Depression in the Digital Age

Exploring the Link Between Daily Social Media Use and Depression Severity

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Abstract

Social media has become an inseparable part of daily life, especially for young adults. While it allows users to stay connected, spending too much time online may also harm mental health. This study explored how the duration and type of social media use relate to symptoms of depression among 606 university students in the Netherlands over two years. Starting in 2021, the students reported their average daily social media use and whether their use was more active (interacting with others) or passive (scrolling without engaging). Depression levels were measured at three time points (baseline, month 3, and month 6) using linear regressions that controlled for gender and the duration of social media use. For each time point, the updated social media use data were used to accurately reflect the participants' current habits. Results showed that students who spent more time on social media initially reported higher depression symptoms, but this relationship weakened over time. Passive use became linked to higher depression scores after three months, suggesting that its negative effects may develop gradually. These findings highlight that not all social media use is equally harmful, and that promoting more active and balanced online engagement could help protect young adults' mental well-being.

Layman's Abstract

In today's world, social media is a vital part of everyday life, especially for young people. While it helps people stay connected, too much online time can also affect our mood. This study followed 606 university students in the Netherlands to see how the time they spend on social media and the way they use it relate to their feelings of depression. In our research, students who spent more time on social media reported higher levels of depressive symptoms, but this link became weaker over time. Our study also found that people who used social media more passively (scrolling through posts without any interaction) showed more signs of depression after several months. In contrast, more active social media use (posting and engaging with others) seemed less harmful to mental health. These results suggest that how we use social media matters as much as how much we use it. Encouraging more positive and interactive online habits could support better psychological health in young adults.

Depression in the Digital Age: Exploring the Link Between Daily Social Media Use and Depression Severity

Day by day, social media platforms become more popular, slowly becoming part of our daily lives. These platforms act as a distraction, oftentimes providing an escape from our busy lives and responsibilities. As of 2023, approximately 4.9 billion people are active on at least one social media platform (Wong, 2023). While these platforms allow us to connect with one another and transfer knowledge, they also bring along potential mental health challenges. One of these challenges might be depression, which is characterized by low energy, feelings of sadness, emptiness, and lack of interest (McCarron, 2021). The prevalence of depression in adolescents between the ages of 12 and 17 has been on the rise for the past twenty years, so it is crucial to investigate the contributing factors to this phenomenon (Solmi et al., 2022).

Given the increasing use of social media among the younger generation, it becomes more and more important to understand how online behaviors may affect depression severity within this demographic. The constant accessibility of social platforms encourages them to frequently check for updates and pushes them to continue online engagement. This can interfere with everyday responsibilities and reduce the time spent on real-life interactions, which may lead to social media addiction (Satchell et al., 2021). The drift from real-life interaction into digital may cause distress and isolation, which are prominent symptoms of early depression (McCarron, 2021). Another study by Shensa and colleagues (2017) aimed to analyze the link between the use of social media and depressive symptoms. For their study, they sent out a national survey to U.S. young adults between ages 19–32, measuring their frequency and duration of passive social media use and their depressive symptoms using multiple questionnaires. Their findings reveal that there is a positive association between frequent social media use and depressive symptoms. This association may partly be due to social media occupying the participants' time and preventing them from getting sufficient sleep and their daily physical activity (Shensa et al., 2017). Another interesting study which explains the link between social media use and depression symptoms is that of Meshi and Ellithorpe (2021). Their aim was to investigate how problematic social media use might affect mental health, particularly depression. They surveyed 403 university students to measure their social media use, depression, and anxiety, as well as the social support they received in real life vs. on social media. Researchers concluded that

problematic social media use was negatively associated with in-person social support, but positively associated with online support (Meshi & Ellithorpe, 2021). The only variable to predict better mental health scores was real-life support, which suggests that while some people turn to the internet for connection, these interactions do not provide a protective effect unlike real-life support. Similarly to the previous study mentioned, researchers underline how excessive social media use tends to cause a decline in mental health by displacing meaningful in-person connections with more superficial online interactions (Meshi & Ellithorpe, 2021).

The context of what people's social media algorithms expose them to may also play an important role in mental health. In their study, Liu and Zhang (2025) examined how exposure to the stigmatization of depression on social media impacts adolescents' mental health and their willingness to seek help. They surveyed 428 Chinese participants aged 18 to 35 and found that exposure to content which depicts depression as "not real" and those with depression as "dangerous" or "weak" was positively associated with the participants' avoidance of seeking psychological help (Liu & Zhang, 2025). Overall, researchers highlight that although social media can be a practical tool for health awareness, it can also spread harmful misconceptions that discourage people and prevent them from accessing treatment, which contributes to their inevitable decline of overall mental well-being.

Another important factor that affects depression severity is gender. The meta-analyses of Salk and colleagues (2017) reveal that women are almost twice as likely to be diagnosed with Major Depressive Disorder in comparison to men. In their study, women consistently reported higher depression symptom severity compared to their male participants. According to their analyses, this difference becomes significant in early adolescence. The high prevalence of depression in women might be attributed to certain psychological, biological, and social factors (such as hormonal differences, rumination habits, and stress sensitivity) (Kuehner, 2017). In the context of digital behavior, gender also appears to affect the association between social media use and psychological wellness. In their study, Nesi and Prinstein (2015) highlight that women are more likely to compare themselves to others in social media, which can create a negative perception of the self and eventually lead to an increase in depressive symptoms. Due to these reasons, gender is an important factor to take into consideration when analyzing habits surrounding social media use and psychological health.

A relevant concept that we will be looking into for our research is the active vs. passive use of social media. In our case, “active use” refers to creating content or actively engaging with other users on social media, whereas “passive use” refers to simply scrolling through content on several platforms without any online engagement. In their research, Verduyn and colleagues (2015) found through both experimental and longitudinal designs that passive Facebook browsing negatively affects users’ mental well-being because it leads to upward social comparison, which is characterized by individuals comparing themselves to others whom they perceive to be superior to themselves. Similarly, Frison and Eggermont (2016) showed that while active online behavior (such as commenting and posting) was associated with an increase in perceived online social support and a decrease in depressed mood, passive content consumption predicted higher depressive symptoms among adolescents. Collectively, these studies suggest that high passive social media use fails to provide opportunities for meaningful interaction and instead promotes maladaptive comparisons, which are linked to vulnerability to a depressive state. By inspecting the association between social media use and depression symptoms, we can aid upcoming generations within the fields of public health and individual well-being. Moreover, companies could benefit from certain changes in app usage in order to protect their users from any psychological harm. Considering these ideas, our study has the potential to lead future advancements regarding mental well-being and modern digital behavior.

In the light of previous studies, we can form two hypotheses: Firstly, we hypothesize that (1) students who have higher levels of daily social media use have more severe depressive symptoms. Previous research points towards a clear association between excessive social media use and depressive symptoms due to the decrease of face-to-face social interaction it causes (McCarron, 2021; Satchell et al., 2021). Furthermore, we also hypothesize that (2) students who engage in passive social media use compared to active social media use are more prone to developing depressive symptoms, while controlling for the duration of social media use. Similarly to the findings of Shensa and colleagues (2017), we see the possibility of frequency of (passive) social media use to interfere with sleep and exercise, which are key components to both physical and mental health.

This present study will analyze the data of 606 university students in the Netherlands and see if social media use duration and type have a relationship with their depression score at three different timepoints: baseline, month 3, and month 6.

Methods

Design and Procedure

We analyzed data from the WARN-D Study, which included 606 students from different universities across the Netherlands. We followed them over a two-year period, using a multi-cohort design. The participants were divided into four equal groups of 500, with the first group starting in 2021, second and third groups starting in 2022, and the final group starting in 2023, with around 6 months between the starting date of each cohort.

The complete procedure of the WARN-D study consists of 4 stages. In the baseline stage, participants complete a 75-minute online survey on Qualtrics about risk factors for depression. They are also asked to enter their postal code into the Dutch registry data, which can possibly indicate their socioeconomic status. The second stage is daily monitoring, in which participants share their real-time data about their sleep and heart rate using their smartwatches and smartphones. They answer 4 surveys a day over a span of 85 days through the "Ethica" app. The third step consists of 8 follow-up surveys that the participants complete to reveal any changes in their mental health. Two of these surveys are longer and take around half an hour to complete, with the remaining six taking around fifteen minutes each. Stage 4 is a repeat of stage 2 in around 500 students from the first two cohorts. The aim of this final step is to analyze the stability of the participants' mood patterns over the course of the study and to track possible mental health changes. This thesis focuses on stages 1 and 3.

The WARN-D study is supported by funding from the European Research Council as part of the EU's Horizon 2020 research and innovation program (Number: 949059). The data collection received approval from the Research Ethics Committee at Leiden University (reference: 2021-09-06-E.I.Fried-V2-3406). The study did not need to obtain ethical approval under the Medical Research Involving Human Subjects Act, as it was considered exempt.

Participants

Our participants consist of 606 students who follow MBO, HBO, or WO degrees at the time of study, and live in the Netherlands, Germany, or Belgium. To participate, they had to be 18 years-old or older, and fluent in either English or Dutch. They were required to live in closeby countries in order to ensure that they would receive their smartwatches in a timely manner. Moreover, the smartwatches required the participants to use smartphones that are able to run on Android or IOS (Fried, 2023).

The additional inclusion criteria were as follows: (1) not showing signs of moderate depression (indicated by a score of 2 or higher on the Patient Health Questionnaire-2, or 14 or higher on the Patient Health Questionnaire-9) (Kroenke et al., 2003), (2) not showing manic symptoms according to DSM-5, (3) not showing signs of a specific disorder (indicated by a score of 1 or more on relevant screener) (American Psychiatric Association, 2013), (4) not meeting the criteria for any substance use disorder (indicated by a score of 27 or higher on the "Alcohol, Smoking and Substance Involvement Screening" Test) (World Health Organization, 2010), (5) not receiving any mental disorder treatments at the time of the study, (6) not reporting moderate or more suicidal ideation (indicated by a score of 2 or higher on the Beck Scale for Suicide Ideation) (Beck et al., 1979), and lastly, (7) participants should not report that the calorie burn displayed on their smartwatches causes them significant stress.

Measures

A few key principles were taken into account when choosing the assessment tools: having relevant constructs to accurately assess human psychology and mood, having sufficient psychometric properties, and the questions being in English or Dutch. For this thesis, we will focus on participants' daily social media use in hours, and their depressive symptom severity on the basis of the percentage of their active or passive use of social media. The participants will be asked about their media use at three different stages of the study. The two questions about daily social media use in our study's questionnaire are taken from the Caring Universities survey, which is a mental health screening created to provide support for students (Fried et al., 2023).

a. Predictors: Duration and Type of Social Media Use

There are two questions in the WARN-D survey that measure daily social media use. The first one is: "*On a typical day, approximately how much time do you spend using social media*?" (adapted from the Caring Universities survey). It is scored through seven categories in this order; 1 = *I don't use social media*, 2 = *less than 30 minutes*, 3 = *between 30 and 60 minutes*, 4 = *1 to 2 hours*, 5 = *3 to 4 hours*, 6 = *5 to 6 hours*, 6= *5 to 6 hours*, 7= *more than 6 hours*. The second question measuring social media usage is: "*What percentage of your social media use is active*?" (taken directly from the WARN-D survey) (Fried et al., 2023). The answer to this question is chosen within a continuous variable with a slider on a line of numbers that range from 1 to 100, with 100 being the maximum active side and 0 being the maximum passive side.

b. Outcome: Depression Symptom Severity

Depressive symptoms were measured through the sum of 9 scales about different depression-related symptoms: anhedonia, hopelessness, insomnia, change in appetite, feeling of worthlessness, change in concentration, and suicidality. The questions were taken from the Patient-Health-Questionnaire-9 (Kroenke et al., 2003) and were each scored in the following four ordered categories: 0 = *not at all*, 1 = *several days*, 2 = *more than half the days*, 3 = *almost every day* (Fried et al., 2023). This variable is the computed average score of the results of the four scales mentioned above.

c. Covariate: Gender

Gender was coded by asking the participants their preference within three categories: 0 = *male*, 1 = *female*, and 2 = *other* (Fried et al., 2023). Previous research points towards the possibility of women reporting higher depression compared to men due to biological, psychological, and social differences (Kuehner, 2017). Since gender difference can independently affect depressive symptom severity of participants, not accounting for it could result in finding inaccurate or biased associations.

Statistical Analyses

All assumptions for linear regression were examined before running the tests on SPSS. Inspection of scatterplots and Q–Q plots revealed that the assumptions of normality, linearity, and homoscedasticity were all met. Variance inflation factors (VIF) were below 5, which suggests no multicollinearity issues.

For hypothesis 1, we will conduct a linear regression with self-reported daily social media use at baseline as the main predictor, and depression symptom severity score at baseline as the outcome variable. Afterwards, we will repeat this test for months 3 and 6 (using the updated social media use data of months 3 and 6) to see if there is an association between social media use duration and depression severity after baseline. To test Hypothesis 2, we will conduct a linear regression with daily social media use and type of use (active vs. passive) as the predictors, and depression symptom severity as the outcome variable. This will allow us to see if there is an association between the type of social media use and depressive symptom severity, while still taking the duration of social media use into account. We will repeat this test for month 3, and month 6. For all tests, we will be controlling for gender.

Results

Our dataset consisted of 606 university students, with women as the majority (n = 487, 80.36%) and the average age being 22.61 (SD = 4.023). A linear regression was conducted to measure the effect of social media use duration on the depressive symptoms of university students, while controlling for their gender. The test was repeated for months 3 and 6 after baseline. Following this, another linear regression was conducted but this time with the newly added predictor: type of social media use. The test was also repeated for months 3 and 6. The model included the daily social media use duration time, the type of social media use (active vs. passive), and the gender of the participants.

Table 1

Multiple Regression Analyses Predicting Depressive Symptom Severity from Social Media Use (H1) and Type of Use (H2) at Baseline, Month 3, and Month 6

Predictor	Baseline *B* (β)	p	Month 3 *B* (β)	p	Month 6 *B* (β)	*p*
Hypothesis 1						
Social media use (time)	0.41 (.11)	.005	34.39 (.14)	.122	0.34 (.11)	.247
Gender	1.38 (.13)	.002	11.57 (.01)	.875	-0.07 (-.01)	.924
Model F(df)	$F(2,601) = 9.99$	<.001	$F(2,121) = 1.25$	.290	$F(2,110) = 0.7$	.501
Hypothesis 2						
Active vs. passive use	-0.01 (-.03)	.480	3.42 (.24)	.012	-0.01 (-.07)	.446
Gender	1.43 (.13)	.002	29.55 (.04)	.699	-0.06 (-.01)	.940
Social media use (time)	0.72 (.18)	<.001	24.33 (.08)	.388	0.39 (.12)	.209
Model F(df)	$F(3,572) = 10.3$	<.001	$F(3,111) = 3.15$	.028	$F(3,10) = 0.71$	.547

Note. B = unstandardized regression coefficient; β = standardized coefficient. "Active vs. Passive use" was coded such that higher scores indicate more active use. Gender was included as a covariate in all models.

Association Between the Duration of Social Media Use and Depression (H1)

We hypothesized that students who reported spending more time on social media daily would report more severe depressive symptoms. This was tested using the variable of daily social media use, and the test results supported our hypothesis. The overall model was not found to be significant ($F(2, 601) = 9.99$, $p < .001$), but duration of social media use turned out to be a significant predictor of depressive symptoms ($B = 0.41$, $\beta = .11$, $p = .005$). This indicates that more frequent social media use was associated with more severe symptoms of depression. Gender was also found to positively predict depressive symptoms ($B = 1.38$, $\beta = .13$, $p = .002$), which suggests that women reported significantly higher depression scores. Overall, these results support the first hypothesis that higher social media use is associated with increased depressive symptom severity, even after accounting for gender differences.

The same linear regression was repeated for months 3 and 6. This time, depression scores were recoded with the updated answers of the participants taken from the follow-up surveys.

In month 3, the overall model did not turn out to be significant ($F(2,121) = 1.25$, $p = .290$), which means that our predictors together do not significantly predict depressive symptoms. Duration of social media use was not found to be a significant predictor of depressive symptoms ($B = 34.39$, $\beta = .14$, $p = .122$). Similarly, gender was also not found to be a significant predictor ($B = 11.57$, $\beta = .01$, $p = .875$).

In month 6, the overall model was not significant ($F(2, 110) = 0.7$, $p = .501$). Duration of social media was not a significant predictor of depressive behavior ($B = .34$, $\beta = .11$, $p = .247$). Finally, gender was also not found to be a significant predictor ($B = -.07$, $\beta = -.01$, $p = .924$).

Association Between the Type of Social Media Use and Depression (H2)

The second hypothesis proposed that the students who engage in passive social media use over passive use would report greater depressive symptoms. A multiple linear regression analysis was conducted to examine if the type of social media use (active vs. passive) predicted depressive symptom severity while controlling for daily social media use time and gender. The overall model was statistically significant ($F(3, 572) = 10.30$, $p < .001$). Results showed that social media use duration remained a significant positive predictor of depressive symptom severity ($B = 0.72$, $\beta = .18$, $p < .001$), indicating that students who spent more time on social media platforms reported more severe depression symptoms. Gender was also a significant predictor ($B = 1.43$, $\beta = .13$, $p = .002$), suggesting that female participants reported higher levels

of depressive symptoms on the survey compared to male participants. However, the type of social media use (active vs. passive) was not a significant predictor of depressive symptom severity (B = -0.01, β = -.03, p = .480). These results suggest that while the overall amount of social media use and gender were associated with higher depression severity, the distinction between active and passive use did not significantly predict depressive symptoms at baseline.

When we repeated the linear regression for Hypothesis 2 on month 3, the overall model turned out to be significant ($F(3, 111) = 3.15$, p = .028). Furthermore, the type of social media engagement turned out to be a significant predictor of depression symptom severity of the participants (B = 3.42, β = .24, p = .012). Gender did not turn out to be a significant predictor (B = 29.55, β = .04, p = .699).

When we ran the test again for month 6, we found that the overall model was not significant ($F(3,108) = 0.71$, p = .547). Similarly, the type of social media use was not a significant predictor (B = -.01, β = -.07, p = .446). Lastly, gender was also not a significant predictor (B = -.06, β = -.01, p = .940).

Discussion

The present study examined how duration and type (active vs. passive) of social media use are associated with depressive symptom severity among university students over three different timepoints. The first hypothesis predicted that participants who reported spending more time on social media daily would report higher depression symptom severity. The results supported this hypothesis at baseline: more daily social media use was significantly associated with higher depression scores, even after controlling for gender. However, this association was not significant at month 3 and month 6. The second hypothesis proposed that participants who engaged in passive social media use would report higher depressive symptom severity compared to those who engaged in active use. While the results did not support this hypothesis at baseline, a significant relationship between passive use and higher depression scores emerged at month 3, but not at month 6.

Interpretation of Findings

The significant relationship found at baseline between the duration of social media use and depressive symptoms is consistent with previous research, which indicates that higher social media engagement correlates with poorer mental health outcomes (Shensa et al., 2017; Meshi &

Ellithorpe, 2021). Excessive social media use may prevent individuals from getting in-person social interactions, physical activity, and sufficient sleep, which are all protective factors against depression. Additionally, when young adults are constantly exposed to idealized online portrayals of others, they may engage in negative social comparisons, which can worsen mental well-being (Verduyn et al., 2015). These findings support that the duration of social media use is an important predictor of mental health. Interestingly, our results indicate non-significant findings at month 3 and month 6, which means that this association weakened over time. One possible explanation for this result could be the habituation of participants. They may have adapted to their social media habits, and the initial emotional effects of social media use could have diminished. Additionally, external factors, such as life events, academic workload, and personal events, may have influenced the results.

Our second hypothesis received partial support. Although the baseline analysis did not show a significant association between passive social media use and depression, a significant effect emerged at month 3. This aligns with prior research showing that passive use tends to undermine mental health, whereas active use can promote the growth of social interaction and perceived online support (Frison & Eggermont, 2016; Verduyn et al., 2015). The delayed emergence of this effect on month 3 might suggest that the negative consequences of passive use develop gradually. Passive use can accumulate over time, and potentially lead to negative social comparison, perceived social isolation, or emotional exhaustion (Thorisdottir, 2019).

It is important to highlight that gender significantly predicted depressive symptoms at baseline, with women reporting higher depression scores. This is in accordance with existing evidence of women consistently reporting higher depression compared to males, potentially due to psychological, biological, and social factors (Salk et al., 2017; Kuehner, 2017). However, this effect was not consistent across the remaining timepoints we measured. This may suggest that the gender gap in depression behavior might reflect long-standing psychological or biological traits that don't necessarily change in response to social media habits. Additionally, research finds that women engage more in social comparison and feedback-seeking online, which can heighten depression (Nesi & Prinstein, 2015).

These findings contribute to the growing literature distinguishing between quantity and quality of social media engagement. While overall screen time has often been linked to poorer mental health, our results support that not all social media use is equally detrimental. Passive use

seems particularly harmful because it offers limited opportunities for social engagement and emotional support while maximizing exposure to potential social comparison triggers (Verduyn et al., 2015). In contrast, active social media use can help fulfill social needs, such as validation, and social connectedness (Frison & Eggermont, 2016).

These findings align with social comparison theory (Festinger, 1954), which implies that individuals determine their self-worth based on others' portrayals. Passive scrolling may foster upward comparisons with idealized online identities, which may lead to envy and self-discrepancy (Tandoc et al., 2015). Furthermore, from a displacement theory perspective (Nie, 2001), passive browsing on the internet can replace meaningful offline engagement, contributing to loneliness and depression in the younger generation.

Strengths and Limitations

A key strength of this study is the use of longitudinal data with multiple measurement timepoints, allowing for the examination of temporal dynamics rather than relying solely on cross-sectional correlations. The large and diverse sample of 606 university students also provides sufficient statistical power and generalizability within the higher-education context. Another strength is the inclusion of both social media duration and type of use as distinct predictors, offering a more comprehensive understanding of how different aspects of online behavior relate to mental health.

On the other hand, several limitations can be noted. First, social media use and depression were assessed through self-reported data, which may be prone to recall bias or social desirability effects. Objective tracking data could provide more accurate estimates of the participants' social media use patterns. Secondly, the study's measurement of active vs. passive use relied on a single-item self-estimation scale, which may oversimplify complex online behaviors. It could be helpful to focus on participants who engage in active and passive social media equally in the future. Third, the non-significant results at month 3 and month 6 might be influenced by unaccounted confounders such as academic stress, sleep quality, or major life events. Lastly, a potential limitation to finding accurate results may be the number of participants who were active during the baseline, but later dropped out of the study. They may have dropped out due to many reasons, such as their mental health worsening. Acquiring this information might have allowed us to see a stronger connection between social media use and depression.

Future Implications

The present study has multiple implications for mental health research and digital well-being interventions. For future research, these findings highlight the importance of differentiating between active and passive use of social media rather than treating total screen time as a general risk factor. Future studies can investigate the bidirectional relationship between depression and online behavior. Moreover, the findings emphasize the need to promote digital intentional engagement. Social media platforms could design features that reduce "doomscrolling" and encourage their users to interact with others, or they could simply add a feature that reminds their users to "take a break" from scrolling every few hours. Additionally, platforms could also limit their algorithms from exposing their users to content that could negatively affect them.

In conclusion, the findings of this study reveal that excessive social media use is linked to higher depression symptom severity, and that the type of social media engagement plays a critical role in shaping psychological outcomes. While the overall duration of social media use predicted depressive symptom severity at baseline, passive use became a significant predictor at month 3, which suggests that the mental health effects of digital behavior may evolve over time. The findings highlight the idea that not all social media use can be considered harmful, since passive use appears to carry greater psychological risks for adolescents. Comprehending these dynamics is vital for creating interventions which promote healthier digital habits and protect the mental health of young adults in an increasingly online world.

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