

Age moderated relation between perceived stress and social media use

Zhengnan Xu

Syracuse University, New York 13244, United States

findxu098@gmail.com

Abstract. With the growing popularity of social media, there is increasing research interest in the relationship between social media use and mental health. Past work in this area has yielded conflicting findings and suggested that age may play a moderating role in this relationship. In the current study, we leverage an existing multicampus collaborative survey (EAMMi2; $n = 2324$; Grahe et al., 2013) to investigate the moderating role of age in the association between social media use and perceived stress. This study yielded two main findings: first, we found a marginally positive main effect of social media use on stress; second, age and perceived stress significantly interacted to predict social media use, where social media use and perceived stress were positively correlated in young adults (ages < 25) but negatively correlated in older adults (ages > 25). Our findings contribute to a broader discussion of the differential associations between social media use and perceived stress across different age groups.

Keywords: Technology, Social media, Age, Social cognition, Well-being.

1. Description

Past work has yielded conflicting findings on the association between social media use and mental wellbeing. Leveraging an existing multicampus survey ($n=2324$), we found that age and perceived stress significantly interacted to predict social media use, where social media use and stress were positively correlated in young adults (ages <25) but negatively correlated in older adults (ages >25).

2. Introduction

Social media such as Instagram, Facebook, and TikTok has become a massive part of our daily lives. In the U.S., the population that uses social media has increased from 10% in 2008 to 82% in 2021 (S. Dixon, 2022). Among all social media users, young people aged 18 to 29 are the most significant in using social media (Perrin, 2015). Instant messaging, images, status updates, image-sharing, and video-sharing are a few essential components contributing to social media's popularity (University of South Florida - UCM, 2022). It not only connects you to people you care about, but it also provides people with a wealth of information. As people are getting more and more information, regardless of accuracy, stress is also coming along with that information. Young people experience more stress nowadays, especially during COVID-19 (Hawes et al., 2021). The reason for this is that people are afraid of uncertainty about COVID-19, and they are absorbing so much misleading information on social media platforms, which will put them under more pressure (Farris, 2021). Because of the rapid development of modern society, young people gradually experience more anxiety, mainly from the community. It is common for young people to have work-related stress since they just began working or have worked for a few years and have less control over their work. Financial stress is another stress that is very common among young adults. Some adults are also stressed by being successful. 60% of 18-24 years old and 41% of 25-34 years senior adults are stressed by being successful (By admin, 2020).

People of all ages report using social media; By March 2018, over half of adults in the US had a Facebook account, 75% of whom reported using Facebook daily (Smith & Anderson, 2018). Social media platforms such as Instagram and Snapchat are becoming increasingly popular, especially among younger generations. 78% of people (ages 18–24) report using Snapchat, and 71% report using Instagram, most of whom use the sites daily or several times per day (Smith & Anderson, 2018).

There are various reasons for using social media: connecting with family members or friends, following up with society, following celebrities, and expressing emotions (Boyd & Ellison, 2007; Ellison & Boyd, 2013; Smith, 2011). Young adults are the generation that most frequently uses social media; 88% of 18-to-29-year-olds indicate that they use it in some capacity (O'Day & Heimberg, 2021).

People increasingly use social media, and it is critical to understand the role social media plays in people's lives. Some scholars posit that social media can be a risk factor for mental health, especially among the younger population (Rasmussen et al., 2020). There is four potential social media pressure mentioned by Steele (2019). Bucher and his colleagues used a survey and found that the expectation from the internet may cause stress: others' approval, comparison, fear of missing any information, and connection overload. That digital stress occurs mainly in adolescents and young people. The stress caused by social media is present in our daily life and work life, especially for people who need social media to work every day. Their information overload, uncertainty, and invasion increase their stress (2013).

Although social media use can cause stress, it can also be used as a stress-coping strategy. Wolfers(2022) reported that social media could be used to cope with stress when stress is activated. But its effectiveness has to do with context. The research also shows that people who face pressure tend to seek help from social media(Denq et al., 2018). As they seek more help, they will use social media more often. When they get help from social media, people will feel connected with the world, their stress will decrease, and happiness will increase. Thus, they will use social media more often whenever they are stressed and need help from society(Nabi et al., 2013).

Social media could be a coping tool and stressor when experiencing negative emotions(Wolfers & Utz, 2022). It is quite often to hear that using social media is harmful to our life and well-being, especially for people who are teenagers and young adults(Hughes, 2022). Still, Hughes mentioned more than one study that using social media plays a minute role in harming adolescents(2022). Hancock and his colleagues made 226 cases of the meta-analysis(2022). They found that some cases showed a marginal positive correlation between time spent on social media and wellbeing, such as depression and low life satisfaction. In contrast, some cases also showed a marginal negative correlation between social media and wellbeing. In general, there is no significant correlation between wellbeing and social media use, but Hancock and his colleagues (2022) use "participant population ", which is age, as one of the moderators to see the difference. Age did show some effects on wellbeing and social media use. However, it did not provide clear evidence on how it affects social media use in young adults and adults. Thus, we would like to see how different age groups moderate the correlation between well-being and social media use.

Age may also be a factor related to stress and social media(cite har/window). People encounter different pressures and problems at different ages: in childhood, getting a good grade may be pressure; In young adulthood, getting a good job or going back to school can be stressful; In middle age, there is pressure to make enough money to support a family. The frequency of reasons for using social media may also change at different ages under stress. (Hardy & Castonguay, 2018) The article from Hardy and Castonguay found that young adults (18-29) who use more social media will experience fewer nervous meltdowns, whereas middle age(30- 49)and older people (50+) are experiencing more nervous breakdowns when using more social media. (2018)

With technology and reliance on electronic devices, social media has become an integral part of every one of us. However, with the gradual development of society, people are under more and more pressure. On social media, people can make more friends and get more help. But too much information can also make them more and more stressed. They worry about whether their posts are commented on or liked. They also worry about whether their friends on social media need them all the time(Bucher et al., 2013). The current study examines the association between social media use and perceived stress. We will examine participants' stress and social media use by survey research. We expect a positive linear relationship between perceived stress and social media usage, where people tend to use social media the most when they are at high-stress levels. We are also interested

in how the stress level interacted with age which will influence social media use, so also will build a model for interaction between stress level and age on social media use.

3. Method

These data were gathered as part of a multicampus collaborative project investigating aspects of emerging adulthood. Researchers collected data at 32 institutions, including 29 in the United States and one each in England, Grenada, and Greece. The appropriate institutional review board approved each recruitment site, and all data collection procedures adhered to American Psychological Association ethical standards. All participants aged 18-61 ($N = 2324$) completed the survey described below. Participants who did not respond to questions related to demographics (age, sex, and education level), perceived stress, and social media use are not included in the analysis. The mean age was 21.13 years ($SD = 4.86$). Most participants in this study identified as female (73.2%), 25.1% identified as male, and 1.7 % as other gender. The Open Science Framework project page (<https://osf.io/te54b/>) includes a detailed description of the sample, measures, and data collection procedures.

3.1 Social Media Measures

The survey measures the intensity of using social media. We used seven survey questions related to exploring new information or friendships and connecting with friends. We expect the participants will do things that are asked by survey questions when they perceive stress. Participants used a 5-point Likert scale (from 1 = Never to 5 = A lot) to indicate their frequency of using social media. The scale achieved good internal consistency (Chronbach's $\alpha = 0.82$). Table 2 shows the survey question as well as the mean rating on each question.

3.2 Perceived Stress Measures

Perceived stress was measured through ten questions. Participants answer on a 5-point Likert scale (from 1 = Never to 5 = Very often) to questions about their feeling and thought during the past month and to indicate their perceived stress. The Perceived Stress Scale achieved good internal consistency (Chronbach's $\alpha = 0.85$). Table 1 shows the survey question and the mean rating on each question.

3.3 Analyses

Table 1. Perceived Stress Scale and mean rating

	Mean	Stan.D
In the last month, how often have you...		
1. ...been upset because of something that happened unexpectedly?	3.1	0.98
2. ...felt that you were unable to control the important things in your life?	3.2	1.11
3. ... felt nervous and "stressed"?	4.1	0.95
4. ... felt confident about your ability to handle your personal problems?	2.5	0.94
5. ... felt that things were going your way?	2.8	0.90
6. ...found that you could not cope with all the things that you had to do?	3.0	1.06
7. ... been able to control irritations in your life?	2.8	0.90
8. ... felt that you were on top of things?	2.8	0.92
9. ... been angered because of things that were outside of your control	3.2	1.06
10. ... felt difficulties were piling up so high that you could not overcome them?	3.0	1.16

We first examined whether there was a main effect of perceived stress on social media use. This was examined through an Ordinary Least Squares (OLS) regression model with education, age, and gender as control variables. Second, we examined whether age significantly moderated the relationship between perceived stress and social media use. To do this, we built an OLS regression model with the interaction term of age and pressure as the predictor, after controlling for age, gender, and education. For visualization purposes, we visualized age in two groups, one is people who are younger than or are 25 years old, and another group is people who are older than 25 years old.

Table 2. Social Media survey question and mean rating

	Mean	Stan.D
Think of the social media platform (e.g., Facebook, Instagram, Twitter, etc.) you use most often.		
How often do you use it for the following reasons?		
1. Keeping in touch with friends	3.7	1.1
2. Let friends know what I've been up to	3.2	1.2
3. Reconnect with people I used to know	2.8	1.1
4. Make new friends	2.4	1.2
5. Get in touch with someone I met at social events	3.0	1.2
6. Get different kinds of information	3.5	1.1
7. Share different kinds of information	3.2	1.2

4. Results

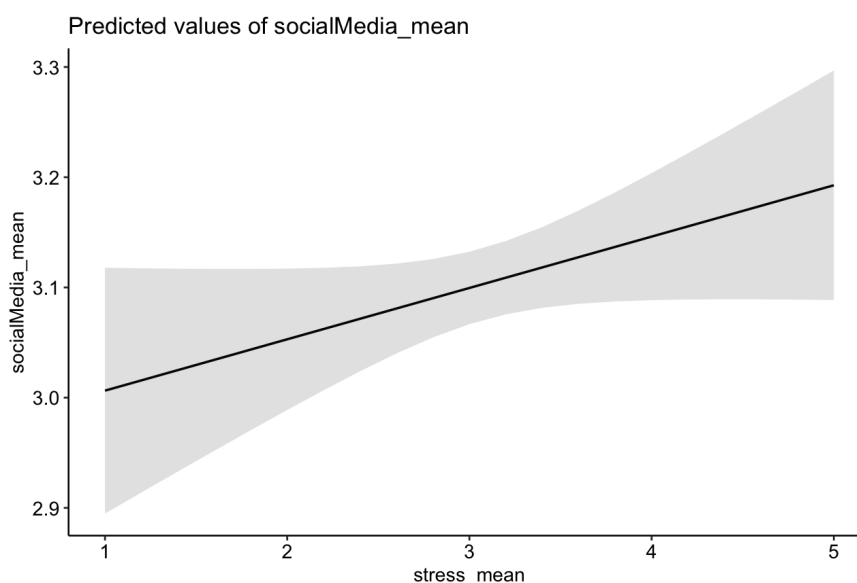


Figure 1. The main effect of perceived stress on social media use.

We first examined the association between perceived stress and social media without interaction with age. Our OLS model results indicated a marginal association between perceived stress and social media use ($b = 0.05$, 95% CI = $[-0.01, 0.00]$, $p = 0.08$; Table 3, Figure 1), which means that with more perceived stress, there are marginally more social media use. In addition to perceived stress, age ($b = -0.02$, 95% CI = $[-0.03, -0.0]$, $p = 0.00$) and sex ($b = 0.14$, 95% CI = $[0.07, 0.22]$, $p = 0.00$) were also found to be significant predictors for social media use. Sex and social media are positively associated, indicating that females use social media more than males when they perceive stress. Whereas, age is negatively associated with social media use, which is supported by figure 2 that older people use less social media. In sum, we found that perceived stress level is positively associated with

social media use without interaction with age, and age is found to be a significant predictor of social media use.

Next, we examined whether the association between perceived stress and social media use would depend on age. Figure 2 and Table 4 report the correlation between stress and social media use with interaction with age. The interaction between social media use and age produced a negative coefficient ($b = -0.01$, 95% CI = $[-0.02, -0.00]$, $p = 0.03$), indicating the strength of the association between social media use and stress level decreases with age. For visualization, age was divided into two groups (age ≤ 25 , age > 25). From figure 2, we can see that young adults who are younger than 25 years old are more likely to use more social media when they perceive more stress, but when younger adults' stress levels are lower, they use less social media than older adults. For people who are older than 25 years old, the relation between social media use and stress level is negative, indicating that social media use is associated with lower levels of perceived stress in older adults. In conjunction, these findings indicate that the association between social media use and perceived stress may depend on age.

Table 3. Regression table

	Model 1	Model 2
(Intercept)	3.13 *** (0.13)	2.44 *** (0.34)
Perceived stress	0.05 (0.11)	0.29 * (0.11)
sex	0.14 *** (0.04)	0.14 *** (0.04)
edu	-0.00 (0.01)	-0.00 (0.01)
age	-0.02 *** (0.02)	0.01 (0.02)
Perceived stress x age		-0.01 * (0.01)
N	2324	2324

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$.

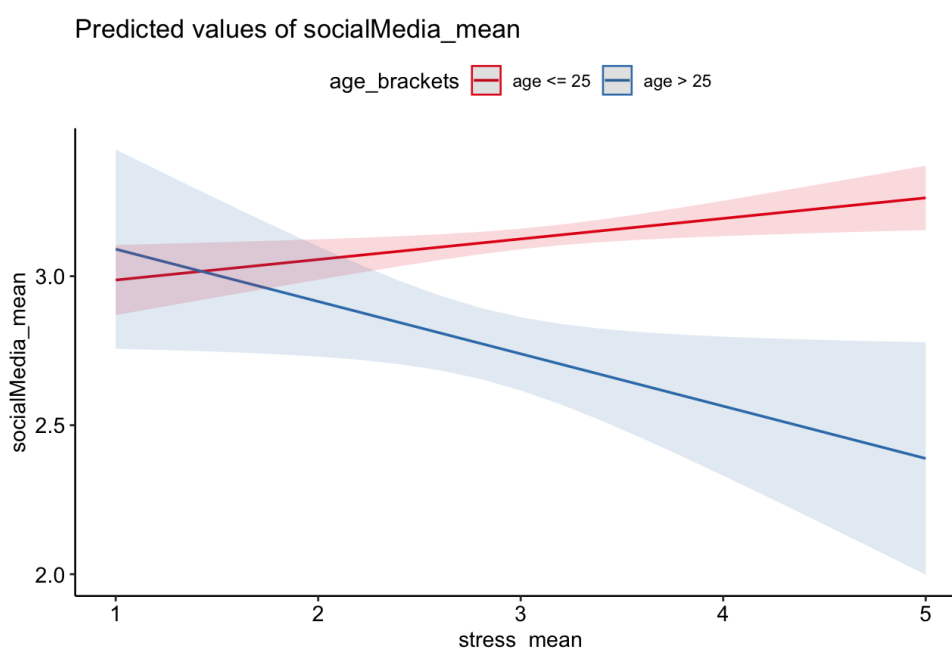


Figure 2. Relation between social media use and stress level in two age groups

5. Discussion

In this study, we examined the relationship between perceived stress, age, and use of social media using an existing multicampus collaborative survey (EAMMi2). This study yielded two results. First, we found a marginally positive association between social media use and stress, such that people who reported higher stress levels tended to use report marginally more social media use. Second, we found that the relationship between stress and social media use is moderated by age. We observed significant differences in the association between social media use and stress in different age groups. Among adults younger than 25 years old, there was a positive association between social media use and stress levels, whereas this association is negative among those older than 25 years. These findings suggest that people of different age groups may use social media differently in response to stress. There are two reasons that might help explain the different associations between age groups separately: younger adults are exposed to social media early on and older adults are more susceptible to social comparison on social media.

Age significantly moderated the association between social media use and stress. For younger adults, they are more likely to seek help and support from social media than older adults when they are stressed, and we think that is because young adults are more skilled and more likely to connect with friends or explore new things online (Rideout & Fox, 2018). Younger adults are living and born in a technology generation, which is likely to be a reason to use more social media. Prensky (2001) indicated that young people are a generation that grows and lives in an environment surrounded by new technology, and he named those young people “digital natives”. Rideout (2018) also found that the reason for young people who asks for support on social media is that they usually receive positive feedback from those media rather than negative feedback. Young people who have moderate to severe symptoms of depression think that suggestions on social media are more useful than not using social media (Rideout & Fox, 2018).

We found a negative association between social media use and stress in people older than 25. This may be due to their higher tendencies to engage in social comparison on social media. Hardy (2018) indicated that many older people who are over 30 would compare with people who used to be at the same level. People are not posting their real lives on social media; they post about their richer, more positive lives online, putting pressure on others (Comment, 2020). That comparison would lower the mental health level and well-being. Also, a study showed that face-to-face meetings after online interaction would increase social comparison and stress levels (Rauch et al., 2014). These findings may explain that when adults older than 25 may experience more social comparison induced stress on social media, thus leading to less frequent usage.

There are some limitations to this study. First, the survey focuses more on young adults, our sample includes significantly more participants under 25 years old than participants over 25 years old, which may affect the results in model 2. Second, the survey mainly collected data from universities. Thus, people who are 25 years old or older and still attending university may not be representative of the larger population in that age group. Third, this study is not an experimental study, therefore it is hard to know the cause and effect relationship between social media use and perceived stress. Our research has shown that young adults will use social media as a platform for seeking support, future studies could investigate how and why social media will help release stress in a more general population.

Overall, there was a marginally positive association between stress and social media use, but this association is significantly moderated by age. Our results indicated that people of different age groups may have distinct experiences using social media: people under 25 years old are more likely to use social media to relieve stress, whereas people over 25 may have a higher tendency to engage in social comparison on social media. These findings provide initial evidence that social media could not only be used as entertainment but also be considered as a support for stress, especially for the younger populations.

References

- [1] Bucher, E., Fieseler, C., & Suphan, A. (2013). The stress potential of social media in the Workplace. *Information, Communication & Society*, 16(10), 1639–1667. <https://doi.org/10.1080/1369118x.2012.710245>.
- [2] By: admin. (2020, August 25). Why do young adults get more stressed? - cardiac screen. Cardiac Screen - Just another WordPress site. Retrieved June 27, 2022, from <https://www.cardiacscreen.co.uk/blog/why-do-young-adults-get-more-stressed/#:~:text=Causes%20of%20Stress%20in%20Young%20Adults&text=Work%2Drelated%20stress%20is%20very,to%20be%20less%20financially%20secure>.
- [3] Comment, T. S. (2020, October 16). Are people the same person on social media as real life? Medium. Retrieved July 26, 2022, from <https://medium.com/@thesocialcomment/are-people-the-same-person-on-social-media-as-real-life-b1dcd76c5440>.
- [4] Farris, S. G., Kibbey, M. M., Fedorenko, E. J., & DiBello, A. M. (2021). A Qualitative Study of COVID-19 Distress in University Students. *Emerging Adulthood*, 9(5), 462–478. <https://doi.org/10.1177/21676968211025128>.
- [5] Hancock, J., Liu, S. X., Luo, M., & Mieczkowski, H. (2022). Psychological well-being and social media use: A meta-analysis of associations between social media use and depression, anxiety, loneliness, eudaimonic, hedonic and social well-being. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.4053961>.
- [6] Hardy, B. W., & Castonguay, J. (2018). The moderating role of age in the relationship between social media use and mental well-being: An analysis of the 2016 general social survey. *Computers in Human Behavior*, 85, 282–290. <https://doi.org/10.1016/j.chb.2018.04.005>.
- [7] Hawes, M. T., Szenczy, A. K., Klein, D. N., Hajcak, G., & Nelson, B. D. (2021). Increases in depression and anxiety symptoms in adolescents and young adults during the COVID-19 pandemic. *Psychological Medicine*, 1–9. <https://doi.org/10.1017/s0033291720005358>.
- [8] Hughes, V. (2022, March 28). Does social media make teens unhappy? it may depend on their age. *The New York Times*. Retrieved July 21, 2022, from <https://www.nytimes.com/2022/03/28/science/social-media-teens-mental-health.html>.
- [9] Grahe, J., Faas, C., Chalk, H. M., Skulborstad, H. M., Barlett, C., Peer, J. W., Hermann, A., Hall, S., Sharon, T., & Hauhart, R. (2013, September 3). Emerging adulthood measured at multiple institutions 2: The next generation (EAMMI2). OSF. Retrieved July 26, 2022, from <http://doi.org/10.17605/OSF.IO/TE54B>.
- [10] O'Day, E. B., & Heimberg, R. G. (2021). Social media use, social anxiety, and loneliness: A systematic review. *Computers in Human Behavior Reports*, 3, 100070. <https://doi.org/10.1016/j.chbr.2021.100070>.
- [11] Perrin, A. (2015). Social media usage. *Pew research center*, 125, 52–68.
- [12] Prensky, M. (2001). Digital Natives, Digital Immigrants Part 2: Do they really think differently? *On the Horizon*, 9(6), 1–6. <https://doi.org/10.1108/10748120110424843>.
- [13] Rasmussen, E. E., Punyanunt-Carter, N., LaFreniere, J. R., Norman, M. S., & Kimball, T. G. (2020). The serially mediated relationship between emerging adults' social media use and mental well-being. *Computers in Human Behavior*, 102, 206–213. <https://doi.org/10.1016/j.chb.2019.08.019>.
- [14] Rauch, S. M., Strobel, C., Bella, M., Odachowski, Z., & Bloom, C. (2014). Face to face versus Facebook: Does exposure to social networking websites augment or attenuate physiological arousal among the socially anxious? *Cyberpsychology, Behavior, and Social Networking*, 17(3), 187–190. <https://doi.org/10.1089/cyber.2012.0498>.
- [15] Rideout, V., & Fox, S. (n.d.). Digital Health Practices, social media use, and mental well-being among teens and young adults in the U.S. Providence St. Joseph Health Digital Commons. Retrieved July 19, 2022, from <https://digitalcommons.psjhealth.org/publications/1093/>.
- [16] S. Dixon, & 23, M. (2022, March 23). Social media usage in U.S. Statista. Retrieved June 27, 2022, from <https://www.statista.com/statistics/273476/percentage-of-us-population-with-a-social-network-profile/>.
- [17] Smith, A., & Anderson, M. (2021, April 7). Social media use in 2018. *Pew Research Center: Internet, Science & Tech*. Retrieved July 4, 2022, from <http://www.pewinternet.org/2018/03/01/social-media-use-in-2018/>.

- [18] Steele, R. G., Hall, J. A., & Christofferson, J. L. (2019). Conceptualizing digital stress in adolescents and young adults: Toward the development of an empirically based model. *Clinical Child and Family Psychology Review*, 23(1), 15–26. <https://doi.org/10.1007/s10567-019-00300-5>.
- [19] University of South Florida - UCM. (2022). Marketing. Introduction to Social Media | University Communications and Marketing. Retrieved July 20, 2022, from <https://www.usf.edu/ucm/marketing/intro-social-media.aspx>.
- [20] Wheaton, B., Young, M., Montazer, S., & Stuart-Lahman, K. (2012). Social Stress in the twenty-first century. *Handbooks of Sociology and Social Research*, 299–323. https://doi.org/10.1007/978-94-007-4276-5_15.
- [21] Wolfers, L. N., & Utz, S. (2022). Social media use, stress, and coping. *Current Opinion in Psychology*, 45, 101305. <https://doi.org/10.1016/j.copsyc.2022.101305>.