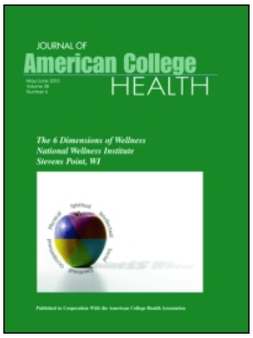

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Real-life closeness of social media contacts and depressive symptoms among university students

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ABSTRACT

Objective: To examine the association between degree of real-life closeness of social media (SM) contacts and depressive symptoms. **Participants:** Students ages 18–30 (N = 1124) were recruited in August 2016. **Methods:** Participants completed an online survey assessing SM use and depression. We used multivariable logistic regression to assess associations between real-life closeness of SM contacts and depressive symptoms. **Results:** After controlling for covariates, each 10% increase in the proportion of SM friends with whom participants had no face-to-face relationship was associated with a 9% increase in odds of depressive symptoms (AOR = 1.09; 95% CI = 1.05–1.13). However, each 10% increase in the proportion of SM friends with whom participants had a close face-to-face relationship was associated with a 7% decrease in depressive symptoms (AOR = 0.93; 95% CI = 0.89–0.97). **Conclusions:** Having no in-person relationship with SM contacts is associated with increased depressive symptoms; however, having close in-person relationships with SM contacts is associated with decreased depressive symptoms.

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College students in the US are now considered an at-risk group for depression. Past year prevalence ranges between 8 and 25% and has been increasing over time.[1-3] While the etiology of depression is complex and multifactorial, the transition to the new environment of college can be associated with depressive symptomology. For example, college students often move away from home for the first time, get substantially less or poorer sleep, and experience increased academic and social pressures.[4-7] If untreated, depression among college students is associated with increased risk of substance abuse, poor academic performance, and suicide.[8-11] Although data suggest many students do seek care for depression at campus health centers, treatment remains a substantial challenge in this population.[12,13]

Depression often coincides developmentally with increased emphasis on one's social connections.[14,15] Given the ubiquitous presence of social media (SM) in the lives of young adults, research has investigated the potential link between SM relationships and emotional well-being. Some studies have suggested that maintenance of relationships using SM can positively influence well-being. For example, one study found that (1) Facebook use among college students helped to maintain formerly established relationships and (2) there were particularly strong benefits among users with low self-esteem and low life-satisfaction.[16] Similarly, studies have demonstrated that individuals with a greater number of SM "actual friends"—relationships rooted in a face-to-face (FTF) connection—have reported greater social capital, which may enhance well-being.[17,18] Having a larger Facebook audience also has been associated with increased life satisfaction, perceived social support, and subjective well-being.[19,20] Finally, one study found that having a greater number of Facebook friends was associated with having fewer symptoms of dysthymia or persistent low-grade depressive symptoms.[21]

However, other evidence suggests that when there is no real-life closeness, SM relationships may be associated with declines in emotional well-being. For example, studies of young adult social media users found that frequency of use and inclusion of a greater number of people who participants did not know was associated with negative self-perceptions and depression.[22,23,24]

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In summary, prior research suggests that having more close "real life friends" in one's SM milieu may be associated with lower risk of depressive symptoms, while having more "strangers" (i.e., individuals never met face-to-face) in one's SM milieu may be associated with a higher risk of depressive symptoms. This pattern would be consistent with social network theory, which suggests that strong ties (i.e., real life friends) are based on trust and affection, and are likely to offer emotional support in uncertain situations.[22] Conversely, weak ties (i.e., non-face-to-face friends) are helpful for finding new information and resources, but provide low levels of intimacy and relationship intensity.[23]

However, filling gaps in the literature may help to test this theory and to clarify the mixed findings noted surrounding SM relationships and emotional well-being. First, because prior studies have focused on one platform, such as Facebook or Instagram, it may be useful to examine SM as a general construct. While Instagram and Facebook are important and commonly used platforms, an increasing number of individuals are using a more diverse set of platforms.[24,25] Second, prior studies investigated one aspect of relationship closeness, such as the number of strangers or number of friends. It may also be valuable to measure real-life closeness of SM contacts across various levels of closeness to assess whether findings are consistent. Finally, because of the proliferation of and morbidities associated with depression among college students, it is important to focus on depression symptomology in particular, as opposed to general emotional concerns.

Therefore, the purpose of this study was to examine, in a large cohort of college students, associations between closeness of SM contacts and self-report depressive symptoms. Based on prior research and theory described above, we hypothesized that having no FTF relationship with SM contacts would be associated with increased depressive symptoms (H1). Additionally, we hypothesized that having distant FTF relationships with SM contacts and having close FTF relationships with SM contacts would be associated with decreased depressive symptoms (H2 and H3, respectively).

Methods

Participants and procedures

We conducted a cross-sectional observational study of SM use and mental health among young adults from one large mid-Atlantic US state university. In August 2016, participants were recruited via an email distributed to all registered students, including both undergraduate and graduate students. The email invited recipients to participate in an online survey designed to understand both the positive and negative associations between SM use and well-being. There were no specific exclusion criteria for this study except that individuals had to be at least 18 years of age. Participants provided online informed consent. As thanks for their time, participants were entered into a drawing for a $50 Amazon gift card for every 25 participants enrolled in the study. This study was approved by the West Virginia University Institutional Review Board and the survey was administered via Qualtrics.[26] The median completion time was 16 minutes.

Measures

Depressive symptoms (Dependent variable)

We assessed depressive symptoms using the Patient-Reported Outcomes Measurement Information System (PROMIS) 4-item scale. PROMIS health measures were developed as an initiative of the National Institutes of Health Roadmap to provide precise, reliable, valid, and standardized questionnaires measuring patient–reported outcomes across the domains of physical, mental, and social health.[27] The PROMIS depression scale has been validated against several other widely used depression instruments such as the Patient Health Questionnaire (PHQ-9), the Beck Depression Inventory (BDI-II), and the Center for Epidemiological Studies Depression Scale (CES-D).[28,29] The 4-item PROMIS scale asks participants how frequently over the past 7 days they felt hopeless, worthless, helpless, and depressed. This scale is not intended as a diagnostic tool for depression, but is meant to assess severity of depressive symptomology based on self-report. The PROMIS depression short-form is intended to be a universal, rather than disease-specific measure, which reduces respondent burden while maintaining strong psychometric properties.[30] We assessed each item using a 5-point Likert-type scale with corresponding responses of *Never (1), Rarely (2), Sometimes (3), Often (4), and Always (5)*.[29] We then created a composite scale, which ranged from 4 to 20 and served as the dependent variable in our study. Due to the non-normal distribution of the variable and the clinically relevant cut-point of 11, we operationalized the dependent variable into *None* (4–7), *Mild* (8–10), and *Moderate to Severe* (11–20) categories.[31] These cut-points correspond with recommended guidelines for interpreting the severity of symptoms of PROMIS scales.[32]

Real-Life closeness of social media contacts (Independent variables)

We assessed real-life closeness of participants' SM contacts using 3 items. These items asked individuals to approximate what proportion of their friends on the SM

platform they use most they consider to be people with whom they have 1) no FTF relationship, 2) a distant FTF relationship, and 3) a close FTF relationship. We adapted these items based upon prior work, which demonstrated the distinction in quality of friendships.[33,34] We presented participants with a slider ranging from 0 to 100 as the response choice for each item. The resulting 3 scores served as independent variables. For logistic regression analyses, we transformed responses into a 10-point scale (1 point for every 10%), based on the natural distribution of responses around these anchors and to improve interpretability of results.

Socio-demographic factors (Covariates)

We asked participants to report their age, sex, race/ethnicity, relationship status, and living situation. We provided participants with open response formats for reporting age, sex, and race/ethnicity. We assessed age as a continuous variable in years (*18 to 30*) and collapsed race/ethnicity into two categories (White, non-Hispanic or Other). We used multiple choice items to assess relationship status (Single; Dating; In a committed relationship) and living situation (With parent/guardian; With significant other; With friends; Alone). We collapsed categories with < 5% responses for model stability in analyses.

Analyses

We performed Chi-square tests to assess patterns of missing data and determine if there were any socio-demographic differences between those with complete and those with incomplete data.

We described our sample reporting category percentages and assessing independence between our independent variables, covariates, and the dependent variable using non-parametric Kruskal-Wallis tests for continuous variables and Chi-square tests for categorical variables (Table 1). We then screened our data to ensure we had met appropriate assumptions for our analytic model. We examined our multivariable models for collinearity using the average variance inflation factor (VIF). We verified that the proportional odds assumption had been met for all 3 ordered logistic regression models.

We then assessed bivariable and multivariable associations between each independent and dependent variables using ordered logistic regression based upon the 3-level ordered categorical scale of our dependent variable. We decided *a priori* to adjust for all socio-demographic covariates in our multivariable models regardless of significance level in bivariable analyses (Table 1), due to their association with depression.[35] We defined statistical significance with a 2-tailed alpha of 0.05 and analyzed all data using Stata 14.[36]

Results

Our final sample consisted of 1124 individuals with complete data on our 3 independent variables and 1 dependent variable. Eighty-seven (7%) individuals had missing data. When comparing those with and without missing data, there were no significant differences by age, race, or depression. However, those with missing data were more likely to be male (60% vs. 40%, $p < .001$). This indicated that, while our data are not missing completely at random (MCAR), they are also not heavily biased. However, we addressed this by controlling for all socio-demographic covariates in the multivariable models reported below.

The majority of our sample was female (64.1%), and White, non-Hispanic (71.9%). Our sample ranged in age from 18 to 30 years old, with a median age of 20 (IQR = 19–22). Most participants reported being single (78.2%) and almost half of the sample reported living with friends (48.8%). Only sex was significantly associated with depressive symptoms in bivariable analyses (Table 1).

We screened our three multivariable models for collinearity among covariates and confirmed that each model met the proportional odds assumption. VIFs of 1.1 indicated no issues of multicollinearity among each independent variable and covariates. Moreover, pairwise correlations among the independent variable and covariates for each multivariable model were below 0.28 using Pearson's r. All models met the proportional odds assumption, indicated by non-significant p-values ranging from 0.37 to 0.57.

The distribution of each independent variable was slightly skewed right. Participants reported having no FTF relationship with a mean of 38.7% (SD = 30.1%) and median of 30% (IQR = 10–61%) of their SM contacts. Participants reported having a distant FTF relationship with a mean of 37.7% (SD = 25.2%) and a median of 32% (IQR = 20–55%) of their SM contacts. Finally, they reported having a close FTF relationship with a mean of 34.5% (SD = 26.7%) and a median of 27% (IQR = 12–50%) of their SM contacts.

Having no FTF relationship with SM contacts was significantly associated with depressive symptoms (AOR = 1.09; 95% CI = 1.05–1.13; $p < .001$), after controlling for age, sex, race/ethnicity, relationship status, and living situation (**H1**). Having a distant FTF relationship with SM contacts was not significantly associated with depressive symptoms in multivariable models (**H2**) (see Table 2). Finally, having a close FTF relationship with SM contacts was significantly associated with decreased odds of depressive symptoms (AOR = 0.93; 95% CI = 0.89–0.97; $p = .001$), after controlling for age, sex, race/ethnicity, relationship status, and living situation (**H3**) (Table 2).

Table 1. Whole sample characteristics and bivariable associations between independent variables, covariates, and depressive symptoms (N = 1124).

Independent variable/covariate	Whole sample	Depressive symptoms			*P* value[b]
		None (57.2%)	Mild (22.2%)	Moderate/severe (20.6)	
Real-life closeness of SM contacts					
No FTF, median (IQR)	30 (10–61)	30 (10–60)	35 (14–62)	41 (20–70)	<0.001
Distant FTF, median (IQR)	32 (20–55)	31 (19–55)	35 (20–50)	34 (20–59)	0.82
Close FTF, median (IQR)	27 (12–50)	30 (15–55)	25 (10–47)	22 (10–50)	0.002
Socio-demographic characteristic					
Age, y, median (IQR)	20 (19–22)	20 (19–22)	20 (19–22)	20 (19–22)	0.38
Sex, %[a]					0.006
Male	36	41	33	30	
Female	64	59	67	70	
Race, %[a]					0.07
White, non-Hispanic	72	74	72	66	
Non-White[c]	28	26	28	34	
Relationship status, %[a]					0.91
Single	50	49	52	50	
Dating	45	46	44	46	
In a committed relationship[d]	5	5	4	4	
Living situation, %[a]					0.34
With a parent or guardian	14	14	16	12	
With a significant other	10	12	10	9	
With friends	49	50	45	53	
Alone	27	25	29	26	

Note.
[a]Column percentages may not total 100 due to rounding.
[b]Significance level determined using the non-parametric Kruskal-Wallis test for continuous independent variables and Chi-square tests for categorical socio-demographic variables.
[c]Includes Black, Hispanic, Asian, Native American, and Multiracial.
[d]Included being engaged, married, or in a domestic partnership.

Table 2. Multivariable associations between real-life closeness of SM contacts, socio-demographic characteristics, and depressive symptoms.

Independent variable/covariate	Depressive symptoms		
	Model 1[a] AOR (95% CI)[b]	Model 2[a] AOR (95% CI)[b]	Model 3[a] AOR (95% CI)[b]
No FTF[c]	1.09 (1.05–1.13)	—	—
Distant FTF[c]	—	1.01 (0.96–1.05)	—
Close FTF[c]	—	—	0.93 (0.88–0.97)
Age	1.01 (0.96–1.06)	1.01 (0.96–1.06)	1.00 (0.96–1.05)
Sex			
Male	reference	reference	reference
Female	1.58 (1.23–2.03)	1.55 (1.21–1.99)	1.56 (1.22–2.00)
Race			
White, non-Hispanic	reference	reference	reference
Non-White[d]	1.36 (1.05–1.76)	1.35 (1.04–1.74)	1.37 (1.06–1.77)
Relationship status			
Single	reference	reference	reference
Dating	0.88 (0.69–1.13)	0.90 (0.71–1.16)	0.91 (0.71–1.16)
In a committed relationship[e]	0.99 (0.49–2.00)	0.99 (0.49–1.99)	1.02 (0.51–2.06)
Living situation			
With a parent or guardian	reference	reference	reference
With a significant other	0.96 (0.55–1.67)	0.93 (0.53–1.62)	0.87 (0.50–1.52)
With friends	1.12 (0.79–1.58)	1.09 (0.77–1.54)	1.09 (0.77–1.54)
Alone	0.93 (0.64–1.37)	0.96 (0.65–1.41)	0.95 (0.65–1.39)

Note.
[a]Model 1 includes No FTF and all covariates included in the table. Model 2 includes Distant FTF and all covariates included in the table. Model 3 includes Close FTF and all covariates included in the table.
[b]AOR = adjusted odds ratio; CI = confidence interval; adjusted for age, sex, race, relationships status, and living situation.
[c]Each independent variable indicates the proportion of participants' SM contacts with whom they have no, distant, or close face-to-face (FTF) relationship. Associated odds represent the increase in moderate/severe depressive symptoms for every 10% increase in the independent variable.
[d]Includes Black, Multiracial, Hispanic, Asian, and Native American.
[e]Included being engaged, married, or in a domestic partnership.

Comment

This study of a convenience sample of young adult university students found that real-life closeness with SM contacts was significantly and independently associated with depressive symptoms. Specifically, having no face-to-face (FTF) relationship with SM contacts was associated with significantly increased odds of depressive symptoms; however, having a close FTF relationship with SM contacts was significantly associated with decreased odds of depressive symptoms. These findings are consistent with studies that have found that friending or following strangers may be associated with poor emotional well-being. These findings are also consistent with studies finding that using SM to connect with actual friends may be beneficial.[16,17,37] However, the current research extends prior studies by (1) assessing SM as a general construct instead of focusing on one platform, (2) examining real-life closeness of SM contacts across a spectrum (no FTF, distant FTF, close FTF), and (3) assessing self-report depressive symptoms using a reliable and valid scale.

For each 10% increase in the proportion of SM contacts with whom participants had no FTF relationship, there was a 9% increase in odds of moderate to severe depressive symptoms. Because these data are cross-sectional, the directionality of this association cannot be determined, only guided by theory and prior research. In one direction, it may be that SM relationships pose a risk if they include individuals with whom SM users have no real-life closeness. One explanation for this may be that, compared with real-life relationships, SM-only relationships may be characterized by lower reciprocity.[38,39] For example, it is common on platforms such as Instagram or Twitter to have relationship asymmetry, in which an individual follows a contact but is not followed back, and prior research on tie strength has noted the importance of mutually acknowledged relationships.[40] Thus, SM-only contacts may offer little substantive support. Another plausible explanation for the association between having no FTF relationship with SM contacts and depressive symptoms is the exposure to potentially detrimental content. This phenomenon is supported by social comparison theory.[41,42] For example, on SM users often present an idealized, highly curated version of themselves. Increased exposure to this content may lead to harmful social comparisons, envy, and subsequent depressive feelings.[41-43] Finally, individuals with a greater proportion of SM-only contacts may also engage in contentious interactions that they would otherwise avoid given the inherent accountability of a future FTF encounter. These negative SM experiences may then lead to negative affect, rumination, and depression.[44,45]

Alternatively, it may also be that individuals with more severe depressive symptoms tend to have a greater proportion of SM-only contacts. This explanation is plausible because social anxiety, social isolation, and poor self-image—conditions that often accompany depression—may make SM-only relationships more appealing.[46] For example, SM relationships can be accessed from home and do not require the spontaneity of FTF interactions. To that end, individuals who suffer from depression may perceive online social interaction as less threatening and believe themselves to be more effective in this environment than FTF.[46] Additionally, individuals who have chronic recurrent depression may have less established FTF relationships perhaps due to unemployment, lack of social affiliation, or failed relationships.[47,48] Thus, the proportion of SM-only friendships would naturally be greater.

This study also found that having a greater proportion of SM contacts with whom participants had close FTF relationships was associated with decreased depressive symptoms. This finding reflects the body of research that demonstrates the benefits of SM use[16,19] and suggests that using SM to supplement or maintain established FTF relationships may be associated with less depression. For example, the ease and accessibility of SM can facilitate more consistent and frequent communication that would otherwise be challenging to maintain due to factors such as geographic separation, lack of privacy, and busy schedules.[49-51] It is also plausible that happier individuals simply have greater overlap between FTF and SM relationships, and thus a smaller proportion of SM-only contacts. For example, these individuals may have more real-life social affiliations and connections—jobs, extended families, sports, or religious affiliations—and use SM to extend relationships established in FTF contexts. This is also suggested by research around strength of ties demonstrating the importance of relationships between people that have overlapping affiliations.[52,53]

In this study, proportion of SM contacts with whom participants had a "distant FTF relationship" was not significantly associated with depressive symptoms. It may be that this "distant FTF" population pose neither the risk of strangers nor offer the protection of close friends. It should also be noted that the term "distant" may have been interpreted in varying ways. It may be valuable for future studies to explicitly define "distant" and "close" relationships in order to capture a more consistent and fine-grained measure of closeness.

Findings from this study may be useful in forming educational programming on college and university campuses. Recent data suggests a steadily increasing trend among university students for self-reported mental health distress—particularly prevalent among students at

large, public, nonresidential institutions.[13,54] While university counseling and student health centers play a central role in treatment and outreach concerning mental health, the results from this research indicate that utilization of other facets of university life may also be warranted. For example, residence life initiatives can highlight the importance of FTF relationships and suggest the utility of SM to extend those friendships, focusing on relationship quality.[55] Likewise, other student affairs or student life divisions can utilize freshman orientation or other programming to foster interpersonal relationships and accentuate the potential risks and benefits associated with using SM particularly during the transition from home to college. In universities without a strong residence or student life community, faculty participation through strategies such as curriculum infusion may be beneficial.[56]

Limitations

One limitation of this study, as noted above, is that the directionality of associations cannot be determined, due to the cross-sectional nature of these data. Therefore, findings should be interpreted with caution and future studies utilizing more rigorous designs—such as longitudinal and cross-lagged panel designs—would be useful to explore directionality of results. Additionally, it is important to acknowledge that we focused on young adult university students and a majority of participants were female. Therefore, results cannot be generalized to a more diverse population, such as older or non-university adults, nor were they proportionate of the population in terms of sex. Another limitation of this study is that we did not directly assess aspects of SM that may moderate or mediate the association between closeness of SM contacts and depressive symptoms, including social support or level of engagement of SM contacts. Social support—such as that garnered via close FTF relationships—has been shown to be particularly potent for women as a protective factor against depression.[57,58] Future work may benefit from assessing a more inclusive and granular set of measures. Finally, it is possible participants may have under-reported symptomology due to the sensitive nature of depression. However, this is unlikely, as we assured participants of confidentiality and the survey was self-administered.

Conclusions

In this sample of young adult university students, having closer in-person relationships with SM contacts was independently associated with lower depressive symptoms. Moreover, having no real-life closeness with SM contacts was associated with increased depressive symptoms. These findings suggest that SM contacts may be beneficial to one's mental health if they are extensions of real-life relationships and that SM-only relationships may compromise mental health. Because college students are particularly at-risk for depression, college-based interventions specific to SM use may be useful as an opportunity to maintain or extend close in-person relationships. Future work utilizing a longitudinal design would be helpful in elucidating effects and establishing directionality between real-life closeness of SM contacts and depressive symptoms.

Conflict of interest disclosure

The authors have no conflicts of interest to report. The authors confirm that the research presented in this article met the ethical guidelines, including adherence to the legal requirements, of the United States and received approval from the Institutional Review Board [details removed for blinded review].

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