# Social Media and Face-to-Face Interactions Among U.S. Young Adults: Associations with Depression

by

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With the proliferation of social media (SM) use, young adults' interactions with their social networks have substantially shifted from face-to-face (FTF) to SM. While it is well-established that FTF connections provide emotional support and are beneficial to mental health, the research on SM connections is less clear. Therefore, the research presented in this dissertation aimed to address gaps in our understanding of the associations between SM use, perceived emotional support, and depression with three inter-related projects.

Data from a cross-sectional, online survey of 2,408 U.S. adults ages 18 to 30 was analyzed. Factor analysis using these data revealed that FTF and SM-based perceived emotional support were two distinct constructs. A fully adjusted multivariable logistic model showed that greater endorsement of SM-based emotional support was associated with significantly greater odds of depression, whereas greater endorsement of FTF emotional support was associated with significantly lower odds of depression.

A purposeful random sample of 100 depressed and non-depressed individuals was then selected from this sample. Thematic analysis of participants' responses to open-ended qualitative items revealed that of the 16 themes found, *connection with others* and *exposure to negativity* were the most commonly referenced positive and negative effects of SM, respectively, regardless of depression status. SM was noted as a *distraction from real life* more often by non-depressed

than depressed participants and *fear of being judged* was mentioned solely by depressed participants.

Finally, cluster analysis was used to partition the sample based upon endorsement of high FTF and SM social sharing and perceived emotional support. A four-cluster solution was found. After controlling for related socio-demographic and person characteristics, membership in the clusters characterized by high SM social sharing were associated with depression.

These findings suggest that SM-based experiences are not the same as those that occur FTF and that they may be associated with a mental health risk. Because the directionality of effects is not clear, it may be that depressed young adults perceive and experience SM differently than non-depressed young adults. Findings from these projects may help inform future research clarifying the dynamic interplay between SM use, perceived emotional support, and depression.

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## Preface

This dissertation was only possible with the support of many people, a few of whom I would like to acknowledge here. First, thanks to my mentor of almost 10 years, Brian Primack, for giving me countless opportunities for growth and collaboration and for encouraging me to move beyond my comfort zone. I am grateful for your support and friendship.

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# 1.0 Introduction

## 1.1 Social Support and Mental Health

Social support has a substantial and sustaining impact on mental health.[1–3] Emotional support—one subtype of social support—is often garnered through close relationships, and it is the type of social support most robustly associated with positive mental health outcomes.[3–5] For example, increased emotional support has been identified as protective against pre- and postnatal maternal depression and stress, anxiety, and depression among HIV-positive men.[6,7] Additionally, national data from U.S. adults revealed that individuals who reported high levels of perceived emotional support were 87% less likely to report current depression.[8] Although characteristics such as age and gender may moderate the relationship between emotional support and mental health outcomes, emotional support is consistently associated with an overall beneficial effect. Moreover, emotionally sustaining relationship experiences in early life have been found to positively impact an individual's mental health throughout the lifespan.[1,9]

## 1.2 Emotional Support Through Social Network Connection

Connecting with others has been shown to be an effective way of obtaining emotional support. For example, research on religiosity demonstrated that the social connection involved in religious identity such as building congregational social networks leads to increased life satisfaction.[10] The powerful influence of human connection also was demonstrated in two

longitudinal studies that found that one's happiness is dependent upon the happiness of others with whom one is connected.[11,12] This work also shows that positive health behaviors appear to spread via social connections in a large social network.[11,12] However, social networks and the way in which young adults connect has changed dramatically with the proliferation of social media (SM). From 2005 to 2019, the percentage of online adults ages 18-29 who use SM has increased from 7% to 90%, with U.S. young adults now spending an average of two to three hours per day on SM, contrasted with an average of 39 minutes per day connecting in person.[13,14] Despite the accessibility and popularity of SM, it is uncertain if SM connections offer emotional support that provides the same mental health benefit as those from traditional, face-to-face (FTF) relationships.

### 1.3 SM and Mental Health

It may be that electronic social networks mimic FTF social networks in their ability to provide emotional support and positively impact mental health. However, research on the associations between general SM use and mental health has been inconclusive. Some research has indicated that, for young adults, greater SM use is associated with lower perceived emotional support and increased social isolation and depression.[15–17] Other research has found that—particularly for individuals with mental health problems—SM may be perceived as preferable to FTF connection, used for self-disclosure, and perceived as a potential source of support.[18–21] For example, a nationally-representative study of approximately 1,300 teens and young adults found that individuals with moderate to severe depressive symptoms were twice as likely as their non-depressed counterparts to say that SM helps connect them to useful advice and support.[22] Similarly, a study of young adults found that those living with mental illness were more likely than those

without mental illness to engage in SM activities that promoted connectivity and friendship.[23] It is likely that depressed individuals interact with and experience SM differently than non-depressed individuals; however, the research on this is inconclusive.

### 1.4 SM-Based Support and Depression

Several studies have sought to conceptualize and evaluate the associations between various indicators of SM-based support and mental health, including social connectedness, social contact, and social support. In one study conducted among non-U.S. University students, Facebook connectedness was found to be a distinct construct from FTF connectedness, yet both constructs were associated with lower depression.[24] Similarly, a longitudinal study of U.S. adults found that social connectedness on Twitter was associated with decreased depressive symptoms, but only among individuals with low FTF social support.[25] Conversely, a study of military veterans found that—while increased frequency of FTF social contact was associated with lower odds of depression—increased social contact on Facebook was not.[26] Two studies of general online social support conducted on both a sample of college students and community participants found that FTF and online social support were distinct constructs and that both forms of social support were protective against depression-related outcomes.[27,28]

## 1.5 Dissertation Goals

The proposed research aims to clarify conflicting findings in the literature and to address gaps in our understanding of the associations between SM, perceived emotional support, and depression among young adults. We will achieve this using three inter-related projects. In **Project 1**, we will more clearly conceptualize SM-based emotional support by determining whether it is a distinct construct from traditional FTF emotional support. This project will also assess associations between each type of emotional support and depression. In **Project 2**, we will conduct a qualitative thematic analysis of open-ended responses soliciting both the positive and negative effects of SM. We will compare the occurrence and context of themes between depressed and non-depressed young adults to gain a greater understanding of how individuals interact with and perceive SM. In **Project 3,** we will characterize distinct clusters of social sharing and perceived emotional support—FTF and on SM. We will then explore associations between membership in each of these clusters in terms of sociodemographic characteristics. Finally, we will determine associations between cluster membership and depression, helping to disentangle distinctions between FTF and SM dynamics. Together, these three projects will help elucidate the complex interrelationships among SM use, emotional support, and depression among U.S. young adults. Results will have clear implications and directions for future research and practice.

## 2.0 Conceptualization and Measurement of Social Media-Based Emotional Support

### Project 1

### 2.1 Introduction

Social support has a profound and far-reaching impact on mental and physical health and health behavior.[1–3] Emotional support—typically obtained through close relationships—is the type of social support most strongly associated with mental health outcomes.[29] High emotional support has been associated with higher survival in various clinical populations and is protective against stress, anxiety, and depression.[3,6,7,30] Data from the Behavioral Risk Factor Surveillance System (BRFSS) found that individuals who reported high levels of perceived emotional support were 87% less likely to report current depression.[8] Moreover, emotionally sustaining relationship experiences in early life impact an individual's health throughout the lifespan.[9]

Traditionally, in-person (also known as FTF) connections have been an effective way of obtaining emotional support. However, the way in which adolescents and young adults connect has changed dramatically with the proliferation of SM. U.S. young adults spend an average of two to three hours per day on SM, contrasted with an average of 39 minutes per day socializing and communicating in-person.[14,31] Nearly 20% of U.S. young adults prefer communicating via SM compared to in-person or on the phone, and 24% report missing important moments in their life because they were trying to capture and share it on SM.[32] Although use of SM among young adults may present opportunities for connection and thus emotional support, SM use has been associated

with lower FTF emotional support and greater social isolation, anxiety, and depression.[15–17,33–35] Conversely, other research has found either mixed results or no evidence linking SM use to well-being among adolescents [36,37]. Overall, the literature in this area is emerging and often conflicting. It is important to gain a more nuanced understanding of how SM use may or may not be linked to the recently documented increases in internalizing problems among some young people.[38]

Existing conceptual frameworks and measurement of emotional support are based upon traditional FTF relationships and may not address current young adult relationships often maintained or conducted using SM.[39,40] For example, because emotional support is often characterized by perceptions of trust within a relationship[41,42] existing emotional support scales ask individuals about the extent to which they have someone to confide in.[43] However, assessing relationship trust in this manner may not be translatable into the SM environment. Similarly, reciprocity, encouragement, and love—characteristics of emotionally supportive relationships—may be experienced differently in the SM environment. Indeed, a recently developed theoretical framework of adolescent peer relations in the SM context proposed that SM relations are distinct and a departure from traditional, FTF relations.[44]

Although some studies have sought to conceptualize a more integrated measure of social support, to our knowledge the specific concept of emotional support in this context has not yet been comprehensively examined.[45,46] Preliminary findings from the broader social support literature are mixed. One study suggested that SM connectedness may be a distinct yet related construct to FTF connectedness, and that SM connectedness may be associated with lower depression.[24] Additionally, a formal scale development study found that like FTF social support, online (i.e., gaming and dating sites, texting, and SM platforms) social support was protective against depression-related outcomes, although to a slightly lesser degree.[27] However, another study

found that while increased frequency of FTF social contact was associated with lower odds of depression, increased social interaction on SM was not.[26] Finally, and perhaps most counterintuitively, a Facebook-based social support scale found that greater endorsement of the Facebook measure of emotional support, specifically, was associated with greater severity of depression and poorer psychological quality of life.[46]

In order to clarify mixed findings surrounding SM-based support, FTF support, and depression, it would be useful to examine whether FTF and SM-based support are separate constructs and how they are each associated with depression, in a large cohort of young adults. Specifically, focusing on multi-platform SM-based support and perceived emotional support—the type of social support most robustly associated with mental health—may hone our understanding of the complexities surrounding these associations. Therefore, this study had two aims: (1) To determine if SM-based emotional support is an extension of or distinct construct from FTF emotional support, and (2) to assess independent associations between each domain of emotional support and depression risk among a large, national sample of U.S. young adults.

## 2.2 Methods

### 2.2.1 Study Design and Sample Selection

Participants were recruited online using Qualtrics Sampling Services. Qualtrics Sampling Service is a subdivision of Qualtrics, a private research software company specializing in Web-based data collection that partners with over 20 Web-based panel providers to supply diverse, quality respondents.[47] Participants were recruited using a "balanced start" sampling methodology,

which applies quotas based upon U.S. census data in terms of age, sex, race, education, household income, and geographic region to approximate the U.S. adult population. Data were collected in March of 2018.

A total of 2,408 individuals completed the survey, which contained 93 items and included a variety of items measuring SM use, self-reported mental health, and sociodemographic characteristics. Participants were required to be aged 18-30 and to respond to questionnaire items using a computer-based interface. In order to assure high quality data, several strategies were employed. First, a pilot test was conducted with 30 individuals who were not a part of the final sample to assess whether the survey was functioning properly (skip patterns, data collected for each item, etc.). Additionally, a "soft launch" was conducted on 10% of the intended final sample size (n=240) before full implementation of the survey so that the research team could again review the data for inconsistencies. Finally, Qualtrics employs a number of data quality checks post hoc, such as screening for a high proportion of skipped responses, participants who straight-line their answers or who "speed" (i.e., complete the survey faster than 1/3 the median completion time), or other patterns suggesting poor effort. Median time for completion was 18 minutes. Participants received a point incentive from Qualtrics, which can be redeemed, for example, for gift cards. This study was approved by the University of Pittsburgh Institutional Review Board.

### 2.2.2 Measures

#### 2.2.2.1 Emotional Support

We assessed perceived emotional support (ES) using a 4-item scale developed by the Patient-Reported Outcomes Measurement Information System (PROMIS). PROMIS is a National

Institutes of Health (NIH) Roadmap initiative aiming to provide precise, reliable, valid, and standardized questionnaires measuring patient–reported outcomes across the domains of physical, mental, and social health [48–50]. The PROMIS emotional support item bank specifically aims to assess perceived feelings of being cared for and valued as a person.[51] Participants were presented with the following items: "I have someone who will listen to me when I need to talk"; "I have someone to confide in or talk to about myself or my problems"; "I have someone who makes me feel appreciated" and "I have someone to talk with when I have a bad day." Each item was followed by a Likert-type response scale with possible responses of *Never (1), Rarely (2), Sometimes (3), Often (4), and Always (5).*

#### 2.2.2.2 Social Media-Based Emotional Support

We adapted the above items to assess perceived emotional support derived specifically from SM (SM-ES). We consulted with SM and social support researchers and revised the items based upon expert feedback. In order to use language that encompassed a wide range of SM platforms and experiences, items were then pilot tested prior to survey administration using a youth advisory panel. Feedback was positive in terms of item relevance and comprehensibility. Modified items were as follows: "I have people on social media to listen to me when I need to talk"; "I have people on social media to confide in or talk to about myself or my problems"; "I have people on social media who make me feel appreciated" and "I have people on social media to talk with when I have a bad day." The response scale was identical to that described above.

#### 2.2.2.3 Depression Risk

We assessed depressive symptoms using the nine item Patient Health Questionnaire (PHQ-9), which asks *how often over the past two weeks* participants have been bothered by any of the following: Little interest or pleasure doing things; Feeling down, depressed, or hopeless; Trouble falling asleep, or sleeping too much; Feeling tired or having little energy; Poor appetite or overeating; Feeling bad about yourself—or that you are a failure or have let yourself or your family down; Trouble concentrating on things, such as reading the newspaper or watching television; Moving or speaking so slowly that other people could have noticed? Or the opposite—being so fidgety or restless that you have been moving around a lot more than usual; Thoughts that you would be better off dead or of hurting yourself in some way. Response options included: *Not at all (0), Several days (1), More than half of the days (2), or Nearly every day (3)*. Responses were summed to create a composite scale ranging from 0-27. We categorized the scale into low risk (0-9) and high risk (10-27) based upon recommended clinical cut-points; low risk encompassing none to mild symptomology and high risk encompassing moderate to severe symptomology.[52]

#### 2.2.2.4 Personal and Socio-Demographic Covariates

We assessed daily time spent on SM, adverse childhood experiences (ACE), age, sex, race/ethnicity, education, household income, relationship status and living situation via self-report. Daily time spent on SM was measured using one item that asked individuals "on average, how much time per day do you spend on social media for personal use (not work related)?" Responses were converted to hours for analysis. ACE was assessed using a modified 6-item version of the Adverse Childhood Experiences questionnaire, which asked about individuals' experiences before turning 18 years old such as, "Were your parents separated or divorced?" and "Did you live with

anyone who was depressed, mentally ill, or suicidal?" Response options were *Yes (1)* or *No (0)*.[53] Items were summed to create a scale with scores ranging from 0-6. Age, in years, was measured as a continuous variable. Sex at birth was assessed as male/female. Race/ethnicity was assessed as White, non-Hispanic/Black, non-Hispanic/Hispanic/Asian/Other or Multiracial and collapsed into two categories in multivariable analyses (White, non-Hispanic/Other) for model stability. Education (high school or less/some college or technical school/college graduate/graduate school), household income (less than $25,000/$25,000 to $49,999/$50,000 to $74,999/$75,000 or above), and living situation (by myself/with parent or guardian/with significant other/other) were each divided into four categories. Relationship status (single/member of an unmarried couple/married) was divided into three categories.

### 2.2.3 Data Analysis

We included all participants with complete data on the eight emotional support and nine depression items. We examined the data for patterns of missingness, and used Chi-square and Kruskal-Wallis tests to assess for differences in socio-demographic and personal characteristics between those with and without missing data. Additionally, we assessed the data for unreasonable or unfeasible responses (i.e., reporting using SM more than 18 hours per day), based on a conservative estimate of a 6 hour sleep duration among this age group.[54]

Because we included four additional emotional support items that had been modified from the previously validated version (by assessing emotional support from SM specifically), we performed a factor analysis (FA) using the principal factor (PF) estimation method with oblique rotation to examine the underlying factor structure of these eight items. We used several recommended criteria to determine the best factor solution.[55] First, we assessed the individual item

factor loadings, with those below .50 or crossloading indicating items should be considered for removal. Next, we examined the eigenvalues, looking for factors with eigenvalues over 1. Next, we visually examined the factor structure using a scree plot, looking for the point at which there is a transition from vertical to horizontal in the line. We assessed the uniqueness—the percentage of variance for each variable that is not explained by the common factors—considering values greater than 0.60 high and therefore not well explained by the factors. Having made a decision on the factor-solution, we then calculated the internal consistency of items using Cronbach's alpha and created summary scale(s). In order to more fully assess the reliability and validity of the resultant scale, specifically how much information individual items as well as the overall scale contribute in terms of measuring the range of the construct, we used the item response theory (IRT) graded response model, which is appropriate for ordinal response scale items.[56–58]

We described our sample and examined the associations between each factor, personal characteristic and depression using Chi-square tests for categorical variables and Wilcoxon rank-sum tests for continuous variables. Bivariable logistic regression models were used to assess associations between each emotional support scale, and each covariate with depression risk. We used a multivariable logistic regression model, including both SM-ES, ES, while adjusting for covariates to assess the independent association between each emotional support scale and depression risk. We decided *a priori* to include all sociodemographic and SM use characteristics in our multivariable model—regardless of statistical significance in bivariable analyses—based upon their prior associations with depression. [16,53,59,60] Using the Wald test for significance as well as the Likelihood Ratio Test to compare model fit, we tested for interaction effects in our model between each emotional support scale and sex, as prior research has demonstrated that males and females often perceive emotional support differently.[2,61] Similarly, we tested for an interaction

effect between SM-ES and ES to further assess any interdependence between the two constructs in terms of their association with depression risk.

In all logistic regression models, we incorporated design-specific survey weights provided by Qualtrics in order to estimate effects for the general U.S. population of 18 to 30 year olds as well as adjust for any under- or over-sampling in terms of key demographic factors based upon the most recent U.S. census data. Statistical analyses were performed with Stata 15.0 and two-tailed *p* values of <.05 were considered significant.

We performed three planned sensitivity analyses to examine the robustness of our results and address areas of potential bias. First, we conducted our multivariable analysis using linear regression and operationalizing depression risk as a continuous variable. Second, we conducted the multivariable analysis using no survey weights. Third, we conducted the multivariable analysis using only a parsimonious set of covariates that had a bivariable association of $p < 0.10$ with depression risk.

## 2.3 Results

### 2.3.1 Participants

Our final sample consisted of 2,375 individuals with complete data on our primary variables of interest and after removing 14 individuals who reported using SM more than 18 hours per day and were thus considered extreme outliers. There were no significant differences between those with and without complete data in terms of socio-demographic or personal characteristics (*p* values ranging from 0.05 to 0.92). Based on the low frequency of missing data (1.4%) and the

likelihood of those missing completely at random (MCAR), we used casewise deletion to isolate our final sample. Our sample was approximately half female (51%) and the majority was White, non-Hispanic (68.5%) with at least some college or technical school education (86.2%). Complete sociodemographic information is presented in **Table 1**.

**Table 1 Whole Sample Characteristics and Bivariable Associations with Depression Risk**

| Characteristic | Whole Sample N = 2,395 | Depression Risk | | P Value[a] |
|---|---|---|---|---|
| | | Low (75.3%) | High (24.7%) | |
| Median (IQR) | | | | |
| ES [b] | 4.3 (3.3-5.0) | 4.5 (3.8-5.0) | 3.8 (3.0-4.5) | < 0.001 |
| SM-ES [b] | 2.5 (1.5-3.5) | 2.5 (1.3-3.3) | 3.0 (2.0-3.8) | < 0.001 |
| Hours Per Day on SM | 2.3 (1.0-4.0) | 2.0 (1.0-3.5) | 3.0 (2.0-5.3) | < 0.001 |
| ACE[c] | 1.0 (0.0-2.0) | 0.0 (0.0-1.0) | 2.0 (0.0-3.0) | < 0.001 |
| Age, y | 27 (25-27) | 28 (25-29) | 27 (25-29) | < 0.001 |
| Column %[d] | | | | |
| Sex | | | | 0.001 |
| Male | 49.0 | 51.0 | 43.2 | |
| Female | 51.0 | 49.0 | 56.8 | |
| Race | | | | |
| White, non-Hispanic | 68.5 | 69.6 | 65.2 | 0.23 |
| Black, non-Hispanic | 7.6 | 7.2 | 8.8 | |
| Hispanic | 14.3 | 13.6 | 16.6 | |
| Asian | 8.3 | 8.4 | 8.3 | |
| Other[e] | 1.3 | 1.4 | 1.2 | |
| Education | | | | |
| High school or less | 13.8 | 11.4 | 21.2 | < 0.001 |
| Some college or technical school | 30.9 | 28.7 | 37.8 | |
| College graduate | 33.5 | 35.5 | 27.3 | |
| Graduate school | 21.8 | 24.4 | 13.7 | |
| Annual Household Income | | | | < 0.001 |
| Less than $25,000 | 16.7 | 13.8 | 25.4 | |
| $25,000 to $49,999 | 26.9 | 26.0 | 29.5 | |
| $50,000 to $74,999 | 22.8 | 23.8 | 19.7 | |
| $75,000 or above | 33.6 | 36.3 | 25.4 | |
| Relationship Status | | | | < 0.001 |
| Single | 43.4 | 41.0 | 50.6 | |
| Member of unmarried couple | 26.0 | 26.2 | 25.6 | |
| Married | 30.6 | 32.9 | 23.9 | |
| Living Situation | | | | < 0.001 |
| By myself | 18.3 | 17.4 | 21.1 | |
| With parent or guardian | 20.9 | 19.2 | 26.0 | |
| With Significant other | 45.9 | 48.5 | 38.0 | |
| Other[f] | 14.9 | 14.9 | 14.9 | |

[a] Significance determined with Chi-square tests for categorical variables and Wilcoxon rank-sum test for nonparametric continuous variables.

[b] Scales range from 1-5.

[c] Modified Adverse Childhood Experiences questionnaire ranging from 0-6.

[d] Column totals may not equal 100 due to rounding.

[e] Other includes American Indian/Native Alaskan and Native Hawaiian/Pacific Islander.

[f] Other includes acquaintances, friends, and roommates.

### 2.3.2 Factor Analysis

Pairwise correlations between all eight emotional support items ranged from 0.02 (ES1 and SM-ES4) to 0.88 (ES1 and ES2). Factor analysis yielded a clear 2-factor solution, with eigenvalues on Factor 1 and Factor 2 of 3.46 and 3.00, respectively. All four PROMIS items loaded on Factor 1, ranging in value from 0.88-0.92. All four adapted SM-ES items loaded on Factor 2, ranging in value from 0.82-0.92. The two-factor solution accounted for 82% of the variance among all eight items. Uniqueness values ranged from 0.14 to 0.32, indicating the items were well-explained by the factors. The rotated factors had a correlation of 0.07. We calculated a raw summary score for each factor ranging from 4-20. Scales were then divided by 4 to aid in interpretation, resulting in two scales—ES and SM-ES—each ranging from 1 to 5. Internal consistency reliability for the resulting ES and SM-ES scales was 0.95 and 0.94, respectively (**Table 2**).

**Table 2 Factor Structure for Emotional Support Items**

| | Complete Item | Factor Loading[a] | |
|---|---|---|---|
| | | 1 | 2 |
| ES1 | I have someone who will listen to me when I need to talk. | **0.915** | - 0.008 |
| ES2 | I have someone to confide in or talk to about myself or my problems. | **0.925** | 0.004 |
| ES3 | I have someone who makes me feel appreciated. | **0.880** | 0.001 |
| ES4 | I have someone to talk with when I have a bad day. | **0.914** | - 0.009 |
| SMES1 | I have people on SM to listen to me when I need to talk. | - 0.022 | **0.901** |
| SMES2 | I have people on SM to confide in or talk about my problems or myself. | - 0.044 | **0.912** |
| SMES3 | I have people on SM who make me feel appreciated. | 0.084 | **0.817** |
| SMES4 | I have people on SM to talk with when I have a bad day. | - 0.007 | **0.919** |
| Cronbach's alpha | | 0.952 | 0.940 |
| Proportion of variance explained | | 0.416 | 0.396 |
| Correlation between rotated factors | | 0.069 | |

[a] Rotated factor loadings using principal factor estimation method and Promax oblique rotation.

### 2.3.3 Item Response Theory

The graded response model provides estimates of two types of parameters for each item. Discrimination refers to the magnitude of association between an item and latent construct, where

higher values suggest more sensitive discrimination between participants.[62] Difficulty refers to the threshold or level of the latent construct that is necessary for an item response option to be endorsed compared to the other options. After modeling these parameters, we were then able to produce item and test information curves, which describes the reliability or precision of each item and the overall scale. As depicted in **Figure 1** and **Figure 2**, the functions are slightly wavy due to the number of items in the scale, and the lower discrimination of item SMES3 is evident, however still providing useful information. The item and test information curves suggest that the SM-ES scale tends to perform best for the participants falling between approximately 1 standard deviation (SD) below and 2 SDs above the mean and provides less information in the tails of the curve or for more extreme cases.

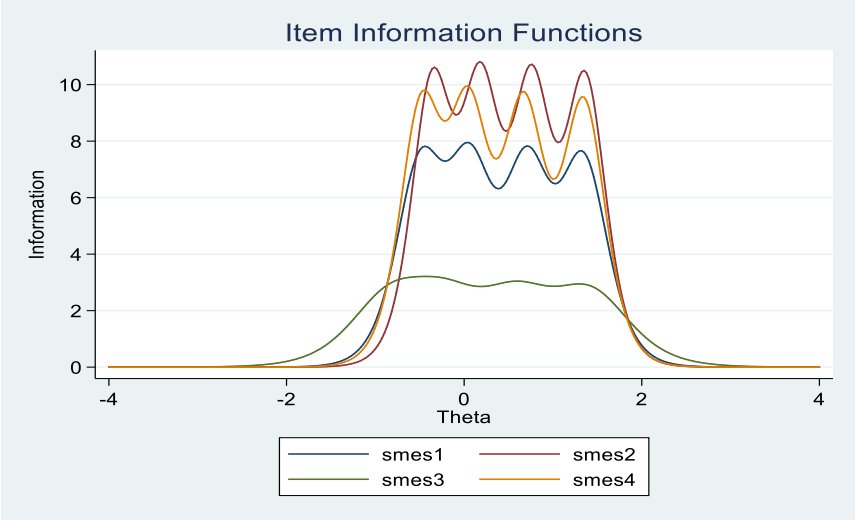


**Figure 1 Item Information Functions for the SM-ES scale**

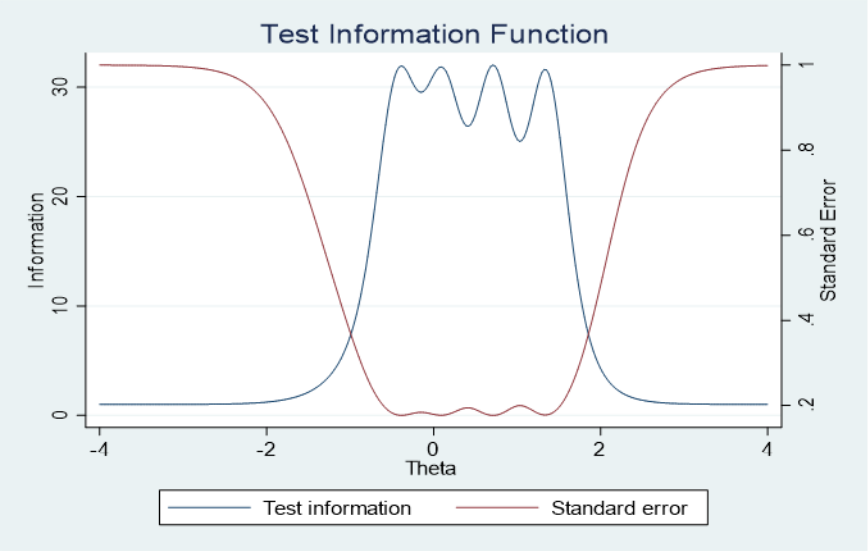


**Figure 2 Test Information Function for the SM-ES scale**

### 2.3.4 Logistic Regression

In bivariable logistic regression models, a 1-unit increase in ES was significantly associated with 44% lower odds of depression (OR = 0.56, 95% CI = 0.51-0.61), whereas a 1-unit increase in SM-ES was significantly associated with 24% greater odds of depression (OR = 1.24, 95% CI = 1.15-1.34). In the multivariable model including both ES, SM-ES and all personal and socio-demographic covariates, a 1-unit increase in ES was significantly associated with 43% lower odds of depression (AOR = 0.57, 95% CI = 0.52-0.63), whereas a 1-unit increase in SM-ES was associated with 20% greater odds of depression (AOR = 1.20, 95% CI = 1.09-1.32). Complete bivariable and multivariable results are presented in **Table 3**.

**Table 3 Bivariable and Multivariable Associations Between Modes of Emotional Support, Personal and Socio-Demographic Covariates, and Depression Risk**

| Independent Variables/Covariates | Depression Risk | |
|---|---|---|
| | OR(95% CI) | AOR(95% CI) |
| ES[a] | **0.56 (0.51-0.61)** | **0.57 (0.52-0.63)** |
| SM-ES[a] | **1.24 (1.15-1.34)** | **1.20 (1.09-1.32)** |
| Hours per day on SM | **1.16 (1.12-1.20)** | **1.10 (1.06-1.14)** |
| ACE[b] | **1.56 (1.46-1.67)** | **1.46 (1.35-1.57)** |
| Age, y | **0.95 (0.92-0.98)** | 0.99 (0.95-1.03) |
| Sex | | |
| Male | Reference | Reference |
| Female | **1.39 (1.15-1.68)** | **1.43 (1.14-1.79)** |
| Race | | |
| White, non-Hispanic | Reference | Reference |
| Other[c] | **1.21 (1.00-1.49)** | 0.85 (0.67-1.07) |
| Education | | |
| High school or less | Reference | Reference |
| Some college or technical school | **0.72 (0.55-0.94)** | 0.89 (0.65-1.21) |
| College graduate | **0.42 (0.31-0.55)** | 0.82 (0.58-1.15) |
| Graduate school | **0.31 (0.22-0.43)** | 0.71 (0.48-1.05) |
| Annual Household Income | | |
| Less than $25,000 | Reference | Reference |
| $25,000 to less than $50,000 | **0.61 (0.47-0.80)** | 0.77 (0.56-1.06) |
| $50,000 to less than $75,000 | **0.45 (0.33-0.60)** | **0.65 (0.46-0.91)** |
| $75,000 or above | **0.38 (0.29-0.50)** | 0.75 (0.53-1.06) |
| Relationship Status | | |
| Single | Reference | Reference |
| Member of unmarried couple | 0.80 (0.64-1.01) | 1.06 (0.78-1.44) |
| Married | **0.60 (0.48-0.76)** | 1.01 (0.68-1.49) |
| Living Situation | | |
| By myself | Reference | Reference |
| Parent or guardian | 1.09 (0.80-1.41) | 1.24 (0.85-1.67) |
| Significant other | **0.65 (0.49-0.82)** | 0.81 (0.53-1.14) |
| Other[d] | 0.82 (0.59-1.12) | 1.02 (0.71-1.48) |

Notes: Bolded values represent significant odds ratios; OR = odds ratio; CI = confidence interval; AOR = adjusted odds ratio. AOR represents the odds for each variable, adjusting for all the other variables in the table.

[a] Associated odds is for each 1-unit increase on a 5-point scale.

[b] Modified Adverse Childhood Experiences questionnaire ranging from 0-6.

[c] Includes Black, non-Hispanic, Hispanic, Asian, American Indian/Native Alaskan, and Native Hawaiian/Pacific Islander.

[d] Other includes acquaintances, friends, and roommates.

We found a significant interaction effect between ES and sex ($p < 0.001$), the inclusion of which improved overall model fit ($p < 0.001$). Although ES was significantly associated with depression for both females and males, the magnitude varied. A 1-unit increase in ES was significantly associated with 30% lower odds of depression for females compared to males (AOR

= 0.70, 95% CI = 0.58-0.85). There was not a significant interaction effect between SM-ES and sex ($p$ = 0.54) or between SM-ES and ES ($p$ = 0.48). Results from all three sensitivity analyses were consistent with our primary models and therefore not shown.

## 2.4 Discussion

This study of a large national sample of young adults found that emotional support from social media (SM-ES) was a distinct construct from traditional, FTF emotional support (ES). Unlike ES, which was associated with lower odds of depression, SM-ES was independently associated with greater odds of depression. These findings reflect existing research on the distinctions between FTF and SM-based support in general and their associations with mental health.[26,46] However, our findings differ from some prior studies that showed that like FTF emotional support, online support was associated with lower depression.[27,63] Additionally, our scale demonstrated strong psychometric properties, suggesting that it can be used as a brief assessment of SM-based emotional support.

We found a strong positive association between SM-ES and depression risk, after controlling for ES and a comprehensive set of related covariates. This finding suggests that SM-based emotional support does not function in the same way as traditional FTF emotional support in terms of a mental health benefit. This may be due to the fundamentally different nature of SM, as compared to FTF, interactions. For example, SM interactions may lack the full range of interpersonal cues and the direct interpersonal connection that make social support effective.[64] Indeed, research has found that SM interactions differ from FTF interactions in a number of fundamental ways that may transform the experience of social support for young people, including

through the reduction of interpersonal cues, the allowance of asynchronous interactions, and the focus on quantifiable indicators of peer approval.[44]

The positive association between SM-ES and depression risk may also be due to some SM-specific exposures within the SM environment that increase the risk of depressive symptoms. Prior research has found that certain types of SM experiences, such as passive use (as opposed to active), having a greater proportion of strangers as SM contacts, and exposure to negative experiences on SM are associated with greater risk of depression.[65–67] Additionally, several studies have found that individuals who engage in excessive reassurance-seeking and problematic social comparison on SM report increases in depressive symptoms and decreases in self-esteem over time.[68] One study found that young adults with lower self-esteem engaged in greater levels of negative self-disclosure on Facebook, and these posts received fewer "likes" and comments, which may potentially lead to depressive symptoms.[69] It may be beneficial for future research to assess these aspects of SM use in conjunction with SM-ES and depression.

It is also plausible that individuals with depression tend to perceive SM as a source of emotional support to a greater extent than do non-depressed individuals. Some research has found that for individuals with mental health conditions, SM may be perceived as preferable to FTF connection and as a potential source of support.[18,19] However, in our study, SM-ES and ES were not negatively correlated and ES was included in the multivariable model, suggesting that SM-ES was not necessarily displacing ES. Therefore, it is unlikely that depressed individuals perceive SM to be a source of emotional support simply because they lack FTF emotional support. An alternative possibility is that when people are depressed, they perceive social support differently than their non-depressed peers.[70] Additionally, it may be that our findings are consistent with research indicating that depressive symptoms increased when social support was sought on

Facebook but perceived to not occur.[64] Future research will benefit from a more nuanced investigation of the complexities surrounding these associations. Although our study results should be interpreted with caution, they may have clinical implications for individuals who are at risk for depression. Specifically, identifying SM as a source of support may not be an effective replacement for FTF social interaction in promoting positive mental health.

Factor analysis of eight emotional support items—four items from a validated measure of traditional emotional support and four SM-specific items adapted from this measure—revealed two distinct factors. While some research has suggested that SM is an extension of or opportunity to enhance our FTF social networks,[71] these findings indicate it is likely not. Although SM does offer features to express support such as liking a post or leaving an encouraging comment, such gestures of emotional support may not function in the same way as verbal or bodily expressions of support. This finding is consistent with research that found that parasocial and social relationships were differentially associated with psychological well-being.[72] Looking more closely at what characterizes FTF emotional support—perceptions of reciprocity, being valued, and encouragement in relationships[41,42]—it is understandable how these characteristics may be less potent and subsequently less valuable in the SM environment.

Our study found that there was no difference in the positive association between SM-ES and depression risk between females and males. This result suggests that the effect of perceiving SM to be a source of emotional support is a risk factor for depression, regardless of sex. This finding is contrary to that of the association between ES and depression risk, which differed for females and males. Although the association was significant and negative for both, the magnitude of the association was greater for females than for males. This may be valuable information for informing interventions and recommendations, as well as for clinicians treating young adults.

### 2.4.1 Limitations

This study had several limitations worth mentioning. First, we did not conduct a formal scale development study to measure SM-ES. However, we chose to adapt items, which is recommended as a preferable method when a modifiable scale is available.[56] Second, because this study was cross-sectional, directionality of associations cannot be determined. However, whether SM-ES leads to greater risk of depression or greater risk of depression leads to SM-ES, this association provides useful information for future studies. Finally, because we used an online panel to recruit participants from the general public, it is not possible to calculate a response rate. However, we did implement methods to reduce the potential impact of selection bias and the representativeness of data gathered from internet panels has been shown to be comparable to that from probability-based general population samples.[73]

### 2.4.2 Conclusions

This study found that emotional support derived FTF and emotional support derived via SM are two distinct constructs. Although FTF emotional support was strongly associated with lower odds of depression, emotional support related to SM was associated with greater odds of depression. The accessibility of SM makes it an inviting option for connecting with others, particularly for individuals who are geographically or socially isolated, mobility-, or time-impaired. However, these findings indicate that FTF and SM connections are not equally valuable in terms of protection against depression risk. Future longitudinal and qualitative studies may help further elucidate these associations.

# 3.0 Positive and Negative Social Media Experiences Among Depressed and Non-Depressed Young Adults

## Project 2

## 3.1 Introduction

Depression is one of the most common mental health conditions and a leading cause of disability worldwide.[74] In the United States, its prevalence is highest for adolescents and young adults, with approximately 13% of 18 to 24 year olds experiencing at least one major depressive episode in the past year.[75] Individuals suffering from depression, compared with those who do not, have 25 times greater risk for suicide, which is the second leading cause of death among adolescents and young adults.[76] Depression is also associated with poor social functioning and social isolation, both of which contribute to sustained depression and impairment.[77–81]

Given the strong associations between depression and social connectedness, along with the rapid rise in SM use over the past two decades, it is important to better understand links between SM use and depression. The way in which young adults interact socially has changed over the past several years; for example, young adults spend, on average, more time socializing on SM than they do in person.[14] Results from existing research addressing SM and depression among young adults are conflicting. For example, large epidemiological studies demonstrate associations between SM use and a decline in well-being.[82–85] However, other research calls these associations into question, concluding that SM is not a predictor of life satisfaction, depressive symptoms, or impaired mental

health functioning.[36,86,87] Some of our understanding of conflicting prior results may be explained by the fact that SM use is highly varied; it represents a broad continuum of exposures, given the variety of platforms, personal characteristics of users, and variety of ways to engage on SM.[65,88–90] For example, whereas experiencing more negative SM experiences has been associated with greater risk of depression and social isolation, experiencing more positive SM experiences has not been significantly associated with lower risk of these mental health outcomes.[91,92] Further research addressing the positive and negative SM exposures may ultimately help guide evidence-based recommendations for young adults navigating a digital world.

Another gap in the literature is that prior research has not sufficiently provided direct comparisons between depressed and non-depressed young adults. We know that depressed and non-depressed adolescents experience online media differently from each other. For example, daily time spent on the Internet, connecting with both peers and strangers, and engaging in personal disclosure is significantly greater among depressed youth.[93] Additionally, depressed adolescents may have smaller, less connected SM networks, and compared with non-depressed adolescents, they seem to experience greater negative interactions and negative affect following interactions.[94,95] Other literature suggests that while depressed and non-depressed adolescents generally experience SM similarly, for depressed adolescents, these experiences may be more pronounced.[96,97] However, it remains unclear how these experiences apply to young adults.

A final important gap is that the vast majority of existing research on SM and depression among young adults has been quantitative.[16,98–101] While this research has been valuable in determining overall associations and generalizable results, qualitative examinations are needed in order to elucidate more specific information and to develop a depth of understanding about the relationship between SM use and mental health among young adults. In addition, qualitative

assessments may be particularly important given prior conflicting results, because the associated methods can help to uncover and explore the nuances that are not addressed in quantitative methods.[102–104]

Therefore, the current study uses thematic analysis to systematically explore responses from open-ended survey questions. Exploring the perceptions of positive and negative effects of SM simultaneously, we attempt to reconcile conflicting findings in the literature and elucidate both positive and negative social experiences in the SM context.[102] Additionally, we sought to provide insight into the differential experiences on SM between depressed and non-depressed young adults.

## 3.2 Methods

### 3.2.1 Study Design and Sample Selection

We commissioned Qualtrics Sampling Services, which partnered with a web-based panel provider, to recruit a national sample of adults ages 18 to 30. Participants were recruited using a "balanced start" sampling methodology, which applies quotas based upon U.S. census data in terms of age, sex, race/ethnicity, education, household income, and geographic region to approximate the U.S. adult population. Panel members were invited via email to participate in an online survey about SM use and mental health during March of 2018. If individuals consented, they were redirected to the survey. Median completion time for the survey was 18 minutes (interquartile range [IQR] = 13-26 minutes) and participants received incentives in the form of points, which could be redeemed for incentives of their choice, such as gift cards. This study was approved by the University of Pittsburgh Institutional Review Board.

In order to identify and select information-rich cases related to our study objectives, we purposefully sampled from our larger sample an equal number of participants with severe depressive symptoms and no depressive symptoms (hereafter referred to as depressed and non-depressed participants). These designations are indicated by the nine-item Patient Health Questionnaire (PHQ-9) cut-points for severe and normal symptoms, respectively, as detailed below. Using a random number generator, we selected a random sample of 50 depressed and 50 non-depressed participants. This sample size was based on prior qualitative studies and recommendations for achieving thematic saturation using purposeful sampling.[105–109] Prior to the random draw, we eliminated only participants with missing responses on both items, as including them would not assist in the objective of this study.

### 3.2.2 Codebook Development and Procedures

We used an iterative approach to codebook development, integrating insights present in the literature with new themes emerging from the participants' responses. Based on existing literature, we developed a list of codes previously related to both positive and negative SM experiences. For example, the initial list included the code *upward social comparison* as a potential negative effect of SM. Upward social comparison in this context was described to coders as comparing attractiveness, success, happiness, possessions, etc. in a way that makes one feel badly about her/himself. We chose an initial sample of 20% of the larger sample for codebook development. Two trained coders, blinded to participants' depression status, independently coded these responses, using the preliminary codebook. When coders proposed new codes or had coding discrepancies, both coders met with the principal investigator (PI) to resolve the discrepancy and refine the codebook until consensus was achieved. The two coders then independently coded the

remaining 80% of responses. Inter-rater agreement was measured using two alternative measures—Cohen's κ and Krippendorff's α—in order to confirm the robustness of results as well as accommodate categories with a smaller frequency.[110] Agreement across all categories ranged from .70 to 1.00. In the cases of disagreement, coders worked with the PI to adjudicate codes.

### 3.2.3 Measures

#### 3.2.3.1 Perceived Effects of SM.

Two open-ended items asked participants: "In 4 or 5 sentences, please tell us stories about the ways in which SM has had a positive effect on your life" and "In 4 or 5 sentences, please tell us stories about the ways in which SM has had a negative effect on your life."

#### 3.2.3.2 Depression

We assessed depression using the PHQ-9, which is a self-administered tool for diagnosing the presence and severity of depressive symptoms. Based upon recommended clinical cut-points for diagnosis, scores ranging from 0-4 can be interpreted as "normal" or no depressive symptoms; whereas scores ranging from 20-27 can be interpreted as "severe" depressive symptoms.[111]

#### 3.2.3.3 Socio-demographic characteristics.

Participant characteristics were provided from Qualtrics including age in years and sex. Additionally, race/ethnicity (White, non-Hispanic/Other), relationship status (single/member of unmarried couple/married), living situation (by myself/with others), and education (high school graduate or less/some college or technical school/college graduate or more) were collected via self-report.

### 3.2.4 Analysis

We synthesized the qualitative findings, identifying key themes consistent with the study objectives and presenting exemplary quotations. We used Microsoft Excel to manage and index the codes. To describe our sample in terms of socio-demographic composition and to explore and compare the occurrence of themes among the whole sample and between depressed and non-depressed participants' responses, we calculated frequencies and percentages using Stata 15.0.

## 3.3 Results

### 3.3.1 Sample

Our purposeful random sample of 100 participants—50 depressed and 50 non-depressed—were approximately half female and ranged in age from 18 to 30, with an average age of 27 years. A majority of participant reported being White, non-Hispanic, in a committed relationship, living with others, and had an educational level of some college or technical school or more.

### 3.3.2 Positive Effects of SM

We identified nine major themes associated with perceived positive effects of SM listed in order of most often to least often discussed: 1) *connection with others*, 2) *informational support*, 3) *exposure to positivity*, 4) *emotional support*, 5) *self-expression*, 6) *pass time*, 7) *coping*, 8) *positive feedback*, and 9) *downward social comparison*. **Table 4** presents information about theme

frequency and provides exemplary quotations. The most commonly referenced positive effect of SM was *connection with others*. For example, participants discussed SM as a way to stay in touch with friends and family who do not live close (e.g., "Social media allows me to stay connected with friends and family that I don't speak with often, or that are far away"); as a way to reconnect with old friends (e.g., "Thanks to social media it was easy for me to make contact with an old friend after we hadn't seen each other for 15 years"); and as a way to form new relationships (e.g., "I have met amazing people all over the world through SM and have gone to visit them in their countries"*).*

### 3.3.3 Negative Effects of SM

We identified seven major themes associated with perceived negative effects of SM listed in order of most often to least often discussed: 1) *exposure to negative content*, 2) *upward social comparison*, 3) *distraction from real life*, 4) *negative impact on relationships*, 5) *judgment*, 6) *decline in self-worth*, and 7) *fear of missing out (FOMO)* (See **Table 4**). The most commonly referenced negative effect of SM was *exposure to negative content*. For example, participants described being exposed to posts about current events (e.g., "Lots of negative posts about politics and life makes me sad about the world"); and being exposed to others' negative interactions (e.g., "People constantly arguing and insulting one another over small differences…").

### 3.3.4 Effects of SM by Depression Status

Overall, depressed and non-depressed participants mentioned themes regarding the positive effects of SM with similar frequency and context; whereas depressed participants

mentioned themes associated with the perceived negative effects of SM more often than non-depressed participants. However, one perceived negative theme—*distraction from real life*—was mentioned more than twice as often by non-depressed participant than depressed participant and was characterized by three major sub-themes among the whole sample. Non-depressed participants described neglecting "real-life" responsibilities due to spending time on SM (e.g., "Always on my phone. Need to frequently check my social media. Ignoring important household chores"); and that their use of social media was adversely affecting "real-life" relationships (e.g., "It has created problems with my relationship because I'm always on social media"). Whereas, depressed participants described the negative effect of others' SM use in their presence (e.g., "Social media has very little direct impact on my life, rather it is usually the ones that heavily use it that impact me. The prime example of a negative impact on me is that those around me are constantly using it…"). The second perceived effect of SM that differed between depressed and non-depressed participants—*judgment*—was mentioned solely by depressed participant and was characterized by two major sub-themes. Depressed participants described a fear of being judged by others (e.g., "I never post anything on my own because I'm afraid of people's reactions") as well as the general judgmental nature of people on SM (e.g., "Everyone is so judgmental").

**Table 4 Frequency of Codes and Exemplary Quotations**

| Code (n) | Exemplary Quotation |
|---|---|
| **Positive Effects (145)** | |
| Connection with others (64) | *It helps me keep in contact with people I don't see daily and see how past friends are doing.* |
| Informational support (29) | *Helpful advice from other parents.* |
| Exposure to positivity (18) | *I find funny pictures that make me laugh like cats.* |
| Emotional support (8) | *I'm able to discuss my problems with people that understand my situation without having to see them in person, considering their distance away from me.* |
| Self-expression (7) | *Express my feelings and thoughts* |
| Pass time (6) | *It is a fun thing to do in my free time.* |
| Coping (6) | *Social media is a great way to take my mind of things when I may be stressed with work, etc.* |
| Positive feedback (4) | *I get compliments on social media.* |
| Downward social comparison (3) | *It remind me that everyone has their own lives/struggles.* |
| **Negative Effects (113)** | |
| Exposure to negative content (37) | *Everytime I go on there there's usually something negative happening. I hate reading about all the political stuff.* |
| Upward social comparison (29) | *I can compare myself to anyone/anything. See all of the things I could have or could be, and I am just not. Whether I know the person or not I envy their situation.* |
| Distraction from real life (21) | *There are times where I spend too much time on my phone with social media that I don't pay enough attention to my family.* |
| Negative impact on relationships (11) | *Social media has ruined the images of some of the people close to me.* |
| Judgement (7) | *I never post anything on my own because im afraid of peoples reactions.* |
| Decline in self-worth (6) | *Makes me hate myself.* |
| Fear of missing out (2) | *Seeing my friends get together without me on social media is hard.* |

## 3.4 Discussion

This study of a purposeful, random sample of depressed and non-depressed young adults qualitatively explored their perceptions of positive and negative effects of SM. Our systematic assessment of open-ended responses revealed nine positive and seven negative themes about SM use. While depressed and non-depressed participants mentioned themes related to the positive effects of SM with similar frequency, the frequency with which they mentioned two themes related to the negative effects of SM differed. Our findings are consistent with prior research that demonstrates both the positive and negative aspects of SM. However, the current study extends existing research by thematically assessing SM experiences among adults and comparing these experiences—both in frequency and context—between a sample of depressed and non-depressed young adults.

Connections with others was most frequently mentioned as a positive effect of SM, regardless of depression status. Descriptions of *connection with others* demonstrated how SM can be useful for various types of interpersonal connection including maintaining former or current relationships as well as building new relationships. The landscape of human connection is increasingly digital and mobile and SM seems to play a critical role in this social network aspect of people's lives. Although previous research has noted that positive experiences on SM may not necessarily buffer the negative mental health outcomes that are associated with negative experiences, [91,92] it is nevertheless a promising qualitative trend that connection with others is positively perceived. Additionally, that connection with others is accessible via SM among our severely depressed participants is particularly encouraging.

When reflecting on the negative effects of SM on their lives, participants frequently mentioned their exposure to negative content. This response was prominent in both depressed and

non-depressed people. Prior research has identified other negative SM exposures; in our study, FOMO and comparison with others were present, though cyberbullying and harassment were not.[96,112] Compared with these other exposures, the prevalence of exposure to negative content, most often characterized by posts or discussion around current events, may have been a result of the political and social climate at the time of the survey. Recent results from national surveys indicate that Americans are feeling "worn out" by the volume of news they encounter and find political conversations on SM to be stressful.[113,114] It may also be that for adults this exposure is more impactful than those found more typically among younger, adolescent samples.

Although depressed and non-depressed participants expressed themes relating to the positive effects of SM with similar frequency, they differed more so in the frequency with which they mentioned themes relating to the negative effects of SM. *Judgement*—the fear of being judged for posts and the general judgmental nature of people on SM—was expressed solely by depressed participants. This finding may reflect depressed individuals' increased sensitivity to external input and subsequent online vulnerability.[115,116] It is also possible that, like individuals with low self-esteem, depressed individuals tend to share negative posts on SM, which have been associated with undesirable responses from others.[69] It may be beneficial for depressed individuals to limit how much they share publicly on SM and instead use it to connect with others one-to-one.

Overall, non-depressed participants referenced SM as a *distraction from real life* more than twice as often than depressed participants. However, and perhaps more interesting were the differences of perspective expressed by the non-depressed and depressed participants. For example, when non-depressed participants referenced their SM use as a *distraction from real life*, they expressed a perception about their own SM use; that they should be doing something more productive and that they were neglecting real-life relationships in lieu of SM. On the other hand,

when depressed participants referenced SM as a *distraction from real life*, they discussed the negative impact of others' SM use when in the same physical space. These thematic nuances may reflect the notion that SM use can be disruptive, pulling individuals away from their physical surroundings as well as others in that space, and that depressed individuals may be particular sensitive to this disruption.[117–119] Research has found that compared to those without depression, individuals with depression experience social connection differently. Specifically, for these individuals, the pain from perceived social rejection is more sustained.[120]

### 3.4.1 Limitations

This study had several limitations that warrant mention. The qualitative information for this study was collected via self-report using results from only two questions included in an on-line survey at a single time period. Therefore, qualitative responses were reflective of participants' initial responses and there was no opportunity to follow up with probes in order to elicit additional insights. Additionally, the median completion time for the entire survey was 18 minutes, which suggests it is unlikely that participants spent a lot of time reflecting on these two qualitative questions. It is also possible that individuals who responded to the qualitative items included in this survey differed from those who did not, limiting the generalizability of findings. Finally, this study utilized a purposeful subsample within a larger study of U.S adults ages 18 to 30. Because the subsample was on average 27 years of age, these findings may not be generalizable to a broader population of younger or older adults. It may be valuable for future research to focus on the positive and negative experiences of younger adults ages 18 to 24, for example, who may be developmentally distinct and have SM experiences varying from their older counterparts.

Similarly, it may also be valuable to explore the SM experiences of older adults, who have a growing SM presence and for whom depression remains a risk.[13,75]

### 3.4.2 Conclusions

The perceived positive and negative effects of SM described by participants in this study highlight the complexities surrounding SM use in the lives of young adults. While individuals use SM to connect with others and perceived this to have a positive effect on their lives, they also are exposed to others' negative content, resulting in a negative effect on their lives. For the most part, depressed and non-depressed individuals expressed the positive effects of SM with similar frequency, while there were differences in how frequently they mentioned two negative effects. Using SM to connect with others may be beneficial; however, users may want to take advantage of tools to filter exposure to negative content. Given this population's comfort communicating online, it may be valuable for future research to utilize more interactive qualitative methodologies such as web-based discussion groups or one-on-one semi-structured interviews that allow for elaboration and clarification in order to more fully understand the nuances related to both positive and negative SM experiences and the effects on young adults' well-being.

# 4.0 Patterns of Social Sharing and Perceived Emotional Support: Face-to-Face and on Social Media

## Project 3

## 4.1 Introduction

Sharing about experiences or emotions with others, also called self-disclosure or social sharing, plays a central role in the development and maintenance of relationships and has been found to be beneficial for one's psychological health.[121] Extensive experimental research has demonstrated that engaging in traditional (i.e., offline) social sharing can increase reciprocal favorable feelings between individuals and improve symptoms of depression.[121,122] These findings are consistent with the Social Sharing of Emotion Theory that posits that after experiencing a distressing event, individuals often seek out others with whom they can share their emotions and that this is a beneficial disclosure.[123] Motives for these disclosures may include becoming closer to others, receiving consolation, facilitating social interaction, and obtaining support.[123,124] Additionally, individuals who share about positive events benefit from increased positive affect and well-being and experience a sustained positive emotional experience over time.[125,126]

With the proliferation of SM use, the way in which adolescents and young adults communicate and share information is changing rapidly.[127–129] Several studies support the notion that sharing on SM can foster relationships, elicit emotional support, and contribute positively to overall well-being.[130–133] For example, social sharing on Facebook was found to buffer the negative

effects of stressful life events on depression among college students.[134] Similarly, social sharing on Facebook was directly associated with decreased loneliness, greater relationship intimacy, and greater social support, all of which are protective against depression.[132–136] However, there are also conflicting findings about the effects of sharing on SM. For example, sharing about negative experiences or feelings on Facebook and Twitter was found to amplify negative emotions, increase negative affect, and elicit undesirable responses from others.[69,137] It may be particularly important to clarify the effects of SM sharing for individuals with mental health concerns, who tend to limit their FTF sharing, but may prefer sharing on SM.[69,138–141]

To our knowledge, no research has directly compared social sharing conducted FTF and on SM and the associations with mental health. However, several studies have compared FTF and general online social sharing and the association with emotional support, with mixed results.[142,143] For example, one study concluded that the process of FTF sharing replicated itself in a blog social network site, where both positive and negative emotional sharing elicited emotional support—known to be protective against depression.[3,130] Other research found differences between the two modes of social sharing; depth and frequency of shares were greater FTF than online, and for women, FTF sharing was perceived to elicit more emotional support than online sharing.[142,143] Given these inconclusive findings, it is likely that a more complex combination of factors determines how sharing with others and perceptions of emotional support—FTF and on SM—are comparable in terms of a mental health benefit.

The majority of existing research on the effects of social sharing using electronic media has been either broad (i.e., various online activities) or narrow (e.g., sharing on Facebook).[130,132–134,138,143] Additionally, prior studies tended to focus only on convenience samples of college students.[133–136] This current study addresses several crucial gaps that may help clarify how the

value of social sharing FTF compares to the value of social sharing on SM in terms of emotional support and a potential mental health benefit. First, this study extends previous research by exploring social sharing on SM specifically—as opposed to general online activity and assesses SM use broadly across platforms. Second, this study examines social sharing and emotional support both FTF and on SM simultaneously among a large national sample of young adults. Third, we use cluster analysis, an exploratory technique for identifying distinct groups or patterns of behavior that may be more reflective of real-world dynamics. Finally, we examine and compare how these patterns are associated with depression. This study has three aims: 1) To identify distinct clusters of participants based upon frequency of social sharing FTF and on SM and perceived emotional support from FTF and SM relationships; 2) to characterize the distinct clusters in terms of sociodemographic composition; and 3) to assess the differential associations between cluster membership and depression.

## 4.2 Methods

### 4.2.1 Study Design and Sample Selection

Data for this study were collected as part of a larger study on SM and mental health. In collaboration with Qualtrics Panel Services, we administered an online survey to 2,408 U.S. adults ages 18 to 30 in March of 2018. Participants were recruited using a "balanced start" sampling methodology, which applies quotas based upon U.S. census data in terms of age, sex, race/ethnicity, education, household income, and geographic region to approximate the U.S. adult population. Complete study design and sampling procedures have been described in **Project 1**.[144]

### 4.2.2 Measures

We used four variables—FTF sharing, SM sharing, FTF perceived emotional support, and SM perceived emotional support—to identify distinct clusters of participants within the data. We categorized both modes of social sharing and emotional support, in order to address non-normal distributions and to better identify interpretable clusters.

#### 4.2.2.1 Clustering Variables

Participants were asked two items to assess FTF and SM sharing: "When you experience a stressful situation, how often do you talk about it in-person?" and "When you experience a stressful situation, how often do you talk about it on SM?" Items were scored using a 5-point Likert-type scale with corresponding responses of *Never (1), Rarely (2), Sometimes (3), Often (4), and Always (5).* Initial items were developed based upon existing theory and scales and adapted to reflect the context of the current study. [40,145] Prior to administration, items were discussed with an expert panel, revised, and pilot tested among a youth advisory board that consisted of individuals in our target age range of 18-30. Responses for both variables were categorized into three levels due to low cell frequencies and in order to identify interpretable clusters. The low group consisted of responses of *Never* or *Rarely*; the moderate group consisted of responses of *Sometime*s; and the high group consisted of responses of *Often* or *Always*.

We assessed both perceived FTF emotional support and perceived SM emotional support, referred to here as FTF and SM emotional support, with a series of items. FTF emotional support was measured using a 4-item scale developed by the Patient-Reported Outcomes Measurement Information System (PROMIS). PROMIS is a National Institutes of Health (NIH) Roadmap initiative aiming to provide precise, reliable, valid, and standardized questionnaires measuring

patient–reported outcomes across the domains of physical, mental, and social health [48–50]. The complete items and psychometric properties of this measure have been reported elsewhere.[43] We calculated a raw summary score ranging from 4-20, including only respondents who answered all 4 items, as directed by the PROMIS scoring instructions. The scale was then divided at the median for analysis; the low group consisting of scores ranging from 4-17 and high consisting of scores ranging from 18-20. Our low and high groups corresponded with the PROMIS guidelines for interpreting scores as below and above average in the general population, respectively. [146]

We adapted the PROMIS 4-item emotional support scale to assess emotional support derived specifically from SM. Modified items were as follows: "I have people on social media to listen to me when I need to talk"; "I have people on social media to confide in or talk to about myself or my problems"; "I have people on social media who make me feel appreciated" and "I have people on social media to talk with when I have a bad day." This scale demonstrated strong psychometric properties, which was reported previously.[144] We calculated a raw summary score ranging from 4-20, using only the respondents who answered all 4 items, as directed by the PROMIS scoring instructions. The scale was then divided at the median for analysis; the low group consisting of scores ranging from 4-10 and high consisting of scores ranging from 11-20. Because our study was the first to use these items, no cut-point for dichotomization has been established. Therefore, we used the median to correspond with the PROMIS emotional support scale described above.

#### 4.2.2.2 Dependent Variable and Covariates

We assessed depression using the nine item Patient Health Questionnaire (PHQ-9), which assesses severity of symptoms over the past two weeks and has been validated extensively in clinical and non-clinical populations. Responses were summed to create a composite scale ranging

from 0-27. We categorized the scale into low (0-9) and high (10-27) based upon recommended clinical cut-points of symptom severity, with low consisting of normal and mild symptom severity and high consisting of moderate and severe symptom severity.[52]

We assessed age in years, a modified version of the Adverse Childhood Experiences (ACEs), time per day on SM in hours, sex, race/ethnicity, education, household income, relationship status, and living situation via self-report. We decided a priori to include all covariates in our multivariable model due to their prior associations with depression. [16,59,60,144]

### 4.2.3 Analysis

Our final sample consisted of all individuals with complete data on all four clustering variables. Using Chi-square tests for categorical variables and Wilcoxon sum-rank tests for continuous variables, we tested for differences in terms of socio-demographic and personal characteristics between those with and without missing data. Because screening procedures prior to cluster analysis recommend eliminating or replacing highly correlated variables (correlation coefficients > 0.90), we examined the four clustering variables for collinearity, conducting pair-wise correlations using two alternative measures—Spearman's Rho and Pearson's *r*— and operationalizing variables in both their original and categorized scales.[147] Using the 2-step cluster algorithm and log-likelihood distance measure appropriate for clustering variables of differing scales and for large data sets, we performed a cluster analysis using SPSS version 25.[148] The algorithm provides a table of fit indices using either Akaike's Information Criterion (AIC) or the Bayesian Information Criterion (BIC) and automatically chooses the optimal number of cluster based upon the largest ratio of distance measure provided by these fit criteria.[149,150]

We employed several recommended techniques to assess the stability and the validity of the chosen cluster-solution according to best practices for the use and reporting of cluster analyses.[147,151] First, we cross-validated the cluster solution by selecting a fixed number of clusters based upon the optimal solution indicated by the algorithm and repeating the cluster analysis 10 times using a different random sample of 50% of cases with each iteration. We then compared the cluster membership between each subsample and the whole sample. Next, we examined the face validity and evaluated the cluster solution using several recommended criteria. Optimally, a cluster-solution should be both substantial and parsimonious: a limited number of clusters large enough to warrant attention; and exhibit high degrees of within-cluster homogeneity and between-cluster heterogeneity.[147,149] After determining the cluster solution was viable and comprehensible, we interpreted and labelled each cluster accordingly.

We performed descriptive statistics to present the overall distribution of clusters and the composition of each cluster by each of the four clustering variables. Chi-square tests and Wilcoxon rank-sum tests were used to assess bivariable associations between socio-demographic and personal characteristics with cluster membership. To assess the criterion-related validity of the cluster solution and address study aim 3, we used logistic regression to assess bivariable and multivariable associations between cluster membership and depression,[147] adjusting for all socio-demographic and person factors in the multivariable model. Stata statistical software version 15 was used for all analyses other than the cluster analysis and two-tailed p values $< 0.05$ were considered statistically significant.[152]

## 4.3 Results

### 4.3.1 Participants

Of the 2,408 participants who completed the survey, the final sample for this study consisted of 2,396 participants. There were no significant differences between the final sample and those omitted for missing data in terms of socio-demographic or personal characteristics. Because there was no evident pattern of missing data, and it was a relatively small proportion of individuals (n = 12, 0.5%), we used casewise deletion.[153] Whole sample socio-demographic and personal factors are presented in **Table 5.**

**Table 5 Whole Sample Socio-Demographic and Personal Characteristics and Associations with Cluster Membership**

| Socio-Demographic/ Personal Characteristic | Whole Sample N = 2,366 | Traditionalists | Supported Spectators | Withholders | Oversharers |
|---|---|---|---|---|---|
| **Median, (IQR)** | | | | | |
| **Age**, years*** | 27 (25-29) | 28 (26-29) | 27 (25-29) | 28 (25-29) | 27 (25-29) |
| **ACE***[a] | 1 (1-2) | 1 (0-2) | 1 (0-2) | 0 (0-2) | 1 (0-3) |
| **Time per day on SM,** hours*** | 2.3 (1.0-4.0) | 2 (1.0-3.0) | 3.0 (2.0-4.0) | 1.5 (1.0-2.8) | 3.3 (2.0-5.0) |
| **Column %** | | | | | |
| **Sex*** | | | | | |
| Male | 49.1 | 45.0 | 41.8 | 58.0 | 52.7 |
| Female | 50.9 | 55.0 | 58.2 | 42.0 | 47.3 |
| **Race*** | | | | | |
| White, non-Hispanic | 68.3 | 77.0 | 66.9 | 68.9 | 61.9 |
| Other[b] | 31.7 | 23.0 | 33.1 | 31.1 | 38.1 |
| **Education*** | | | | | |
| High school or less | 13.8 | 8.8 | 12.0 | 16.0 | 18.2 |
| Some college or technical school | 31.0 | 27.1 | 35.2 | 28.8 | 31.5 |
| College graduate or higher | 55.2 | 64.1 | 52.8 | 55.3 | 50.3 |
| **Household Income*** | | | | | |
| Less than $50,000 | 43.5 | 35.1 | 44.1 | 42.3 | 51.1 |
| $50,000 to $74,999 | 22.8 | 23.2 | 22.9 | 23.8 | 21.5 |
| $75,000 and above | 33.7 | 41.7 | 33.0 | 34.0 | 27.4 |
| **Relationship Status*** | | | | | |
| Single | 43.4 | 34.8 | 43.4 | 45.9 | 48.7 |
| Not single | 56.6 | 65.2 | 56.6 | 54.1 | 51.3 |
| **Living Situation**** | | | | | |
| Alone | 18.4 | 13.3 | 17.8 | 19.0 | 22.8 |
| With other(s)[c] | 81.6 | 86.7 | 82.2 | 81.0 | 77.2 |

Note: *$p < .05$, ** $p < .01$; *** $p < .001$; P value derived using Chi-square tests for independence to compare categorical socio-demographic characteristics and the non-parametric Wilcoxon rank-sum test to compare age, ACE, and time per day on SM with cluster membership.

[a] Modified Adverse Childhood Experiences questionnaire ranging from 0-6.

[b] Includes Black, non-Hispanic, Hispanic, Asian, American Indian/Native Alaskan and Native Hawaiian/Pacific Islander

[c] Includes parent or guardian, significant other, and other.

### 4.3.2 Description of Clusters

Results from all pairwise correlation tests ranged from -0.18 to 0.57, indicating no substantial evidence of collinearity, therefore all clustering variables were retained.[147] The two-step cluster algorithm identified a four-cluster solution, with AIC and BIC indices nearly identical.

Cross-validation of a four-cluster solution using 10 random subsamples provided evidence of cluster stability, with 80% of participants, on average, classifying into the same cluster compared to the complete sample. Examination of the cluster distribution revealed a parsimonious yet substantial cluster solution, with the smallest and largest clusters containing 22% and 29% of participants respectively. Additionally, each cluster had at least one variable for which either 0% or 100% of the group had high levels that differed across clusters, suggesting both within-cluster homogeneity and between-cluster heterogeneity.[147] Clusters were interpreted based on the percentage of members endorsing high levels of the cluster variables (as opposed to low and moderate for the social sharing variables and as opposed to low for the two emotional support variables). The final four-cluster solution was both comprehensible and meaningful in terms of the study objectives.

We assigned clusters 1 through 4 the following labels, based upon their composition in terms of high FTF and SM social sharing and high FTF and SM emotional support: *Traditionalists*, *Supported Sharers*, *Withholders*, and *Oversharers*. Cluster 1, *Traditionalists*, reported no (0%) high SM sharing and virtually no (1%) high SM emotional support; nearly half (44%) of members reported high FTF sharing and about a third (31%) reported high FTF emotional support. Cluster 2, *Supported Sharers*, reported no (0%) high SM sharing and about half (52%) reported high SM emotional support; about a third reported both high FTF social sharing and emotional support (31% and 33%, respectively). Cluster 3, *Withholders*, reported no high SM or FTF sharing (0% and 0%, respectively); almost no (3%) high SM emotional support; and a minority (18%) reported high FTF emotional support. Cluster 4, *Oversharers*, all (100%) endorsed high SM sharing and almost half of members (44%) reported high SM emotional support; a minority reported high FTF sharing and emotional support (24% and 18%, respectively) (**Table 6**).

**Table 6 Composition of Clusters by Modes of Emotional Support and Social Sharing**

| Cluster | Whole Sample | FTF Sharing | SM Sharing | FTF Emotional Support | SM Emotional Support |
|---|---|---|---|---|---|
| | 2,396 (%) | %[a] | %[a] | %[b,c] | %[b,c] |
| Cluster 1 **Traditionalists** | 535 (22) | 44 | 0 | 31 | 1 |
| Cluster 2 **Supported Spectators** | 691 (29) | 31 | 0 | 33 | 52 |
| Cluster 3 **Withholders** | 541 (23) | 0 | 0 | 18 | 3 |
| Cluster 4 **Oversharers** | 629 (26) | 24 | 100 | 18 | 44 |

[a] Percentages indicate individuals classified as high as opposed to low or moderate.
[b] Percentages indicate individuals classified as high as opposed to low.
[c] Refers to perceived emotional support.

### 4.3.3 Socio-Demographic and Personal Characteristics of Cluster Membership

All socio-demographic and personal characteristics were significantly associated with cluster membership ($p \leq 0.001$). *Supported Spectators* and *Oversharers* were slightly younger than *Traditionalists* and *Withholders* (27 years vs. 28 years). Compared with the other clusters, *Traditionalists* consisted of the greatest proportion of White, non-Hispanic members (77%); the most well-educated members (64.1% reported being a college graduate or higher); and the most economically advantaged members (41.7% reported an annual household income of $75,000 or above). *Oversharers* spent the most time per day on SM (3.3 hours per day) and had the greatest proportion of members who reported being single and living alone (48.7% and 22.8%, respectively). Additional socio-demographic and personal characteristics for all clusters are presented in **Table 5**.

### 4.3.4 Bivariable and Multivariable Associations of Cluster Membership with Depression

Because it was considered the most "low-risk" group for depression, *Traditionalists* was assigned as the reference group in logistic regression models. In bivariable models, not including socio-demographic and personal covariates, membership in *Supported Spectators*, *Withholders*, and *Oversharers* was each significantly associated with greater odds of depression (**Table 7**). In the multivariable model, controlling for all covariates, membership in *Withholders* and *Oversharers* were each independently associated with greater odds of depression (AOR = 1.49, 95% CI = 1.07-2.07 and AOR = 2.06, 95% CI= 1.52-2.78, respectively). *Supported Sharers* membership was no longer significantly associated with depression after controlling for covariates (**Table 7**).

**Table 7 Bivariable and Multivariable Associations Between Cluster Membership and Depression**

| Cluster | Depression | |
|---|---|---|
| | OR (95% CI)[a] | AOR (95% CI) [a,b] |
| **Traditionalists** | Reference | Reference |
| **Supported Spectators** | **1.37 (1.03-1.84)** | 1.08 (0.79-1.47) |
| **Withholders** | **1.47 (1.08-1.99)** | **1.49 (1.07-2.07)** |
| **Oversharers** | **2.82 (1.13-3.73)** | **2.06 (1.52-2.78)** |

Note: OR = odds ratio; AOR = adjusted odds ratio; CI = confidence interval. Bolded values represent significant odds ratios.

[a] Associated estimates represent the odds of high vs. low depression

[b] Adjusted for age, ACE, time per day on SM, sex, race, education, household income, relationship status, and living situation.

## 4.4 Discussion

This cluster analysis of a large national sample of young adults identified four distinct patterns of social sharing and emotional support. Clusters were characterized in terms of high (as opposed to low or moderate) FTF and SM sharing and high (as opposed to low) FTF and SM emotional support. Membership in two clusters—*Withholders* and *Oversharers*—was associated with significantly greater risk of depression compared to the lowest risk group. Membership in the remaining two clusters, although representing unique patterns of social sharing and emotional support, was not associated with greater risk of depression.

Membership in the *Oversharers* cluster was most strongly associated with depression risk. This cluster was characterized by relatively high SM sharing and emotional support and low FTF sharing and emotional support. This pattern demonstrates that individuals who perceive SM to be a source of emotional support also tend to share on SM more frequently. However, the associated risk of depression indicates that prioritizing SM over FTF as a mode of sharing about stressful life events may be associated with a mental health risk. It may also be that although these individuals perceive SM to be a source of emotional support, they do not receive the desired feedback or

support when they share, resulting in depressive symptoms. This is consistent with research that found that sharing about negative events or emotions led to increased negative affect and undesirable feeback.[69,137] Given that all members of this cluster reported often or always sharing about a stressful life event on SM, it may be particularly valuable for clinicians treating young adults to emphasize the risks of sharing solely on SM. This information may also be useful to inform future interventions aimed at treating young adults with depression. While it has been shown that sharing about stressful life events may be psychologically beneficial,[121] doing so only on SM may be counterproductive to one's mental health.

Membership in the *Withholders* cluster was also associated with depression risk, although to a lesser magnitude than membership in the *Oversharers* cluster. *Withholders* reported uniformly low sharing and low emotional support both on SM and FTF. It may be that these individuals are socially isolated, lacking connection with any social network, which would be consistent with the associated elevated depression risk.[154] Interestingly, unlike the *Oversharers*, the *Withholders* had low reliance on SM for sharing and emotional support. It may be that this lack of connection with SM is also shielding them from the exposure to negative and/or lack of feedback on SM, resulting in the slightly lower depression risk. This cluster may represent an ideal opportunity for intervention in that prior research has shown an association between social isolation and greater SM use.[17] It is plausible that this cluster, however, has not yet turned to SM and may benefit instead from recommendations for increased FTF sharing.

Memberships in two clusters—*Traditionalists* and *Supported Sharers*—was not significantly associated with depression risk after controlling for related covariates. These individuals are seemingly connected with their social networks, but prioritize FTF over SM. Although not the majority, a substantial proportion (31% to 44%, respectively) of members in

these clusters reported high FTF emotional support and sharing, indicating that these individuals have and utilize FTF social networks, likely resulting in a mental health benefit. Approximately half of *Supported Spectators* reported high SM emotional support; however none reported high SM sharing, which suggests it may be the social sharing rather than the perception of emotional support from SM that is associated with an elevated depression risk.

The socio-demographic and personal characteristics differed among clusters, which may be valuable information in developing targeted interventions. For example, the cluster with the greatest risk of depression, the *Oversharers*, reported spending more than three hours per day on SM, which is consistent with prior research that showed an association between spending more than two hours per day on SM and depression among young adults.[84] However, the *Supported Spectators*—a cluster not independently associated with elevated depression risk—reported spending three hours per day on SM. This is approximately the same amount of time as the *Oversharers* (3.3 hours) and twice the time of the *Withholders* (1.5 hours), the two clusters associated with elevated risk of depression. These findings suggest it is not simply the amount of time one spends on SM that explains the differential associations with depression. Additionally, the *Oversharers* cluster was the least educated and had the greatest proportion of members who reported being single and living alone. These characteristics are often associated with loneliness and social isolation among young adults, which may account for the greater utilization of SM for sharing and emotional support.[155,156] Considering cluster composition in terms of these socio-demographic and personal characteristics in addition to modes of social sharing and emotional support may help inform interventions that suggest, for example, to reduce daily time spent on SM and increase daily FTF interactions with others.

### 4.4.1 Limitations

This study had several limitations that warrant mention. First, the direction of the associations between depression and clusters of social sharing and perceived emotional support cannot be determined using cross-sectional data. Future work utilizing ecological momentary assessment (EMA) may be useful to address this limitation. For example, being able to simultaneously track social sharing behaviors, perceptions of emotional support, and mood in real time and in participants' natural environments may improve measurement of the related constructs and how they interact.[157,158] Second, because there were no established meaningful cut-points associated with the emotional support scales, we dichotomized the scales at the median, which may result in loss of information. However, this categorization led to more easily identifiable and interpretable groups, which is a goal of cluster analysis.[147] Finally, although these data were from a national sample of 18 to 30 year olds, the average age of individuals was 27 and the education and household incomes were greater than national averages for this age range, limiting the generalizability of findings to younger and less well-educated and economically advantaged adults. Despite these limitations we believe the findings from this study significantly advance our understanding of how social sharing and perceived emotional support—FTF and on SM—co-occur and how these distinct groups are differentially associated with depression.

### 4.4.2 Conclusions

This cluster analysis identified four distinct patterns of social sharing and perceived emotional support among a large sample of U.S. young adults. The socio-demographic and personal characteristics of clusters varied. Membership in two clusters was associated with greater

risk of depression. Prioritizing SM over FTF particularly for sharing about stressful life events appears to put individuals at a greater risk for depression. Membership in the remaining two clusters represented unique patterns of social sharing and perceived emotional support but was not associated with an elevated depression risk. Examining patterns of FTF and SM sharing and perceived emotional support simultaneously rather than individually may be more indicative of real-word experiences. Findings from this study may help inform future studies aimed at establishing directionality among modes of social sharing, perceived emotional support and depression in order to develop educational and clinical interventions. For example, depression prevention and management recommendations may include sharing about one's feelings and life events. It will be important for future research to first clarify directionality in order to address if one mode of sharing is more therapeutic.

# 5.0 Conclusion

With the proliferation of SM use, young adults' interactions with their social networks have increasingly shifted to SM. While it is well established that FTF connections provide emotional support and improve mental health, the research on SM connections is less clear. The research presented in this dissertation aimed to address gaps in our understanding of the associations between SM use, perceived emotional support, and depression among U.S. young adults with three interrelated projects. Our findings contribute to the measurement of a new construct, a richer understanding of SM experiences of depressed and non-depressed individuals, and greater insight into how FTF and SM interpersonal dynamics co-occur and relate to depression among U.S. young adults.

In **Project 1**, we found that that perceived FTF- and SM-based emotional support were distinct constructs and that SM-based emotional support was associated with greater odds of depression. It will be valuable to test the reliability of the SM-based emotional support scale (SM-ES) by administering it to a different sample of young adults over several time points. Due to the cross-sectional nature of the data used in **Project 1**, a longitudinal assessment will be useful to assess directionality of effects. Additionally, qualitative methods may be valuable to explore directionality of the association between SM-ES and depression. For example, qualitative interviews with a subsample of participants who endorse high levels of SM-ES may help illuminate why these individuals tend to be depressed.

Clarifying whether greater SM-ES leads to greater depressive symptoms or the opposite—whether having depression leads to a greater perception of SM-ES—will help inform future interventions. For example, the use of SM-based mental health interventions is increasingly

popular despite questionable long-term effectiveness.[159] If depressed individuals perceive SM as a source of support, novel SM-based interventions may be useful. And, in these cases, the SM-ES scale presented here could serve as an intermediate outcome. Conversely, if greater SM-ES leads to depression, it will be important to better understand this process. For example, it may be useful to ask participants their experiences sharing stressful experiences on SM in order to determine why they do not seem to derive true support from these interactions. As one possibility, they may feel judged by others when they share on SM.

In **Project 2**, we learned that depressed and non-depressed participants perceived connecting with others on SM as positively influencing their lives; however, they also perceived exposure to negativity on SM as having a negative effect. Depressed participants feared being judged on SM. They also felt that others' SM use in their presence was bothersome and distracted from FTF interactions.

These findings offer a compelling foundation for future research using more in-depth and interactive qualitative methodologies, such as web-based discussion groups or one-on-one semi-structured interviews. Both of these methodologies encourage participants to elaborate on their initial responses and to explore nuances of meaning. Therefore, they would help to explore how to maximize the potential for connection, particularly for depressed individuals, while minimizing negative exposures. Several SM platforms have already developed tools for managing contacts and content. Facebook now allows users to unfollow friends, so that their posts do not appear in the user's feed. Twitter also offers protective site features that enable users to mute words and/or tweets from specific accounts. Future research will help study whether using these tools can help individuals both with and without depression. Finally, examining how positive and negative effects

of SM overlap may provide additional insight and a more comprehensive perspective on how individuals with and without depression experience SM.

In **Project 3**, we identified that sharing on SM about stressful life events, even when one has a FTF social network with which to share and garner emotional support, was associated with elevated risk of depression. However, it is unclear if these behaviors and perceptions lead to depression, if depression leads to these behaviors and perceptions, or if the associations are bidirectional. Future research leveraging EMA may be useful to address this limitation. EMA can simultaneously track social sharing behaviors, perceptions of emotional support, and mood in real time and in participants' natural environments. This may improve measurement of the related constructs and how they interact.[157,158] If depressed individuals favor sharing on SM, as prior research suggests,[141] this may be valuable insight for researchers developing interventions aimed at preventing and managing depression. However, it will be crucial first to clarify the directionality of the associations between social sharing, emotional support and depression.

In conclusion, the research presented in these three projects offers new insights into the conceptualization of SM-based emotional support, perceptions of positive and negative SM experiences, how FTF and SM interpersonal dynamics co-occur, and the associations with depression among U.S. young adults. Our findings present opportunities for future research. In particular rigorous mixed methods study designs will help clarify directionality of effects, facilitating more in-depth understanding of the complex interplay between SM experiences and mental health.

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