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The Association between Social Media Use and Eating Concerns among US Young Adults

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ABSTRACT

Background The etiology of eating concerns is multifactorial, and exposure to media messages is considered to be a contributor. Although traditional media, such as television and magazines, have been examined extensively in relation to eating concerns risk, the influence of social media has received relatively less attention.

Objective To examine the association between social media use and eating concerns in a large, nationally representative sample of young adults.

Design Cross-sectional survey.

Participants/setting Participants were 1,765 young adults aged 19 to 32 years who were randomly selected from a national probability-based online nonvolunteer panel.

Outcome measures An eating concerns scale was adapted from two validated measures: the SCOFF Questionnaire and the Eating Disorder Screen for Primary Care. Social media use (including Facebook, Twitter, Google+, YouTube, LinkedIn, Instagram, Pinterest, Tumblr, Vine, Snapchat, and Reddit) was assessed using both volume (time per day) and frequency (visits per week).

Statistical analyses To examine associations between eating concerns and social media use, ordered logistic regression was used, controlling for all covariates.

Results Compared with those in the lowest quartile, participants in the highest quartiles for social media volume and frequency had significantly greater odds of having eating concerns (adjusted odds ratio 2.18, 95% CI 1.50 to 3.17 and adjusted odds ratio 2.55, 95% CI 1.72 to 3.78, respectively). There were significant positive overall linear associations between the social media use variables and eating concerns ($P<0.001$).

Conclusions The results from this study indicate a strong and consistent association between social media use and eating concerns in a nationally representative sample of young adults aged 19 to 32 years. This association was apparent whether social media use was measured as volume or frequency. Further research should assess the temporality of these associations. It would also be useful to examine more closely the influence of specific characteristics of social media use, including content-related and contextual features.

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FEEDING AND EATING DISORDERS, KNOWN MORE colloquially as eating disorders, represent an important clinical and mental health issue in the United States, especially among adolescents and young adults. Estimates based on the most recent *Diagnostic and Statistical Manual of Mental Disorders* definitions suggest lifetime prevalence by age 20 years of approximately 0.8% for anorexia nervosa (AN), 2.6% for bulimia nervosa, 3% for binge eating disorder, and 11.5% for feeding or eating disorder not elsewhere classified.[1,2] Eating disorders can have serious medical complications,[3] and meta-analyses suggest an increased mortality rate—including an increased risk of suicide—for individuals with AN.[4,5] However, subclinical eating concerns have prevalence rates substantially higher than those of diagnosed eating disorders.[6,7] Body dissatisfaction, negative or altered body image, and disordered eating represent a wide spectrum of eating concerns, all of which are significant precursors to the development of a diagnosable eating disorder.[8-11] Even when they do not lead to an eating disorder, these conditions can contribute to a long-lasting period of continued disordered eating.[9,12]

The etiology of eating concerns is multifactorial and includes biological, psychological, intrapersonal, and environmental influences.[6] One environmental influence—exposure to media such as fashion magazines and television—has been associated with the development of these issues, which is likely mediated by thin-ideal internalization.[13,14] Newly emerging social media combine many aspects of traditional media with technology-facilitated peer interaction.[15] This combination of visual media and propagation of stereotypes among peers may be linked to increased risk for eating concerns. For example, an analysis of the video-sharing social media site YouTube found that one-third of AN-related videos could be classified as "pro-anorexia," and these videos were more likely to

receive higher viewer ratings than "informative" videos, such as those highlighting the health consequences of eating disorders.[16] Similarly, studies of Facebook have found that maladaptive use, such as comparing one's self to others, is associated with greater disordered eating and body dissatisfaction in college women.[17,18] However, studies have found that even nonmaladaptive use of Facebook may be associated with both disordered eating and body image concerns.[19,20]

The majority of the research on social media and eating concerns has focused on a specific platform, such as Facebook or YouTube. In addition, much of this research has been limited to specific groups of individuals, such as college students, women, and those with eating disorder diagnoses. To our knowledge, there are no published studies exploring the links between broader social media use (ie, studies examining more than one platform) and eating concerns among a general, nationally representative population of young adults. Therefore, this study aimed to determine whether there was an association between two different measures of social media use—volume and frequency—and eating concerns, and to assess the potential linearity of the association between each social media use measure and eating concerns. The two hypotheses for this study were: two different measures of social media use—volume and frequency—would be independently associated with eating concerns and there would be a significant linear association between the two different measures of social media use and eating concerns.

MATERIALS AND METHODS

Participants and Procedures

Participants were recruited from a nationally representative probability-based online nonvolunteer access panel known as the KnowledgePanel. This panel, which consists of approximately 55,000 members aged 18 years and older, is recruited and maintained by a company called Growth from Knowledge (GfK). GfK populated this panel through both address-based sampling and random-digit dialing, resulting in a sampling frame that represented approximately 97% of US households.[21] The data for this study were collected as part of a follow-up wave of a longitudinal survey about health behaviors. From March to April 2013, a total of 3,254 GfK panel members aged 18 to 30 years completed an Internet-based survey as a baseline assessment. Any panel member in this age group was eligible for this study. There were no specific exclusion criteria. In October 2014, GfK sent a follow-up survey to those who had completed the baseline survey, who were then aged 19 to 32 years. Those participants were asked additional questions regarding social media use and eating concerns, and this represented the sample for our study.

Those who completed the follow-up survey were given a $15 cash-equivalent incentive. With data delivery, GfK personnel provided sampling weights to facilitate adjustment of results to be generalizable to the US population. This study was approved by the University of Pittsburgh Institutional Review Board and was granted a Certificate of Confidentiality from the National Cancer Institute at the National Institutes of Health. All participants provided written informed consent before participation.

Measures

Eating Concerns (Dependent Variable). Participants were presented with five items that were adapted from the SCOFF assessment tool, which is an acronym representing five items measuring eating disorders,[22] and the Eating Disorder Screen for Primary Care, both of which were designed as brief screening assessments to identify primary care patients at risk for eating disorders and in need of more specialized care.[23,24] Specific items were: "Losing control over how much I eat concerns me," "Food dominates my life," "Someone (such as a health professional, a family member, or friend) has expressed concerns about my eating patterns," "My weight negatively affects the way I feel about myself," and "I am satisfied with my eating patterns." When necessary, items were altered to assess broader, subclinical eating concerns. Although the SCOFF and Eating Disorder Screen for Primary Care instruments present their items as questions, for this study items were formatted as statements with a 5-point Likert-type agreement scale with response categories of "definitely no," "probably no," "don't know," "probably yes," and "definitely yes." The summed raw score ranged from 0 to 20 because there were five items, each of which was scored from 0 to 4. Based on the nonnormal distribution of the data, these scores were collapsed into tertiles. "Low" eating concerns consisted of scores ranging from 0 to 3, "medium" ranged from 4 to 9, and "high" ranged from 10 to 20. These cut points were not based on established clinical definitions or intended for diagnostic purposes. Instead, they helped form distinctions based on the natural distribution of the data.

Social Media Use (Independent Variables). Social media use was assessed with multiple items that were used to create two distinct social media use measures. First, participants were asked to estimate their volume (time per day, in hours and minutes) of social media use. Text associated with this item specifically instructed participants not to include work-related use. The second set of items assessed frequency of use by asking participants to indicate how often they visited the following social media platforms each week: Facebook, Twitter, Google+, YouTube, LinkedIn, Instagram, Pinterest, Tumblr, Vine, Snapchat, and Reddit. These platforms were selected based on prior research documenting their popularity with this age group.[25] Seven response categories for each of these items, based on a framework established by the Pew Research Center, included "I don't use this platform (0)," "less than once a week (1)," "1-2 days a week (2)," "3-6 days a week (3)," "about once a day (4)," "2-4 times a day (5)," and "5 or more times a day (6)."[25] These data were used to estimate participants' summary frequency (visits per week) by converting the response categories into numeric averages. For example, "1-2 days a week" was recoded as 1.5 and "2-4 times a day" was recoded as 21 (three times per day, or 21 times per week). Each of these two independent variables (volume and frequency) was collapsed into quartiles for primary analyses. This was done both to improve the interpretability of results and to be consistent with similar studies in this area.[26] However, all analyses were also conducted with independent variables as continuous to ensure robustness of results.

Table 1. Whole sample characteristics and bivariable associations between social media use and sociodemographic variables with eating concerns among a nationally representative sample of young adults

Variable	Total sample (n=1,765)	Eating Concerns[a] Low (n=540)	Medium (n=637)	High (n=588)	*P* value[b]
	←%[c]→				
Social media use					
Volume (time per day) (min)					<0.001
Quartile 1 (0-30)	29.8	37.6	28.3	21.3	
Quartile 2 (31-60)	20.8	20.7	23.8	16.9	
Quartile 3 (61-120)	23.9	20.9	23.2	28.7	
Quartile 4 (121 and above)	25.6	20.8	24.6	33.1	
Frequency (visits per week)[d]					<0.001
Quartile 1 (<9)	28.1	36.9	25.7	19.8	
Quartile 2 (9-30)	25.2	24.7	28.5	21.5	
Quartile 3 (31-57)	23.9	21.8	22.6	28.3	
Quartile 4 (58+)	22.8	16.6	23.2	30.4	
Sociodemographic					
Age (y)					0.67
19-23	33.6	36.1	34.1	29.9	
24-26	24.7	24.5	23.7	26.5	
27-32	41.6	39.5	42.3	43.6	
Sex					<0.001
Female	49.7	42.5	48.7	60.3	
Male	50.3	57.5	51.3	39.7	
Race/ethnicity					0.03
White, non-Hispanic	57.2	58.5	59.0	53.2	
Black, non-Hispanic	13.1	16.3	12.7	9.1	
Hispanic	20.8	19.9	19.0	24.3	
Other[e]	9.0	5.3	9.2	13.4	
Relationship status					0.99
Single[f]	44.6	44.9	44.5	44.5	
In a committed relationship[g]	55.4	55.5	55.5	55.4	
Living situation					0.85
Parent/guardian	34.0	34.7	34.4	32.4	
Significant other	35.7	34.2	34.7	38.9	
Other[h]	30.4	31.1	30.9	28.6	
Household income					0.004
Low (under $30,000)	23.0	15.7	25.3	29.4	
Medium ($30,000-$74,999)	38.6	43.5	38.3	38.6	
High ($75,000 and above)	38.5	40.9	36.4	38.0	

(*continued on next page*)

Table 1. Whole sample characteristics and bivariable associations between social media use and sociodemographic variables with eating concerns among a nationally representative sample of young adults (*continued*)

Variable	Total sample (n=1,765)	Eating Concerns[a] Low (n=540)	Medium (n=637)	High (n=588)	*P* value[b]
Education level					0.17
High school or less	36.2	34.3	39.7	34.0	
Some college	38.3	42.2	32.6	40.5	
Bachelor's degree or higher	25.6	23.5	27.7	25.6	

[a]Eating concerns represents a summary score for the following items: Losing control over how much I eat concerns me, Food dominates my life, Someone (such as a health professional, a family member, or friend) has expressed concerns about my eating patterns, My weight negatively affects the way I feel about myself, and I am satisfied with my eating patterns. Low corresponds to scores of 0 to 3; medium corresponds to scores of 4 to 9; high corresponds to scores of 10 to 20.
[b]Derived using χ^2 analyses comparing proportion of users in each category.
[c]Values may not total 100 due to rounding. Column percentages are based on survey weighted data and, therefore, may not be congruent with the cell frequency proportion of the total sample.
[d]Includes Facebook, Twitter, Google+, YouTube, LinkedIn, Instagram, Pinterest, Tumblr, Vine, Snapchat, and Reddit.
[e]Includes multiracial.
[f]Includes widowed, divorced, and separated.
[g]Includes engaged, married, and in a domestic partnership.
[h]Defined as not living with a parent/guardian or significant other.

Sociodemographic Factors (Covariates). GfK maintains sociodemographic information on its panel members. Based on their potential for having associations with eating concerns and/or social media use,[25,27-30] it was decided *a priori* to include seven sociodemographic variables in multivariable analyses: age, sex, race/ethnicity, household income, relationship status, living situation, and educational attainment. Based on the distribution of the data, age was collapsed into three categories (19 to 23, 24 to 26, and 27 to 32). Although eating concerns are typically thought to be issues of adolescence, prevalence in the young adult age range is substantial.[12,31] Race/ethnicity was collapsed into four categories, including white, non-Hispanic; black, non-Hispanic; Hispanic; and other, which included multiracial individuals. Household income was divided into three categories, including low (under $30,000), medium ($30,000 to 74,999), and high ($75,000 and above). Relationship status was categorized as single or in a committed relationship. Living situation was categorized as with parent/guardian; with significant other; and all other responses. Finally, education level was categorized as high school or less; some college; or bachelor's degree or higher. All sociodemographic data were obtained via participant self-report.

Data Analysis

Weighted descriptive statistics were calculated for the dependent variable (eating concerns), two independent variables (social media volume and frequency), and each of the seven covariates.

Exploratory factor analysis using principal components analysis with varimax rotation was performed to assess the underlying structure of the eating concerns items, and Cronbach's α was used to examine the internal consistency reliability of the eating concerns items.

The χ^2 test was used to determine bivariable associations between each of the independent variables and covariates and the dependent variable. In addition, bivariable associations between each of the covariates and independent variables were assessed using χ^2 tests.

After confirming that the proportional odds assumption was met for each analysis, ordered logistic regression was used to assess bivariable and multivariable associations between each independent variable and the dependent variable, which was an ordered categorical variable. It was decided *a priori* to include all covariates in multivariable models. In addition, tests for interaction effects between each independent variable and all covariates were performed. The presence of an overall linear trend between each ordered categorical independent variable and the dependent variable was tested using an established method.[32]

Two sets of sensitivity analyses were conducted to confirm the robustness of the results. First, auxiliary analyses were conducted that modeled the dependent variable (eating concerns) as dichotomous and in quartiles. Second, analyses were conducted that modeled the independent variables (social media volume and frequency) as continuous.

Study-specific poststratification weights provided by GfK were used to perform all descriptive statistics and analyses. These weights were computed to adjust for nonresponse as well as noncoverage, under-, or oversampling resulting from the sample design. Statistical analyses were performed with Stata version 12.1 (2011, Stata Statistical Software), and two-tailed *P* values <0.05 were considered to be significant.

RESULTS

Participants

The final sample consisted of the 1,765 individuals with complete data for the dependent variable (response rate=59%). Only 31 individuals (1.7%) were omitted due to missing data. Approximately half of respondents were women (49.7%) and 57.2% were white, non-Hispanic (Table 1).

Table 2. Bivariable associations between sociodemographic covariates and social media volume among a nationally representative sample of young adults

Covariate	Volume (time per day) (min)[a] Quartile 1 (0-30) (n=507)	Quartile 2 (31-60) (n=365)	Quartile 3 (61-120) (n=423)	Quartile 4 (121+) (n=454)	*P* value[b]
	←%[c]→				
Age (y)					<0.001
19-23	26.7	27.3	36.4	43.5	
24-26	27.4	20.0	26.4	23.4	
27-32	45.9	52.7	37.2	33.1	
Sex					<0.001
Female	42.4	43.2	52.8	60.7	
Male	57.6	56.8	47.2	39.3	
Race/ethnicity					0.12
White, non-Hispanic	63.2	63.4	54.6	48.0	
Black, non-Hispanic	10.6	10.5	15.2	16.7	
Hispanic	16.7	17.5	23.6	25.6	
Other[d]	9.4	8.7	6.6	9.7	
Relationship status					0.07
Single[e]	41.6	37.6	46.8	50.8	
Committed relationship[f]	58.4	62.4	53.2	49.2	
Living situation					0.15
Parent/guardian	31.4	29.2	37.3	37.9	
Significant other	40.8	40.9	31.6	29.3	
Other[g]	27.9	29.9	31.1	32.9	
Household income					0.17
<$30,000	18.4	20.9	24.6	28.2	
$30,000-$74,999	41.3	36.6	42.0	34.4	
$75,000+	40.4	42.5	33.4	37.4	
Education level					.004
High school or less	31.9	26.5	38.9	44.8	
Some college	37.4	42.1	38.3	37.2	
Bachelor's degree or higher	30.7	31.4	22.8	18.1	

[a]Including personal, not-work-related use. Total sample size does not equal 1,765 due to individuals with incomplete data on this variable (n=16).
[b]Derived using χ^2 analyses comparing proportion of users in each category.
[c]Values may not total 100 due to rounding.
[d]Includes multiracial.
[e]Includes widowed, divorced, and separated.
[f]Includes engaged, married, and in a domestic partnership.
[g]Defined as not living with a parent/guardian or significant other.

Eating Concerns

Principal components analysis revealed that all items assessing eating concerns loaded onto a single factor (eigenvalue=2.83), which explained 57% of the variance. The lowest loading factor was 0.66. The internal consistency of the 5 items was high (α=.81). The mean summary score was 6.9 with a standard deviation of 5.0. A total of 9.7% of the respondents had a score of 0 (minimum) and 0.2% of the respondents had a score of 20 (maximum).

When the dependent variable was collapsed into tertiles and accounting for survey weights, the "medium" eating concern group consisted of the greatest number of respondents (36.1%) and the "low" group consisted of 30.6% of

Table 3. Bivariable and multivariable associations between social media use and eating concerns among a nationally representative sample of young adults

	Eating Concerns[a]			
Social media use	**Odds ratio (95% CI)**	***P* value[b]**	**Adjusted odds ratio[c] (95% CI)**	***P* value[b]**
Volume (time per day) (min)		<0.001		<0.001
Quartile 1 (0-30)	1[d]		1[d]	
Quartile 2 (31-60)	1.35 (0.95-1.93)		1.46 (1.02-2.09)	
Quartile 3 (61-120)	1.91 (1.31-2.77)		2.00 (1.37-2.93)	
Quartile 4 (121+)	2.14 (1.49-3.07)		2.18 (1.50-3.17)	
Frequency (visits per week)[e]		<0.001		<0.001
Quartile 1 (<9)	1[d]		1[d]	
Quartile 2 (9-30)	1.49 (1.05-2.12)		1.51 (1.05-2.16)	
Quartile 3 (31-57)	1.94 (1.32-2.85)		1.97 (1.34-2.90)	
Quartile 4 (58+)	2.49 (1.70-3.65)		2.55 (1.72-3.78)	

[a]Eating concerns represents a summary score for the following items: Losing control over how much I eat concerns me, Food dominates my life, Someone (such as a health professional, a family member, or friend) has expressed concerns about my eating patterns, My weight negatively affects the way I feel about myself, and I am satisfied with my eating patterns. Eating concerns is divided into low, medium, and high tertiles.
[b]*P* value derived using test for overall linear trend of ordered categorical independent variables.
[c]Adjusted for age, sex, race, relationship status, living situation, household income, and education level.
[d]Reference category.
[e]Includes Facebook, Twitter, Google+, YouTube, LinkedIn, Instagram, Pinterest, Tumblr, Vine, Snapchat, and Reddit.

respondents. The "high" group consisted of the remaining 33.3% (Table 1).

Social Media Use

Median volume was 61 minutes per day (interquartile range=30 to 135), whereas median frequency was 30 visits per week (interquartile range=8.5 to 56.5).

Bivariable Analyses

Bivariable analyses showed significant associations between the two social media use variables, three of the covariates (sex, race/ethnicity, and household income) and eating concerns (*P* values ranging from <0.001 to 0.03) (Table 1). In addition, bivariable analyses demonstrated significant associations between age, sex, and education level and social media volume (*P* values ranging from <0.001 to 0.004) (Table 2). Age and household income were significantly associated with frequency (*P* values ranging from <0.001 to 0.05) (data not shown).

Multivariable Analyses

In fully adjusted models, participants in the highest quartile of social media volume had significantly greater odds of having eating concerns compared with those in the lowest quartile (adjusted odds ratio 2.18, 95% CI 1.50 to 3.17) (Table 3). Compared with those in the lowest quartile, participants in the highest quartile of frequency (adjusted odds ratio 2.55, 95% CI 1.72 to 3.78) reported significantly greater eating concerns (Table 3). No significant interaction effects were found between either of the social media use variables and any of the covariates. In addition, there were significant positive overall linear associations between the social media use independent variables and eating concerns (*P* values <0.001 for all) (Table 3). All sensitivity analyses demonstrated consistent results—in terms of both significance and magnitude—regardless of the way that dependent and independent variables were operationalized (data not shown).

DISCUSSION

The results from this study indicate a strong and consistent association between social media use and eating concerns in a nationally representative sample of young adults aged 19 to 32 years. This association was apparent whether social media use was measured using volume (time per day) or frequency (visits per week), supporting the first hypothesis that two different measures of social media use would be independently associated with eating concerns. In addition, the second hypothesis that there would be a significant linear association as the volume and frequency of social media use increased was supported.

The directionality of these associations cannot be ascertained due to the cross-sectional study design. One possible explanation for the results of this study is that those individuals who use more social media are exposed to more images and messages that present a risk for the development of eating concerns. Some social media platforms, such as Instagram, Snapchat, Pinterest, and Tumblr, are more visually oriented, involving the sharing and viewing of pictures and videos.[33] According to the Pew Research Center,[25] 53% of online adults aged 18 to 29 years use Instagram and 49% of Instagram users use the site daily. In addition, 42% of women online use Pinterest.[25] These types of social media platforms may expose users to influential visual material, including visuals that may promote the thin ideal. Research suggests that individuals who use Facebook with higher frequency compare themselves with others, potentially leading to body

image concerns.[17] Some social media platforms have attempted to mitigate this issue, such as Instagram banning the hashtags "thinspiration" and "thinspo."[34] However, users have easily been able to circumvent these barriers by spelling the words slightly incorrectly (eg, "th1nspo").[35] Research has shown that individuals tend to post images online that present themselves positively.[36,37] Therefore, users are likely to select from hundreds of more "accurate" photographs the scant few that may make the subject appear thinner and more attractive, in line with current social ideals. This may result in users being exposed to unrealistic expectations for appearance.

Another explanation for the results of this study is that those individuals who develop eating concerns may consequently use more social media. These individuals may seek out information on social media to connect with other individuals who also have eating concerns. Those who do so may encounter proeating disorder groups, such as the "pro-ana" and "pro-mia" communities that have a substantial presence on social media. There were at least 500 of these groups on Facebook in 2010.[38] Individuals report seeking out these communities as a potential antidote to self-reported loneliness and social isolation.[38] However, using these groups for social support may be problematic, because studies suggest that these groups may lead to development of a shared social identity that inhibits authentic and meaningful recovery from an eating disorder.[39,40]

Although preliminary studies investigating the association between social media and eating concerns focused on women in younger age groups,[19,20,41] this study included men and young adults aged 19 to 32 years. Interestingly, although there was a significant difference between men and women for both social media use and eating concerns, no significant interaction effect for social media use and sex on eating concerns was found. In addition, whereas the younger age groups in this study reported significantly greater social media volume, no significant interaction effect for social media use and age on eating concerns was found. This suggests that the association between social media use and eating concerns is an issue that is not confined to young women. Research has shown that men are not immune to media images of "ideal" body shape,[42] and that use of Facebook may affect men's body image.[43] Likewise, disordered eating has a prevalence among older age groups,[31] members of which are also increasing their presence on social media.[25] Therefore, potential prevention messages concerning the association between social media use and eating concerns should be applicable to a broad population.

The results of this study should be considered with some important limitations. First, as noted above, the cross-sectional design of this study limits the ability to make causal inferences. Second, all data were self-reported. However, because respondents were assured that their responses were confidential, it is unlikely that respondents would not be truthful. Third, because this sample consisted of individuals aged 19 to 32 years, results cannot be generalized to any other age groups. Fourth, response rate was 59%, and nonrespondents may have been different from respondents. However, the application of appropriate survey weights allows for the generalization of these results based on the other sociodemographic variables. Fifth, although the eating concerns measure was adapted from two validated measures, it would be valuable to more closely align scale values with established clinical cutoffs. Finally, the assessments of social media use in this study were limited to volume and frequency of use. Future studies should also examine other contextual factors around social media use, such as whether use is generally alone or with peers.

CONCLUSIONS

A strong and consistent association between social media use and eating concerns was found in a nationally representative sample of young adults. This association was apparent regardless of whether social media use was operationalized as volume or frequency. These results suggest an important association that should be further explored in longitudinal analyses to determine temporality.

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STATEMENT OF POTENTIAL CONFLICT OF INTEREST

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