

## Negative comparisons about one's appearance mediate the relationship between Facebook usage and body image concerns



Jasmine Fardouly\*, Lenny R. Vartanian

School of Psychology, UNSW Australia, Sydney, New South Wales 2052, Australia

### ARTICLE INFO

#### Article history:

Received 5 June 2014

Received in revised form 20 October 2014

Accepted 22 October 2014

#### Keywords:

Facebook

Social media

Drive for thinness

Body dissatisfaction

Appearance-related social comparison

Comparison target group

### ABSTRACT

Use of social media, such as Facebook, is pervasive among young women. Body dissatisfaction is also highly prevalent in this demographic. The present study examined the relationship between Facebook usage and body image concerns among female university students ( $N=227$ ), and tested whether appearance comparisons on Facebook in general, or comparisons to specific female target groups (family members, close friends, distant peers [women one may know but do not regularly socialize with], celebrities) mediated this relationship. Results showed a positive relationship between Facebook usage and body image concerns, which was mediated by appearance comparisons in general, frequency of comparisons to close friends and distant peers, and by upward comparisons (judging one's own appearance to be worse) to distant peers and celebrities. Thus, young women who spend more time on Facebook may feel more concerned about their body because they compare their appearance to others (especially to peers) on Facebook.

© 2014 Elsevier Ltd. All rights reserved.

### Introduction

For young women in Western society, the Internet is the most commonly used form of media (Bair, Kelly, Serdar, & Mazzeo, 2012; Bell & Dittmar, 2011), and social networking websites, such as Facebook, are used more often than any other websites (Australian Bureau of Statistics, 2013; Tiggemann & Slater, 2013). Given the popularity of social media, it is important to understand its association with young women's body image concerns. Body dissatisfaction has become normative among young women both in high school (Bearman, Presnell, Martinez, & Stice, 2006; Ricciardelli & McCabe, 2001) and in university settings (Berg, Frazier, & Sherr, 2009; Neighbors & Sobal, 2007). The high prevalence of body dissatisfaction among young women is particularly concerning because body dissatisfaction is one of the most robust risk and maintenance factors for eating disorders (Stice, 2002). Sociocultural models of eating disorders highlight the role of the media in the development and maintenance of body image problems (Keery, van den Berg, & Thompson, 2004; van den Berg, Thompson, Obremski-Brandon, & Coovert, 2002), but research connecting the use of social media and body image concerns is sparse.

A few recent studies have found that Facebook usage in general is associated with appearance concerns. For example, research with Australian samples found that preadolescent and adolescent female Facebook users reported greater appearance concerns and dieting behavior than did non-users (Tiggemann & Slater, 2013, 2014). Similarly, research with female high school students in the United States found that Facebook users had higher levels of self-objectification (i.e., placed more value on their appearance than their competence), and made more appearance comparisons than did non-users (Meier & Gray, 2014). Beyond simply comparing users and non-users, research has examined the connection between the amount of time spent on Facebook and appearance concerns. Female primary school and high school students in Australia who reported spending more time on Facebook were more dissatisfied with their appearance, internalized the thin ideal to a greater extent, and had greater drive for thinness (Tiggemann & Miller, 2010; Tiggemann & Slater, 2013, 2014). Research has also found that it is greater exposure to photographs on Facebook, rather than overall Facebook usage, that is associated with greater body dissatisfaction in female high school students (Meier & Gray, 2014). The authors of several of these studies on Facebook usage suggested that appearance comparisons might be the mechanism responsible for the relationship between Facebook usage and body image concerns (Tiggemann & Miller, 2010; Tiggemann & Slater, 2013, 2014), but no research has directly investigated the role of appearance comparisons in this relationship.

\* Corresponding author. Tel.: +61 2 9385 8758.

E-mail addresses: [jasmine.fardouly@unsw.edu.au](mailto:jasmine.fardouly@unsw.edu.au) (J. Fardouly), [l.vartanian@unsw.edu.au](mailto:l.vartanian@unsw.edu.au) (L.R. Vartanian).

Sociocultural models of body image and disordered eating highlight the role of appearance comparisons in the possible development and maintenance of body dissatisfaction (Fitzsimmons-Craft et al., 2014; Keery et al., 2004; van den Berg et al., 2002; Vartanian & Dey, 2013). In particular, negative body image can result when women make upward appearance comparisons, comparing their appearance to someone whom they believe to be more attractive than themselves (Myers, Ridolfi, Crowther, & Ciesla, 2012; as is the case with many celebrities and fashion models, for example; Leahey & Crowther, 2008). The majority of research on appearance comparisons has focused on comparisons to media images through magazines, television, or music videos (Myers & Crowther, 2009), and exposure to these traditional media types has been found to lead to greater body image concerns in young women (Bell, Lawton, & Dittmar, 2007; Groesz, Levine, & Murnen, 2002; Halliwell & Dittmar, 2004; Hargreaves & Tiggemann, 2004). Furthermore, research examining exposure to these traditional media types has found that people's tendency to compare their appearance to the appearance of others accounted for the relationship between media exposure and women's body dissatisfaction (Tiggemann & McGill, 2004; Tiggemann & Slater, 2004). That is, media exposure is linked to body dissatisfaction because of appearance comparison. Similar processes might be at play in the context of social media. Given the vast number of images that are uploaded to Facebook every day (Mayer-Schönberger & Cukier, 2013), this platform provides women with regular opportunities to make appearance comparisons with others. Furthermore, because people tend to present an idealized version of the self on social media (Manago, Graham, Greenfield, & Salimkhan, 2008; Zhao, Grasmuck, & Martin, 2008), upward comparisons to other Facebook users may be particularly likely.

Another important feature of sociocultural models of body image, such as the tripartite influence model (van den Berg et al., 2002), is the emphasis on appearance-related pressures from different sources, including one's family, peers, and the media. Similarly, it may be that examining appearance comparisons to women within these different groups (family, peers, models/celebrities) can play an important role in understanding the development of body image concerns. Unlike more traditional forms of media (such as magazines and television), which predominantly features images of models, celebrities, or other strangers, social media (such as Facebook) contains images of a variety of different types of individuals. Facebook generally features known others (or "friends") who vary in relational closeness to the user, including family members, close friends, and distant peers (i.e., people the viewer may know but does not regularly socialize with in person). In addition, when using Facebook, people are also exposed to images of models and celebrities through advertisements, fan pages, and other commercial pages. Despite being exposed to a variety of different target groups on Facebook, people mainly use Facebook to interact with their peers (Hew, 2011), and having more "friends" on Facebook has been associated with greater body image concerns among female high school students (Tiggemann & Slater, 2013). There is also some evidence to suggest that appearance comparisons to peers may have a stronger association with body image concerns than does comparisons to models or celebrities (Carey, Donaghue, & Broderick, 2014), perhaps because the appearance of peers may be seen as more personally attainable than the appearance of celebrities. However, these effects have not been consistent in the literature (Leahey & Crowther, 2008; Ridolfi, Myers, Crowther, & Ciesla, 2011; Schutz, Paxton, & Wertheim, 2002). Given that Facebook contains images of a variety of potential comparison targets varying in relational closeness, it is important to examine whether the frequency and direction of comparisons to specific target groups accounts for the relationship between Facebook usage and women's body image concerns.

## The Present Study

Overall, the aims of this correlational study are to: (a) investigate the relationship between the frequency of Facebook usage and body image concerns among female university students; and (b) examine whether appearance comparisons in general or comparisons to different target groups on Facebook account for this relationship. Extrapolating from previous research (Tiggemann & Miller, 2010; Tiggemann & Slater, 2013, 2014), we predict that greater Facebook usage would be associated with higher levels of body image concerns. Furthermore, based on research using traditional media types (Tiggemann & McGill, 2004; Tiggemann & Slater, 2004), appearance comparisons to women on Facebook are expected to mediate, or account for, the relationship between Facebook usage and body image concerns. Finally, the frequencies and directions (i.e., whether the target was judged to be more [upward comparison] or less [downward comparison] attractive than oneself) of appearance comparisons to different target groups on Facebook are expected to be differentially associated with women's body image concerns. Given that Facebook is generally used to interact with one's peers (Hew, 2011), and that having more "friends" on Facebook is associated with greater appearance concerns (Tiggemann & Slater, 2013), appearance comparisons to peers on Facebook are expected to have the strongest association with young women's body image concerns.

## Method

### Participants

Participants ( $N=227$ ) were female first-year psychology students at a large public university in eastern Australia. Power analysis indicated that this sample size was sufficient to detect small-to-medium effects with 80% power and alpha set at .05. The mean age of participants was 19.13 years ( $SD=2.21$ ), and their mean Body Mass Index (BMI:  $\text{kg}/\text{m}^2$ ) was 21.41 ( $SD=3.93$ ). One-hundred-and-five participants (46.3%) identified as White, 95 (41.9%) identified as Asian, and 27 (11.8%) identified as "other."

### Measures

**Facebook usage.** Two questions were used to measure how much time participants usually spend on Facebook: "On a typical day, how often do you check Facebook (even if you are logged on all day)?" (1 = *not at all*, 2 = *once a day*, 3 = *every few hours*, 4 = *every hour*, 5 = *every 30 minutes*, 6 = *every 10 minutes*, 7 = *every 2 minutes*); and "Overall, how long do you spend on Facebook on a typical day?" (1 = *5 minutes or less*, 2 = *15 minutes*, 3 = *30 minutes*, 4 = *1 hour*, 5 = *2 hours*, 6 = *4 hours*, 7 = *6 hours*, 8 = *8 hours*, 9 = *10 hours or more*). Because these indicators were highly correlated,  $r=.57$ ,  $p<.001$ , responses on these two questions were standardized and then averaged to form a single measure of Facebook usage.

**Facebook appearance comparisons in general.** Three statements taken from the Physical Appearance Comparison Scale (PACS; Thompson, Heinberg, & Tantleff, 1991) were modified to measure participants' tendency to compare their appearance to others on Facebook. These three statements were chosen because they refer to the specific situation or place where the comparisons take place (e.g., "at parties or social events") and could therefore be modified to address comparisons through Facebook. Participants were asked to indicate their level of agreement on a 5-point scale (1 = *definitely disagree*, 5 = *definitely agree*) with each of the following statements: "When using Facebook, I compare my physical appearance to the physical appearance of others," "When using Facebook, I compare how I am dressed to how other people are dressed," and

“When using Facebook, I sometimes compare my figure to the figures of other people.” Responses were averaged to form a combined measure of Facebook appearance comparison tendency *in general* (Cronbach’s  $\alpha = .75$ ).

**Comparisons to specific target groups on Facebook.** Participants reported on the frequency and direction of appearance comparisons that they made to specific female target groups on Facebook. In each case, participants were instructed that the question “refers to people of the same sex as you.” For the frequency-of-comparison item, participants were asked on a 5-point scale, “When looking at photos of the following people on Facebook, how often do you compare your body to theirs?” (1 = *never*, 5 = *very often*); for the direction-of-comparison item, participants were asked on a 6-point scale, “When comparing your body to each of the following people on Facebook, how do you rate yourself?” (1 = *much worse*, 6 = *much better*). (Note that, for the direction-of-comparison item, responses were not included for those participants who indicated that they never compared their body to a particular target group in the frequency-of-comparison item.) The target groups varied in relational closeness and included: *family members*, *close friends* (i.e., females you are friends with on Facebook and regularly hang out with), *Facebook friends* (i.e., females you are friends with on Facebook but do not regularly hang out with), *friends of friends* (i.e., females you know but are not friends with on Facebook and you do not regularly hang out with), and *celebrities* (e.g., actors, musicians, models). Ratings for *Facebook friend* and *friend of friend* were averaged to form a single measure labeled the *distant peer* target group for both the frequency-of-comparison (Cronbach’s  $\alpha = .88$ ) and direction-of-comparison (Cronbach’s  $\alpha = .90$ ) measures. Ratings for the *family member*, *close friend*, and *celebrity* target groups were considered independently for both the frequency-of-comparison and direction-of-comparison measures.

**Body image concerns.** Two subscales of the Eating Disorder Inventory (EDI; Garner, Olmstead, & Polivy, 1983) were used to assess individuals’ concerns with body weight and shape: the Body Dissatisfaction subscale (BD) and the Drive for Thinness subscale (DFT). Using a 6-point response scale (1 = *never*, 6 = *always*), participants rated the extent to which nine statements related to body dissatisfaction (e.g., “I think my stomach is too big”) and seven statements related to drive for thinness (e.g., “I am terrified of gaining weight”) described them. Internal consistency reliability in the present study was high for both the Body Dissatisfaction (Cronbach’s  $\alpha = .90$ ) and Drive for Thinness (Cronbach’s  $\alpha = .91$ ) subscales.

## Procedure

This study was approved by the authors’ university ethics committee. Participants were recruited via an online psychology participant pool. Only female students with a Facebook account were eligible to sign up for this study, which was described as an online study examining the use of social networking websites. When participants signed up for the study, they were sent an email with a link to the online survey that included the aforementioned measures as well as six filler questionnaires related to the self that were not part of the current investigation. Participants were also asked if they had a Facebook account (all participants indicated that they did have a Facebook account), and were asked to report their age, ethnicity, and height and weight (used to calculate BMI). Participants completed the online questionnaires in their natural environment (e.g., at home or the library). Participants were debriefed in person and given introductory psychology course credit for their participation.

## Data Analysis

Before conducting any analyses, missing data points were replaced by series means for the body dissatisfaction and drive for thinness measures (no participant missed more than two questions on each measure). Descriptive statistics were then calculated for the two Facebook usage questions before they were combined to form a single item. We next examined the correlations between Facebook usage and body image concerns (body dissatisfaction and drive for thinness) to test the hypothesis that greater Facebook usage would be associated with higher body image concerns, and conducted a mediation analysis using the bootstrapping procedure described by Preacher and Hayes (2008) to test whether the relationship between Facebook usage and body dissatisfaction and/or drive for thinness was accounted for by Facebook appearance comparisons. This bootstrapping procedure generates confidence intervals for the indirect effect of the predictor variable on the criterion variable through the mediating variable by repeatedly sampling from the data set (in this case, 5000 bootstrap resamples) to create an approximation of the sampling distribution of the indirect effect. Note that a significant direct relationship between the predictor variable on the criterion variable is not necessary for mediation (Hayes, 2009).

We next conducted repeated measures analyses of variance (ANOVAs) to test whether the frequency and direction of appearance comparisons varied by target group (*family members*, *close friends*, *distant peers*, *celebrities*). For each target group, correlations were also calculated between appearance comparison frequency/direction and both Facebook usage and body image concerns (body dissatisfaction and drive for thinness). Finally, if the frequency/direction of appearance comparisons to any target group was significantly correlated with both Facebook usage and either of the two measures of body image concerns, mediation analyses were conducted to test whether the relationship between Facebook usage and body image concerns was mediated by the frequency/direction of appearance comparisons to that specific target group on Facebook. If appearance comparison frequency/direction to more than one target group was correlated with both Facebook usage and either of the two measures of body image concerns, multiple mediation analysis was also conducted in order to compare the strength of the indirect effects.

## Results

### Preliminary Analyses

The pattern of results did not vary for participants with reported Caucasian or Asian ethnicity. Therefore, all analysis was conducted on the group as a whole. Participants’ modal frequency of checking Facebook on a typical day was “every few hours” ( $M = 3.50$ ,  $SD = 1.08$ ) and the modal amount of time spent on Facebook on a typical day was “2 hours” ( $M = 4.40$ ,  $SD = 1.47$ ). As predicted, there was a significant positive correlation between the combined Facebook usage measure and body dissatisfaction,  $r = .14$ ,  $p = .03$ , and between the combined Facebook usage measure and drive for thinness,  $r = .17$ ,  $p = .01$ .

### Mediation through General Facebook Comparisons

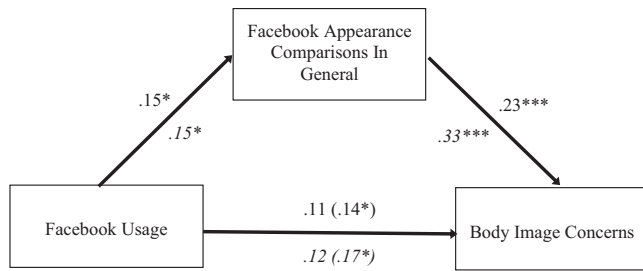
Both Facebook usage and the two body image concerns measures (body dissatisfaction and drive for thinness) were significantly and positively correlated with Facebook appearance comparisons in general (see Table 1). Mediation analysis showed that Facebook appearance comparisons in general mediated the relationship between Facebook usage and body image concerns

**Table 1**

Correlations between Facebook usage, body image concerns, appearance comparisons, and the frequencies and directions of appearance comparisons to specific target groups.

	Facebook appearance comparisons in general	Frequency of comparison				Direction of comparison			
		Family	Close friends	Distant peers	Celebrities	Family	Close friends	Distant peers	Celebrities
Facebook usage	.15*	-.01	.14*	.19**	.11	-.05	-.06	-.22**	-.17*
Body dissatisfaction	.25**	.16*	.30**	.31**	.23**	-.47**	-.53**	-.59**	-.49**
Drive for thinness	.35**	.31**	.46**	.43**	.32**	-.30**	-.37**	-.44**	-.34*

\*  $p < .05$ .  
\*\*  $p < .01$ .



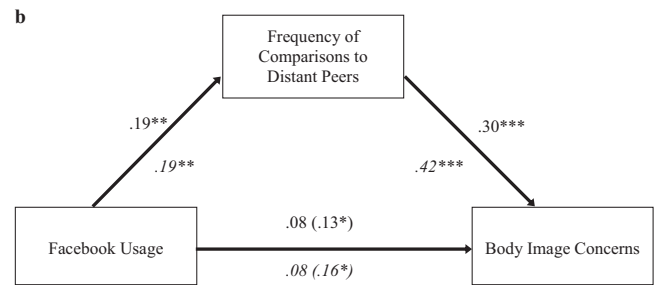
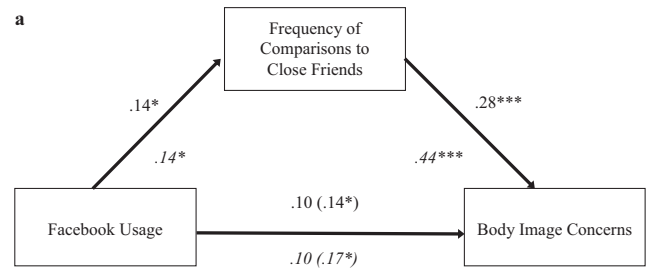
**Fig. 1.** Mediation model for Facebook appearance comparison tendency in general. All numbers represent standardized beta weights. Numbers in parentheses represent the direct, unmediated effects. Numbers above the arrows represent the coefficients for body dissatisfaction, and numbers below the arrows (in italics) represent the coefficients for drive for thinness. \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

(see Fig. 1), as the 95% confidence interval (CI) did not include zero (body dissatisfaction:  $B = 0.38$ ,  $SE = 0.20$ , 95% CI = 0.11, 0.85; drive for thinness:  $B = 0.50$ ,  $SE = 0.24$ , 95% CI = 0.15, 1.00).

**Mediation through Facebook Comparisons to Specific Target Groups**

As seen in Table 2, participants reported comparing their appearance most often to their distant peers on Facebook, just as frequently to close friends and celebrities, and significantly less frequently to female family members. Furthermore, participants rated their body most negatively when comparing to female celebrities, followed by close friends and distant peers (which did not differ from one another), and least negatively when comparing to female family members. Because the direction-of-comparison item required participants to rate their bodies as either better or worse than each target group (i.e., there was no midpoint or “same” option) any mean above 3.5 represented downward comparisons and any mean below 3.5 represented upward comparisons. In all cases, except for comparisons to family members, participants on average rated their bodies as worse than the target group (i.e., made upward comparisons).

**Comparison frequencies.** As seen in Table 1, the frequencies of comparisons to close friends and distant peers were correlated with both Facebook usage and the two body image concerns measures. Therefore, the frequencies of comparisons to these target groups were tested as potential mediators. Mediation analysis revealed that the frequency of comparisons to close friends (body dissatisfaction:  $B = 0.44$ ,  $SE = 0.23$ , 95% CI = 0.10, 0.98; drive for thinness:  $B = 0.63$ ,  $SE = 0.31$ , 95% CI = 0.08, 1.29) mediated the relationship between Facebook usage and body image concerns (see Fig. 2a). In addition, the frequency of comparisons to distant peers (body dissatisfaction:  $B = 0.64$ ,  $SE = 0.26$ , 95% CI = 0.22, 1.28; drive for thinness:  $B = 0.82$ ,  $SE = 0.30$ , 95% CI = 0.29, 1.49) also mediated the relationship between Facebook usage and body image concerns (see Fig. 2b). Multiple mediation analysis revealed that there was no difference in the strength of the indirect effect for close



**Fig. 2.** Mediation models for the frequency of appearance comparisons to (a) close friends and (b) distant peers on Facebook. All numbers represent standardized beta weights. Numbers in parentheses represent the direct, unmediated effects. Numbers above the arrows represent the coefficients for body dissatisfaction, and numbers below the arrows (in italics) represent the coefficients for drive for thinness. \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

friends or distant peers (body dissatisfaction:  $B = -0.14$ ,  $SE = 0.35$ , 95% CI =  $-0.93$ , 0.51; drive for thinness:  $B = 0.12$ ,  $SE = 0.32$ , 95% CI =  $-0.45$ , 0.90).

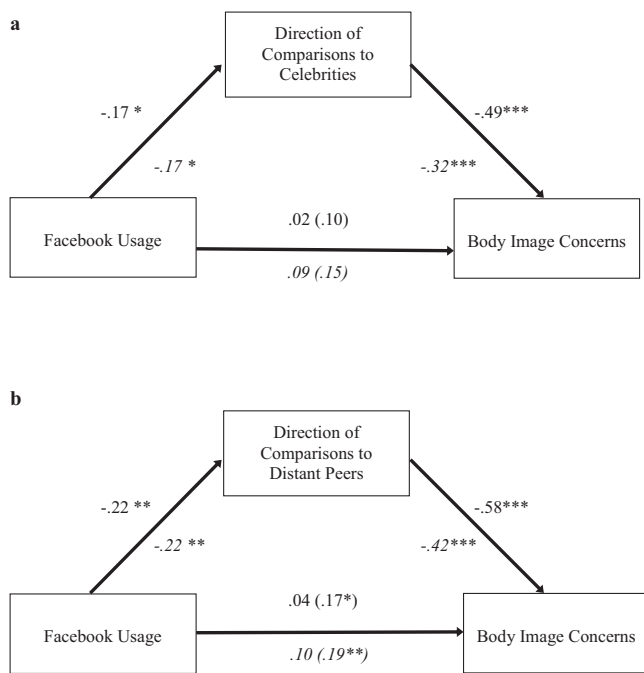
**Comparison directions.** As seen in Table 1, the directions of comparisons to distant peers and celebrities were significantly correlated with both Facebook usage and the two body image concerns measures, and therefore these target groups were tested as potential mediators. Mediation analysis revealed that the direction of comparisons to celebrities (body dissatisfaction:  $B = 0.93$ ,  $SE = 0.43$ , 95% CI = 0.17, 1.80; drive for thinness:  $B = 0.58$ ,  $SE = 0.29$ , 95% CI = 0.13, 1.21) mediated the relationship between Facebook usage and body image concerns (see Fig. 3a). In addition, the direction of comparisons to distant peers (body dissatisfaction:  $B = 1.40$ ,  $SE = 0.49$ , 95% CI = 0.55, 2.49; drive for thinness:  $B = 0.90$ ,  $SE = 0.34$ , 95% CI = 0.32, 1.70) also mediated the relationship between Facebook usage and body image concerns (see Fig. 3b). Multiple mediation analysis indicated that the indirect effect of distant peers was stronger than the indirect effect of celebrities for both measures of body image concerns (body dissatisfaction:  $B = 1.00$ ,  $SE = 0.49$ , 95% CI = 0.22, 2.24; drive for thinness:  $B = 0.72$ ,  $SE = 0.44$ , 95% CI = 0.05, 1.77). Furthermore, the indirect effect of Facebook



**Table 2**  
Mean (SD) ratings of the frequencies and directions of appearance comparisons to specific target groups on Facebook.

	Family	Close friends	Distant peers	Celebrities
Comparison frequencies	2.11 (1.09) <sup>a</sup>	2.88 (1.16) <sup>b</sup>	2.99 (1.13) <sup>c</sup>	2.85 (1.35) <sup>b</sup>
Comparison directions	3.52 (1.00) <sup>a</sup>	3.16 (1.01) <sup>b</sup>	3.01 (0.97) <sup>b</sup>	2.12 (1.06) <sup>c</sup>

Note: Comparison frequency ratings ranged from 1 = *never* to 5 = *very often*, and comparison direction ratings ranged from 1 = *much worse* to 6 = *much better*. Means within a row with different superscripts are significantly different at  $p < .05$ .



**Fig. 3.** Mediation models for the direction of appearance comparisons to (a) celebrities and (b) distant peers on Facebook. All numbers represent standardized beta weights. Numbers in parentheses represent the direct, unmediated effects. Numbers above the arrows represent the coefficients for body dissatisfaction, and numbers below the arrows (in italics) represent the coefficients for drive for thinness.  $^*p < .05$ .  $^{**}p < .01$ .  $^{***}p < .001$ .

usage on drive for thinness through comparisons to celebrities was no longer significant ( $B = 0.24$ ,  $SE = 0.20$ , 95% CI =  $-0.02, 0.70$ ).

## Discussion

Consistent with previous research on female high school students (Tiggemann & Miller, 2010; Tiggemann & Slater, 2013), frequency of Facebook usage showed a small-to-moderate positive association with body image concerns (in terms of both body dissatisfaction and drive for thinness) in female university students. Therefore, the present study extends previous literature by showing that the association between the frequency of Facebook usage and female body image concerns is evident in both adolescence and early adulthood. Importantly, the present study further showed that the relationship between Facebook usage and body image concerns was mediated by appearance comparisons in general. These findings are consistent with sociocultural models of eating disorders (Keery et al., 2004; van den Berg et al., 2002), and several previous studies on more traditional forms of media (Tiggemann & McGill, 2004; Tiggemann & Slater, 2004), and suggest that women who spend more time on Facebook may feel more concerned about their body because they compare their appearance to others more often on Facebook.

Given that Facebook users are presented with a wide range of potential comparison targets, we also examined whether comparison frequency and direction varied by target groups, and

whether comparisons to these specific target groups mediated the relationship between Facebook usage and body image concerns. Participants reported comparing their appearance on Facebook most frequently to distant peers, just as frequently to close friends and celebrities, but compared their appearance less frequently to family members. This finding is consistent with previous research examining appearance comparisons to peers, celebrities, and family members (Schutz et al., 2002), and could be due to the fact that the family member target group consists of young women (such as sisters and cousins) but also older women (such as mothers and aunts), who might not be perceived to be relevant comparison targets. In addition, participants may have reported comparing their appearance most often to distant peers on Facebook because women are likely to have access to a higher percentage of images of their distant peers on Facebook than the other target groups. In regard to the direction of comparisons, participants rated their bodies to be worse than celebrities, slightly worse than their peers (close friends and distant peers), and the same as family members. Thus, close friends, distant peers, and celebrities, but not family members, appear to be a source of upward appearance comparisons for female Facebook users.

When examining comparisons to specific target groups, it was the frequency of comparisons to peers (both close friends and distant peers) that mediated the association between Facebook usage and body image concerns. One possible reason for this finding is that peers may be seen as more relevant comparison targets than family members or celebrities. Family members may not be seen as relevant comparison targets because this target group consists of both older and younger women, and celebrities may be seen as less relevant comparison targets because of the resources that celebrities have to improve their appearance. Peers may be seen as having similar resources and lifestyles to participants and therefore the appearance of peers may be seen as more personally attainable than the appearance of celebrities. With respect to the directions of appearance comparisons, it was comparisons to distant peers and (to a lesser extent) celebrities that accounted for the relationship between Facebook usage and body image concerns. This finding may be because the lack of personal contact with distant peers and celebrities (relative to close friends and family members) makes it difficult for people to accurately gauge how realistic (or idealized) the appearance of distant peers and celebrities are on Facebook. Consequently, when viewing images of distant peers and celebrities on Facebook, women may judge their own appearance to be less attractive, which in turn could lead to greater body image concerns. We also found that the direction of comparisons to distant peers had a stronger indirect effect on body image concerns than the direction of comparisons to celebrities and models. Again, this difference may be due to the appearance of distant peers being seen as more attainable than the appearance of celebrities and therefore having a greater impact on women's body image concerns.

Limitations to the present study should be noted. First, because the study was correlational we are unable to infer causation. It may be that women who spend more time on Facebook are more concerned about their appearance, or it may be that women who are more concerned with their appearance spend more time on Facebook. Given that one experimental study found no difference in women's weight and shape preoccupation after spending

time browsing Facebook or an appearance-neutral control website (Mabe, Forney, & Keel, 2014), it may be that Facebook attracts users who are already highly concerned about their body. However, further experimental research measuring women's pre-existing trait body image concerns or appearance comparison tendencies is needed to examine whether any of these pre-existing traits moderate the effect of Facebook usage on women's state body image concerns.

Second, in the present study participants were required to rate their body as either better or worse than specific comparison targets on Facebook, but it is possible that participants believe that their bodies are no better or worse (i.e., made lateral comparisons) compared to these target groups. Therefore, future research should consider adding a midpoint or "same" option when measuring the direction of appearance comparisons. Third, although participants also completed a range of filler measures in the present study, it is possible that some participants could have guessed the purpose of the study and that their responses were therefore influenced by demand characteristics. Therefore, future research on Facebook usage should take care to further disguise the true nature of study. Finally, the present study focused on the usage of Facebook because it is currently the most popular social media platform in the world, with over 1.3 billion active monthly users (Facebook, 2014), and is regularly used by young women (Tiggemann & Slater, 2013, 2014). However, the usage of other popular social media platforms (such as Instagram, Twitter, or Pinterest) may also be associated with women's body image concerns. In fact, other social media platforms (such as Instagram), which mainly contain images, may have a stronger association with women's body image concerns than Facebook, which contains both images and large amounts of text. This suggestion would be consistent with the findings of previous research (Meier & Gray, 2014) indicating that photo-based activity on Facebook could be driving any effect of Facebook usage on women's body image concerns. Future research could examine the association between other social media platforms and appearance concerns among young women.

Overall, the present study found that spending more time on Facebook was associated with greater body image concerns in female university students and that appearance comparisons in general, frequency of comparisons to peers (close friends and distant peers), and direction of comparisons to distant peers and celebrities accounted for this relationship. Given the popularity of Facebook, young women are provided with ample opportunity to engage in appearance comparisons. Future research should identify ways to minimize any possible negative consequences of Facebook usage for young women's body image concerns, for example, by focusing women's attention away from any appearance-focused material on Facebook or by educating women on the idealized nature of people's Facebook profiles.

#### Author disclosure statement

No competing financial interests exist.

#### Acknowledgements

We would like to thank Dr. Rebecca Pinkus for her advice on this research.

#### References

Australian Bureau of Statistics. (2013). *Census at school Australia*. Retrieved from <http://www.abs.gov.au/websitedbs/CaSHome.nsf/Home/2013+CensusAtSchool+Summary+Data>

- Bair, C. E., Kelly, N. R., Serdar, K. L., & Mazzeo, S. E. (2012). Does the Internet function like magazines? An exploration of image-focused media, eating pathology, and body dissatisfaction. *Eating Behaviors*, *13*, 398–401. <http://dx.doi.org/10.1016/j.eatbeh.2012.06.003>
- Bearman, S. K., Presnell, K., Martinez, E., & Stice, E. (2006). The skinny on body dissatisfaction: A longitudinal study of adolescent girls and boys. *Journal of Youth and Adolescence*, *35*, 229–241. <http://dx.doi.org/10.1007/s10964-005-9010-9>
- Bell, B. T., & Dittmar, H. (2011). Does media type matter? The role of identification in adolescent girls' media consumption and the impact of different thin-ideal media on body image. *Sex Roles*, *65*, 478–490. <http://dx.doi.org/10.1007/s11199-011-9964-x>
- Bell, B. T., Lawton, R., & Dittmar, H. (2007). The impact of thin models in music videos on adolescent girls' body dissatisfaction. *Body Image*, *4*, 137–145. <http://dx.doi.org/10.1016/j.bodyim.2007.02.003>
- Berg, K. C., Frazier, P., & Sherr, L. (2009). Change in eating disorder attitudes and behavior in college women: Prevalence and predictors. *Eating Behaviors*, *10*, 137–142. <http://dx.doi.org/10.1016/j.eatbeh.2009.03.003>
- Carey, R. N., Donaghue, N., & Broderick, P. (2014). Body image concern among Australian adolescent girls: The role of body comparisons with models and peers. *Body Image*, *11*, 81–84. <http://dx.doi.org/10.1016/j.bodyim.2013.09.006>
- Facebook. (2014). *Company information*. Retrieved from <https://newsroom.fb.com/company-info/>
- Fitzsimmons-Craft, E. E., Bardone-Cone, A. M., Bulik, C. M., Wonderlich, S. A., Crosby, R. D., & Engel, S. G. (2014). Examining an elaborated sociocultural model of disordered eating among college women: The roles of social comparison and body surveillance. *Body Image*, *11*, 488–500. <http://dx.doi.org/10.1016/j.bodyim.2014.07.012>
- Garner, D. M., Olmstead, M. P., & Polivy, J. (1983). Development and validation of a multidimensional eating disorder inventory for anorexia nervosa and bulimia. *International Journal of Eating Disorders*, *2*, 15–49. [http://dx.doi.org/10.1002/1098-108x\(198321\)2:2%3C15::aid-eat2260020203%3E3.0.co;2-6](http://dx.doi.org/10.1002/1098-108x(198321)2:2%3C15::aid-eat2260020203%3E3.0.co;2-6)
- Groesz, L., Levine, M., & Murnen, S. (2002). The effect of experimental presentation of thin media images on body satisfaction: A meta-analytic review. *International Journal of Eating Disorders*, *31*, 1–17. <http://dx.doi.org/10.1002/eat.10005>
- Halliwel, E., & Dittmar, H. (2004). Does size matter? The impact of model's body size on women's body-focused anxiety and advertising effectiveness. *Journal of Social and Clinical Psychology*, *123*, 104–122. <http://dx.doi.org/10.1521/jscp.23.1.104.26989>
- Hargreaves, D. A., & Tiggemann, M. (2004). Idealized media images and adolescent body image: "comparing" boys and girls. *Body Image*, *1*, 351–361. <http://dx.doi.org/10.1016/j.bodyim.2004.10.002>
- Hayes, A. F. (2009). Beyond Baron and Kenny: Statistical mediation analysis in the new millennium. *Communication Monographs*, *76*, 408–420. <http://dx.doi.org/10.1080/03637750903310360>
- Hew, K. F. (2011). Students' and teachers' use of Facebook. *Computers in Human Behavior*, *27*, 662–676. <http://dx.doi.org/10.1016/j.chb.2010.11.020>
- Keery, H., van den Berg, P., & Thompson, J. K. (2004). An evaluation of the Tripartite Model of body dissatisfaction and eating disturbance with adolescent girls. *Body Image*, *1*, 237–251. <http://dx.doi.org/10.1016/j.bodyim.2004.03.001>
- Leahey, T., & Crowther, J. (2008). An ecological momentary assessment of comparison target as a moderator of the effects of appearance-focused social comparisons. *Body Image*, *5*, 307–318. <http://dx.doi.org/10.1016/j.bodyim.2008.03.002>
- Mabe, A. G., Forney, K. J., & Keel, P. K. (2014). Do you "like" my photo? Facebook use maintains eating disorder risk. *International Journal of Eating Disorders*, *47*, 516–523. <http://dx.doi.org/10.1002/eat.22254>
- Manago, A. M., Graham, M. B., Greenfield, P. M., & Salimkhan, G. (2008). Self-presentation and gender on MySpace. *Journal of Applied Developmental Psychology*, *29*, 446–458. <http://dx.doi.org/10.1016/j.appdev.2008.07.001>
- Mayer-Schönberger, V., & Cukier, K. (2013). *Big data: A revolution that will transform how we live, work and think*. New York, NY: Houghton Mifflin Harcourt Publishing Company.
- Meier, E. P., & Gray, J. (2014). Facebook photo activity associated with body image disturbance in adolescent girls. *Cyberpsychology, Behavior, and Social Networking*, *4*, 199–206. <http://dx.doi.org/10.1089/cyber.2013.0305>
- Myers, T. A., & Crowther, J. H. (2009). Social comparison as a predictor of body dissatisfaction: A meta-analytic review. *Journal of Abnormal Psychology*, *118*, 683–698. <http://dx.doi.org/10.1037/a0016763>
- Myers, T. A., Ridolfi, D. R., Crowther, J. H., & Ciesla, J. A. (2012). The impact of appearance-focused social comparisons on body image disturbance in the naturalistic environment: The roles of thin-ideal internalization and feminist beliefs. *Body Image*, *9*, 342–351. <http://dx.doi.org/10.1016/j.bodyim.2012.03.005>
- Neighbors, L. A., & Sobal, J. (2007). Prevalence and magnitude of body weight and shape dissatisfaction among university students. *Eating Behaviors*, *8*, 429–439. <http://dx.doi.org/10.1016/j.eatbeh.2007.03.003>
- Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavioral Research Methods*, *40*, 879–891. <http://dx.doi.org/10.3758/brm.40.3.879>
- Ricciardelli, L., & McCabe, M. (2001). Dietary restraint and negative affect as mediators of body dissatisfaction and bulimic behavior in adolescent girls and boys. *Behavior Research and Therapy*, *39*, 1317–1328. [http://dx.doi.org/10.1016/s0005-7967\(00\)00097-8](http://dx.doi.org/10.1016/s0005-7967(00)00097-8)
- Ridolfi, D. R., Myers, T. A., Crowther, J. H., & Ciesla, J. A. (2011). Do appearance focused cognitive distortions moderate the relationship between social comparisons to peers and media images and body image disturbance? *Sex Roles*, *65*, 491–505. <http://dx.doi.org/10.1007/s11199-011-9961-0>

- Schutz, H., Paxton, A. S., & Wertheim, E. H. (2002). Investigation of body comparison among adolescent girls. *Journal of Applied Social Psychology*, 32, 1906–1937. <http://dx.doi.org/10.1111/j.1559-1816.2002.tb00264.x>
- Stice, E. (2002). Risk and maintenance factors for eating pathology: A meta-analytic review. *Psychological Bulletin*, 128, 825–848. <http://dx.doi.org/10.1037/0033-2909.128.5.825>
- Thompson, J. K., Heinberg, L., & Tantleff, S. (1991). The Physical Appearance Comparison Scale (PACS). *The Behavior Therapist*, 14, 174.
- Tiggemann, M., & McGill, B. (2004). The role of social comparison in the effect of magazine advertisements on women's mood and body dissatisfaction. *Journal of Social and Clinical Psychology*, 23, 23–44. <http://dx.doi.org/10.1521/jscp.23.1.23.26991>
- Tiggemann, M., & Miller, J. (2010). The Internet and adolescent girls' weight satisfaction and drive for thinness. *Sex Roles*, 63, 79–90. <http://dx.doi.org/10.1007/s11199-010-9789-z>
- Tiggemann, M., & Slater, A. (2004). Thin ideals in music television: A source of social comparison and body dissatisfaction. *International Journal of Eating Disorders*, 35, 48–58. <http://dx.doi.org/10.1002/eat.10214>
- Tiggemann, M., & Slater, A. (2013). NetGirls: The Internet, Facebook, and body image concern in adolescent girls. *International Journal of Eating Disorders*, 46, 630–634. <http://dx.doi.org/10.1002/eat.22141>
- Tiggemann, M., & Slater, A. (2014). NetTweens: The Internet and body image concerns in preteenage girls. *Journal of Early Adolescence*, 34, 606–620. <http://dx.doi.org/10.1177/0272431613501083>
- van den Berg, P., Thompson, J. K., Obremski-Brandon, K., & Covert, M. (2002). The Tripartite Influence model of body image and eating disturbance: A covariance structure modeling investigation testing the mediational role of appearance comparison. *Journal of Psychosomatic Research*, 53, 1007–1020. [http://dx.doi.org/10.1016/s0022-3999\(02\)00499-3](http://dx.doi.org/10.1016/s0022-3999(02)00499-3)
- Vartanian, L. R., & Dey, S. (2013). Self-concept clarity, thin-ideal internalization, and appearance-related social comparison as predictors of body dissatisfaction. *Body Image*, 10, 495–500. <http://dx.doi.org/10.1016/j.bodyim.2013.05.004>
- Zhao, S., Grasmuck, S., & Martin, J. (2008). Identity construction on Facebook: Digital empowerment in anchored relationships. *Computers in Human Behavior*, 24, 1816–1836. <http://dx.doi.org/10.1016/j.chb.2008.02.012>