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Social Comparisons on Social Media: The Impact of Facebook on Young Women's  
Body Image Concerns and Mood

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### Abstract

The present study experimentally investigated the effect of Facebook usage on women's mood and body image, whether these effects differ from an online fashion magazine, and whether appearance comparison tendency moderates any of these effects. Female participants ( $n = 112$ ) were randomly assigned to spend 10 minutes browsing their Facebook account, a magazine website, or an appearance-neutral control website before completing state measures of mood, body dissatisfaction, and appearance discrepancies (weight-related, and face, hair, and skin-related). Participants also completed a trait measure of appearance comparison tendency. Participants who spent time on Facebook reported being in a more negative mood than those who spent time on the control website. Furthermore, women high in appearance comparison tendency reported more facial, hair, and skin-related discrepancies after Facebook exposure than exposure to the control website. Given its popularity, more research is needed to better understand the impact that Facebook has on appearance concerns.

*Keywords:* Facebook, social media, magazine, appearance-related social comparison, body image concerns, mood

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The use of social media is pervasive and growing rapidly worldwide. Facebook is the most popular social media platform, currently with over 1.3 billion regular users (Facebook, 2014). Social media use is particularly popular among young women (Kimbrough, Guadagno, Muscanell, & Dill, 2013; Muscanell & Guadagno, 2012), a demographic for which body dissatisfaction (i.e., dissatisfaction with one's current physical self) is also particularly problematic (Bearman, Martinez, Stice, & Presnell, 2006; Ricciardelli & McCabe, 2001). Existing research has demonstrated a positive correlation between Facebook usage and body dissatisfaction (Fardouly & Vartanian, 2015; Tiggemann & Miller, 2010; Tiggemann & Slater, 2013, 2014), but there is currently no theoretically-driven experimental research examining Facebook's impact on young women's body image concerns.

Social comparison theory proposes that people have a drive to evaluate their progress and standing on various aspects of their lives and, in the absence of objective standards, people compare themselves to others to know where they stand (Festinger, 1954). According to sociocultural models of body image and disordered eating, body dissatisfaction can develop when women repeatedly compare their own appearance to the appearance of others (Keery, van den Berg, & Thompson, 2004; van den Berg, Thompson, Obremski-Brandon, & Covert, 2002; Vartanian & Dey, 2013). Indeed, research shows that women regularly evaluate their appearance by comparing themselves to others (Leahey, Crowther, & Mickelson, 2007), and that a greater tendency to engage in appearance comparisons is associated with a high level of body dissatisfaction (Keery et al., 2004; Myers & Crowther, 2009; van den Berg et al., 2002; Vartanian & Dey, 2013).

Given that 10 million new photographs are uploaded to Facebook every hour (Mayer-Schönberger & Cukier, 2013), Facebook provides women with a medium for frequently engaging in appearance-related social comparisons, and can therefore potentially contribute to body image concerns among young women. Thus, the present study experimentally investigated the impact of exposure to Facebook on young adult women's body image and mood. We also tested whether women's tendency to make appearance-related social comparisons moderates any effects of exposure.

### **Facebook Usage**

The majority of experimental research in the body image and appearance-related social comparison literature has investigated the influence of exposure to idealized bodies in traditional forms of media, such as magazines, television, and music videos on young women's body dissatisfaction (Myers & Crowther, 2009). This research has found that exposure to the thin ideal is associated with more negative body image among girls and women (Grabe, Ward, & Hyde, 2008; Groesz, Levine, & Murnen, 2002). However, more recent research suggests that the popularity of these media types is being overtaken by the popularity and availability of more interactive media such as the Internet, particularly among adolescents (Bell & Dittmar, 2011; Tiggemann & Miller, 2010). In the Australian 2013 student census, social networking sites, such as Facebook, were the most common use of the Internet for female high school students (Australian Bureau of Statistics, 2013). In Australia, 87% of Internet users in the 15-24 years age group report engaging in social networking (Australian Bureau of Statistics, 2011). Similarly, 90% of 16-24 year olds in the United Kingdom (Office for National Statistics, 2013), and 90% of 18-29 year olds in the United States (Pew Research, 2013a), use social networking websites. Although

there has been some suggestion that Facebook usage is declining among young people, there is no publically available data to support these assertions. Facebook continues to be the most popular social media platform with a growing membership (Pew Research, 2013b), and young women report spending around two hours per day on Facebook (Fardouly & Vartanian, 2015; Tiggemann & Slater, 2013).

Facebook allows users to create public or semi-public personal profiles, and to customize their pages with photos and information about themselves. Like magazine images which are edited and often “enhanced” before publication, Facebook users are also able to edit images before uploading them to Facebook and are able to closely monitor their self-presentation in order to present an idealized or “hoped for possible” version of the self (Manago, Graham, Greenfield, & Salimkhan, 2008; Zhao, Grasmuck, & Martin, 2008). Importantly, just as with exposure to idealized images in the media, viewing one’s own or other people’s idealized images and profiles on Facebook could have a negative impact on women’s self-evaluations and overall well-being. Further contributing to this concern is the fact that women have reported viewing other people’s Facebook profiles in order to make comparisons to those individuals (Haferkamp, Eimler, Papadakis, & Kruck, 2012). Indeed, one study found that participants who spend more time on Facebook believe that others are happier and have better lives than themselves, especially when the participants had a greater number of Facebook “friends” that they do not know personally (Chou & Edge, 2012). Finally, Facebook contains additional elements that could impact people’s body image concerns, such as comments posted by other people.

### **Impact of Media Exposure**

Several correlational studies have investigated the association between Facebook usage and young women’s body image concerns. Pre-teenage girls

(Tiggemann & Slater, 2014) and female high school students (Meier & Gray, 2014; Tiggemann & Slater, 2013) who were Facebook users reported more body image concerns than did non-users. In addition, more time spent on Facebook was associated with greater body image concerns among pre-teenage girls (Tiggemann & Slater, 2014), female high school students (Tiggemann & Miller, 2010; Tiggemann & Slater, 2013), and female university students (Fardouly & Vartanian, 2015). Furthermore, in a longitudinal study of female university students, maladaptive Facebook usage (which included seeking negative social evaluations and making general social comparisons) was associated with increased body dissatisfaction four weeks later, and body dissatisfaction was found to mediate the relationship between maladaptive Facebook usage and increases in overeating (Smith, Hames, & Joiner, 2013). These studies provide some initial evidence linking Facebook usage with body dissatisfaction in young women. However, because these studies are all correlational, the causal association between Facebook and body dissatisfaction is still unknown. Experimental research is therefore needed to determine the direction of the relationship between Facebook usage and body image concerns.

Only one previous study has experimentally investigated the impact of Facebook on one aspect of women's body image (Mabe, Forney, & Keel, 2014). This study found that weight and shape preoccupation decreased among women who were exposed to Facebook; however, they also found this effect among those who were exposed to a neutral website. Because the decrease in weight and shape preoccupation was greater for participants exposed to a control website than for participants exposed to Facebook, the authors concluded that Facebook usage maintains women's preoccupation with their weight and shape compared to other internet activity (Mabe et al., 2014). Further theoretically-driven experimental research is still needed to

establish the causal impact of exposure to Facebook on evaluative aspects of body image, including body dissatisfaction and dissatisfaction with particular aspects of appearance.

Previous experimental research has found that exposure to more traditional types of media, such as magazines, can increase body image concerns in young women (Groesz et al., 2002; Halliwell, Malson, & Tischner, 2011; Knobloch-Westerwick & Crane, 2012; Tiggemann & McGill, 2004; Tiggemann & Polivy, 2010). Most previous research on magazine exposure has presented participants with a static image or advertisement of a thin-ideal model or celebrity before asking them to rate their state body dissatisfaction (Myers & Crowther, 2009). Given that young women are now turning to Internet sources rather than print media (Bell & Dittmar, 2011; Tiggemann & Miller, 2010), and given that people are able to be more selective with the content viewed online, it is also important to examine the effect that this medium is having on women's body image.

In addition to its impact on body dissatisfaction, exposure to thin-ideal media (e.g., magazines) also leads to more negative mood (Harper & Tiggemann, 2008; Tiggemann & McGill, 2004). Similarly, one study found that spending 20 minutes on Facebook lead to more negative mood than did browsing the Internet in general (not including social networking sites) or spending no time online (Sagioglou & Greitemeyer, 2014). Facebook itself, quite controversially, manipulated users' newsfeeds and found that reducing the percentage of positive content posted by others resulted in users themselves posting less positive content (Kramer, Guillory, & Hancock, 2014), perhaps because they were also in a more negative mood. Taken together, these studies suggest that exposure to Facebook can potentially influence people's mood as well as their body image concerns.

### **Comparison Targets**

One difference between images on Facebook and images in magazines is the type of comparison targets they contain. Magazines generally feature images of models and celebrities whereas Facebook mainly features images of one's peers (Hew, 2011). Similar to the effect of exposure to images of thin-ideal models and celebrities (Halliwell & Dittmar, 2004; Halliwell et al., 2011; Hargreaves & Tiggemann, 2004), exposure to peers who closely match the thin ideal has been found to increase women's body dissatisfaction (Krones, Stice, Batres, & Orjada, 2005). Some research examining the impact of appearance comparisons to these different target groups has shown that comparisons to peers and models can lead to different outcomes in regard to women's body image concerns, perhaps because the appearance of peers is seen to be more personally attainable than the appearance of models or celebrities due to the similar resources and lifestyle that peers often have to oneself. However, the findings in the area are mixed (Carey, Donaghue, & Broderick, 2013; Leahey & Crowther, 2008; Ridolfi, Myers, Crowther, & Ciesla, 2011; Schutz, Paxton, & Wertheim, 2002), and a meta-analysis of research on appearance comparisons and body dissatisfaction found no significant difference between the effects of comparisons to peers or thin-ideal media images on women's body dissatisfaction (Myers & Crowther, 2009).

### **Face, Hair, and Skin Comparisons**

The increasing use of social networking sites may also be changing what components of appearance are salient during the appearance comparison process. Whereas traditional media forms have focused primarily on the body, women have been found to upload more portrait pictures than full-bodied pictures to their Facebook profiles (Haferkamp et al., 2012), which would in turn provide women with more opportunities to make face, skin, and hair-related comparisons than body

comparisons. Because more frequent facial comparisons may lead to more dissatisfaction with one's facial features, it is important to consider the potential impact of Facebook on broader appearance constructs beyond just weight-related body dissatisfaction. Indeed, research suggests that facial features, skin, and hair are also important aspects of attractiveness for women (Adams, 1977; Confer, Perilloux, & Buss, 2010; Hassebrauck, 1998; Jones, 2001; Tucker, 1985) and can be a basis for social comparison (Jones, 2001; Newton & Minhas, 2005; Richins, 1991).

### **Moderation by Appearance Comparison Tendency**

Another important consideration from previous research is that exposure effects of traditional media on women's body image seem to be influenced by certain individual difference factors; that is, not everyone is equally affected by exposure to media images. The tendency to engage in appearance-related social comparisons has been found to influence the relationship between exposure to traditional media and women's body dissatisfaction (Keery et al., 2004; van den Berg et al., 2002; Vartanian & Dey, 2013). Specifically, women who more frequently compare their appearance to others are also more negatively affected by exposure to the media, relative to women who do not make as many appearance comparisons (Dittmar & Howard, 2004). Therefore, it is important to also consider how women's appearance comparison tendency moderates their reactions to Facebook.

### **The Present Study**

The overall aims of the present study are to: (a) investigate the immediate effect of Facebook usage on women's state mood, body dissatisfaction, weight and shape discrepancy (i.e., the extent to which participants want to change specific aspects of their weight and shape), and face, hair, and skin-related discrepancy (i.e., the extent to which participants want to change specific aspects of their facial features,

hair, or skin); (b) investigate whether this effect differs from the use of an online fashion magazine or an appearance-neutral website; and (c) investigate whether trait appearance comparison tendency moderates these effects. We hypothesized that brief exposure to Facebook would lead to more negative mood, body dissatisfaction, weight and shape discrepancy, and face, hair, and skin-related discrepancy than would exposure to an appearance-neutral control website. Similarly, we hypothesized that exposure to an online fashion magazine would lead to more negative mood, body dissatisfaction, weight and shape discrepancy, and face, hair, and skin-related discrepancy than would exposure to an appearance-neutral control website. Given that no previous research has examined the difference between exposure to Facebook vs. a magazine (online or in print), and given that previous research on comparisons to peers and models is mixed (Carey et al., 2013; Leahey & Crowther, 2008; Ridolfi et al., 2011; Schutz et al., 2002), no specific hypotheses were made regarding Facebook vs. the online fashion magazine. Finally, appearance comparison tendency was predicted to moderate the relationship between exposure to an assigned website (Facebook, online fashion magazine, control) and state negative mood, body dissatisfaction, and appearance discrepancies.

## **Method**

### **Design**

This was a two-part study with a between-participants experimental design. At Time 1, participants were randomly assigned to one of three conditions in which they were asked to browse one of the following websites for 10 minutes: their own Facebook account ( $n = 38$ ; all participants had their own Facebook account), a fashion magazine website ( $n = 36$ ), or an appearance-neutral control website ( $n = 38$ ). Participants completed pre- and post-exposure state measures of negative mood and

body dissatisfaction and a post-exposure state measure of appearance-discrepancy. One week later (Time 2), participants completed an online survey containing a trait measure of appearance comparison tendency.

### **Participants**

Participants ( $N = 112$ ) were female students and staff members aged between 17-25 years ( $M = 20.46$ ,  $SD = 1.71$ ) from a university in the United Kingdom. Participants' mean body mass index (BMI:  $\text{kg}/\text{m}^2$ ) was 23.40 ( $SD = 4.18$ ). The majority of the participants identified as White ( $n = 84$ ; 75%), 11 as Asian (9.8%), eight as Black (7.1%), four as mixed race (3.6%), and four as "other" (3.6%); ethnicity information was missing for two women. Participants were recruited for a study on "Media Use and Memory." They were recruited through the university psychology student participant pool and given course credit for their participation ( $n = 45$ ), or were recruited through flyers posted around the university and paid 10 GBP for their participation ( $n = 67$ ). There was no difference in age ( $p = .461$ ) or BMI ( $p = .753$ ) for participants assigned to each condition.

### **Materials**

**Pilot study.** A pilot study was conducted to ensure that the websites used in each condition were equally engaging and to ensure that there were the same opportunities to make appearance comparisons on the magazine website as on Facebook. Eleven female volunteers made ratings of their Facebook accounts (in general, not just their own profile page) and four popular websites (candidate websites to be used in the magazine and control conditions) on measures of website engagement (including ratings of website interest and enjoyment) and image percentage (e.g., percentage of images on each website as opposed to text). (Although demographic details were not collected from the volunteers, they were drawn from the

same population as the sample for the main study, and would therefore be similar in age and ethnicity.) Of the piloted websites, the UK Cosmopolitan magazine website ([www.cosmopolitan.co.uk](http://www.cosmopolitan.co.uk)) was chosen for the fashion magazine condition, and a home craft website ([www.hearthandmade.co.uk](http://www.hearthandmade.co.uk)) was chosen for the appearance-neutral control condition.

There were no pairwise comparison differences between Facebook ( $M = 3.42$ ,  $SD = 0.52$ ), the Cosmopolitan website ( $M = 2.97$ ,  $SD = 0.66$ ), or the home craft website ( $M = 2.52$ ,  $SD = 1.04$ ), on a combined rating of engagement, interest, and enjoyment (1 = *not at all*, 4 = *very much*;  $ps > .05$ ). Similarly, there were no pairwise comparison differences between Facebook ( $M = 67.27$ ,  $SD = 11.91$ ), the Cosmopolitan website ( $M = 60.00$ ,  $SD = 17.32$ ), or the home craft website ( $M = 75.45$ ,  $SD = 11.28$ ), on a rating of website image percentage (as opposed to text;  $ps > .05$ ). Furthermore, Facebook (83%) and the Cosmopolitan website (84%) did not differ in the percentage of images containing people ( $p = .858$ ), but both had significantly more images containing people than did the control website (7%,  $ps < .001$ ). Therefore, both Facebook and the fashion magazine website provided equal opportunities to make appearance comparisons, whereas participants in the control condition had little opportunity to make appearance comparisons. Participants were also asked “What sort of women do you think featured in the images on the website?” For the magazine website, all of the pilot participants (100%) indicated that it featured images of models or celebrities; for Facebook, all of the pilot participants (100%) indicated that it featured images of their peers. (Note that, although participants reported that Facebook mainly featured images of their peers, Facebook can also contain images of other potential targets of appearance-based comparisons, such as celebrities or family members; Fardouly & Vartanian, 2015.)

Finally, participants were asked “How long do you think you could spend on the website whilst staying entertained?” for which participants were provided with an open-ended response. On average, participants reported that they could spend around 30 minutes on Facebook ( $M = 30.45$ ,  $SD = 14.74$ ), around 30 minutes on the magazine website ( $M = 30.91$ ,  $SD = 21.42$ ), and around 15 minutes on the control website ( $M = 15.00$ ,  $SD = 13.37$ ). In order to maintain consistency across conditions and to minimize the likelihood that participants would lose interest in the task, we selected 10 minutes as the amount of time that participants would spend browsing their assigned website.

**State mood and body dissatisfaction.** Following previous media exposure studies (Heinberg & Thompson, 1995; Prichard & Tiggemann, 2012; Tiggemann & Slater, 2003), computer based visual analog scales (VAS) were used to measure state negative mood and body dissatisfaction both before and immediately after browsing the assigned website. Participants were asked to rate how they feel “right now” by moving a vertical marker to the appropriate place on a horizontal line with endpoints labeled “not at all” (0) and “very much” (100). Participants rated the items *depressed*, *anxious*, *angry*, *confident* (reverse coded), and *happy* (reverse coded), which were combined to form an overall measure of negative mood (Cronbach’s  $\alpha = .71$ ), and the items *physically attractive* (reverse coded), *fat*, and *satisfied with your body size and shape* (reverse coded), which were combined to form a measure of state body dissatisfaction (Cronbach’s  $\alpha = .74$ ). Previous research has shown VAS to be a reliable measure of changes in mood and body dissatisfaction among college women (Heinberg & Thompson, 1995). To further disguise the purpose of the study and reduce the salience of the body related questions, participants also reported on their

*satisfaction with their romantic relationship, satisfaction with their financial status, satisfaction with their housing situation, and satisfaction with their social life.*

**State appearance-discrepancy.** The state version of the Self-Discrepancy Index (SDI; Dittmar, Beattie, & Friese, 1996; Halliwell & Dittmar, 2006) was used to measure weight and shape-related appearance discrepancy as well as face, hair, and skin-related appearance discrepancy. The SDI is an unobtrusive measure used to reduce demand characteristics previously found to be associated with experimental research examining exposure effects (Mills, Polivy, Herman, & Tiggemann, 2002). Participants were asked to describe three aspects of themselves that they would ideally like to change right now. For each aspect reported, on 5-point scales participants were asked to rate how different they would like to be from what they actually are (magnitude; 1 = *a little different*, 5 = *extremely different*), and to indicate how important this difference is to them (psychological salience; 1 = *not important*, 5 = *extremely important*). The reported aspects were coded as weight and shape-related appearance if they explicitly referred to weight, body size or shape (e.g., “flatter stomach,” “thinner arms,” and “bigger breasts”), and were coded as face, hair, and skin-related appearance if they explicitly referred to aspects of the face, hair, or skin (e.g., “better complexion,” “longer and thicker hair,” and “level of tan”). Two independent raters (the first author and a research assistant) coded the responses for weight and shape-related and face, hair, and skin-related appearance discrepancies with a high level of inter-rater agreement ( $Kappa = .98$ ). Any incongruities between raters were agreed upon after a discussion. For any weight and shape-related statement and face, hair and skin-related appearance statement, the magnitude and salience ratings were multiplied and then summed for each individual, giving a single score for each measure that ranged from 0 to 75, with higher scores indicating greater

state weight and shape-related discrepancy or face, hair, and skin-related appearance discrepancy. The SDI has been validated in previous research with college women (e.g., Halliwell & Dittmar, 2006).

**Trait appearance comparison tendency.** The Upward and Downward Appearance Comparison Scale (UPACS/DACS; O'Brien et al., 2009) was used to measure participants' tendency to compare their overall appearance with that of others. Participants indicated their level of agreement on a 5-point scale (1 = *strongly disagree*, 5 = *strongly agree*) with 18 statements on comparisons to people who look better (upward comparison) or worse (downward comparison) than themselves, such as "when I see good-looking people I wonder how I compare to them" and "I compare myself to people less good looking than me." The UPACS/DACS has good internal consistency and construct validity among college women (O'Brien et al., 2009). Previous research has found that the upward appearance comparison and downward appearance comparison subscales of the UPACS/DACS are strongly and positively correlated with each other and with measures of body image concerns among college women (O'Brien et al., 2009; Vartanian & Dey, 2013). In addition, in the present study, the pattern of moderation was identical for upward and downward comparisons when analyzed separately. Given these findings, the UPACS and DACS were combined to form an overall appearance comparison tendency measure in the present study. Reliability of the combined measure in the present study was high (Cronbach's  $\alpha = .92$ ).

### **Procedure**

Participants were told that the study was an investigation into the influence of media use on memory. For Part 1 of the study, participants came into the laboratory and were tested in individual rooms. To add to the cover story and to reduce suspicion

about pre- and post-exposure measures, participants were informed that they would be asked to report on their mood throughout the experiment because mood had previously been found to influence memory. After providing informed consent, participants completed the pre-exposure state VAS measure of negative mood and body dissatisfaction on the computer. They were then asked to browse their assigned website for 10 minutes. Participants were told they could view whatever they like on their assigned website but that they should not visit any other websites. Note that in order to capture naturalistic viewing and maintain ecological validity, participants in the Facebook condition were asked to log into their Facebook account and browse Facebook in general, but they were not instructed to only view their own or certain people's Facebook profiles. Therefore, just like the magazine and control conditions, participants in the Facebook condition could view whatever content they wanted as long as they stayed on their assigned website. After browsing their assigned website for 10 minutes, participants completed the post-exposure state VAS measures of negative mood and body dissatisfaction, as well as the state appearance-discrepancy measure. In keeping with our cover story, participants were then asked to complete a brief memory task on the computer in which they were shown a list of 30 words (which were not appearance-related) for 30 seconds and then asked to write down as many words as they could remember from the list. After completing the memory test, participants again completed the state VAS measure to bolster the cover story. The Internet search history was viewed on the computer after each participant to ensure that they spent the 10-minute exposure time on their assigned website only (all participants complied with the instructions).

For Part 2 of the study, participants were sent an email message one week after completion of Part 1 with a link to an online survey containing the trait measure

of appearance comparison tendency, some filler questionnaires, and a demographics questionnaire asking them to report their age, ethnicity, and height and weight (used to calculate their BMI). In keeping with the cover story, participants were also asked to report on what they remember the study being about, were once again asked to write down as many words they could remember from the word list that they studied in Part 1 of the study, and completed memory-related questionnaires. Participants were debriefed on completion of the study.

### **Statistical Analyses**

Univariate analyses of variance (ANOVAs) were conducted to test whether participants randomly assigned to each website exposure condition (Facebook, online magazine, control) varied on any pre-exposure VAS state measure or trait comparison tendency measure. Participants in each condition did not differ on the trait measure of comparison tendency,  $F(2, 99) = 1.61, p = .205$ , on the pre-exposure VAS state measures of negative mood,  $F(2, 71) = 1.27, p = .206$ , or on state body dissatisfaction,  $F(2, 71) = 0.02, p = .766$ . Because pre-exposure VAS measures did not differ between conditions, all further analyses were conducted on post-exposure measures only.

Hierarchical moderated multiple regression analyses were conducted to investigate the impact of website exposure (Facebook, online magazine, control) on state negative mood, body dissatisfaction, weight and shape discrepancy, and face, hair, and skin-related appearance discrepancy, and to investigate the potential moderation of trait comparison tendency. Website conditions were dummy coded into orthogonal contrasts and entered at Step 1, followed by mean-centered scores for comparison tendency (potential moderator) entered at Step 2. Finally, interaction terms between each of the website condition contrasts and comparison tendency were entered at Step 3. Each of the regression analyses was structured in the same way, but

differed at Steps 1 and 3, with different website contrasts (either Facebook as the comparison condition or the control website as the comparison condition) and corresponding interaction terms entered to allow for comparisons between all of the website conditions. Specifically, in the first regression analysis, the control condition was nominated as the comparison group for the contrasts, to allow for the examination of differences between exposure to Facebook and exposure to the control website, and exposure to the online fashion magazine and exposure to the control condition on women's state negative mood, body dissatisfaction and appearance discrepancies. In the second regression analysis, the contrasts were restructured with the Facebook condition as the comparison condition, to allow for the examination of differences between exposure to Facebook and exposure to the online fashion magazine. Because the direct effect of conditions and potential moderation of comparison tendency are of interest to the present study, only main effects of condition contrasts and interaction terms are reported. In all cases, the pattern of results did not change when controlling for participants' BMI, therefore BMI was not included in the regressions. Missing data were handled with pairwise deletion. The only variable with a substantial amount of missing data was post-exposure negative mood (the results for this measure should be interpreted with caution).

## Results

### Negative Mood

**Main effects of condition.** At Step 1 of the hierarchical MRA, the overall model was significant,  $F(2, 67) = 3.18, p = .048$ , and the condition contrasts explained 9% of the variance in negative mood. Consistent with our hypothesis, the contrast between the Facebook and control conditions was a significant predictor of negative mood,  $\beta = .34, t(67) = 2.51, p = .013$ . Specifically, after exposure to their assigned

website, participants in the Facebook condition reported being in a more negative mood than did participants in the control condition (see Table 1). No other condition contrast predicted negative mood ratings.

**Moderation by comparison tendency.** Trait appearance comparison tendency did not moderate the relationship between website conditions and negative mood. At Step 3, interaction terms between comparison tendency and condition contrasts accounted for less than 1% of further variance in negative mood,  $\Delta F(2,62) = 0.02, p = .976$ . Therefore, we did not find support for our hypothesis that trait appearance comparison tendency would moderate the relationship between exposure condition and state negative mood.

### **Body Dissatisfaction**

**Main effects of condition.** Contrary to our hypotheses that Facebook usage and magazine usage would lead to greater body dissatisfaction, there was no main effect of condition on post-exposure body dissatisfaction ratings. The overall regression model at Step 1 was not significant,  $F(2, 90) = 0.68, p = .512$ , with condition contrasts accounting for only 1% of variance in body dissatisfaction.

**Moderation by comparison tendency.** Inconsistent with our hypothesis, comparison tendency did not moderate the relationship between website conditions and post-exposure body dissatisfaction. Interaction terms at Step 3 between comparison tendency and condition contrasts accounted for less than 1% of further variance in body dissatisfaction,  $\Delta F(2,87) = 0.08, p = .924$ .

### **Weight and Shape Discrepancy**

**Main effects of condition.** Condition contrasts accounted for a significant 6% of variance in weight and shape discrepancy ratings at Step 1,  $F(2, 99) = 3.23, p = .044$ . Consistent with our hypothesis, the contrast between the magazine and control

conditions significantly predicted ratings of weight and shape discrepancy,  $\beta = .28$ ,  $t(99) = 2.54$ ,  $p = .013$ . Specifically, participants in the online fashion magazine condition reported more weight and shape discrepancy after exposure to their assigned website than did participants in the control condition (see Table 1). Contrary to our hypothesis, the contrast between the Facebook and control conditions was not a significant predictor of weight and shape discrepancy. There was also no significant difference between the magazine and Facebook conditions.

**Moderation by comparison tendency.** Comparison tendency did not moderate the relationship between website conditions and weight and shape discrepancy. At Step 3, interaction terms between comparison tendency and condition contrasts accounted for a non-significant 2% of further variance in weight and shape discrepancy,  $\Delta F(2,96) = 1.20$ ,  $p = .306$ . Therefore, we did not find support for our hypothesis that appearance comparison tendency would moderate the relationship between exposure condition and state weight and shape discrepancy.

### **Face, Hair, and Skin Discrepancy**

**Main effects of condition.** There was no main effect of condition on face, hair, and skin-related discrepancy. At Step 1, the overall regression model was not significant,  $F(2, 99) = 1.67$ ,  $p = .194$ , with condition contrasts accounting for only 3% of variance in face, hair, and skin-related discrepancy ratings. Therefore, contrary to our hypotheses, brief exposure to Facebook or the fashion magazine website did not impact women's face, hair, and skin discrepancy overall.

**Moderation by comparison tendency.** At Step 3, interaction terms between comparison tendency and condition contrasts significantly account for 6% of further variance in face, hair, and skin-related discrepancy,  $\Delta F(2,96) = 3.25$ ,  $p = .043$ . In support of our hypothesis, the interaction between comparison tendency and the

contrast between the Facebook and control conditions was a significant predictor of face, hair, and skin-related discrepancies,  $\beta = .36$ ,  $t(96) = 2.53$ ,  $p = .013$ . Simple slopes for the association between exposure to Facebook and the control website and face, hair, and skin-related discrepancy were tested for low ( $-1$  *SD* below mean) and high ( $+1$  *SD* above mean) comparison tendency. The simple slope was significant for high comparison tendency,  $\beta = .47$ ,  $p = .007$ , but not for low comparison tendency,  $\beta = -.12$ ,  $p = .419$  (see Figure 1). Thus, for women who are high in comparison tendency, spending time on Facebook led to more face, hair, and skin-related discrepancy than did spending time on the control website. No other interaction terms were significant predictors of face, hair, and skin-related discrepancy.

### Discussion

The aims of this study were to: (a) investigate the effect of Facebook on young women's mood, body dissatisfaction, weight and shape discrepancies and face, hair, and skin-related discrepancies; (b) investigate if the effect of Facebook differed from the influence of an online fashion magazine; and (c) investigate if appearance comparison tendency moderated this effect. We found that women reported being in a more negative mood after brief exposure to Facebook than after exposure to an appearance-neutral website, and that for women who are high in appearance comparison tendency, spending time on Facebook led to greater face, hair and skin-related discrepancies. The finding that exposure to Facebook induced a more negative mood in young women is consistent with previous research showing that brief exposure to Facebook led to more negative mood for both men and women (Sagioglou & Greitemeyer, 2014). One possible reason for these findings is that Facebook provides women with a means for comparing themselves on a broad range of dimensions (beyond just appearance), such as social status and life experiences. For

example, similar to the findings of Chou and Edge (2012), women may be judging others on Facebook to be happier or have better lives than them, which in turn could induce a more negative mood.

Contrary to the suggestions of previous correlational research (Fardouly & Vartanian, 2015; Smith et al., 2013; Tiggemann & Miller, 2010; Tiggemann & Slater, 2013, 2014), exposure to Facebook in an experimental setting did not have a direct effect on young women's satisfaction with their body, or on their desire to change their weight and shape. However, for women who tend to make more appearance comparisons, Facebook usage was related to a greater desire to change their face, hair, and skin-related features. These results show that, when it comes to their appearance concerns, not all women are equally affected by exposure to Facebook. Consistent with previous studies using more traditional media types (Keery et al., 2004; van den Berg et al., 2002; Vartanian & Dey, 2013), it is specifically women who have a greater tendency to make appearance comparisons to others who desires to change their face, hair, and skin-related appearance after viewing Facebook.

The finding that Facebook exposure was associated with face, hair, and skin-related concerns but not weight-related body dissatisfaction may be due to the fact that there are more portrait images available on Facebook (Haferkamp et al., 2012), thus making comparisons of facial features, skin, and hair more common than body-related comparisons. Another possible reason for the null effects on weight-related body dissatisfaction in the Facebook condition is that there may be images of a wider range of body types available for comparison on Facebook than in fashion magazines. Further research is needed to determine why face, hair, and skin-related features are salient aspects of appearance on Facebook and to test whether women who are higher

in trait appearance comparison pay attention to different aspects of appearance on Facebook compared to women lower in trait appearance comparison.

Consistent with previous research on magazine exposure (Halliwell et al., 2011; Knobloch-Westerwick & Crane, 2012; Tiggemann & McGill, 2004; Tiggemann & Polivy, 2010), in the present study exposure to the online fashion magazine website led to more weight and shape discrepancy in women. Most previous research on magazine exposure has presented women with a static image or advertisement of a model or celebrity extracted from a magazine, and the present study therefore extends this past research by demonstrating similar effects in an online magazine medium that did not restrict the content viewed by participants. Note that there was a significant main effect for the magazine condition on the weight and shape discrepancy measure but not on the VAS body dissatisfaction measure. This may be because the discrepancy measure allowed women to specify the exact part of their body that they wanted to change (e.g., thinner legs, bigger breasts), whereas the VAS body dissatisfaction measure contained broader more global categories of body dissatisfaction (e.g., physically attractive, fat), which may not have captured participants' specific concerns.

There are some limitations to the present study that should be noted. First, because there is limited experimental research on the impact of Facebook usage on young women's body image concerns, as a first step we wanted to maintain naturalistic viewing and ecological validity, and therefore did not constrain or monitor the specific elements of Facebook that participants viewed during their 10 minute browsing time (e.g., pictures of friends, status updates). If some participants were viewing images of themselves or peers and others were reading status updates, this may have muddied our effects. In addition, because people can "follow" a variety of

different organizations, news sites, or fan pages on Facebook, the content of participants' newsfeeds and the percentage of posts from their peers on their newsfeeds may vary widely. Similarly, the content on a person's newsfeed also varies from day-to-day, which could lead to inspirational effects (i.e., women feeling better about their appearance) on some days (cf. Mabe et al., 2014), and could lead to body dissatisfaction on other days. Future research could control for the images and content presented during Facebook exposure to test the effects of comparisons to various target groups (e.g., close friends vs. people they do not know personally). In addition, exposure to more image-based social networking websites (e.g., Instagram) may have stronger effects on women's appearance concerns due to their exclusive focus on imagery and thus should be tested in future research.

Second, in order to reduce demand characteristics, participants in the present study were not directly asked if they had compared themselves to others on their assigned website, thus we are unable to determine if appearance comparisons are driving the influence of Facebook on mood and appearance concerns, or magazines on weight and shape discrepancies. Future research could instruct women to make comparisons on Facebook or ask participants if they compared their appearance to certain targets after exposure to Facebook to determine if actual appearance comparisons account for the relationship between Facebook exposure and mood or appearance concerns.

Third, some of the effect sizes in the present study were relatively small, and it is possible that the study was underpowered to detect particular effects. Furthermore, our study was fairly homogeneous with respect to demographic variables, and it is possible that the effects of exposure to Facebook would vary according to the sample characteristics. For example, facial, skin, and hair comparisons may be particularly

pertinent for women of color, given research on the importance of skin tone and hair to their self-worth (Thompson & Keith, 2001). Therefore, future experimental Facebook research should be conducted on a larger and more diverse sample in order to provide a clearer picture of the effect that Facebook has on users' appearance concerns.

### **Conclusions**

Facebook is used regularly by over a billion people around the world (Facebook, 2014) and is the most popular use of the media amongst young women (Bell & Dittmar, 2011; Tiggemann & Miller, 2010). Our findings indicate that Facebook usage can put women in a more negative mood. In addition, for women who make more appearance comparisons, spending time on Facebook led to greater desire to change their face, hair, and skin-related features. Given the popularity of social media among young women and the opportunity this medium creates to make a broad range of appearance-related social comparisons, future research is needed to explore the potential for body image and media literacy interventions to address the impact of social media usage. For example, in addition to addressing traditional media, intervention programs could highlight the idealized nature of the images and content uploaded to social media and educate girls and young women about the impact that comparisons to such content can have on their appearance concerns and mood.

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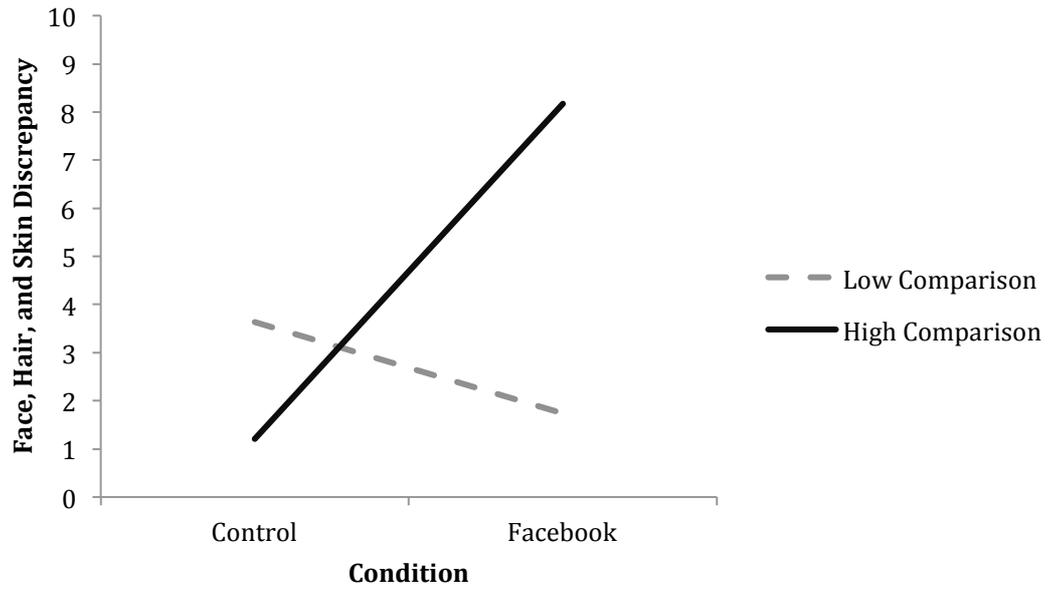
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Table 1

*Mean (SD) ratings for post-exposure measures by condition.*

	Facebook	Magazine	Control
Negative Mood	31.24 (18.57)	27.48 (14.37)	20.38 (12.28)
Body Dissatisfaction	45.53 (16.93)	50.05 (19.84)	45.04 (21.58)
Weight and Shape Discrepancy	8.58 (7.53)	10.97 (11.78)	6.16 (7.43)
Face, Hair, and Skin Discrepancy	5.37 (8.39)	5.19 (7.07)	2.63 (5.50)



*Figure 1.* Simple slopes for face, hair, and skin-related discrepancy when exposed to Facebook or the control website at low and high comparison tendency.