Investigating the Relationship Between Perceived Social Support, Social Networks and Depression in Young Adults

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Abstract

This research explores the interplay between social media usage, offline and online interactions, perceived social support, and depression levels among university students. Analyzing data from 430 participants, this cross-sectional study leverages the Patient Health Questionnaire-9 (PHQ-9) to assess depression symptoms and employs both multivariate and univariate linear regression analyses, as well as MANOVA and ANOVA tests, to understand the connections between online/offline social interactions, perceived social support, and depression. Key findings indicate a significant relationship between the level of perceived social support ($\beta = -0.49$, $p < .001$) and frequency of online interactions ($\beta = 0.43$, $p < .05$) with depression levels. Notably, individuals reporting higher levels of perceived social support tend to exhibit lower depression levels, while those with frequent online interactions often show higher depression levels. The study also identifies marked gender differences in social media use and depression, with females showing greater susceptibility. These results underscore a nuanced relationship between active/passive social media engagement, gender, and mental health. The research emphasizes the need for mental health strategies that consider individual differences, particularly focusing on the quality of social support and patterns of online engagement, to effectively address mental health concerns in young adults.

Keywords: depression, social media, perceived social support, social networks

Virtual and Physical Social Networks: Investigating the Relationship Between Perceived Social Support, Social Media Use, and Depression in Young Adults

Understanding the complex relationship between social life and mental health is pivotal, particularly for students navigating academic and personal challenges that can deeply affect their well-being. This topic gains additional relevance in the context of the digital age, marked by the rise and ubiquity of social media platforms that have radically altered social dynamics (Appel et al., 2019). Social life encompasses an individual's interactions and relationships within multiple contexts. It plays a vital role not just in an individual's cognitive development but also in their overall sense of well-being (Weber, 1968; Vygotsky, 1978). Contrarily, mental health is a nuanced construct influenced by a multitude of factors, ranging from unconscious processes to lived experiences and the journey towards self-fulfillment (WHO, 2004; Rogers, 1961). Both social life and mental health are not universal constructs; they're experienced differently based on cultural, societal, and individual circumstances.

Key Concepts Linking Social Life and Mental Health

Understanding the complex relationship between mental health and social life involves examining several key facets, including social connectedness, social integration, and perceived social support. All these elements contribute to an individual's overall well-being (Helliwell & Putnam, 2004; Wickramaratne et al., 2022). Within this framework, perceived social support plays a nuanced role (Siedlecki, Salthouse, Oishi, & Jeswani, 2013). It's the lens through which individuals view the availability of emotional, informational, and practical help from their social circles (Ioannou, Kassianos, & Symeou, 2019). This sense of support can subtly elevate mental health by enhancing feelings of self-worth, creating a sense of security, and establishing emotional connectedness.

Similarly, social connectedness offers its own contributions. It encompasses both the quality and quantity of relationships, contributing to a broader sense of community and inclusion (Wickramaratne et al., 2022). Social integration, on the other hand, delves into how ingrained an individual is within their social networks, accounting for the number, nature, and

frequency of social interactions. Intriguingly, more interactions are not always better; the relationship between social integration and mental health can be complex, as both under-integration and over-integration can have adverse effects (Falci & McNeely, 2009).
So while all three factors are undeniably important in shaping mental well-being, perceived social support offers specific insights into the emotional and practical resources an individual believes they can draw upon. Each aspect has its role, and, together, they provide a detailed understanding of the intersection of social life and mental health.

The Importance of Offline Social Life

One of the key factors that significantly impact mental health is not just the quantity but the quality of social relationships. Holt-Lunstad et al. in their seminal 2010 paper published in PLoS Medicine emphasize that the quality of social relationships predicts mental health outcomes, including the risk of depression and anxiety (Holt-Lunstad, Smith, & Layton, 2010). Emotional support from social relationships enhances mental well-being, which lowers the risk of engaging in unhealthy behaviors and suffering from poor physical health. Mental health itself is an important aspect of overall health, yet often overlooked in policy considerations. Overall, mental health issues are prevalent and have significant societal impact, being the leading cause of disability globally (Umberson & Karas Montez, 2010). The efficacy of emotional support seems to be more potent in offline, face-to-face interactions. A meta-analytic review by House, Landis, and Umberson (1988) suggests that the lack of social relationships is a significant risk factor for mortality and is comparable to well-established risk factors like smoking and alcohol consumption. The immediate feedback provided in face-to-face interactions can help foster emotional well-being more effectively.

It is worth mentioning that in 2020, governments directed or requested that half of the global population remain at home to mitigate the transmission of COVID-19. Measures like lockdowns were somewhat effective in controlling the spread of COVID-19, but they also had a detrimental impact on various aspects of mental health, including depression (Brooks et al., 2020; Chiesa, Antony, Wismar, & Rechel, 2021). To help alleviate mental stress and negative emotions from restrictions, authorities advised keeping social connections while staying physically apart (Hwang, Rabheru, Peisah, Reichman, & Ikeda, 2020). Consequently, many turned to digital communication and video calls to stay connected during lockdowns. However, it is uncertain if such online social engagement can replace in-person conversations

for mental well-being. Face-to-face communication is generally considered more beneficial for mental health than digital interactions. This is because in-person settings offer richer social context cues, such as clothing or seating arrangements, that digital platforms lack. Theories suggest that the absence of such cues, like body language or voice tone, may make digital interactions less emotionally engaging. This could explain why digital communication might not effectively engage our innate, subconscious mechanisms for social bonding and evaluating trustworthiness (Stieger, Lewetz, & Willinger, 2023).

Social Media in Modern Social Life

As the lines between online and offline realities blur, social media has become an integral part of social life, especially among adolescents and young adults (Cunningham et al., 2021; Ivie et al., 2020; Lin et al., 2016; Vidal et al., 2020). However, its impact on mental health is complex and still not fully understood. Social media use is commonly divided into active and passive categories. Active social media use (ASMU) refers to engaging directly with other users through activities like posting, commenting, and messaging. This type of engagement has been generally linked to positive mental health outcomes such as improved mood and increased feelings of social support (Kross et al., 2013; Liu et al., 2018). On the flip side, passive social media use (PSMU) involves merely scrolling through one's feed and not interacting with others. This form of engagement is often tied to negative mental outcomes, such as loneliness and a decrease in overall well-being (Kross et al., 2013; Martilla et al., 2021).

Despite these broad categorizations, the relationship between social media use and mental health remains complex and is often mediated by various factors which are beyond the scope of this study. For instance, the type of content consumed and the context in which social media is used can significantly influence its psychological impact. Furthermore, the current empirical landscape provides mixed results, indicating that social media can either be a boon or a bane depending on the context and type of usage (Cunningham et al., 2021; Kross et al., 2020).

Previous research has shown that excessive use of social media, online forums, and virtual communication can be associated with higher levels of depression (Best, Manktelow, & Taylor, 2014). Factors like social comparison and reduced face-to-face interactions not only contribute to this association but also have the potential to lead to depression and social

isolation. In contrast, in-person interactions consistently lead to better mental health outcomes (Simone, Geiser, & Lockhart, 2019). Offline conversations, social gatherings, and physical touch enhance social support, emotional expression, and nonverbal cues (Lieberman & Schroeder, 2020).

Understanding Depression's Complexity

Depression is a unique aspect of mental health with its own complex challenges, making it different from other mental health problems. It is not a single, monolithic condition but a multi-faceted mental health issue with a network of interacting symptoms (Fried, 2015). This complexity aligns with the dimensional and symptom-based diagnostic approaches that have gained popularity in modern psychiatric research (Insel et al., 2010) contrary to the categorical classifications typically found in the DSM-5. In this view, the relationship between social life factors, such as social media use, and depression is not straightforward. Several lines of research underscore the heterogeneity of depression, which ranges from cognitive symptoms to emotional disturbances and even physical manifestations such as fatigue and sleep disruption (American Psychiatric Association, 2013). Individual symptoms, like loneliness, can have complex interactions with external elements, such as passive social media usage (Erzen & Çikrikci, 2018; Kross et al., 2013). Some research suggests that passive engagement with social media can increase feelings of social comparison and decrease well-being (Valkenburg, Peter, & Walther, 2016). Furthermore, the quantity of social media use doesn't always relate with mental health outcomes; instead, the quality of the interactions holds more weight (Primack et al., 2017). These interactions can trigger a domino effect, impacting multiple areas of one's mental health. For instance, loneliness may exacerbate cognitive distortions, leading to increased negative thinking and eventually, symptoms of depression (Cacioppo & Hawkley, 2009). The intricate relationship between individual symptoms and external factors necessitates a nuanced approach to understanding and treating depression, considering both its symptom heterogeneity and its interaction with lifestyle factors such as social media usage.

Gender and User-Specific Variables

It is important to mention that factors influencing mental health issues such as depression extend beyond just offline and online social media use. One's experience with

social media and its subsequent effect on mental health can also be highly personal, influenced by individual characteristics such as gender and personality (Ivie et al., 2020; Valkenburg et al., 2022). For example, women, who generally engage more with social media, are found to be more susceptible to its negative effects, like body image issues arising from constant upward social comparisons (Twenge & Martin, 2020; Hogue & Mills, 2019). Therefore, we deem important to explore how men and women differ in depression levels, as well as in individual symptoms, and social media use. This will help us understand the distinct ways each gender interacts with social media and its impact on their mental health.

The nature of one's social media usage can drastically influence real-world social support levels, further complicating its impact on mental health (Karim, Oyewande, & Abdalla, 2020). A high quality of social connections, especially with family and friends, has been found to be protective against depression, emphasizing the importance of the quality over the mere frequency of social interactions (Werner-Seidler et al., 2017). By exploring the specific aspects of social life that may influence depressive symptoms, including perceived social support, online social engagement, frequency of in-person interactions, and active social media use, this thesis research contributes to a deeper understanding of students' mental well-being.

Present Study

The impetus for this research stems from the increasingly complex dynamics between social life and mental health, particularly in the context of depression among students. At the core of this study is an empirical investigation on cross-sectional data from the first cohort of the WARN-D study (Stage 1), as detailed in the Methodology section. Our objectives are underpinned by previous research, which suggests that certain aspects of social life can act as either protective factors or vulnerabilities in relation to mental well-being.

Specifically, four central questions are posed. First, the aim is to explore how perceived social support—operationalized via constructs such as feelings of being loved, being heard, and depending on others—relates to depression levels among students. Second, the relationship between online social engagement (i.e., the use of social media and virtual communication platforms) and depression is scrutinized. Third, the nuances of social media usage are delved into, distinguishing between active and passive use, to assess their

relationship with depression. Lastly the frequency of in-person social interactions and its connection with depression levels is investigated.

Perceived social support will be analyzed through various constructs, including feelings of understanding and the frequency of conflicts within social relationships. Online social engagement will be assessed based on factors such as engagement frequency, duration, and the size of participants' online social networks. In-person interactions will be evaluated by considering their frequency and the size of participants' offline social circles. Social media usage will be characterized by the time spent and the nature of engagement, distinguishing between active and passive use. Depression levels will be measured using questionnaire scores as explained in detail in the Methodology section.

Based on existing literature, four hypotheses are posited. Hypothesis 1 posits that increased levels of perceived social support will be inversely related to depression levels, echoing findings from studies such as those by Wickramaratne et al. (2022). Hypothesis 2 anticipates a positive relationship between online social engagement and depression levels, substantiated by research like that of Best, Manktelow, and Taylor (2014). Contrarily, Hypothesis 3 suggests that frequent in-person interactions will be associated with lower depression levels, supported by studies like Lee, Leung, Lo, Xiong, and Wu (2010). Lastly, Hypothesis 4 proposes that active social media use will be negatively associated with depression levels, a concept supported by Valkenburg, van Driel, and Beyens (2021).

Methods

The study in question drew from initial data gathered by Leiden University's WARN-D research initiative. The purpose of WARN-D is to pinpoint early indicators of depression in students and to use this information to create individualized prevention strategies. This data gathering received ethical clearance from the Psychology Research Ethics Committee at Leiden University, granted on September 6, 2021 (reference ID: 2021-09-06-E.I.Fried-V2-3406).

Participants

Initially, 448 individuals took part in the baseline questionnaire in November 2021. Four of these participants did not finish the survey for reasons that are not clear and were subsequently omitted from the data set. Given that prior research largely concentrates on

teenagers and young adults—who are the most frequent users of social media—this study excluded participants over the age of 30. An additional 14 individuals above this age were consequently removed, resulting in a final sample of 430 participants. The average age was 22.2 years, with a standard deviation of 2.7 and an age range of 18-30. Concerning biological sex, 64 participants (14.8%) were male, while 366 (85.1%) were female. In terms of the highest education level achieved, 173 (40%) had completed pre-vocational secondary education, 20 (4.6%) had a secondary vocational diploma, 19 (4.4%) had completed higher vocational education, 211 (49%) had an academic university degree, and 7 (1.6%) were uncertain about their highest educational attainment.

Procedure

To recruit participants, various channels such as posters, social media, email newsletters, and personal referrals were utilized. Interested individuals could register their email addresses through an online form. Subsequently, they were invited to take part in online surveys where they were screened based on certain inclusion and exclusion criteria and asked to give informed consent, all in line with Leiden University's policies. Eligibility criteria mandated that participants must: (1) be a minimum of 18 years old, (2) be enrolled at a Dutch institution of higher education (MBO, HBO, or WO), (3) be proficient in Dutch or English, (4) possess a smartphone running Android or iOS, and (5) have a European bank account with an IBAN number. On the exclusion front, participants could not have a current diagnosis of (1) schizophrenia, psychosis, or a thought disorder, (2) major depressive disorder, (3) (hypo)mania or bipolar disorder, (4) primary substance use disorder, and (5) moderate to severe suicidal thoughts. Participants were screened for these exclusion criteria through queries regarding current psychological or psychiatric treatment and further validated self-report assessments. For participating in the baseline questionnaire, individuals were compensated with 7.5 euros.

Measures

Depression Symptoms

To gauge the symptoms of depression, a modified form of the Patient Health Questionnaire-9 (PHQ-9) was employed, as originally designed by Kroenke and colleagues in 2013. Participants responded to 14 items ($\alpha = .83$) designed to assess problems experienced in

the preceding two weeks (e.g., “feeling hopeless”) using a four-point Likert scale (0 = not at all, 1 = several days, 2 = more than half the days, 3 = nearly every day). Subsequently, they answered one item concerning impairment. The scale used for this measurement ranged from 0 to 3 (0 = Not at all, 3 = Nearly every day). These items evaluated how much the study participants were disturbed by specific depressive symptoms during the past two weeks, such as a lack of enthusiasm or joy, feelings of depression, exhaustion, difficulties in focusing, sensations of worthlessness, and feelings of despair, as identified by Fried in 2017. For example, one item inquired about having “Little interest or pleasure in doing things”. According to the scoring criteria, scores ranging from 0 to 4 indicate minimal or no depression, 5-9 suggest mild depression, 10-14 indicate moderate depression, 15-19 signal moderately severe depression, and 20-27 point to severe depression (Kroenke et al., 2001). For our tests this modified 15-item form of the PHQ-9 was recomputed back to the original 9 items.

Perceived Social Support

In the study, perceived social support was assessed among participants using a modified version of the Caring Universities survey (https://caring-universities.com). This tailored instrument zeroes in on multiple constructs capturing a broad spectrum of social support. These constructs encompass feeling loved and cared for by others, dependence and reliance on others for support, feeling understood and heard by others, perceived level of support demand or expectation, and the frequency of disputes in social relationships. The choice of these constructs was rooted in their importance in gauging social support, as originally identified by the Caring Universities survey. Each dimension is evaluated through single-choice questions crafted to explore diverse aspects of social connections and emotional health. Participants answer each query on an ordinal scale, where response options span from 1 (Not at all) to 5 (Extremely), allowing them to express their agreement level or frequency of experiences pertaining to each social support facet. For instance, an item might pose the question, “How frequently do you feel loved and cared for by others?”, with participants selecting from the five provided options (Caring Universities, 2022). To mitigate multicollinearity, stemming from moderate intercorrelations in our analyses (Burchert, Kerber, Zimmermann, & Knaevelsrud, 2021), a composite score was computed: we summed the positive constructs (feeling loved and cared for by others, dependence and reliance on others for support, feeling understood and heard by others) and the negative constructs

(perceived level of support demand or expectation, and the frequency of arguments in social relationships) were subtracted from the score.

Frequency of in-person interactions

Specific measures to evaluate the frequency and scope of in-person interactions among participants were included. These measures were adapted from the Caring Universities survey and focus on two key constructs that pertain to offline social activities. The first dimension, termed “Social Network (Interaction Frequency Offline),” assesses the frequency with which participants engage in face-to-face interactions. Participants are prompted to indicate how often they take part in offline social interactions, using a scale that ranges from “Never” to “Every day.” This measure aims to capture the regularity of direct social contact and can provide valuable insights into the participants’ level of social engagement. The second dimension, known as “Social Network (Size Offline),” examines the number of individuals with whom participants maintain regular face-to-face interactions. To gauge this, participants are asked to indicate the size of their offline social network on a scale that ranges from "1" to ”10 or more.” This measure provides a snapshot of the extent of each participant’s in-person social circle. Through these two constructs, the study seeks to offer a comprehensive understanding of the frequency and extent of face-to-face interactions among participants. This, in turn, provides a nuanced view of their offline social activities and connections, supplementing our broader investigation into social support and well-being.

Social Media

Online social engagement

To assess Online social engagement, the study employs two specific measures adapted from the Caring Universities survey. The first measure, “Social Network (Interaction Time Online),” gauges the frequency and duration of participants’ online social engagement. Participants indicate their level of online engagement using a scale that ranges from “I don’t do these things” to “More than 6 hours a day.” The second measure, “Social Network (Size Online),” examines the number of individuals participants regularly interact with online. For this metric, participants use a scale that ranges from “1” to “10 or more” to indicate the size of their online social network. By summing their scores, these measures together provide a

quantitative understanding of the frequency, duration, and extent of participants' online social interactions.

Social Media Use

For the aspect of Social Media Use, the study also adopts two specific measures from the Caring Universities survey developed by WARN-D. The first, labeled "Social Media Time," evaluates the amount of time participants allocate to social media platforms. Participants choose from a variety of options that range from "I don't use social media" to different time intervals such as "<30min," "30-60min," "1-2hrs," "3-4hrs," "5-6hrs," and ">6hrs." The second measure, "Social Media Use (Active/Passive)," assesses the level of active versus passive engagement on these platforms. Participants indicate their engagement type on a scale from 0 to 100%, where 0% represents only passive use, and 100% signifies only active use. This approach offers a quantitative assessment of both the time spent on social media platforms and the nature of that engagement, whether it be active or passive. By employing these distinct measures, the study aims to obtain a more nuanced understanding of both online social engagement and social media usage, and how these factors might influence.

Statistical Analyses

All statistical analyses were conducted using the open-source statistical software R (v 2023.06.1+524). An array of tools was used for different parts of data cleaning and organization, the running of statistical tests, as well as the plotting and formatting of test outputs. The main tools utilized will be highlighted in the interest of facilitating similar analyses for future students and other researchers. First, the dplyr tool was employed, part of the tidyverse suite. This was used throughout to simplify the coding expressions and to facilitate data manipulation with functions such as select, exclude, and mutate. Tidyverse proved an invaluable tool; indicatively, the composite values for depression levels and perceived social support levels were constructed by summing the appropriate columns with the mutate function.

For the hypothesis testing, as well as the multiple linear regressions presented below, R's built-in functions for linear tests were used, also known as lm. We first utilized univariate linear regressions to show the relationship between each construct and depression levels in

isolation. We then utilized a multiple linear regression to show the relationship between all constructs and depression levels simultaneously where we also account of the effects of gender. These investigations focused on understanding:

- The association of perceived social support with depression levels, echoing findings.
- The relationship between online social engagement and depression.
- The impact of regular face-to-face interactions on depression.
- The potential correlation between active engagement on social media and depression.

As factors were sequentially introduced, it was particularly important to account for potential multicollinearity stemming from intercorrelations in the independent variables. To this end, the independent variables were compiled in a data frame and the correlation matrices were produced, checking for correlations that exhibited a moderately strong relationship, here denoted by .35 in absolute terms.

To test the collective significance of differences between men and women in terms of symptoms, we employed a MANOVA test using R's built-in function. We also utilized ANOVA tests to assess the significance of individual symptoms between men and women.

For visualizations of the descriptive statistics, we relied on the stargazer package, which was manually modified to also accommodate descriptive statistics (Hlavac, 2018). To ensure the most aesthetically pleasing results, the analyses were first exported in LaTeX, compiled using Overleaf, and then converted to Word where final changes were made. Plots were constructed utilizing the ggplot2 library and were compiled into single graphics using gridExtra. To showcase the factors influencing depression and the relationship between them we used R's built-in LOESS function. This function fits a smooth curve to the data by using weighted linear regression over local neighborhoods of each point in the data set, allowing for a flexible fit that captures the underlying trend without assuming a specific parametric form like a straight line.

Results

Descriptive Statistics

The descriptive statistics of the study revealed several key characteristics of the population, which are detailed in the subsequent sections. As evident in Table 1, symptoms like "Loss of Interest or Pleasure", "Worthlessness", and "Psychomotor Disturbance" were typically minimal to non-existent. However, participants experienced more pronounced

symptoms like “Depressed Mood”, “Sleep Problems”, and “Fatigue”. ‘Concentration Problems’ were also somewhat prevalent with a mean of 1.09. Furthermore, participants engaged primarily in “Passive Social Media Use” (PSMU). Lastly, the “Perceived Social Support” metric suggested that participants generally felt a reasonable level of support.

Table 1.

Descriptive Statistics of Variables

Variable	N	Mean	St. Dev.	Min/Potential Min	Max/Potential Max
Loss of Interest or Pleasure	427	0.73	0.76	0/0	3/3
Depressed Mood	427	0.84	0.73	0/0	3/3
Sleep Problems	427	1.16	0.95	0/0	3/3
Fatigue	427	1.45	0.89	0/0	3/3
Appetite Problems	427	0.86	0.86	0/0	3/3
Worthlessness	427	0.76	0.83	0/0	3/3
Concentration Problems	427	1.09	0.94	0/0	3/3
Psychomotor Disturbance	427	0.36	0.63	0/0	3/3
Suicidal Ideation	427	0.15	0.44	0/0	3/3
Time Spent on Social Media	429	3.84	1.35	1/1	7/7
Type of SMU	405	24.50	22.92	0/0	100/100
Perceived Social Support	427	6.99	2.78	−2/-10	13/15

Note. ‘‘Type of SMU” measures the percentage of active vs passive use of social media (0 = only passive, 100 = only active). Of the total 430 participants, 25 didn’t answer the “Type of SMU” due to non-use of social media. One participant skipped the ‘Time Spent on Social Media’ question. Three participants did not respond to other listed variables. The Min and Max columns depict the range of each scale used.

Both male and female participants displayed varying degrees of depressive symptoms. Females reported slightly higher levels of symptoms across several domains, although most differences were not statistically significant according to ANOVA tests. 'Psychomotor Disturbance' and 'Sleep Problems' were higher in females ($p < .05$ and $p < .01$, respectively). Females also presented higher fatigue levels ($p < .01$). Both genders reported similar hours of social media usage and types of engagement, as well as perceived social support. For detailed statistical data, refer to Table 2 below.

Table 2.

Descriptive Statistics of Variables per Gender Group

Gender		N	Mean	St. Dev.	Min	Max
Female	Loss of Interest or Pleasure	363	0.74	0.75	0	3
	Depressed Mood	363	0.86	0.72	0	3
	Sleep Problems	363	1.22	0.96	0	3
	Fatigue	363	1.51	0.90	0	3
	Appetite Problems	363	0.90	0.87	0	3
	Worthlessness	363	0.78	0.85	0	3
	Concentration Problems	363	1.12	0.94	0	3
	Psychomotor Disturbance	363	0.38	0.64	0	3
	Suicidal Ideation	363	0.15	0.45	0	3
	Time Spent on Social Media	365	3.92	1.35	1	7
	Type of SMU	347	24.54	22.82	0	100
	Perceived Social Support	363	6.96	2.74	-2	13
Male	Loss of Interest or Pleasure	64	0.67	0.81	0	3
	Depressed Mood	64	0.73	0.78	0	3
	Sleep Problems	64	0.87	0.82	0	3
	Fatigue	64	1.15	0.80	0	3
	Appetite Problems	64	0.59	0.75	0	3
	Worthlessness	64	0.70	0.77	0	3
	Concentration Problems	64	0.93	0.92	0	3
	Psychomotor Disturbance	64	0.23	0.52	0	2
	Suicidal Ideation	64	0.14	0.39	0	2
	Time Spent on Social Media	64	3.39	1.25	1	6
	Type of SMU	58	24.24	23.75	0	93

Perceived Social Support	64	7.12	3.05	-2	12

Note. Of the total 430 participants, 16 females and 6 males did not answer the 'Type of SMU' due to non-use of social media. Two females skipped the 'Time Spent on Social Media' question. For females, the remaining discrepancies in the number of respondents for other listed variables amount to 3 non-responses. For males, all other listed variables have consistent responses. The Min and Max columns indicate the range of each scale used.

As Table 3 depicts, we assessed the collective significance of the different depressive symptoms between men and women with a MANOVA test and found those differences to be statistically significant ($p < .05$).

Table 3.

MANOVA Depressive Symptoms between genders

Variable	Df	Pillai	Approx.F	NumDf	DenDf	Pr(>F)
Gender	1	0.036	1.74	9	417	0.076*
Residuals	425					

Note: Asterisks (∗,∗∗,∗∗∗) denote statistical significance: ∗ denotes significance at the 0.05 level, ∗∗ at 0.01 and ∗∗∗ at 0.001.

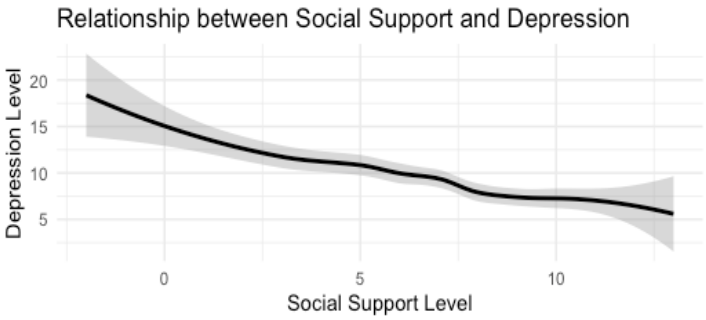
Factors Influencing Depression Levels

The following study's visualizations, detailed in Figures 1 to 3, underscore the complex interplay between social dynamics and mental well-being and reveal key insights into the relationship between social factors and depression. Specifically, Figure 1 illustrates the contrasting effects on depression. Increased social support correlates with decreased depression, while prolonged social media use may have the opposite effect. Figure 2 shows the different impacts of online versus offline interactions on depression, highlighting the importance of examining the nature and quality of these interactions. Lastly, Figure 3 indicates that the mode of engagement on social media (active/passive) may significantly affect depression levels, underscoring the need for a balanced approach to online activity.

The grey region around the spline represents the confidence interval, which R's function "LOESS" also calculates. It shows the range of values within which we can expect

the true regression line to lie, with a certain level of confidence. This interval accounts for the variability in the data and gives us a visual measure of the uncertainty of the curve's estimates.

Figure 1.



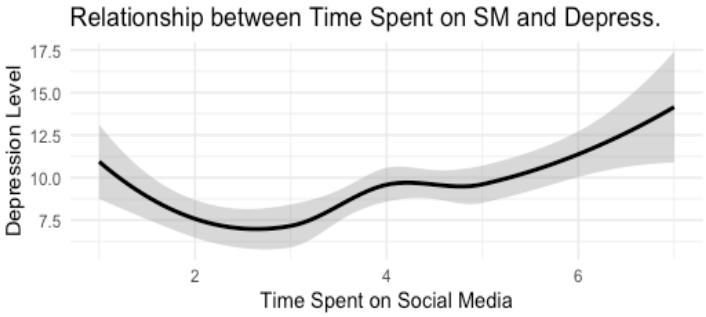
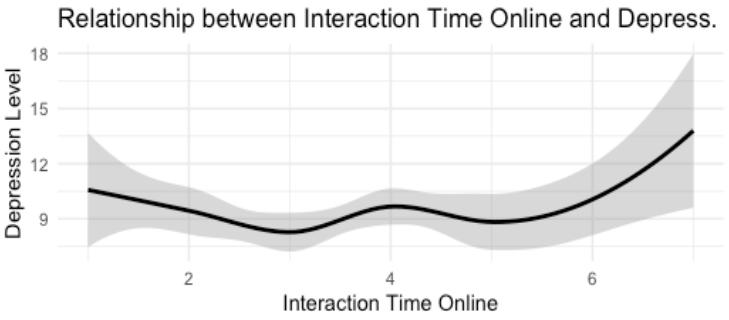


Figure 2.



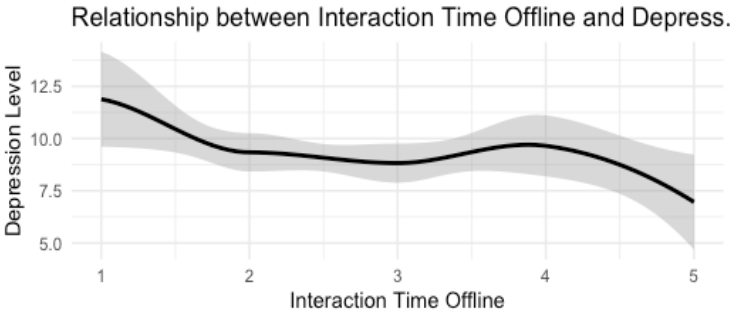
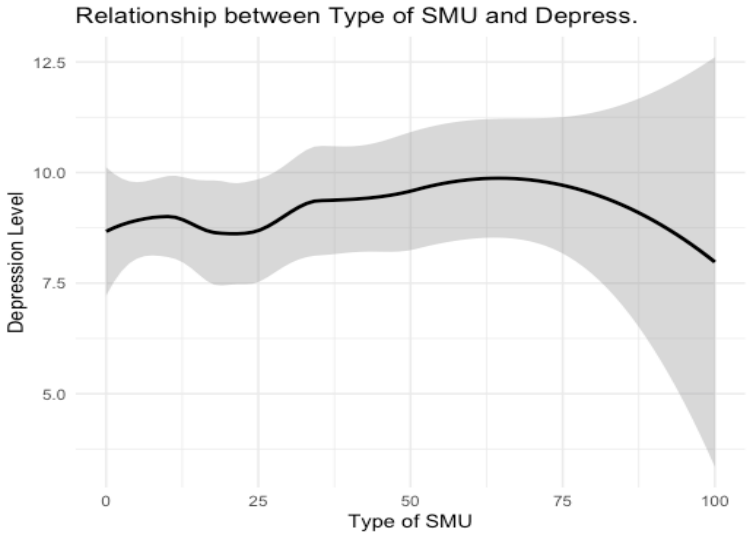


Figure 3.



Hypothesis Testing & Regression Analysis

Table 4 presents the results from regression analyses where the dependent variable is "Depression." Four different hypotheses were tested, and their respective results are displayed in columns.

Hypothesis 1: For the first hypothesis, the predictor variable was 'Perceived Social Support.' A significant negative relationship was observed between Perceived Social Support and Depression ($B = -0.53$, $SE = 0.08$, $p < .001$), indicating that an increase in Perceived Social Support is associated with a decrease in Depression levels. The model was statistically significant ($F(1, [df]) = 48.79$, $p < .001$).

Hypothesis 2: Here, the predictor was 'Interaction Time Online.' The analysis revealed a positive but not statistically significant relationship between Interaction Time Online and Depression ($B = 0.18$, $SE = 0.19$, $p > .05$).

Hypothesis 3: The third hypothesis used 'Interaction Time Offline' as the predictor. The analysis indicated no statistically significant relationship between Interaction Time Offline and Depression ($B = -0.40$, $SE = 0.23$, $p > .05$), although it suggests that more offline interaction has a negative relationship with levels of depression.

Hypothesis 4: In this hypothesis, the predictor was 'Type of SMU.' The Type of SMU had a minimal positive relationship with Depression, but this was not statistically significant ($B = 0.01$, $SE = 0.01$, $p > .05$). It is important to note that the number of observations for this hypothesis was 403, slightly fewer than the other hypotheses. This reduction in observations is because these participants indicated that they do not use social media and, consequently, were not presented with the question on 'Type of SMU'.

Table 4.

Hypotheses

	Dependent variable			
	Depression			
	Hypothesis 1	Hypothesis 2	Hypothesis 3	Hypothesis 4
Perceived Social Support	—0.53***			
	(0.08)			
Interaction Time Online		0.18		
		(0.19)		
Interaction Time Offline			—0.40	
			(0.23)	
Type of SMU				0.01
				(0.01)
N	427	427	427	403
R^2	0.11	0.001	0.01	0.002

Residual Std. Error	4.33 (df = 425)	4.57 (df = 425)	4.56 (df = 425)	4.47 (df = 401)
F Statistic	48.79*** (df = 1; 425)	0.92 (df = 1; 425)	3.16 (df = 1; 425)	0.49 (df = 1; 401)

Note. Coefficients show change in Depression per predictor unit, with standard errors in parentheses. Asterisks (*, **, ***) denote statistical significance: * denotes significance at the 0.05 level, ** at 0.01 and ∗∗∗ indicates significance at the 0.001 level. "N" denotes observations, "R^2" the explained variance, and "F Statistic" model significance.

In the multivariate regression analysis, the influence of several predictors on the level of depression were evaluated. The findings, summarized below, are detailed in Table 5. "Perceived Social Support" displayed a consistent inverse relationship with depression across all models. Each unit increase in social support was associated with a decrease in depression levels, a statistically significant finding. The initial positive relationship of "Interaction Time Online" with depression was not significant. However, in later models, this predictor reached statistical significance, suggesting a positive relationship with increased depression levels. "Interaction Time Offline" showed an inverse relationship with depression, but this was not statistically significant. "Type of Social Media Use" (Passive/Active) had a nominal positive relationship with depression, though this was not statistically significant. "Gender" showed a significant positive relationship with depression levels, indicating that gender plays a critical role in how depression varies among individuals. The overall variance explained by these models in depression levels ranged from 10% to 12%.

Table 5.

Multiple Regression Analysis

	Dependent variable				
	Depression Level				
	(1)	(2)	(3)	(4)	(5)
Perceived Social Support	-0.53***	-0.53***	-0.52***	-0.50***	-0.49***
	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)
Interaction Time Online		0.27	0.31	0.41	0.43*
		(0.18)	(0.18)	(0.19)	(0.19)
Interaction Time Offline			—0.25	-0.24	-0.25
			(0.22)	(0.23)	(0.22)

Type of Social Media Use				0.003	0.002
				(0.01)	(0.01)
Gender					1.42*
					(0.60)
N	427	427	427	403	403
R^2	0.10	0.11	0.11	0.11	0.12
Adjusted R^2	0.10	0.10	0.10	0.10	0.11
Residual Std. Error	4.33 (df =425)	4.33(df=424)	4.32 (df =423)	4.23 (df =398)	4.21 (df =397)
F Statistic	48.79*** (df=1;425)	25.58***(df=2;424)	17.47***(df=3;423)	12.53*** (df =4;398)	11.26***(df=5;397)

Note. *p < .05 **p < .01, ***p < .001

We identified no multicollinearity (see Table 6). The correlational matrix aids in understanding the interrelationships between the variables of interest.

Table 6.

Correlational Matrix

	Depression Level	Perceived Social Support	Interaction Time Online	Interaction Time Offline	Type Of Social Media Use	Gender
Depression level	1	-0.32	0.04	-0.08	0.03	0.13
Perceived Social Support	-0.32	1	0.06	0.16	-0.01	0.01
Interaction Time Online	0.04	0.06	1	0.24	0.19	-0.02
Interaction Time Offline	-0.08	0.16	0.24	1	0.08	0.01
Type of Social Media Use	0.03	-0.01	0.19	0.08	1	0.01
Gender	0.13	-0.01	-0.02	-0.01	0.01	1

Discussion

In the context of young adulthood, the dynamic interplay between online and offline social networks has become increasingly complex. The findings of our study shed light on this relationship and its implications for mental well-being. When we consider the wide array of online connections facilitated by social media platforms, it's essential to differentiate between

the breadth and depth of these interactions. While these platforms have made it easier for young adults to connect with people worldwide and potentially reduce feelings of isolation, the quality of these interactions can often be superficial. This superficiality contrasts with the deeper, more immersive experiences typically associated with face-to-face interactions. In-person meetings offer the richness of non-verbal cues, immediate feedback, and a palpable sense of presence, all of which can enhance the perception of genuine support. This difference may help explain why some young adults, despite having many online connections, still feel a lack of meaningful social support.

The study, although preliminary, highlights the importance of further longitudinal research. It's crucial to understand the impact of increased social media usage on mental health, particularly among younger individuals, and how online platforms may influence perceived social support. If certain social media practices diminish perceived social support, it could be a significant risk factor for depression. This research underscores the urgency of exploring the consequences of digital social interactions on mental health, particularly regarding perceived social support.

Perceived Social Support and Depression

Perceived social support plays a fundamental role in shaping emotional well-being, and its significance cannot be overstated. Our analysis firmly underscores its pivotal role in mitigating depression among young adults, a finding consistent with previous research (Cohen, 2004; Kawachi & Berkman, 2001). The influence of perceived social support on depression can be attributed to its impact on self-esteem, its role in providing emotional resilience against life's challenges, and its contribution to a profound sense of belonging (Thoits, 2011). Recognizing the power of perception in shaping emotional states, it becomes clear that targeted interventions aimed at aligning individuals' perceptions with their actual social realities or enhancing the tangible support they receive can be highly effective in preventing and alleviating depression in young adults (Hefner & Eisenberg, 2009). Community-based programs, peer support networks, and counseling services have emerged as valuable tools in this regard.

Social Media and Depression

Exploring the intricate terrain of social media's influence on mental health reveals a complex landscape. While the time spent on these platforms may offer insights into emotional well-being, it is the quality of this digital engagement that appears to be of greater consequence. Moderate usage, characterized by active and constructive participation (e.g., sharing positive life updates and engaging in meaningful conversations) can enhance feelings of inclusion and social relevance (Winstone, Mars, Haworth, & Kidger, 2021). However, a shift towards excessive use or passive engagement, such as endless scrolling and making unfavorable comparisons, can evoke feelings of inadequacy and alienation. Moreover, the role of social media in the lives of young adults is multifaceted. For those already contending with depressive symptoms, these virtual spaces may provide solace, opportunities for self-expression, and connections with like-minded communities. Conversely, these platforms can also amplify feelings of exclusion, especially when confronted with idealized depictions of happiness and success.

Our findings, indicating no significant relationship between the duration of online social engagement and depression levels among young adults, align with recent research emphasizing that the sheer quantity of online social engagement alone may not robustly predict depression (Primack et al., 2017). This underscores the multifaceted and context-dependent nature of the impact of social media on mental health. Indeed, studies suggest that the effects of social media use can vary significantly based on specific online activities, such as passive scrolling versus active engagement (Primack et al., 2017).

Furthermore, the absence of a significant relationship between the type of social media use (active vs. passive) and depression levels in our study underscores the inherent complexity of this issue. Existing research highlights that the impact of social media use on depression is mediated by a plethora of factors, including the content of online social engagement, the presence of cyberbullying, and the dynamics of social comparison processes (Turel & Qahri-Saremi, 2016). It is essential to acknowledge the dual nature of social media, as it can simultaneously function as a source of social support and exacerbate feelings of isolation, depending on the specific context (Deters & Mehl, 2013). Consequently, a nuanced and comprehensive perspective is indispensable when assessing the impact of social media on mental health.

Offline Interaction Time and Depression

The significant inverse relationship discovered in our study between offline interaction time and depression levels underscores the vital role of face-to-face social interactions in preserving the mental well-being of young adults (Teo, Choi, & Valenstein, 2013). This finding aligns with existing research emphasizing the unique benefits of offline interactions for mental health. Offline interactions offer a range of opportunities for emotional bonding, social support, and the development of essential interpersonal skills (Teo, Choi, & Valenstein, 2013). For instance, in-person conversations allow for nuanced communication through non-verbal cues like facial expressions and body language, which can enhance emotional connection and understanding (Reis & Gable, 2003). Moreover, offline interactions provide a platform for immediate feedback, reducing feelings of isolation and loneliness (Joiner & Katz, 2006). Engaging in face-to-face activities can create a sense of belonging and foster deeper connections, which are vital protective factors against depression (Thoits, 2011; Leary, 2010). In educational settings, promoting offline interactions among young adults is paramount. Group activities, team sports, and campus events offer structured opportunities for social engagement and can significantly contribute to the prevention and management of depression (Eisenberg, Gollust, Golberstein, & Hefner, 2007; Teo, Choi, & Valenstein, 2013). Encouraging young adults to participate in offline interactions not only complements their mental health but also provides a holistic approach to their social development (Gross, 2009).

Gender and Individual Differences

In the realm of social media's influence on mental health, it's essential to acknowledge its deeply personalized nature, shaped by individual characteristics such as gender and personality. Women tend to be more active users of social media, potentially rendering them more susceptible to its negative consequences, including body image issues arising from social comparisons. Moreover, the nuances of social media usage can have a profound impact on an individual's real-world social support, further complicating the relationship between social media use and mental health. Our study's observation of gender disparities in depressive symptoms aligns with a wealth of existing research, indicating that females exhibit a higher likelihood of experiencing depression and reporting elevated levels of specific symptoms (Kuehner, 2017). These disparities arise from a complex interplay of factors, including hormonal distinctions, differential coping mechanisms, and the pervasive influence of societal expectations (Kuehner, 2017; vida & Olfson, 1995). To address these gender-

specific challenges effectively, interventions should be tailored to meet the unique needs of young adult males and females. For example, tackling body image concerns, which are more prevalent among females due to the impact of social media and prevailing beauty standards, assumes paramount significance (Perloff, 2014)."

The study's findings illuminate the complex relationship between social life, social media use, perceived social support, and depression in young adults, which is especially pertinent in today's digital age dominated by social media's influence. This recognition of the intricate relationship between these factors aligns with previous research emphasizing the impact of social context on mental health (Thoits, 2011). The integration of social media into daily life, particularly among young adults, has intensified the relevance of understanding its effects on well-being (Primack et al., 2017). While the COVID-19 pandemic accelerated the reliance on digital communication, the study underscores that in-person interactions remain crucial for emotional engagement due to richer social cues. This acknowledgment is consistent with research highlighting the importance of face-to-face communication in fostering emotional connections (Reis & Gable, 2003). The COVID-19 pandemic's impact on social interactions further underscores the significance of this aspect (Loades et al., 2020). Recognizing social media's integration into modern life, especially among young adults, the study delves into its multifaceted impact, distinguishing between active and passive use. The distinction between active and passive social media use is supported by existing literature (Primack et al., 2017). Research has shown that active engagement can have positive effects, while passive scrolling may lead to feelings of loneliness (Primack et al., 2017; Turel & Qahri-Saremi, 2016). The study also highlights depression's nuanced nature, comprising various interacting symptoms. It acknowledges that these symptoms, such as loneliness, can interact with external factors like passive social media usage, potentially worsening depressive symptoms. This recognition aligns with the understanding that depression is a complex and heterogeneous condition with multiple contributing factors (Kessler et al., 2016). The interplay between symptoms and external factors has been emphasized in prior research (Joiner & Katz, 1999). Furthermore, the study acknowledges that one's experience with social media and its effect on mental health can be highly personal, influenced by individual characteristics such as gender and personality. Women, who generally engage more with social media, may be more susceptible to its negative effects, such as body image issues arising from social comparisons. Additionally, the nature of social media usage can influence

real-world social support levels, further complicating its impact on mental health. The influence of individual characteristics on the relationship between social media and mental health is consistent with prior research (Primack et al., 2017). The impact of social media on real-world social support levels has been explored in previous studies as well (Primack et al., 2017).

Implications

The intricate relationship between social dynamics in the digital age and mental well-being is increasingly under academic scrutiny. This study, while exploratory in nature, sheds light on the potential association between social media usage and depressive levels among students. Interestingly, our findings also suggest that perceived social support plays a pivotal role in mediating this relationship, hinting at the nuanced ways in which online social engagement might influence our psychological states. Despite these insights, the cross-sectional nature of our data constrains our ability to pinpoint definitive conclusions about causality or directionality. While the current findings don't seamlessly translate into applied clinical strategies, they accentuate the importance of more in-depth, longitudinal research. Such studies could provide insights into the differentiated impacts of Active Social Media Use (ASMU) and Passive Social Media Use (PSMU) on mental well-being. Specifically, they could elucidate whether ASMU or PSMU is more strongly associated with heightened depressive moods, or if either form of engagement offers protective or mitigative effects against such moods. This understanding is particularly paramount for younger cohorts, who are major consumers of social media. Their developmental phase coupled with their evolving social interactions makes this demographic potentially more susceptible. Additionally, understanding how perceived social support, as facilitated or hindered by online platforms, contributes to mental well-being will be crucial. If, for instance, certain social media platforms or practices diminish perceived social support, it could be a significant risk factor for depression. This research, although preliminary, serves as a foundational stone. It emphasizes the urgency to investigate the potential repercussions of digital social interactions on mental health, especially in the context of perceived social support.

Strengths & Limitations

In this research, a comprehensive approach that encompassed both online and physical interactions was adopted, offering an encompassing view of university students' social

experiences in today's digital landscape. A key strength of our study is its holistic understanding. By simultaneously examining online and physical realms, a richer and more nuanced insight into the modern student's social environment was gained. The emphasis on perceived social support has proven invaluable. It not only expanded the depth of the analysis but also spotlighted potential protective factors in the challenges associated with social media usage. By focusing specifically on university students, the immediate relevance of our findings was ensured, considering this demographic's intimate engagement with both digital and tangible interactions. While the cross-sectional nature of the data does present certain inherent limitations, it provides a significant snapshot, setting a foundation for possible longitudinal studies in the future. This research aims to explore both the positive and negative aspects of social media interactions, striving for a balanced viewpoint. The methodological approaches that were adopted, from careful selection criteria to the use of validated research tools, are aimed at ensuring the accuracy and relevance of our findings.

The limitations of this study are multifaceted, rooted primarily in its cross-sectional design. This type of data collection restricts our ability to draw any causal links or ascertain the directionality of the observed associations. Essentially, a cross-sectional approach offers only a "snapshot" view of the situation at a single point in time, thus not accounting for any evolution or changes that could occur over a more extended period. Another significant constraint is the potential for recall bias. Since participants were asked to self-report their recent emotions like depression, stress, and loneliness, as well as their typical daily activities such as social media use, the results may be influenced by their current emotional state or circumstances. This could lead to over-reporting or under-reporting, thereby affecting the validity of the findings. In terms of data measurement, the study used a between-subjects design, focusing on group-level data. While this can offer valuable insights, it inherently overlooks the nuances of individual differences, which can be crucial for a more comprehensive understanding of the studied phenomena. The sample size also imposes limitations. Data was drawn from 430 participants involved in the initial phase of the larger WARN-D research project, which aims to encompass 2000 participants. This relatively small sample size may not adequately represent the broader population, affecting the generalizability of the findings. Moreover, the demographic composition of the sample further restricts its representativeness. A significant portion of the participants were female (84.7%), and previous research suggests that women, on average, engage more in social media

activities than men do (Twenge & Martin, 2020). This gender imbalance raises questions about the potential bias in the results and their applicability to a more balanced, gender-diverse population. Lastly, the study is limited by its focus on a specific age group, ranging from 18 to 30 years. This concentration on a relatively narrow age range means that the results are not readily generalizable to other age cohorts, potentially missing important life stage-specific influences on the variables under study.

Given that our dataset was collected in 2021, during the COVID-19 pandemic, this timing significantly influences the interpretation of our findings on offline social interactions. The restrictions on in-person gatherings and the widespread adoption of social distancing would have likely resulted in fewer face-to-face interactions for many participants (Brooks et al., 2020). It is necessary to consider this context when assessing responses about the frequency of offline social interactions and the size of in-person social networks. The pandemic's impact may have led to a temporary decrease of offline social networks and a shift towards online communication (Gioia, Fioravanti, Casale, & Boursier, 2021). Therefore, we need to take into consideration these unique circumstances, as they provide a unique perspective for interpreting the collected data, reflecting not just general social interaction patterns but also the adaptability and resilience of social networks in times of global crisis.

In summary, while the study offers valuable insights, the limitations imposed by its design, sample size, timing, and demographic composition must be considered when interpreting the findings and their broader implications.

Conclusion

This thesis explored the confluence of online and physical interactions, scrutinizing their social and psychological impacts on university students. The data suggested that while average social media usage is linked to specific depressive symptoms, perceived social support plays a notable mediating role. The interplay between the social constructs of our digital age and the psychological ramifications they bring to the fore is complex. As we navigate a world where digital and physical social realms coexist, this research lays foundational groundwork, underscoring the intertwined nature of our social behaviors and mental well-being.

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