

A brief mindfulness meditation can ameliorate the effects of exposure to idealised social media images on self-esteem, mood, and body appreciation in young women: An online randomised controlled experiment

R. Hooper, E. Guest^{*}, C. Ramsey-Wade, A. Slater

Centre for Appearance Research, University of the West of England, Bristol, UK

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ABSTRACT

The study examined whether a 10-minute mindfulness meditation intervention could ameliorate effects of exposure to social media thinspiration and fitspiration images on women's self-esteem, mood, and body appreciation. A total of 162 women aged 18–42 years ($M = 25.94$, $SD = 4.38$) completed an online experiment which involved viewing thinspiration and fitspiration images before random allocation to either a brief, ten-minute mindfulness meditation audio intervention or a ten-minute control audio about jujitsu. Participants completed self-reported measures of self-esteem, positive and negative mood, and body appreciation at baseline (Time 1), post-exposure to idealised social media images (Time 2), and immediately post-intervention (Time 3). Mixed, repeated-measures ANOVAs showed that scores were lower for body appreciation, self-esteem, and positive mood, and higher for negative mood, in both groups after exposure to idealised imagery. However, a brief mindfulness intervention ameliorated the negative effects of social media exposure. Specifically, self-esteem, body appreciation, and mood were higher in the mindfulness meditation group at Time 3, compared to the control group. Future interventions should explore the utility of mindfulness practices to provide long term buffering effects against such social media content, as well as targeting the idealisation of female physiques portrayed in thinspiration and fitspiration content.

1. Introduction

Over the last decade, the usage of social networking sites has grown exponentially, the most prominent being Facebook, Instagram, and Twitter (Gentina, Chen, & Yang, 2021). Facebook is the most frequently visited, drawing in almost 2.96 billion users as of February 2023 (Omnicores Agency, 2023, 2023), whilst Instagram generates over 2.35 billion users with approximately 3 billion photos shared on the site each day (Omnicores Agency, 2023). Importantly, research has demonstrated that social media exposure is a key sociocultural factor contributing to body image concerns (Holland & Tiggemann, 2016, 2017), which is associated with decreased body appreciation, internalisation of the thin-ideal, and increased disordered eating behaviours (Vandenbosch, Fardouly, & Tiggemann, 2022). Considering gender differences, young women are more likely to use image-based social media platforms than men and to make upward appearance comparisons on social media which can have a negative impact on mood and body appreciation (Fardouly & Vartanian, 2015; Ortiz-Ospina & Roser, 2023).

Research has illustrated that young adults between 16–24 years of age are the most active users of social media platforms, using more than six different social media platforms on average (Ofcom, 2022). Individuals use social media sites to engage in activities including socialising, taking selfies, posting pictures, communicating, and a means of passing time (Kircaburun, Alhabash, Tosuntaş, & Griffiths, 2020). The main form of engagement on social media is through visual communication, in particular posting and commenting on photos and videos (Nesi, Choukas-Bradley, & Prinstein, 2018).

A specific social media feature which may further contribute to body image concerns in women is the increase in trends such as 'thinspiration', which focuses on promoting weight loss and idealises an unrealistic standard of thinness through the presentation of extremely thin female bodies displaying protruding hipbones and/or collarbones (Ghaznavi & Taylor, 2015), and 'fitspiration', which centres around the promotion of healthy lifestyles and exercise which depict a thin yet toned or muscular female body (Tiggemann & Zaccardo, 2018). Such trends have been found to be associated with decreased self-esteem,

^{*} Correspondence to: Centre for Appearance Research, University of the West of England, Bristol BS16 1QY, UK.

E-mail address: Ella.Guest@uwe.ac.uk (E. Guest).

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mood, and body appreciation (Griffiths & Stefanovski, 2019). These associations arise as the content involved in both trends is unattainable for most individuals and the pursuit of achieving such trends would require excessive and unhealthy behaviours (Easton et al., 2018; Yee et al., 2020). Therefore, although fitspiration images may appear under the guise of being 'healthy', experimental research has demonstrated negative effects from exposure to fitspiration amongst women, including increased negative mood and body image concerns (Tiggemann & Zacardo, 2015).

1.1. The impact of social media on self-esteem, mood, and body appreciation

The negative impact of social media usage and social media trends (e.g., thinspiration, fitspiration) on self-esteem, mood, and body appreciation have been documented in recent years. For example, a systematic review exploring the impact of social media use on body image, revealed positive correlations between social media use and lower body appreciation (Holland & Tiggemann, 2016). Additionally, a study by De Vries, Peter, De Graaf, and Nikken (2016) found that higher frequency of social media use predicted body dissatisfaction 18-months later. Moreover, Tiggemann & Slater's (2017) study examined the association of Facebook usage and body image concerns in female adolescents. The study demonstrated a positive correlation between Facebook usage and body image concerns across a two-year period. Additionally, the number of Facebook friends an individual had predicted the observed increase in drive for thinness. This is likely attributed to the increased opportunity to make multiple social comparisons to idealised images in line with social comparison theory (Festinger, 1954), which suggests that individuals compare their abilities, appearances, and opinions to those of others.

Crucially, studies have also explored specific features of social media and their effects on mood and body appreciation, with various studies demonstrating that social comparison is a key contributing factor which not only leads to lower body appreciation but also negatively impacts mood. For example, Fardouly, Diedrichs, Vartanian, and Halliwell (2015) explored if social comparison effects were different between participants using social media, a magazine website, or an appearance neutral website. Their results indicated that participants assigned to spend time on Facebook reported more negative mood than those who spent time on the control website. Furthermore, women high in trait appearance comparison reported more appearance discrepancies after Facebook exposure than exposure to the control website. Such research implies that viewing idealised images is associated with an increase in body concerns and negative emotions, due to individuals comparing themselves to, and internalising, the appearance ideals to which they are exposed (Yamamiya, Cash, Melnyk, Posavac, & Posavac, 2005). Notably, social media platforms are often highly photo-based, particularly Instagram, with many of the application's images consisting of thinspiration and fitspiration content (Cohen et al., 2017). Thus, as users of Instagram are exposed to an increased number of such images, they are more likely to compare themselves to others and internalise the thin-ideal and unrealistic content, resulting in a decrease in body appreciation and increase in negative mood (Fardouly, Willburger, & Vartanian, 2018).

Some studies have also found that individuals with low self-esteem tend to rely on social networking to improve their self-esteem and self-image (Błachnio, Przepiorka, & Rudnicka, 2016). For instance, individuals who have low self-esteem, low life satisfaction, and few friends outside of social media tend to rely on social media to gain more friends and increase popularity (Mehdizadeh, 2010). This is further evidenced with a large-scale study of over 23,000 social media users, which outlined that addictive social media use was associated with high levels of narcissism, a personality trait commonly associated with low empathy and low levels of self-esteem (Andreassen et al., 2016). Moreover, Denti et al. (2012) illustrated that individuals tend to portray their lives on

social media as being more positive than in reality, which can result in others comparing their lives negatively, leading to a detrimental impact on self-esteem. In sum, recent studies point to social media usage having negative consequences on body image, resulting in decreased self-esteem, subsequently contributing to negative mood. As research has illustrated these potentially negative consequences, it is important to consider interventions that may ameliorate this effect.

1.2. The impact of mindfulness on self-esteem, mood, and body appreciation

A form of meditation often utilised to improve wellbeing is mindfulness meditation (Upchurch & Chyu, 2005). Mindfulness is an intentional, non-judgemental meditation practice which focuses upon self-regulation of attention to immediate experience and fosters the ability to be open and accepting of experiences (Bishop et al., 2004; Kabat-Zinn, 1994). Research has illustrated that practicing mindfulness can lead to improvements in body appreciation (Albertson, Neff, & Dill-Shackleford, 2015), mood (Bravo, Pearson, Stevens, & Henson, 2016), self-esteem and self-concept (Omara, 2020). Herceg & Clarke (2020) found that body appreciation scores increased among female undergraduate students following a brief mindful body scan (paying attention to bodily sensations in a gradual sequence from feet to head). In support of this research, Yu et al.'s (2020) systematic review illustrated that exposure to mindfulness-based interventions (MBIs; interventions designed to train individuals to cultivate mindfulness and incorporate its practice into daily life) reduced body image concerns in female adolescents and young adults. Moreover, research has demonstrated the association between MBIs and an increase in self-esteem. For example, Thompson and Waltz (2008) explored the association between mindfulness, self-esteem, and self-acceptance in students who undertook daily MBI. The researchers demonstrated positive correlations between mindfulness and self-esteem, suggesting that mindfulness skills may cultivate increased self-acceptance and self-esteem.

A systematic review by Randal, Pratt, and Bucci (2015) examined the impact of MBIs on self-esteem, finding that there were significant positive correlations between dispositional mindfulness (the innate capacity of paying and maintaining attention to present-moment experiences with a non-judgmental attitude (Brown & Ryan, 2003) and self-esteem. Furthermore, exploring the relationship between mindfulness and mood, previous studies have demonstrated that high levels of mindfulness are associated with positive emotions, improved wellbeing, and increased ability to cope with stressful experiences (Bravo, Pearson, Wilson, & Witkiewitz, 2018; Lenger, Gordon, & Nguyen, 2017). In support of this research, Goetz et al.'s (2020) pilot study explored the clinical effectiveness of a one-week online course of mindfulness on prenatal depression and anxiety. On completion of the course, there were significant reductions in mean levels of anxiety and depression, suggesting that short-term computerised mindfulness interventions have the potential to improve wellbeing through reducing anxiety and depression.

Studies have also demonstrated immediate, short-term effects of brief mindfulness-based interventions. For example, Wu et al., (2019) investigated the effects of a fifteen-minute mindfulness meditation intervention on mood and emotion processing compared to a control group. The researchers found that participants within the mindfulness meditation condition showed a significant decrease in emotional intensity in response to positive and negative emotional stimuli. This suggests that brief mindfulness meditation practices can provide immediate short-term reductions in negative mood. In support of this research, Müller et al. (2021) demonstrated that a brief mindfulness meditation intervention of 15-minutes significantly reduced negative mood and depression in participants compared to a control group. Additionally, Atkinson and Diedrichs (2021) found that a 15-minute mindfulness video intervention significantly improved internalisation of appearance ideals, perceived sociocultural pressures to adhere to appearance ideals,

and mood in undergraduate women. Practically, it is beneficial to explore the efficacy of brief mindfulness exercises because their length makes them relatively easy for individuals to engage with on a day-to-day basis, and they may provide immediate relief in direct response to challenging situations. Overall, the literature points towards MBIs having a positive impact on self-esteem, mood, and body appreciation, whereas social media can have a negative impact on these domains. Therefore, it is worth exploring if mindfulness can ameliorate the negative impacts of social media exposure.

1.3. Mindfulness and social media exposure

Notably, as humans have a fundamental need to belong (Baumeister & Leary, 1995), they often, within the cyber age, rely upon social media to initiate and maintain relationships with others (Phua, Jin, & Kim, 2017). Thus, individuals feel socially connected following social media usage (Grieve, Indian, Witteveen, Tolan, & Marrington, 2013). In general, individuals who have positive experiences on social media report positive outcomes, such as increased happiness and self-esteem (Zell & Moeller, 2018); however, negative experiences on social media such as lack of interest (or negative feedback) on a selfie post can have adverse outcomes such as increased stress levels (Knausenberger, Hellmann, & Echterhoff, 2015). Accordingly, to avoid adverse outcomes and to gain popularity, individuals tend to present their ideal self on social media sites (Utz, Tanis, & Vermeulen, 2012). In contrast, people with high mindfulness tend to spend less time using social media (Baker, Krieger, & LeRoy, 2016); when they do, they tend to share content which is more authentic and not that of their ideal self (Charoensukmongkol, 2016; Yang & Mak, 2017). Therefore, it could be argued that mindfulness might alleviate some of the perceived social pressures and negative effects of social media usage on wellbeing.

Importantly, few researchers have directly examined whether trait mindfulness (one's predisposition to be mindful in daily life) may alleviate the detrimental aspects associated with social media usage such as body image concerns and low self-esteem (Sabik, Falat, & Magagnos, 2020). Nonetheless, many studies have provided indirect evidence to support such possibilities. For example, literature has suggested that individuals with high mindfulness, relative to low mindfulness, are better able to control the amount of time spent social networking and focus their attention on career activities and other work productivity activities (Andreassen, Torsheim, Brunborg, & Pallesen, 2012), resulting in a reduction in psychological distress and emotional exhaustion from their job roles (Sriwilai & Charoensukmongkol, 2016). More broadly, research has demonstrated that individuals with high mindfulness are less affected by negative feedback on social media (Valkenburg, Peter, & Schouten, 2006). Consequently, these findings suggest that mindfulness is linked to fewer negative outcomes associated with social media usage and illustrate the potential benefits of mindfulness.

In considering the ability of MBIs to buffer the impact of social media exposure, studies have presented promising findings. For example, Hong et al., (2021) examined the mediating role of mindfulness in the association between social media exposure to COVID-19 information and psychological distress. Their research revealed that mindfulness acted as a protective factor, buffering the adverse effect of social media exposure on psychological distress through rumination. Therefore, if mindfulness potentially reduces the psychological distress produced by rumination, it may also reduce psychological distress produced through exposure to thinspiration and fitspiration content. Importantly, mindfulness may act as a protective factor against the negative effect of exposure to thinspiration and fitspiration content on self-esteem, mood, and body image (Bai, Cohen, Miyakawa, & Falkenberg, 2018).

Similarly, Wade, George, and Atkinson (2009) used a technique of acceptance amongst other conditions such as distraction and ruminative attention control, to explore if acceptance could improve body appreciation in university students. Despite this acceptance condition not specifically constituting an MBI, it did include techniques which

encouraged participants to simply observe their current thoughts and feelings by bringing them into awareness and holding them there - a central practice in mindfulness (Bodhi, 2011). The findings demonstrated that acceptance and distraction approaches were both superior compared to a ruminative attention control with respect to increasing body appreciation. In addition, only people in the acceptance condition experienced significantly increased body appreciation over time compared to those in the control condition. Thus, such research illustrates that MBIs could increase body appreciation and subsequently self-esteem and mood.

1.4. The present study

Research has demonstrated mindfulness can positively influence social media usage. Yet, there has been limited research exploring how mindfulness can ameliorate decreases in self-esteem, mood, and body appreciation (Poon & Jiang, 2020). It is possible that mindfulness may facilitate coping strategies due to providing increased awareness of internal thoughts, emotions, and behaviours. This may result in individuals being less likely to be distracted by anxiety or negative emotions, and able to cope with the negative features of social media exposure such as lack of positive interaction on a post (Rodríguez-Ledo et al., 2018; Butler et al., 2018). Mindfulness may also reduce the tendency to ruminate on such events as individuals have increased focus on the present moment (Kadziokla et al., 2016). As rumination is often associated with negative emotions such as depression and anxiety, through mindfulness individuals may be less likely to become overwhelmed with ruminating over thinspiration or fitspiration images (Newman & Nezelek, 2019).

The present study aimed to examine whether a brief, 10-minute mindfulness practice could ameliorate the negative effects of social media exposure to thinspiration and fitspiration content, specifically in relation to self-esteem, mood, and body image. The first hypothesis was that viewing thinspiration and fitspiration posts would negatively affect self-esteem, mood, and positive body image for participants in both the intervention and control conditions. Specifically, participants in both groups would have lower scores of self-esteem, body appreciation, and positive mood, and higher scores of negative mood, after viewing the idealised images (H1).

The second hypothesis was that compared to the control condition, a brief mindfulness practice would ameliorate the negative effects of viewing thinspiration and fitspiration posts on self-esteem, mood, and body appreciation. Specifically, it was predicted that scores of self-esteem, body appreciation, and positive mood would be higher, and negative mood would be lower, at post-intervention (T3) in the mindfulness condition compared to the control condition (H2).

2. Method

2.1. Participants

Participants were 162 English speaking women aged between 18–42 years ($M = 25.94$, $SD = 4.38$). The majority of participants (62%, $n = 100$) identified as White, with others reporting to be Black (12%, $n = 20$), Asian (12%, $n = 20$), and Mixed Race (14%, $n = 22$). Exploring the educational attainment of participants, 38% had completed an undergraduate degree ($n = 62$), 7% a master's degree ($n = 11$), 15% had completed A-levels or equivalent ($n = 24$), 35% were educated to GCSE/high school level ($n = 56$), and two participants did not report this information. Twenty-one participants (13%) identified as having a disability. The 162 participants were frequent users of social media spending, on average, 2 – 3 h on Instagram per day. Participants were recruited using opportunity sampling, whereby recruitment is carried out based on the availability of participants. The study was advertised on the social media platforms Instagram and Facebook through the first authors' personal account and university social media accounts. The

advertisements were not paid and were intended to reach young women who were active users of both Instagram and Facebook. G*Power software was used to conduct a power analysis. Assuming a medium-sized intervention effect (Cohen's $d = 0.5$), and a significance level of $\alpha = 0.05$ (two-tailed), the analysis showed that a sample size of 73 per group would provide 85% power.

2.2. Materials and measures

2.2.1. Experimental stimuli

Due to a lack of validated images, a pilot study was conducted to select thinspiration and fitspiration images for the experimental stimuli. A total of twenty images were sourced via Instagram. The search terms '#fitspo', '#thinspiration', '#thinideal' and '#gymbody' were used to gather the initial pool of images. Images were sourced that met the target age range of the participants in the study and depicted young women of a range of races, all posts included faces, and clothing ranged from bikinis or gym clothes to jeans and a top. All images were coloured and cropped to remove quotes. The images only included the name of the account and the amount of likes the image received and were configured to be perceived as actual Instagram posts. The images were chosen as they were perceived to represent thinspiration and fitspiration trends.

The stimuli were piloted with a total of 34 young women, who were recruited via the first author's Instagram and Facebook accounts. Therefore, those who took part were friends/acquaintances of the first author and followed their social media accounts. Inclusion criteria was that participants should be women aged 18–45 years. Participants were asked to rate on a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) how well each image either fit the thinspiration or fitspiration definition. The definition provided for thinspiration was: "Thinspiration is focused upon content which promotes weight loss and an unrealistic ideal of thinness" (Lewis & Arbuthnott, 2012). The definition for fitspiration was: "Fitspiration promotes fitness and strength-building over thinness, usually through weight training and cardio" (Tiggemann & Zaccardo, 2018). Images that had a score of 100% agreement, whereby all participants strongly agreed that the specific image met the description, were used. A total of six thinspiration and six fitspiration images were selected and used.

2.2.2. Measures

Self-esteem: To measure self-esteem, the Rosenberg Self-Esteem Scale was utilised (RSES; Rosenberg, 1965). The RSES is a 10-item scale that measures global self-worth by measuring both positive and negative feelings about the self. The measure included statements such as "At times I think I am no good at all." The scale assesses a person's overall evaluation of worthiness as a human being and is believed to be unidimensional (Rosenberg, 1965). All items are answered using a 5-point Likert scale format ranging from 'strongly disagree' (0) to 'strongly agree' (4). RSES total scores range from 10–40, with higher scores indicate higher self-esteem. The RSES has evidence of construct, concurrent and predictive validity (Rosenberg, 1979). Cronbach's alphas for the RSES in the current study were 0.71, 0.86 and 0.97 at Time 1, Time 2 and Time 3, respectively.

Body appreciation: The State Body Appreciation Scale-2 (SBAS-2; Homan, 2016) was used to measure state body appreciation at baseline, post-exposure to images, and post-intervention. Previous research has illustrated the scale to be reliable and valid, and a sensitive measure of body appreciation (Tylka & Wood-Barcalow, 2015). Participants were provided ten statements relating to their body appreciation (e.g., "At this moment I feel good about my body") and asked to rate how much they agreed with each statement on a 5-point Likert scale from 'strongly disagree' to 'strongly agree'. Possible averaged scores ranged from 1–5, with higher scores representing greater body appreciation. The SBAS-2 has evidence of convergent and incremental validity (Homan, 2016). In the present study, internal consistency of the SBAS-2 was

demonstrated to be high, Cronbach's alphas for the current study were 0.79, 0.84 and 0.94 at Time 1, Time 2, and Time 3, respectively.

Mood: Computerised Visual Analogue Scales (VAS), scored 'not at all' on the far left (0 cm) to 'very much' to the far right (10 cm), were utilised to assess positive and negative mood at three time points: baseline, post-exposure to images, and post-intervention (Cohen, Fardouly, Newton-John, & Slater, 2019). The original measure, utilised by Cohen and colleagues (2019), consists of twelve items assessing positive mood, negative mood, body image, and filler items relating aspects of life satisfaction. Only the positive and negative mood items were included in the analyses for the present study ('happy', 'confident', 'anxious', 'depressed'). Separate total scores (ranging from 0–10) were calculated for positive and negative mood because the two constructs are found to be experienced independently (Cohen et al., 2019). Total scores were calculated by averaging happiness and confidence items to form the positive mood subscales and anxiety and depression for the negative mood subscale. In line with Cohen et al.'s (2019) study, positive and negative mood were treated as independent constructs and individual scores were calculated for each using average scores. There is evidence that VAS are suitable for measuring mood in experimental pre-post designs (Cohen et al., 2019). For positive mood, Cronbach's alpha was 0.9 at Time 1, 0.87 at Time 2, and 0.92 at Time 3. For negative mood, Cronbach's alpha was 0.85 at Time 1, 0.79 at Time 2, and 0.91 at Time 3.

2.2.3. Intervention: mindfulness meditation audio or Brazilian Jiu Jitsu podcast

The intervention consisted of participants being asked to listen to either an audio recording of a guided mindfulness meditation practice or a control audio recording. Those in the experimental condition listened to a ten-minute mindful awareness of breathing audio recording, which was provided by the third author, who is an experienced and British Association of Mindfulness-Based Approaches registered mindfulness teacher (BAMBA, 2023). The practice guides listeners to focus their attention on sensations of breathing in the body, to cultivate concentration and calmness.

The ten-minute control audio was an audio clip from a Roy Dean podcast, centred around the martial art Brazilian Jiu Jitsu and detailing the life of a student progressing from white belt up until receiving his black belt. The specific clip included descriptions of the practicalities of progressing in Jiu Jitsu and did not include a personal motivational story. This audio was utilised because it did not relate to mindfulness or breathing, and the authors felt that the mundane descriptive information would be unlikely to impact body image, self-esteem, or mood.

Participants were asked two questions about the audio recordings: 1) Did you listen to the recording from start to finish? 2) Could you please outline any aspects of the audio that stood out? This was to ensure that participants actively listened to the audio recordings. Participants who did not pass this and a second attention check (described below) were removed from the study.

2.3. Procedure

Following ethics approval from The University of the West of England, participants completed the study remotely via online survey platform Qualtrics using their own smart device or laptop. Participants were required to complete a consent form and answer demographic questions before the study began. Next, participants were presented with the VAS relating to mood, the SBAS-2 and the RSES. All measures were counterbalanced to reduce order effects. Participants were then exposed to twelve images of thinspiration and fitspiration content. Each image was viewed for twenty seconds before they could click to the next image. To ensure participants actively looked at the images, they were given an active attention check (required to remember a given number). Participants then viewed the final six images before being asked to 'Please clarify which number you were asked to remember'; participants

were provided four options being ‘7’, ‘10’, ‘12’ and ‘cannot remember’. After viewing the images, participants from both the control and experimental group were once again asked to complete the VAS, the SBAS-2, and the RSES.

On completion of the questionnaires, participants were randomly allocated by Qualtrics to one of two conditions (control or experimental) and asked to copy and paste a URL link into google to listen to an audio recording. Participants in the control intervention were asked to listen to a ten-minute audio recording of a Roy Dean podcast centred around Brazilian Jiu Jitsu. Alternatively, participants within the experimental condition were asked to listen to a ten-minute mindfulness of breathing guided practice. Following the audio recordings, both groups were redirected back to the study, where they were asked the two attention questions described above. After participants had answered these questions, they were asked for the final time to complete the VAS questionnaire, the SBAS-2 and the RSES. On completion of these measures, participants were provided with a debrief form explaining the aims of the study.

2.4. Analysis strategy

IBM SPSS Statistics version 29 was used to carry out the analysis. First, a series of repeated-measures ANOVAs were carried out to examine whether there were significant differences in body appreciation, self-esteem, and positive and negative mood scores pre-post exposure to idealised imagery (fitspiration and thinspiration) for both the control and intervention groups. The purpose was to clarify whether thinspiration and fitspiration led to decreased self-esteem, positive mood, and body appreciation, and increased negative mood in all participants by comparing scores at Time 1 (pre-exposure) and Time 2 (immediately post-exposure) (H1). This was followed by two-way repeated measures ANOVAs to determine within and between-subjects factors for differences in measures of self-esteem, body appreciation, and mood between exposure to ‘thinspiration’ and ‘fitspiration’ images (Time 2) and subsequent exposure to an intervention (Time 3). Specifically, this was to examine whether exposure to the mindfulness intervention led to improvements in measures of self-esteem, body appreciation, and mood compared to the control group (H2).

3. Results

3.1. Data screening

A total of 194 participants completed the study; however, twelve were removed due to only completing pre-measures, with a further 20 removed for failing to complete the full set of measures. The final sample therefore consisted of a total of 162 participants. The data for the outcome measures (self-esteem, body appreciation, positive mood, and negative mood) were found to be normally distributed at each time point and have homogeneity of variance at all three timepoints, based on the visualisation of histograms. Moreover, there were no outliers, as defined by no studentised residuals greater than ± 2 standard deviations. Means and standard deviations for each outcome measure can be found in Table 1.

Table 1
Group means and standard deviations for outcome measures at each timepoint.

	Time 1 Mean (SD)		Time 2 Mean (SD)		Time 3 Mean (SD)	
	Control	Intervention	Control	Intervention	Control	Intervention
Self-esteem	29.36 (6.76)	29.31 (5.91)	20.70 (5.11)	20.53 (5.63)	20.30 (4.83)	31.42 (4.51)
Body appreciation	3.71 (0.97)	3.48 (0.93)	2.39 (0.75)	2.32 (0.84)	2.35 (0.74)	3.92 (0.64)
Positive mood	6.60 (2.16)	6.30 (2.10)	4.31 (1.86)	4.22 (2.13)	4.04 (1.97)	7.15 (1.63)
Negative Mood	2.65 (1.96)	2.71 (2.08)	5.17 (2.02)	5.21 (2.13)	5.19 (2.24)	1.89 (1.77)

3.2. Effects of image exposure on self-esteem, mood, and body appreciation

To test Hypothesis 1, a series of mixed repeated-measures ANOVAs were carried out to examine whether self-esteem, body appreciation, positive mood, and negative mood scores changed for all participants after viewing thinspiration and fitspiration imagery. For self-esteem, there was a significant main effect of time, $F(1160) = 356.45, p < .001$, partial $\eta^2 = .690$ but no effect of group, $F(1160) = .019, p = .890$, partial $\eta^2 = .000$, and no interaction effect $F(1160) = .018, p = .894$, partial $\eta^2 = .000$. For body appreciation, there was a significant main effect of time, $F(1160) = 385.52, p < .001$, partial $\eta^2 = .707$ but no effect of group, $F(1160) = 1.38, p = .242$, partial $\eta^2 = .009$ and no interaction effect, $F(1160) = 1.46, p = .229$, partial $\eta^2 = .009$. For positive mood there was a significant main effect of time, $F(1160) = 276.479, p < .001$, partial $\eta^2 = .633$ but no effect of group, $F(1160) = .44, p = .507$, partial $\eta^2 = .003$, and no interaction effect, $F(1160) = .638, p = .426$, partial $\eta^2 = .004$. For negative mood there was a significant main effect of time, $F(1155) = 282.64, p < .001$, partial $\eta^2 = .646$ but no effect of group, $F(1155) = .004, p = .948$, partial $\eta^2 = .000$ and no interaction effect, $F(1155) = .322, p = .571$, partial $\eta^2 = .002$. Therefore, in support of Hypothesis 1, exposure to idealised fitspiration and thinspiration imagery significantly decreased self-esteem, body appreciation, and positive mood, and increased negative mood in all participants.

3.3. Effects of intervention on self-esteem, mood, and body appreciation

To test Hypothesis 2, that listening to a 10-minute mindfulness meditation audio would ameliorate the effects of exposure to thinspiration and fitspiration, compared to the control group, mixed repeated-measures ANOVAs were carried out for self-esteem, body appreciation, positive mood, and negative mood. Visual representations of mean scores for self-esteem, body appreciation, positive mood, and negative mood at each timepoint can be found in Figs. 1 - 4.

For self-esteem, there were significant main effects of time $F(1160) = 191.29, p < .001$, partial $\eta^2 = .545$, group $F(1160) = 62.12, p < .001$, partial $\eta^2 = .280$, and a significant interaction effect $F(1160) = 222.19, p < .001$, partial $\eta^2 = .581$. Simple main effects analysis showed that the meditation group had significantly higher self-esteem scores ($M = 31.42, SE = .52$) at Time 3, compared to the control group ($M = 20.30, SE = .52; p < .001$).

For state body appreciation, there were significant main effects of time $F(1160) = 280.36, p < .001$, partial $\eta^2 = .637$, group $F(1160) = 49.30, p < .001$, partial $\eta^2 = .236$, and an interaction effect $F(1160) = 54.51, p < .001$, partial $\eta^2 = .658$. Simple main effects analysis showed that the meditation group had significantly higher body appreciation scores ($M = 3.92, SE = .08$) at Time 3, compared to the control group ($M = 2.35, SE = .08; p < .001$).

For positive mood, there were significant main effects for time $F(1160) = 128.76, p < .001$, partial $\eta^2 = .446$, group $F(1160) = 29.75, p < .001$, partial $\eta^2 = .889$, and an interaction effect $F(1160) = 186.85, p < .001$, partial $\eta^2 = .539$. Simple main effects analysis showed that the meditation group had significantly higher positive mood scores ($M = 7.15; SE = .20$) at Time 3, compared to the control group ($M = 4.04, SE$

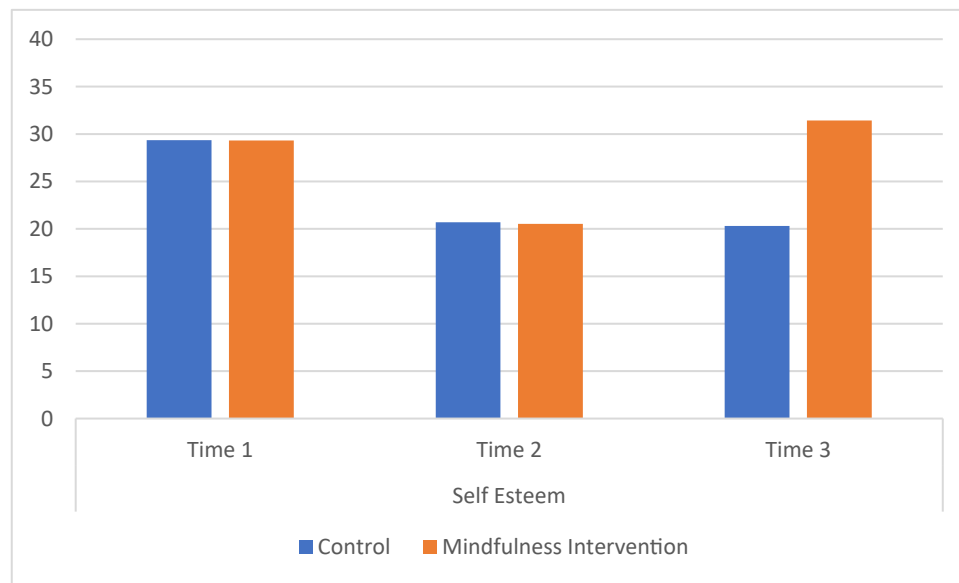


Fig. 1. Mean self-esteem scores at baseline (Time 1), post-exposure to images (Time 2), and post-intervention (Time 3).

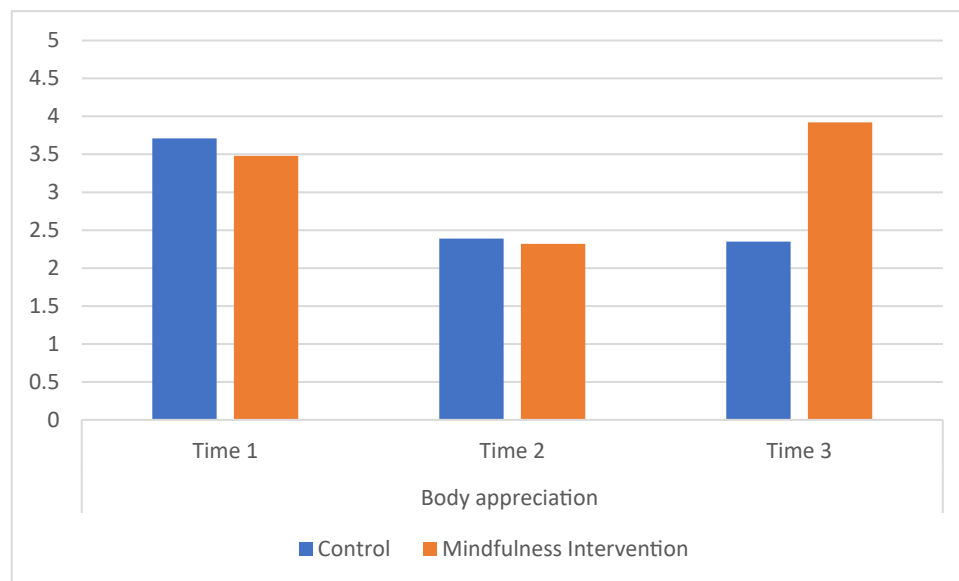


Fig. 2. Mean body appreciation satisfaction scores at baseline (Time 1), post-exposure to images (Time 2), and post-intervention (Time 3).

=.20; $p < .001$).

For negative mood, there were significant main effects for time $F(1155) = 197.23$, $p < .001$, partial $\eta^2 = .560$, group $F(1155) = 27.39$, $p < .001$, partial $\eta^2 = .150$, and an interaction effect $F(1155) = 201.55$, $p < .001$, partial $\eta^2 = .565$. Simple main effects analysis showed that the meditation group had significantly lower negative mood scores ($M = 8.01$; $SE = .23$) at Time 3, compared to the control group ($M = 4.82$, $SE = .23$; $p < .001$). Therefore, negative mood significantly decreased in the mindfulness group but not the control group.

In support of Hypothesis 2, scores for self-esteem, body appreciation, and positive mood were significantly higher, and negative mood significantly lower, in the mindfulness compared to the control group at Time 3. Therefore, listening to a brief 10-minute mindfulness meditation ameliorated the negative effects of viewing thinspiration and fitspiration imagery.

As an exploratory analysis, a series of repeated-measures ANOVAs were carried out to examine whether there were differences in scores for

self-esteem, body appreciation, and mood at Time 1 (pre-exposure) and T3 (post-intervention) in the mindfulness group.

For self-esteem, there was a significant main effect of time $F(1,80) = 11.95$, $p < .001$, $\eta^2 = .13$. An inspection of mean scores showed that scores were significantly higher at Time 3 ($M = 31.42$) than Time 1 ($M = 29.31$).

For body appreciation, there was a significant main effect of time $F(1,80) = 32.15$, $p < .001$, $\eta^2 = .29$. An inspection of mean scores showed that scores were significantly higher at Time 3 ($M = 3.92$) than Time 1 ($M = 3.48$).

For positive mood, there was a significant main effect of time $F(1,80) = 23.13$, $p < .001$, $\eta^2 = .22$. An inspection of mean scores showed that scores were significantly higher at Time 3 ($M = 7.15$) than Time 1 ($M = 6.30$).

For negative mood, there was a significant main effect of time $F(1,75) = 32.71$, $p < .001$, $\eta^2 = .27$. An inspection of mean scores showed that scores were significantly lower at Time 3 ($M = 1.91$) than Time 1 (M

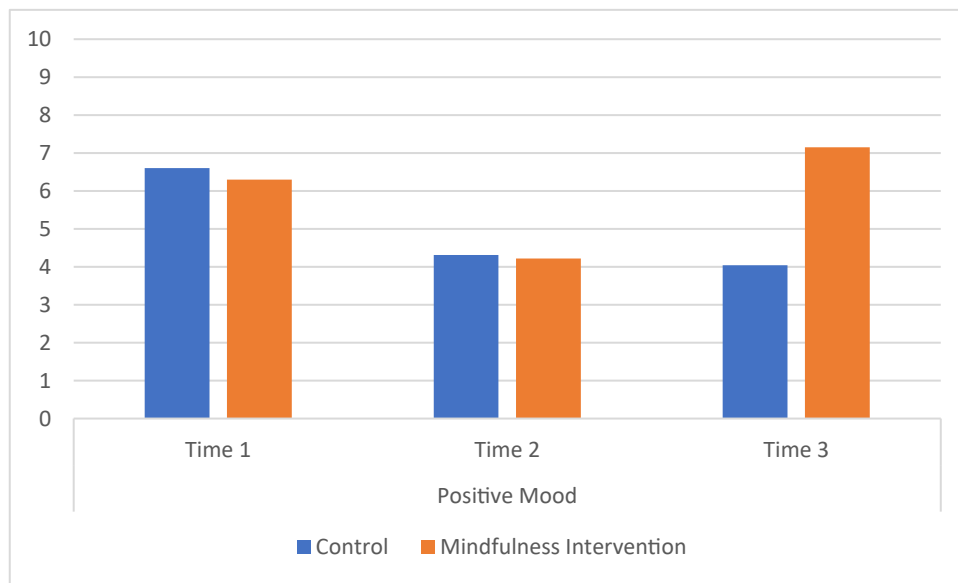


Fig. 3. Mean positive mood scores at baseline (Time 1), post-exposure to images (Time 2), and post-intervention (Time 3).

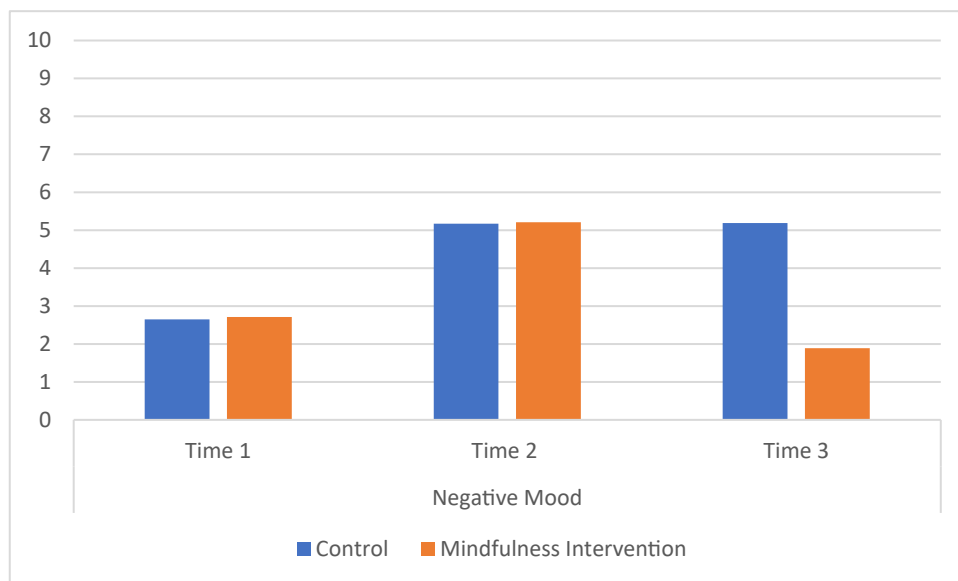


Fig. 4. Mean negative mood scores at baseline (Time 1), post-exposure to images (Time 2), and post-intervention (Time 3).

= 2.82).

Therefore, scores of self-esteem, body appreciation and positive mood were significantly higher, and negative mood significantly lower, at post-intervention (T3) compared to baseline (T1). This suggests that even after exposure to idealised images, completing the mindfulness exercises improved all outcomes above where they were at baseline.

4. Discussion

The present study aimed to determine the effect of exposure to thinspiration and fitspiration social media imagery on women’s self-esteem, body appreciation, and negative and positive mood, and to explore whether a mindfulness intervention could ameliorate these effects. Two hypotheses were proposed: (1) Viewing thinspiration and fitspiration posts would negatively affect self-esteem, mood, and positive body image for participants in both the intervention and control condition. (2) A brief mindfulness practice would ameliorate the

negative effects of viewing thinspiration and fitspiration posts on self-esteem, body appreciation, and mood compared to the control condition. Specifically, it was predicted that there would be a significant increase in self-esteem, body appreciation, and positive mood scores, and a decrease in negative mood scores, from post-exposure to post-intervention for the mindfulness condition but not the control condition.

Firstly, in line with Hypothesis 1, exposure to thinspiration and fitspiration images resulted in significantly decreased self-esteem, positive mood, and body appreciation, and increased negative mood, in participants in both the intervention and control groups. Secondly, in support of Hypothesis 2, listening to a 10-minute mindfulness audio ameliorated the negative effect of exposure to thinspiration and fitspiration images on women’s self-esteem, mood, and body appreciation in the intervention group, compared control group.

As previously highlighted, exposure to thinspiration and fitspiration images significantly worsened self-esteem, body appreciation, and mood. This is consistent with a large body of previous research

demonstrating the negative effects of viewing thinspiration and fitspiration images on women's self-esteem (Chansiri & Wongphothiphan, 2021; Griffiths & Stefanovski, 2019). The finding that exposure to thinspiration and fitspiration also led to lower body appreciation and positive mood, and greater negative mood is consistent with general research on the impact of thin-ideal media depicted in magazines, television shows, and music videos (Russell, 2018) and images of athletic women (Rounds et al., 2021; Prichard, O'Toole, Wu, Harford, & Tiggemann, 2021). It is also consistent with three studies that have shown that fitspiration images, in particular, have a detrimental effect on body appreciation and negative mood relative to control images of travel inspiration (Tiggemann & Zaccardo, 2015) and thin-ideal images (Cha, Mayers, and Stutts (2022); Robinson et al., 2017).

However, as the current study incorporated both thinspiration and fitspiration images together and all participants viewed the same images, it is difficult to differentiate whether one type of stimuli had a greater effect on women's self-esteem, mood, and body appreciation. A study by Dignard (2017) demonstrated that although the effect of fitspiration was not statistically different from that of thinspiration, tests of equivalence showed that the effect also was not equivalent. Specifically, viewing fitspiration images was associated with lower body appreciation than was viewing thinspiration images, suggesting that although fitspiration may at first glance appear to be promoting health and fitness, it is in fact just as harmful as, and potentially more harmful than, thinspiration content. Thus, it may have been beneficial for future studies to split the image exposure conditions (participants to either view thinspiration or fitspiration content) in order to understand the relative impact of both types of social media images more fully.

As predicted by Hypothesis Two, a brief mindfulness practice can ameliorate the negative effects of viewing thinspiration and fitspiration posts on self-esteem, mood, and body appreciation compared to the control condition. Moreover, at T3, scores for all outcome measures had significantly improved from T1 for participants in the mindfulness group. Therefore, even after exposure to idealised imagery, the brief mindfulness practice increased participants' self-esteem, body appreciation, and mood beyond baseline levels. These findings are in line with previous literature that has found that MBIs significantly improve self-esteem, mood, and body image (Randal et al., 2015; Thompson and Waltz, 2008). However, it is worth noting that the efficacy of short-term mindfulness is mixed, with some studies stating that mindfulness depends on several moderators including motivation to practice, practice time, and frequency of practice (Carson, Carson, Gil, & Baucom, 2004). More specifically, frequency is related to positive affect and maintained wellbeing (Van Beveren et al., 2018). As shown by several studies, regular practice yields an ongoing orientation towards the present moment, resulting in increased attention regulation, emotional awareness, and reduced maladaptive automatic responses (D'antoni et al., 2021; Ito, Watanabe, & Osawa, 2021). Given the current study consisted of a brief, one-off mindfulness intervention, it may be suggested that it is unlikely to produce long term buffering effects against thinspiration and fitspiration content, with a limitation of this study being a lack of follow-up to explore whether effects could be sustained. Thus, it may be crucial to integrate mindfulness into everyday life to provide sustainable buffering effects against exposure to thinspiration and fitspiration content (Ryan, Donald, & Bradshaw, 2021). This is further supported by studies which illustrate that regular mindfulness practices are associated with better health and increased well-being (Shankland, Tessier, Strub, Gauchet, & Baeyens, 2021; Wingert, Jones, Swoap, & Wingert, 2020), although other studies have shown that mindfulness students who do not follow informal homework practices still experienced benefits in terms of reduced rumination (Hawley et al., 2013), suggesting that increasing the length of the study's intervention may not necessarily yield longer-term impacts on women's self-esteem, body appreciation, and mood. Such inconsistencies in the literature (e.g., Khoury et al., 2013; Vettese, Toneatto, Stea, Nguyen, & Wang, 2009) could be attributed to difficulty in measuring brief and informal practice time (e.g., Hawley

et al., 2013), and by the scarcity of studies measuring practice time, frequency, adherence to suggested practices, and correlations between these factors and outcomes. Therefore, future research could incorporate daily mindfulness practice within a longitudinal design, to examine whether daily practice can sustain the buffering effects demonstrated in this study.

Nonetheless, there is a body of experimental research which has illustrated the effectiveness of single-session mindfulness interventions in producing immediate short-term effects. When considering mood, two experimental studies that have demonstrated that a brief mindfulness meditation interventions of 15-minutes and 60-minutes respectively significantly reduced negative mood and depression compared to the control group, suggesting that brief mindfulness interventions provide an immediate effect of improved mood (Atkinson & Diedrichs, 2021; Müller et al., 2021; Zeidan, Johnson, Gordon, & Goolkasian, 2010). These studies are further supported by research which investigated the immediate effects of a 10-minute mindfulness-based body scan on adult outpatients. The researchers found that following listening to this mindfulness audio recording within a clinic environment the participants reported a significant reduction in ratings for pain related distress and for pain interfering with social relations for the body scan group compared with the control group, suggesting that, in a clinic setting, a brief body scan has immediate benefits for those experiencing chronic pain. As chronic pain is associated with low mood, self-esteem and body appreciation (Honda, Ashizawa, Kiriya, Take, & Yoshimoto, 2022; Perugio et al., 2022; Markey, Dunaev & August, 2020), this study highlights the effectiveness of brief mindfulness across the three variables included in this study.

In summary, the current findings suggest that exposure to both thinspiration and fitspiration images significantly decreased self-esteem, mood, and body appreciation in young women. The findings of the current study contribute to existing research in two important ways. First, the research lends support to the growing body of experimental research on the harmful effects of viewing thinspiration and fitspiration content on women's self-esteem, mood, and body appreciation. Second, the present study appears to be the first experimental study to demonstrate that mindfulness practice can potentially buffer against the negative effects of viewing idealised social media images on women's self-esteem, body appreciation, and mood. Therefore, the use of mindfulness practices for young women who are regular users of social media warrants further research. Expanding the length of the intervention whilst making it more naturalistic and encouraging regular practice could also hold value and potentially provide longer term buffering effects.

4.1. Practical implications

At a practical level, the current findings suggest that it is crucial for young women to limit their exposure to thinspiration and fitspiration social media content as the immediate negative impact of viewing such images on self-esteem, body appreciation, and mood is clear. However, the current study has also demonstrated that mindfulness can ameliorate the effects of exposure to thinspiration and fitspiration content for young women, highlighting the utility of prevention strategies centred around mindfulness. Importantly, this research has demonstrated that mindfulness can provide immediate, short-term improvements to self-esteem, body appreciation, and mood. Practising brief mindfulness exercises in response to viewing idealised content on social media may help to restore self-esteem, body appreciation, and mood. Future research could also explore whether the benefits from these short mindfulness exercises can motivate women to engage in social media in a more positive way. Audio-based mindfulness practices could represent an efficient use of limited healthcare resources and offer substantially easier access to those who live further away from services. Social media literacy interventions thus far have focused on adolescent girls (e.g., Stevens & Griffiths, 2020; McLean, Wertheim, Masters, & Paxton, 2017); it could

be beneficial to continue targeting adolescent girls, as research has demonstrated that MBI is an effective treatment option for adolescents (Etty-leal, 2019; Coholic & Eys, 2016). These programmes may be implemented in collaboration with social media platforms such as Instagram through population-level campaigns, which could be developed and tested to encourage people to practice mindfulness if they feel upset by idealised images, with the inclusion of practical tips to moderate exposure to thinspiration and fitspiration imagery (e.g., unfollowing accounts which do not contribute to wellbeing and limiting usage of social media).

4.2. Limitations and future research

It is important to note limitations of the current research. First, although the study used a picture format that was like real Instagram posts and participants accessed the content remotely resulting in it being similar to real life settings, the presentation of each image for twenty seconds may have not been replicable to real world viewing. Thus, it could be argued the study had low ecological validity. Second, the sample size mostly comprised of young white females. Therefore, it is unclear if the results of this study are generalisable to women of other ethnicities and age groups, or men, as research has illustrated gender differences in body appreciation concerns (Fischetti, Latino, Cataldi, & Greco, 2020). Future studies may examine the effects of viewing thinspiration and fitspiration images on women from diverse ethnic and cultural backgrounds, as well as adolescent girls, given the high usage of image-centric social media platforms in this age group (Feerick, 2021).

Another limitation is that a trait measure was used to assess self-esteem. Although the RSES was sensitive to changes in self-esteem across the three timepoints in the study, it would be useful for future research to utilise a validated state measure such as the Six-Item State Self-Esteem Scale (SSES-6; Webster, Howell, & Shepperd, 2022). A further limitation to this study relates to the fitspiration and thinspiration images being combined as the experimental stimuli, which makes it difficult to ascertain whether one set of images had more of an impact than the other. It would be beneficial for future research to explore the effects of idealised images separately; although, it is important to note that both thinspiration and fitspiration images have both been shown to negatively affect body image (Easton et al., 2018; Yee et al., 2020).

As the current study consisted of a brief, one-off mindfulness intervention, it is difficult to ascertain the longevity of the intervention, alongside the long-term buffering effects against thinspiration and fitspiration content, with a limitation of this study being a lack of follow-up to explore whether effects could be sustained. Future research should include follow-up timepoints including a number of weeks and months to ascertain whether there are longer-term effects. Additionally, it could examine whether there are benefits of repeated exposure to brief mindfulness interventions. Finally, there are many potential mediating factors that were not explored in this study, as the focus was on the causal effects of exposure to thinspiration and fitspiration imagery on women's self-esteem, mood, and body appreciation. While it can be proposed that appearance comparisons account for the observed contrast effects of viewing thinspiration and fitspiration images on women's decrease in self-esteem, mood, and body appreciation, further investigation is required to ascertain the mediating effects of these processes. With multiple studies demonstrating that exposure to thinspiration and fitspiration images is often mediated by internalisation of societal standards of the 'ideal body' (e.g., Prichard, McLachlan, Lavis, & Tiggemann, 2018), researchers may also consider reviewing this mechanism in the context of the effects of exposure to thinspiration and fitspiration imagery on women's self-esteem, mood, and body appreciation. Finally, the online nature of this study may be viewed as an advantage as online surveys can be administered in a cost effective, time-efficient manner and the speed and reach of the internet allows real-time access for interactions with diverse respondent groups Topuzovska, Borota (2020). However, online studies are not without flaws,

with research highlighting that participants can become distracted and pay less attention when remotely accessing online studies (Newman, Bavik, Mount, & Shao, 2021). The current study aimed to control for this using attention questions to ascertain the images and interventions were attended to.

5. Conclusion

The current study found that exposure to thinspiration and fitspiration imagery can significantly lower young women's self-esteem, positive mood, and body appreciation. However, it was found that a brief, 10-minute mindfulness practice was able to reduce the negative effects viewing such content had on women's self-esteem and mood suggesting that mindfulness can be a useful intervention in this area. Considering these findings, young women who use social media may find it beneficial to avoid posts relating to thinspiration and fitspiration content and be encouraged to practice mindfulness to boost counteract the negative effects of exposure to appearance ideals on social media and improve their self-esteem, body appreciation, and mood.

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None.

Declaration of Competing Interest

The authors declare that they have no conflicts of interest.

Data Availability

Data will be made available on request.

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