media environments in which users are more likely to encounter appearance-focused content provide opportunities to make negative appearance comparisons and internalise appearance ideals, which in turn leads to more negative body image outcomes (Couture Bue, 2020; Karsay et al., 2021).

1.1. Social media and body image in everyday life

Although research seeking to understand the impact of social media use on body image outcomes has developed quickly (Andersen & Swami, 2021), much of the available research remains limited to cross-sectional study designs (Jarman et al., 2022). This is important because data derived from such studies may be subject to recall biases, such as in estimates of social media use or engagement (Faelens et al., 2021b). Likewise, although there is now an emerging body of work utilising laboratory-based experimental methods (e.g., Engeln et al., 2020; Tiggeman & Anderberg, 2020), which is crucial in terms of being able to infer causality, such studies are limited in terms of measurement occasions; that is, these studies typically use a pre- and post-intervention methodology, with no longer-term follow-up and no measurement at multiple time-points post-intervention. Additionally, laboratory-based studies may also lack ecological validity in the sense that they do not fully replicate the ways in which social media are used in everyday life (Faelens et al., 2021b; Valkenburg, 2017). Indeed, scholars have called for greater attention to the ways in which social media use may be associated with body image outcomes in everyday life outside the laboratory (Vandenbosch et al., 2022).

One research method that offers an ideal tool for studying the impact of social media usage on body image outcomes in everyday life is the experience sampling method (ESM; Bolger & Laurenceau, 2013; Mehl & Conner, 2012). In ESM research, respondents are invited to respond to prompts to complete brief surveys on multiple, semi-random occasions throughout the day over a period of time (i.e., a structured diary technique). In this way, ESM generates intensive prospective or longitudinal data in a manner not possible with traditional laboratory-based research and provides an unparalleled opportunity to assess moment-to-moment fluctuations in respondent tendencies (Bolger & Laurenceau, 2013; Stieger & Kuhlmann, 2018). Furthermore, ESM data have the benefit of increased ecological validity (Macht et al., 2004), allowing of an examination of social media experiences as they occur naturally in everyday life (Faelens et al., 2021b).

In fact, the ESM framework has been increasingly used in body image research (e.g., Fuller-Tyszkiewicz, 2019; Fuller-Tyszkiewicz et al., 2018; Stieger et al., 2022), with little decline in the quality of data produced (Fuller-Tyszkiewicz et al., 2013). To date, however, this methodology has only been infrequently used to assess the impact of social media use on body image outcomes. Thus, one recent study showed that use of social media in general at a given timepoint was significantly associated with more negative body image, though participation was limited to women with an eating disorder (Srivastava et al., 2022).

Other studies have shown that everyday exposure to thinspiration and fitspiration content (i.e., image-based social media content that idealises bodily thinness or thin bodies with visible muscles, respectively) was associated with lower body satisfaction (Griffiths & Stefanovski, 2019; see also Krug et al., 2020) and greater desire for muscularity in men (Yee et al., 2020). Conversely, ESM studies have also found that viewing body positivity content (i.e., social media content that promotes diversity of physical appearances and challenges mainstream beauty ideals) is associated with improved body satisfaction (Fioravanti et al., 2022; Stevens & Griffiths, 2020; but see Legault & Sago, 2022). Other relevant ESM work has shown that the number of social media sites visited, but not time spent on social media, was a significant predictor of body dissatisfaction in college women (Bennett et al., 2020).

1.1.1. Known vs. unknown targets

One relatively neglected aspect of this burgeoning work concerns the impact of exposure to known (e.g., peers, acquaintances, family) versus unknown targets (e.g., celebrities, models, influencers) on social media. According to Festinger's (1954) social comparison theory, people evaluate their progress and standing on different aspects of their lives through comparisons with others. Body image scholars, in particular, have shown that appearance-based comparisons are often made upwards (i.e., comparisons with others who are perceived as better off in terms of appearance), which in turn has a negative impact on body image outcomes (for a review, see Myers & Crowther, 2009). Additionally, however, Festinger (1954) also suggested that, in order to obtain accurate self-assessments, people have an innate need to compare themselves with similar others. In terms of traditional media forms, however, such comparisons with similar others (e.g., with acquaintances, peers) are unlikely, given their likely absence from such media formats.

This can be contrasted with social media, where individuals are able to encounter – and thus make social comparisons with – both known and unknown targets. To date, we are aware of only one study that has examined the impact of social comparisons to known and unknown targets using an ESM method (Fardouly et al., 2021). This study showed that participants most frequently made comparisons with acquaintances, followed by celebrities/models,

strangers, and close peers on social media. Upward social comparisons to all targets were associated with lower appearance satisfaction, but the appearance of models/celebrities was found to be perceived as less personally attainable than the appearance of peers (Fardouly et al., 2021). Notably, however, this work was focused on social comparison processes across different modalities (i.e., both offline and online), rather than the impact of social media specifically. As such, there is scope to extend current knowledge by examining the potentially differential impact of engaging with social media content of known and unknown targets.

1.1.2. Using a physical analogue scale

As a further contribution to the body image literature, the present study introduces a novel method for assessing state body image. Extant ESM-based research on body image has typically relied on the use of visual analogue scales (VASs), where participants are asked to report their state body image on a continuous scale. Here, in contrast, we assessed state body image using a wrist-worn wearable and a physical analogue scale (PAS; Stieger et al., 2020). The PAS makes use of the angle of a participant's forearm between flat (e.g., lying flat on the table, i.e., 0° = lowest scale value) and fully upright (e.g., forearm points upwards; i.e., 90° = highest scale value) as a continuous response scale. This novel method has previously been used to assess experiences of social media ostracism (Stieger et al., 2020), but its use for assessing body image outcomes is novel. As such, we present preliminary evidence of its impact on the measurement of body image outcomes in the present study, assessed in terms of participant burden.

1.2. The present study

In light of the discussion above, we used ESM to examine the extent to which daily engagement with social media content – operationalised here as active browsing or direct interaction with photo- and video-based content on social media – is associated with appearance satisfaction, assessed using a PAS. We felt this focus on active browsing of photo- and video-based content was warranted given that such content is most likely to elicit negative body image outcomes on social media (Åberg et al., 2020; Engeln et al., 2020). Further, to extend current knowledge, we also distinguished between engagement with content from known and unknown others on social media. Additionally, in contrast to existing work, which has typically asked participants to recall engagement with content since the last sampling time-point (e.g., Srivastava et al., 2022; Stevens & Griffiths, 2020), the present study used an event-based sampling method in which participants were asked to complete a survey any time they engaged with social media content. In broad outline, and based on the available evidence (Fioravanti et al., 2022; Griffiths & Stefanovski, 2019; Stevens & Griffiths, 2020; Yee et al., 2020), we hypothesised that greater engagement with social media content would be significantly associated with lower appearance satisfaction as measured using the PAS.

Additionally, previous studies (e.g., Stevens & Griffiths, 2020) have generally reported that the impact of social media engagement on body image outcomes occurs even after accounting for inter-individual variation in sociodemographic factors, such as gender, age, and body mass index (BMI). However, it is important to note that state body image outcomes may also be impacted by other trait-related variations beyond sociodemographic factors, such as trait body image (e.g., Fuller-Tyszkiewicz et al., 2019). Indeed, previous ESM work has shown that trait body image, for instance, may moderate the effects of exposure to idealised social media images on state body image outcomes (e.g., Yee et al., 2020). In light of these findings, we included a number of trait-related constructs that were hypothesised as possible moderators of the relationship between social media engagement and state appearance satisfaction, namely trait body satisfaction, personality, appearance comparison tendencies, and attitudes toward appearance (e.g., Allen & Walter, 2016; Fuller-Tyszkiewicz et al., 2018). Although this aspect of our study was more exploratory, we expected that these variables would be significantly associated with state appearance satisfaction outcomes.

2. Method

2.1. Participants and power

We expected a medium-to-small effect size of r = 0.2 (see Yee et al., 2020 using also an ESM design). Based on a rough power calculation following the recommendation by Twisk (2006, p. 123ff), a sample size of around N = 60 was needed (ICC = 0.3 as the average ICC-value usually found in ESM-studies, Bolger & Laurenceau, 2013, α = 5%, power = 80%, 2-sided, number of assessments: ~5 per day over a period of 14 days = 70 single assessments per participant). Perhaps due to the relatively high participant burden (use of a wearable, smartphone, several surveys each day), 72 participants began the study, but only 62 completed the study by returning the final survey. Additionally, three participants only returned minimal data in the longitudinal phase (e.g., wearable assessments) and a further seven participants appeared to have misunderstood instructions (e.g., using a -90° to +90° scale with the PAS or switching the anchor points of the PAS; for details, see supplement on the Open Science Framework https://osf.io/eyzcf/). After data exclusion, 50 participants remained in the final dataset.[1]

Participants were on average 23.4 years old (SD = 7.28, range 19–55 years) and predominantly women (64.0%; the remainder identified as men). Most were from Austria (96.0%), with a small minority from Germany (4.0%). In terms of relationship status, 52.0% were in a relationship, 42.0% were single and living alone, and 6.0% were married or in a partnership. Participants had invested 13.3 years on average in their education (SD = 1.89) and had a mean self-reported BMI of 21.6 kg/m^2 (SD = 2.73, range 16.7–29.4 kg/m^2).

2.2. Measures

2.2.1. Wearable: daily question

Participants were asked to respond to the following state appearance satisfaction item taken from Fuller-Tsyzkiewicz et al. (2018): "How satisfied are you with your appearance right now?". However, where Fuller-Tsyzkiewicz et al. (2018) asked participants to respond to this item using an 11-point scale, we asked participants to respond using a wearable and a PAS (see Section 2.4.), either when they were prompted by a signal (i.e., haptic coin-vibrator motor signal using time-based sampling) or whenever a situation arose during their everyday lives where they engaged with social media (i.e., event-based sampling). In terms of the latter, participants were provided with the following definition of "engagement": "having actively looked at a photo or even lingered (i.e., looking at a photo for more than one second, not just 'scrolling through', perhaps going back to the photo to take a closer look or even zooming in; the same counts for stories), or watched a video depicting a person face-forward (including full-body moving images, not only "selfies" of the face), or interacted with a photo/video (e.g., liking, commenting)". For the time-based sampling (i.e., reference assessments), two random signals were used, which were randomly chosen between the time frames 8 a.m. and 2 p.m., as well as 2 p.m. and 8 p.m. without using any reminders. For an example of the data structure of this design, see Fig. 1 (Wearable number EA.31.E1.07.E7.4A).

Participants were instructed to complete their ratings with the wearable using the PAS (i.e., 0° = *completely dissatisfied*, 90° = *completely satisfied*) by bringing the forearm to the intended position (0° = parallel to the ground; 90° = upright position). Further details about this procedure are provided in Stieger et al. (2020).

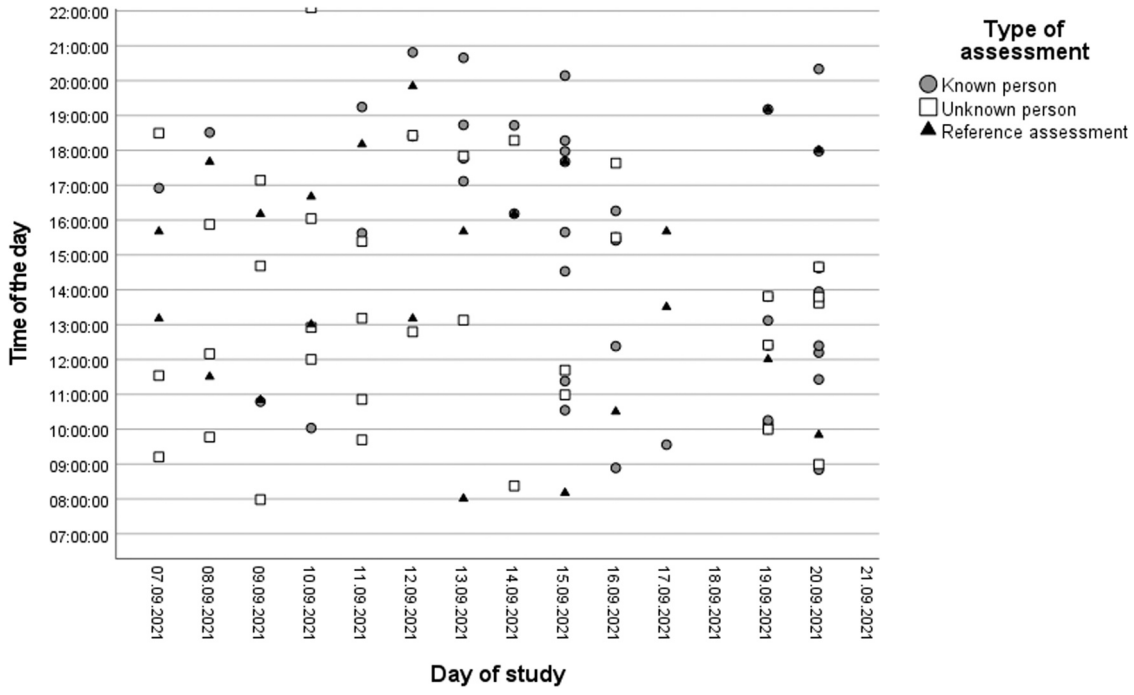

Fig. 1. Example data structure of assessment points for a single participant during the study and over the time of the day.

Additionally, participants were instructed to press a button on the wearable once for a known target (described as friends, family, peers, or anyone that the participant knows in person), twice for an unknown target (described as anyone that the target does not know in person), and three times for the time-based assessment (i.e., reference measurement). Instruction of participants was done in person by the second to fourth authors in order to ensure that participants understood the definition of "engagement" and the exact procedure, and to answer any questions that arose.

2.2.2. Smartphone: demographic survey

Following the installation of ESMira and registration in the study (see Section 2.3.), participants were asked to provide their demographic information, consisting of gender, age, nationality, number of years in education, relationship status, weight (in kg), and height (in cm). Participants were also asked to indicate the anonymised number of the wearable, depicted on the back of the case, in order to merge the smartphone data with the data from the wearable.

2.2.3. Smartphone: end-of-day survey

At the end of each day, participants were asked to complete the measures described below[2].

2.2.3.1. Daily social media use. Following Escobar-Viera et al. (2018), we asked two questions about how much time (in minutes) was spent on social media on the day the survey was completed. We differentiated between active and passive use: "How much time did you spend **actively on social media** today (e.g., creating Facebook posts, writing Tweets, sending WhatsApp messages)?" and "How much time did you spend **passively on social media** today (e.g., watching YouTube videos, reading Facebook posts, viewing Snapchat pictures)?" [emphasis in original].

2.2.3.2. Wearable-specific items. We asked how often participants thought they had forgotten to log an event during that particular day ("How many times have you forgotten to log an event with your wearable today?"). We also asked for any comments regarding the use of the wearable (e.g., problems).

2.2.4. Smartphone: final survey

Following the longitudinal phase of the study (see Section 2.5.), participants were asked to complete a second set of demographic items in order to assess data validity. In this final survey, we also presented the instruments described below.

2.2.4.1. Daily social media use. We asked two questions about how much time (in minutes) social media was used on average each day. We differentiated between active and passive use ("**On average each day**, how much time do you typically spend **actively** on social media (e.g., creating Facebook posts, writing Tweets, sending WhatsApp messages)?" and "**On average each day**, how much time do you typically spend **passively** on social media (e.g., watching YouTube videos, reading Facebook posts, viewing Snapchat pictures)?" [emphasis in original].

2.2.4.2. Trait body satisfaction. To assess trait body satisfaction, we used the adapted (Fuller-Tsyzkiewicz et al., 2012), 5-item Body Image Dissatisfaction subscale of the Body Change Inventory (Ricciardelli & McCabe, 2002). Although nominally developed to measure body image in adolescents, the instrument has also been used with adults (McCabe et al., 2007) and the specific subscale is often used in ESM work with adults (e.g., Fuller-Tsyzkiewicz et al., 2019). This scale assesses satisfaction with one's weight/shape, muscles, lower body, middle body, and upper body (sample item: "How satisfied are you with your weight/shape?). Instead of the original 5-point scale, we used a visual analogue scale in the present study (1 = *very unsatisfied*, 101 = *very satisfied*). An overall score was computed as the mean of all items, with higher scores reflective of greater body satisfaction. Internal consistency for scores on this measure, as assessed using McDonald's ω, was 0.83 (95% CI = 0.76,0.91).

2.2.4.3. Personality. We included the Mini-International Personality Item Pool (Mini-IPIP; Donnellan et al., 2006), a 20-item measure of the Big Five personality traits based on the International Personality Item Pool. The instrument measures the 5-factor model of personality with four items per construct (Openness to Experience,

Conscientiousness, Extraversion, Agreeableness, and Neuroticism; sample item: "I have a vivid imagination") and, despite its brevity, presents adequate psychometric properties (Donnellan et al., 2006). Items were rated on a 5-point scale (1 = *strongly disagree*, 5 = *strongly agree*). Factor scores were computed as the mean of relevant items, with higher scores indicating greater trait personality on a given dimension. In the present study, internal consistencies for each of the five factors, as measured using McDonald's ω, was adequate for Extraversion (0.88), Agreeableness (0.82), and Neuroticism (0.74), but slightly lower for Conscientiousness (0.66) and Openness to Experience (0.64). Nevertheless, lower values are still in line with the original publication by Donnellan et al. (2006; Conscientiousness = 0.69; Openness to Experience = 0.65).

2.2.4.4. Appearance comparisons. Participants were asked to complete the revised version of the Physical Appearance Comparison Scale (PACS-R; Schaefer & Thompson, 2014). This is an 11-item measure that assesses an individual's tendency to engage in physical appearance comparisons (sample item: "When I'm at the gym, I compare my physical appearance to the appearance of others"). Items were rated on a 5-point scale ranging from 1 (*never*) to 5 (*always*). An overall score was computed as the mean of all items, such that higher scores reflect greater appearance comparison tendencies. Internal consistency for scores on this measure in the present study was adequate, McDonald's ω = 0.91 (95% CI = 0.87,0.95).

2.2.4.5. Attitudes toward appearance. Participants were asked to complete the Sociocultural Attitudes Towards Appearance Questionnaire-4 (SATAQ-4; Schaefer et al., 2015). This is a 22-item instrument that assesses attitudes toward appearance along five dimensions: Internalisation of Thinness/Low Body Fat Ideals (5 items), Internalisation of Muscular/Athletic Ideals (5 items), Pressures to Attain Ideals from Family (4 items), Pressure to Attain Ideals from Peers (4 items), and Pressure to Attain Ideals from Media (4 items) (sample item: "I want my body to look very thin"). We used a visual analogue scale for all items using the following scale anchors: 1 = *strongly disagree*, 101 = *strongly agree*. In the present study, internal consistencies, as measured using McDonald's ω, was adequate for all subscales (0.83–0.95) except for Pressures to Attain Ideals from Family, which was slightly deflated (0.64).

2.2.4.6. General feedback about the wearable. Because using wearables for body image research remains novel, we asked several general questions about the wearable usage using visual analogue response scales: "How difficult did you find it to always have the wearable with you?" (1 = *not at all difficult*, 101 = *very difficult*), "How much did the wearable interfere with your everyday life?" (1 = *no interference at all*, 101 = *greatly interfered*), and "How difficult was it for you to estimate your current satisfaction with your appearance with the wearable?" (1 = *not at all difficult*, 101 = *very difficult*).

2.3. ESMira research application for smartphones

For project administration and data collection, the experience sampling method software *ESMira* was used (Stieger, Lewetz, & Swami, 2021; Lewetz and Stieger, 2022).[3] ESMira offers a wide repertoire of functions for scientific data collection, such as the presentation of an informed consent form, data security, data encryption, graphical feedback, anonymous chat function, and guaranteed anonymity through randomly generated subject codes. ESMira was available for Android and iOS operating systems.

2.4. Wearable

We used a commercially available wrist-worn wearable, which was recently adapted for the use with ESM designs (Stieger et al., 2020). The wearable can be programmed using a freely-available Android app for these scientific purposes (https://github.com/KL-Psychological-Methodology/ESM-Board-Admin). Participant data were stored on the wearable and uploaded at the end of the study onto the researchers' smartphone via a Bluetooth connection. The wearable has one button and several built-in sensors (e.g., light intensity, acceleration, air pressure, gyroscope), of which only the button and the acceleration sensor were enabled and used.

With the wearable, we made use of a PAS (Stieger et al., 2020), which is similar to a visual analogue scale except that the gradual measurement is not done using a graphically displayed scale, but rather the position of the wearable in a 3-dimensional space. Participants were instructed to bring the forearm wearing the wearable to a position between 0° (forearm parallel to the floor) and 90° (forearm in an upright position). By pressing the button, the built-in accelerator sensor determined the position in 3-dimensional space, timestamped, and stored the *x*-, *y*-, *z*-values, and also saved the number of button presses. The values for *x*-, *y*-, and *z*- were then transformed into an angle between 0° and 90°, which represents the PAS value. To support the procedure of angle assessments, whenever the button was pressed a short haptic vibration signal (500 ms) was elicited, giving the participant feedback that the button-press had been recognised. If no further button presses were done within a 2-second time-frame, the wearable assumed that the assessment procedure was finished by giving the participant haptic feedback that the number of button presses had been stored by vibrating for 1 s

2.5. Procedures

The study took place between July and October 2021. Participants were recruited by the second, third, and fourth authors from their circle of acquaintances and via social networks. Upon registering their interest, potential participants were asked to attend a face-to-face meeting with researchers. First, participants were provided with general information about the project's ESM procedure. At this point, participants were also provided with detailed information about the assessments using the ESMira smartphone app, as well as how to complete the PAS assessments with the wearable. Participants were also given an opportunity to try the wearable and complete assessments themselves in order to check that instructions were understood correctly. After downloading and installing the ESMira app, and starting up ESMira, participants were to provide consent in accordance with the Declaration of Helsinki in order to be successfully registered to the study. After joining the study, participants received a first signal (i.e., bing, notification) after one minute, which invited them to complete the first survey consisting of demographic items.

Data collection took place in the everyday environments of participants (work, home, university, etc.). During the 2-week field phase, participants received daily notifications at 8 p.m. on their smartphones from ESMira to complete the end-of-day survey. If they did not respond, a reminder was sent out 60 min after the initial bing. Notifications were deleted automatically after three hours. After 14 days, the study was completed and a notification was sent out asking participants to complete the final cross-sectional survey (three reminders after one day each; no deletion of bing message). Participants were paid €5 as remuneration.

Table 1
Results of the Multi-Level Analyses with Appearance Satisfaction as the Criterion.

	Fixed						Random	
	Coeff.	*B*	*SE*	*CI*	β	*t*	Coeff.	*SD*
Intercept (Reference)	β_{00}	50.8	5.37	40.3 – 61.3		9.45 ***	r_{0i}	16.23
Within-person								
Known target	β_{10}	-12.4	2.71	-17.7 – -7.1	-0.23	-4.59 ***	r_{1i}	14.29
Unknown target	β_{20}	-5.9	2.36	-10.5 – -1.2	-0.10	-2.48 *	r_{2i}	11.22
Between-person								
Gender (women)	β_{01}	-2.8	7.31	-17.1 – 11.5	-0.08	-0.38		
Age.cgm	β_{02}	0.6	0.41	-0.2 – 1.4	0.28	1.55		
Body mass index.cgm	β_{03}	1.7	1.18	-0.5 – 4.1	0.28	1.50		
SM use – active.cgm	β_{04}	-1.0	2.71	-6.3 – 4.3	-0.06	-0.38		
SM use – passive.cgm	β_{05}	-0.3	4.45	-9.0 – 8.4	-0.02	-0.07		
Extraversion.cgm	β_{06}	-4.7	3.00	-10.6 – 1.2	-0.25	-1.57		
Agreeableness.cgm	β_{07}	-0.8	3.95	-8.6 – 6.9	-0.03	-0.21		
Conscientiousness.cgm	β_{08}	4.9	4.51	-4.0 – 13.7	0.19	1.08		
Neuroticism.cgm	β_{09}	6.3	4.56	-2.7 – 15.2	0.28	1.38		
Openness.cgm	β_{10}	7.8	5.10	-2.3 – 17.8	0.28	1.52		
Appearance comparisons.cgm	β_{11}	1.8	0.29	-3.9 – 7.4	0.09	0.62		
Trait body satisfaction.cgm	β_{12}	0.7	0.17	0.3 – 1.0	0.72	3.85 ***		
$R^2_{conditional}$ = 43%, $R^2_{marginal}$ = 20%, AIC = 19650, BIC = 19774, ICC = 0.31								

Note. Reference category for known and unknown targets were the time-based assessments. Reference for gender was men. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. ICC of the null model. SM = Social Media.

2.6. Statistical analyses and data availability

Our data, survey materials, and codes are available on the Open Science Framework at https://osf.io/eyzcf/. Following an initial inspection of the wearable data, we had to exclude 61 datasets (2.5% of 2348 overall datasets) because the number of button presses was larger than three. Furthermore, because the active social media usage variable was highly skewed (skewness = 4.8), we log-transformed both social media usage variables (1 + log), which resulted in an acceptable range (< |1.2|) in accordance with the recommendations of Bentler (2006; ± 3) and Byrne (2010; ± 5).

We used *R* (R Development Core Team, 2014) to conduct multilevel models using the *lme4* (Bates et al., 2015) and *sjstats* packages (Lüdecke, 2019). Random-intercept, random-slope multi-level regression analyses were calculated to analyse the effects of target type (known person vs. unknown person vs. reference category; level 1), participant gender, age, BMI, social media active and passive use, trait body satisfaction, personality, appearance comparison tendencies, and attitudes towards appearance (all level 2) on state appearance satisfaction. Multi-level models accounted for the nested design of our study with measurement occasions (level 1) nested within persons (level 2). All level 2 predictors were grand-mean centred (cgm = centered grand mean) except for participant gender (Curran & Bauer, 2011; Enders & Tofighi, 2007; Nezlek, 2012).

We first ran a baseline model without any predictors to calculate intraclass correlation coefficient (ICC) values (see Table 1). In order to reduce the number of predictors in the model, we ran random-intercept random-slope models with only the SATAQ-4 subscales plus their interactions (cross-level interactions with level 1 variables). All main effects, as well as interactions, did not reach statistical significance. Therefore, in order to avoid the dangers of overfitting and for the sake of a parsimonious model, we excluded the SATAQ-4 subscales in all subsequent analysis.

In general, we also considered analysing possible cross-level interactions between level 2 and level 1 variables. Because the ratio between sample size and number of predictors in the model was rather unfavourable, we refrained from interpreting these interactions.[4] Therefore, again in order to avoid the dangers of overfitting and for the sake of a parsimonious model, we did not include cross-level interactions in the final model, which also has the benefit of improving the power of the design. The final model is displayed below:

Level 1 (within person): (State appearance satisfaction)$_{ti}$ = π_{0i} + π_{1i} Known target$_{ti}$ + π_{2i} Unknown target$_{ti}$ + e_{ti}

Level 2 (between persons): π_{0i} = β_{00} + β_{01} Gender(women) + β_{02} Age·cgm + β_{03} BMI·cgm + β_{04} Social media active use·cgm + β_{05} Social media passive use·cgm + β_{06} Extraversion·cgm + β_{07} Agreeableness·cgm + β_{08} Conscientiousness·cgm + β_{09} Neuroticism·cgm + β_{10} Openness·cgm + β_{11} Appearance comparisons·cgm + β_{12} Trait body satisfaction·cgm + r_{0i}

Level 2 (between persons): π_{1i} = β_{10} + $r_{1i;}$ π_{2i} = β_{20} + r_{2i}

We used R^2_{GLMM} (Nakagawa et al., 2017; Nakagawa & Schielzeth, 2013) as a measure of explained variance, which can be interpreted like the traditional R^2 statistic in regression analyses. $R^2_{conditional}$ represents the proportion of variance explained by both fixed and random factors and $R^2_{marginal}$ the proportion of variance explained by the fixed factors alone. Additionally, following Nakagawa and Schielzeth (2013), we also included AIC and BIC as information criteria indices. Standardised coefficients were obtained using the *effectsize* package (Ben-Shachar et al., 2020), which takes the different levels of standardisation into account (i.e., level 1 parameters are standardised within groups, while level 2 parameters are standardised between groups; Hoffman, 2015).

3. Results

3.1. Validity check

We compared demographic data provided at the beginning of the study with those provided in the final survey as a validity check. In terms of gender, no deviations were found. Participant age was again very accurate: in only two cases did the stated age in the final survey differ (by one year higher) from the start of the study ($r = 0.999$, $p < 0.001$). Nationality also was very accurate with only one mismatch, as was relationship status, where one participant changed status from single to being in a relationship. Self-reported weight and height were highly consistent ($rs = 0.958$ and 0.999, respectively, all $ps < 0.001$). Only the number of years spent in education was relatively less accurate ($r = 0.820$, $p < 0.001$), possibly because participants found it difficult to estimate the number of years invested

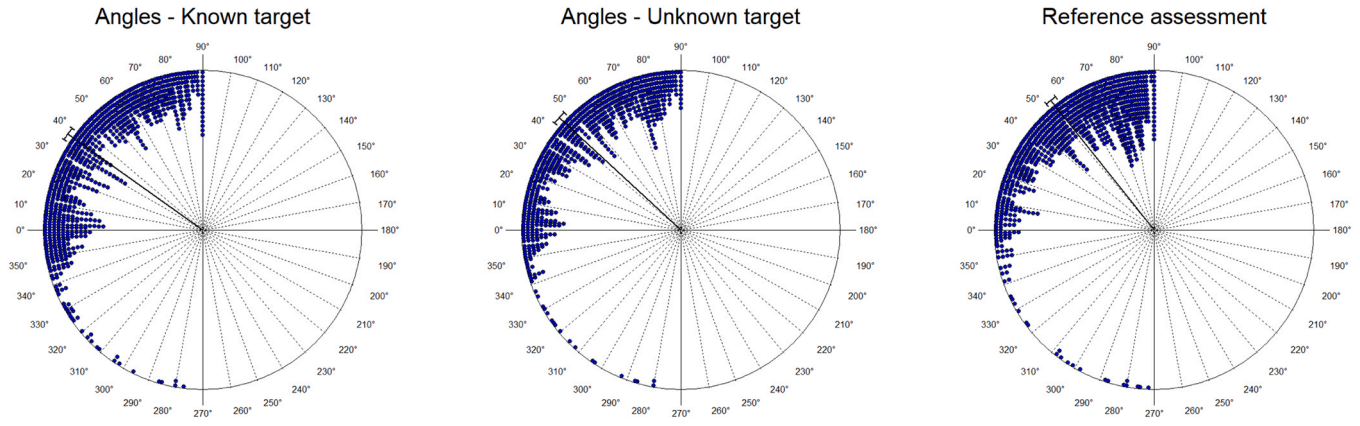

Fig. 2. Circle histogram of all responses to the Physical Analogue Scale (PAS) separated by category. Bold radial lines represent the mean angles including a 95% confidence interval.

in education. Similar results have also been reported elsewhere (Stieger, Lewetz, & Swami, 2021).

3.2. Descriptive statistics and preliminary analyses

In the end-of-day surveys, we asked how actively and passively participants used social media on that particular day ($N = 586$). On average, social media were used actively for 73.2 min per day (*SD* = 154; Median = 30) and passively for 89.8 min passively per day (*SD* = 130; Median = 60). Furthermore, we were interested in how often participants did not log an event for various reasons (e.g., forgot the event, forgot the wearable). On average, 1.3 events were not logged each day (*SD* = 3.4, Median = 0, range 0–50). Participants used the event-based assessment with the wearable on average 2.21 times per day (*SD* = 3.01) and reacted to the time-based bings on average 1.37 times per day (*SD* = 0.79). While the number of time-based reference assessments was stable during the duration of the study ($r_{sp} = 0.033$, $p = 0.450$), the event-based assessment slightly decreased over time ($r_{sp} = -0.169$, $p < 0.001$).

3.3. Impact on appearance satisfaction

As hypothesised, we found that engaging with social media reduced appearance satisfaction relative to reference measurements at random time points during the day (see Table 1). For known targets, the reduction was 12.4° on the PAS, while for the unknown targets the reduction was 5.9° (see Fig. 2). This effect was significantly stronger for known targets compared to unknown targets (see Table 2). All the other level 2 predictors had no significant relationship with state appearance satisfaction except for trait body satisfaction. That is, greater trait body satisfaction was significantly associated with greater state appearance satisfaction as measured using the PAS. This is noteworthy because, one might expect that appearance satisfaction would be associated with age or gender. In fact, these effects were prevalent but either did not reach statistical significance (e.g., women lower appearance satisfaction than men; see Table 3) or were not significant after taking the multi-level structure into account, although effect sizes were substantial (see Tables 1 and 2).

3.4. Using the wearable

In the final survey, we asked general questions about the wearable. In general, participants did not find it overly difficult to carry the wearable with them (*M* = 43.4, *SD* = 28.1; 1 = *not at all difficult*, 101 = *very difficult*). Asked about how much the wearable interfered with their everyday life during the day, participants reported relatively little interference (*M* = 34.2, *SD* = 25.0; 1 = *no interference at all*, 101 = *greatly interfered*). Furthermore, participants did not find it overly difficult to judge their appearance satisfaction using the wearable (*M* = 29.9, *SD* = 22.5; 1 = *not at all difficult*, 101 = *very difficult*).

4. Discussion

In the present study, we examined associations between everyday engagement with social media content and appearance satisfaction using an ESM design. In outline, our results suggest that engaging with social media in the form of photo- and video-based content was associated with lower state appearance satisfaction. Indeed, this effect was of a substantial size: engagement with social media explained 23% of the variance in state appearance satisfaction (see Table 1). Speaking generally, this finding is consistent with reviews and meta-analyses indicating that social media use and engagement is negatively associated with body image outcomes (de Valle et al., 2021; Faelens et al., 2021a; Fardouly & Vartanian, 2016; Lonergan et al., 2021; Rounsefell et al., 2019). It is also consistent with recent ESM studies indicating that engagement with specific forms of social media content, such as fitspiration and thinspiration, has a negative impact on body image (Fioravanti et al., 2022; Griffiths & Stefanovski, 2019; Stevens & Griffiths, 2020; Yee et al., 2020), as well as work showing that use of social media in general was significantly associated with more negative body image in women with an eating disorder (Srivastava et al., 2022).

The importance of our findings lies in the contribution to knowledge via a more ecologically valid study design; that is, rather than asking participants to recall engagement with content since the last sampling time-point (e.g., Srivastava et al., 2022; Stevens & Griffiths, 2020), we used an event-based sampling method in which participants were asked to complete a survey any time they engaged with social media content. This allowed us to show that engagement with social media content was robustly associated with lower appearance satisfaction. In explaining this general finding, it is worth considering that social media content is often appearance-focused and idealised (Brown & Tiggemann, 2020; Simpson & Mazzeo, 2017; Sharp & Gerrard, 2022). More than this, much of social media content also promotes narratives emphasising the importance and value of appearance-perfection (Choukas-Bradley et al., 2022), such as purported connections with health and wellness (Monks et al., 2021), and often uses shame as a motivator for work on the body (Marks et al., 2020). As a consequence, unrealistic norms of appearance are often normalised on social media (Rodgers & Melioli, 2016) and, to the extent that users both internalise and engage in upward social comparisons with such idealised content, it likely

Table 2
Results of the Multi-Level Analyses with Appearance Satisfaction as the Criterion (Comparison of Known vs. Unknown Targets).

	Fixed						Random	
	Coeff.	*B*	*SE*	*CI*	β	*t*	Coeff.	*SD*
Intercept (Reference)	β_{00}	44.9	5.33	34.5 – 55.4		8.43 ***	r_{0i}	16.23
Within-person								
Known target	β_{10}	-6.6	2.34	-11.2 – -2.0	-0.12	-2.81 *	r_{1i}	14.29
Reference measurement	β_{20}	5.9	2.36	1.2 – 10.5	0.11	2.48 *	r_{2i}	11.22
Between-person								
Gender (women)	β_{01}	-2.8	7.31	-17.1 – 11.5	-0.08	-0.38		
Age.cgm	β_{02}	0.6	0.41	-0.2 – 1.4	0.28	1.55		
Body mass index.cgm	β_{03}	1.8	1.18	-0.5 – 4.1	0.28	1.50		
SM use – active.cgm	β_{04}	-1.0	2.71	-6.3 – 4.3	-0.06	-0.38		
SM use – passive.cgm	β_{05}	-0.3	4.45	-9.0 – 8.4	-0.02	-0.07		
Extraversion.cgm	β_{06}	-4.7	3.00	-10.6 – 1.2	-0.25	-1.57		
Agreeableness.cgm	β_{07}	-0.8	3.94	-8.6 – 6.9	-0.03	-0.21		
Conscientiousness.cgm	β_{08}	4.9	4.51	-4.0 – 13.7	0.19	1.08		
Neuroticism.cgm	β_{09}	6.3	4.56	-2.7 – 15.2	0.28	1.38		
Openness.cgm	β_{10}	7.8	5.10	-2.3 – 17.8	0.28	1.52		
Appearance comparisons.cgm	β_{11}	1.8	2.89	-3.9 – 7.4	0.09	0.62		
Trait body satisfaction.cgm	β_{12}	0.7	0.17	0.3 – 1.0	0.72	3.85 ***		

Note. Reference category for known and time-based reference measurement were unknown targets. Reference for gender was men. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. SM = Social Media.

results in detriments to body image (Fardouly et al., 2021; Saiphoo & Vahedi, 2019). Additionally, social media content provides ample opportunities to sexual objectify bodies, which can cause internalisation of an observer's view of the self (i.e., self-objectification) and, in turn, self-consciousness about one's physical appearance (Fardouly et al., 2018; Wang et al., 2020).

Beyond these general conclusions, however, our work also makes a number of additional, incremental contributions to the literature. First, we found that engagement with the content of known targets (e.g., friends, peers, and family) had a significantly stronger negative impact on appearance satisfaction that engagement with the content of unknown targets (e.g., models, celebrities, influencers). This finding may be somewhat surprising, particularly given that unknown others are typically perceived as representing more unattainable appearance ideals compared with known others on social media (Fardouly et al., 2021). One possible explanation for this finding is that participants may have perceived posts by known others as depicting appearance ideals that were "normative" and attainable, whereas they may have been more critically engaged with posts by unknown others (e.g., perceiving their appearance ideals and narratives as unrealistic). For instance, there is evidence that social media users are heavily invested in appearance-based engagement on social media, and that engagement with peer appearance interactions are highly ubiquitous (e.g., Paddock & Bell, 2022). Such engagement with the appearance-related content of known others may provide a contained environment where appearance becomes highly salient and internalised as important. Indeed, some scholars have suggested that appearance-based engagement with known others are a form of "appearance training" (Lawler & Nixon, 2011), creating micro-level "appearance cultures" where appearance ideals are negotiated, shared, and reinforced (Jones & Crawford, 2006; Perloff, 2014).

Moreover, such "appearance cultures" involving known others – and particularly the monitoring of the appearance of known others on social media – may be associated with greater self-objectification, self-surveillance, and more negative body image (Vandenbosch & Eggermont, 2016). Moreover, it is possible that engaging with the social media content of known others triggers an other-oriented focus (i.e., where users are exposed to idealised presentations of the self without receiving positive feedback on their own appearance), which results in poorer body image (Steinsbekk et al., 2021). In contrast, it is possible that appearance-related engagement with social media content by unknown others, such as models and celebrities, are viewed more critically as being unrealistic and unattainable, and therefore unhelpful as a site for social comparisons. Alternatively, participants may have been more likely to critically appraise social media content by unknown others (e.g., being attentive to who created the content and why, the values that such content portrays and their impact on one's body image, and the extent to which such content distorts reality; Paxton et al., 2022). Finally, it is also possible that participants were simply more likely to come into contact with the content of known versus unknown others on social media. In fact, in our study, 34.1% of targets were known persons, 29.5% were unknown targets, and the remaining assessments were the reference measurement (36.5%). Thus, although the difference is relatively minor, it could in part account for the effects reported here.

Importantly, our results also indicated that state appearance satisfaction was not significantly associated with participant characteristics, including participant gender, age, BMI, the type of social media use (active vs. passive), personality, appearance comparison tendencies, and attitudes toward appearance ideals (i.e., internalisation and perceived pressure to internalise appearance ideals). At a broad level of abstraction, this can be taken as evidence that the association between social media engagement and body satisfaction is relatively robust. Indeed, this is generally consistent with previous meta-analytic work suggesting that person-related factors, such as gender, do not significantly impact of the effects of social media use on body image outcomes (Saiphoo & Vahedi, 2019). In contrast, we did find that trait body satisfaction was significantly associated with state appearance satisfaction as measured using the PAS, which is both consistent with previous ESM work (Fuller-Tyszkiewicz et al., 2018; Yee et al., 2020) and in line with expectations.

An additional novel aspect of the present study was the use of wearables and a PAS response method for measuring state appearance satisfaction. Although ESM offers many advantages over traditional paper-and-pencil surveys, compliance of responding to prompts remains a long-standing challenge, which in turn hampers the effectiveness of the method (Csikszentmihalyi & Larson, 2014), including in terms of response rates and delayed responding. The use of wrist-worn wearables and a PAS offers novel opportunities to overcome these issues (Khanshan et al., 2021; Stieger et al., 2020), but we are not aware of its previous application to body image research. Our preliminary data suggest that participants generally had little trouble carrying the wearable on their wrist and that it did not greatly interfere with their everyday lives. Perhaps most importantly, participants also indicated that it was relatively easy to make judgements about their state appearance satisfaction using the

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Table 3
Intercorrelations between Study Variables.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1 mean PAS – known person																			
2 mean PAS – unknown person	0.51**																		
3 mean PAS – reference	0.46**	0.63**																	
4 Gender (women)	-0.15	-0.02	-0.16																
5 Age	0.34*	0.16	0.36*	0.14															
6 BMI	0.09	< 0.01	0.18	-0.51**	0.18														
7 SM use – active	0.02	-0.18	-0.26	-0.11	-0.17	0.04													
8 SM use – passive	-0.45**	-0.17	-0.24	0.15	-0.37*	-0.04	0.15												
9 Extraversion	0.18	-0.21	-0.16	-0.32*	-0.04	0.18	0.16	-0.03											
10 Agreeableness	0.04	-0.14	-0.11	0.24	0.01	-0.36*	0.05	0.05	0.14										
11 Conscientiousness	0.19	0.21	0.08	0.27	0.10	-0.44**	-0.02	-0.29	0.02	0.25									
12 Neuroticism	-0.11	-0.18	-0.32*	0.36*	-0.01	-0.03	-0.03	0.14	-0.29	-0.12	-0.36*								
13 Openness	0.13	< 0.01	-0.08	0.05	-0.10	-0.24	-0.10	0.30*	0.21	0.51**	0.19	-0.32*							
14 Trait Body Satisfaction	0.32*	0.48**	0.49**	-0.34*	-0.05	-0.04	0.04	-0.08	0.23	-0.07	0.22	-0.61**	-0.01						
15 SATAQ Internalization Thinness	-0.26	-0.28	-0.24	0.08	0.13	-0.12	0.08	0.07	-0.31*	-0.03	-0.06	0.25	0.12	-0.48**					
16 SATAQ Internalization Muscular	0.03	-0.19	-0.06	-0.36*	< 0.01	-0.16	0.07	-0.06	0.24	0.21	0.12	-0.24	0.25	0.24	0.47**				
17 SATAQ Pressure Family	0.01	-0.08	0.05	-0.03	0.26	0.24	0.06	0.15	-0.24	-0.06	-0.30*	0.07	0.13	-0.26	0.42**	0.11			
18 SATAQ Pressure Peers	-0.15	-0.17	-0.02	-0.26	0.18	0.31*	-0.08	-0.11	-0.15	-0.35*	-0.33*	0.21	-0.18	-0.35*	0.48**	0.27	0.52**		
19 SATAQ Pressure Media	-0.29	-0.11	-0.17	0.25	-0.06	-0.13	0.11	0.29*	-0.36*	0.03	-0.18	0.27	0.22	-0.47**	0.71**	0.24	0.49**	0.48**	
20 Appearance comparisons	-0.08	-0.03	-0.04	0.03	0.05	-0.02	-0.02	0.04	-0.19	-0.01	-0.08	0.18	0.15	-0.35*	0.61**	0.40**	0.54**	0.56**	0.75**

Note. Reference for gender was men. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. ICC of the null model. SM = Social Media, BMI = Body Mass Index, SATAQ = Sociocultural Attitudes Towards Appearance Questionnaire.

wearable and the PAS response scale. Indeed, given that previous work has suggested that PAS responses and visual analogue responses are highly correlated (Stieger et al., 2020), this method may offer possibilities to enhance ESM research related to body image.

4.1. Limitations

A number of limitations of the present study should be considered. First, following participation exclusion, we were unable to reach our targeted sample size of $N = 60$ in our final sample. Nevertheless, it should be noted that power calculations for multi-level models are somewhat difficult because many values are not known a-priori (e.g., the ratio between within-subject and between-subject variance = ICC) and are usually realised through pre-tests or calculating them on the basis of the first data collected during the study itself. Thus, our calculated sample size should be considered a rough estimate, rather than strict requirement. Second, in our power analysis we assumed a small-to-medium effect size. This reflects the uncovered effect on the known persons (see standardised *B* in Table 1), but the effect for unknown persons was considerably lower (i.e., assuming the real effect in population is as assumed, the effect on unknown persons is probably underpowered). Nevertheless, explained variance for both random and fixed effects was $R^2 = 43\%$, whereas 20% of the variance was from the fixed effects alone. Although post-hoc power analyses can be problematic if true effect sizes are overestimated, it seems unlikely that the expected true effect is null.

Related to sampling, our recruitment method means that we cannot be certain that our sample was representative of German-speaking populations in Central Europe. Indeed, it was notable that our sample was relatively young, though of course young adults are most likely to be heavy users of social media (Perrin & Anderson, 2019) and are more likely to be at risk for negative body image outcomes as a result of social media exposure (Rodgers & Rousseau, 2022). In future work, it may be useful to replicate our findings with more representative and more diverse populations, so as to determine the extent to which our findings are generalisable. Beyond sampling concerns, it should be noted our method of operationalising social media engagement may also be a limitation for a number of reasons. That is, because we operationalised social media engagement in terms of general interaction with photo- and video-based content on social media, we are unable to state conclusively that all such engagement reflected appearance-based activities. Likewise, we are unable to distinguish the impact of engagement with different social media platforms (e.g., photo-based platforms, such as Instagram, versus rather primarily text-based platforms, such as Twitter). Given that both of these factors are important in terms of body image outcomes (Vandenbosch et al., 2022), future ESM work may want to consider including items focused on appearance-based activities and platform type.

In a similar vein, we also cannot rule out the possibility that at least some of the engagement with social media content in the present study had positive effects. For instance, recent ESM studies have shown that viewing body positivity content on social media is associated with improved body satisfaction (Fioravanti et al., 2022; Stevens & Griffiths, 2020). In this sense, our data only allow for a broad-stroke conclusion that engagement with social media content on the whole results in more negative state body image. Relatedly, although the ESM design increases the ecological validity of a study, it has the disadvantage of only allowing for the inclusion of a limited number of survey items. As a result, our key constructs were measured using relatively brief instruments, whose psychometric properties may not be as robust as longer survey instruments. Likewise, while we included a range of potential moderator variables, these were selected on the basis of constructs that have been included, or hypothesised as being important, in previous research

and it is possible we have overlooked other potentially useful constructs (e.g., appearance orientation) and user characteristics (Rodgers & Rousseau, 2022). Finally, and related to our instrumentation, it was notable that composite reliability for some trait-relevant subscales were deflated (although in line with expectation, as in the case the Mini-IPIP), which may warrant further investigation.[5]

4.2. Conclusion

In the present study, we set out to examine the association between social media engagement and appearance satisfaction using an ESM design. Our results support a growing body of evidence indicating that social media use is robustly associated with more negative body image outcomes (de Valle et al., 2021; Faelens et al., 2021a; Fardouly & Vartanian, 2016; Rounsefell et al., 2019; Saiphoo & Vahedi, 2019). Given these findings, practitioners may consider it meaningful to consider the extent of social media engagement when working to improve body satisfaction in individuals and populations. To this end, various interventionist methods have proposed to limit the negative impact of social media on body image, including reducing time spent on social media, changing the profiles and pages that one follows on social media (e.g., to focus on appearance-neutral pages; de Valle et al., 2021), and improving social media literacy (Gordon et al., 2021; Paxton et al., 2022). Additionally, there may also be value in promoting social media content that promotes positive body image, such as content that portrays appearances diverging from prescriptive appearance ideals (Cohen et al., 2021; Nelson et al., 2022; Rodgers et al., 2021; Rodgers et al., 2022), as well as interventions based on self-compassion, which have been shown to prevent increases in weight dissatisfaction following appearance-based social media use (e.g., Gobin et al., 2022; Mahon & Hevey, 2022).

Footnotes

[1] Although the Twisk approach gives a good proxy of the necessary sample size, it focuses on Level 1 effects, but not effects on Level 2. Therefore, we calculated another (post-hoc) power analysis using a more elaborate approach with the *R*-package *simr* (Green & MacLeod, 2016). We used the following assumptions: $\alpha = 5\%$, intraclass correlation ICC = 0.30, number of retests = 70, number of participants = 50, standardised effects at Level 1 and 2 and cross-level interactions of 0.2, and a random slope for Level 1 effects of 0.09 (moderate effect; for recommendations, see Arend & Schäfer, 2019). Using 1000 simulations, we reached a power of 98.20% (95% CI = 97.17, 98.93). Reducing the number of retests down to 50 (representing the actual found compliance rate) did not substantially reduce the power of the design: 96.20% (95% CI = 94.82, 97.30).

[2] A mental health questionnaire (Żemojtel-Piotrowska et al., 2018) was also included in the end-of-day questionnaire, but is not analysed as part of this study.

[3] https://esmira.kl.ac.at/.

[4] In any event, only two interactions reached statistical significance. Once a Bonferroni correction was applied, neither were significant any longer.

[5] In terms of the SATAQ-4 Pressures to Attain Ideals from Family subscale, it is possible the deflated composite reliability was partly a function of our use of McDonald's ω, which we used because of known problems with the use of Cronbach's α (e.g., McNeish, 2018). However, Cronbach's α for this subscale indicated adequate composite reliability (0.71).

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CRediT authorship contribution statement

Stefan Stieger: Conceptualisation, Methodology, Formal analysis, Writing – original draft, Writing – review & editing, Supervision, Funding acquisition, Project administration; **Hannah M. Graf:** Conceptualisation, Methodology, Investigation, Writing – review & editing; **Stella P. Riegler:** Conceptualisation, Methodology, Investigation, Writing – review & editing; **Sophie Biebl:** Conceptualisation, Methodology, Investigation, Writing – review & editing; **Viren Swami**: Conceptualisation, Methodology, Writing – original draft, Writing – review & editing.

Data availability

https://osf.io/eyzcf/.

Declarations of interest

The authors declare that they have no conflicts of interest.

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