



Social comparison and problematic social media use: Relationships between five different social media platforms and three different social comparison constructs

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ABSTRACT

Almost four billion people worldwide use social media platforms. For some individuals, the social rewards obtained on these sites can lead to problematic social media use (PSMU). Research attempting to understand social media use in general has found relationships with various types of social comparison, but no study has yet investigated PSMU with respect to specific platforms and type of social comparison. To address this, we conducted an online survey ($n = 601$) to assess how three different trait constructs of social comparison (comparison of abilities, comparison of opinions, comparison directionality) relate to the problematic use of five social media platforms (Facebook, Instagram, Snapchat, TikTok, and Twitter). While controlling for demographic characteristics and total number of social media platforms used, linear regression models revealed different associations between problematic use of each platform depending on trait social comparison type. Overall, comparison of abilities was *positively* related with PSMU of all five platforms, whereas comparison of opinions was *negatively* related with PSMU of only Facebook, Instagram, and Snapchat. However, social comparison directionality was not significantly related with PSMU. Results, limitations, and future directions are discussed.

1. Introduction

Eighty-four percent of American adults report using at least one social media platform, such as Instagram, Snapchat, and TikTok (Auxier & Anderson, 2021). Social media platforms provide inherent social rewards (e.g., “likes”), and users tend to return and spend significant amounts of time on these sites due to these reinforcing social rewards (Meshi et al., 2015; Stewart, 2016). However, these social rewards can also result in some individuals maladaptively using these platforms. Problematic social media use (PSMU) refers to continuous engagement with social media despite impaired daily functioning and/or psychological distress. Symptoms of PSMU include a preoccupation with social media, mood modification, tolerance, conflict, withdrawal, and relapse, all of which mirror substance use disorders (Griffiths et al., 2014). Furthermore, PSMU has been consistently associated with negative mental health, such as increased depression, anxiety, and loneliness (for review see Huang, 2020). The maladaptive use of social media has pushed scholars to better understand how PSMU relates to various internal characteristics (e.g., big 5 traits; Kircaburun et al., 2020) and

external variables (e.g., social support; Meshi & Ellithorpe, 2021). Importantly, social comparison is a trait that has been assessed in relation to social media use, however, it is still underexplored in relation to PSMU.

Social comparison refers to humans' innate drive to evaluate themselves with others (Festinger, 1954), and serves our needs for self-evaluation, self-improvement, and self-enhancement (Wood, 1989). Individuals display trait-level differences in their overall tendency to engage in social comparisons, and social comparison can be assessed as a singular overarching construct (Wood, 1989). However, social comparison can also be subdivided into two specific comparison domains: comparison of abilities and comparison of opinions (Gibbons & Buunk, 1999; Suls et al., 2002). Regarding the comparison of abilities, people often judge their own characteristics, qualifications, and achievements through comparison with others. For example, a student may compare their own grades with classmates' grades. Specifically, individuals engaging in these comparisons reflects more of a competition-oriented cognition (Festinger, 1954; Guimond, 2006). In contrast, individuals engaging in social comparisons of their opinions often refer to situations

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of ambiguity, where individuals compare their own views with others to help shape their future opinions. For example, a person may compare their views on debated political issues with others if they are unsure of their own stance. Engagement in this type of social comparison reflects more of an aspect of information collection, when one looks to guide decision making, separate from competition or judgement (Suls et al., 2000). Besides these two aspects, social comparisons can also be framed in regard to directionality (e.g., upwards or downwards), most often in reference to comparisons of ability (Suls et al., 2002). Upward social comparisons occur when an individual compares themselves to another whom they perceive as “better” in terms of some characteristic (e.g., ability, status, etc.), and downward social comparisons occur when comparing oneself with another who they perceive as “inferior.” These forms of social comparison serve different needs across different contexts and people (Taylor & Lobel, 1989). Importantly, people engage in all three of these different types of social comparison on social media.

Social media offer new avenues for people to observe and compare themselves with others in an online context (Meshi et al., 2015). Commonly, studies collapse social comparison of abilities and opinions into an overall comparison measure and relate this measure to the amount or intensity of social media use (Cramer et al., 2016; Lee, 2014; Vogel et al., 2015). For example, individuals who display greater levels of overall social comparison spend more time on Facebook (Vogel et al., 2015). In addition, individuals who display greater overall social comparison also display a higher intensity of Facebook use (e.g., daily routine use and feelings of missing out; Lee, 2014). Furthermore, when assessed in a specifically social media context, greater overall social comparison on Facebook is correlated with greater overall Facebook use, posting, passive reading, and Facebook fatigue (e.g., a desire to take a break from this site; Cramer et al., 2016). More recently, as described above, researchers have broken down social comparison into comparing one's abilities and comparing one's opinions. Both greater comparisons of ability and greater comparisons of opinions are associated with higher frequency of active Instagram interactions with friends and passive Instagram browsing (Yang & Robinson, 2018). With regard to directionality, Vogel et al. (2014) assessed amount of upward social comparisons and downward social comparison on Facebook separately. Greater time on Facebook is related with both directions of social comparison, although individuals displayed a higher overall amount of upward social comparisons on Facebook (Vogel et al., 2014). These relationships are important because associations between social media and psychological well-being/mental health appear to be mediated by the degree one engages in social comparisons (Jabłońska & Zajdel, 2020; Lup et al., 2015; Masciantonio et al., 2021; Park & Baek, 2018; Tandoc et al., 2015; Verduyn et al., 2017; Yang & Robinson, 2018). Of note, a great majority of the extant research linking social comparison with social media use focuses on the amount of regular social media use, not PSMU.

Research exploring the relationship between PSMU and social comparison remains in its infancy with just two published papers. First, Kim et al. (2021) assessed relationships between social comparisons of abilities, social comparison of opinions, and PSMU across two studies. In both studies, greater PSMU was associated only with greater comparisons of ability. Second, Vogel et al. (2014) assessed problematic Facebook use, amount of upward social comparison on Facebook, and amount of downward social comparison on Facebook. Here, greater problematic Facebook use was related to both greater upward and downward social comparison on Facebook. While one of the previous studies (Kim et al., 2021) reported descriptive differences between various platforms, their measure of PSMU in relation to social comparison only assesses overall social media use without assessing differences between separate platforms, while the other paper (Vogel et al., 2014) only assesses problematic use of Facebook. Therefore, absent from the scant previous research is the examination of multiple, distinct social media platforms with respect to social comparison and PSMU. The extant literature tends to focus either only on the problematic use of a

singular platform (e.g., Facebook) or on PSMU overall (agnostic to platform). However, known differences exist between specific platform types with regard to user engagement and experiences (Voorveld et al., 2018), as well as relationships between social media and traits such as narcissism (Davenport et al., 2014). Other research on PSMU has revealed differences in platforms with regard to trait preferences for social rewards as well (Meshi et al., 2020). Therefore, we explored whether platform differences exist with respect to PSMU and our primary construct of interest, social comparison. To do this, we conducted an online survey assessing three different, independent trait constructs of social comparison (comparisons of ability, comparisons of opinion, comparison directionality) and related each of these to participants' problematic use of five different social media platforms (Facebook, Instagram, Snapchat, TikTok, and Twitter).

2. Method

2.1. Participants

Participants were recruited from an online undergraduate student pool at a large Midwestern U.S. university and received course credit for their participation. Individuals needed to report using at least one social media platform to be eligible. The final sample consisted of 601 participants (206 male, 395 female) after excluding the following 15 participants: two who entered a nonsensical value outside of the established ranges for a demographics question (e.g., the value “29” for GPA or “1” for age); three who failed a survey attention check; and 10 who selected “other” or “prefer not to disclose” for a demographic question¹. Participants ranged from 18 to 32 years of age, with an average of 20.0 years ($SD = 1.6$). See Table 1 for complete demographic characteristics of the sample. On average, participants used 4.33 ($SD = 0.98$) of the five social media platforms we investigated.

2.2. Procedure

On an online survey website, participants first provided informed consent and then completed our questionnaire to assess problematic use of five different social media platforms, three different types of social comparison, and demographic characteristics. All data were collected between October and December of 2020, and all procedures were approved by the university's Institutional Review Board.

2.3. Measures

2.3.1. Problematic social media use

Problematic use of five different social media platforms (Facebook, Instagram, Snapchat, TikTok, and Twitter) was assessed through platform-specific versions of the Bergen Facebook Addiction Scale (BFAS; Andreassen et al., 2012). We modified the BFAS for each specific platform by replacing the word “Facebook” in each item with the names of each of the other four platforms to develop platform specific PSMU scales (e.g., Meshi et al., 2020). These PSMU scales assess six core aspects of addiction: salience (preoccupation), mood modification, tolerance, conflict, withdrawal, and relapse (Griffiths et al., 2014). For example, one item on the BFAS which assess withdrawal includes, “How often do you become restless or troubled if you are prohibited from using Facebook?”. Each scale provided response options on a 5-point scale (1 = “very rarely”; 5 = “very often”), and we summed responses to create a composite score for each platform, with higher scores indicating greater problematic use (Andreassen et al., 2012). Participants only completed scales for platforms which they reported having an account. Participants responded to all relevant questions, therefore, there was no missing data. Internal consistencies of all five scales were good or excellent (Table 1).

Table 1
Sample descriptive statistics and bivariate correlation matrix of all covariates and variables of interest.

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
Mean		19.95	4.33	19.98	18.36	62.53	8.87	13.69	13.55	15.43	10.42
SD		1.6	0.98	4.6	3.3	17.2	4.1	5.0	5.7	6.2	5.1
Cronbach's α				0.84	0.89	0.81	0.91	0.87	0.89	0.89	0.93
1. Gender	–	–0.09*	0.21**	0.14***	0.14**	–0.12**	–0.04	0.15***	0.08	0.20***	–0.09
2. Age		–	–0.07	–0.05	–0.06	0.03	20***	0.06	–0.13**	–0.13**	0.09
3. Number of platforms used			–	0.11**	0.12**	0.05	–0.13**	0.09*	0.14**	0.01	–0.04
4. Comparison of ability				–	0.44***	–0.14**	0.08	0.27***	0.26***	0.29***	0.12*
5. Comparison of opinion					–	–0.11**	–0.13**	–0.02	0.03	0.10*	–0.04
6. Direction of SC						–	0.05	0.004	0.04	–0.14**	–0.02
7. Problematic Facebook use							–	0.47***	0.42***	0.26***	0.55***
8. Problematic Instagram use								–	0.61***	0.50***	0.37***
9. Problematic Snapchat use									–	0.52***	0.39***
10. Problematic TikTok use										–	0.27***
11. Problematic Twitter use											–

SC = social comparison.

Note. Gender was coded as Male = 1, Female = 2.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

2.3.2. Social comparison

We assessed three aspects of social comparison with two different established social comparison scales.

2.3.2.1. Iowa-Netherlands Comparison Orientation Measure (INCOM).

This scale has been previously validated as a measure of social comparison, specifically assessing two distinct subconstructs: comparison of abilities and comparison of opinions (Gibbons & Buunk, 1999). The comparison of abilities subscale consisted of six items such as “I often compare myself with others with respect to what I have accomplished in life”, whereas the comparison of opinions subscale contained five items such as “I often like to talk with others about mutual opinions and experiences”. Participants were presented with the complete 11-question INCOM scale, and asked to respond how much they agreed with the statements on a 5-point scale (1 = “strongly disagree”; 5 = “strongly agree”). One item in each subscale was reverse coded, and we summed within each subscale to create a single score for each (Gibbons & Buunk, 1999). Higher scores indicate a greater overall amount of social comparison within both the ability and opinion constructs. Participants responded to all relevant questions, therefore, there was no missing data. Internal reliability for both subscales was good (Table 1).

2.3.2.2. Allan & Gilbert Social Comparison Scale. This scale has been previously validated as an accurate measure of social comparison, assessing the general direction (upwards vs. downwards) of participants' social comparisons (Allan & Gilbert, 1995). The statement “In relationship to others I feel...” was presented at the top of the scale and participants were presented with 11 bipolar constructs (e.g., inferior to superior). Participants indicated feelings of comparison on a 10-point semantic differential scale, with 1 indicating the more negative adjective and 10 indicating the oppositional, more positive adjective. Responses were summed for each participant (Allan & Gilbert, 1995), with higher scores indicating more downward social comparisons, and lower scores indicating more upward social comparisons. Participants responded to all relevant questions, therefore, there was no missing data. Internal reliability of this scale with our sample was good (Table 1).

2.4. Data analysis

All analyses were performed using SPSS (version 26). To assess relationships between PSMU and constructs of social comparison, we first performed bivariate Pearson's or point-biserial correlations (where appropriate) between all variables. We next conducted five linear

regression models predicting problematic use of each social media platform (Facebook, Instagram, Snapchat, TikTok, and Twitter) with the three social comparison scales, while controlling for gender, age, and number of social media platforms. Gender and age were included as covariates due to established differences in levels of social comparison among both demographic variables (Callan et al., 2015; Guimond et al., 2006). Number of social media platforms used was also controlled for to ensure that any relationship is due to the specific platform of interest, and not due to potential additive effects of using multiple platforms.

3. Results

Means and correlations between all variables can be viewed in Table 1. To address our research question, we conducted five linear regressions for problematic use of each social media platform with the three measures of social comparison while controlling for gender, age, and total number of platforms used (Table 2). Social comparison of ability was positively related with problematic use of all five platforms (all β 's > 0.17, all p 's < .001). In other words, the greater an individual's frequency to engage in social comparisons concerning their abilities, the greater their problematic use of each social media platform (Facebook, Instagram, Snapchat, TikTok, Twitter). Social comparison of opinion was negatively related with problematic use of Facebook, Instagram, and Snapchat (all β 's < –0.21, all p 's < .01), but not TikTok or Twitter (p 's > .05). In other words, the greater an individual's frequency to engage in social comparisons concerning their opinions, the lesser their problematic use of only Facebook, Instagram, and Snapchat. Social comparison directionality was not significantly related with problematic use of any platform (all p 's > .05). To note, when using correlation not regression, social comparison directionality was negatively correlated with problematic TikTok use, such that more upward social comparisons related with greater problematic use, however, this relationship did not hold in the problematic TikTok use regression model. Of interest, number of social media platforms was negatively related to problematic Facebook use ($\beta = -0.56, p < .05$) and positively related with problematic Snapchat use ($\beta = 0.77, p < .01$). Therefore, the more platforms a participant used, the lower their problematic use of Facebook, but greater their problematic use of Snapchat.

4. Discussion

The current study investigated the relationships between three different types of social comparison and the problematic use of five of the most popular social media platforms in the U.S. among young adults

Table 2
Linear regression models predicting problematic social media use of each specific platform.

Variable	Model 1			Model 2			Model 3			Model 4			Model 5		
	Facebook	Instagram	Snapchat	TikTok	Twitter										
	N = 514			N = 578			N = 555			N = 475			N = 456		
	R ² = 0.094***			R ² = 0.120***			R ² = 0.113***			R ² = 0.131***			R ² = 0.039**		
	β	SE	C.I.	β	SE	C.I.	β	SE	C.I.	β	SE	C.I.	β	SE	C.I.
Gender	-0.04	0.38	-0.79, 0.72	1.39**	0.43	0.54, 2.24	0.28	0.50	-0.71, 1.26	2.18***	0.61	0.99, 3.37	-1.00	0.52	-2.03, 0.02
Age	0.47***	0.11	0.25, 0.69	0.24	0.13	-0.02, 0.50	-0.44**	0.15	-0.73, -0.15	-0.47*	0.19	-0.85, -0.10	0.24	0.14	-0.04, 0.52
Number of platforms used	-0.56*	0.23	-1.01, -0.12	0.31	0.24	-0.15, 0.78	0.77**	0.29	0.20, 1.34	-0.06	0.38	-0.80, 0.69	-0.09	0.37	-0.82, 0.64
Comparison of ability	0.17***	0.04	0.09, 0.25	0.36***	0.05	0.27, 0.46	0.38***	0.06	0.27, 0.49	0.37***	0.07	0.24, 0.50	0.18**	0.06	0.07, 0.30
Comparison of opinion	-0.24***	0.06	-0.35, -0.13	-0.28***	0.07	-0.41, -0.15	-0.21**	0.08	-0.36, -0.06	-0.10	0.09	-0.28, 0.08	-0.14	0.08	-0.30, 0.02
Direction of SC	0.01	0.01	-0.01, 0.03	0.01	0.01	-0.1, 0.03	0.02	0.01	-0.002, 0.05	-0.03	0.02	-0.06, 0.002	-0.01	0.01	-0.04, 0.02

SC = social comparison.

Note. Gender was coded as Male = 1 Female = 2.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

(Auxier & Anderson, 2021): Facebook, Instagram, Snapchat, TikTok, and Twitter. The frequency of comparing one's abilities with others was positively associated with the problematic use of all five social media platforms. In contrast, the frequency of comparing one's opinions with others was negatively associated with the problematic use of Facebook, Instagram, and Snapchat. Therefore, participant's frequency of social comparison is significantly related to problematic use of various platforms, however in differing directions and for different platforms depending on the nature of these comparisons (abilities or opinions). Directionality of social comparisons (upward vs. downward) was not significantly related to the problematic use of any platform.

We found that the greater one's frequency for comparing their abilities with others, the greater their problematic use of five different social media platforms. This finding agrees with a previous study which also found greater comparison of abilities related to greater PSMU overall (Kim et al., 2021). While Kim and colleagues assessed PSMU as a single construct spanning across all platforms, we assessed PSMU in regard to five distinct social media platforms. To speculate about causality, it could be that given the trait aspects of social comparison, greater tendencies for comparison of ability may make individuals more susceptible to developing symptoms of PSMU across these five platforms. For example, people who engage in greater comparison of abilities are more likely to seek opportunities for comparison in all places, and social media would present an easy opportunity to engage in this behavior. However, the heavily curated images on social media, where people present their best selves, could also invite people to engage more with social comparisons online. Therefore, PSMU may lead individuals to engage in greater comparison of abilities. Regardless of the specific direction, our findings align with prior research on general PSMU, and importantly, future longitudinal research can be designed to address these issues of causality.

We also found that the greater one's frequency for comparing their opinions with others, the lesser their problematic use of Facebook, Instagram, and Snapchat. Similar to above, we can speculate on causality; it could be that individuals who do not engage in frequent comparison of opinions are more easily driven to problematic use of these three platforms, or it could be that individuals who display the problematic use of these platforms are led to reduce their engagement in comparisons of their opinions with others. Either way, future longitudinal research can better elucidate causality in these relationships. Importantly, our findings with comparisons of opinion are novel as previous research did not find any relationships with overall PSMU (Kim et al., 2021). It could be that Kim and colleagues' method of generalizing problematic use across platforms obscured the relationships we revealed with these specific platforms (Facebook, Instagram, and Snapchat). Therefore, investigating platform specific PSMU in the future may help us better understand these nuanced relationships with trait variables such as social comparison.

Our study did not reveal any significant associations with social comparison directionality and problematic use of five social media platforms. While Vogel et al. (2014) found positive relationships between both upward and downward social comparison on Facebook with problematic Facebook use, differences are likely due to different measures. We measured comparison directionality with an established, 11-item scale assessing directional (upward and downward) social comparison within each item (Allan & Gilbert, 1995). This provided a continuous measure of social comparison along a single, directional spectrum, considering multiple constructs of social comparisons in a global context (e.g., both real-world and online). In contrast, Vogel et al. (2014) utilized only one questionnaire item for upward social comparison and one separate questionnaire item for downward social comparison, and directly asked about these concepts specifically within a social media context. Ideally, future research on directional social comparison and PSMU will use established, multi-item scales, but also improve on our method by taking into account the online context. For example, some previous research has also asked about social comparison

in a specifically social media context (Cramer et al., 2016; Yang et al., 2018), however not in comparison to an offline context or in regard to problematic use.

Despite our findings regarding social comparison and PSMU, the current study has several limitations. First, as mentioned above, the cross-sectional nature of our data does not permit us to test for causal relationships. While we speculated on causality above, future research should employ a longitudinal design to better discern causal direction. Second, our participants were college-aged students which may limit the generalizability to other populations. Nevertheless, this population displays the highest level of social media use and a high likelihood of developing PSMU (Cheng et al., 2021), therefore, our research with this demographic is important. Future research can assess these relationships across multiple demographic characteristics to understand the potential influence on these processes.

In the present work, social comparisons of abilities and opinions were associated with PSMU across multiple different platforms. Specifically, greater levels of comparisons of ability were related with greater problematic use across all five platforms, whereas greater levels of comparisons of opinion were related with reduced problematic use of Facebook, Instagram, and Snapchat. Directionality of social comparison was not related with the problematic use of any platform we measured. As not all platforms were linked with all forms of social comparison (e. g., comparisons of opinion), future research on social media use may benefit from taking multiple platforms into consideration, examining what other constructs and traits may differ across platforms with respect to problematic use. Of note for clinicians, if future research discerns that engagement in comparisons of ability, for example, leads to PSMU, then reducing engagement in these comparisons may be beneficial for reducing PSMU. Alternately, finding ways to boost an individual's tendency toward making comparisons of opinion may also be effective in alleviating symptoms of the problematic use of some platforms. Finally, as social comparison has acted as a mediator between social media use and negative mental health in other studies (Masciantonio et al., 2021; Verduyn et al., 2017; Vogel et al., 2014), our current findings can be considered for future research aimed at better understanding links between problematic social media use and mental health.

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CRedit authorship contribution statement

Kaitlin M. Lewin: Formal analysis, Writing – original draft. **Morgan E. Ellithorpe:** Conceptualization, Methodology, Writing – review & editing. **Dar Meshi:** Conceptualization, Methodology, Investigation, Writing – review & editing.

Data availability

Data will be made available on request.

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