Aging & Mental Health

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/camh20

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To cite this article: Kaitlin M. Lewin, Dar Meshi, Amy M. Schuster & Shelia R. Cotten (2022): Active and passive social media use are differentially related to depressive symptoms in older adults, Aging & Mental Health, DOI: 10.1080/13607863.2022.2068133

To link to this article: https://doi.org/10.1080/13607863.2022.2068133

Published online: 26 Apr 2022.

AGING & MENTAL HEALTH
https://doi.org/10.1080/13607863.2022.2068133

Active and passive social media use are differentially related to depressive symptoms in older adults

Kaitlin M. Lewin[a], Dar Meshi[a], Amy M. Schuster[b] and Shelia R. Cotten[b,c]

[a]Department of Advertising and Public Relations, Michigan State University, East Lansing, MI, USA; [b]Department of Sociology, Anthropology, and Criminal Justice, Clemson University, Clemson, SC, USA; [c]Department of Communication, Clemson University, Clemson, SC, USA

ABSTRACT

Objectives: Previous research on social media use (SMU) and mental health has focused on younger individuals. For example, in young adults active SMU (e.g. posting content) has been related to decreased depressive symptoms, whereas passive SMU (e.g. browsing content) has been related to increased depressive symptoms. These relationships have not yet been investigated in older adults, however, even though SMU and poor mental health are common.

Methods: We collected data from adults aged 65 years and older, and categorized SMU into active and passive dimensions with a principal component analysis. Next, we conducted t-tests and logistic regressions to assess whether older adults' SMU was associated with depressive symptoms.

Results: Our analysis revealed that active SMU was associated with *increased* odds for depressive symptoms, whereas passive SMU was associated with *decreased* odds for depressive symptoms.

Conclusion: Our results suggest that the relationships between active and passive SMU and depressive symptoms in older adults are different from previous literature focusing on younger individuals. We theorize that these findings may be due to older adults' engaging in fewer social comparisons overall, and hence experiencing fewer negative feelings while passively viewing others' social media posts.

ARTICLE HISTORY
Received 11 September 2021
Accepted 6 April 2022

KEYWORDS
Social media; Facebook; active; passive; depression < mood disorders; anxiety and trauma related disorders; mental health < caregiving; social support < psychosocial and cultural aspects

Introduction

Depression is a mental health disorder consisting of a decreased interest or loss of pleasure in previously rewarding activities (American Psychiatric Association, 2013). Affecting over 264 million individuals worldwide, depression, in particular, is one of the most common mental health illnesses (James et al., 2018). Major depression becomes more common in older age, and depressive symptoms often go without a clinical diagnosis for older adults (Kok & Reynolds, 2017; Schaakxs et al., 2018). Depression in older adults has been linked to negative outcomes, such as physical illnesses, cognitive impairments, and suicide risk (Taylor, 2014). Furthermore, a recent meta-analysis established that late-life depression is associated with a higher risk of both all-cause and cardiovascular mortality (Wei et al., 2019). With the gravity of these health outcomes in mind, more research is needed to determine behaviors that are associated with depression, as well as whether certain types of technology use could help ameliorate depression in older adults.

Several theories have attempted to explain the human phenomenon of depression, and one relevant theory in particular has focused on the importance of social interactions. Baumeister and Leary (1995) need to belong theory posits that social connection, as a result of evolution, is one of the most powerful drivers of human behavior, and without social connection and belonging, people experience negative mental states like depression. To briefly explain, our ancestors who had genes predisposing them to find social interactions rewarding received benefits from their attraction to group living, such as increased safety and access to nutrition, as well as enhanced reproductive success. As a result, these pro-social genes were selected over generations, and humans today have strong needs to connect socially and belong to groups. Importantly however, if we are unable to satisfy these social needs, we will experience negative mental states, like depression (Baumeister & Leary, 1995). Much research in older adults has supported this theory. For example, social isolation in older adults contributes to increased depression (Nicholson, 2012; Taylor et al., 2018), while increasing older adults' social connection through group membership, for example, can both protect against future depressive symptoms in a non-clinical population and alleviate existing depressive symptoms (Cruwys et al., 2013). Furthermore, individuals with more diverse social networks, consisting of both friends and family, display reduced depressive symptoms, whereas older adults with more restricted social networks display higher depressive symptoms (Fiori et al., 2006; Litwin, 2012; Santini et al., 2015). Relevant to this literature, technology such as social media provide an online environment for individuals of all ages to seek and fulfill their strong evolutionary drives for social connection and belongingness (Meshi et al., 2015).

In today's society, older adults can increase their social interactions through the use of social media platforms. The majority of community-dwelling older adults use social media, with 73% of adults aged 50–64 years, and 45% of adults aged 65 years and older using at least one social media platform (Auxier & Anderson, 2021). Indeed, older adults with smartphones report that social media use (SMU) is their primary activity on these phones (Busch et al., 2021). Older adults use social media, like Facebook, to keep in touch with family, communicate with others, and satisfy their curiosity (Jung et al., 2017). This Facebook use provides older individuals with an increased sense of social

CONTACT Kaitlin Lewin lewinkai@msu.edu

connection (Sinclair & Grieve, 2017), and has been associated with improved cognitive skills such as working memory and broader executive functioning skills (Khoo & Yang, 2020; Myhre et al., 2017). Overall, SMU in older adults has been linked with enhanced social support and satisfaction with their social lives (Bell et al., 2013; Khoo & Yang, 2020; Kim & Shen, 2020; Leist, 2013; Sala et al., 2021), and older adults appear to benefit from this social support like younger adults (Sinclair & Grieve, 2017). Importantly however, much of this research in older adults has ignored key aspects of mental health, such as depressive symptoms.

In younger individuals, SMU has been extensively linked to a variety of negative mental health outcomes. In emerging adults, for example, increased SMU has repeatedly been correlated with increased depressive symptoms (Lin et al., 2016; Primack et al., 2009), although meta-analyses in adolescents and young adults have revealed only a small effect size (Ivie et al., 2020; Keles et al., 2020; McCrae et al., 2017). Importantly, the causal relationship between SMU and depressive symptoms is unresolved; some longitudinal research has demonstrated that greater SMU leads to greater depressive symptoms (Primack et al., 2021) while other longitudinal research has failed to find a causal relationship (Coyne et al., 2020). With the need for a better understanding of the relationship between SMU and mental health, researchers have categorized different patterns of SMU behaviors and then related these patterns to mental health. Two often-investigated patterns are active and passive SMU. Active SMU is defined as engaging in social media behaviors that facilitate direct interaction with others (e.g. posting, commenting, and sending private messages), whereas passive SMU is defined as only monitoring or observing content and behavior on social media platforms without direct exchanges with others (e.g. scrolling and browsing; Kross et al., 2021). Research in both adolescents and young adults has shown that active SMU is associated with reduced depressive symptoms while passive SMU is associated with increased depressive symptoms (Escobar-Viera et al., 2018; Thorisdottir et al., 2019). Similar associations have also been shown with active and passive SMU and affective well-being in young adults (Verduyn et al., 2015). Therefore, SMU's relationship to mental health in younger individuals appears to be nuanced and differs depending on how these individuals engage with social media.

In older adults, however, the link between SMU and depression is not as well researched and understood (Wiwatkunupakarn et al., 2021). To begin with, one study simply investigated the difference between older adults who were familiar versus unfamiliar with social media, finding that individuals who were unfamiliar with social media demonstrated greater depressive symptoms (Wu & Chiou, 2020). Another study found a significant negative relationship between SMU and depression in older adults (Fu & Xie, 2021). However, the researchers' measure of SMU only asked about participants' frequency of contact with friends and family on mobile phones and 'other network communication devices' rather than asking about types of activities on social media platforms. In line with this, another recent study investigated specific behaviors on social media and their relationship to depressive symptoms in older adults (Hofer & Hargittai, 2021). Here, two active behaviors on social media, answering others' questions and finding a friend who was suddenly absent from an online group, were related to greater depression in older adults. Importantly, this finding contrasts with the above-described research in younger individuals and active SMU, which was related to reduced depressive symptoms in younger individuals. Of note, however, this study did not report the actual associations between overall measures of active and passive SMU and depressive symptoms in older adults. Therefore, further investigation is warranted to specifically tease apart these SMU constructs and their relationships to depression in older adults.

Theoretically, we would expect that if SMU allowed older adults to stay connected with their social ties, SMU should be associated with reduced depressive symptoms, in line with need to belong theory (Baumeister & Leary, 1995). Indeed, research on older adults who use information and communication technologies (ICTs) in general suggests that for many older adults simply being able to observe what happens with their social ties (passive use) can bring positive benefits for their quality of life (Cotten et al. 2017). For example, seeing pictures of family members at the beach on vacation or seeing news about family members or friends may help some older adults to stay engaged and knowledgeable of what is happening in the lives of their social ties. Thus, we hypothesize that passive SMU will be associated with reduced depressive symptoms in older adults. In regard to active SMU, need to belong theory would imply that older adults who exhibit greater active SMU would also have reduced depressive symptoms. However, the above-mentioned research on aspects of SMU in older adults found that the more older adults engage with SMU in two different active ways, the greater their depressive symptoms (Hofer & Hargittai, 2021). The authors interpreted their finding, theorizing that forms of active SMU in older adults may be compensatory in nature, acting as a proxy for activities they can no longer engage in, and importantly, greater compensatory behaviors like this have been linked to reduced well-being (Hofer & Eden, 2020). Therefore, if active SMU behaviors act as an substandard replacement for newly infeasible activities due to some aspect of aging, this may be related with increased depression. In line with this, we hypothesize that greater active SMU overall will be associated with greater depressive symptoms in older adults. Of note, our hypotheses for both active and passive SMU contrast with the above-described literature in younger individuals and depression (Escobar-Viera et al., 2018; Thorisdottir et al., 2019). With this in mind, we hope that our study in older adults provides insights that guide future studies on SMU and depressive symptoms across the lifespan.

Methods

Participants

During October and November 2017, data were collected through an online survey with older adults ($N = 1,258$) recruited from a U.S. Qualtrics panel. Qualtrics is a commercial company specializing in software to conduct online surveys as well as recruiting participants for online studies (www.qualtrics.com). The Qualtrics panels consist of individuals who have signed up to participate in online surveys; in essence, they comi prise a convenience sample. Qualtrics partners with large sampling companies to ensure that their panels are diverse. Many universities have partnerships with Qualtrics to allow their faculty to utilize survey software and to contract for access to samples. Qualtrics provides incentives to the participants, rather than the researchers providing incentives to participants themselves. Researchers have no knowledge of the specific amount of incentives provided to respondents, nor any input into the level of incentives provided to participants. The researchers typically pay Qualtrics a 'per respondent' cost for each completed survey (Boas et al., 2020).

The sample was reflective of the U.S. population aged 65 and older, and was proportionate to the Census classifications for age, race, sex, and education. Our final sample included 862 participants who all used Facebook and responded to our questions on SMU, excluding 394 participants due to missing data, and two participants for selecting 'other' as their gender. Approximately 60% of participants were female, with an overall mean age of participants of 73.1 years (SD = 7.0).

Procedure

All procedures were approved by an Institutional Review Board (IRB) and all participants consented to participate. Participants completed a questionnaire that took an average of 15 minutes, which measured attitudes towards, and use of, information and communication technologies (i.e. social media use), as well as depressive symptoms and other psychosocial measures.

Measures

Demographic factors

All demographic information was collected through self-report. Age was asked in an open-ended format and then divided into three categories: young-old (65–74 years), old-old (75–84 years), and oldest-old (85+ years) (Seccombe & Ishii-Kuntz, 1991). Gender, race, relationship status, and education level were all presented with closed-ended response options. Gender responses were presented in three categories: Male, Female, Other (see exclusions above). Race response options included five choices: Asian/Pacific Islander, Black or African American, White, Native American or American Indian, Other. For final analyses, we recoded race in combination with ethnicity (Hispanic, Latino, or Spanish origin: Yes/No) into two categories: White, Non-Hispanic and Non-White. Relationship status was presented with five initial response options: married/domestic partnership, separated, divorced, widowed, single/never married, then recoded into three categories: in partnership/marriage, single never married, and single, previously married. Education level was assessed through eight response options (1 = 'Less than high school degree' to 8 = 'Doctorate degree'), then recoded into three broader categories (high school or less, some college or associates degree, and bachelors' degree or higher).

Social media use

A 15-item self-report scale was adapted from Junco (2012) to measure active and passive SMU. We focused on Facebook as it is the most prevalent platform for older adults (Auxier & Anderson, 2021). Participants reported how frequently they performed various activities on Facebook with a 5-point Likert scale (1 = 'None of the time' to 5 = 'All the time'). Items designed to assess active and passive SMU, and mean scores for each item, can be viewed in Table 1. All 15 SMU variables displayed significant deviations from normality according to Shapiro-Wilk tests (all p's < .001); therefore, we used Spearman's Rank Correlations to determine how all variables correlated with each other.

Depressive symptoms

Self-reported depressive symptoms were assessed with a two-item measure (PHQ-2) (Löwe et al., 2010), which has been validated as an effective measure for detecting major depression (Arroll et al., 2010). Participants reported how often over the last month they: (a) had little interest or pleasure in doing things and (b) felt down, depressed, or hopeless, on a 4-point Likert Scale (0 = 'Not at All' to 3 = 'Nearly Every Day'). Items were summed for each participant. Depressive symptoms displayed significant deviations from normality, indicated by a significant Shapiro-Wilks test ($p < .001$). Therefore we dichotomized depressive symptoms according to a validated cut-point (Arroll et al., 2010), with a score of 2 or higher denoting high depressive symptoms and a score of 1 or below denoting low depressive symptoms.

Table 1. Principal component analysis for passive and active social media use.

Complete item[a]	M (SD)	Factor loading I 'active use'	Factor loading II 'passive use'
Posting videos	1.62 (.99)	**.76**	.19
Posting photos	1.98 (1.07)	**.73**	.27
Chatting on messenger	2.16 (1.21)	**.72**	.33
Creating/RSVPing to events	1.61 (.97)	**.71**	.17
Sending private messages	2.39 (1.12)	**.68**	.31
Playing games (Candy Crush, Words with Friends, etc.)	2.04 (1.44)	**.47**	.06
Sharing links	2.35 (1.31)	**.64**	.50
Posting status updates	2.43 (1.32)	**.64**	.51
Reading posts-friends	3.69 (1.16)	.19	**.85**
Reading posts-family	3.72 (1.21)	.12	**.84**
Viewing photos	3.24 (1.10)	.20	**.79**
Viewing videos	2.76 (1.23)	.32	**.67**
Checking in to see what someone is up to	2.81 (1.25)	.36	**.64**
Commenting (on statuses, pictures, etc.)	2.69 (1.24)	.54	.58
Checking newsfeed	2.69 (1.42)	.46	.54
Total mean (SD)	2.54 (.84)	2.07 (.86)	3.24 (.96)
Cronbachs α[b]	–	.81	.85
Factor variance[c]	–	.30	.29

Note. Bolded items included in each factor.
[a]Participants were asked to rate how frequently they performed the activities on Facebook; response options ranged from none of the time to all of the time.
[b]Measuring internal consistency of items.
[c]Measuring percentage of explained common variance for each factor.

Data analyses

We modeled our data analyses on previous research examining active and passive SMU in young adults (Escobar-Viera et al., 2018). This consisted of two primary steps: (1) A principal component analysis to establish measures of active and passive SMU, and (2) Logistic regressions to investigate relationships with depressive symptoms. All analyses were performed with SPSS (version 26; IBM Inc., Armonk, NY, USA).

Principal component analysis with SMU

We first confirmed that our data were sufficient to conduct a factor analysis through a Kaiser-Meyer-Olken test (KMO = .81). Next, we conducted a principal component analysis (PCA) with varimax orthogonal rotation (Table 1). Similar to previous research (Escobar-Viera et al., 2018), we retained items with factor loadings higher than .40, in combination with a difference between factors larger than .30. According to these criteria, six items loaded onto Factor I ('Active Use') and four items loaded onto Factor II ('Passive Use'). Although 'Sharing Links', 'Posting Status Updates', and 'Checking in' had a loading difference <.30 between factors, we included them due to their high loadings onto one factor (>.60) combined with previous literature establishing their association with active or passive SMU (Verduyn et al., 2017). Therefore, 'Active Use' consisted of a final total of

eight items and 'Passive Use' consisted of a final total of five items. Two items did not load onto either factor ('commenting' and 'checking newsfeed'), and were excluded from subsequent analyses. A scree plot confirmed the presence of two factors in the dataset: Factor I 'Active SMU' explaining 49.4% of the variance with an eigenvalue of 7.43; and Factor II 'Passive SMU' explaining 9.5% of variance with an eigenvalue of 1.42. Internal reliability was acceptable for each factor (α > .80 for both).

Items that loaded onto active and passive SMU were averaged to create a single score for each participant. We calculated the average and standard deviation for each continuous variable and frequencies for each categorical variable across both depressive symptom groups, then ran independents samples t-tests and chi-squared tests to determine any significant differences across our dependent variable.

Logistic regression to predict depressive symptoms

In line with previous research by Escobar-Viera et al. (2018), we conducted three multiple logistic regression analyses to assess whether passive SMU (Model 1), active SMU (Model 2), and both types of SMU together (Model 3) could predict high depressive symptoms while controlling for demographic characteristics. This approach was taken because of previous evidence that active and passive SMU predictors are not mutually exclusive of each other, with both types of use occurring, and having an effect, concurrently (Escobar-Viera et al., 2018). All assumptions were met and residuals were normally distributed. We checked for possible interactions and collinearity between our main SMU predictors and found no issues of either in our analyses.

Results

We report means and standard deviations for all individual SMU items in Table 1. Please see Table 2 for all sample descriptive statistics. Briefly, the mean age of participants was 73.1 years (SD = 7.0). The majority of respondents were female (59.6%), White, Non-Hispanic (78.7%), married or in a partnership (50.9%), and had a high school degree or less (44.3%). In addition, overall sample depression scores were 1.05 (SD = 1.26) before dichotomizing, indicating that individuals across our sample experienced depressive symptoms for an average of 'several days' in the previous two weeks. After dichotomizing, mean depression scores were 0.27 (SD = 0.44) for the low depression group and 2.51 (SD = 0.89) for the high depression group. Regarding our individual SMU items, all items correlated with each other (all rho's between .14 and .81, all *p*'s < .001). Of note, playing games, sending private messages, chatting on messenger, creating or RSVPing to events, posting videos, and checking newsfeed were positively correlated with overall depression scores (all rho's > .07, all *p*'s < .05) and reading posts by family were negatively correlated with overall depression scores (rho = −.09, $p < .05$); all other relationships were nonsignificant (*p*'s > .05).

We next began analyses to address our research questions regarding active and passive SMU. We first conducted preliminary independent samples t-tests with respect to depressive symptoms using our dichotomized depression variable. Results indicated that participants significantly differed for active SMU levels across depressive symptoms ($p < .01$), with individuals in the high depression group reporting more active SMU. No significant relationship to depression was revealed for passive SMU levels ($p > .05$) (Table 2). Other t-tests revealed that participants also differed across depressive symptoms in regard to age ($p < .01$), gender ($p < .05$), and relationship status ($p < .05$). Race and education level did not differ across depressive symptoms ($p > .05$).

Table 2. Social media use and covariate descriptive statistics by depressive symptom split.

Independent variable and covariates[a]	Whole sample (*N* = 862)	Depressive symptoms Low (*N* = 569)	Depressive symptoms High (*N* = 293)	*p*-value[b]
Independent variables				
Passive SMU, *M (SD)*	3.24 (.96)	3.26(.97)	3.22(.94)	.57
Active SMU	2.07(.86)	2.00(.80)	2.22(.96)	.001
Covariates				
Age in years	73.10(6.99)	73.59(7.16)	72.16(6.58)	.005
65–74	68.31(2.62)	68.56(2.65)	67.89(2.54)	.006
75–84	77.71(2.35)	77.68(2.33)	77.76(2.41)	.81
85+	87.63(2.91)	87.80(2.78)	87.05(3.34)	.30
Gender, n(%)				.03
Male	348(40.4)	245(43.1)	103(35.2)	
Female	514(59.6)	324(56.9)	190(64.8)	
Race				.94
White, non-Hispanic	678(78.7)	448(78.7)	230(78.5)	
Non-White[c]	184(21.3)	121(21.3)	63(21.5)	
Relationship Status[d]				.01
In Partnership/ Marriage	438(50.9)	310(54.6)	128(43.8)	
Single, never married	65(7.6)	42(7.4)	23(7.9)	
Single, previously married[e]	357(41.5)	216(38.0)	141(48.3)	
Education level				
High school or less	382(44.3)	242(42.5)	140(47.8)	.29
Some college or associates	226(26.2)	151(26.5)	75(25.6)	
Bachelors' or higher	254(29.5)	176(30.9)	78(26.6)	

Note. SMU: social media use.
[a]Continuous variables measured in *M(SD)*, and categorical variables recorded as n(%).
[b]*p*-value derived from independent samples t-test for continuous variables and χ^2 analysis for categorical variables.
[c]Includes multiracial.
[d]Two people declined to answer.
[e]Includes divorced, separated, and widowed.

To specifically address our hypotheses, we conducted three multiple logistic regressions predicting the odds of high depressive symptoms while controlling for demographic variables (Table 3). Model 1 was not significant; therefore, passive SMU alone was not significantly associated with depressive symptoms ($p > .05$). Model 2 was significant, with each one-point increase in active SMU associated with 30% increased odds for reporting high depressive symptoms (AOR = 1.30, 95% CI = 1.10–1.54, $p < .01$). Model 3 was also significant, with each one-point increase in passive SMU associated with 33% *decreased* odds for high depressive symptoms (AOR = .67, 95% CI = .54–.82, $p < .001$), and each one-point increase in active SMU associated with 75% *increased* odds for high depressive symptoms (AOR = 1.75, 95% CI = 1.39–2.21, $p < .001$). Nonsignificant Hosmer-Lemeshow tests indicated good model fits ($p > .05$).

Discussion

The present study with older adults yielded several notable findings. At the bivariate level, we found that active SMU levels were significantly different across low and high depressive symptom categories, while passive SMU levels were not. At the multivariate level, active SMU alone was associated with an increased likelihood of reporting high depressive symptoms, while passive SMU alone was not significantly associated with depressive symptoms. Together, as co-predictors in the same

Table 3. Multiple logistic regression between passive and active social media use and depressive symptoms.

	Depressive symptoms[a]		
	Model 1	Model 2	Model 3
Independent variables and covariates	*AOR*[b]*(95* percent CI)	*AOR (95* percent CI)	*AOR (95* percent CI)
Passive SMU	.93(.80–1.08)		.67(.54–.82)***
Active SMU		1.30(1.10–1.54)**	1.75(1.39–2.21)***
Age[c]			
65–74 (Reference)			
75–84	.85(.61–1.19)	.90(.64–1.26)	.93(.66–1.31)
85+	.53(.31–.91)*	.58(.34–1.00)	.62(.36–1.07)
Gender			
Male (Reference)			
Female	1.23(.90–1.68)	1.14(.84–1.56)	1.23(.89–1.68)
Race			
White, non-Hispanic (Reference)			
Non-White[d]	.93(.65–1.35)	.91(.63–1.32)	.90(.62–1.30)
Relationship status			
In Partnership/Marriage (Reference)			
Single, never married	1.25(.71–2.18)	1.23(.70–2.16)	1.17(.66–2.07)
Single, previously married[e]	1.53(1.12–2.08)**	1.55(1.14–2.11)**	1.54(1.13–2.11)**
Education level			
High school or less (Reference)			
Some college or associates	.84(.58–1.20)	.89(.62–1.29)	.91(.63–1.31)
Bachelors' or higher	.86(.60–1.23)	.89(.62–1.28)	.90(.62–1.29)
Nagelkerke's R^{2}[f]	.031	.044	.068

Note. SMU: social media use, AOR: adjusted odds ratio, CI: confidence interval.
[a]Treated as a 2-level categorical variable.
[b]Represents the odds for having high self-reported depressive symptoms for a one unit increase in predictor or covariate.
[c]Treated as a 3-level categorical variable.
[d]Includes multiracial.
[e]Includes divorced, separated, and widowed.
[f]Measuring percentage of variance explained by predictors for each model.
*$p < .05$, **$p < .01$, ***$p < .001$.

model, active SMU was again associated with an increased likelihood for high depressive symptoms, and passive SMU was significantly associated with a decreased likelihood of high depressive symptoms.

Our findings between active and passive SMU and depressive symptoms in older adults contrast with the relationships found in younger adults. Specifically, research in younger individuals (i.e. adolescents and young adults) revealed that passive SMU is associated with increased depressive symptoms, while active SMU is associated with decreased depressive symptoms (Escobar-Viera et al., 2018; Thorisdottir et al., 2019). Conversely, in older adults, we found that active SMU is associated with increased depressive symptoms, while passive SMU is associated with decreased depressive symptoms. Our results complement previous literature on these relationships in older adults. Specifically, Hofer and Hargittai (2021) also found links between two specific active SMU behaviors and greater depression in older adults, however they did not find significant relationships between individual passive SMU behaviors and depression. Of importance, these authors did attempt to group behaviors into overall active and passive SMU, however they did not find significant results or discuss their lack of findings in detail—they only examined relationships of individual SMU activities with depression.

Our findings with older individuals differ from the literature on active/passive SMU and depression in younger individuals. This contrast may be explained by need to belong theory (Baumeister & Leary, 1995), and we speculate that this contrast may also result from differences in the degree of social comparisons across age groups. To elaborate, humans compare ourselves with others as a means of evaluating our status within a group. Therefore, social comparisons serve as a mechanism for assessing our group belongingness, and as a result, these comparisons influence our mental health. In younger adults, upward social comparisons (and resulting feelings, such as envy) have mediated the link between passive SMU and both depression and affective well-being (Tandoc et al., 2015; Verduyn et al., 2017). However, research has suggested that as people age, they are less likely to engage in upward social comparisons (Schmuck et al., 2019). For example, older adults experience less body dissatisfaction from Facebook use compared to young adults (Hayes et al., 2015). Importantly though, recent research on loneliness in older adults failed to find a mediating effect of upward social comparisons between passive SMU and loneliness (Yang et al., 2021). Future research specifically on depressive symptoms may yield different results, as meta-analyses have demonstrated that engaging in social comparisons is strongly linked to depression (McCarthy & Morina, 2020). In sum, it could be that older adults are engaging in fewer potentially harmful upward social comparisons when passively consuming social media, and as a result, they experience less of an effect on subsequent depressive symptoms.

A second possible explanation for our different findings could lie in the specific content consumed by the different age groups on social media. As opposed to younger adults, older adults primarily report using social media as a means to stay in contact with family (Hutto et al., 2015; Jung et al., 2017), with passive Facebook use fulfilling older adults desire to connect with family (Jung et al., 2017). It may be that simply seeing information posted by social ties is sufficient to enhance quality of life for older adults (Cotten et al., 2017). Therefore, it could be that older adults are passively viewing different content, such as specific posts from family, in comparison to younger adults, who may be viewing a wider variety of content. Unfortunately, our data do not permit us to determine the answer to this speculation, and very little research has focused on differences in specific content viewed on social media between generations. Another possible explanation of our different findings concerns

the potential reason for older adults' active SMU. Several researchers have theorized that older adults' active SMU may be compensatory in nature, consisting as undesirable but necessary substitutions for other social activities that are now infeasible due to aging related losses in social networks or health (Hofer & Eden, 2020; Hofer & Hargittai, 2021). Therefore, it could be that older individuals are depressed due to their social situation and turn to more active SMU, which would explain the relationship that we observed. Overall, specific research is needed that investigates both social media content consumed and motivational differences for SMU between age groups, and how this may be related to depressive symptoms.

Although our research investigated depressive symptoms, we discuss it here in the context of recent work on loneliness as only one study has previously examined active and passive SMU and depressive symptoms in older adults. In a sample of adults aged 50 years and older, social media users with higher self-reported passive SMU also self-reported lower perceived loneliness (Hutto et al., 2015). Our research aligns with this study, demonstrating a similar association for passive SMU and depressive symptoms. In contrast, another recent study on loneliness in older adults found no direct relationship between passive SMU and loneliness, but found that greater active SMU had a direct relationship with reduced loneliness (Yang et al., 2021). The discrepancies between this study and ours are likely due to several factors, in addition to the primary difference of mental health construct (depressive symptoms vs. loneliness). Yang et al. (2021) used different measures of active and passive SMU, and conducted their study in a smaller sample of Chinese older adults living in care communities. Therefore, there may be cross-cultural and habitation differences in these underlying constructs, as well as differences in statistical power (Yang et al., 2021). Overall, however, there is growing literature demonstrating that active and passive SMU have important relationships with mental health outcomes in older adults, and future research should continue to tease apart specific aspects, constructs, and reported differences.

The current study has several limitations that deserve mention. First, due to the cross-sectional design, we are unable to make claims about causality or any long-term impacts of passive and active SMU in older adults over time. Future longitudinal research should be conducted to better determine these relationships. Second, we assessed depressive symptoms with the two-item PHQ-2. Although validated as an appropriate assessment of depression (Arroll et al., 2010), a more extensive scale with a greater number of items may result in a better depiction of depressive symptoms. The PHQ-2 is a self-report measure, therefore we cannot make assumptions or inferences regarding patients clinically diagnosed with major depressive disorder and their SMU. Third, although we controlled for several factors previously related to depressive symptoms (Akhtar-Danesh & Landeen, 2007; Stordal et al., 2003), it remains possible that the observed relationships between active and passive SMU and depressive symptoms may be explained by a third, unmeasured variable. Future research that includes additional measures of other relevant dimensions, such as personality and physical health, for example, will be better able to address this issue. Fourth, a recent review cautioned against broad classifications into active and passive SMU, and future research should investigate whether our results hold within the authors' recommendations for a more nuanced understanding of these active and passive terms (Valkenburg et al., 2022). Finally, our sampling methodology needs to be taken into account when interpreting our results. The sample for this study was comprised of older adults who are online and who participate in Qualtrics panels. It may be that this sample of online older adults is different than older adults who use social media but are not members of Qualtrics panels. For example, the older adults who were able to access and complete this survey may have more advanced technological skills than other older adults. Therefore, future research will be able to determine whether and how the presented results vary among other, less technologically savvy groups of older adults who still use social media.

Overall, we found that active SMU was associated with an increased likelihood for greater depressive symptoms, while passive SMU was associated with a decreased likelihood of greater depressive symptoms in older adults. This research appears to demonstrate reverse relationships when compared to previously observed research in younger individuals (Escobar-Viera et al., 2018; Thorisdottir et al., 2019). Therefore, our research implies that age is an important factor in the relationships between SMU and mental health, and future research should consider this. Future work will likely build off our findings, utilizing a sample that includes young and old individuals, to directly investigate active and passive SMU and depressive symptoms across the lifespan. Future studies should also take into account important potential mediators of these relationships, such as upward social comparisons, technological proficiency, and the nuanced differences in active and passive SMU (Yang et al., 2021). Finally, because our study provides evidence for age differences in depressive symptoms and mode of SMU, clinicians should be aware of these age differences and exercise caution if suggesting changes in SMU to older adults. In sum, our research is an important step towards a better understanding of the relationship between SMU and depressive symptoms in older adults.

Acknowledgements

The authors would like to thank Travis Kadylak for assistance in developing the survey and dataset.

Disclosure statement

The authors have no conflict of interest to declare.

Ethical statement

This study was approved by an institutional review board at Michigan State University, approval number x17-1022e; i054659. All participants signed an informed consent document and agreed to participate in the study.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

ORCID

Kaitlin M. Lewin http://orcid.org/0000-0002-0894-8299
Dar Meshi http://orcid.org/0000-0003-0772-037X
Amy M. Schuster http://orcid.org/0000-0002-4472-0283
Shelia R. Cotten http://orcid.org/0000-0002-8657-8262

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