Under the influence of Facebook? Excess use of social networking sites and drinking motives, consequences, and attitudes in college students

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Background and aims: Excessive use of social networking sites (SNS) has recently been conceptualized as a behavioral addiction (i.e., "disordered SNS use") using key criteria for the diagnosis of substance dependence and shown to be associated with a variety of impairments in psychosocial functioning, including an increased risk of problem drinking. This study sought to characterize associations between "disordered SNS use" and attitudes towards alcohol, drinking motives, and adverse consequences resulting from alcohol use in young adults. *Methods:* Undergraduate students ($n = 537$, 64.0% female, mean age = 19.63 years, $SD = 4.24$) reported on their use of SNSs and completed the Alcohol Use Disorders Identification Test, Temptation and Restraint Inventory, Approach and Avoidance of Alcohol and Drinking Motives Questionnaires, and Drinker Inventory of Consequences. *Results:* Respondents meeting previously established criteria for "disordered SNS use" were significantly more likely to use alcohol to cope with negative affect and to conform to perceived social norms, reported significantly more conflicting (i.e., simultaneous positive and negative) attitudes towards alcohol, and had experienced significantly more, and more frequent adverse consequences from drinking in their inter- and intrapersonal, physical, and social functioning, compared to individuals without problems related to SNS use. *Discussion and conclusions:* Findings add to an emerging body of literature suggesting a link between excess or maladaptive SNS use and problems related to alcohol in young adults and point to emotion dysregulation and coping motives as potential shared risk factors for substance and behavioral addictions in this demographic.

Keywords: social networking sites, behavioral addiction, alcohol use disorder, problem drinking, drinking motives

INTRODUCTION

The use of social networking sites (SNSs) like Facebook, Twitter, and Instagram has quickly become ubiquitous in recent years, in particular among adolescents and young adults, and can be excessive or maladaptive (Griffiths, Kuss, & Demetrovics, 2014; Ryan, Chester, Reece, & Xenos, 2014). In fact, recent research conceptualizing excessive SNS use as a behavioral addiction found that nearly 10% of students endorsed a set of criteria traditionally thought of as being characteristic of substance addiction, including tolerance, or an increase in time spent on the sites, withdrawal, or anger or irritability when unable to access these websites, and cravings for SNS use (Hormes, Kearns, & Timko, 2014). Excess engagement in SNS use has been linked to a variety of impairments in psychosocial functioning, including an increase in internalizing problems, depressive symptoms, and difficulties with relationships, and reduced physical activity, real life community participation, and academic achievement (Kuss & Griffiths, 2011; Steers, Wickham, & Acitelli, 2014; Tsitsika et al., 2014).

Preliminary research suggests that excess use of SNSs in young adults may also be associated with a heightened risk for problem drinking, with those meeting proposed criteria for "disordered SNS use" scoring significantly higher on the Alcohol Use Disorders Identification Test (Hormes et al., 2014; Saunders, Aasland, Babor,

De la Fuente, & Grant, 1993). There are at least three possible ways in which use of SNSs and alcohol consumption may be linked: (1) exposure to substance use in traditional mass media outlets such as television or radio has long been known as a risk factor for alcohol and other drug use in adolescents (Anderson, de Brujin, Angus, Gordon, & Hastings, 2009; J. D. Klein et al., 1993; Robinson, Chen, & Killen, 1998), and SNSs may similarly serve to disseminate information that shapes perceived social norms for adolescent alcohol use, (2) alcohol use may encourage excessive or maladaptive use of SNSs, for example by providing a novel platform to engage in "risky" behaviors while intoxicated (e.g., posting embarrassing or revealing information on SNSs when consuming alcohol, akin to the phenomenon of "drunk dialing"), and (3) there may be shared risk factors that increase susceptibility to both alcohol-related problems and excess SNS use.

There is research to support each of these hypotheses: displays of alcohol use, including of excessive drinking, were found to be common on students' social networking profiles (Moreno et al., 2010; Thompson et al., 2008). Adolescents tend to interpret their peers' online references

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to alcohol consumption as being reflective of actual behavior (Moreno, Briner, Williams, Walker, & Christakis, 2009), and exposure to alcohol-related references on SNSs results in greater willingness to use alcohol and more positive attitudes toward use (Litt & Stock, 2011). These findings support the assumption that SNSs serve to create and perpetuate perceived social norms normalizing youth consumption of alcohol via peer-to-peer transmission (Griffith & Casswell, 2010). Research also suggests that excessive SNS use may be negatively reinforced by providing relief from depressive and anxious mood states (Wegmann, Stodt, & Brand, 2015). Consistent with this hypothesis, individuals with "disordered SNS use" were found to endorse significantly elevated emotion regulation deficits (Hormes et al., 2014), which are known risk factors for alcohol and other substance misuse (Aldao, Nolen-Hoeksema, & Schweizer, 2010), suggesting that emotion dysregulation may increase susceptibility to both substance and behavioral addictions. However, more work is needed to systematically examine specific attitudes, motives, and adverse consequences linking problem drinking and excess use of SNSs. Such data will serve to illuminate mechanisms underlying the etiology of comorbid substance and behavioral addictions, and to inform novel prevention and treatment interventions.

This study was designed to examine associations between SNS use and alcohol-related attitudes and behaviors in college students in the United States, a population in which both behaviors are common and frequently associated with significant impairment (Griffiths et al., 2014), in particular given the relatively high legal drinking age of 21 years, which makes any alcohol use in this age group illegal. We specifically sought to assess potential differences in patterns of alcohol use, frequency and severity of drinking problems, motives for using alcohol, negative consequences that arise from drinking, successful and unsuccessful attempts to refrain from drinking, and overall attitudes towards alcohol use, including any evidence for conflicting or ambivalent attitudes, in individuals meeting previously established diagnostic criteria for "disordered SNS use" (Hormes et al., 2014), compared to their peers. We hypothesized that excess SNS use would be associated with significantly more positive attitudes towards alcohol use and significantly more negative consequences from drinking. We furthermore postulated that maladaptive coping motives and poor emotion regulation skills would emerge as shared risk factors for both problem behaviors in this population.

METHODS

Participants

Participants were 537 undergraduate students (64.0%, $n = 343$ female, mean age = 19.63 years, $SD = 4.24$) at a large University in the Northeastern United States. Respondents without a current Facebook account (5.6%, $n = 30$) and those not reporting on their current use of Facebook (0.9%, $n = 5$) were excluded from the analyses presented here, resulting in a final sample of 502 respondents. A majority of participants identified as "white/Caucasian" (58.8%, $n = 295$); all remaining participants were combined into a group of "non-white" respondents to facilitate comparisons by race/ethnicity.[1]

Measures

Participants completed the following measures via the secure online server SurveyMonkey in exchange for research participation credit:

Demographics. Respondents indicated their gender, age, and race/ethnicity.

Social networking site use. Participants rated their average patterns of daily use of the Internet in general, and the SNS Facebook in particular (on a scale ranging from 1 = "less than 15 minutes" to 6 = "more than 3 hours," Table 1), and indicated the amount of time (in minutes) they spent on the Internet and on Facebook on the previous day.

"Disordered SNS use" was assessed in the manner established in previous research, utilizing seven diagnostic criteria for alcohol use disorders (i.e., tolerance, withdrawal, loss of control, failed efforts to cut back on alcohol use, time spent engaged in activities related to alcohol at the expense of other activities, and impaired well-being as a result of drinking) that were modified to assess addiction-like symptoms related to the use of Facebook (e.g., irritability or anger when unable to access the website, or failed efforts to cut back on the amount of time spent on the website, Cronbach's α in the present sample = .74) (Hormes et al., 2014).[2] Of note, a comparable approach has been used in the development of proposed diagnostic criteria for other hypothesized behavioral addictions, including "Internet Gaming Disorder," a DSM-5 "Condition for Further Study" (APA, 2013), food addiction (Gearhardt, Corbin, & Brownell, 2009), excessive exercise (Hausenblas & Symons Downs, 2002), and use of indoor tanning beds (Mosher & Danoff-Burg, 2010).

Given the inclusion of craving as a diagnostic criterion for substance use disorders in the *Diagnostic and statistical manual of mental disorders* (DSM-5) (American Psychiatric Association, 2013), respondents also completed a modified version of the Penn Alcohol Craving Scale (PACS), a five-item self-report measure assessing craving for alcohol (Flannery, Volpicelli, & Pettinati, 1999). The PACS was modified to capture strong urges to use Facebook (e.g., "How often have you thought about drinking or about how good a drink would make you feel" modified to "During the past week, how often have you thought about Facebook or how good checking Facebook would make you feel?" Cronbach's α = .89), in a manner comparable to

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[1]These respondents identified (in overlapping percentages) as "black/African-American" (18.5%, $n = 93$), "Asian" (14.7%, $n = 74$), "Hispanic/Latino" (12.9%, $n = 65$), "American Indian/Alaskan Native" (2.4%, $n = 12$), "Native Hawaiian/Pacific Islander" (1.0%, $n = 5$), and "other" (2.0%, $n = 10$).

[2]Please note that the research on which this approach is based uses the term "disordered online social networking (OSN) use." In order to streamline the language utilized in this field of study we employ the more common term/acronym "social networking site (SNS) use" instead.

Table 1. Frequency and quantity of alcohol use and frequency of binge drinking in the combined sample and in male versus female respondents reporting any alcohol use in the past 12 months

	Total ($n = 469$) M (SD) / % (n)	Men ($n = 170$) M (SD) / % (n)	Women ($n = 299$) M (SD) / % (n)	Statistic
Alcohol Use Disorders	8.27 (5.40)	9.40 (5.53)	7.61 (5.21)	$F(1,451) = 13.38$,
Identification Test – Total Score				$p < .001$, $\eta p^2 = .03$[a]
Alcohol Use Disorders	48.9 (222)	57.5 (96)	43.9 (126)	$\chi^2 = 7.79$,
Identification Test – Score < 8				$p = .01$, $\Phi = .13$
During the last 12 months,				$\chi^2 = 6.89$,
how often did you usually				$p = .55$, $\Phi = .12$
have any kind of drink containing alcohol?				
Every day	0.2 (1)	0.6 (1)	–	
5–6 times/week	2.6 (12)	2.4 (4)	2.7 (8)	
3–4 times/week	15.4 (72)	18.2 (31)	13.7 (41)	
Twice/week	27.3 (128)	30.0 (51)	25.8 (77)	
Once/week	11.5 (54)	11.2 (19)	11.7 (35)	
2–3 times/month	19.2 (90)	18.8 (32)	19.4 (58)	
Once/month	7.5 (35)	5.9 (10)	8.4 (25)	
3–11 times/week	11.7 (55)	9.4 (16)	13.0 (39)	
1 or 2 times in the past year	4.7 (22)	3.5 (6)	5.4 (16)	
During the last 12 months,				$\chi^2 = 53.73$,
how many alcoholic drinks did you have				$p < .001$, $\Phi = .34$
on a typical day when you drank alcohol?				
25 or more drinks	0.9 (4)	1.2 (2)	0.7 (2)	
16–18 drinks	1.3 (6)	1.8 (3)	1.0 (3)	
12–15 drinks	4.9 (23)	9.4 (16)	2.3 (7)	
9–11 drinks	9.0 (42)	17.6 (30)	4.0 (12)	
7–8 drinks	12.4 (58)	16.5 (28)	10.0 (30)	
5–6 drinks	19.8 (93)	17.6 (30)	21.1 (63)	
3–4 drinks	28.1 (132)	17.6 (30)	34.1 (102)	
2 drinks	12.2 (57)	7.6 (13)	14.7 (44)	
1 drink	11.5 (54)	10.6 (18)	12.0 (36)	
During the last 12 months,				$\chi^2 = 13.43$,
how often did you have 5 or more (men) /				$p = .10$, $\Phi = .17$
4 or more (women) drinks containing any				
kind of alcohol within a 2-hour period?				
Every day	0.2 (1)	0.6 (1)	–	
5–6 times/week	0.7 (3)	0.6 (1)	0.7 (2)	
3–4 times/week	5.7 (26)	8.9 (15)	3.8 (11)	
Two days/week	19.3 (89)	23.7 (40)	16.8 (49)	
One day/week	11.7 (54)	10.1 (17)	12.7 (37)	
2–3 days/month	11.1 (51)	9.5 (16)	12.0 (35)	
One day/month	10.0 (46)	10.1 (17)	10.0 (29)	
3–11 days in the past year	11.5 (53)	12.4 (21)	11.0 (32)	
1 or 2 days in the past year	29.8 (137)	24.3 (41)	33.0 (96)	

[a]Race included as significant ($p < .05$) covariate(s).

prior studies of craving for various substances and gambling (Chang, Sommers, & Herz, 2010; Tavares, Zilberman, Hodgins, & el-Guebaly, 2005).

Based on prior research, respondents who endorsed at least three of the modified diagnostic criteria, including either impairment or distress related to their Facebook use, and scored at or above the 75th percentile on the modified PACS (i.e., $M = 11.0$ or higher in the present sample) were categorized as meeting criteria for "disordered SNS use" (Hormes et al., 2014). These diagnostic criteria were previously validated and shown to be positively associated with scores on the Young Internet Addiction Test, a measure of general Internet addiction (Widyanto & McMurran, 2004;

Young, 1996), greater difficulties with emotion regulation, and problem drinking (Hormes et al., 2014).

Participants then completed the following set of widely used and well-validated measures selected to capture multiple facets of alcohol use, including drinking patterns (captured by the National Institute on Alcohol Abuse and Alcoholism questions about quantity and frequency of alcohol consumption), the frequency and severity of any problems related to excess use (quantified by the Alcohol Use Disorders Identification Test), any successful or failed attempts to restrict consumption (via the Temptation and Restraint Inventory), conflicting attitudes towards drinking (as captured by the Approach and Avoidance of Alcohol

Table 2. Time spent online and on Facebook on average and on the previous day in the combined sample and in respondents with and without Disordered Social Networking Site (SNS) use

	Total (*n* = 481)	Disordered SNS Use (*n* = 45)	No Disordered SNS Use (*n* = 436)	
	M (SD) / % (n)	*M (SD) / % (n)*	*M (SD) / % (n)*	Statistic
Time spent online (on average)				$\chi^2 = 13.94$, $p = .02$, $\Phi = .17$
< 15 min	0.6 (3)	2.2 (1)	0.5 (2)	
15–30 min	2.7 (13)	4.4 (2)	2.5 (11)	
30 min–1 hour	5.4 (26)	–	6.0 (26)	
1–2 hours	23.1 (111)	6.7 (3)	24.8 (108)	
2–3 hours	28.7 (138)	40.0 (18)	27.6 (120)	
> 3 hours	39.4 (189)	46.7 (21)	38.6 (168)	
Time spent on Facebook (on average)				$\chi^2 = 30.21$, $p < .001$, $\Phi = .25$
< 15 min	20.0 (96)	6.7 (3)	21.4 (93)	
15–30 min	21.9 (105)	11.1 (5)	23.0 (100)	
30 min–1 hour	25.6 (123)	22.2 (10)	26.0 (113)	
1–2 hours	21.9 (105)	33.3 (15)	20.7 (90)	
2–3 hours	8.3 (40)	15.6 (7)	7.6 (33)	
> 3 hours	2.3 (11)	11.1 (5)	1.4 (6)	
Time spent online (yesterday)	150.64 (141.38)	228.71 (270.73)	143.02 (119.52)	$F(1,469) = 10.73$, $p = .001$, $\eta p^2 = .02$[a]
Time spent on Facebook (yesterday)	45.97 (85.60)	100.64 (220.51)	40.43 (54.05)	$F(1,455) = 19.64$, $p < .001$, $\eta p^2 = .04$

[a]Race included as significant (*p* < .05) covariate(s).

Questionnaire), motives for alcohol use (assessed using the Drinking Motive Questionnaire-Revised) and any negative repercussions in various domains of life that have resulted from alcohol use (captured by the Drinker Inventory of Consequences).

National Institute on Alcohol Abuse and Alcoholism questions about quantity and frequency of alcohol consumption. Survey skip patterns were based on responses to six self-report questions assessing quantity and frequency of alcohol use (Table 2),[3] and allowed respondents who indicated not having consumed alcohol in their lifetime (4.4%, *n* = 22) or in the past year (2.2%, *n* = 11) to skip subsequent questions about alcohol use.

Alcohol Use Disorders Identification Test (AUDIT). The AUDIT is a ten-item self-report measure that is widely considered to be the "gold standard" screen for hazardous alcohol consumption (Cronbach's α = .84) (Saunders et al., 1993). A score of eight or higher (range: 0–40) is generally considered indicative of the presence of problem drinking.

Temptation and Restraint Inventory (TRI). The TRI assesses tensions between the temptation to drink and attempts to abstain from alcohol (Collins & Lapp, 1992; MacKillop, Lisman, & Weinstein, 2006). The 15 items of the TRI load onto two second-order factors assessing temptation to drink ["cognitive and emotional preoccupation (CEP)," Cronbach's α = .87] and preoccupation with limiting drinking ["cognitive and behavioral control (CBC)," Cronbach's α = .80]. The CEP subscale includes three first-order factors assessing difficulty controlling alcohol intake

("govern," Cronbach's α = .80), negative affect as a reason for drinking ("emotion," Cronbach's α = .82), and "cognitive preoccupation" with drinking (Cronbach's α = .77). The CBC subscale subsumes two first-order factors assessing attempts to limit drinking ("restrict," Cronbach's α = .73) and "concern" about drinking (Cronbach's α = .67). The TRI was included here in part because scores have been shown to reliably predict heavy drinking, drinks consumed per drinking day, and negative repercussions of alcohol consumption in clinical populations (Connors, Collins, Dermen, & Koutsky, 1998).

Approach and Avoidance of Alcohol Questionnaire (AAAQ). The AAAQ is a valid and reliable 20-item self-report measure that quantifies "approach" (Cronbach's α = .86) and "avoidance" tendencies related to alcohol use (Cronbach's α = .80) (A. Klein, Stasiewicz, Koutsky, Bradizza, & Coffey, 2007). The AAAQ was administered to assess respondents' conflicting or ambivalent feelings about their alcohol consumption.

Drinking Motive Questionnaire-Revised (DMQ-R). The DMQ-R is a 20-item measure that captures different motivations for alcohol consumption, including "social" (five items, including alcohol use "to be sociable," Cronbach's α = .90), "coping" (five items, including alcohol use "to forget your worries," Cronbach's α = .87), "enhancement" (five items, including alcohol use "to get high," Cronbach's α = .88), and "conformity" (five items, including alcohol use "to fit in with a group you like," Cronbach's α = .84) reasons for drinking (Cooper, 1994). The DMQ-R was included here in an attempt to identify motives that may increase the risk for problem drinking and comorbid excess SNS use.

[3]http://www.niaaa.nih.gov/research/guidelines-and-resources/recommended-alcohol-questions

Drinker Inventory of Consequences (DrInC). The DrInC is a widely used and well-validated measure of adverse consequences associated with alcohol abuse (Miller, Tonigan, & Longabaugh, 1995). Respondents indicate the total number of adverse events related to their alcohol use (out of 50) they have experienced in their life, and the frequency with which these events occurred in the past three months (rated on a scale ranging from 0 = "never" to 3 = "daily or almost every day"). Ratings load on to five factors quantifying negative consequences related to "physical" (Cronbach's α = .69 for lifetime, Cronbach's α = .78 for past three months), "intrapersonal" (Cronbach's α = .79 lifetime, .87 past three months), "social" (Cronbach's α = .71 lifetime, .83 past three months), and "interpersonal" (Cronbach's α = .71 lifetime, .85 past three months) functioning, as well as "impulse control" (Cronbach's α = .77 lifetime, .86 past three months).

Statistical analyses

Missing values ranged from 6.8% (n = 34) on the "Cognitive Preoccupation" subscale of the TRI to 12.0% (n = 60) on the AAAQ "Avoidance" subscale. Given this relatively low proportion of missing values for most variables we did not employ any measures to replace missing values but instead elected to exclude them from the analyses presented here. Demographic groups and individuals with and without "disordered SNS use" were compared using chi-square and independent samples *t*-tests. Associations between "disordered SNS use" and scores on the AUDIT, TRI, AAAQ, DMQ-R, and DrInC were explored via a series of univariate (ANCOVA) and multivariate analyses of co-variance (MANCOVA, for scales containing multiple factors). Gender and race ("white" vs. "non-white") were initially included as co-variates in all analyses but subsequently removed if found to be non-significant.

Ethics

Study procedures were carried out in accordance with the Declaration of Helsinki. All methods were approved by the local Institutional Review Board, University at Albany, State University of New York. All participants were informed of the nature and purpose of the research and consented prior to completion of study questionnaires.

RESULTS

A total of 93.4% (n = 469) of respondents had consumed any alcohol in the previous year, with 57.0% (n = 267) drinking at least weekly (Table 1). A majority of respondents indicated drinking at least three drinks per sitting (76.4%, n = 358), and 37.6% (n = 173) engaged in episodes of binge drinking at least weekly (Table 1). Almost half of the participants (48.9%, n = 222) obtained a score of eight or higher on the AUDIT, suggesting the likely presence of problem drinking. Men on average scored significantly higher on the AUDIT, compared to women (Table 1). White respondents scored on average significantly higher on the AUDIT [M = 9.85, SD = 5.43 vs. M = 5.81, SD = 4.33;

$t(452)$ = 8.75, p < .001, d = .82] and were significantly more likely to meet criteria for the likely presence of problem drinking [60.8%, n = 276 vs. 39.2%, n = 178; χ^2 = 40.37, p < .001, Φ = .30], compared to non-white respondents.

The majority of respondents (91.2%, n = 438) reported spending more than one hour online on a typical day (Table 2). When asked about time spent specifically on Facebook, 41.9% (n = 201) of respondents indicated spending less than 30 minutes on the SNS on an average day, while another 47.5% (n = 228) of participants indicated spending 30 minutes to two hours on the site on a typical day. Respondents on average spent less than one hour browsing Facebook on the previous day (Table 2). Non-white respondents reported spending significantly more time on the Internet on the previous day, compared to respondents identifying as white or Caucasian [M = 174.33, SD = 171.56 vs. M = 131.76, SD = 109.79; $t(491)$ = 3.11, p = .002, d = .30], with no significant differences in time spent specifically on Facebook on the previous day [M = 51.34, SD = 117.47 vs. M = 40.03, SD = 47.66; $t(475)$ = 1.28, p = .20, d = .04]. There were no statistically significant gender differences in time spent on the Internet or on Facebook.

A total of 9.4% (n = 45) of respondents met the proposed diagnostic criteria for "disordered SNS use." There was no significant difference in prevalence of disordered SNS use in men (7.5%, n = 13) versus women (10.4%, n = 32; χ^2 = 1.14, p = .33, Φ = −.05). Non-white respondents were significantly more likely to meet criteria for "disordered SNS use," compared to white respondents (15.2%, n = 29 vs. 5.5%, n = 16; χ^2 = 12.69, p = .001, Φ = −.16). Individuals with "disordered SNS use" reported spending significantly more time on the Internet in general, and specifically on Facebook, compared to individuals without problems related to SNS use (Table 2).

Respondents with "disordered SNS use" scored significantly higher on the AUDIT, suggesting higher prevalence of problem drinking, compared to respondents not meeting criteria for "disordered SNS use" (Table 3). There was a significant multivariate main effect of "disordered SNS use" on combined scores of the TRI [$F(5,430)$ = 3.68, Wilk's λ = .96, p = .003, ηp^2 = .04; with race as a significant covariate, p < .001], with respondents with "disordered SNS use" scoring significantly higher on all five first-order factors (Table 3). Results were similar when comparing scores on the two second-order factors, with a significant multivariate main effect [$F(2,433)$ = 8.20, Wilk's λ = .96, p < .001, ηp^2 = .04; race as significant covariate, p < .001] and significantly higher scores on both the "cognitive and emotional preoccupation" and "cognitive and behavioral control" subscales in individuals with "disordered SNS use" (Table 3).

There was a significant multivariate main effect of "disordered SNS use" on AAAQ scores [$F(2,409)$ = 5.75, Wilk's λ = .97, p = .003, ηp^2 = .03; with gender and race as significant covariates, both p < .001], with respondents meeting criteria for "disordered SNS use" simultaneously endorsing significantly greater "approach" tendencies towards alcohol and "avoidance" of drinking (Table 3). There were significant differences between respondents with and

without "disordered SNS use" in combined scores on the DMQ-R [$F(4,404) = 6.26$, Wilk's $\lambda = .94$ $p < .001$, $\eta p^2 = .06$; with race as a significant covariate, $p < .001$]. Individuals meeting criteria for "disordered SNS use" were significantly more likely to endorse consuming alcohol as a way to cope with negative affect and to conform to perceived group norms about alcohol use (Table 3).

There were significant multivariate main effects of "disordered SNS use" on the reported number of lifetime adverse consequences experienced as a result of alcohol use [$F(5,409) = 4.63$, Wilk's $\lambda = .95$, $p < .001$, $\eta p^2 = .05$; with gender and race as significant covariates, $p = .002$ and $p < .001$, respectively], and the frequency with which these adverse events occurred in the past three months [$F(5,383) = 2.81$, Wilk's $\lambda = .97$, $p = .02$, $\eta p^2 = .04$; with gender and race as significant covariates, $p = .01$ and $p < .001$, respectively]. Respondents meeting criteria for "disordered SNS use" reported significantly more lifetime adverse consequences in physical, intrapersonal, social, and

interpersonal functioning, and significantly more frequent negative repercussions from alcohol use in the same four domains in the past three months (Table 3).

DISCUSSION

This study examined attitudes towards alcohol use, motives for drinking, and adverse consequences associated with alcohol consumption in individuals meeting criteria for "disordered SNS use" established and validated in prior research conceptualizing excess involvement in SNS use as a behavioral addiction (Hormes et al., 2014). There were three main findings in the present study: first, respondents with "disordered SNS use" simultaneously endorsed significantly more positive and more negative attitudes towards alcohol use, compared to individuals without problems related to SNS use, suggesting the presence of conflicting desires to consume and avoid alcohol, perhaps due to

Table 3. Scores on the Alcohol Use Disorders Identification Tests, Temptation and Restraint Inventory, Approach and Avoidance of Alcohol and Drinker Motive Questionnaires, and Drinker Inventory of Consequences in respondents with and without Disordered Social Networking Site (SNS) use

	Total ($n = 481$) M (SD)	Disordered SNS Use ($n = 45$) M (SD)	No Disordered SNS Use ($n = 436$) M (SD)	Statistic
Alcohol Use Disorders Identification Test	8.36 (5.35)	9.50 (6.50)	8.25 (5.22)	$F(1,431) = 7.59$, $p = .01$, $\eta p^2 = .02$[a,b]
Temptation and Restraint Inventory				
Cognitive and Emotional Preoccupation	1.99 (1.13)	2.57 (1.37)	1.93 (1.09)	$F(1,435) = 15.99$, $p = .001$, $\eta p^2 = .04$[b]
Govern	2.02 (1.41)	2.63 (1.83)	1.96 (1.35)	$F(1,434) = 11.93$, $p = .001$, $\eta p^2 = .03$[b]
Emotion	2.42 (1.67)	3.04 (1.86)	2.36 (1.65)	$F(1,434) = 8.26$, $p = .004$, $\eta p^2 = .02$[b]
Cognitive Preoccupation	1.53 (.95)	2.05 (1.29)	1.48 (.90)	$F(1,434) = 15.73$, $p < .001$, $\eta p^2 = .04$[b]
Cognitive and Behavioral Control	2.02 (1.18)	2.59 (1.46)	1.97 (1.14)	$F(1,434) = 9.65$, $p = .002$, $\eta p^2 = .02$
Restrict	2.26 (1.52)	2.87 (1.81)	2.21 (1.48)	$F(1,434) = 6.52$, $p = .01$, $\eta p^2 = .02$
Concern	1.78 (1.10)	2.30 (1.46)	1.73 (1.05)	$F(1,434) = 9.81$, $p = .002$, $\eta p^2 = .02$
Approach and Avoidance of Alcohol Questionnaire				
Approach	1.72 (1.54)	2.05 (1.83)	1.69 (1.51)	$F(1,410) = 4.52$, $p = .03$, $\eta p^2 = .01$[a,b]
Avoidance	1.29 (1.31)	1.89 (1.70)	1.23 (1.25)	$F(1,410) = 9.24$, $p = .003$, $\eta p^2 = .02$[a]
Drinking Motive Questionnaire				
Social	17.23 (5.40)	17.74 (5.41)	17.18 (5.41)	$F(1,409) = 1.83$, $p = .18$, $\eta p^2 = .004$[b]
Coping	11.28 (5.12)	13.59 (4.82)	11.07 (5.10)	$F(1,409) = 10.14$, $p = .002$, $\eta p^2 = .02$[b]
Enhancement	14.44 (5.45)	15.21 (5.51)	14.37 (5.45)	$F(1,409) = 2.41$, $p = .12$, $\eta p^2 = .01$[b]
Conformity	8.63 (4.14)	11.50 (4.69)	8.37 (3.99)	$F(1,409) = 22.08$, $p < .001$, $\eta p^2 = .05$[b]
Drinker Inventory of Consequences – Lifetime				
Physical	2.50 (1.73)	2.94 (1.94)	2.46 (1.71)	$F(1,413) = 6.31$, $p = .01$, $\eta p^2 = .02$[b]
Intrapersonal	1.35 (1.82)	2.35 (2.20)	1.27 (1.76)	$F(1,413) = 13.32$, $p < .001$, $\eta p^2 = .03$[b]
Social	1.23 (1.55)	2.15 (1.89)	1.15 (1.49)	$F(1,413) = 17.67$, $p < .001$, $\eta p^2 = .04$[b]
Interpersonal	1.62 (1.62)	2.26 (2.25)	1.57 (1.55)	$F(1,413) = 8.16$, $p = .01$, $\eta p^2 = .02$[b]
Impulse Control	2.27 (2.26)	2.53 (2.78)	2.24 (2.21)	$F(1,413) = 2.90$, $p = .09$, $\eta p^2 = .01$[a,b]
Drinker Inventory of Consequences – Past 3 Months				
Physical	.32 (.30)	.38 (.37)	.31 (.29)	$F(1,387) = 4.33$, $p = .04$, $\eta p^2 = .01$[b]
Intrapersonal	.18 (.30)	.29 (.40)	.16 (.29)	$F(1,387) = 6.95$, $p = .01$, $\eta p^2 = .02$[b]
Social	.18 (.31)	.33 (.42)	.17 (.30)	$F(1,387) = 12.33$, $p = < .001$, $\eta p^2 = .03$[b]
Interpersonal	.17 (.25)	.25 (.31)	.16 (.24)	$F(1,387) = 6.14$, $p = .01$, $\eta p^2 = .02$[b]
Impulse Control	.19 (.27)	.25 (.36)	.19 (.26)	$F(1,387) = 3.67$, $p = .06$, $\eta p^2 = .01$[b]

[a]Gender, [b]race included as significant ($p < .05$) covariate(s).

adverse consequences that resulted from excess alcohol consumption in the past.

This assumption is supported by our second major finding of significantly more and more frequent negative consequences in physical, inter- and intrapersonal, and social functioning as a result of alcohol use in individuals with "disordered SNS use," compared to individuals without problems related to SNS use. While the cross-sectional design of the present study does not allow us to speak to the direction of causality in this association, it can be hypothesized that excess SNS use directly increases vulnerability to adverse consequences of alcohol use, for example by facilitating the dissemination of materials that may turn out to be embarrassing or incriminating. The fact that participants with disordered SNS use reported negative consequences specifically in interpersonal and social functioning appears to support this assumption.

Finally, respondents with "disordered SNS use" were significantly more likely to use alcohol as a way to cope with negative affect and to conform to perceived social norms about drinking. This finding is consistent with prior research pointing to significantly more emotion regulation deficits in individuals with "disordered SNS use" (Hormes et al., 2014), and suggests that emotion dysregulation may be at the core of comorbid substance and behavioral addictions. Results also tie in with previous research demonstrating that adolescents reference alcohol use on online social networking sites in an effort to garner social acceptance (Moreno et al., 2009). Findings thus support our initial hypothesis and suggest that the proposed diagnostic criteria for "disordered SNS use" capture a clinically meaningful cluster of symptoms indicative not only of distress and impairment associated with excess or maladaptive engagement in SNS, but of an increased risk of comorbid problems resulting from alcohol use. Our data furthermore supports the assumption that a third variable increases the likelihood that individuals engage in both problem drinking and excess use of SNS. Elevated scores on the TRI "emotion" and DMQ-R "coping" subscales point to emotion dysregulation as a likely shared risk factor for both problem behaviors.

There are a number of limitations to the present research. Questionnaires were administered online and our sample may have been biased in favor of participants with a high degree of familiarity with the Internet. Alcohol and SNS use behaviors were assessed via retrospective self-report, which is susceptible to bias (Brener, Billy, & Grady, 2003). As noted earlier, our cross-sectional data do not speak to the direction of causality in the association between "disordered SNS use" and alcohol-related problems. Future research should attempt to track alcohol and SNS use behaviors over time to establish with more certainty cause and effect in the association between the two phenomena. More research is also needed to examine in greater detail the gender and racial/ethnic differences in the relationship between SNS use and problem drinking, given our data to suggest greater prevalence of problems related to excess SNS use in racial and ethnic minority students. Finally, it is important to note that the present sample is somewhat unique given the relatively high legal drinking age of 21 years in the U.S. The fact that a majority of respondents in the present study consume alcohol illegally may contribute to the high

prevalence of adverse outcomes and ambivalent attitudes related to alcohol use. Future research should attempt to replicate our findings in more geographically and culturally diverse samples of respondents.

The substantial adverse impact of alcohol use on mortality and morbidity in college students has been widely documented (Hingson, Heeren, Winter, & Wechsler, 2005; Hingson, Zha, & Weitzman, 2009; Pope, Ionescu-Pioggia, & Pope, 2001; Slutske, 2005), and there remains an urgent need for research to identify novel targets for interventions. Our findings suggest that it may be feasible to disseminate prevention and treatment interventions addressing problem drinking via SNSs as a way of reaching those who may be at risk but unlikely to present for screening and treatment on their own, given the lack of widespread screening for alcohol problems specifically in college students (Foote, Wilkens, & Vavagiakis, 2004). Our data also suggest that college students engaged in heavy use of SNSs may be most likely to use alcohol to cope with negative affect or to conform to perceived social norms. Intervention efforts disseminated via SNSs should thus focus on identifying and challenging perceived social norms about adolescent substance use.

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