“I Look Up, I Look Down”:
Assessing Antecedents and Consequents of Social Media Social Comparison

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Abstract

Computer-mediated social comparisons have been identified as a threat to psychological well-being. Because online friends selectively self-present, social comparisons may be biased upward, producing feelings of inadequacy. However, existing evidence consistently confounded social comparative thoughts with their causes or outcomes. The present survey tests how traits, motivations, selectivity, and mood management influence computer-mediated downward and upward social comparison, and how comparison influences affect, self-esteem, and misperceptions of others. Results indicated age, social comparison orientation, mood modification, selectivity, and Facebook intensity predicted social comparisons. Younger, frequent users made more upward comparisons, while mood modifiers made more downward comparisons. Comparing upward boosted negative affect, harmed self-esteem, and produced pluralistic ignorance. Downward comparisons enhanced self-esteem and reduced pluralistic ignorance about actual friends.

Keywords: social comparison, social networking site, mood management, self-esteem, pluralistic ignorance, selectivity
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“See? I look up, I look down, I look up... I'm going right out to buy myself a nice tall stepladder.”

– James Stewart as “Scottie” Ferguson in Vertigo (Hitchcock, 1958)

Alarms have been raised about social media use and psychological well-being.

General use of social networking sites (SNSs) such as Facebook can diminish mood and life satisfaction (Kross et al., 2013; Shakya & Christakis, 2017) and has been linked to depression (Huang, 2017; L. Lin et al., 2016; Primack et al., 2017). Yet the specific nature of SNS use matters for its relationship with psychological well-being (Davila et al., 2012). Social comparison in particular is a use of social media that has been implicated in producing low subjective well-being (Chou & Edge, 2012; Feinstein et al., 2013; Hanna et al., 2017; Steers, Wickham, & Acitelli, 2014). However, recent reviews of this nascent research area have concluded that existing evidence is too simplistic, imprecise, and prone to sweeping generalizations (Appel, Gerlach, & Crusius, 2016; Baker & Perez Algorta, 2016; Feinstein, Bhatia, Latack, & Davila, 2015; see also Guernsey, 2014).

In particular, findings suffer from inattention to motives for social comparison and from an array of confounded measures. Intentions for making computer-mediated social comparisons will vary across persons and situations, and these motives inform the types of comparisons that are made and how they ultimately impact the self-concept and well-being. This motivated selectivity plays an important role in dynamic effects on self and affect (Knobloch-Westerwick, 2015). Indeed, some evidence from social media contexts shows reciprocal effects of social comparison and well-being (Frison & Eggermont, 2016; Shakya & Christakis, 2017; Steers et al., 2014). However, just a few studies have measured (Authors, 2016; Cramer, Song, & Drent, 2016) or experimentally controlled (Authors, 2017) situational antecedents of social comparisons made in social media, although some have assessed predictive trait variables (e.g., Lee, 2014). Additionally, of the many recent studies on the
topic, the vast majority employ measures of social comparison that confound it with its theorized causes (e.g., a trait tendency to compare, or time spent on social media) or consequents (e.g., emotional responses, or misperceptions of others).

The present investigation makes a unique contribution to disentangling these issues by discretely measuring the distinct relationships of interest, at each stage of the social media social comparison process. Predictions are derived from the theoretical and empirical literature on social comparison theory, especially research on comparisons made on social media platforms, and by drawing from self- and affect-management theory (Knobloch-Westerwick, 2015) as an impetus for selective social comparison (Authors, 2014, 2017).

**Predictors of Social Media Social Comparison**

Social comparison theory (Festinger, 1954) describes how individuals make use of information about the behavior of others to assess their own relative performance. Mediated depictions of others allow for social comparisons which can be used to assess or enhance one’s self-concept (Mares & Cantor, 1992). The rise of social media has produced a target-rich environment for social comparison. For example, online images of peers outperform celebrity images in terms of generating social comparative thoughts about body image on Instagram (Z. Brown & Tiggemann, 2016). Moreover, people may attempt to use social media social comparison to alleviate threats to their well-being. This can be an adaptive strategy, or may backfire and produce a reinforcing pattern of diminishing well-being (Shakya & Christakis, 2017). Thus, it is critical to account for specific motives of use and patterns of use in order to understand the long-term relationship between social media, happiness, and individual flourishing.

Social comparison made on SNSs is distinct from traditional forms of social comparison, not only because others selectively self-present images which are filtered through the affordances of the technology (Fox & Vendemia, 2016; Walther, 1996), but also
because the technology allows end users to privately view other’s self-presentations at a time and place of their own choosing, even repeatedly if they wish. This gives individuals greater control over when and how they compare themselves to others, which can facilitate social comparisons that are self-serving, motivated, and selective. The selective exposure self- and affect-management (SESAM) model (Knobloch-Westerwick, 2015) describes the processes by which people selectively use media content to regulate their feelings and beliefs about themselves. Individuals with a need to improve, maintain, or otherwise regulate their well-being should gravitate toward mediated depictions (in the present context, others’ SNS self-presentations) that provide desired gratifications for the self and subjective feelings.

The first set of relevant predictors are dispositional factors, including personality. Given the decades of literature on the antecedents of social comparison (Corcoran, Crusius, & Mussweiler, 2011; Knobloch-Westerwick & Hastall, 2006; Krizan & Bushman, 2011; Wood, 1989), as well as indications from newer SNS studies, it is expected that individual differences in life satisfaction, trait self-esteem, narcissism, and social comparison orientation will be positively associated with the selection of certain types of social comparison.

Frison and Eggermont (2016) found that lower life satisfaction predicted upward social comparison on Facebook. However, the design did not measure downward social comparison or account for selectivity (rather, it documented a reciprocal relationship between poor life satisfaction and negative responses to social comparison). Other findings show an association of life dissatisfaction with both comparison orientation (Gerson, Plagnol, & Corr, 2016) and negative responses to comparison (de Vries & Kühne, 2015) on Facebook. And, more specifically, body dissatisfaction was predictive of Facebook social comparison over time (Rousseau, Eggermont, & Frison, 2017). These findings are ambiguous as to the relative effect of life satisfaction on upward versus downward comparisons, but the self-regulatory
perspective of the SESAM suggests dissatisfaction should be even more likely to lead to self-enhancing downward comparisons.

With regard to trait self-esteem, individuals with low self-esteem have been shown to avoid upward comparisons on Facebook (Lee, 2014; Liu, Li, Carcioppolo, & North, 2016); yet evidence is mixed for a link between low trait self-esteem and a general orientation toward comparing on Facebook (Cramer et al., 2016; Jang, Park, & Song, 2016). Additionally, the trait of narcissism is predictive of more online friends and Facebook interactions (Brailovskaia & Bierhoff, 2016). Research on narcissism and social media has focused on self-presentation rather than social comparison (Mehdizadeh, 2010), but narcissism predicts more social comparison, especially downward comparison, in the offline context (Krizan & Bushman, 2011). And, in perhaps the only SNS study to date to distinguish between social comparison orientation (the personality trait) and social comparative thoughts, the former was predictive of the latter (Lee, 2014).

So, while low life satisfaction and high social comparison orientation should produce both downward and upward comparison, individuals scoring low on trait self-esteem or high on narcissism are expected to seek self-enhancement (Wills, 1981) by selecting downward social comparisons (Knobloch-Westerwick, 2015).

**Hypothesis 1 (H1):** Lower (a) life satisfaction and higher (b) social comparison orientation will be associated with more upward and downward social comparison.

**Hypothesis 2 (H2):** Lower (b) trait self-esteem, and higher (c) narcissism will be associated with more downward social comparison.
With regard to specific personal motives for social media social comparison, social comparison is especially linked to self-evaluative motives (Festinger, 1954; Tesser, 1988). In particular, self-enhancement (needing to feel better about the self) should be positively associated with downward social comparison, and self-assessment (needing to accurately judge the self) and self-improvement (needing to strive toward a better self) should be positively associated with upward social comparison (Wood, 1989). A survey by Cramer et al. (2016) found moderately strong correlations between all three motives and social comparison orientation in the Facebook context. However, it is unclear whether self-verification (needing to confirm the perception of the self), the fourth self-evaluative motivation characterized by Sedikides and Strube (1997), might also be associated with upward or downward social comparison. To that end, a hypothesis and research question are posed for the effect of self-evaluative motives on social comparison.

**Hypothesis 3 (H3):** The motive of (a) self-enhancement will be associated with more downward social comparison, and motives of (b) self-assessment and (c) self-improvement will be associated with more upward social comparison.

**Research Question 1 (RQ1):** Is self-verification associated with more upward or downward social comparison?

Moreover, mood management tendencies (Mares & Cantor, 1992) are predictive of selectivity in social comparison (Knobloch-Westernick & Hastall, 2006), as comparisons can be sought out for anticipated beneficial influence on affective states. Therefore, a stronger need for mood regulation should be positively associated with downward social comparison (Authors, 2014). While mood management is often tested with experimental research, a
number of self-report inventories measure the drives to repair or regulate mood (Catanzaro & Means, 1990; Salovey, Mayer, Goldman, Turvey, & Palfai, 1995) or use social media to modify mood (Andreassen, Torsheim, Brunborg, & Pallesen, 2012). Likewise, individuals may vary in the extent to which they make use of selective strategies during social media use, versus passively browsing newsfeeds (McAndrew & Jeong, 2012). Exercising selectivity should be predictive of self-enhancing patterns of exposure (i.e., downward comparison).

**Hypothesis 4 (H4):** Higher (a) mood management tendencies and (b) selectivity will be associated with more downward social comparison.

Finally, the general intensity of Facebook use will likely be associated with both upward and downward social comparison. More time spent on Facebook (Hanna et al., 2017; Steers et al., 2014) and more intensive use (Jang et al., 2016; Lee, 2014) appear to be predictive of more social comparison in general, as well as greater emotional response to upward comparison (de Vries & Kühne, 2015). Similarly, intensity of Instagram use is predictive of social comparison on that platform (Lup, Trub, & Rosenthal, 2015; Stapleton, Luiz, & Chatwin, 2017).

**Hypothesis 5 (H5):** Higher Facebook intensity will be associated with more upward and downward social comparison.

**Operationalizing Social Media Social Comparison**

It bears repeating that most of the SNS-related evidence for the antecedent variables identified above (and consequent variables identified in the next section) relies on studies that employ proxy measures for social comparison that are confounded with theoretically relevant
variables. With regard to confounded measures in surveys, whether longitudinal or cross-sectional, extant work has used trait comparison tendencies (Cramer et al., 2016; Hanna et al., 2017; Jang et al., 2016; Ozimek & Bierhoff, 2016; Stapleton et al., 2017), emotional responses to social comparisons (de Vries & Kühne, 2015; Feinstein et al., 2013; Frison & Eggermont, 2016; Gerson et al., 2016; Lup et al., 2015; Steers et al., 2014), pluralistic ignorance (Appel, Crusius, & Gerlach, 2015), or even social media general usage (Chou & Edge, 2012; Tromholt, 2016) as proxies for measuring actual social comparison. Likewise, experimental designs have either used forced exposure to stimuli (Haferkamp & Krämer, 2011; Liu et al., 2016) or used behavioral measures of exposure to upward and downward targets rather than measures of social comparative thought (Authors, 2014, 2017).

These are all antecedents or consequents rather than social comparison itself (i.e., social comparative thinking). In this way, the literature on the phenomenon of SNS social comparison almost universally suffers from a lack of precision at best and a host of confounds at worst. In addition, social media researchers have often assumed that upward and downward social comparison are opposing, inverse phenomena (but see Batenburg & Das, 2015, and Steers et al., 2014, for exceptions in the social media context), although traditional social comparison research shows them to be conceptually independent and typically positively related in occurrence (D. Brown, Ferris, Heller, & Keeping, 2007). Taken together, these shortcomings present serious barriers to the ability to accurately and meaningfully measure and explain social comparisons made on social media and their effects.

Recent work has offered some indirect measurements of social comparison that are somewhat more fine-grained: the level of effort and targeting in the received communication (composition, one-click, or broadcast) (Burke & Kraut, 2016), and whether social media usage is passive (observing others) or active (interacting with others publicly or privately) (Frison & Eggermont, in press; Tromholt, 2016; Yang, 2016). However, these
conceptualizations of usage can and should be distinguished from social comparison itself (Rousseau et al., 2017). A state measure of social comparison has been tested in Instagram context, but the measure was specific to comparisons of physical appearance (Z. Brown & Tiggemann, 2016). Lee (2014) has made use of a single-item measure of frequency of Facebook social comparison, which was distinguished from social comparison orientation as well as emotional response to social comparison information. Building on this distinction, and following the few existing examples in the face-to-face social comparison literature that directly measure social comparative thinking (Buunk et al., 2012; Locke, 2007) the present study will more directly measure social comparison, for both upward and downward comparisons. This is an important remedy, given that most of what is known so far about the causes and effects of social comparisons made online does not validly measure the key variable of interest: upward and downward social comparisons made on social media.

**Effects of Social Media Social Comparison**

Outcomes of computer-mediated social comparison (Feinstein et al., 2013; Steers et al., 2014) may play out in the short or long term (Bayer, Ellison, Schoenebeck, Brady, & Falk, in press). Although depressive symptoms are the focus of longitudinal studies and represent the most severe potential outcomes from social media social comparison, a variety of related short-term effects on affective states and self-concepts are likely. These short-term effects are important as potential mechanisms for long-term effects on well-being (L. Lin et al., 2016) and may be harmful or beneficial, depending on the direction of comparison.

With regard to upward social comparison on Facebook and other social media, previous studies have indicated that it was negatively associated with positive emotional responses to the comparisons (Lee, 2014), positive affect (de Vries, Möller, Wieringa, Eigenraam, & Hamelink, in press; Haferkamp & Krämer, 2011; Verduyn et al., 2015), and state self-esteem (de Vries & Kühne, 2015; see also Haferkamp & Krämer, 2011; Stapleton et
al., 2017), and was positively associated with negative affect (Z. Brown & Tiggemann, 2016).

In addition, social comparison is suspected to produce pluralistic ignorance (misperceiving others’ behaviors or mental states) regarding online friends, whether they are online-only or also acquainted offline (Appel et al., 2015; Chou & Edge, 2012). Pluralistic ignorance concerning peers’ well-being is widespread (Jordan et al., 2011), largely due to others’ self-presentations and the individual’s failure to discount the others’ impression management. This trend is believed to be heightened online, because of the ability to carefully construct and edit desired personas (Walther, 1996).

**Hypothesis 6 (H6):** Upward social comparison will be associated with less (a) positive emotional responses, (b) positive affect, and (c) state self-esteem, and will be associated with more (d) negative affect as well as pluralistic ignorance regarding both (e) online-only and (f) offline friends.

In contrast, downward social comparison (Wills, 1981) will likely be positively associated with positive emotional responses, positive affect (Haferkamp & Krämer, 2011), and state self-esteem (Authors, 2017), and will be negatively associated with negative affect as well as pluralistic ignorance regarding both online-only and offline friends. However, there is simply less evidence to date about the effects of downward social comparison on social media, either because only upward comparisons were measured, or comparison direction was not taken into account (e.g., Lee, 2014). Those studies which did account for downward comparison have shown positive effects of exposure (on states) in experimental settings (Authors, 2017; Haferkamp & Krämer, 2011), but negative effects of emotional responses (on well-being) in survey settings (Batenburg & Das, 2015; Steers et al., 2014).
Measuring social comparison directly will address these conflicting results. Moreover, decades of research on downward social comparisons in offline settings (Wills, 1981) suggest that these comparisons should be beneficial to affect and self-evaluation, especially if selected for self-enhancing properties (Knobloch-Westwick, 2015).

**Hypothesis 7 (H7):** Downward social comparison will be associated with more (a) positive emotional responses, (b) positive affect, and (c) state self-esteem, and will be associated with less (d) negative affect as well as pluralistic ignorance regarding both (e) online-only and (f) offline friends.

Finally, it is predicted that effects of social comparison on pluralistic ignorance will be stronger for online-only friends (Chou & Edge, 2012). More engagement with close friends, but not weak ties, on Facebook was predictive of positive well-being (Burke & Kraut, 2016; R. Lin & Utz, 2015). Similarly, following more strangers on Instagram was predictive of more social comparison and depressive symptoms (Lup et al., 2015).

Experimentally, when randomly assigned to view a Facebook profile of either a close friend or a distant friend, individuals exhibited emotional contagion with close friends (e.g., upward comparison generated positive emotion), compared to contrast effects with distant friends (e.g., upward comparison facilitated negative emotion) (Liu et al., 2016). This is in keeping with the notion that distant friends are more likely to be abstract, idealized targets that facilitate contrast (Authors, 2017), whether for self-enhancing downward comparison or envy-evoking upward comparison.

**Hypothesis 8 (H8):** Effects of social comparison on pluralistic ignorance will be stronger for online-only friends.
To test these predictions about antecedents and consequents of SNS social comparison, and to do so with removal of the confounds that have hindered previous studies, a questionnaire was designed to assess how the relevant traits, self-evaluative motives, selectivity, and strategic mood management might predict upward and downward social comparison made on Facebook or other social media. The questionnaire also tested the relationships between these social comparisons and subsequent emotional responses, affect, state self-esteem, and pluralistic ignorance.

**Method**

A survey was administered to 163 adults who used social media, 62.6% female, $M_{\text{age}} = 26.97$, $SD = 10.34$. To construct a diverse convenience sample, participants were recruited from a university participant pool in the Netherlands ($n = 88$) and from Amazon MTurk ($n = 75$). The MTurk subsample was older [$M_{\text{mturk}} = 34.56$, $SD = 9.53$, vs. $M_{\text{student}} = 20.50$, $SD = 5.46$; $t(161) = 11.77, p < .001, d = 1.849$] and more male [56% vs. 21.59%; $\chi^2(1) = 20.47, p < .001$] than the student sample. However, the subsamples did not differ in their intensity of Facebook use (Ellison, Steinfield, & Lampe, 2007; see measure details below), $M_{\text{mturk}} = 3.19$, $SD = 1.22$, versus $M_{\text{student}} = 3.23$, $SD = 0.85$; $t(161) = -0.24, p = .81, d = 0.039$.

When asked what social media platforms they used, 95.1% reported using Facebook. In addition, 50.9% used Instagram, 47.9% Twitter, and 35.6% LinkedIn. Multiple respondents also reported using Pinterest, Google Plus, Tumblr, Vine, Flickr, Snapchat, WhatsApp, Myspace, and YouTube as social media. A number of items in the survey made reference to Facebook as a context for social comparisons or responses. For those ($n = 8$) who did not use Facebook, “social media” was instead inserted as substitute text in their surveys. The study materials (questionnaire, dataset, and syntax) are available at https://osf.io/rqw29/?view_only=7ce0479b058e48bba7b04005114254ef.
Measures

**Antecedents of social comparison.** Several core traits were measured to account for relatively stable individual differences predicted to affect social comparison. Life satisfaction was measured with five items, e.g., “In most ways my life is close to my ideal,” 1 = *strongly disagree* to 7 = *strongly agree* (Diener, Emmons, Larsen, & Griffin, 1985), $\alpha = .921$, $M = 4.56$, $SD = 1.41$. Trait self-esteem was measured with ten items, e.g., “I take a positive attitude toward myself,” 1 = *strongly disagree* to 4 = *strongly agree* (Rosenberg, 1965), $\alpha = .926$, $M = 3.11$, $SD = 0.63$. Narcissism was measured with the single-item narcissism scale, “I am a narcissist,” 1 = *not very true of me* to 7 = *very true of me* (Konrath, Meier, & Bushman, 2014), $M = 2.56$, $SD = 1.42$. Social comparison orientation was measured with the Iowa-Netherlands Comparison Orientation Scale (INCOM; Gibbons & Buunk, 1999), e.g., “I always like to know what others in a similar situation would do,” 1 = *disagree strongly* to 5 = *strongly agree*, $\alpha = .857$, $M = 3.33$, $SD = 0.70$.

To measure self-evaluation motives, the brief inventory of Gregg, Hepper, and Sedikides (2011) was administered. Eight items, e.g., “In general, I like to hear that I am a great person”, 1 = *strongly disagree* to 7 = *strongly agree*, measured the four motives of self-enhancement ($r = .719$, $M = 5.48$, $SD = 1.11$), self-assessment ($r = .739$, $M = 5.60$, $SD = 1.13$), self-verification ($r = .651$, $M = 5.26$, $SD = 1.16$), and self-improvement ($r = .695$, $M = 4.80$, $SD = 1.25$).

Three distinct scales measured the tendency to engage in mood management. The first was the mood repair subscale of the Trait Meta-Mood Scale (TMMS; Salovey et al., 1995). Six items, e.g. “When I become upset I remind myself of all the pleasures in life,” ranged from 1 = *strongly disagree* to 7 = *strongly agree*, $\alpha = .835$, $M = 3.51$, $SD = 0.80$. The next scale was a short form of the Negative Mood Regulation scale (NMR; Catanzaro & Means, 1990). Nine items, e.g., “When I’m upset, I believe that I can do something to feel better,”
ranged from 1 = strongly disagree to 5 = strongly agree, $\alpha = .912$, $M = 3.61$, $SD = 0.79$. Lastly, the three mood modification items of the Bergen Facebook Addiction Scale (BFAS; Andreassen et al., 2012), e.g., “How often do you use Facebook in order to forget about personal problems,” 1 = very rarely to 5 = very often, formed a reliable scale, $\alpha = .880$, $M = 2.07$, $SD = 1.03$.

Selectivity was measured with four items, “When I use Facebook, I choose which posts and profiles I look at,” “When I spend time on Facebook, I usually browse whatever appears in my feed” (reversed), “I tend to look at particular people on Facebook,” and “I am very selective regarding what I view on Facebook,” with response options from 1 = strongly disagree to 5 = strongly agree, $\alpha = .701$, $M = 2.92$, $SD = 0.82$.

Finally, Facebook intensity (FBI; Ellison et al., 2007) was measured with six items, e.g., “Facebook is part of my everyday activity,” 1 = strongly disagree to 5 = strongly agree, $\alpha = .896$, $M = 3.21$, $SD = 1.03$.

Social comparison. Social comparative thoughts were measured with four items ranging from 1 = very rarely to 5 = very often, two for upward comparison, “I compare myself with people on Facebook who are doing better in life than me” and “I compare myself with people on Facebook who are happier than me,” $r = .936$, $M = 2.45$, $SD = 1.18$, as well as two items for downward comparison, “I compare myself with people on Facebook who are doing worse in life than me” and “I compare myself with people on Facebook who are sadder than me,” $r = .932$, $M = 2.15$, $SD = 1.12$.

Consequents of social comparison. Immediate effects of Facebook use were measured with several self-reported measures. First, the 10-item Social Comparison Rating Scale (SCRS; Allan & Gilbert, 1995) was administered to measure emotional responses to comparison. It was tailored to the social media context (cf. Feinstein et al., 2013) and used
semantic differential items, e.g., “In relation to others on Facebook, I feel…” $1 = \text{inferior}$ to $10 = \text{superior}$, $\alpha = .925$, $M = 6.23$, $SD = 1.42$. A higher score reflects more positive feelings.

Next, affect was measured by the Positive Affect Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988), framed with regard to “to what extent you feel this way after you browse Facebook.” Response options ranged from $1 = \text{very slightly or not at all}$ to $5 = \text{extremely}$, with 10 items for positive affect ($\alpha = .910$, $M = 2.74$, $SD = 0.83$) and 10 for negative affect ($\alpha = .900$, $M = 1.68$, $SD = 0.67$). State self-esteem was measured with 20 items (Heatherton & Polivy, 1991), e.g., “I feel satisfied with the way my body looks right now,” $1 = \text{not at all}$ to $5 = \text{extremely}$. The instructions were framed with regard to “what you feel is true of yourself after you browse Facebook,” $\alpha = .924$, $M = 3.57$, $SD = 0.67$)

Finally, pluralistic ignorance was measured with six items that inquired about how “happy” and “successful” were “you” the respondent, “the people you only know through the internet,” and “the people you know in real life, face to face.” Respondents were instructed to “provide your most accurate estimate” ranging from $1 = \text{not at all happy/successful}$ to $7 = \text{very happy/successful}$. The sum of happiness and success was taken for each referent, and pluralistic ignorance was then computed by subtracting perceptions of the self from perceptions of face-to-face others ($M = 0.70$, $SD = 1.88$) and by subtracting perceptions of the self from perceptions of online-only others ($M = 0.15$, $SD = 2.64$). The positive means reflect a general tendency toward seeing others as more well-off.

Results

The predictions were tested in two steps. First, after controlling for demographics, antecedents of social comparison were tested in multiple regression models as predictors of upward social comparison and of downward social comparison. In the second step, a multiple regression model was constructed for each consequent of social comparison, with
hierarchical blocks consisting of demographics, antecedent variables observed in the first step to be predictive of social comparison at $p < .10$, and finally upward and downward social comparison as predictors. Table 1 reports the zero-order correlations among antecedents and social comparisons, and Table 2 reports the correlations among social comparisons and consequents. The regression models testing hypotheses are presented in Tables 3 and 4.

Table 3 reports findings regarding the effects of antecedents on social comparison. First of all, age was negatively related to upward comparison, the only demographic effect on social comparison. Next, social comparison orientation (as measured by the INCOM) was highly predictive of both upward and downward social comparison, supporting H1b. Selectivity in Facebook use was a significant predictor of upward comparison and marginal predictor of downward comparison, which was insufficient to support H4b. Facebook intensity was positively linked to upward social comparison, partially supporting H5, and, finally, mood modification (as measured by items from the Bergen Facebook Addiction Scale) was marginally predictive of more downward social comparison. This falls short of supporting H4a. Multicollinearity was not a threat to analyses, as tolerance was $> .84$ for all predictors. Given these results, INCOM, BFAS, selectivity, and FBI measures were retained as covariates (along with demographics) to examine the subsequent effects of social comparison on consequents.

[Table 3 here]

In the regression models testing effects of social comparison (Table 4), some effects of demographics and antecedents were seen on dependent variables. MTurk participants experienced more negative responses to social comparison (as measured by the SCRS) yet generally felt less negative affect. Those high on social comparison orientation experienced more negative responses to social comparisons, felt lower state self-esteem after Facebook use, and experienced more pluralistic ignorance. More frequent mood modifiers experienced
more positive affect yet lower state self-esteem after Facebook use. And, Facebook use intensity was associated with more positive responses to social comparison, more positive affect, higher state self-esteem, and less pluralistic ignorance.

Both upward and downward social comparisons were generally predictive of the expected consequents. As hypothesized, more frequent upward comparison reduced the positivity of feelings in response to social comparison (SCRS) while more frequent downward comparison increased positive responses, supporting H6a and H7a. However, only upward comparison was linked to subsequent affect: looking upward decreased positive affect and increased negative affect, supporting H6b and H6d. No effects of downward comparison on affect were evident. However, downward comparison was linked to improved state self-esteem, supporting H7c, while upward comparison was linked to deflated state self-esteem, H6c. With regard to pluralistic ignorance, upward comparison was associated with increased pluralistic ignorance regarding both online-only and offline friends, supporting H6e and H6f. Surprisingly, the effect was greater for offline friends, $b^* = .392, p < .001$, than for online-only friends, $b^* = .325, p = .003$, so that H8 was not supported. Meanwhile, downward comparison on Facebook was linked to a reduction in pluralistic ignorance, but only for offline friends, in keeping with H7f. Hypothesis 8 was thus supported for neither upward or downward comparison. Multicollinearity was not a threat to analyses, as tolerance was $> .58$ for all predictors.

[Table 4 here]

Discussion

The present results echo previous findings that show the potential for harm to subjective well-being from social comparisons made via social media. However, the results also go beyond the narrow “Facebook depression” frame (Guernsey, 2014) to illustrate that
social media social comparison can also produce benefits to well-being, and that social comparison is variable and related to particular antecedent factors.

First and foremost, the present investigation demonstrates the utility of distinguishing social comparison itself from the variables that precede and follow it. Future research should pay heed to the distinctions highlighted here, and extend these findings with longitudinal data well-suited to testing causal relationships, given that existing multi-wave studies suffer from confounds. The present findings also show some key differences with previous findings.

First of all, predictions regarding motivations for social comparison were not well supported. But, selectivity and mood modification appear to play roles, providing some support for the SESAM perspective that selective media use aids the maintenance of affective states and the self-concept (Knobloch-Westerwick, 2015). However, the prevalence of upward social comparisons despite their detrimental outcomes suggests that social media users are limited in their ability to use social comparisons strategically.

Individual differences in social comparison orientation were shown to matter a great deal for the extent to which individuals make upward and downward social comparisons. However, the findings do illustrate the shortcomings of merely using the INCOM (Gibbons & Buunk, 1999), or general measures of social media use such as the FBI, as a proxy for social comparison itself. Feinstein et al. (2013) have previously demonstrated with survey panel data that the INCOM may not be predictive of effects of social comparison, compared to arguably closer proxies such as the SCRS. The present findings show that while INCOM and FBI have some predictive power of their own for outcomes of interest (e.g., positive affect), direct measures of social comparison explained more variance for outcomes such as state self-esteem and (offline) pluralistic ignorance. Indeed, the results support the notion that variables such as INCOM are best situated as distal predictors of social comparative thought,
where they are quite predictive, and that social comparisons themselves should be modeled as the predictors of subsequent subjective feelings and thoughts about the self.

The findings especially indicate how particular patterns of social media use contributed to individuals’ subjective sense of well-being. Upward comparisons elicited more negative affect and less positive affect, and diminished self-esteem; these immediate effects are in keeping with extant literature’s focus on the harmful short- and long-term effects of upward social media social comparison. These upward comparisons also contributed to pluralistic ignorance regarding all kinds of friends. Downward comparisons, in contrast, provided a boost to self-esteem and mitigated pluralistic ignorance for online friends who are also known face-to-face. Beneficial effects were also seen for emotional responses to social comparisons, as measured by the SCRS. But surprisingly, no impacts on positive or negative affect were evident. The prediction that effects on pluralistic ignorance would be stronger for online-only friends was not supported. However, previous findings for this outcome were admittedly mixed, and also made use of indirect measures of both social comparison and who the targets of comparison were (Chou & Edge, 2012).

In addition to its cross-sectional design, a limitation of the present study is the use of only a few items to measure social comparison. However, it is a step forward from existing approaches. Measuring social comparison can be difficult because it is a fleeting and sometimes automatic, yet reoccurring and value-based, phenomenon. The development of a more comprehensive and nuanced inventory to measure actual comparative thinking during social media use, distinct from dispositional tendencies or responsive thoughts or feelings, is also in order. These steps will allow for more rigorous assessment and specification of the effects that social media social comparisons produce on subjective well-being over time.

Future work should investigate particular motives for maintaining friendship and connection (Authors, 2016), automatic versus controlled comparisons (cf. Verduyn et al.,
2015), and contrasting versus assimilating comparisons (Batenburg & Das, 2015). Future research should also pay more attention to the many possible dimensions of social comparison (e.g., success or appearance), such as in research focused on social media and comparisons of body image (e.g., Fox & Vendemia, 2016; Hendrickse, Arpan, Clayton, & Ridgway, 2017) or social media and comparisons of parenting (Chae, 2015). Additionally, differences between social media platforms such as Facebook and Instagram (de Vries et al., in press), especially with regard to the richness of their features (Authors, 2017; Pittman & Reich, 2016), should be considered as the research into social comparison made on social media becomes more sophisticated and increasingly focused on social and psychological processes (cf. Stoycheff, Liu, Wibowo, & Nanni, 2017). An additional research possibility is the potential of interventions to heighten awareness of misperceptions about the online personas of peers, as well as training to facilitate the use of selective strategies of social media use that could aid self-regulation and well-being.

In their review of the state of research into Facebook, social comparison, and well-being, Appel et al. (2016) characterize the initial findings in this area as promising yet they call for more “rigorous scrutiny of causal relationships” and “the differentiation of constructs and their measurements” (p. 47). By drawing clearer distinctions between directions of social comparisons and their antecedents and consequents (including several variables previously confounded with social comparison), the present study offers an important step forward in these definitional and operational issues. Social media hold great potential and peril for users. More clearly defined research can identify what processes may yield these varied outcomes and how users and platforms might manage and adjust their practices to improve individual psychological well-being.
References


and Social Networking, 20, 142-149. doi:10.1089/cyber.2016.0444


Table 1

Zero-Order Correlations Between Antecedents and Social Comparisons

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
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<td>.674***</td>
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<td>- .169*</td>
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<td>.204**</td>
<td>.471***</td>
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<td>NMR</td>
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<td>.153#</td>
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<td>.221**</td>
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<td>.084</td>
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<td>- .142#</td>
<td>.300***</td>
<td>.078</td>
<td>.193*</td>
<td>.602***</td>
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</table>

Note. N = 163. #p < .10, *p < .05, **p < .01, ***p < .001. INCOM = Iowa-Netherlands Comparison Orientation Scale. TMMS = Trait Meta-Mood Scale, mood repair subscale. NMR = Negative Mood Regulation scale, short form. BFAS = Bergen Facebook Addiction Scale, mood modification subscale. FBI = Facebook intensity scale.
Table 2

Zero-Order Correlations Between Social Comparisons and Consequents

<table>
<thead>
<tr>
<th>Variable</th>
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<td>6. State Self-Esteem</td>
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<td>.491***</td>
<td>.251**</td>
<td>-.335***</td>
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<td>7. Pluralistic Ignorance (Online)</td>
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<td>-.564***</td>
<td>-.193*</td>
<td>.115</td>
<td>.484***</td>
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<td>8. Pluralistic Ignorance (Offline)</td>
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<td>.448***</td>
<td>.638***</td>
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Note. N = 163. #p < .10, *p < .05, **p < .01, ***p < .001. SCRS = Social Comparison Rating Scale.
Table 3

Effects of Antecedent Variables on Social Comparisons

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<th>Predictors</th>
<th>Upward Social Comparison</th>
<th>Downward Social Comparison</th>
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<tr>
<td></td>
<td>b (SE)</td>
<td>ΔR²</td>
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<tr>
<td>Female</td>
<td>0.28 (0.20)</td>
<td>0.30 (0.19)</td>
</tr>
<tr>
<td>Age</td>
<td>-0.03* (0.01)</td>
<td>-0.02 (0.01)</td>
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<tr>
<td>MTurker</td>
<td>0.26 (0.26)</td>
<td>0.14 (0.25)</td>
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<tr>
<td>Step 2</td>
<td></td>
<td>.432***</td>
</tr>
<tr>
<td>Life Satisfaction</td>
<td>-0.05 (0.08)</td>
<td>0.06 (0.08)</td>
</tr>
<tr>
<td>Trait Self-Esteem</td>
<td>-0.18 (0.21)</td>
<td>0.17 (0.23)</td>
</tr>
<tr>
<td>Narcissm</td>
<td>0.08 (0.06)</td>
<td>0.09 (0.06)</td>
</tr>
<tr>
<td>INCOM</td>
<td>0.87*** (0.12)</td>
<td>0.68*** (0.13)</td>
</tr>
<tr>
<td>Self-Enhance</td>
<td>0.07 (0.08)</td>
<td>0.02 (0.08)</td>
</tr>
<tr>
<td>Self-Assess</td>
<td>-0.05 (0.08)</td>
<td>-0.14 (0.09)</td>
</tr>
<tr>
<td>Self-Verify</td>
<td>-0.01 (0.08)</td>
<td>0.09 (0.08)</td>
</tr>
<tr>
<td>Self-Improve</td>
<td>-0.02 (0.07)</td>
<td>0.02 (0.07)</td>
</tr>
<tr>
<td>TMMS</td>
<td>-0.01 (0.15)</td>
<td>-0.13 (0.16)</td>
</tr>
<tr>
<td>NMR</td>
<td>-0.17 (0.16)</td>
<td>-0.18 (0.17)</td>
</tr>
<tr>
<td>BFAS</td>
<td>0.01 (0.08)</td>
<td>0.15# (0.09)</td>
</tr>
<tr>
<td>Selectivity</td>
<td>0.21* (0.10)</td>
<td>0.18# (0.10)</td>
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<tr>
<td>FBI</td>
<td>0.22* (0.08)</td>
<td>0.08 (0.09)</td>
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Note. N = 163. Unstandardized coefficients. #p < .10, *p < .05, **p < .01, ***p < .001.
Table 4

Effects of Social Comparisons on Consequent Variables

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Social Comparison Rating (SCRS)</th>
<th>Positive Affect</th>
<th>Negative Affect</th>
<th>State Self-Esteem</th>
<th>Pluralistic Ignorance (Online)</th>
<th>Pluralistic Ignorance (Offline)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>-0.55* (0.24)</td>
<td>-0.05 (0.15)</td>
<td>-0.06 (0.11)</td>
<td>-0.23# (0.11)</td>
<td>0.21 (0.46)</td>
<td>0.20 (0.32)</td>
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<tr>
<td>Age</td>
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<td>0.01 (0.01)</td>
<td>0.002 (0.01)</td>
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<td>-0.01 (0.03)</td>
<td>0.00 (0.02)</td>
</tr>
<tr>
<td>MTurker</td>
<td>-0.69* (0.31)</td>
<td>-0.14 (0.19)</td>
<td>-0.61*** (0.14)</td>
<td>0.01 (0.15)</td>
<td>1.01# (0.58)</td>
<td>0.73# (0.41)</td>
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<td>0.72* (0.32)</td>
<td>0.66** (0.22)</td>
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<td>Selectivity</td>
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<td>0.00 (0.06)</td>
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<td>0.15 (0.27)</td>
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<tr>
<td>FBI</td>
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<td>-0.35* (0.15)</td>
</tr>
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<td>0.14* (0.06)</td>
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<tr>
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<td>0.12* (0.05)</td>
<td>-0.26 (0.23)</td>
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Note. N = 163. Unstandardized coefficients. #p < .10, *p < .05, **p < .01, ***p < .001.