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The impact of appearance comparisons made through social media, traditional media, and in person in women's everyday lives

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ABSTRACT

Appearance comparisons are an important sociocultural factor influencing women's body image. These comparisons can occur in different contexts (e.g., through magazines, social media, in person). However, little is known about the frequency and outcome of appearance comparisons made in different contexts in women's everyday lives. Using Ecological Momentary Assessment methods, female undergraduate students ($n = 146$) completed a brief online survey at random times every day for 5 days. They reported the frequency, direction (upward, lateral, downward), and context of appearance comparisons, and also reported their appearance satisfaction, mood, and diet and exercise thoughts and behaviors. Upward appearance comparisons were the most common across all contexts. Upward comparisons through social media were associated with more negative outcomes on all measures (except diet and exercise behavior) than comparisons made in person, and with more negative mood than comparisons in any other context. These findings highlight the importance of the appearance comparison context.

Introduction

Body dissatisfaction has reached normative levels among young women in Western society (Al Sabbah et al., 2009; Bearman, Martinez, Stice, & Presnell, 2006). These findings are concerning given that body dissatisfaction is one of the most consistent and robust risk and maintenance factors for eating disorders (Stice, 2002). Sociocultural models of body dissatisfaction and eating disturbance highlight the role of the media in the development and maintenance of women's body image concerns (Fitzsimmons-Craft et al., 2014; Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999), and suggest that appearance-based social comparisons may in part be responsible for this association. Indeed, research on both traditional forms of media (e.g., magazines, television; see Myers & Crowther, 2009, for a review) and social media (e.g., Facebook, Instagram; see Fardouly & Vartanian, 2016; Holland & Tiggemann, 2016; for reviews) provides evidence for the importance of appearance comparisons in the link between media usage and women's appearance concerns.

Social comparison theory proposes that people have an innate drive to evaluate their progress and standing on various aspects of their lives (Festinger, 1954). According to this theory, in the absence of objective standards, people compare themselves to others to know where they stand. Festinger (1954) differentiated between two types of social comparisons: upward comparisons and downward comparisons. Upward comparisons occur when people compare themselves to someone better off than themselves, and these comparisons typically produce negative consequences (Gibbons, 1986; Lemyre & Smith, 1985). Downward comparisons occur when people compare themselves to someone worse off than themselves, and downward comparisons typically produce positive consequences (Gibbons & Gerrard, 1989; Marsh & Parker, 1984; Wills, 1981). People can also make lateral comparisons, in which they compare themselves to others whom they perceive to be the same as them in a particular domain (Harris, Anseel, & Lievens, 2008; Pinkus, Lockwood, Schimmack, & Fournier, 2008; Sohn, 2011). Lateral comparisons, like downward comparisons, generally have positive effects (Wheeler & Miyake, 1992).

With respect to appearance comparisons, most previous research consists of experimental studies that expose participants to specific stimuli in artificial environments, or correlational studies that ask participants to retrospectively recall their comparison tendencies. Although these approaches are informative, they cannot accurately capture the frequency and impact of appearance

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comparisons in people's lives. One way to overcome these limitations is by using Ecological Momentary Assessments (EMA). In EMA studies, participants complete questionnaires multiple times per day regarding specific experiences they have as those experiences occur in their daily lives. EMA not only reduces the bias associated with memory recall in previous research, but it is also highly generalizable to real life, given that questionnaires are completed in response to events that occur in people's natural environment.

A few studies have utilized EMA methodology to examine the impact of naturalistic appearance comparisons on women's body image, mood, and diet and exercise thoughts and behaviors (Fitzsimmons-Craft, Ciao, & Accurso, 2016; Leahey & Crowther, 2008; Leahey, Crowther, & Ciesla, 2011; Leahey, Crowther, & Mickelson, 2007; McKee et al., 2013; Myers, Ridolfi, Crowther, & Ciesla, 2012; Patrick, Neighbors, & Knee, 2004; Ridolfi, Myers, Crowther, & Ciesla, 2011). These studies show that women are more likely to make upward appearance comparisons (i.e., comparisons to someone more attractive) than they are to make lateral appearance comparisons (i.e., comparisons to someone equally attractive) or downward appearance comparisons (i.e., comparisons to someone less attractive) in their everyday lives (Leahey & Crowther, 2008; Leahey et al., 2007, 2011; Ridolfi et al., 2011). In terms of the impact of those naturalistic comparisons, upward appearance comparisons have consistently been found to have the most negative effects on women's body image (Leahey & Crowther, 2008; Leahey et al., 2007, 2011; Myers et al., 2012; Ridolfi et al., 2011).

In addition to examining the direction of comparison, it is also important to consider the context in which individuals are making appearance comparisons. For example, some contexts have been found to have a more negative impact on women's body image than others (e.g., magazines, television; Tiggemann, 2003). Furthermore, the popularity of social media among young women is outpacing the popularity of traditional media (Kimbrough, Guadagno, Muscanell, & Dill, 2013; Muscanell & Guadagno, 2012), and there is research indicating that appearance comparisons through social media may negatively impact body image (Fardouly, Diedrichs, Vartanian, & Halliwell, 2015a; Fardouly & Vartanian, 2015; Kim & Chock, 2015; Tiggemann & Zaccardo, 2015). For example, experimental research suggests that viewing attractive images of strangers taken from social media and comparing one's appearance to those images (i.e., making upward appearance comparisons) is harmful to women's body image (Haferkamp & Krämer, 2011; Tiggemann & Zaccardo, 2015). Thus, examining the frequency and impact of appearance comparisons made in various contexts can provide insights into when such appearance comparisons will have the most negative impact.

There are several reasons why naturalistic appearance comparisons made in different contexts (e.g., traditional media, social media, and in person) may differentially influence women's body image, mood, and diet and exercise behavior. First, different contexts may contain different appearance comparison targets. Whereas traditional media generally provides women with the opportunity to compare their appearance to models and celebrities, social media contains a variety of known targets (e.g., family, close friends, peers), celebrities, and strangers (Fardouly, Diedrichs, Vartanian, & Halliwell, 2015b; Fardouly & Vartanian, 2015), and appearance comparisons made in person are likely to be to known others or strangers. There is evidence to suggest that appearance comparisons to different target groups (e.g., celebrities, peers) may differentially influence women's body image (Carey, Donaghue, & Broderick, 2014; Fardouly et al., 2015b; Fardouly & Vartanian, 2015; Leahey & Crowther, 2008; Schutz, Paxton, & Wertheim, 2002). Second, different contexts may vary in the extent to which they contain realistic or idealized appearance comparison targets. Images of women in traditional media are often idealized and enhanced (Reaves, Hitchon, Park, & Yun, 2004). Similarly, people can edit images before posting them on social media and often present an idealized version of themselves on their social media profiles (Manago, Graham, Greenfield, & Salimkhan, 2008; Zhao, Grasmuck, & Martin, 2008). The idealized nature of the images presented in these contexts may make upward appearance comparisons particularly likely. In contrast, it is more difficult to control one's appearance in person, and thus the direction of in-person comparisons might be more varied.

The Present Study

The aim of the present study is to investigate the overall frequency and the direction of appearance comparisons made in different contexts (traditional media, social media, in person) in women's everyday lives, as well as the impact of those comparisons on women's appearance satisfaction, mood, thoughts of dieting and exercising, and diet and exercise behavior.

First, we examined the frequency and direction of comparison by context. Given that images in traditional media and social media are often enhanced and idealized (Manago et al., 2008; Reaves et al., 2004; Zhao et al., 2008), upward appearance comparisons are hypothesized to be most common through these media types, whereas in-person comparisons are expected to be more varied in direction.

Next, we examined the interaction between comparison direction and comparison context on a range of outcome variables (i.e., appearance satisfaction, mood, and diet and exercise thoughts and behaviors). Based on the findings of previous research that highlight the importance of peer comparisons (Carey et al., 2014; Schutz et al., 2002), one might expect that upward appearance comparisons made in contexts that contain peers (e.g., social media and in person) would lead to less appearance satisfaction, a less positive mood, and more dieting and exercising thoughts and behavior than upward comparisons made in contexts that mainly contain models and celebrities (e.g., traditional media). However, because of their emphasis on idealized images, one might also expect that upward appearance comparisons through traditional media and social media would be associated with less appearance satisfaction, a less positive mood, and more dieting and exercising thoughts and behavior than upward comparisons made in person (which may contain more realistic targets). Because little research has examined the impact of lateral and downward appearance comparisons to different targets or different types of images (e.g., idealized or not), no specific hypotheses were made for those directions of comparison. Consistent with other EMA studies on appearance comparisons (e.g., Leahey et al., 2007, 2011), "no comparison" reports were used as baseline measurements, and appearance comparisons made in any context were expected to be associated with more negative outcomes than these baseline reports.

Finally, we also investigated whether trait body dissatisfaction moderated any effect of comparisons made in different contexts on the outcome variables. Based on the results of previous EMA studies (Leahey & Crowther, 2008; Leahey et al., 2007, 2011), we predicted that the effects of appearance comparisons would be more pronounced among women high in body dissatisfaction.

Method

Participants

Participants were 160 female first-year psychology students at a large public university in Australia who were given course credit ($n = 135$) or were paid $30 AUD ($n = 25$) for their participation. To minimize the rate of attrition, participants were informed that they needed to complete at least 80% of the online diary ques-

tionnaires sent to them over the 5-day period in order to meet the requirements of the study and be fully reimbursed for their participation. The final sample consisted of 146 participants who met this requirement, and those participants completed an average of 23.26/25 (*SD* = 1.44) questionnaires over the 5-day period. Participants' mean age was 19.24 years (*SD* = 2.24), and their mean body mass index (BMI: kg/m^2) was 21.74 (*SD* = 3.71). Sixty-four participants (44.4%) identified as Asian, 57 (39.6%) as White, two as Aboriginal/Pacific Islander (1.4%), and 21 as "other" (14.6%); ethnicity information was missing for two women. The majority of participants reported living in Australia for all of their lives (65.8%) and most had lived in Australia for at least 10 years (81.5%).

Procedure

The university's ethics committee approved this study. Participants were informed that the study was about women's daily experiences. Only female students who had regular access to the Internet were eligible to sign up for this study. Participants came into the laboratory for an initial meeting during which they provided informed consent to participate, completed a series of pre-diary measures, and were told about the study procedures. The pre-diary measures consisted of a trait body dissatisfaction questionnaire and other filler items, as well as a demographics questionnaire asking participants to report their age, ethnicity, time spent living in Australia, and height and weight (used to calculate BMI).

Following the initial meeting, participants were sent five text messages per day for 5 days (which included at least 1 day of a weekend) to their personal mobile phones. This approach is similar to previous body image research using EMA (e.g., Myers et al., 2012; Ridolfi et al., 2011). The text message contained a link to the brief online diary questionnaire assessing the frequency, nature, and impact of appearance comparisons in participants' everyday lives. These text messages were sent between 9 a.m. and 11 p.m. The 14-h range of possible assessment time was divided into five time blocks (9–11 a.m., 11 a.m.–2 p.m., 2–5 p.m., 5–8 p.m., and 8–11 p.m.) and one signal occurred randomly within each time block, resulting in a stratified random sampling schedule. Participants were informed that they should complete the questionnaire as soon as possible after receiving each text message and were told that this was important because they needed to complete the questionnaire before receiving the next text message signal in order for it to be counted toward the minimum 80% required completion rate. However, participants were also instructed not to complete the questionnaire in situations that were inconvenient (e.g., in a meeting) or unsafe (e.g., while driving). Participants were able to complete the questionnaire on any device that they could access the Internet on (e.g., Smartphone, computer, tablet). After completing 5 days of EMA, participants returned to the laboratory to complete a post-diary reactivity measure and to be debriefed.

Pre-diary Measure

Trait body dissatisfaction. The Body Dissatisfaction subscale of the Eating Disorder Inventory (EDI; Garner, Olmstead, & Polivy, 1983) was used to measure participants' trait level of concern with their body weight and shape. Using a 6-point scale, participants rated the extent (1 = *never*, 6 = *always*) to which nine statements related to body dissatisfaction described them. Items were summed with higher scores indicating more body dissatisfaction. Internal consistency reliability for the Body Dissatisfaction subscale in the present study was good (Cronbach's $\alpha = .86$).

Diary Measures

Appearance comparisons. Participants reported on the frequency, nature, and impact of appearance comparisons. First, participants were asked whether they had compared their appearance to another individual since completing the previous diary questionnaire. If participants indicated that they had *not* made an appearance comparison, then they were immediately directed to the outcome measures. If they had made an appearance comparison, participants were asked to think about the most recent comparison they had made and indicate: (1) what context they had compared themselves in (response options were *social media [e.g., Facebook], magazine, television/movie, billboard advertisement, in person*, or an open-ended "*other*" option; context-of-comparison measure); and (2) how they thought they looked compared to the other individual (*much worse, worse, the same, better, or much better*; direction-of-comparison measure). For the direction-of-comparison measure, responses of *worse* and *much worse* were coded as *upward comparisons*, responses of *the same* were coded as *lateral comparisons*, and responses of *better* and *much better* were coded as *downward comparisons*.

Appearance satisfaction. Appearance satisfaction was measured with items drawn from the Appearance subscale of the State Self-Esteem Scale (SSES; Heatherton & Polivy, 1991). Participants were asked to keep in mind their feelings immediately following the most recent incident in which they compared their appearance to another individual (if participants indicated that they *had* made a comparison), or to keep in mind their feelings since they last completed the questionnaire (if participants indicated that they *had not* made a comparison), and indicate on a 5-point scale (1 = *not at all*, 5 = *extremely*) how they felt in regard to six statements related to appearance satisfaction. Five of these statements were taken from the Appearance subscale of the SSES (e.g., "I feel satisfied with the way my body looks right now"). The sixth statement was modified from the original scale and was included to assess face-related appearance ("I feel satisfied with the way my face looks right now"). Total scores represent a sum of the items with higher scores indicating higher levels of appearance satisfaction. Internal consistency reliability for the appearance satisfaction measure in the present study was good (Cronbach's $\alpha = .87$).

Mood. Similar to measures used in previous EMA research (Vartanian, Pinkus, & Smyth, 2014), participants were asked to indicate on a 5-point scale (1 = *not at all*, 5 = *extremely*) how they felt in regard to five words related to a positive mood (*happy*, *inspired*, *proud*, *satisfied*, *enthusiastic*) and five words related to a negative mood (*upset*, *distressed*, *guilty*, *ashamed*, *discouraged*). When completing this measure, participants were asked to keep in mind their feelings immediately following the most recent incident in which they compared their appearance to another individual (if participants indicated that they had made a comparison), or keep in mind their feelings since they last completed the questionnaire (if participants indicated that they had not made a comparison). Total scores represent a sum of the positive mood items minus the sum of the negative mood items, with higher scores indicating a more positive mood. (A similar pattern of results was found when examining positive mood and negative mood separately.) Internal consistency reliability was adequate for the overall mood measure (Cronbach's $\alpha = .73$).

Thoughts of dieting and exercising. Two questions assessed the extent to which participants had thought about dieting or exercising to lose weight since making a comparison (if participants indicated that they had made a comparison) or since completing the previous questionnaire (if participants indicated that they had

not made a comparison). These questions were adapted from the Eating Disorders Examination Questionnaire (EDE-Q; Fairburn & Beglin, 1994) and have been successfully used in previous EMA research (Leahey et al., 2007): "To what extent have you thought about trying to restrict the amount of food you eat in order to influence your shape or weight?" and "To what extent have you thought about exercising as a means of controlling your weight, altering your shape or amount of fat, or burning off calories?" Responses to these questions (1 = *not at all*, 4 = *very much*) were averaged to form an overall measure of thoughts of dieting and exercising to lose weight. Internal consistency reliability was adequate for the combined measure (Cronbach's $\alpha = .78$).

Diet and exercise behavior. Two questions assessed whether participants had exercised or restricted their food intake since making a comparison (if participants indicated that they had made a comparison) or since completing the previous questionnaire (if participants indicated that they had not made a comparison). One question assessed exercise behavior ("Have you exercised?") and the other assessed dieting ("Have you restricted your food intake?"). Participants responded either yes or no, and responses to these questions were combined into a dichotomous variable, indicating whether participants had engaged in any exercise or dieting behavior (1) or not (0).

Post-diary Measure

Reactivity to diary completion. In line with other EMA studies (Leahey & Crowther, 2008; Leahey et al., 2011), we tested for reactivity to completing the diary measures. Specifically, participants in the present study were asked to indicate on a 7-point scale (1 = *very little*, 7 = *very much*) the extent to which recording appearance comparisons made them more aware of how much they engaged in such comparisons.

Data Analysis

Because the data were nested in structure (i.e., multiple observations [Level-1 comparisons] were nested within participants [Level-2 individuals]), hierarchical linear modeling (HLM; Raudenbush & Bryk, 2002) was used in all analyses in order to control for the non-independence in these data. Data were analyzed using the software package HLM7 (Raudenbush, Bryk, & Congdon, 2010). HLM analyses were conducted to (a) test for differences in participants' frequency of making appearance comparisons in different contexts (i.e., traditional media, social media, in person), (b) examine the direction of comparisons made in those contexts, and (c) examine the joint effect of context and direction on the outcome variables. Models with continuous outcome variables were analyzed using hierarchical linear modeling (HLM) and models with categorical outcome variables were analyzed using hierarchical generalized linear modeling (HGLM). HLM is a statistical technique that allows for missing data within the Level-1 dataset, but not within the Level-2 dataset (Bryk & Raudenbush, 1992). Therefore, before running any analyses, missing data for the pre-diary body dissatisfaction measure (i.e., Level-2 predictor) were mean replaced (no more than two responses were missing for any participant). After computing total scores for the trait body dissatisfaction measure, this variable was mean centered. Including participants' age, BMI, or ethnicity in the HLM model did not improve model fit for any of the outcome measures. Therefore, these demographic variables were not included in any other analyses.

Results

Reactivity to Diary Completion

Participants' mean rating on the reactivity measure ($M = 5.07$, $SD = 1.55$) was significantly above the midpoint of the scale (i.e., a value of 4), $t(140) = 8.23$, $p < .001$, suggesting that participants thought that recording appearance comparisons made them more aware of making such comparisons. There was, however, no difference in the number of appearance comparisons reported on any day throughout the study (Day 1 $M = 4.66$, Day 2 $M = 3.01$, Day 3 $M = 3.79$, Day 4 $M = 3.66$, Day 5 $M = 3.21$), $F(1,37) = 3.66$, $p = .06$. Therefore, although there does seem to be some increased awareness of making appearance comparisons due to participation in the study, there was no indication that this awareness resulted in an increase in the frequency of making appearance comparisons over the five-day testing period.

Frequency of Comparison by Context

Of the most recent appearance comparisons that participants reported in each diary questionnaire, 646 (71.2%) were made *in person*, 107 (11.8%) were made through *social media* (such as Facebook), 69 (7.6%) were made through *television/movies*, 14 (1.5%) were made through *magazines*, and 6 (0.7%) were made through *billboard advertisements*. Given the small number of appearance comparisons made through *magazines* and *billboards*, comparisons made in these contexts were combined with those made through *television/movies* to form a *traditional media* category. Responses for *social media* and *in person* were considered independently. Hierarchical generalized linear models (HGLM) with log-odds ratios were used to analyze whether there were relative differences in the frequency of making traditional media comparisons, social media comparisons, or in-person comparisons. Dummy coded variables (0 = absent, 1 = present) were created for each context (social media, traditional media, in person) and were entered into Level 1 of two HGLM analyses with in-person comparisons and social media comparisons as the reference categories, respectively, to test for differences among all comparison contexts. Participants were significantly less likely to make social media comparisons than in-person comparisons ($b_{00} = -1.89$, $SE = 0.13$, $p < .001$), and significantly less likely to make traditional media comparisons than in-person comparisons ($b_{00} = -2.04$, $SE = 0.14$, $p < .001$). There were no differences in the log-odds of making traditional media comparisons relative to social media comparisons ($b_{00} = -0.15$, $SE = 0.17$, $p = .38$). When traditional forms of media (i.e., television/movies, magazines, billboard advertisements) were examined separately (rather than combined into a traditional media category) in HGLM analyses, participants were significantly more likely to make appearance comparisons through social media than any specific form of traditional media ($ps < .02$).

Direction of Comparison within Each Context

HGLM analyses were run separately with upward comparisons and downward comparisons as the reference categories to test for relative differences in the frequency of making upward comparisons, lateral comparisons, or downward comparisons within each context. As seen in Table 1, for social media and traditional media, participants made significantly more upward comparisons than lateral or downward comparisons. For in-person comparisons, upward comparisons were the most common, followed by downward comparisons, then lateral comparisons.

Table 1
Number (percentage) of upward, lateral, and downward appearance comparisons made within each context.

	Upward	Lateral	Downward	Total
Social media	71 (67.0%)[a]	22 (20.8%)[b]	13 (12.2%)[b]	106
Traditional media	71 (80.7%)[a]	5 (5.7%)[b]	12 (13.6%)[b]	88
In person	289 (45.1%)[a]	152 (23.7%)[c]	200 (31.2%)[b]	641
Total	431	179	225	

Note: For each context, means within a row with a different superscript differ at $p < .05$. Analyses for differences down each column were not conducted due to low power for lateral and downward comparisons. The discrepancy between the total number of comparisons made within each context reported in the text and this table is due to some participants reporting the context but not the direction of some appearance comparisons.

Table 2
Effects of upward appearance comparisons made in different contexts on women's appearance satisfaction, mood, thoughts of dieting and exercising, and diet and exercise behavior.

	b	*SE*	*t*	*p*
Appearance satisfaction				
Intercept	3.05	0.06	49.24	<.001
No vs. social media	−0.44	0.08	−5.44	<.001
No vs. traditional media	−0.33	0.06	−5.54	<.001
No vs. in person	−0.25	0.05	−5.27	<.001
Mood				
Intercept	0.90	0.09	10.16	<.001
No vs. social media	−0.84	0.14	−6.21	<.001
No vs. traditional media	−0.39	0.15	−2.61	.01
No vs. in person	−0.53	0.08	−6.26	<.001
Thoughts of dieting and exercising				
Intercept	1.65	0.05	34.51	<.001
No vs. social media	0.50	0.10	5.20	<.001
No vs. traditional media	0.25	0.09	2.81	.01
No vs. in person	0.26	0.06	4.61	<.001
Diet and exercise behavior				
Intercept	−1.81	0.14	−12.56	<.001
No vs. social media	0.85	0.31	2.73	.01
No vs. traditional media	0.15	0.38	0.40	.69
No vs. in person	0.84	0.21	4.02	<.001

Note: No comparison is the reference category.

Context × direction interactions

Only the interaction between comparison context and comparison direction was of theoretical interest in the present study; thus, the main effects are not reported here. There were no significant context × direction interactions for any of the outcome variables ($p > .05$), although this may be due to low power given the small number of lateral and downward comparisons made within social and traditional media (see Table 1). Because women primarily made upward appearance comparisons through social and traditional media in the present study, and because most previous research on women's body image has focused on upward comparisons (Myers & Crowther, 2009), we examined the impact of upward appearance comparisons (only) made in different contexts on women's appearance satisfaction, mood, and diet and exercise thoughts and behaviors.

Impact of Upward Comparisons by Context

Hierarchical linear models were created to test the effect of upward appearance comparisons (only) made within each context on the outcome variables. Dummy-coded variables (0 = absent, 1 = present) for each context (social media, traditional media, in person) were entered into Level 1 of the models, with the reference category being "no comparison" responses. Bernoulli models were used for the dichotomous diet and exercise behavior outcome variable.

Appearance satisfaction. As seen in Table 2, the model yielded significant coefficients for social media, traditional media, and in-person comparisons compared to no comparisons. These coefficients were substituted into the mixed model equation to derive the average overall appearance satisfaction response for upward appearance comparisons within each context. Participants reported significantly less appearance satisfaction following upward comparisons made through social media ($b = 2.61$), through traditional media ($b = 2.72$), and in person ($b = 2.80$), than when no comparisons were made ($b = 3.05$). In addition, upward comparisons made through social media were associated with less appearance satisfaction than those made in person, $\chi^2(1) = 4.25$, $p = .04$. However, there was no difference in appearance satisfaction ratings between upward comparisons made though social media and traditional media, $\chi^2(1) = 1.09$, $p = .30$, or between upward comparisons made through traditional media and in person, $\chi^2(1) = 1.15$, $p = .28$.

One possible explanation for the difference between social media and in-person upward comparisons is that participants perceived a greater discrepancy between their own appearance and the appearance of women on social media than between their own appearance and the appearance of women they saw in person (i.e., they made more extreme upward comparisons on social media than in person). To test this possibility, post hoc hierarchical linear models were created with extremity of upward comparison (1 = worse, 2 = much worse than the comparison target) as the outcome variable and a dummy coded context predictor variable (1 = social media, 0 = in person). Indeed, participants made more extreme upward appearance comparisons on social media than in person, $b = 0.15$, $SE = 0.05$, $t = 2.74$, $p = 0.01$.

Mood. The model yielded significant coefficients for all three contexts compared to no comparisons (as seen in Table 2). These coefficients were substituted into the mixed model equation to derive the average overall mood response for each context of comparison. Participants reported being in a significantly less positive mood following upward comparisons through social media ($b = 0.06$), traditional media ($b = 0.51$), and in person ($b = 0.37$) than when no comparisons were made ($b = 0.90$). Furthermore, participants reported being in a less positive mood after upward comparisons through social media than traditional media, $\chi^2(1) = 5.39$, $p = .02$, and after upward comparisons through social media than in person, $\chi^2(1) = 4.22$, $p = .04$. There was no difference in mood ratings following upward comparisons made through traditional media or in person, $\chi^2(1) = 0.66$, $p > .50$.

Thoughts of dieting and exercising. As seen in Table 2, the model yielded significant coefficients for social media, traditional media, and in-person upward comparisons compared to no comparisons. These coefficients were substituted into the mixed model equation to derive the average overall thoughts of dieting and exercising response for each context of comparison. Participants reported significantly more thoughts of dieting and exercising following social media comparisons ($b = 2.15$), traditional media comparisons ($b = 1.90$), and in-person comparisons ($b = 1.91$) than no comparisons ($b = 1.65$). Furthermore, participants reported more thoughts of dieting and exercising after upward comparisons made through social media than in person, $\chi^2(1) = 3.98$, $p = .04$. There was no difference in thoughts of dieting and exercising following upward comparisons made through social media and traditional media, $\chi^2(1) = 2.77$, $p = .09$, or following upward comparisons made through traditional media and in person, $\chi^2(1) = 0.02$, $p > .50$.

Diet and exercise behavior. The model yielded significant coefficients for social media and in-person comparisons compared to no comparisons, but not for traditional media comparisons compared to no comparisons (as seen in Table 2). These coefficients were substituted into the mixed model equation to derive the average overall diet and exercise behavior response for each context of comparison. Note that the overall rates of diet and exercise behavior were low (regardless of whether participants made a comparison or not), which is not surprising (especially for exercise) given that participants were asked to report on their diet and exercise behavior five times per day. The negative logits (reported below) indicate that, at any given signal, participants were more likely to have *not* engaged in diet or exercise behavior than they were to have engaged in such behavior. Participants were more likely to report diet and exercise behavior following upward comparisons made through social media ($b = -0.96$) and in person ($b = -0.97$) than following no comparison ($b = -1.81$), but there was no difference in the likelihood of diet/exercise behavior following traditional media comparisons ($b = -1.66$) and no comparisons. Furthermore, participants were less likely to diet or exercise following traditional media comparisons than in-person comparisons, $\chi^2(1) = 3.79$, $p = .05$. There was no difference in the likelihood of diet or exercise behavior following upward comparisons made through social media and traditional media, $\chi^2(1) = 2.37$, $p = .12$, or following upward comparisons made through social media and in person, $\chi^2(1) = 0.001$, $p > .50$.

Moderation by trait body dissatisfaction. Trait body dissatisfaction was entered at Level 2 of the HLM. The mixed model equations included both the main effects of the trait measure and its interaction with each context of upward comparison to predict each of the outcome variables. There was a main effect of trait body dissatisfaction on each of the outcome variables ($ps < .001$). Specifically, participants higher in trait body dissatisfaction reported less state body satisfaction, less positive mood, more thoughts of dieting and exercising, and more diet and exercise behavior after any given signal. However, none of the interactions with trait body dissatisfaction were significant ($ps > .05$) and the pattern of results reported in the sections above was identical when including trait body dissatisfaction in the model. Thus, trait body dissatisfaction did not moderate the effect of upward appearance comparisons made in different contexts on women's appearance satisfaction, mood, thoughts of dieting and exercising, and diet and exercise behavior.

Discussion

The present study used EMA to examine the frequency, direction, and impact of appearance comparisons made in different contexts in women's everyday lives. The vast majority of appearance comparisons reported in the present study were made in person, followed by social media and television, and rarely through magazines and billboards. Although the majority of research on appearance comparisons has focused on comparisons to idealized images of women in magazines (Myers & Crowther, 2009), these types of comparisons appear to be less common in women's everyday lives than are comparisons to other people who they see and interact with in person. Women also compared their appearance to others on social media more than on any other media platform (i.e., television, magazines, billboards). Adding to the findings of other research on social media (Fardouly et al., 2015a, 2015b; Fardouly & Vartanian, 2015; Tiggemann & Slater, 2013, 2014), the findings of the present study highlight the popularity of social media use among young women. The greater frequency of comparison through social media compared to traditional media might be partly due to women choosing to compare their appearance to peers on social media because they are seen as more relevant comparison targets than are models in magazines. Alternatively, images on social media may be more readily accessible than images on traditional media because social media can be easily accessed on mobile phones. Further research is needed to determine why women compare their appearance to others on social media more often than other media types.

As predicted, when looking at the direction of comparisons made within each context, upward appearance comparisons were vastly more common than lateral and downward comparisons through both social media and traditional media. This is the first study to show that women primarily make upward appearance comparisons on social media. Despite the fact that there may be images of a wider range of body types available for comparison on social media than in traditional media (as suggested by Fardouly et al., 2015a), women still make a disproportionate amount of upward comparisons in this context. This may be due to the somewhat idealized nature of images posted on social media (Manago et al., 2008; Zhao et al., 2008), similar to those on traditional media (Reaves et al., 2004), which may mask or enhance unfavorable aspects of women's appearance. Furthermore, although in-person comparisons were more varied in direction, upward appearance comparisons were still the most common (followed by downward comparisons, then lateral comparisons) for comparisons made in person. The prevalence of upward appearance comparisons to others in person (and overall) may be due to what Festinger (1954) termed the "unidirectional drive upward", which refers to people's preference to make upward comparisons in order to improve themselves in that particular domain (presumably by noticing the strategies that the superior others have used).

No interaction was found between the direction and context of comparison, perhaps because of the small number of lateral and downward appearance comparisons reported through social and traditional media. Because upward appearance comparisons were the most common through all contexts, and because most previous body image research has focused on upward appearance comparisons to media images (Myers & Crowther, 2009), we focused our analyses on the impact of upward comparisons made in different contexts. Upward appearance comparisons in all contexts were associated with less appearance satisfaction than when no comparisons were made. However, the extent to which upward appearance comparisons influenced women's body image varied depending on the comparison context. Upward appearance comparisons through social media were associated with less appearance satisfaction than were upward comparisons made in person. Given that both in-person comparisons and social media comparisons are likely to be to known others and strangers (Fardouly et al., 2015b; Fardouly & Vartanian, 2015; Hew, 2011), the target of comparison (e.g., close friends, peers, strangers) is unlikely to account for any difference between social media and in-person upward comparisons. One possible reason for why upward comparisons on social media were associated with less appearance satisfaction than those made in person is that the idealized presentation of peers and strangers on social media may lead to more extreme upward comparisons (i.e., ratings of "much worse" rather than "worse" on the direction-of-comparison measure) than those made in person. Indeed, participants in the present study reported larger appearance discrepancies between themselves and the comparison target when the comparisons were made through social media than in person. In addition, other features of social media, such as other users liking or commenting on pictures, may make upward comparisons through social media more influential than in-person comparisons to women's body image. More specifically, when viewing an image of a target on social media, the number of "likes" and positive comments on the target's appearance from other users

may reinforce the target's attractiveness leading to less appearance satisfaction for the comparer than viewing an attractive comparison target in person.

Upward appearance comparisons in all contexts were associated with a less positive mood than when no comparisons were made. Furthermore, upward appearance comparisons through social media were associated with a less positive mood than were those made in person or through traditional media. These findings add to the findings of previous research (Fardouly et al., 2015a; Kramer, Guillory, & Hancock, 2014; Sagioglou & Greitemeyer, 2014) suggesting that social media usage can have a negative impact on women's mood. Social media comparisons may be particularly influential on women's mood because peers on social media may be seen as individuals who are more relevant comparison targets than are models in traditional media, but whose (presumably idealized) appearance is less attainable than is the appearance of peers in person.

With regard to their thoughts of dieting and exercising, women reported more thoughts of dieting and exercising following upward appearance comparisons made in all contexts than when no comparisons were made. In addition, upward comparisons through social media were associated with more thoughts of dieting and exercising than were those made in person. The pattern of results for their actual diet and exercise behavior was slightly different. Women reported being more likely to restrict their food intake and exercise following upward comparisons through social media and in person than when no comparisons were made. In contrast, traditional media upward comparisons had no impact on how likely women were to engage in diet and exercise behavior. Again, these findings may be due to women discounting appearance comparisons to models and celebrities on traditional media because they are not seen as relevant comparison targets given the amount of money and time that they have to spend on their appearance. Research examining the relevance of peers and models as appearance comparison targets and the extent to which women perceive their appearance to be personally attainable would help shed light on this topic. Nevertheless, the results of the present study show that upward appearance comparisons can contribute to women's diet and exercise behavior, particularly if they are made in person or through social media.

Moderation by Trait Body Dissatisfaction

This study also investigated whether trait body dissatisfaction moderated any effect of comparison direction and/or comparison context on women's appearance satisfaction, mood, and diet and exercise thoughts and behaviors. In contrast to previous EMA research (Leahey & Crowther, 2008; Leahey et al., 2007, 2011), the present study found that trait body dissatisfaction did not moderate any effect of upward appearance comparisons made in different contexts on any of the outcome measures. It is possible that this discrepancy for body dissatisfaction is due to the measures used in the different studies. For example, the Body Dissatisfaction subscale of the EDI used in the present study only examines cognitive indices of body dissatisfaction (such as the extent to which participants think their thighs are too big). In contrast, previous EMA studies have used the Body Shape Questionnaire (Cooper, Taylor, Cooper, & Fairburn, 1987) as a measure of body dissatisfaction, which assesses the frequency with which participants experience cognitive, affective, and behavioral indices of body dissatisfaction (such as the extent to which worrying about their weight makes participants diet). Despite any potential methodological differences between studies, the current results suggest that moderation by trait body dissatisfaction in an EMA context might not be robust, and that even women low on body dissatisfaction can experience the negative effects of appearance comparisons.

Limitations and Future Directions

Several limitations to the present study should be noted. First, in keeping with other EMA research (Leahey & Crowther, 2008; Leahey et al., 2007, 2011; Myers et al., 2012; Ridolfi et al., 2011), the purpose of the study was not disguised to participants and it is possible that the results of the study were influenced by demand characteristics. For example, participants may have made more appearance comparisons during the testing period because they knew that the study was concerned with appearance comparisons. However, this situation is unlikely given that participants did not progressively report more appearance comparisons throughout the five-day testing period. In addition, it is unlikely that participants would alter the context in which they compared their appearance and the outcome of those comparisons in the present study as a result of demand characteristics. Second, although the present study was novel in assessing comparisons through social media, only a single "social media" category was assessed, and that category could include any social media platform. There are a variety of different social media platforms through which women can make appearance comparisons (e.g., Facebook, Instagram, Twitter, videogames), and these platforms may contain different comparison targets or different features that could influence the impact of comparisons. Therefore, future EMA research could examine appearance comparisons made through different social media platforms to see if they differentially impact women's body image and related constructs. Third, the present study examined the immediate impact of appearance comparisons made in different contexts on women's body image, mood, and diet and exercise thoughts and behaviors. Future longitudinal research could examine these associations over longer periods of time to test whether chronically making upward appearance comparisons in certain contexts (e.g., social media) predicts more negative mood, body dissatisfaction, and unhealthy weight loss behaviors over time.

In the present study, two hypotheses were suggested regarding the impact of upward appearance comparisons made in different contexts; (1) comparisons made in contexts containing peers (e.g., social media, in person) would lead to worse outcomes than comparisons made in contexts that primarily contain models and celebrities (e.g., traditional media); and (2) comparisons made in contexts containing somewhat idealized targets (e.g., social media, traditional media) would lead to worse outcomes than comparisons made in contexts that contain more realistic presentations of targets (e.g., in person). (Note that one of the original aims of this study was to examine the relative effects of comparisons to different target groups (e.g., peers, celebrities) made in different contexts. Unfortunately, there were not enough comparisons made to certain targets (particularly through social media), precluding any meaningful analyses based on the specific target of comparison. Therefore, the target of comparison was not reported in this paper.) Together the results of the present study suggest that both the target of comparison (e.g., peers or celebrities) and the extent to which the target's appearance is idealized (e.g., through photo manipulation techniques or careful selection of images) may be important when considering the impact of appearance comparisons made in different contexts. Further research is needed, however, experimentally manipulating the target of comparison (e.g., peers or models) and the idealized presentation of those targets (e.g., edited/idealized or realistic) to more clearly determine the influence of those factors on women's body image.

Conclusions

The findings of the present study indicate that the majority of appearance comparisons in women's everyday lives occur in person. This is an important finding given that the majority of

research in the literature has focused on comparisons through traditional forms of media (e.g., magazines; Myers & Crowther, 2009). In-person comparisons were varied in direction, and upward appearance comparisons made in person were associated with less negative outcomes than comparisons made through media platforms (specifically social media). Although less common than in-person comparisons, women also compared their appearance to others through social media and, to a lesser extent, traditional media platforms. The majority of appearance comparisons made through social and traditional media were upward in direction and these comparisons negatively impacted women's appearance satisfaction, thoughts of dieting and exercising, and diet and exercise behavior (for social media comparisons). Furthermore, upward comparisons through social media had the worst impact of any context on women's mood. These findings suggest that appearance comparisons through social media may be particularly harmful to young women's mental and physical health. Given the popularity of social media among young women, it is important to reduce the frequency of such pernicious social media comparisons in women's everyday lives. Thus, in addition to addressing traditional media, body image and eating disorder intervention programs could address the impact of appearance comparisons on social media on users' body image concerns, mood, and diet and exercise behavior. For example, intervention programs could highlight the idealized nature of the images and content uploaded to social media and encourage students to de-construct these idealized self-presentations in order to reduce the negative impact of comparisons made in this context.

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