Look Up, Look Down: Articulating Inputs and Outputs of Social Media Social Comparison

Benjamin K. Johnson

University of Florida, Gainesville, Florida, USA
Correspondence: benjaminkjohnson@ufl.edu

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, earlier evidence consistently confounded social comparative thoughts with causes or outcomes. A cross-sectional survey (N = 163) tested how traits, motivations, selectivity, and mood management influence computer-mediated downward and upward social comparison, and how comparison influences affect, self-esteem, and peer misperceptions. Results indicated age, social comparison orientation, mood modification, selectivity, and Facebook intensity produced 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 offline friends.

Keywords: social comparison, social networking site, mood management, self-esteem, pluralistic ignorance

Introduction

If social media are a net negative for mental health, users might be well-advised to abandon or "detox" from these technologies (Tromholt, 2016). Alarms have been raised about social media and psychological well-being, but how dangerous are they? General use of social networking sites (SNSs) such as Facebook can diminish mood and life satisfaction (Kross et al., 2013; Shakya & Christakis, 2017) and cultivate depression (Huang, 2017; L. Lin et al., 2016; Primack et al., 2017). Yet the specific nature of SNS use matters for relationships with psychological well-being (Davila et al., 2012). Social comparison via social media has been particularly implicated in damages to well-being (Chou & Edge, 2012; Feinstein et al., 2013; Hanna et al., 2017; Steers et al., 2014). However, reviews of this nascent research area have concluded that existing evidence is too simplistic, imprecise, and prone to sweeping generalizations (Appel et al., 2016; Baker & Perez Algorta, 2016; Feinstein et al., 2015; Guernsey, 2014). This paper contributes to called-for improvements by illustrating how a broader theoretical perspective and concrete methodological improvements facilitate more useful and rigorous evidence about social comparison's relationship to digital well-being.

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, only a few studies have measured (Cramer et al., 2016; Ouwerkerk & Johnson, 2016) or experimentally controlled (Johnson & Knobloch-Westerwick, 2017) situational antecedents of social comparisons made in social media, although some have assessed antecedent trait variables (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 (Festinger, 1954), especially research on comparisons made on social media as hyperpersonal environments (Walther, 1996), and by drawing from self- and affect-management theory (Knobloch-Westerwick, 2015) as an impetus for selective social comparison. In the following, theorized causes of social comparison are reviewed, along with an inventory of relevant evidence from social media. Then, definitional issues around social comparison are dissected, followed by a review of theorized well-being effects and associated evidence. To illustrate how expected inputs and outputs of social media social comparison might be better assessed, a small cross-sectional survey is deployed and analyzed.

Literature Review

Antecedents to Social Media Social Comparison

Social comparison theory (Festinger, 1954) explains how individuals make use of information about the behavior of others to assess their own relative performance; decades of research have implicated social comparison in individuals' self-evaluation and adjustment. Further, mediated depictions allow for social comparisons which can also be used to assess or enhance one's self-concept (Mares & Cantor, 1992; Sun & Guo, 2017). Social media allow a more target-rich environment for social comparison. For example, online peer images on Instagram outperform celebrity images in generating comparative body image thoughts (Brown & Tiggemann, 2016). Moreover, people may 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 (Muise et al., 2014). These hyperpersonal dimensions give 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) explains that 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 (e.g., others' SNS self-presentations) that provide desired gratifications for the self and subjective feelings (Ouwerkerk & Johnson, 2016; Sun & Guo, 2017).

Theoretically, both social comparison and SESAM foreground situational motives but also allow a role for distal factors, e.g., personality. Given the decades of literature on the antecedent inputs of social comparison (Corcoran et al., 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.

Yet, as with most predictions in this manuscript, existing evidence is partial and provisional. Frison and Eggermont (2016) found that lower life satisfaction led to 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 et al., 2016) and negative responses to comparison (de Vries & Kühne, 2015) on Facebook. And, more specifically, body dissatisfaction caused more Facebook social comparison over time (Rousseau et al., 2017). These findings are ambiguous as to the relative effect of life satisfaction on upward versus downward comparisons, but the SESAM's self-regulatory perspective suggests dissatisfaction should be 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 et al., 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 et al., 2016). Additionally, trait narcissists have 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 leads to 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 orientation was found to produce more comparative thoughts (Lee, 2014).

Given the theoretical assumptions and prior empirical hints, low life satisfaction and high social comparison orientation should produce

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

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

H2: Lower (b) trait self-esteem, and higher (c) narcissism will be associated with more downward social comparison.

With regard to specific personal motives, social comparison is especially linked to the broad class of 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 empirically unknown whether self-verification (needing to confirm the perception of the self), the fourth self-evaluative motivation characterized by Sedikides and Strube (1997), might be associated with upward or downward social comparison. To that end, a hypothesis and research question are posed for effects of self-evaluative motives on social comparison.

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.

RQ1: Is self-verification associated with more upward or downward social comparison?

Moreover, mood management tendencies (Mares & Cantor, 1992) lead to selectivity in social comparison (Knobloch-Westerwick & 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 (Johnson & Knobloch-Westerwick, 2014). While mood management is often tested with experimental research, a number of self-report inventories measure drives to repair or regulate mood (Catanzaro & Means, 1990; Salovey et al., 1995) or use social media to modify mood (Andreassen et al., 2012). Likewise, individuals may vary in the extent to which they make take advantage

of technological features of social media, by either actively and selectively searching or browsing, or else passively browsing newsfeeds (McAndrew & Jeong, 2012). Exercising selectivity should lead to self-enhancing patterns of exposure (i.e., downward comparison).

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 cause more social comparison in general. Similarly, intensity of Instagram use is linked to social comparison on that platform (Lup et al., 2015; Stapleton et al., 2017).

H5: Higher Facebook intensity will be associated with (a) more upward and (b) more downward social comparison.

Operationalizing Social Media Social Comparison

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. These are severely confounded with theoretically relevant variables. Longitudinal and cross-sectional surveys have 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 et al., 2015), and social media general usage (Chou & Edge, 2012; Tromholt, 2016) as proxies for measuring social comparison. Likewise, experimental designs have used forced stimuli exposure (Haferkamp & Krämer, 2011; Liu et al., 2016) or behavioral measures of stimuli exposure (Johnson & Knobloch-Westerwick, 2014, 2017) rather than measures of social comparative thought.

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 et al., 2007). Taken together, these shortcomings present serious barriers to measurement validity and the ability explain social media social comparisons and their effects.

Recent work has offered some indirect measurements of social comparison that are somewhat more fine-grained: the level of message involvement (Burke & Kraut, 2016), and whether social media usage is passive (observing others) or active (interacting with others) (Frison & Eggermont, 2020; 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 the Instagram context, but the measure was specific to comparisons of physical appearance (Z. Brown & Tiggemann, 2016). Both Lee (2014) and Chae (2018) have made use of single-item measures of frequency of Facebook social comparison, which were distinguished from antecedent inputs such as social comparison orientation as well as consequent outputs such 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.

Social Media Social Comparison and Consequents

Computer-mediated social comparison may yield effects in the short or long term (Bayer et al., 2018). Although depressive symptoms are the focus of longitudinal studies and represent the most severe potential outcomes, a variety of related short-term effects on affective states and self-concepts are likely. These short-term effects are important potential mechanisms for long-term effects on well-being (L. Lin et al., 2016). Social comparison theory (Wills, 1981) stipulates that effects may be harmful or beneficial, depending on the comparison direction (upward, downward) and how information is processed.

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 (Chae, 2018; de Vries et al., 2018; Haferkamp & Krämer, 2011; Verduyn et al., 2015), and state self-esteem (de Vries & Kühne, 2015), and was positively associated with

negative affect (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 (fully hyperpersonal) 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.

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

In contrast, downward social comparison (Wills, 1981) should be positively associated with positive emotional responses, positive affect (Haferkamp & Krämer, 2011), and state self-esteem (Johnson & Knobloch-Westerwick, 2017), and 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 considered (e.g., Lee, 2014). Those studies which did account for downward comparison have shown positive effects of exposure (on states) in experimental settings (Haferkamp & Krämer, 2011; Johnson & Knobloch-Westerwick, 2017), but negative effects of emotional responses (on well-being) in survey settings (Batenburg & Das, 2015; Steers et al., 2014). Measuring social comparison directly can 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-Westerwick, 2015).

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

Finally, it is predicted that effects of social comparison on pluralistic ignorance will be stronger for online-only friends (Chou & Edge, 2012). Pluralistic ignorance should be heightened for comparisons to online content, because of the ability of peers to carefully construct

and edit desired personas (Walther, 1996). Online-only friends have more license for this selective self-presentation and are not constrained by face-to-face history.

However, few data speak to this proposition. More engagement with close friends, but not weak ties, on Facebook yielded more positive well-being (Burke & Kraut, 2016; R. Lin & Utz, 2015). Similarly, following more strangers on Instagram was associated with more social comparison and depressive symptoms (Lup et al., 2015). In an experiment, individuals exhibited emotional contagion with close friends (e.g., upward comparison generated positive emotion), but contrast effects with distant friends (e.g., upward comparison facilitated negative emotion) (Liu et al., 2016). This is in keeping with the hyperpersonal notion that distant friends are more likely to be abstract, idealized targets that facilitate contrast (Johnson & Knobloch-Westerwick, 2017), whether for self-enhancing downward comparison or envy-evoking upward comparison. Yet the effect of social comparison on online-only (vs. offline) misperceptions of friends lacks direct testing to follow-up on Chou and Edge (2012).

> **H8**: Effects of social comparison on pluralistic ignorance will be stronger for online-only friends than for offline friends.

To test these theoretically-grounded predictions about inputs and outputs of SNS social comparison, and with removal of the confounds that have hindered previous studies, a questionnaire was designed to assess how relevant traits, self-evaluative motives, selectivity, and strategic mood management might influence upward and downward social comparisons made on Facebook or other social media. The questionnaire also tested relationships between these social comparisons and subsequent emotional responses, affect, state self-esteem, and pluralistic ignorance.

Method

An online survey was administered in English to 163 adults who used social media, 62.6% female, M_{age} = 26.97, SD = 10.34. To construct a diverse convenience sample, participants were recruited in 2014-2015 from a university participant pool in the Netherlands (n = 88) and from Amazon MTurk (n = 75). The MTurk subsample was older [M_{mturk} = 34.56, SD = 9.53, vs. $M_{student}$ = 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 et al., 2007; see below), M_{mturk} = 3.19, SD = 1.22, versus $M_{student}$ = 3.23, SD = 0.85; $t(161)$ = -0.24, p = .81, d = 0.039. The sample provides .80 power to detect small-to-moderate correlations of r = .22, $p < .05$ or r = .19, $p < .10$.

When asked what social media platforms they used, 95.1% reported using Facebook. In addition, 50.9% used Instagram, 47.9% Twitter, 35.6% LinkedIn, plus various others. A number of items in the survey referred to Facebook as a context for social comparisons or responses. For those (*n* = 8) who did not use Facebook, "social media" was inserted as substitute text in their surveys. Study materials (questionnaire, dataset, and syntax) are available at https://osf.io/rqw29.

Measures

Wherever possible, established, validated scales were used to measure variables. Novel measures are indicated below, developed in response to a lack of conceptually suitable inventories.

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 et al., 1985), α = .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), α = .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 et al., 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*, α = .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, given a lack of consensus in the literature. 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*, α = .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*, α = .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, α = .880, *M* = 2.07, *SD* = 1.03.

Selectivity was measured with four novel 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*, α = .701, *M* = 2.92, *SD* = 0.82.

Finally, Facebook intensity (FBI) was measured with six usage items from Ellison et al., (2007), e.g., "Facebook is part of my everyday activity," 1 = *strongly disagree* to 5 = *strongly agree*, α = .896, *M* = 3.21, *SD* = 1.03.

Social Comparison

Social comparative thoughts were measured with four novel 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. Its semantic differentials were tailored to the social media context, e.g., "In relation to others on Facebook, I feel…" 1 = *inferior* to 10 = *superior*, α = .925, *M* = 6.23, *SD* = 1.42. Higher scores reflect more positive feelings.

Next, affect was measured by the Positive Affect Negative Affect Schedule (PANAS; Watson et al., 1988), framed with regard to "to what extent you feel this way after you browse Facebook." Response options ranged from 1 = *very slightly* or *not at all* to 5 = *extremely*, with 10 items for positive affect (α = .910, *M* = 2.74, *SD* = 0.83) and 10 for negative affect (α = .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 = *not at all* to 5 = *extremely*. Instructions were framed with regard to "what you feel is true of yourself after you browse Facebook" (α = .924, *M* = 3.57, *SD* = 0.67).

Finally, pluralistic ignorance was measured with six novel 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 = *not at all happy/successful* to 7 = *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

Predictions were tested in two phases. First, after controlling for demographics, antecedents of social comparison were tested in multiple regression models as independent variables that would affect upward social comparison and of downward social comparison. In the second phase, a multiple regression model was constructed for each consequent of social comparison, with hierarchical blocks consisting of demographics, antecedent variables observed in the first phase to be associated with social comparison at *p* < .10, and finally upward and downward social comparison as independent variables. Table 1 reports correlations among antecedents and social comparisons, and Table 2 reports correlations among social comparisons and consequents. Regression models testing hypotheses appear in Tables 3 and 4.

Table 1. Zero-Order Correlations Between Antecedents and Social Comparisons

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Age															
2. Life Satisfaction	-.175*														
3. Trait Self-Esteem	.084	.672***													
4. Narcissism	-.327***	.090	-.007												
5. INCOM	-.304***	-.052	-.197*	.067											
6. Self-Enhance	-.351***	.106	.064	.143#	.307***										
7. Self-Assess	-.140	.116	.174*	-.198*	.119	.340***									
8. Self-Verify	.007	.242**	.427***	-.064	.069	.264***	.310***								
9. Self-Improve	-.006	.050	.134#	.031	.012	.072	.407***	.197*							
10. TMMS	.181*	.503***	.674***	-.176*	-.169*	.064	.204**	.471***	.250**						
11. NMR	.166*	.510***	.737***	-.188*	-.159*	.015	.233**	.363***	.209**	.741***					
12. BFAS	-.031	.067	-.021	-.050	.267***	.030	-.044	.139#	.076	.121	-.026				
13. Selectivity	.372***	-.083	.029	-.091	-.070	-.208**	-.037	-.129	-.009	.094	.092	.022			
14. FBI	-.074	.267***	.303***	-.006	.204**	.243**	.230**	.285***	.023	.318***	.309***	.366***	.015		
15. Compare Up	-.198*	-.170*	-.281***	.153#	.617***	.221**	-.014	-.051	-.067	-.234**	-.269***	.227**	.084	.224**	
16. Compare Down	-.142#	.035	-.064	.175*	.484***	.137#	-.097	.063	-.033	-.104	-.142#	.300***	.078	.193*	.602***

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

Variable	1	2	3	4	5	6	7
1. Compare Up							
2. Compare Down	.602***						
3. SCRS	-.102	.089					
4. Positive Affect	.020	.150#	.395***				
5. Negative Affect	.273***	.197*	.006	.222**			
6. State Self-Esteem	-.421***	-.169*	.491***	.251**	-.335***		
7. Pluralistic Ignorance (Online)	.252**	.090	-.564***	-.193*	.115	-.484***	
8. Pluralistic Ignorance (Offline)	.229**	-.085	-.589***	-.200*	.022	-.448***	.638***

Note. $N = 163$. #$p < .10$, *$p < .05$, **$p < .01$, ***$p < .001$. SCRS = Social Comparison Rating Scale.

Table 3 reports findings regarding 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 (measured by INCOM) was a strong effect on both upward and downward social comparison, supporting H1b. Selectivity in Facebook use was a significant influence on upward comparison and marginal influence on downward comparison, which was insufficient to support H4b. Facebook intensity was positively linked to upward social comparison, supporting H5a, and, finally, mood modification (the BFAS subscale) was marginally influential for more downward social comparison. This falls short of supporting H4a. Multicollinearity was not a threat to analyses, as tolerance was > .84 for all variables. 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.

In the regression models testing effects of social comparison (Table 4), some covariate effects of demographics and antecedents were observed. MTurk participants experienced more negative responses to social comparison (measured by 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.

Table 3. Effects of Antecedent Variables on Social Comparisons

Variable	Upward Social Comparison		Downward Social Comparison	
	b (SE)	ΔR^2	*b*	ΔR^2
Step 1		.054*		.035
Female	0.28 (0.20)		0.30 (0.19)	
Age	-0.03* (0.01)		-0.02 (0.01)	
MTurker	0.26 (0.26)		0.14 (0.25)	
Step 2		.432***		.309***
Life Satisfaction	-0.05 (0.08)		0.06 (0.08)	
Trait Self-Esteem	-0.18 (0.21)		0.17 (0.23)	
Narcissism	0.08 (0.06)		0.09 (0.06)	
INCOM	0.87*** (0.12)		0.68*** (0.13)	
Self-Enhance	0.07 (0.08)		0.02 (0.08)	
Self-Assess	-0.05 (0.08)		-0.14 (0.09)	
Self-Verify	-0.01 (0.08)		0.09 (0.08)	
Self-Improve	-0.02 (0.07)		0.02 (0.07)	
TMMS	-0.01 (0.15)		-0.13 (0.16)	
NMR	-0.17 (0.16)		-0.18 (0.17)	
BFAS	0.01 (0.08)		0.15# (0.09)	
Selectivity	0.21* (0.10)		0.18# (0.10)	
FBI	0.22* (0.08)		0.08 (0.09)	

Note. $N = 163$. Unstandardized coefficients. #$p < .10$, *$p < .05$, **$p < .01$, ***$p < .001$.

Table 4. Effects of Social Comparisons on Consequent Variables

Variable	Social Comparison Rating Scale (SCRS) b (SE)	ΔR^2	Positive Affect b (SE)	ΔR^2	Negative Affect b (SE)	ΔR^2	State Self-Esteem b (SE)	ΔR^2	Pluralistic Ignorance (Online) b (SE)	ΔR^2	Pluralistic Ignorance (Offline) b (SE)	ΔR^2
Step 1		.073**		.010		.180***		.027#		.023		.033
Female	-0.55* (0.24)		-0.05 (0.15)		-0.06 (0.11)		-0.23# (0.11)		0.21 (0.46)		0.20 (0.32)	
Age	-0.01 (0.01)		0.01 (0.01)		0.002 (0.01)		0.01 (0.01)		-0.01 (0.03)		0.00 (0.02)	
MTurker	-0.69* (0.31)		-0.14 (0.19)		-0.61*** (0.14)		0.01 (0.15)		1.01# (0.58)		0.73# (0.41)	
Step 2		.114***		.216***		.047#		.193***		.067*		.080**
INCOM	-0.34* (0.16)		0.01 (0.09)		0.14# (0.07)		-0.31*** (0.07)		0.72* (0.32)		0.66** (0.22)	
BFAS	0.05 (0.11)		0.17** (0.06)		0.10# (0.05)		-0.13* (0.05)		0.28 (0.22)		0.16 (0.15)	
Selectivity	-0.10 (0.14)		0.09 (0.08)		0.00 (0.06)		-0.01 (0.06)		0.15 (0.27))		0.05 (0.19)	
FBI	0.44*** (0.11)		0.27*** (0.06)		-0.07 (0.05)		0.20*** (0.05)		-0.51* (0.21)		-0.35* (0.15)	
Step 3		.043*		.021		.038*		.294***		.051*		.118***
Compare Up	-0.29* (0.12)		-0.14* (0.07)		0.14* (0.06)		-0.26*** (0.05)		0.72** (0.24)		0.62*** (0.16)	
Compare Down	0.30* (0.12)		0.09 (0.07)		0.01 (0.05)		0.12* (0.05)		-0.26 (0.23)		-0.67*** (0.16)	

Note. N = 163. Unstandardized coefficients. #*p* < .10, *p* < .05, **p* < .01, ***p* < .001

Both upward and downward social comparisons were generally associated with the expected consequent variables. As hypothesized, more frequent upward comparison reduced positive feelings in response to social comparison (SCRS) while more frequent downward comparison increased positive responses, supporting H6a and H7a. However, only upward (not downward) comparison was linked to subsequent affect: looking upward decreased positive affect and increased negative affect, supporting H6b and H6d. Yet, 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 not supported, as online-only relationships were less impacted by social comparison. Multicollinearity was not a threat to analyses, as tolerance was > .58 for all variables.

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. Theoretically, a broad lens allowed for focus on both distal (personality inputs and perceptual outputs) and proximate (motivation inputs and affective outputs) variables, and the conceptual framework integrated social comparison theory (and its developments over decades; Corcoran et al., 2011) with the hyperpersonal (Walther, 1996) and selective exposure self- and affect-management (Knobloch-Westerwick, 2015) models. Methodologically, the study presents improved paths forward for studying social media social comparison.

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 suffered from confounds. The present findings also show some key differences with previous

findings.

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 linked to effects of social comparison, compared to arguably closer proxies such as the SCRS. The present findings show that while INCOM and FBI have some explanatory 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 causes of social comparative thought, where they are quite influential, and that social comparisons themselves should be modeled as the causes of subsequent subjective feelings and thoughts about the self. Direct measures of social comparison perform above and beyond mere proxies.

Next, predictions regarding motivations for social comparison were not broadly 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. Future work must do more to explain both short- and long-term effects of social media social comparison (L. Lin et al., 2016; Shakya & Christaksi, 2017) and how they may differ. Pursuit of short-term strategies may be ineffective in the long-term. More research is also needed on how algorithmic presentation of content promotes upward comparison targets over downward comparison opportunities in newsfeeds.

Findings also indicated how patterns of social media use contributed to individuals' subjective 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). Much more work is needed on the question of how hyperpersonal overattributions contribute to social misperceptions.

The investigation focused on internal validity: conceptual distinctions and a comprehensive set of explanatory variables. The modestly-powered convenience sample restricts external validity. Yet findings suggest that dispositions produce upward comparisons while motivations and control over technology enable downward comparisons. Upward comparison harms immediate and long-term well-being; downward comparison yields short-term benefits. Theory development can build further upon these points.

In addition to its cross-sectional design, a current limitation is the use of just several items to measure social comparison. However, it is a step forward from existing approaches. Measuring social comparison is difficult as a fleeting and sometimes automatic, yet reoccurring and value-based, phenomenon. The development of a more comprehensive, nuanced inventory to measure comparative thinking during social media use, distinct from dispositional tendencies or responsive thoughts or feelings, is needed. These steps will allow for more rigorous assessment and specification of social media social comparison's effects on well-being over time. The present study was underpowered to detect small effects, and the use of a convenience sample (students and MTurkers) restricts generalizability. More well-powered and cross-cultural research survey work is needed. Although social media (and even Facebook) use is widespread globally and across demographics, differences and disparities in motives and effects are important.

Future work should investigate particular motives for maintaining friendship and connection (Ouwerkerk & Johnson, 2016), automatic versus controlled comparisons (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 (Fox & Vendemia, 2016) or social media and comparisons of parenting (Chae, 2015). Additionally, differences between social media platforms such as Facebook and Instagram (de Vries et al., 2018), especially with regard to the richness of their

technological features (Johnson & Knobloch-Westerwick, 2017; Pittman & Reich, 2016), should be considered as social media social comparison research becomes more sophisticated and increasingly focused on social and psychological processes (cf. Stoycheff et al., 2017). An additional research possibility is the potential of interventions (Weinstein, 2017) 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 inputs and outputs (including several variables previously confounded with social comparison), the present study offers an important step forward in these conceptual and operational issues. Social media hold great potential and peril for users. 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.

Benjamin K. Johnson (PhD, The Ohio State University) is an assistant professor of Advertising at the University of Florida. His research is focused on why and how people select and share messages in new media settings, especially as it relates to psychological processes such as impression management, social comparison, and self-regulation. He is an editor of *Media Psychology* and is an author of over three dozen peer-reviewed publications in high-profile communication journals.

References

Allan, S., & Gilbert, P. (1995). A social comparison scale: Psychometric properties and relationship to psychopathology. *Personality and Individual Differences, 19*, 293-299.

Appel, H., Crusius, J., & Gerlach, A. L. (2015). Social comparison, envy, and depression on Facebook: A study looking at the effects of high comparison standards on depressed individuals. *Journal of Social and Clinical Psychology, 34*, 277-289.

Appel, H., Gerlach, A. L., & Crusius, J. (2016). The interplay between Facebook use, social comparison, envy, and depression. *Current Opinion in Psychology, 9*, 44-49.

Andreassen, C. S., Torsheim, T., Brunborg, G. S., & Pallesen, S. (2012). Development of a Facebook addiction scale. *Psychological Reports, 110*, 501-517.

Baker, D. A., & Perez Algorta, G. (2016). The relationship between online social networking and depression: A systematic review of quantitative studies. *Cyberpsychology, Behavior, & Social Networking, 19*, 638-648.

Batenburg, A., & Das, E. (2015). Virtual support communities and psychological well-being: The role of optimistic and pessimistic social comparison strategies. *Journal of Computer-Mediated Communication, 20*, 585-600.

Bayer, J., Ellison, N., Schoenebeck, S., Brady, E., & Falk, E. B. (2018). Facebook in context(s): Measuring emotional responses across time and space. *New Media & Society, 20*, 1047-1067.

Burke, M., & Kraut, R. E. (2016). The relationship between Facebook use and well-being depends on communication type and tie strength. *Journal of Computer-Mediated Communication, 21*, 265-281.

Buunk, A. P., Bennenbroek, F. T. C., Stiegelis, H. E., van den Bergh, A. C. M., Sanderman, R., & Hagedoorn, M. (2012). Follow-up effects of social comparison information on the quality of life of cancer patients: The moderating role of social comparison orientation. *Psychology & Health, 27*, 641-654.

Brailovskaia, J., & Bierhoff, H.-W. (2016). Cross-cultural narcissism on Facebook: Relationship between self-presentation, social interaction and the open and covert narcissism on a social networking site in Germany and Russia. *Computers in Human Behavior, 55*, 251-257.

Brown, D. J., Ferris, D. L., Heller, D., & Keeping, L. M. (2007). Antecedents and consequences of the frequency of upward and downward social comparisons at work. *Organizational Behavior and Human Decision Processes, 102*, 59-75.

Brown, Z., & Tiggemann, M. (2016). Attractive celebrity and peer images on Instagram: Effect on women's mood and body image. *Body Image, 19*, 37-43.

Catanzaro, S. J., & Mearns, J. (1990). Measuring generalized expectancies for negative mood regulation: Initial scale development and implications. *Journal of Personality Assessment, 54*, 546-563.

Chae, J. (2015). "Am I a better mother than you?" Media and 21st-century motherhood in the context of social comparison theory. *Communication Research, 42*, 503-525.

Chae, J. (2018). Reexamining the relationship between social media and happiness: The effects of various social media platforms on reconceptualized happiness. *Telematics and Informatics, 35*, 1656-1664.

Johnson. JoCTEC 2021 4(1), pp. 28-53

49

Chou, H.-T. G., & Edge, N. (2012). "They are happier and having better lives than I am": The impact of using Facebook on perceptions of others' lives. *Cyberpsychology, Behavior, and Social Networking, 15*, 117-121.

Corcoran, J., Crusius, J., & Mussweiler, T. (2011). Social comparison: Motives, standards, and mechanisms. In D. Chadee (Ed.), *Theories in social psychology* (pp. 119-139). Oxford, UK: Wiley-Blackwell.

Cramer, E. M., Song, H., & Drent, A. M. (2016). Social comparison on Facebook: Motivation, affective consequences, self-esteem, and Facebook fatigue. *Computers in Human Behavior, 64*, 739-746.

Davila, J., Hershenberg, R., Feinstein, B. A., Gorman, K., Bhatia, V., & Starr, L. R. (2012). Frequency and quality of social networking among young adults: Associations with depressive symptoms, rumination, and corumination. *Psychology of Popular Media Culture, 1*, 72-86.

de Vries, D. A., & Kühne, R. (2015). Facebook and self-perception: Individual susceptibility to negative social comparison on Facebook. *Personality and Individual Differences, 86*, 217-221.

de Vries, D. A., Möller, A. M., Wieringa, M. S., Eigenraam, A. W., & Hamelink, K. (2018). Social comparison as the thief of joy: Emotional consequences of viewing strangers' Instagram posts. *Media Psychology, 21*, 222-245.

Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The Satisfaction with Life Scale. *Journal of Personality Assessment, 49*, 71-75.

Ellison, N. B., Steinfield, C., & Lampe, C. (2007). The benefits of Facebook "friends": Social capital and college students' use of online social network sites. *Journal of Computer-Mediated Communication, 12*, 1143-1168.

Feinstein, B. A., Hershenberg, R., Bhatia, V., Latack, J. A., Meuwly, N., & Davila, J. (2013). Negative social comparison on Facebook and depressive symptoms: Rumination as a mechanism. *Psychology of Popular Media Culture, 2*, 161-170.

Feinstein, B. A., Bhatia, V., Latack, J. A., & Davila, J. (2015). Social networking and depression. In L. D. Rosen, N. A. Cheever, & L. M. Carrier (Eds.), *The Wiley handbook of psychology, technology, and society* (pp. 273-286). Oxford, UK: Wiley-Blackwell.

Festinger, L. (1954). A theory of social comparison processes. *Human Relations, 7*, 117-140.

Fox, J., & Vendemia, M. A. (2016). Selective self-presentation and social comparison through photographs on social networking sites. *Cyberpsychology, Behavior, and Social Networking, 19*, 593-600.

Frison, E., & Eggermont, S. (2016). "Harder, better, faster, stronger": Negative comparison on Facebook and adolescents' life satisfaction are reciprocally related. *Cyberpsychology, Behavior, and Social Networking, 19*, 158-164.

Frison, E., & Eggermont, S. (2020). Toward an integrated and differential approach to the relationships between loneliness, different types of Facebook use, and adolescents' depressed mood. *Communication Research, 47*, 701-728.

Gerson, J., Plagnol, A. C., & Corr, P. J. (2016). Subjective well-being and social media use: Do personality traits moderate the impact of social comparison on Facebook? *Computers in Human Behavior, 63*, 813-822.

Gibbons, F. X., & Buunk, B. P. (1999). Individual differences in social comparison: The development of a scale of social comparison orientation. *Journal of Personality and Social*

Johnson. JoCTEC 2021 4(1), pp. 28-53

50

Psychology, 76, 129-142.

Gregg, A. P., Hepper, E. G., & Sedikides, C. (2011). Quantifiying self-motives: Functional links between dispositional desires. *European Journal of Social Psychology, 41*, 840-852.

Guernsey, L. (2014). Garbled in translation: Getting media research to the press and public. *Journal of Children and Media, 8*, 87-94.

Haferkamp, N., & Krämer, N. C. (2011). Social comparison 2.0: Examining the effects of online profiles on social-networking sites. *Cyberpsychology, Behavior, and Social Networking, 14*, 309-314.

Hanna, E., Ward, L. M., Seabrook, R. C., Jerald, M., Reed, L., Giaccardi, S., & Lippman, J. R. (2017). Contributions of social comparison and self-objectification in mediating associations between Facebook use and emergent adults' psychological well-being. *Cyberpsychology, Behavior, and Social Networking, 20*, 172-179.

Heatherton, T. F., & Polivy, J. (1991). Development and validation of a scale for measuring state self-esteem. *Journal of Personality and Social Psychology, 60*, 895-910.

Huang, C. (2017). Time spent on social network sites and psychological well-being: A meta-analysis. *Cyberpsychology, Behavior, and Social Networking, 20*, 346-354.

Jang, K., Park, N., & Song, H. (2016). Social comparison on Facebook: Its antecedents and psychological outcomes. *Computers in Human Behavior, 62*, 147-154.

Johnson, B. K., & Knobloch-Westerwick, S. (2014). Glancing up or down: Mood management and selective social comparisons on social networking sites. *Computers in Human Behavior, 41*, 33-39.

Johnson, B. K., & Knobloch-Westerwick, S. (2017). When misery avoids company: Selective social comparisons to photographic online profiles. *Human Communication Research, 43*, 54-75.

Jordan, A. H., Monin, B., Dweck, C. S., Lovett, B. J., John, O. P., & Gross, J. J. (2011). Misery has more company than people think: Underestimating the prevalence of others' negative emotions. *Personality and Social Psychology Bulletin, 37*, 120-135.

Knobloch-Westerwick, S. (2015). The selective exposure self- and affect-management (SESAM) model: Applications in the realms of race, politics, and health. *Communication Research, 42*, 959-985.

Knobloch-Westerwick, S., & Hastall, M. R. (2006). Social comparisons with news personae: Selective exposure to news portrayals of same-sex and same-age characters. *Communication Research, 33*, 262-284.

Konrath, S., Meier, B. P., & Bushman, B. J. (2014). Development and validation of the Single Item Narcissism Scale (SINS). *PLoS ONE, 9*(8): e103469.

Krizan, Z., & Bushman, B. J. (2011). Better than my loved ones: Social comparison tendencies among narcissists. *Personality and Individual Differences, 50*, 212-216.

Kross, E., Verduyn, P., Demiralp, E., Park, J., Lee, D. S., Lin, N., ... Ybarra, O. (2013). Facebook use predicts declines in subjective well-being in young adults. *PLoS ONE, 8*, e69841.

Lee, S. Y. (2014). How do people compare themselves with others on social network sites?: The case of Facebook. *Computers in Human Behavior, 32*, 253-260.

Lin, L. Y., Sidani, J. E., Shensa, A., Radovic, A., Miller, E., Colditz, J. B., … Primack, B. A. (2016). Association between social media use and depression among U.S. young

adults. *Depression and Anxiety, 33*, 323-331.

Lin, R., & Utz, S. (2015). The emotional responses of browsing Facebook: Happiness, envy, and the role of tie strength. *Computers in Human Behavior, 52*, 29-38.

Liu, J., Li, C., Carcioppolo, N., & North, M. (2016). Do our Facebook friends make us feel worse? A study of social comparison and emotion. *Human Communication Research, 42*, 619-640.

Locke, K. D. (2007). Personalized and generalized comparisons: Causes and consequences of variations in the focus on social comparison. *Personality and Social Psychology Bulletin, 33*, 213-225.

Lup, K., Trub, L., & Rosenthal, L. (2015). Instagram #instasad?: Exploring associations among Instagram use, depressive symptoms, negative social comparison, and strangers followed. *Cyberpsychology, Behavior, and Social Networking, 18*, 247-252.

Mares, M.-L., & Cantor, J. (1992). Elderly viewers' responses to televised portrayals of old age: Empathy and mood management versus social comparison. *Communication Research, 19*, 459-478.

McAndrew, F. T., & Jeong, H. S. (2012). Who does what on Facebook? Age, sex, and relationship status as predictors of Facebook use. *Computers in Human Behavior, 28*, 2359-2365.

Mehdizadeh, S. (2010). Self-presentation 2.0: Narcissism and self-esteem on Facebook. *Cyberpsychology, Behavior, and Social Networking, 13*, 357-364.

Muise, A., Christofides, E., & Desmarais, S. (2014). "Creeping" or just information seeking? Gender differences in partner monitoring in response to jealousy on Facebook. *Personal Relationships, 21*, 35-50.

Ouwerkerk, J. W., & Johnson, B. K. (2016). Motives for online friending and following: The dark side of social network site connections. *Social Media + Society, 2(3)*, article 19.

Ozimek, P., & Bierhoff, H.-W. (2016). Facebook use depending on age: The influence of social comparisons. *Computers in Human Behavior, 61*, 271-279.

Pittman, M., & Reich, B. (2016). Social media and loneliness: Why an Instagram picture may be worth more than a thousand Twitter words. *Computers in Human Behavior, 62*, 155-167.

Primack, B. A., Shensa, A., Escobar-Viera, C. G., Barrett, E. L., Sidani, J. E., Colditz, J. B., & James, A. E. (2017). Use of multiple social media platforms and symptoms of depression and anxiety: A nationally-representative study among U.S. young adults. *Computers in Human Behavior, 69*, 1-9.

Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton, NJ: Princeton University Press.

Rousseau, A., Eggermont, J., & Frison, S. (2017). The reciprocal and indirect relationships between passive Facebook use, comparison on Facebook, and adolescents' body dissatisfaction. *Computers in Human Behavior, 73*, 336-344.

Salovey, P., Mayer, J. D., Goldman, S. L., Turvey, C., & Palfai, T. P. (1995). Emotional attention, clarity, and repair: Exploring emotional intelligence using the Trait Meta-Mood Scale. In J. W. Pennbaker (Ed.), *Emotion, disclosure, and health* (pp. 125-154)¬. Washington, DC: American Psychological Association.

Sedikides, C., & Strube, M. J. (1997). Self-evaluation: To thine own self be good, to thine own self be sure, to thine own self be true, and to thine own self be better. *Advances in*

Johnson. JoCTEC 2021 4(1), pp. 28-53

52

Experimental Social Psychology, 29, 209–269.

Shakya, H. B., & Christakis, N. A. (2017). Association of Facebook use with compromised well-being: A longitudinal study. *American Journal of Epidemiology, 185*, 203-211.

Stapleton, P., Luiz, G., & Chatwin, H. (2017). Generation validation: The role of social comparison in use of Instagram among emerging adults. *Cyberpsychology, Behavior, and Social Networking, 20*, 142-149.

Steers, M.-L. N., Wickham, R. E., & Acitelli, L. K. (2014). Seeing everyone else's highlight reels: How Facebook usage is linked to depressive symptoms. *Journal of Social and Clinical Psychology, 33*, 701-731.

Stoycheff, E., Liu, J., Wibowo, K. A., & Nanni, D. P. (2017). What have we learned about social media by studying Facebook? A decade in review. *New Media & Society, 19*, 968-980.

Sun, Y., & Guo, S. (2017). Predicting fashion involvement by media use, social comparison, and lifestyle: An interaction model. *International Journal of Communication, 11*, 4559-4582.

Tesser, A. (1988). Toward a self-evaluation maintenance model of social behavior. *Advances in Experimental Social Psychology, 21*, 181-227.

Tromholt, M. (2016). The Facebook experiment: Quitting Facebook leads to higher levels of well-being. *Cyberpsychology, Behavior, and Social Networking, 19*, 661-666.

Verduyn, P., Lee, D. S., Park, J., Shablack, H., Orvell, A., Bayer, J., … Kross, E. (2015). Passive Facebook usage undermines affective well-being: Experimental and longitudinal evidence. *Journal of Experimental Psychology: General, 144*, 480-488.

Walther, J. B. (1996). Computer-mediated communication: Impersonal, interpersonal, and hyperpersonal interaction. *Communication Research, 23*, 3-43.

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology, 54*, 1063-1070.

Weinstein, E. (2017). Adolescents' differential responses to social media browsing: Exploring causes and consequences for intervention. *Computers in Human Behavior, 76*, 396-405.

Wills, T. A. (1981). Downward comparison principles in social psychology. *Psychological Bulletin, 90*, 245-271.

Wood, J. V. (1989). Theory and research concerning social comparisons of personal attributes. *Psychological Bulletin, 106*, 231-248.

Yang, C.-C. (2016). Instagram use, loneliness, and social comparison orientation: Interact and browse on social media, but don't compare. *Cyberpsychology, Behavior, and Social Networking, 19,* 703-708.

Johnson. JoCTEC 2021 4(1), pp. 28-53

53