Published in final edited form as:

Int J Eat Disord. 2017 August ; 50(8): 893–905. doi:10.1002/eat.22725.

Eating Disorder-Related Social Comparison in College Women's Everyday Lives

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Abstract

Objective—This study examined: frequency of upward and downward body, eating, and exercise comparisons; context in which these comparisons occur; and body, eating, and exercise comparison direction as predictors of concurrent body dissatisfaction and disordered eating thoughts, urges, and behaviors in college women's everyday lives using ecological momentary assessment (EMA).

Method—Participants were 232 college women who completed a two-week EMA protocol, using their personal electronic devices to answer questions three times per day.

Results—First, body, eating, and exercise comparisons were common. Second, when these comparisons were made, they were typically upward. Third, body comparisons were most oftentimes made about weight and shape and eating comparisons about healthiness and amount of food. Exercise comparisons were made on a wider variety of dimensions. Fourth, most body and eating comparisons were made with strangers and close friends, respectively, while exercise comparisons were made with a variety of individuals. Upward comparisons were usually made with acquaintances and strangers. Fifth, results shed light on where college women compare themselves. Sixth, upward comparisons were found to have negative consequences, and downward comparisons were generally not found to have a buffering effect on eating pathology.

Discussion—Results suggest targeting not only body but also eating and exercise comparisons in intervention. Also, prevention/intervention approaches should not promote engagement in downward comparisons, as they were not found to be protective and were even harmful at times. Clinicians should be attuned to the categories on which, with whom, and where college women are most likely to compare.

Keywords

ecological momentary assessment; social comparison; disordered eating; eating disorder; college students

Comparing oneself to others is pervasive (Suls, Martin, & Wheeler, 2002), as humans have an innate drive to understand how and where they fit into the world (Festinger, 1954), and applies to appearance-related aspects. Indeed, appearance-related comparisons with peers

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are common among college women (Leahey, Crowther, & Mickelson, 2007) and have harmful negative associations, including body dissatisfaction and disordered eating (Fitzsimmons-Craft, 2011; Leahey et al., 2007; Myers & Crowther, 2009). More specifically, comparisons regarding body (e.g., weight, shape), eating (e.g., amount eaten, food healthfulness), and exercise (e.g., amount/intensity of exercise) may be particularly relevant to eating pathology. Body comparisons may increase discrepancy between a woman's actual and ideal body, which may increase thoughts about or actions to "fix" the body, while eating and exercise comparisons focus more on behaviors that may be required to achieve one's ideal body (Fitzsimmons-Craft, Bardone-Cone, & Harney, 2012; Fitzsimmons-Craft, Ciao, & Accurso, 2016). Most past research on the social comparison-eating pathology relation has focused on body comparisons (e.g., Arigo, Schumacher, & Martin, 2014; Vartanian & Dey, 2013). While eating and exercise comparisons have received less attention, they should not go ignored, given research indicating their negative impact (Fitzsimmons-Craft et al., 2016; Fitzsimmons-Craft et al., 2015).

Comparison direction also deserves attention. Women engage in more upward (i.e., with someone perceived as "better off") than downward (i.e., with someone perceived as "worse off") comparisons (Leahey et al., 2007; Leahey & Crowther, 2008; Leahey, Crowther, & Ciesla, 2011; O'Brien et al., 2009), and these comparisons may have differential consequences. Upward appearance-related comparisons have been consistently linked to negative consequences (e.g., Fitzsimmons-Craft 2011), while the effects of downward comparisons are mixed. Some research has demonstrated positive effects (e.g., Bailey & Ricciardelli, 2010; O'Brien et al., 2009), leading some treatment approaches to conceptualize downward comparisons as having a buffering effect on the negative effects of upward comparisons (Paxton & McLean, 2010). However, other research has demonstrated neutral or even negative effects (e.g., Lin & Kulik, 2002; Lin & Soby, 2016; Rancourt, Schaefer, Bosson, & Thompson, 2016). Furthermore, given the pervasiveness of these comparisons in young women's lives, it is crucial to fully understand how, with whom, and where they manifest, which may include understanding: categories on which women are comparing their body, eating, and exercise to others; relationship to comparison target; and where these comparisons are happening, both in terms of specific location and the density of people present when comparisons occur.

Ecological momentary assessment (EMA) circumvents limitations of traditional self-report questionnaires (e.g., often completed in experimental settings, require retrospective recall) by collecting data in the natural environment and allowing for real-time reporting (Smyth et al., 2001). Research using this methodology has established that: women are more likely to make upward appearance comparisons than they are to make neutral (i.e., with someone equally attractive) or downward appearance comparisons (Leahey & Crowther, 2008; Leahey et al., 2007, 2011); upward appearance comparisons have the most negative effects on body image in the natural environment (Leahey et al., 2007, 2011; Myers et al., 2012); and the importance of appearance comparison context, for example, finding that most comparisons are made in-person vs. on media outlets (Fardouly, Pinkus, & Vartanian, 2017). A separate line of research has established the harmful effects of trait and momentary body, eating, and exercise comparisons on eating pathology (e.g., Fitzsimmons-Craft et al., 2014, 2015, 2016). For example, past work has indicated that overall tendencies to engage in body,

eating, and exercise comparisons are correlated with body dissatisfaction and eating disorder psychopathology (Fitzsimmons-Craft et al., 2014) and that overall levels of engagement in these comparisons serve as proximal triggers for body dissatisfaction (Fitzsimmons-Craft et al., 2015) and prospectively predict certain disordered eating thoughts and behaviors (Fitzsimmons-Craft et al., 2016). However, prior research has been lacking in a number of ways: 1) studies of upward and downward appearance comparisons have not considered eating and exercise domains; 2) the context in which eating disorder-related social comparisons occur has not been comprehensively described; and 3) studies of eating and exercise comparisons have not considered comparison direction. The current study addresses these gaps in prior research, and the purpose was to examine, in an exploratory, primarily descriptive fashion: 1) frequency of upward and downward body, eating, and exercise comparisons; 2) context in which these comparisons occur; and 3) body, eating, and exercise comparison direction as predictors of body dissatisfaction, one of the most robust risk factor for eating disorders (Stice, 2002), and disordered eating thoughts, urges, and behaviors in college women's everyday lives using EMA. Findings have the potential to directly inform eating disorder prevention and intervention efforts by shedding light on the types of comparisons that are occurring and associated with negative consequences in women's everyday lives, as well as the context in which these comparisons take place, providing specific information on intervention targets.

Method

Participants

Participants were 235 women attending a large, public Southeastern university recruited through introductory psychology courses. This study was part of a larger study on psychosocial predictors of college women's body image and disordered eating (Fitzsimmons-Craft et al., 2014). At the initial assessment, participants ranged in age from 17 to 22 years, with a mean age of 18.70 years ($SD = 1.00$). Most women (68.9%) identified as White, 7.7% as African American or Black, 7.7% as Asian, 4.3% as Hispanic, 1.3% as American Indian or Alaskan Native, 9.8% as multiracial/multiethnic, and 0.4% as other races/ethnicities. Highest parental education was used as a proxy for socioeconomic status and ranged from 7 to 21 years ($M = 16.50$, $SD = 2.68$). Body mass index (BMI) was calculated from self-reported height and weight and ranged from 16.13 to 41.60 kg/m² ($M = 22.56$, $SD = 3.43$).

Procedure

A study orientation session informed participants about study procedures, EMA reporting procedures, and behaviors participants would track. Participants were provided with a short manual containing information discussed. Participants then completed the two-week EMA protocol using their personal electronic devices to answer questions three times per day: late morning (10:30 am–1:30 pm), late afternoon (3:30 pm–6:30 pm), and before going to sleep (10:00 pm–1:00 am). Participants were provided with these times as guidelines but also received a reminder email with the survey link at the beginning of each time period. Participants received reminder text messages for the first three days of data collection as well, except for one participant who opted out. Research has indicated that EMA reactivity

is at most a minimal concern (Crosby et al., 2009; Heron & Smyth, 2013; Hufford, Shields, Shiffman, Paty, & Balabanis, 2002; Leahey et al., 2007; Stein & Corte, 2003), that participant burden is not excessive (Smyth et al., 2001; Wegner et al., 2002), and that collecting EMA data via personal computers is feasible (Zuckerman & O'Loughlin, 2006). Furthermore, compliance is improved with participant-management procedures such as training and check-ins (Shiffman, 2009); thus, research assistants contacted participants at least three times per week, once via phone and twice via email, to check in and address problems. Participants were also contacted by phone and email on any day after they failed to complete a bedtime report to request that they complete all reports for that day. Participants were provided with research credit in their psychology courses for their participation. Participants were also incentivized to maximize compliance through drawings for one of six \$100 prizes if they completed all study components and at least 85% of the EMA question sets. This study was approved by the university's Institutional Review Board.

Measures

Social comparison frequency—Participants were asked to report how many times they compared their body, eating, and exercise to a same-sex peer since the last time they were signaled, similar to past research (e.g., Leahey et al., 2007; Ridolfi, Myers, Crowther, & Ciesla, 2011).

Information on most recent comparison—If participants endorsed engaging in at least one body/eating/exercise comparison since the last time they were signaled, a number of follow-up questions were asked. First, regarding **comparison direction**, similar to past research (e.g., Leahey et al., 2007; Ridolfi et al., 2011), participants were asked to determine whether the comparison was upward or downward by using a 5-point scale (e.g., “Compared to the last peer who you compared your BODY with, did you think you looked... 1 = much worse, 2 = worse, 3 = same, 4 = better, or 5 = much better). Responses of “much worse” and “worse” were coded as upward comparisons, “same” as neutral, and “better” and “much better” as downward. Second, if participants endorsed engaging in an upward or downward comparison, they were asked about the **categories** in which they felt their body/eating/exercise was worse or better, respectively, than the comparison target. Participants checked all categories that applied. For body, these categories were: “weight,” “shape,” “muscularity/level of tone,” and “other.” For eating, they were: “healthiness,” “amount,” “level of balance,” “speed,” and “other.” For exercise, they were: “intensity,” “length of time,” “type of exercise,” “speed (e.g., running pace),” “quantity (e.g., days per week),” and “other.” For each category checked, participants were asked why they felt worse (e.g., because their weight was less or more) or better (e.g., because their weight was less or more). Third, participants were asked to describe their **relationship** with the peer they made this most recent comparison with, with the following responses provided: “close friend;” “acquaintance;” and “stranger.” Fourth, participants were asked to indicate their **location** when they made this most recent comparison, with the following responses provided: “where I or someone else lives (e.g., dorm room, sorority house, apartment);” “walking around (e.g., on campus);” “at the gym or somewhere else working out (e.g., running or walking outside);” “eating somewhere (e.g., at the dining hall, in a restaurant);” “somewhere on campus (but not walking around) (e.g., in class, in the library doing homework);”

“shopping (e.g., at the mall);” and “other.” Participants were asked to choose the *most relevant* option if more than one applied. Fifth, participants were asked to indicate the **density of individuals present** when they made this most recent comparison, with the following responses provided: “just the person I compared with;” “a few or a handful of other people;” “a moderately sized group of people (e.g., in a small seminar class of about 15 or 20 people);” or “a relatively large group of people (e.g., at a party, at a large exercise class).”

In order to discourage participants from answering “no” to having engaged in a recent comparison to avoid follow-up questions, “filler” questionnaires were administered to participants who endorsed engaging in no body (i.e., General Self-Efficacy Scale; Sherer et al., 1982, with instructions to think about the period of time since last signal when responding), eating (i.e., Rosenberg Self-Esteem Scale; Rosenberg, 1965, with instructions to think about the period of time since last signal when responding, as well as a multiple-choice question about how time was spent since the last signal), or exercise comparisons (i.e., Self-Concept Clarity Scale; Campbell et al., 1996, with instructions to think about the period of time since last signal when responding) that took roughly the same amount of time as the social comparison engagement follow-up questions.

Negative affect—Negative affect was assessed using a five-item version of the negative affect subscale of the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988) developed by Kercher (1992) and further validated by Mackinnon et al (1999). Participants were asked to rate their current level of five negative emotions (i.e. distressed, upset, scared, nervous, afraid) on a scale ranging from 1 = *not at all* to 5 = *very much*. Items were summed to create a subscale score. In the current study, alpha was .86.

Body dissatisfaction—Body dissatisfaction was assessed using visual analogue scales. Weight dissatisfaction was assessed using the following item: “Please slide the bar to indicate how dissatisfied with your WEIGHT you have been since the last time you were signaled, where 0 = not at all dissatisfied and 100 = very dissatisfied.” A parallel question assessing level of shape dissatisfaction was administered as well. The average of these two items was used as a measure of body dissatisfaction. Previous naturalistic work supports the use of single items to assess body dissatisfaction (Durkin, Paxton, & Sorbello, 2007). In the current study, alpha was .89.

Disordered eating thoughts, urges, and behaviors—Disordered eating thought and urge intensity was rated from 0 = not at all to 6 = markedly using the following four questions: “Have you thought about trying to restrict the amount or type of food you eat in order to influence your shape or weight?” (i.e., restriction thoughts), “Have you thought about exercising as a means of controlling your weight, altering your shape or amount of fat, or burning off calories” (i.e., exercise thoughts), “Have you thought about vomiting as a means of trying to control your shape or weight?” (i.e., vomiting thoughts), and “Have you had the urge to binge eat?” (i.e., binge eating urges). Participants were asked to think about the period of time since the last time they were signaled in responding to these questions.

Disordered eating behaviors were assessed using the following four yes/no questions: “Did you attempt to restrict your eating to influence your shape or weight since the last time you were signaled?” (i.e., restriction attempt), “Did you actually exercise to influence your shape or weight since the last time you were signaled?” (i.e., exercising), “Did you actually vomit since the last time you were signaled?” (i.e., vomiting), and “Did you actually binge eat since the last time you were signaled?” (i.e., binge eating).

The disordered eating thoughts, urges, and behaviors questions were adapted from the Eating Disorders Examination-Questionnaire (EDE-Q; Fairburn & Beglin, 2008) and have been used in previous EMA research (Leahey et al., 2007, 2011).

The full text of the EMA items is available in online supplemental material.

Analytic Strategy

First, we descriptively examined overall frequencies of upward and downward body, eating, and exercise comparisons and compared likelihood of a comparison being upward or downward across the three comparison types using McNemar tests. Next, we descriptively examined: categories in which participants felt their body, eating, or exercise was worse or better than the comparison target; participants’ relationship to the comparison target; comparison location; and density of individuals present when making the comparison. We tested whether these differed depending on comparison direction using chi-square tests, following up on significant differences using post hoc tests. Finally, generalized estimating equation models, using Huber-White standard error estimates, were used to assess body, eating, and exercise comparison direction (i.e., upward vs. downward, both relative to neutral) as predictors of concurrent (i.e., over the same short-term assessment period) body dissatisfaction (using scale response data and a gamma distribution), each index of disordered eating thoughts and urges (using scale response data and a gamma distribution) and disordered eating behaviors (using binary response data and a binomial distribution), controlling for body dissatisfaction (in the case of the disordered eating models), negative affect, and BMI. For these models, we calculated pseudo- R^2 as a measure of effect size using corrected quasi-likelihood under independence model criterion (QICC) values. This value represents the change in pseudo- R^2 when the variables of interest (i.e., upward and downward body, eating, and exercise comparisons) were added to the model. All analyses were performed using SPSS Version 19.0.

Results

Participants provided 8,813 separate EMA recordings. Overall compliance with completing EMA surveys was high at 89.3%. Participants’ timeliness was also good, with 73.8% of reports completed within time guidelines. We examined z scores in order to determine survey completion outliers. Three participants completed 21, 24, and 26 surveys ($z = -3.0$); all other participants completed 28 or more surveys. Data from these three participants were excluded, yielding a final sample of 232.

Grand means for person-level means (i.e., individuals’ mean levels of a construct over the reporting period [past several hours] across the two-week EMA period) for overall

frequencies of social comparisons were as follows: 2.32 ($SD = 2.45$) for body comparisons; .88 ($SD = .95$) for eating comparisons; and .71 ($SD = 1.04$) for exercise comparisons. Of the 8,742 valid EMA reports, 52.4% contained a report of one or more body comparisons, 35.9% contained a report of one or more eating comparisons, and 25.6% contained a report of one or more exercise comparisons. Any body comparison was reported by 99.1% of the sample, any eating comparison by 95.7%, and any exercise comparison by 95.3%. No participant recorded zero comparisons of any type.

Comparison direction

Direction of most recent body, eating, and exercise comparison is depicted in Table 1. McNemar tests showed that significantly more body comparisons were endorsed as upward compared to eating comparisons ($\phi = .16, p < .001$), and significantly more exercise comparisons were endorsed as upward compared to body ($\phi = .24$) or eating ($\phi = .15$) comparisons ($p < .001$). Significantly fewer exercise comparisons were endorsed as downward compared to body ($\phi = .12$) or eating ($\phi = .09$) comparisons ($p < .001$), while the proportions of downward comparisons across body and eating comparisons did not differ ($\phi = .09, p = .845$).

Comparison categories

Information on the categories in which participants felt their body, eating, or exercise was worse or better than the comparison target is presented in Table 2. The majority of participants felt their body was worse or better than the comparison target because of their weight or shape, with fewer endorsing feeling this way because of muscularity/level of tone or some other dimension. Downward body comparisons were more likely to be made about shape than upward comparisons ($\chi^2(1, N = 3,394) = 36.29, d = .21, p < .001$), but the percentage of comparisons that were made about weight ($d = .04$) and muscularity/level of tone ($d = .02$) did not differ by direction ($p > .249$). When participants felt worse about their bodies, it was almost always because their weight was more or their muscularity was less, and most oftentimes because their shape was curvier.

The majority of participants felt their eating was worse or better than the comparison target because of healthiness and amount of food, with fewer endorsing feeling this way because of level of balance, speed, or some other dimension. Upward eating comparisons were more likely to be made about amount of food ($\chi^2(1, N = 1,924) = 6.07, d = .11, p = .014$) and speed of eating ($\chi^2(1, N = 1,924) = 21.31, d = .21, p < .001$), while downward eating comparisons were more likely to be made about one's level of balance ($\chi^2(1, N = 1,924) = 27.69, d = .24, p < .001$). The percentages of comparisons that were made about healthiness did not differ by direction ($d = .06, p = .202$). When participants endorsed feeling worse about their eating, it was almost always because their eating was less healthy, a larger amount, less balanced, or faster.

Participants felt their exercise was worse or better than the comparison target for a wider variety of reasons, with all of the following categories endorsed by one-third to two-thirds of participants: intensity, length of time, type of exercise, speed, and quantity. Few endorsed feeling worse or better because of some other dimension. Upward exercise comparisons

were more likely to be made about quantity ($\chi^2(1, N = 1,625) = 39.64, d = .32, p < .001$), while downward exercise comparisons were more likely to be made about intensity ($\chi^2(1, N = 1,625) = 10.99, d = .17, p = .001$), length of time ($\chi^2(1, N = 1,625) = 20.15, d = .22, p < .001$), type ($\chi^2(1, N = 1,625) = 6.27, d = .12, p = .012$), and speed ($\chi^2(1, N = 1,625) = 14.27, d = .19, p < .001$). When participants endorsed feeling worse about their exercise, it was almost always because their exercise was less intense, shorter in duration, easier, slower, or at a lower quantity.

Relationship to comparison target

As depicted in Table 3, participants reported making most of their body comparisons with strangers, while the majority of their eating comparisons were made with close friends. Exercise comparisons were made with a wider variety of people, with 38.1% of upward exercise comparisons made with a close friend and 38.3% made with a stranger. Nearly 50% of downward exercise comparisons were made with a close friend, with the rest being split between strangers and acquaintances. Relationship to target did not differ across body comparison direction ($\chi^2(2, N = 3,385) = .25$, Cramer's $V = .01, p = .883$) but did differ across eating ($\chi^2(2, N = 1,919) = 14.33$, Cramer's $V = .09, p = .001$) and exercise ($\chi^2(2, N = 1,624) = 10.75$, Cramer's $V = .08, p = .005$) comparison direction. In terms of drivers of these differences, post hoc tests revealed that more upward than downward eating comparisons were made with acquaintances ($p = .002$), more downward than upward exercise comparisons were made with close friends ($p = .010$), and more upward than downward exercise comparisons were made with strangers ($p = .016$).

Location

As depicted in Table 4, participants most frequently endorsed making body comparisons where they or someone else lived or walking around. Over 50% of eating comparisons were made eating somewhere, and about one-third were made where the participant or someone else lived. Interestingly, the majority of downward exercise comparisons were made at the gym or somewhere else working out (42.3%), but relatively few upward exercise comparisons were made in this location (15.4%). Few comparisons were made other locations on campus or while shopping. Location did not differ across eating comparison direction ($\chi^2(6, N = 1,924) = 10.51$, Cramer's $V = .03, p = .105$) but did differ across body ($\chi^2(6, N = 3,394) = 16.06$, Cramer's $V = .03, p = .013$) and exercise ($\chi^2(6, N = 1,625) = 123.64$, Cramer's $V = .11, p < .001$) comparison direction. In terms of drivers of these differences, post hoc tests revealed that more upward than downward exercise comparisons were made when walking around ($p = .001$), and more downward than upward exercise comparisons were made at the gym or somewhere else working out ($p < .001$). No post hoc tests emerged as significant across body comparison direction.

Density of individuals present

As depicted in Table 5, all types of comparisons were most likely to occur when around a few or a handful of other people. The number of individuals around did not differ across body ($\chi^2(3, N = 3,390) = 1.96$, Cramer's $V = .02, p = .580$), eating ($\chi^2(3, N = 1,922) = 4.99$, Cramer's $V = .05, p = .172$), or exercise ($\chi^2(3, N = 1,625) = 5.27$, Cramer's $V = .06, p = .153$) comparison direction.

Association with concurrent body dissatisfaction and disordered eating thoughts, urges, and behaviors

Results of the analyses examining body, eating, and exercise comparison direction as a predictor of body dissatisfaction and disordered eating outcomes over the same short-term assessment period are presented in Tables 6 and 7.

Results revealed that upward body and eating comparisons were associated with increased body dissatisfaction ($ps < .001$). Upward exercise comparisons were associated with decreased likelihood of engagement in actual exercise ($p < .001$).

Downward body comparisons were not significantly associated with any outcomes. Downward eating comparisons were associated with increased thoughts about restriction ($p = .001$), increased likelihood of engagement in a restriction attempt ($p < .001$), and decreased likelihood of engagement in binge eating ($p = .001$). Downward exercise comparisons were associated with decreased binge eating urges ($p < .001$) and an increased likelihood of engagement in actual exercise ($p = .010$).

Otherwise, upward and downward body, eating, and exercise comparisons were not associated with other outcome variables. Body dissatisfaction was significantly positively associated with all outcome variables, with the exception of exercising ($p = .180$).

Discussion

This study, in a primarily descriptive fashion, examined eating disorder-related social comparisons in college women's everyday lives, including their frequency, context, and consequences. First, these comparisons were common—nearly all participants reported engaging in a body, eating, and exercise comparison at least once over the study period, and over half of the EMA surveys completed contained a report of a body comparison, over one-third a report of an eating comparison, and over one-fourth a report of an exercise comparison. These results are in line with social comparison theory and the idea that humans have an innate drive to understand their place in the world (Festinger, 1954). Second, across categories, when these comparisons were made, they were typically upward. While Festinger's (1954) original social comparison theory hypothesized that people generally have a drive to make comparisons that result in favorable outcomes, research has indicated that this tenant of the original theory does not hold among women who make appearance-related comparisons (Fitzsimmons-Craft, 2011). As mentioned, previous work has indicated that body comparisons are generally upward (Leahey & Crowther, 2008; Leahey et al., 2007, 2011; O'Brien et al., 2009), and these results confirm this pattern of findings is the case for eating and exercise comparisons as well. Furthermore, exercise comparisons were most likely to be upward followed by body and then eating comparisons. Many exercise comparisons may be prompted by seeing or hearing about someone actually exercising and may be less likely to be prompted by the *absence* of someone exercising—resulting in more upward comparisons, whereas body and eating comparisons may be prompted by a wider variety of targets in daily life (e.g., seeing someone much thinner or much larger, seeing someone eating much more or less)—resulting in comparisons in a wider variety of directions. Future research should explicitly test this hypothesis. Third, body comparisons

were most oftentimes made about weight and shape and eating comparisons about healthiness and amount of food. Exercise comparisons were made on a wider variety of dimensions, and notably, upward comparisons were more likely to be made about quantity while downward comparisons were more likely to be made about intensity. This is line with the idea that many upward exercise comparisons may be prompted by seeing or hearing about someone else actually exercising—resulting in comparisons about quantity, whereas most downward exercise comparisons are made while one is actually exercising—discussed in more detail below and resulting in comparisons about a factor that can easily be compared in the moment, intensity. When participants endorsed feeling worse about themselves, it was almost always because of lack of alignment with features that can be thought of as associated with the thin ideal. These findings are in line with past research indicating an “expected” appearance (Kimber, Georgiades, Jack, Couturier, & Wahoush, 2015) and takes that idea further to suggest “expected” ways to eat and exercise.

Fourth, results provided insight on with whom college women compare themselves, suggesting this may vary across domains. Most body comparisons were made with strangers—perhaps the result of being exposed to the bodies of many strangers in college student daily life, and most eating comparisons were made with close friends—perhaps the result of the fact that most eating, if done with someone else, takes place with a friend. In contrast, exercise comparisons were made with a wider variety of individuals, which could be the result of exercise comparisons being prompted by a variety of situations (e.g., friend talking about exercise, seeing a stranger running, being at the gym with a close friend and also seeing strangers exercise). Notably, more upward than downward eating and exercise comparisons were made with acquaintances and strangers, respectively, and more downward than upward exercise comparisons were made with close friends. This pattern suggests that the most damaging comparisons may be made with targets the individual does not have a close relationship with, perhaps indicating it is easier to idealize acquaintances and strangers than close friends (Fardouly et al., 2017; Leahey & Crowther, 2008). Fifth, results shed light on where college women compare themselves, both in terms of physical location and density of individuals present. Most body and eating comparisons were made where individuals lived, walking around, and while eating, and most oftentimes with just a few or a handful of other individuals present. Interestingly, a significantly greater proportion of downward than upward exercise comparisons were made while working out, and relatively few upward exercise comparisons were made while engaging in physical activity. Thus, damaging exercise comparisons are typically being made when not actually working out, and once individuals actually engage in physical activity, they make relatively few comparisons that make them feel badly.

Sixth and finally, upward body and eating comparisons were associated with elevated concurrent body dissatisfaction. Upward exercise comparisons were associated with a decreased likelihood of actually exercising, dovetailing with the finding that upward comparisons are typically not made during physical activity. It is notable that upward comparisons were not concurrently associated with increased disordered eating thoughts, urges, or behaviors; yet, body dissatisfaction was a significant predictor in all but one of these models, and negative affect was significant in many. This highlights the potency of body dissatisfaction and negative affect as concurrent predictors of in-the-moment

disordered eating thoughts and behaviors. Future research may wish to explicitly test if the relationship between in-the-moment upward comparisons and eating pathology is mediated by body dissatisfaction. Importantly, with just two minor exceptions, downward eating disorder-related comparisons were not found to have a buffering effect on eating pathology, standing in contrast to work demonstrating positive effects (Bailey & Ricciardelli, 2010; O'Brien et al., 2009). In fact, downward comparisons were associated with some negative consequences, including increased restriction thoughts and attempts.

Strengths of this study include the use of EMA, the comprehensive assessment of eating disorder-related comparisons, and the stringent test of the relations between comparisons and disordered eating outcomes, as analyses were run adjusting for body dissatisfaction, negative affect, and BMI—strong correlates of disordered eating (Keel, Forney, Brown, & Heatherton, 2013; Stice, 2002). In terms of limitations, participants were asked to fill out EMA question sets three times per day during certain windows rather than being randomly signaled. Additional limitations include: the assessment of restriction and exercise, as endorsement of these items may not always reflect disordered eating; that we did not specifically assess for comparisons with peers on social media—although past research indicates the majority of appearance comparisons occur in person (Fardouly et al., 2017); and the use of a non-clinical, exclusively female college sample with limited racial/ethnic diversity, which may limit generalizability. Finally, it is acknowledged that comparisons can occur both intentionally and unintentionally (Suls et al., 2002). As such, the social comparison frequency data may represent an underestimate of the actual frequency of social comparisons. However, other research has indicated that social comparisons are cognitively effortful processes (e.g., Want et al., 2015; Want & Saiphoo, 2017), suggesting individuals may be generally aware of comparisons as they occur.

These results have clinical implications. For one, when social comparisons are targeted in eating disorder prevention and intervention, the focus is typically on body comparisons (e.g., Fairburn, 2008). Results suggest the importance of targeting eating and exercise comparisons as well, given their high prevalence in women's everyday lives and negative consequences. Also, prevention/intervention approaches should not promote engagement in downward comparisons, as they were not found to be protective and even harmful at times. Finally, clinicians should be attuned to the categories on which, with whom, and where college women are most likely to compare, particularly noting that most damaging comparisons may be made with acquaintances and strangers.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

Supported by F31 MH093978 from the National Institute of Mental Health; T32 HL007456 from the National Heart, Lung, and Blood Institute; and University of North Carolina at Chapel Hill Department of Psychology Earl and Barbara Baughman Dissertation Research Award.

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Table 1

Direction of most recent body, eating, and exercise comparison

Comparison Type	Number of EMA signals with at least one body/eating/ exercise comparison reported (% of total valid EMA reports [8,742])	Upward (% of total body/eating/ exercise comparisons reported)	Neutral (% of total body/eating/ exercise comparisons reported)	Downward (% of total body/ eating/exercise comparisons reported)
Body	4,583 (52.4%)	2,056 (44.9%)	1,189 (25.9%)	1,338 (29.2%)
Eating	3,136 (35.9%)	1,067 (34.0%)	1,212 (38.6%)	857 (27.3%)
Exercise	2,234 (25.6%)	1,273 (57.0%)	609 (27.3%)	352 (15.8%)

Table 2

Categories in which participants felt their body, eating, or exercise was worse or better than the comparison target and reason why

Comparison type	Category				
	Weight	Shape	Muscularity/level of tone	Other	
Upward body comparison (n = 2,056)	1,500 (73.0%) 94.5% felt worse because their weight was more	1,262 (61.4%) 80.2% felt worse because their shape was curvier	829 (40.3%) 97.0% felt worse because their muscularity/level of tone was less	78 (3.8%)	
Downward body comparison (n = 1,338)	1,000 (74.7%) 92.6% felt better because their weight was less	956 (71.4%) 70.1% felt better because their shape was less curvy	552 (41.3%) 96.9% felt better because their muscularity/level of tone was more	50 (3.7%)	
	Healthiness		Level of balance		Other
	Amount			Speed	
Upward eating comparison (n = 1,067)	704 (66.0%) 93.9% felt worse because their eating was less healthy	745 (69.8%) 93.0% felt worse because their amount of food was larger	161 (15.1%) 97.5% felt worse because their eating was less balanced	98 (9.2%) 93.9% felt worse because their eating was faster	7 (.7%)
Downward eating comparison (n = 857)	589 (68.7%) 98.5% felt better because their eating was healthier	553 (64.5%) 92.5% felt better because their amount of food was smaller	211 (24.6%) 99.5% felt better because their eating was more balanced	33 (3.9%) 84.8% felt better because their eating was slower	9 (1.1%)
	Intensity		Type of exercise		Other
	Length of time			Speed (e.g., running pace)	Quantity (e.g., days per week)
Upward exercise comparison (n = 1,273)	564 (44.3%) 99.6% felt worse because their exercise was less intense	368 (28.9%) 99.5% felt worse because the amount of time they exercised was shorter	364 (28.6%) 98.6% felt worse because their type of exercise was easier	259 (20.3%) 100.0% felt worse because their exercise was at a slower pace/speed	805 (63.2%) 99.7% felt worse because their exercise was at a lower quantity
Downward exercise comparison (n = 352)	191 (54.3%) 97.4% felt better because their exercise was more intense	146 (41.5%) 96.6% felt better because the amount of time they exercised was longer	125 (35.5%) 99.2% felt better because their type of exercise was more difficult	105 (29.8%) 97.1% felt better because their exercise was at a faster pace/speed	157 (44.6%) 98.7% felt better because their exercise was at a higher quantity

Table 3

Relationship to the comparison target

	Close friend	Acquaintance	Stranger
Upward body comparison (<i>n</i> = 2,056)	622 (30.3%)	557 (27.1%)	872 (42.4%)
Downward body comparison (<i>n</i> = 1,338)	410 (30.6%)	352 (26.3%)	572 (42.8%)
Upward eating comparison (<i>n</i> = 1,067)	702 (65.8%)	236 (22.1%)	128 (12.0%)
Downward eating comparison (<i>n</i> = 857)	587 (68.5%)	135 (15.8%)	131 (15.3%)
Upward exercise comparison (<i>n</i> = 1,273)	485 (38.1%)	301 (23.6%)	487 (38.3%)
Downward exercise comparison (<i>n</i> = 352)	165 (46.9%)	81 (23.0%)	105 (29.8%)

Table 4

Location of comparison

	Where I or someone else lives	Walking around	At the gym or somewhere else working out	Eating somewhere	Somewhere on campus (but not walking around)	Shopping	Other
Upward body comparison (<i>n</i> = 2,056)	633 (30.8%)	447 (21.7%)	148 (7.2%)	186 (9.0%)	423 (20.6%)	46 (2.2%)	173 (8.4%)
Downward body comparison (<i>n</i> = 1,338)	374 (28.0%)	287 (21.4%)	78 (5.8%)	156 (11.7%)	264 (19.7%)	32 (2.4%)	147 (11.0%)
Upward eating comparison (<i>n</i> = 1,067)	382 (35.8%)	35 (3.3%)	3 (.3%)	547 (51.3%)	62 (5.8%)	6 (.6%)	32 (3.0%)
Downward eating comparison (<i>n</i> = 857)	254 (29.6%)	37 (4.3%)	2 (.2%)	472 (55.1%)	61 (7.1%)	8 (.9%)	23 (2.7%)
Upward exercise comparison (<i>n</i> = 1,273)	424 (33.3%)	386 (30.3%)	196 (15.4%)	65 (5.1%)	121 (9.5%)	5 (.4%)	76 (6.0%)
Downward exercise comparison (<i>n</i> = 352)	91 (25.9%)	62 (17.6%)	149 (42.3%)	12 (3.4%)	18 (5.1%)	2 (.6%)	18 (5.1%)

Table 5

Density of individuals present when making comparison

	Just the person I compared with	A few or a handful of other people	A relatively large group of people	A moderately sized group of people
Upward body comparison (<i>n</i> = 2,056)	434 (21.1%)	870 (42.3%)	256 (12.5%)	492 (23.9%)
Downward body comparison (<i>n</i> = 1,338)	267 (20.0%)	578 (43.2%)	184 (13.8%)	309 (23.1%)
Upward eating comparison (<i>n</i> = 1,067)	339 (31.8%)	468 (43.9%)	100 (9.4%)	158 (14.8%)
Downward eating comparison (<i>n</i> = 857)	238 (27.8%)	404 (47.1%)	73 (8.5%)	142 (16.6%)
Upward exercise comparison (<i>n</i> = 1,273)	419 (32.9%)	526 (41.3%)	83 (6.5%)	245 (19.2%)
Downward exercise comparison (<i>n</i> = 352)	104 (29.5%)	139 (39.5%)	22 (6.3%)	87 (24.7%)

Table 6

Parameter Estimates for Generalized Estimating Equation Models Examining Social Comparison Direction as a Predictor of Body Dissatisfaction and Disordered Eating Thoughts and Urges Over the Same Short-Term Assessment Period

Criterion Variable	Predictor Variables	B	SE	Wald χ^2	p
<i>Body dissatisfaction</i> <i>Pseudo-R² = .937</i>					
Covariates	Negative affect	.01	.01	1.54	.214
	BMI	.01	.01	1.06	.303
<i>Main Predictor Variables</i>					
	Upward body comparison	.27	.07	16.58	<.001
	Downward body comparison	-.10	.08	1.54	.215
	Upward eating comparison	.21	.05	16.77	<.001
	Downward eating comparison	.04	.06	.46	.496
	Upward exercise comparison	.08	.07	1.08	.299
	Downward exercise comparison	-.10	.10	1.00	.317
<i>Restriction thoughts</i> <i>Pseudo-R² = .867</i>					
Covariates	Body dissatisfaction	.01	.001	42.39	<.001
	Negative affect	.02	.01	4.60	.032
	BMI	.01	.01	2.42	.120
<i>Main Predictor Variables</i>					
	Upward body comparison	-.07	.05	2.00	.158
	Downward body comparison	.01	.05	.01	.907
	Upward eating comparison	-.01	.05	.05	.825
	Downward eating comparison	.14	.04	11.69	.001
	Upward exercise comparison	-.08	.05	2.53	.112
	Downward exercise comparison	.02	.05	.13	.715
<i>Exercise thoughts</i> <i>Pseudo-R² = .890</i>					
Covariates	Body dissatisfaction	.01	.002	11.97	.001
	Negative affect	.01	.01	1.02	.313
	BMI	-.0002	.01	.001	.981
<i>Main Predictor Variables</i>					

Criterion Variable	Predictor Variables	B	SE	Wald χ^2	p
Vomit thoughts <i>Pseudo-R² = .638</i>	Upward body comparison	-.05	.04	1.34	.247
	Downward body comparison	-.02	.04	.19	.660
	Upward eating comparison	.004	.04	.01	.914
	Downward eating comparison	.01	.04	.10	.747
	Upward exercise comparison	-.09	.05	3.81	.051
	Downward exercise comparison	.07	.04	2.85	.091
	<i>Covariates</i>				
	Body dissatisfaction	.004	.001	10.45	.001
	Negative affect	.04	.01	9.61	.002
	BMI	-.03	.02	2.25	.134
Binge eating urges <i>Pseudo-R² = .778</i>	<i>Main Predictor Variables</i>				
	Upward body comparison	.02	.06	.13	.722
	Downward body comparison	-.02	.05	.26	.611
	Upward eating comparison	.15	.08	3.82	.051
	Downward eating comparison	-.04	.04	1.20	.273
	Upward exercise comparison	-.03	.06	.19	.661
	Downward exercise comparison	-.06	.05	1.47	.225
	<i>Covariates</i>				
	Body dissatisfaction	.01	.002	18.95	<.001
	Negative affect	.04	.001	18.25	<.001
Note. BMI = body mass index.	<i>Main Predictor Variables</i>				
	Upward body comparison	-.05	.07	.45	.504
	Downward body comparison	.05	.07	.48	.489
	Upward eating comparison	.10	.06	2.54	.111
	Downward eating comparison	-.11	.06	3.34	.068
	Upward exercise comparison	-.11	.06	3.36	.067
	Downward exercise comparison	-.22	.06	13.69	<.001

Note. BMI = body mass index.

Table 7

Parameter Estimates for Generalized Estimating Equation Models Examining Social Comparison Direction as a Predictor of Disordered Eating Behaviors Over the Same Short-Term Assessment Period

Criterion Variable	Predictor Variables	B	SE	Odds Ratio	Wald χ^2	p
<i>Restriction attempt</i> <i>Pseudo-R² = .789</i>						
<i>Covariates</i>						
	Body dissatisfaction	.02	.01	1.02	10.24	.001
	Negative affect	.06	.03	--	3.10	.078
	BMI	.05	.05	--	.96	.328
<i>Main Predictor Variables</i>						
	Upward body comparison	.01	.21	--	.004	.952
	Downward body comparison	.04	.21	--	.04	.847
	Upward eating comparison	-.06	.20	--	.10	.756
	Downward eating comparison	.86	.17	2.37	24.96	<.001
	Upward exercise comparison	-.20	.21	--	.89	.346
	Downward exercise comparison	.23	.23	--	.99	.321
<i>Exercising</i> <i>Pseudo-R² = .733</i>						
<i>Covariates</i>						
	Body dissatisfaction	.01	.01	--	1.80	.180
	Negative affect	.04	.04	--	1.04	.307
	BMI	-.05	.05	--	.93	.336
<i>Main Predictor Variables</i>						
	Upward body comparison	.23	.23	--	1.00	.317
	Downward body comparison	.19	.22	--	.72	.396
	Upward eating comparison	.16	.23	--	.51	.474
	Downward eating comparison	.18	.18	--	.97	.324
	Upward exercise comparison	-.91	.25	.40	12.86	<.001
	Downward exercise comparison	.62	.24	1.86	6.70	.010
<i>Vomiting</i> <i>Pseudo-R² = .527</i>						
<i>Covariates</i>						
	Body dissatisfaction	.02	.01	1.02	4.08	.043
	Negative affect	.03	.06	--	.18	.671
	BMI	-.38	.25	--	2.43	.119

Criterion Variable	Predictor Variables	B	SE	Odds Ratio	Wald χ^2	p
Binge eating <i>Pseudo-R² = .695</i>	<i>Main Predictor Variables</i>					
	Upward body comparison	1.64	.94	--	3.07	.080
	Downward body comparison	1.36	1.24	--	1.20	.273
	Upward eating comparison	1.12	.63	--	3.13	.077
	Downward eating comparison	-.49	1.19	--	.17	.680
	Upward exercise comparison	.78	.68	--	1.31	.252
	Downward exercise comparison	-.01	1.46	--	-.00004	.995
	<i>Covariates</i>					
	Body dissatisfaction	.03	.01	1.03	15.09	<.001
	Negative affect	.10	.05	1.10	3.87	.049
BMI	-.12	.12	--	.88	.349	
	<i>Main Predictor Variables</i>					
	Upward body comparison	.45	.41	--	1.24	.266
	Downward body comparison	.79	.40	2.20	3.87	.049
	Upward eating comparison	.39	.33	--	1.43	.232
	Downward eating comparison	-1.77	.53	.17	11.26	.001
	Upward exercise comparison	-.13	.47	--	.08	.776
Downward exercise comparison	-.39	.50	--	.62	.433	

Note. BMI = body mass index.