INTERNATIONAL JOURNAL OF HUMAN–COMPUTER INTERACTION
https://doi.org/10.1080/10447318.2021.1976510

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Do You Dare to Compare?: The Key Characteristics of Social Media Users Who Frequently Make Online Upward Social Comparisons

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ABSTRACT

Social media platforms and social networking sites are heavily focused on self-presentation and impression management. The present study aimed to identify salient social media behaviors and psychosocial factors most associated with high levels of upward online social comparisons. An online survey was administered through Amazon's Mechanical Turk to assess demographics, psychosocial factors, and social media behaviors, including tendencies to make upward social comparisons online. Results revealed key factors related to high upward social comparisons: those with low quality of life, low perceived social support, high in fear of missing out, high levels of social media addiction, frequent censorship to avoid judgment, and feelings of safety while using social media. The overall findings of this study suggest an association between negative well-being and making online upward social comparisons.

1. Introduction

Social Media refers to the forms of electronic communication through which users create online communities to share information, ideas, personal messages, and other content (Treem et al., 2016). As of 2019, over 75% of Americans between the ages of 23 and 54 use social media (Pew Research Center, 2019). With such a large proportion of our population using this technology, additional research is needed to understand possible psychological effects for users. One area of research has focused on social media as a facilitator for social comparisons. Examining social comparison behaviors occurring on social media platforms is important for understanding how self-concepts are developed and shaped by the digital world.

Social comparison theory is a psychological concept in which individuals are said to assess themselves or aspects of their lives according to their perceived rankings amongst other individuals (Festinger, 1954). According to the original social comparison theory, a downward social comparison occurs when an individual compares themselves to someone whom they perceive to be worse off than they are and an upward social comparison takes place when an individual compares themselves to others who they believe are faring better than they are (Festinger, 1954). Through this method of self-examination, individuals get a sense of their self-worth, identity, and life satisfaction. Since the proposition of this concept, theorists have discovered and outlined additional aspects of social comparisons. Some research has described social comparisons as automatically occurring behaviors in which all humans participate (Mussweiler, 2003). Other research has indicated the presence of individual differences for tendencies to participate in social comparisons, also known as social comparison orientation (Gibbons & Buunk, 1999). These differences in tendencies suggest that some individuals are more inclined to compare life events, accomplishments, experiences and situations than others (Buunk & Gibbons, 2006). The effects of downward and upward comparisons are generally consistent in most research findings. Overall, downward social comparisons create positive affect, optimism and enhance self-esteem (Alicke, 2000; Gentile et al., 2020; Huang, 2016) while upward social comparisons create negative affect, feelings of inferiority, envy and life dissatisfaction (Alicke, 2000; Moyal et al., 2020; Muller & Fayant, 2010). The present study focused on upward social comparisons because of its important link to harmful effects while also being the most commonly exhibited type of social comparison behavior (Festinger, 1954; Wood, 1989). Although the early emergence of social comparison research primarily focused on in-person interactions between people, current research has heavily shifted to the examination of online social interactions. This new attention to social media interactions has highlighted the ways in which social media may be increasing upward social comparisons.

Social media operate through self-presentation and the approvals/disapprovals from others through exchanges of likes, comments, follows, etc. (Ellison et al., 2011). These platforms also provide users opportunities for self-disclosure and self-expression (K. K. Davis, 2012). Specifically, users have the ability to curate and select the content they wish to present on their accounts for the viewing and feedback of

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others. Research suggests that individuals minimize their negative life events or undesirable characteristics by selecting content that enhances their positive characteristics for purposes of impression management (Lim & Yang, 2015). Some users, for instance, go as far as digitally editing images of their faces, bodies and vacation landscapes to boost their approvals (Fox & Vendemia, 2016; Lo & McKercher, 2015). As a result of the positivity bias in content displayed by social media users (i.e., people presenting only positive aspects of their lives), interpersonal evaluations of individuals demonstrating socially desirable traits on social media are idealized (Vogel & Rose, 2017). Although enhancing one's identity and being appraised by others online may improve short term psychological well-being (Vannucci et al., 2017), these manufactured perfectionistic standards may counterintuitively enable users to constantly make negative/upward social comparisons. Increased upward social comparisons might also be happening because some users seek social media as an escape from boring or unexciting moments in their personal lives (Stockdale & Coyne, 2020) and in doing so, their perceived discrepancies in social hierarchy might become more apparent. When individuals deem themselves as worse off than others, their frustration and resentment increases negative affect (Dijkstra et al., 2010). One study found that even viewing strangers' positive Instagram posts decreased positive affect for people high in social comparison orientation (De Vries et al., 2018). Furthermore, when young adult social media users experience negative feedback, such as not being followed back by someone they know, this may elicit an emotional or stress response (Jackson & Luchner, 2018). Additionally, preexisting negative self-evaluations and low self-esteem can be reinforced as a consequence of receiving unfavorable feedback and further contribute to the frequency of upward social comparisons (Nesi & Prinstein, 2015).

Researchers are now examining the possible long-term consequences of these negative social media interactions. A recent study identified online upward social comparisons, heightened social media addiction, and lack of social interactions as three distinguishable factors associated with individuals who met criteria for major depressive disorder (Robinson et al., 2019). Other research findings further affirm the link between increased social media usage and increased depressive symptoms across genders by attributing negative feelings to making upward social comparisons (Steers et al., 2014). Although individuals may exhibit depressive reactions to increased social media time, an explanation for the continuation of use has been associated with user's fear of missing out or FOMO (Chambers, 2019). Being unaware of exciting events as a result of being offline, may elicit feelings of anxiety and unsteadiness in some individuals (Chambers, 2019). With past research revealing possibilities of experiencing negative side effects as a result of social media use, it is important to know which groups of individuals are at increased risk and which social media behaviors may increase risk.

Therefore, the present study aims to further explore this topic with a new approach by identifying the key psychosocial factors and social media behaviors that are most strongly associated with user participation in upward social comparisons on social media. To date, most research on social media has investigated the general action of making online comparisons, but few studies have examined both the frequency and directionality of such comparisons. The present study differs from existing research because it seeks to first identify individuals frequently making online upward social comparisons and then to determine distinguishable online behaviors and psychological characteristics that are most predictive of this sample group.

Furthermore, this study seeks to extend previous findings, which have connected individuals prone to social comparisons with negative experiences on social media (Alfasi, 2019; Dijkstra et al., 2010; Midgley et al., 2020; Tosun & Kasdarma, 2020; De Vries et al., 2018). However, scholarship has yet to distinguish upward versus downward social comparisons. The current study fills this gap in the literature by focusing on upward social comparisons in particular. Centering scholarly attention on online upward social comparisons is important because of the positive bias in content and increased exposure to other individuals perceived as better off, which results in negative affect.

Finally, this project aims to better understand social comparisons on social media by including specific online behavior variables in combination with psychological characteristics. In doing so, this study differs from past research that has predominantly looked for mental health markers and examined psychological concepts. Previous studies have demonstrated a relationship between social comparisons and perceptions of emotional distress, low self-esteem, addiction, and depression (Midgley et al., 2020; Robinson et al., 2019; Steers et al., 2014). In line with that scholarship, it stands to reason that upward social comparisons, in particular, might also be related to similar psychosocial variables, such as stress, quality of life, social support, empathy, fear of missing out, and anxiety. In addition, this project uniquely includes specific online behaviors – such as online censorship, going viral, and feelings of safety – to provide a broader understanding of users who are more likely to frequently participate in upward social comparisons. Therefore, the main hypothesis of this study was: individuals displaying high levels of upward social comparisons would also have higher levels of depressive symptoms, increased levels of addiction to social media, more negative self-perceptions, and a greater number of maladaptive social media behaviors.

2. Method

2.1. Participants

A total of 1,314 participants were recruited through mTurk. Participation was limited to individuals who were at least 18 years old and had active Facebook and/or Twitter social media accounts. Participants were compensated monetarily after completing the online survey. This study was approved by the participating university's Institutional Review Board. The demographic breakdown of the sample revealed that 48.5% of participants identified as female. The mean age was 35.7 years with a standard deviation of 11.7 and the age of the participants ranged between 18 and 82 years. For race, 68.6% of the sample identified as Caucasian, 7.2% identified as

African American, 10.3% identified as Asian/Pacific Islander, 3.3% identified as Native American/Alaskan Native, 7.2% identified as South Asian/Middle Eastern. The remaining participants (3.4%) endorsed more than one racial category. For ethnicity, 12.3% identified as Hispanic.

2.2. Procedure

This study collected data through the use of an online survey. Participants indicated their age and provided consent before beginning the survey. The online survey asked participants questions about their basic demographics, social media behaviors and psychosocial factors. All survey responses were anonymous and participants were allowed to refrain from answering any questions that made them uncomfortable.

2.3. Measures

The online survey first asked participants basic demographic questions. These questions included items such as age, race, ethnicity, gender identity, political affiliation, and generation category (i.e., Generation Z, Millennial, Generation X, or Baby Boomer). Psychosocial factors were also assessed utilizing validated scales and measures. Social media behaviors were examined using validated scales along with other questions developed by the researchers through two focus groups. The focus groups were comprised of undergraduate and graduate students (n = 8) who met in an informal setting to discuss the study and specific social media behaviors. The primary themes generated included: online safety, censoring, going viral, posting while under the influence, the importance of numbers (likes, friends, etc.), being tagged, and using filters.

This study focused on the psychological effects of frequent or high levels of online social comparisons, therefore two comparisons groups were created (low and high). To categorize participants as low or high on making upward social comparisons, a single response item was included in the survey. Participants were asked to respond to the statement "When comparing yourself to others on social media, to what extent do you focus on people who are better off than you?" Instead of measuring social comparison orientation (Vogel et al., 2015), which is an assessment of individuals' orientation to make comparisons more generally, we used this single item to more explicitly measure comparison frequency on social media. Participants answered this item using a 5-point Likert scale (1 = *Not at all*; 2 = *A little*; 3 = *A moderate amount*; 4 = *A lot*; 5 = *A great deal*). The distribution of the data was positively skewed, with a high proportion of participants indicating responses toward the likelihood of lower upper social comparisons, including 35.2% indicating *Not at all* to the prompt. Those who responded with "*A lot*" or "*A great deal*" were placed in the high upward social comparison group (HUSC; $N = 310$), and those who responded with "*Not at all*," "*A little*" or "*A moderate amount*" were placed into the low upward social comparison group (LUSC; $N = 1004$). The participants were classified based on the item-level responses because the specific Likert scale responses aligned well with the designated group assignments.

The Social Media Intensity Scale (Ellison et al., 2007) was used to separately measure the intensity of social media use for the Facebook and Twitter platforms. This measure included 12 questions each answered on a 5-point Likert scale (1 = *Strongly disagree*; 5 = *Strongly agree*). An example of an item included, "Twitter is part of my everyday activity." For this sample, the Facebook Intensity Score ($M = 3.31$, $SD = 0.24$) achieved an alpha reliability of .907, and the Twitter Intensity Score ($M = 2.90$, $SD = 0.13$) demonstrated excellent reliability = .926.

The Need for Participating in Social Media Scale (Park et al., 2009) was used in order to examine the motivations behind the use of any social media platform. This measure included 12 statements to which the participant indicated their level of agreement on a 6-point Likert scale (1 = *Strongly disagree*; 6 = *Strongly agree*). These items included statements such as "I use social media to get peer support from others." For this sample, the Need for Social Media ($M = 3.58$, $SD = 0.67$) achieved an alpha reliability of .905.

The Bergen Social Media Addiction Scale (Andreassen et al., 2012) was included in the survey to assess overall social media addiction. This scale evaluated how often participants reported negative life experiences or responses due to social media usage. Participants were asked to respond to six statements such as, "How often during the last year have you tried to cut down the use of social media without success?" using on a 5-point Likert scale (1 = *Very rarely*; 5 = *Very often*). For this sample, the Bergen Social Media Addiction Scale ($M = 2.24$, $SD = 0.24$) achieved an alpha reliability of .908.

The remaining social media behavior questions were developed for this study by the researchers based on two focus groups. These questions asked participants to indicate their total number of friends on Facebook and their total number of followers on Twitter. Participants were also asked to provide the number of accounts they were following on the Twitter platform. In addition, participants were asked to indicate the level of agreement on a 5-point Likert scale (1 = *Strongly disagree*; 5 = *Strongly agree*) on various statements regarding personal censorship on these social media platforms for reasons such as to avoid judgment, because of an employer/school and because of family/friends. Participants responded to two additional statements related to their perceived feelings of safety while on social media and whether they "hoped to go viral." Both responses were collected using a 5-point Likert scale (1 = *Strongly disagree*; 5 = *Strongly agree*).

The Perceived Stress Scale (PSS) asked participants about the frequency of specific thoughts and feelings during the span of the previous month (Cohen et al., 1983). This scale contained a 10-item questionnaire based on a 5-point Likert scale (1 = *Never*; 5 = *Very often*). An example item was "How often have you been upset because of something that happened unexpectedly?" For this sample, the PSS ($M = 1.63$, $SD = 0.17$) achieved an alpha reliability = .838.

Quality of Life (QOL) was assessed using the Life Satisfaction Scale (LSS) (Huebner, 1991). Feelings toward life satisfaction were measured using 9-item statements on the LSS and responses were based on a 4-point Likert scale (1 = *Never*; 4 = *Almost always*). Examples of these statements were "I like the way things are going for me." and "I would like to

change many things in my life." For this sample, the LSS (M = 1.74, SD = 0.08) achieved an alpha reliability = .910.

The Interpersonal Support Evaluation List (ISEL) (Cohen & Hoberman, 1983) is a 12-item list of statements assessing the perceived social support experienced by the participant. The list was answered based on how true participants felt these statements were about themselves on a 4-point Likert scale (1 = *Definitely false*; 4 = *Definitely true*). An example of a statement on the list included "I feel that there is no one I can share my most private worries and fears with." For this sample, the ISEL (M = 2.97, SD = 0.13) achieved an alpha reliability of .879.

The subscales of the Interpersonal Reactivity Index (IRI) (M. H. M. H. Davis, 1983) were used to assess fantasy, empathic concern, personal distress and perspective taking. All subscales were rated based on a 5-point Likert scale (1 = *Does not describe me well*; 5 = *Describes me very well*). The fantasy subscale is aimed at measuring empathetic feelings toward fictional characters or hypothetical situations. One example of the eight statements was "I get really involved with the feelings of the characters in a novel." The empathetic concern subscale aimed to measure emotions that are elicited when another person is in distress or trouble. This subscale contained eight items with an example statement was "When I see someone being taken advantage of, I feel kind of protective towards them." The personal distress subscale asked participants to respond to a total of eight items focused on measuring the extent to which an individual experiences negative affect from stressful situations. An example of a statement within this subscale was "Being in a tense emotional situation scares me." Lastly, the perspective taking subscale examined the participants' ability to view situations through the lens of another individual by using responses to statements. An example of these statements included "Before criticizing someone, I try to imagine how I would feel if I were in their place." For this sample, the IRI for all subscales combined (M = 3.26, SD = 0.43) achieved an alpha reliability of .825.

The Rosenberg Self-Esteem Scale (RSES) (Rosenberg, 1965) is composed of 10 statements dealing with general feelings about oneself. Participants were asked to indicate how strongly they agreed or disagreed with the statements on the list based on a 4-point Likert scale (1 = *Strongly disagree* to 4 = *Strongly agree*). Examples of the statements were "On the whole, I am satisfied with myself." and "At times I think I am no good at all." For this sample, the RSES (M = 3.01, SD = 0.17) achieved an alpha reliability of .900.

The Big Five Personality Inventory shortened scale was used for assessing participants' personality traits (John & Srivastava, 1999). The shortened 44-item scale contained statements pertaining to specific personality characteristics, and participants responded using a 5-point Likert scale (1 = *Strongly disagree*; 5 = *Strongly agree*). Statements included items such as "I see myself as someone who is talkative." and "I see myself as someone who is relaxed, handles stress well." The psychometrics for the Big Five Personality subscales in our sample were as follows: Extroversion (M = 3.05, SD = .33) achieved alpha reliability of .845; Agreeableness (M = 3.66, SD = .24) achieved alpha reliability of .795; Conscientiousness (M = 3.80, SD = .33) achieved alpha reliability of .856; Openness (M = 3.54, SD = .41) achieved alpha reliability of .781; and Neuroticism (M = 2.65, SD = .31) achieved alpha reliability of .865.

The Fear of Missing Out (FOMO) Scale (Przybylski et al., 2013) measured the extent to which the idea of missing out on a possibly exciting or interesting event causes distress in an individual. Participants responded to this 10-item instrument by rating their responses on a 5-point Likert scale (1 = *Not at all*; 5 = *All the time*). Examples of statements included "It bothers me when I miss an opportunity to meet up with friends." and "I get anxious or nervous when I don't know what my friends are up to." For this sample, the FOMO Scale (M = 2.39, SD = .18) achieved an alpha reliability of .931.

The Patient Health Questionnaire (PHQ) was used to evaluate the presence of Axis I psychopathology (Spitzer et al., 1999). The PHQ has been validated against the PRIME-MD (Kroenke et al., 2010). In the current study, the Major Depressive Disorder (MDD) subscale (PHQ-9) was used to evaluate specific symptoms related depression. The subscale included nine items asking the extent to which the participant has been negatively impacted by specific issues in the last two weeks. Responses were collected using a 4-point Likert scale (1 = *Not at all sure*; 4 = *Nearly every day*). An example of these problems included items such as "Little interest or pleasure in doing things." A second subscale of the Patient Health Questionnaire measuring for Generalized Anxiety Disorder (GAD-7) was used to evaluate specific symptoms related to anxiety. The subscale included seven items asking the extent to which the participants have been bothered by specific problems within the last four weeks. This scale was based on a 3-point Likert scale ranging from *Not at all* to *More than half the days*. An example of problem statements included "Feeling restless so that it is hard to sit still." For both the MDD and GAD diagnoses, instead of summing the scores and using a specific cutoff score, an algorithm was utilized to determine whether the individual met the criteria for a provisional diagnosis. For the MDD diagnosis, the algorithm used requires 5 or more of the 9 items marked as *more than half the days* with at least 1 item being depressed mood or anhedonia. The algorithm for the GAD diagnosis requires at least 3 of the 6 items marked as *more than half the days* along with the 7th item specifying "feeling nervous, anxious, worrying" marked *more than half the days*.

2.4. Statistical analysis

Univariate comparisons were conducted in order to examine possible differences in demographic and social media behaviors between individuals who met the criteria for the high upward social comparison group (HUSC, N = 310, 23.59%) and those who met the criteria for the low upward social comparison group (LUSC, N = 1,004, 76.41%). To compare the demographic factors between the participants in each of the groups, independent t-tests and chi-square tests of independence were used. For the univariate comparisons of the social media behaviors and the psychosocial comparisons, simple logistic regressions were conducted for each predictor variable, controlling for demographic variables (age, gender,

race, ethnicity), with the outcome indicated as the High Upper Social Comparison group. When controlling for demographic variables, the race variable was dichotomized into two categories: white and all additional races, and the variables gender, race, and ethnicity were included as categorical variables with the reference categories set as: male, white, and non-Hispanic, respectively, and the age variable was included as a continuous variable. Effect sizes for the univariate comparisons are indicated as the odds ratios and 95% confidence intervals for the predictor variable from the simple regressions. A Bonferroni Adjustment was used to correct for potential of Type I Error due to multiple comparisons at the univariate level, and the alpha level was set at $p = .0013$ for all univariate analyses.

Then, a stepwise multivariate binary logistic regression model was developed to determine the key factors associated with HUSC. Only variables significant at the univariate level were included in the multivariate analysis. Listwise deletion was used to account for missing data in the regression model. To determine significance, two-tailed tests with an alpha level of 0.05 was used. A post-hoc power analysis was conducted based on an independent t-test, with alpha = 0.05 and a small effect size ($d = 0.2$), which exhibited sufficient obtained power ($1\text{-}\beta = 0.87$). Researchers used SPSS version 24.0 (IBM Corp, Armonk, NY) for all analyses conducted.

Table 1. Demographic comparisons: high upward social comparisons and low upward social comparisons.

	High Upward Social Comparison Group N = 310 (%)	Low Upward Social Comparison Group N = 1004 (%)	Statistical Significance
Age			
Mean Years (SD)	31.0 (8.6)	37.2 (12.1)	p < .001
Generation Z	4.5	2.7	p < .001
Millennial	79.9	62.0	
Generation X	11.7	22.8	
Baby Boomer	3.9	12.4	
Gender Identity			
Male	55.9	50.1	p = .079
Female	44.1	49.9	
Race			
Caucasian/White	49.0	74.6	p < .001
African American/Black	9.9	6.4	
Asian/Pac Islander	15.8	8.7	
Native Am/Alaskan Native	5.6	2.6	
South Asian/Middle Eastern	16.8	4.2	
Mixed Race	3.0	3.5	
Ethnicity			
Hispanic	19.7	10.0	p < .001
Political Affiliation			
Democratic	42.6	40.2	p = .007^
Republican	32.3	24.9	
Independent	15.8	18.8	
Other	4.2	5.9	
No Affiliation	5.2	10.2	

^Due to Bonferroni Adjustment, Political Affiliation is not significant at the $p = .0013$ level.

3. Results

The data were screened for possible outliers and missing values before analysis. Based on their responses to the survey item regarding the likelihood of making upward social comparisons online, participants were classified into either the high upward social comparison group (HUSC, $N = 310$, 23.59%) or the low upward social comparison group (LUSC, $N = 1{,}004$, 76.41%). There were no significant differences between the two comparison groups in terms of gender identity or political affiliation ($ps > 0.0013$). However, there were significant differences between the two comparison groups for age, race, ethnicity, and generation group as seen in Table 1 ($p < .001$). Those in the HUSC group tended to be younger (based on both the mean age and generational breakdown comparisons), and the HUSC group was comprised of higher proportions of individuals identified as minority races and Hispanic ethnicity.

3.1. Social media behaviors

The analyses for how specific social media behaviors relate to High Upward Social Comparisons (HUSC) are presented in Table 2. Social Media Intensity for both Facebook and Twitter platforms were significantly related to HUSC (ps < .001), and individuals in the HUSC group had higher mean levels of Social Media Intensity on Facebook and Twitter than those in the LUSC group. Likewise, the Need for Social Media and Social Media Addiction were both significantly associated with HUSC (ps < .001). Differences between group means were also observed for the Need for Social Media and Social Media Addiction, with individuals in the HUSC group displaying higher levels when compared to the LUSC group. Additionally, time spent per day on both Facebook and Twitter was significantly associated with HUSC (ps <.001), such that those in the HUSC group spent more hours per day on both Facebook and Twitter platforms. In terms of social media connections, the number of Facebook friends, Twitter followers, or people they followed on Twitter was not significantly associated with HUSC (ps > .05).

When examining specific social media behavior items in this study, there were significant associations with censorship, feelings of safety online, using social media with the hope of "going viral" and the HUSC (ps < .001). Individuals belonging to the HUSC group reported higher mean levels of censorship due to family/friends, employer/school, and to avoid judgment compared to the LUSC group. Mean ratings for feelings of safety online were greater for those in the HUSC group in comparison to those in the LUSC group. In addition, the HUSC group exhibited higher mean levels of using social media with the hope of "going viral."

3.2. Psychosocial comparisons

The analyses for how specific psychosocial factors relate to High Upward Social Comparisons (HUSC) are presented in Table 3. Perceived stress was significantly associated with HUSC ($p < .001$), such that higher mean levels of perceived stress on the PSS were observed for individuals within the HUSC group as compared to those in the LUSC group. The quality of life comparisons showed that lower levels of QOL was significantly related to the HUSC group ($p < .001$). Comparisons for perceived social support on the ISEL

Table 2. Social media behavior comparisons of low upward social comparisons group (ref) and high social upward social comparisons group (controlling for age, gender, race, ethnicity).

	High Upward Social Comparison Group N = 310	Low Upward Social Comparison Group N = 1004	Statistical Significance	Effect Size OR [95% CI]
Social Media Intensity Scale (Scale 1-5)				
Facebook	3.7 (1.0)	3.2 (1.1)	p < .001	1.72 [1.50, 2.02]
Twitter	3.4 (1.1)	2.7 (1.2)	p < .001	1.62 [1.37, 1.92]
Need for Social Media (Scale 1-6)	4.3 (1.0)	3.4 (1.1)	p < .001	2.03 [1.73, 2.39]
Social Media Addiction (Scale 1-5)	3.1 (0.9)	2.0 (0.9)	p < .001	3.18 [2.64, 3.82]
Hours per Day Range (0-24hrs)				
Facebook	7.5 (7.2)	4.1 (5.2)	p < .001	1.07 [1.05, 1.10]
Twitter	5.4 (6.8)	2.1 (3.8)	p < .001	1.10 [1.07, 1.13]
Social Media Connections (Range)				
Facebook Friends (0-5000)	515.6 (682.6)	412.4 (564.4)	p = .114	
Twitter Following (0-12500)	296.0 (844.3)	282.1 (897.9)	p = .420	
Twitter Followers (0-14000)	272.8 (840.9)	251.7 (961.4)	p = .522	
Censor Self Online (Scale 1-5)				
Because of Family/Friends	3.7 (1.2)	3.1 (1.4)	p < .001	1.39 [1.24, 1.56]
Because of Employer/School	3.6 (1.2)	3.1 (1.4)	p < .001	1.31 [1.18, 1.47]
To avoid Judgment	3.5 (1.2)	2.7 (1.3)	p < .001	1.49 [1.33, 1.67]
Feel Safe Online (Scale 1-5)	3.5 (1.1)	3.1 (1.1)	p < .001	1.41 [1.23, 1.61]
Hope of "Going Viral" (Scale 1-5)	2.8 (1.4)	1.8 (1.0)	p < .001	1.70 [1.51, 1.92]

Table 3. Psychosocial comparisons between low upward social comparisons group (ref) and high upward social comparisons group (controlling for age, gender, race, ethnicity).

	High Upward Social Comparison Group N = 310	Low Upward Social Comparison Group N = 1004	Statistical Significance	Effect Size OR [95% CI]
Perceived Stress Scale (PSS) (Scores Range 0-40)	20.7 (5.7)	15.0 (6.9)	p < .001	1.13 [1.10, 1.16]
Quality of Life (QOL) (Scores Range 0-27)	14.2 (5.6)	16.1 (6.2)	p < .001	.94 [.92, .96]
Social Support (ISEL) (Scores Range 12-48)	31.7 (6.8)	36.9 (7.1)	p < .001	.92 [.90, .94]
Empathy Subscales (Scores Range 7-35)				
Perspective-Taking	24.0 (4.7)	24.9 (5.4)	p = .311	1.06 [1.03, 1.09]
Fantasy	23.7 (4.7)	22.2 (5.6)	p < .001	1.15 [1.12, 1.19]
Empathic Concern	24.1 (5.1)	25.7 (5.8)	p = .106	
Personal Distress	22.0 (4.7)	17.4 (5.6)	p < .001	
Self-Esteem (RSES) (Scores Range 10-40)	26.3 (5.9)	31.3 (6.2)	p < .001	.90 [.88, .92]
Big-5 Personality Inventory (Score Ranges Vary by Scale)				
Conscientiousness (11-45)	31.5 (5.9)	35.0 (6.8)	p < .001	.95 [.93, .97]
Agreeableness (12-45)	30.6 (5.8)	33.8 (6.5)	p < .001	.94 [.92, .96]
Openness (10-50)	35.3 (5.9)	35.7 (6.9)	p = .969	1.10 [1.08, 1.13]
Extroversion (7-35)	20.8 (5.6)	21.4 (6.0)	p = .073	
Neuroticism (8-40)	24.9 (5.9)	20.1 (7.2)	p < .001	
Fear of Missing Out (FOMO) (Scores Range 10-50)	32.7 (8.0)	21.2 (8.6)	p < .001	1.15 [1.12, 1.17]
Major Depressive Disorder (PHQ)	49.4%	12.9%	p < .001	4.38 [3.18, 6.04]
Generalized Anxiety Disorder (PHQ)	11.3%	3.4%	p < .001	3.52 [2.05, 6.02]

revealed lower levels of perceived social support to be significantly associated with the HUSC group ($p < .001$). In terms of empathy, the perspective-taking empathy subscale and the empathic concern subscale were not significantly related to the HUSC group; however higher scores on the fantasy empathy subscale ($p < .001$) and higher scores on the personal distress subscale ($p < .001$) were significantly associated with the HUSC group as compared to the LUSC. Lower scores of self-esteem on the RSES were significantly associated with the HUSC group, compared to the LUSC group ($p < .001$).

Three of the personality traits measured by The Big Five Personality Inventory: conscientiousness, agreeableness, and neuroticism, were significantly associated with the HUSC group (ps < .001). The openness and extroversion traits

Table 4. Stepwise binary multivariate regression identifying key demographic, psychosocial, and social media behaviors related to high upward social comparison.

	Beta	St. Error	p-value	Odds Ratio	95% CI Lower	95% CI Upper
Quality of Life (QOL)	−.071	.018	p < .001	.931	.899	.965
Perceived Social Support (ISEL)	−.034	.015	p = .026	.966	.937	.996
Fear of Missing Out (FOMO)	.081	.015	p < .001	1.085	1.053	1.118
Social Media Addiction	.103	.023	p < .001	1.109	1.060	1.160
Censor to Avoid judgment	.191	.081	p = .018	1.210	1.033	1.417
Feel Safe on Social Media	.223	.101	p = .027	1.250	1.025	1.523
Constant	−4.158	.713	p = .033			

were not associated with the HUSC group (ps > .05). Individuals in the HUSC group exhibited lower mean levels of conscientiousness and agreeableness than those in the LUSC group. For neuroticism, the individuals in the HUSC group demonstrated higher mean levels compared to the LUSC group. Fear of Missing Out (FOMO) was also significantly associated with the HUSC group ($p < .001$), such that individuals in the HUSC group demonstrated higher mean levels of FOMO than those in the LUSC group.

Lastly, both major depressive disorder and generalized anxiety disorder were significantly associated with the HUSC group (ps <.001). A larger proportion of individuals in the HUSC group met criteria for MDD (49.4%) compared to those in the LUSC group (12.9%). Likewise, a higher proportion of individuals in the HUSC group met the criteria for generalized anxiety disorder (11.3%) compared to those in the LUSC group (3.4%).

3.3. Multivariate analysis

A multivariate stepwise binary logistic regression model was developed in order to determine which demographic factors, social media behaviors, and psychosocial factors were most associated with HUSC. The omnibus test was significant, $X^2(6) = 318.638$, $p<.001$ with a −2LL = 714.064 and Nagelkerke R-Square = .426. Table 4 displays the results of the regression model and the identified six key factors associated with HUSC. For psychosocial factors, those with low levels of life satisfaction on the QOL were significantly more likely to make upward social comparisons ($p < .001$). In addition, those with low perceived social support ($p = .026$) and those with greater fear of missing out (FOMO) ($p < .001$) were also more likely to make upward social comparisons. Social media behaviors identified by the model as being related to HUSC were high levels of social media addiction according to the Bergen Social Media Addiction Scale ($p < .001$), frequent censorship to avoid judgment ($p = .018$), and feelings of safety while using social media ($p = .027$).

4. Discussion

This study aimed to systematically identify key factors associated with elevated levels of upward social comparisons on social media platforms. The findings of this study partially supported the researchers' hypotheses that those meeting the criteria for high frequency of upward online social comparisons would have higher levels of depressive symptoms, increased levels of addiction to social media, more negative self-perceptions, and a greater number of maladaptive social media behaviors.

The social media behaviors related to HUSC in the current study were high levels of social media addiction, increased censorship to avoid judgment, and higher reported feelings of safety while on social media. The psychosocial factors related to HUSC in the current study were low levels of life satisfaction, low levels of perceived social support, and increased fear of missing out. Although some studies have identified upward social comparisons as potential motivators for improvement and attainment of goals (Buunk & Dijkstra, 2017), individuals belonging in the HUSC group in the current study appeared to instead be experiencing negative outcomes.

Similar to the findings in previous research suggesting a link between social comparisons and social media addiction (Robinson et al., 2019; Steers et al., 2014), the current study revealed that individuals who displayed increased addictive tendencies toward social media were more likely to be in the HUSC group. Although this study also examined hours on Facebook and Twitter use per day, our findings suggest that addiction to social media is more indicative of upward social comparison frequency than hours of use per day. Moreover, according to the findings of this study and previous literature, feelings of dependency to social media might be better for assessing negative psychological effects than the amount of time spent on social media platforms. The connection between social media addiction and depressive symptoms in young adult populations (Frison & Eggermont, 2017) could explain why there are similarities in findings across the literature. The univariate analyses in this study revealed that Major Depressive Disorder was significantly associated with the HUSC group. Additionally, past research found that the tendency to make negative/upward social comparisons predicted increases in rumination (Feinstein et al., 2013). Rumination is a known depressive symptom and could be a key behavioral explanation for why high social media addiction levels are consistently present when frequency of upward social comparisons is high. The authors speculate that individuals making upward social comparisons on social media experience aversive reactions (i.e., feelings of inferiority and social rejection) that persist as ruminating thoughts, leading individuals to obsessively seek reassurance through social media platforms and ultimately to spiral into social media addiction. While the precise order of causation between these factors is difficult to determine, reducing rumination could be a solution for alleviating harmful effects of online upward social comparisons.

Social comparisons involve focusing on the status of others in relation to one's self (Festinger, 1954). An intense attention to other individuals might be the mechanism underlying the other characteristics and behaviors related to upward social comparisons, which were identified in the current study. As previously mentioned, social media users tend to modify their online self-presentations for the purpose of impression management and increasing personal appeal (Lim & Yang, 2015).

With this positivity bias in mind, connections between high levels of FOMO and high upward social comparisons may be occurring among participants in the current study because other social media users, whom our participants follow on Facebook or Twitter, may appear to be engaging in a high number of exciting activities. This inference is supported by the findings of another study linking social media orientation to risk of developing FOMO and consequently decreasing general well-being (Reer et al., 2019). Elevated levels of FOMO in particular are worrisome due to research suggesting the involvement of FOMO in sleep disruption (Adams et al., 2017) and high social media intensity (Roberts & David, 2019). Although our study did not examine sleeping patterns of the sample, it is important to note that HUSC individuals had higher mean levels of social media intensity than those in the LUSC group, which would partially support the findings previously mentioned.

The association between low perceived social support and the HUSC group in our results may also be cause for further examination. Cole et al. (2017) found that lack of perceived social support on social media platforms increased anxiety and depression in users. A similar pattern emerged in the current study. Individuals in the HUSC group not only reported lower mean levels of perceived social support, but this group also contained a greater percentage of individuals meeting MDD and GAD criteria. Another explanation for low social support in the HUSC group could be due to individuals using social media for reassurance and feedback seeking (Nesi & Prinstein, 2015). This could mean that responses, reactions and comments from other users are placed in high value. Therefore, receiving little, or no feedback in comparison to others who are deemed as better off may be altering perceptions of social support in users. In a related issue, "likes" on social media are often described as quantifiable measures of endorsement from other users, and larger numbers of likes on posts are perceived to be more desirable (Sherman et al., 2016). Though the issue of "likes" is beyond the scope of the current study, it is possible that individuals with a tendency to make upward social comparisons may interpret a smaller number of "likes" as evidence that they are less socially supported or validated. This remains a topic of ongoing research in our laboratory.

Increased censorship to avoid judgment could additionally be another distinguishable behavior linked to the importance of online "likes" and appraisals. Recent studies found that social media usage is related to increases in competitive behavior (Charoensukmongkol, 2018) and stress responses to negative feedback (Valkenberg & Peter, 2009). In an attempt to avoid stressors or becoming more competitive with those perceived as better off, individuals making upward social comparisons might be inclined to be more selective of their content on social media sites. Censorship to avoid judgment could be contributing to the ongoing positive biases in content observed by previous researchers and would suggest that the findings of the present study align with previous research.

Findings in this study identified that increased feelings of safety while online did not correspond with the initial predictions made by researchers such as greater number of maladaptive social media behaviors. However, these results could potentially be attributed to the HUSC group's tendency to censor their content more heavily. It is suspected that individuals in this group might express feeling safe online due to their decision of not self-disclosing information that may put them at risk for negative feedback. Future research and investigations must be conducted in order to fully support this speculation.

Researchers initially predicted low levels of life satisfaction (QOL) for individuals high in upward social comparisons. Considering the previously mentioned contributing factors and theoretical implications of upward social comparisons, it is not surprising that the findings aligned with initial predictions. In previous research, Yang and Oliver (2010) found that individuals making upward social comparisons to television characters produced lower levels of perceived quality of life. The findings of the current study not only hint at similarities in behaviors on other versions of media and social networking sites, they also imply that such behaviors may pose a threat to general well-being. According to another study, differences in emotional responses while online and motivations for using social media are connected to overall quality of life. Users who felt sad, stressed and angry after spending time on social media reported lower quality of life scores (Campisi et al., 2015). Thus, lower quality of life levels observed in the HUSC group could be related to similar negative feelings elicited from making upward comparisons.

While these results are compelling, the study was not without limitations. Firstly, the results of the study are subject to the limitations of self-report, namely that participations may have over- or underestimated their responses. Secondly, this study only used a single response item for determining group membership for the upward social media comparison groups. Future research should examine possible distinguishable factors for individuals who are high in downward social comparisons as it is important to also be aware of any positive or negative outcomes that may be related to this specific online behavior. Considering that the majority of individuals sampled in this study had lower frequency of upward social comparisons, it might be an indication that the general population does not participate in high levels of upward social comparisons. It is possible that the overall negative outcomes of this behavior are only applicable to a small group of individuals. This possibility seems to align with the social comparison orientation perspective in that individual differences play a role in how social comparisons are experienced. Future studies should continue to explore downward and lateral social comparison on social media, as well as the construct of social comparison orientation. Additionally, this study focused solely on *online* behaviors, leaving it unknown to the researchers whether the same group of individuals who had high levels of online upward social comparisons would exhibit a similar frequency of these behaviors during in person interactions. A study comparing online versus offline social comparison behaviors might be able to provide more information about the socialization differences between these two types of interactions.

This study reveals important steps forward in developing preventative interventions for the reduction of harmful online upward social comparisons. Previous research has

identified self-esteem as a mediator in the relationship between upward comparisons on social media and depressive symptoms; indicating that making comparisons with others who are better off leads to low self-esteem and depression (Liu et al., 2017). Similarly, the present study found that the HUSC group generally had lower self-esteem compared to the LUSC group on the univariate level. Liu et al. (2017) also identified optimists as less vulnerable to the harmful side effects of upward social comparisons. While measurement of optimism was beyond the scope of the current study, including variables for this characteristic in future investigations would benefit aims to reduce aversive psychological effects from social media use.

This study provided additional insight to the complexities of social media and mental health spheres. The findings of this study further supported existing literature and emphasizes that the manner in which we use social media is crucial in determining whether we are positively or negatively impacted by it. More importantly, the findings of this study help to identify potentially harmful behaviors in social media users for which there is limited research. Finally, this study extends research suggesting the increasing need to develop methods for addressing harmful social media behaviors.

4.1. Compliance with ethical standards

- Ethical approval: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional committee (<REDACTED>) and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.
- No external funding was provided for this study.
- There are no conflicts of interest for any of the authors on this study.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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