



## Full length article

## Differential associations between types of social media use and university students' non-suicidal self-injury and suicidal behavior

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## ABSTRACT

**Objective:** To examine differential associations between types of social media use and non-suicidal self-injury (NSSI) and suicidal behaviors.

**Methods:** Participants were N = 40,065 Norwegian college and university students, age 18–25, from the 2018 Students' Health and Wellbeing (SHoT) study. Students reported on their use of social media for seven specific activities, which we categorized into active and passive non-social use, passive social use, active public social, and active private social use. We also considered students' tendency for negative social comparisons on social media. Outcomes were past-year NSSI, NSSI ideation, suicidal ideation, and suicide attempt. Covariates were age, gender, total daily screen time and financial stress.

**Results:** Results of multiple logistic regression revealed differential associations between types of social media use and outcomes. Notably, active social private use (e.g., messaging friends) was associated with decreased odds of all outcomes, whereas active social public use (e.g., status updates) was associated with increased odds of NSSI ideation, NSSI, and suicide attempt. Social comparison was associated with increased odds of all outcomes.

**Conclusion:** Our results suggest that specific types of social media use are differentially associated with NSSI and suicidal outcomes among university students.

### 1. Introduction

The transition from adolescence to adulthood is fraught with novel stressors, including moving out of the parental home, new financial responsibilities, exploration of romantic relationships, and for many young adults, the transition to higher education (Arnett et al., 2014). Though often exciting, this period is characterized by marked instability across several domains, including employment, housing, finances, and relationships (Arnett et al., 2014); it is therefore perhaps no surprise that this is a particularly vulnerable time with respect to the development of

mental health problems, including self-harm and suicidality (Fergusson et al., 2000; Gandhi et al., 2018; MacKinnon & Colman, 2016).

Self-harm and suicidal behaviors are prevalent in this transitional period. Suicide is the second leading cause of death in 15–29 year olds worldwide (World Health Organization, 2019), and is a significant issue facing university students (Eskin et al., 2016). Suicidal ideation and attempt are common among university students (Garlow et al., 2008; Sivertsen et al., 2019a), and are strong risk factors for suicide (Bostwick et al., 2016). Non-suicidal self-injury (NSSI; distinguished from suicidality in that it is not motivated by an intent to die) is also highly

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prevalent among university students (Cipriano et al., 2017). Due to the prevalence and severity of these behaviors, and the fact that precipitating factors are likely to be context-specific, identifying risk factors specific to the modern university experience is crucial to understanding and preventing NSSI and suicidal behavior in this population.

Digitally-mediated communication platforms, including social media, are an increasingly central context for students' social lives, and it has been suggested that changes in technology use may be contributing to self-harm and suicidality (Gardner et al., 2019). Conversely, others have argued that social media offer a convenient way to maintain existing relationships and form new connections, providing users at least some of the benefits of social connection despite boundaries such as physical distance (Ellison et al., 2007). However, disproportionately little research has examined the implications of the digital social landscape on mental health and suicidal behavior among university students. Some research has linked social media use to negative outcomes, including depressive symptoms (Kross et al., 2013; Sagioglou & Greitemeyer, 2014) – however, findings are mixed, with other studies reporting a protective effect of social media use (Ellison et al., 2007; Valenzuela et al., 2009).

Recent reviews of studies examining associations between social media use and wellbeing have suggested that these mixed findings may be due to a lack of precision in the way social media use is operationalized (Appel et al., 2016; Orben, 2020). The term 'social media' is a broad catch-all for a wide range of platforms and applications that serve as a medium for social interaction. Even within a given platform, there are many different ways in which students can use the tools made available by the medium. *Passive* use of social media describes use of a platform for the purpose of consuming content (Davenport et al., 2014), for example, reading posts or viewing pictures. *Active* use, on the other hand, includes creation of both public (e.g., status updates, tweets) and private content (e.g., direct messages) (Frison & Eggermont, 2015). Additionally, although much social media use is, as its name suggests, *social* in nature, social media platforms are so ubiquitous that many users rely on them for *non-social* activities – for example, accessing news items and media consumption (Broersma & Graham, 2012). Measures of social media usage often ignore these various types of use – assessing, for example, only the total time spent on social media (Davenport et al., 2014).

Different types of media use might be expected to be differentially associated with outcomes – for example, active social use may serve to strengthen social networks and improve social capital, which may in turn protect against poor mental health. On the other hand, excessive passive use of such media may facilitate social comparison (Appel et al., 2016), which has been linked with depression and NSSI in offline contexts (Appel et al., 2016; Gilbert et al., 2009, 2010). In one experimental study, passive, but not active, use of social media predicted subsequent declines in subjective wellbeing (Verduyn et al., 2015). Similarly, a large population-based study of Icelandic adolescents suggested that whereas passive use of social media was associated with symptoms of anxiety and depression, active use of social media was not (Thorisdottir et al., 2019). To our knowledge, no existing population-based studies have examined links between types of social media use and NSSI and suicidal behavior.

The objective of the present study was therefore to examine associations between different types of social media engagement (e.g., active vs. passive; public versus private) and NSSI and suicidal behaviors among university students.

## 2. Method

Data were drawn from the SHoT-2018 study (Students' Health and Wellbeing Study), a survey of approximately 50,000 Norwegian college and university students (ages 18–35), both in Norway and studying abroad (Sivertsen et al., 2019b). Data collection was conducted from February to April 2018 via online questionnaire. Informed consent was obtained from all respondents; all procedures were compliant with the

Code of Ethics of the World Medical Association (Declaration of Helsinki). Responses were received from 50,054 students, representing 30.8% of the eligible student population. For the present study we focused on students age 18–25 (corresponding to the transitional period of early or emerging adulthood, as in previous literature) (Arnett, 2000), yielding a final sample of  $N = 40,065$ .

### 2.1. Measures

**2.1.1 Use of social media.** We assessed participants' use of social media for seven specific activities. For the present study, we categorized these activities into *passive social* ("check out what's happening among friends, groups I'm in, or about cultural activities"), *passive non-social* ("read the news"), *active non-social* ("use social media associated with my studies"), *active social public* ("post status updates or pictures of myself/friends"; "post links or comments on issues or debates related to news, society, culture or politics";  $r = 0.36, p < .001$ ) and *active social private* use ("make appointments with friends organize my daily life"; "Chat with friends (individually or in groups)";  $r = 0.48, p < .001$ ). These questions are comparable to, though not as exhaustive as, the activities listed in the Passive and Active Facebook Use Measure (PAUM) used in other studies of social media use (Gerson et al., 2017). Participants rated their participation in each activity on a 5-point scale: 'Never'; 'Seldom'; 'Weekly'; 'Daily'; 'Several times a day'; these response options were comparable to those employed in other studies (Krasnova et al., 2013). Participants' tendency for *social comparison* on social media was assessed by the question: "I find that what others post (photos/status updates) make me feel less satisfied with myself and my own life". Respondents indicated their agreement on a 5-point scale from 'not at all' to 'very much'.

**2.1.2 NSSI and suicidal behavior.** History of suicidal ideation, suicide attempts, and NSSI were assessed by three items drawn from the Adult Psychiatric Morbidity Survey (AMPS): "Have you ever seriously thought of taking your life, but not actually attempted to do so?"; "Have you ever made an attempt to take your life, by taking an overdose of tablets or in some other way?"; "Have you ever deliberately harmed yourself in any way but not with the intention of killing yourself?". The question about NSSI ideation was adapted from the Child and Adolescent Self-Harm in Europe study (CASE): "Have you ever thought about trying to deliberately harm yourself but not with the intention of killing yourself but have not actually done so?". Follow-up questions assessed the timing of the most recent episode of each outcome, e.g.: "when did you last think about hurting yourself like this", with response options: 'in the last week'; 'in the last year'; 'more than a year ago, but after I started studying'; 'before I started studying'. For the present study we considered NSSI and suicidal behaviours occurring in the past year; responses were dichotomized as 'yes' or 'no'.

**2.1.3 Covariates.** Participants self-reported their *age* and *gender*. *Total screen time* was self-reported using the question "how many hours of screen usage do you have in total during one day", with response options from '0' to '18 or more' hours. *Financial stress* in the past 12 months was assessed using two items – one assessing difficulty paying running household costs including food, transport, and housing, and one assessing difficulty managing a hypothetical unexpected bill. For the present analyses, both items were dichotomized ('yes'/'no').

### 2.2. Analysis

Separate multiple logistic regression models were estimated for each NSSI and suicide outcome. First, we estimated associations between each type of social media use (passive non-social, active non-social, passive social, active social public, and active social private), the tendency for social comparison on social media, and outcomes. Next, we reran these models controlling for age, gender, total screen time, and financial stress. As no substantive differences were observed between these models, fully adjusted models are presented. To test the modifying

effect of gender on these associations, we fitted an interaction term between gender and each type of social media use, for each outcome. None of these interactions were significant, hence we present a model which pools across genders. Cases with missing data (<6%) were listwise deleted. All analyses were conducted using R software (version 3.6.1, The R Foundation for Statistical Computing).

### 3. Results

Our final sample was comprised of over 70% women. Fifty-nine students did not indicate their gender, and an additional 81 students reported a gender other than ‘man’ or ‘woman’. As this sample size was not large enough to consider these gender categories separately, these observations were excluded from further analyses. Approximately seven percent of the sample reported experiencing suicidal ideation in the past year, with less than 5 in 1000 reporting a suicide attempt; figures which did not differ significantly for, men and women in the sample (Table 1). Significantly more women reported thoughts (12.4%) and instances of NSSI (5.3%) than did men (5.3% and 2.3%, respectively). Men and women in the sample reported approximately 8 and 7 h of screen time per day, respectively. Women reported greater use of social media for social and active non-social activities, whereas men reported more passive non-social usage (Table 1).

#### 3.1. Associations between media use and outcomes

Results of fully adjusted models predicting NSSI and suicidality outcomes are presented in Table 2. Active social use in the public sphere (posting updates/pictures/articles) was associated with increased odds of NSSI ideation, NSSI, and suicide attempt, whereas social private use (messaging friends, making plans) was associated with reduced odds of all NSSI and suicidality outcomes. Passive non-social use of social media was associated with decreased odds of NSSI ideation, NSSI, and suicidal ideation. Finally, use of social media associated with studies (active non-social use) was associated with reduced odds of suicide attempt. The tendency for social comparison on social media was also positively associated with increased odds for all NSSI and suicidality outcomes.

**Table 1**  
Descriptive statistics.

	Men (N = 11,937) %	Women (N = 28,128) %	p-value for difference <sup>a</sup>
NSSI ideation (yes)	5.3%	12.4%	<.001
NSSI (yes)	2.3%	5.2%	<.001
Suicidal ideation (yes)	6.6%	7.3%	0.093
Suicide attempt (yes)	0.4%	0.5%	0.232
Financial stress			
Difficulty affording basic necessities (yes)	21.9%	30.0%	<.001
Difficulty coping with unexpected bill (yes)	69.6%	60.3%	<.001
Mean (SD)			
Age	22.19 (1.75)	21.94 (1.73)	<.001
Screen time (hours per day)	7.92 (3.44)	7.05 (3.39)	<.001
Active social	2.80 (0.58)	2.96 (0.50)	<.001
Public	1.66 (0.69)	1.77 (0.59)	<.001
Private	3.94 (0.78)	4.15 (0.73)	<.001
Passive social	3.59 (1.05)	3.77 (0.99)	<.001
Active non social	3.27 (1.13)	3.34 (1.10)	<.001
Passive non-social	3.89 (1.19)	3.81 (1.06)	<.001
Social comparison	1.81 (1.00)	2.52 (1.15)	<.001

NSSI: Non-suicidal self-injury.

<sup>a</sup> p-values based on independent sample t-tests.

### 4. Discussion

In this large sample of Norwegian university students, we demonstrated consistent associations between social media use and several outcomes related to NSSI and suicidality. In particular, different types of social media engagement were differentially associated with all outcomes, suggesting that associations between social media use and mental health may be more nuanced than previously thought. Relatedly, social comparison on social media was positively associated with suicide attempt, suicidal ideation, NSSI, and NSSI ideation.

#### 4.1. Public versus private social media use

Most notably, our results suggested that active use of social media in the public and private sphere were differentially associated with NSSI and suicidality. Private social media use (that is, messaging friends and organizing social plans) was protective against all four outcomes related to NSSI and suicidality. Conversely, public social media use (e.g., posting links, photos, or status updates) was associated with increased risk of NSSI and suicidality.

In recent years, Frison & Eggermont distinguished between public and private active use of Facebook (e.g., posting status updates versus direct messaging) (Frison and Eggermont, 2015, 2016). In a sample of adolescents, they reported that public use was associated with greater depressed mood (Frison & Eggermont, 2016). Private use, on the other hand, was protective against depressed mood – a relationship mediated through adolescents’ level of perceived online social support. Our results extend this line of research, using a large sample of young adults, asking explicitly about use of multiple social media platforms, and focusing on NSSI and suicidality as outcomes. Several conceptual models of media use suggest that making use of online social capital has beneficial effects for users (Kraut et al., 2002; McKenna & Bargh, 2000). One small longitudinal study suggested that even heavy smartphone use was protective against loneliness when participants used these tools to engage in self-disclosure with peers (Karsay et al., 2019). Private messaging necessitates a specific, known recipient, perhaps indicating a greater degree of familiarity or closeness. This type of social media engagement may therefore serve to strengthen existing social networks.

Public use of social media, on the other hand, showed a positive relationship with suicide attempt, suicide ideation, NSSI, and NSSI ideation. It has been hypothesized that the observed association between public use of Facebook and depressed mood may have to do with the feedback, or lack thereof, provided by peers in response to this activity (Frison & Eggermont, 2015). Public use of social media may also be driven by different motivations than private use, which may help explain differential associations with NSSI and suicidal behavior. Public use may be motivated by approval-seeking, which in turn has been linked with elevated depressive symptoms (Nesi & Prinstein, 2015).

In their study of Facebook use among high-school students, Frison and Eggermont further reported a gender difference whereby public social use was beneficial for girls but detrimental for boys (Frison & Eggermont, 2015). Though we explored interactions with gender, public social use was associated with negative outcomes for both men and women in our sample. One possibility is that the relative gender equity observed in Norwegian culture (Borchorst & Siim, 2008) translates into fewer gender differences in the processes governing associations between social media use and mental health. Another possibility is that social media use is differentially associated with outcomes at different developmental stages (i.e., adolescence versus young adulthood), or that these processes may operate differently for NSSI and suicidality than for other mental health outcomes. Unlike the persistent gender differences noted for depression; gender differences in rates of suicide attempt tend to peak in mid-adolescence, with rates among men and women roughly equal by age 19;<sup>35</sup> it is possible that gender differences in the processes linking social media use and suicidality may similarly narrow. However, it should be noted that our sample was 70% female, slightly higher than

**Table 2**  
Associations between types of social media use and outcomes; adjusted models<sup>a</sup>.

	NSSI ideation		NSSI		Suicidal Ideation		Suicide Attempt	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Passive non-social	<b>0.90</b>	0.88, 0.93	<b>0.89</b>	0.86, 0.94	<b>0.90</b>	0.86, 0.93	0.90	0.78, 1.04
Active non-social	1.00	0.96, 1.02	1.00	0.95, 1.04	0.97	0.93, 1.01	<b>0.80</b>	<b>0.69, 0.92</b>
Passive social	<b>0.95</b>	0.92, 0.99	<b>0.91</b>	0.86, 0.97	1.00	0.95, 1.05	0.92	0.77, 1.10
Active social								
public	<b>1.19</b>	1.12, 1.25	<b>1.26</b>	1.16, 1.37	1.06	0.99, 1.14	<b>1.55</b>	1.22, 1.95
private	<b>0.80</b>	0.76, 0.84	<b>0.80</b>	0.74, 0.86	<b>0.73</b>	0.69, 0.78	<b>0.73</b>	0.58, 0.92
Social comparison	<b>1.43</b>	1.39, 1.47	<b>1.40</b>	1.35, 1.46	<b>1.52</b>	1.47, 1.57	<b>1.66</b>	1.46, 1.89

NSSI: Non-suicidal self-injury.

<sup>a</sup> Adjusted for age, gender, screen time, and financial stress.

the proportion of female students observed at the national level (60%) (Statistics Norway, 2020). It is possible that this finding is an artefact of the sample composition, and would not generalize to the Norwegian university student population as a whole.

#### 4.2. Passive social media use and social comparison

Other authors have reported that passive use of social media (e.g., browsing others' photographs) is associated with poorer mental health (Frison & Eggermont, 2015; Thorisdottir et al., 2019; Verduyn et al., 2015). In our sample, we found no evidence for an association between passive media use and NSSI or suicidality. However, our measurement of passive social use of social media was restricted to a single item, whereas other studies have employed more detailed measures of passive use.

Social media profiles are often highly curated, showcasing only the most positive aspects of users' lives. Passive use of social media is hypothesized to facilitate unfavourable social comparisons, placing users at risk for feelings of envy and lowered self-esteem (Appel et al., 2016). It is these negative appraisals of the self in comparison to others that are thought to drive the associations between passive social media use and poor mental health.

Contrary to expectations, in our study, we found a weak association between passive social media use and NSSI outcomes, where passive use was associated with lower odds of NSSI ideation and behavior in fully adjusted models. However, participants' self-reported tendency for negative social comparison on social media was positively associated with NSSI and suicidality. This finding extends previous work suggesting that social comparison on social media is associated with lower subjective wellbeing (Verduyn et al., 2015) and greater depressed mood (Appel et al., 2016). Reducing use of social media for those vulnerable to making unfavourable social comparisons may therefore be one way to mitigate potential negative effects of social media use on NSSI and suicidal behavior. Results of one small experimental study suggested that refraining from using Instagram for a week was associated with higher life satisfaction – particularly for participants' who reported a high tendency for social comparison (Fioravanti et al., 2020). In a Danish experimental study, Tromholt (2016) reported that taking a break from Facebook was associated with increased life satisfaction and positive emotionality comparative to the control group – associations that were more pronounced among participants who mostly used the platform passively, and those who were more prone to envy. Our results suggest similar mechanisms may apply to the links between social media use and NSSI and suicidal behavior.

#### 4.3. Non-social use of social media

In addition to the many social uses of social media, university students often use these tools for non-social reasons: for example, in conjunction with their studies, or to engage with current events. Our

results suggested that non-social use of social media was at worst, not associated with, and at best, negatively associated with, NSSI and suicidal outcomes. Passive non-social use (exemplified by reading the news) in particular, was associated with decreased odds of three out of four outcomes. Previous researchers have worried that exposure to troubling current events may decrease wellbeing, but specific topics, reporting, and context of news consumed may alter its effects on mental health (Boukes & Vliegenthart, 2017). Some evidence suggests that among young adults, news consumption on the internet may be positively related to civic participation and perceptions of social capital (Shah et al., 2001).

#### 4.4. Limitations and strengths

The cross-sectional design of the study did not allow us to assess temporality in the associations between social media use, NSSI, and suicidal behavior. For example, it is possible that engagement in NSSI and suicidal behavior may lead to different types of social media engagement. Though the measure of social media use employed in the current study was comparable with those used in other studies (Gerson et al., 2017), when considering separate types of social media use, several categories of media use were represented by a single item (e.g., 'read the news' for passive non-social use). Ideally, future studies of public versus private social media use would use several items reflecting each construct. Further, the content of social media use was not assessed—for example, students may use social media to access content related to NSSI and suicidal behavior, which may increase their own risk of such behaviours (Arendt et al., 2019). Cyberbullying, which has been associated with NSSI among young adults (John et al., 2018), may also occur through social media platforms. Data for the SHoT study was collected online, and may, therefore, have been subject to some selection bias, as students who lack access to or rarely engage with social media may have been less likely to participate in the study. Finally, suicidality, NSSI, and NSSI ideation were assessed using only four items; though these items have high face validity and are comparable to assessments of NSSI and suicidality in other epidemiological studies (Duffy et al., 2019; McManus & Gunnell, 2020; O'Connor et al., 2018), more exhaustive validated measures of these constructs would be ideal. Strengths of the study included a large sample size and questions about multiple types of social media use.

#### 4.5. Conclusions and implications

By and large, our results suggest that social media is not a monolith with unilateral consequences for wellbeing among young adults. Rather, we suggest that social media represents a toolbox with multiple, distinct uses – each differentially associated with youth self-injury and suicidal outcomes. Inconsistent findings in previous literature are likely due to the fact that authors have rarely and inconsistently distinguished



between these different ways of using social media.

Though we identified protective associations between private social media use and suicidal outcomes, public social media use was associated with greater likelihood of NSSI and suicidal behaviors. Optimistically, in addition to promoting use of social media to connect privately with friends and family, it may be possible to mitigate the negative consequences of maladaptive use of social media. In one study of UK adolescents, family meal frequency moderated the negative association between time spent on social media and wellbeing – among teens who frequently sat down to meals with their family, social media use showed no association with wellbeing (Jagtiani et al., 2019). Bolstering family connections, even when physically separated, and strengthening face-to-face connections with friends may therefore be important in promoting mental health among university students in the digital age.

Social media platforms may also be used proactively to intervene on NSSI and suicidal behavior, in a way that is likely to be palatable and accessible to adolescents and young adults. Social media support has been shown to facilitate young adults' adjustment to college (Deandrea et al., 2012), and social media interventions for those at risk of suicide have been tested and proven safe and feasible (Rice et al., 2016). These studies further emphasize our primary conclusion that although some aspects of social media may be detrimental to youth mental health, other aspects may be beneficial.

#### CRedit author statement

**Mila Kingsbury:** Conceptualization; Methodology; Writing – original draft; writing- editing and review. **Bjørn-Atle Reme:** Conceptualization; Methodology; Formal analysis; Writing- original draft; writing – editing and review. **Jens Cristoffer Skogen:** Conceptualization; Investigation; Resources; Project administration; Writing – editing and review. **Børge Sivertsen:** Conceptualization; Investigation; Resources; Project administration; Writing – editing and review. **Simon Øverland:** Conceptualization; Investigation; Resources; Project administration; Writing – editing and review. **Nathan Cantor:** Conceptualization; Writing- editing and review. **Mari Hysing:** Conceptualization; Writing – editing and review. **Keith Petrie:** Conceptualization; Writing – editing and review. **Ian Colman:** Conceptualization; Methodology; Writing- editing and review; Supervision; Funding Acquisition.

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