INVESTIGATING THE INTERPLAY OF STRESS, LONELINESS, AND SOCIAL MEDIA ADDICTION AMONG MILLENNIALS AND GEN Z

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ABSTRACT

The pervasive use of social media has become a double-edged sword, offering both connectivity and the risk of addiction. As stress levels rise in modern society, individuals increasingly turn to social media platforms as a means of escape and emotional regulation. However, this behavior may be compounded by underlying feelings of loneliness, which can exacerbate the relationship between stress and social media addiction. The current study explores the mediating role of loneliness in the relationship between stress and social media addiction among millennials and Generation Z. The research employed the Bergen Social Media Addiction Scale (BSMAS), the Perceived Stress Scale (PSS), and the Three-Item Loneliness Scale (SIS) among 411 participants. This study identified that the level of social media addiction, perceived stress, and loneliness had a significant positive correlation. Mediation analysis suggests that loneliness acts as a mediator between social media addiction and perceived stress. Also, Generation Z had a higher degree of social media addiction compared to millennials to support the second hypothesis about the higher jeopardy of young people when it comes to the negative impacts of social media usage. Therefore, it can be seen that understanding and preventing loneliness is essential to reduce stress and improve well-being in young adults. Consistent with the results of the study, the authors stress the importance of preventive measures to minimize the negative effects of social media use and encouraging the moderation of screen time. Further research should be carried out with the inclusion of different subjects and study designs with a view of establishing the extent of the associations between these factors and designing intervention approaches that would foster the psychological well-being of young adults in this digital world.

Keywords: Loneliness, Stress, Social Media Addiction, Generation Z

INTRODUCTION

Now-a-days, researchers and the general population both have voiced worries about the immense use of digital technology, especially more focus on cell phones, social media usage (Dienlin & Johannes, 2022). In the past, digital media appeared as a new way of communication and information obtaining. At the present time, it is in all spheres of our lives, and it is used as a means for human communication, education, entertainment, and more (Wertime & Fenwick, 2011). Nevertheless, the advantages of social media usage are complemented by the issues that have been raised about its addictive nature and its effect on mental health and well-being. Generations Z (born between the mid-1990s and early 2010s) and millennials (born between the early 1980s and mid-1990s) (DUISENBEKOVA, 2023) are two cohorts that have grown up with the fast spread of social media platforms. Social media is a part of the daily routine of digital

natives, affecting their social relationships, identity formation and leisure activities. Hence, the factors that are responsible for the social media addiction among these cohorts are very significant. The strain is one of the significant factors that have been found to be in social media addiction. Stress, which is the psychological and physiological reaction to the perceived threats or challenges, has been proven to be related to the excessive use of social media and other addictive behaviors like that by means of excessive use of social media (Andreassen et al., 2016). The incessant need to do well in school, stay connected with social contacts, and stay up-to-date with the latest technology can make people across generations, including Z Generation and millennials, more stressed.

Stress, which is a complicated psychological act arising when people face extraordinary circumstances that are beyond their capacity to handle mental stress, is the result of a complex psychological reaction. However, the behavioral response of people to these trigger factors will greatly depend on their own preferred coping mechanisms. Yet, the level of stress they experience can be as low as very intense (Schneiderman, et al., 2005). The manner in which stress reveals itself is extremely personalized, demonstrating a person's ability to adapting and assessing the concerns of their life. Stress can perform multi-lateral functions, on some occasions it acts as a stepping-stone removing many obstacles, but sometimes in spite of the strain it is experienced. However, stress turn acute or chronic can cause much harm, mental and emotional side (Beiter et al., 2015).

Besides, loneliness has been found to be one of the strongest predictors of addictive behavior, mainly in the area of social media use. Loneliness, which is mostly due to the fact that people feel socially isolated and not connected to others, is highly common among Z Generation and millennial people, who usually use social media as their way of dealing with the feeling of loneliness (Twenge & Campbell, 2018). On the contrary, while social media lets you to connect virtually, it may also worsen the feeling of loneliness and social comparison, resulting in badly use of the phone and addiction (Primack et al., 2017).

Individuals who are not part of the social circle may have a less active life where social networks and connections become almost non-existent. This could be because of physical distance, emotional distance, differences in expectations, or any other factor (Primack et al., 2019). Being alone and being lonely are not genuine partners in crime. They are not the same things. Social isolation and aloneness differ in terms of their nature but have one commonality as they are both contemporary problems. Other-oriented tendency (social isolation) is the state not the emotion when an individual perceives oneself to be devoid of desired social connections. Inner-oriented tendency (loneliness) is the subjective state; it is a feeling of social isolation or feeling of loneliness, when one perceives a gap between the actual and ideal social relationships. The unpleasant truth of social detachment is that it has effects on one's mental and emotional health, which often causes people to isolate even more as they cannot stand this kind of loneliness (Ahmad et al., 2022). The association of these components urges a person to get to the point when type up countermeasures not only towards the objective loneliness but the subjective emotional states it creates.

Initially, it has been implied by some past researches that stress is linked to the rise of social media addiction. This policy is strengthened by research outcomes, which demonstrate the existing link between stress and overall Internet addiction (Tang et al., 2014). Based on the fact that stress is related to the internet addiction that

come in a general form, we can assert that stress may also contribute to social media addiction in a general form. As an exemplification, a work (Hou et al., 2017) on the relationship between stress and individuals' problematic use of social media was undertaken by the researcher that showed that using social media in problematic ways happens because stress levels get high in a person's life.

The point is that technology is not just a tool that people occasionally use but it is integrated deeply into their routine lives (Henderson et al., 2015). A continuous exposure to the Internet may have potential impact on their mood, thinking, and social relationships (Nowland et al., 2018). A major issue with regards to the frequency of which students use digital platforms, such as social media, is to what degree social media impacts the overall wellbeing of students. This study will be focused on the relationship between the digital media engagement and healthcare that is from multi-dimensional perspectives where it consists of biological, psychological, and social dimensions (Ahmadvand et al., 2018). It is also worth mentioning that even though online overexposure can derail the development of teenagers, healthy utilization contributes to the cultivation of desirable results such as higher learning, richer social connections, and better emotional wellbeing.

Taking into account the convergent effects of stress, loneliness and social media use on the addictive behavior, it is imperative to investigate the mediating role of loneliness in the linkage between stress and social media addiction among Z Generation and millennial populations. Through the analysis of these processes, the researchers and practitioners can come up with specialized interventions that will help to overcome the negative effects of stress and loneliness on the social media addiction and establish the healthier patterns of the digitization.

Social media has now turned out to be a part of daily life for the people of all generations, but especially for the Z Generation and millennials. These young digital natives have been exposed to a highly connected world since they were born, where social media are the main channels of communication, socialization, and self-expression (Twenge & Campbell, 2018). Nevertheless, at the same time, the massive popularity of social media, some problems have sprouted up regarding its possible bad effects on the mental and physical health, for example, social media addiction.

The literature on digital media addiction exhibits different kinds of research results. Studies by Burén, J (2021) reveal a preponderance of students' SMA over IGA (Jonas Burén, 2021). The study (Fu et al., 2010) focused on relationship between increased internet addiction and increased negative emotions in teens was reported. As cited by (Cerniglia et al., 2019)and (Weinstein et al., 2015), investigators who studied psychopathological signs and addictive behaviors focused on gender roles and the phases of development. Also, the researchers (Patel et al., 2021) found that social media addiction of undergraduate health professionals was tangled with stress and poor sleep, which was similar to (Vannucci et al., 2017)'s research that indicated increased level of social media usage led to lower self-esteem and heightened anxiety among teenagers.

Stress and Social Media Addiction

Stress as the psychological and physiological reaction to perceived dangers or challenges, has been recognized as an essential predictor of addictive behavior, that includes excessive use of social networks (Andreassen et al., 2016). The unceasing demand of social performance, saving social ties, and editing one's online identity could result in added stress for the Z Generation and

millennials (Twenge & Campbell, 2018). In addition, academic concerns, job stress, and social conflicts can either add to stress levels or act as a source of distraction and solace if social media is used (Andreassen et al., 2016).

Loneliness and Social Media Addiction

Loneliness, which encompasses feelings of social isolation and disconnectedness, has been found to be a powerful precursor of addictive behavior especially in the social media platform (Primack et al., 2017). The members of Z Generation and millennial individuals who are quite well-connected online are reported to have heightened feelings of loneliness and social disconnection which may be associated with reduced face-to-face communication, social comparison and FOMO (fear of missing out) (Twenge & Campbell, 2018). Interestingly, although social media facilitates virtual connection, it can breed loneliness and social comparison, which in turn lead to unhealthy patterns of use and addictive behavior (Primack et al., 2017).

The Mediating Role of Loneliness

Drawing on the theoretical basis of stress and coping (Lazarus & Folkman, 1984) and loneliness- as a social pain (Cacioppo & Hawkley, 2009), this study suggests the pathway that loneliness mediates the relationship between stress and social media addiction among Z Generation and millennials. The transactional model says that when the people face any stressful situation, they may try to release their anxiety in social media platforms such as Facebook, Twitter, YouTube, Snapchat etc. In much the same way, loneliness-as-a-social-pain framework suggests that loneliness evokes social needs, which make people to feel like their identity is recognized and they need to social life through social media platforms (Cacioppo & Hawkley, 2009). Thus, loneliness is the one way

we might explain how stress leads to other addictive behaviors, such as social media use.

Empirical Evidence and Research Gaps

Empirical research examining the mediating role of loneliness in the relationship between stress and social media addiction is still emerging, particularly within the context of Z Generation and millennial populations. While existing studies have provided preliminary evidence supporting the association between stress, loneliness, and social media addiction (Andreassen et al., 2016; Primack et al., 2017), more research is needed to elucidate the underlying mechanisms and pathways linking these variables. Longitudinal and experimental studies are warranted to establish causality and inform targeted interventions aimed at mitigating the adverse effects of stress and loneliness on social media addiction among Z Generation and millennial individuals.

Taken together, literature implies that stress and loneliness are the two important predictors of Z generation and millennials social media addiction. This study will shed light on the factors mediating the stress and addictive behavior link and thereby enhance a deeper understanding of the psychological mechanism underpinning social media addiction. Such knowledge would further the development of informed interventions aiming at promoting healthier patterns of digital engagement among youths.

The Current Study:

The current study aims to examine the mediating role of loneliness in the link between stress and addictive behavior, concentrating on the case of millennials' and Z-Generation individuals' social media addiction. The prevailing body of literature mainly emphasizes the use of either digital media (Cerniglia et al., 2019) or the BPS model (Dailey et al., 2020; Griffiths, 2005) separately, thus leaving a conspicuous gap in the comprehension

of how digital junkies are impacted by social media addiction (SMA) in the fundamental aspects. The aim of the study is identification and explanation of the mental mechanisms which mediate the process of social media addiction.

The emotional alienation is being used in this study as a 'climber' of this process. As you study the relationship between the several phenomena (Stress, loneliness) and environmental level of influence (social media usage), the research presents an invaluable picture of the hard-to-grasp intricacies between individual elements and the wider environment in terms of addictive behavior development. Also, most existing studies narrow down to gender, age, and personality traits like in the case of studies on depression by different researchers like Chang, Dailey, et al.; Kim,; and Sugaya, within the context of the biopsychosocial framework, giving the impresse not all other important aspects have been taken into account (Chang et al.; Dailey et al., 2020; Kim et al., 2016; Sugaya et al., 2019). Also, the research goes on children (Derevensky et al., 2022) or the adolescents (Chen et al., 2022), but we focus on millennials or generation z, and this is the demography that is less understood and crucial in their academic pursuits. Instead of relying on wide-ranging millennial cohorts' generation to generation, this research is ultimately able to open eyes and provide a clearer picture of social media use as well as addiction patterns. We can adjust our approaches for targeted strategies through researching the people's interests and needs and youth their own way to formulate interventions and policies that are understood and effective with the younger population.

Moreover, most of the current studies in this field have reflected the US and Europe experience more than other regions like South East Asia and hence the gap of understanding in South East Asian countries remains. Therefore, the purpose of our research is to fill in the geographic gaps in studies administered, in order to bring in a more extensive perception with respect to the relationships between the main variables examined. Through elucidation of specific mechanisms which connect stress, loneliness, and addictive behaviors the study provides a solid underlying of the further development of the effective approaches to promoting digital well-being and creating healthier relationships with modern technology.

Methodology
Population and Sampling Strategy
The subject sample for this study consists of millennial generation (1981-1996) and Generation Z (1997-2012) who are currently enrolled in college or university programs. This group has been chosen because of their active social media usage, which makes them especially pertinent for researching the dynamics of stress, loneliness, and social media addiction. The method of choosing the sample was stratified random sampling in order to guarantee both the generalizability of the results and a representative sample. To ensure the validity of the perceived data, the participants were stratified based on relevant demographic characteristics such as age, gender, and academic discipline. This strategy ensures that in the end, the sample will fairly represent the various demographic segments.

Measures
In this study, the primary tool for collecting the data was an organized questionnaire. In order to evaluate the main factors of interest, the self-administered survey included three standard scales along with a demographic questionnaire. The assessment tools employed to gather data were The Perceived Stress Scale created by (Cohen et al., 1994), the Three-Item Loneliness Scale (Hughes, 2004), and the Bergen Social Media Addiction Scale (Lemmens et al., 2009).

Age and gender-related questions were included in the survey's demographic section.

Participants were initially asked the first questions concerning the use of social media, and those who replied affirmatively were directed to the other parts of the questionnaire. The Statistical Package for the Social Sciences (SPSS) version 27.0 ("SPSS 27.0.," 2020) was used to analyze the data. The collected data were carefully reviewed for entry mistakes and missing information before being analyzed. Quantitative data was analyzed using descriptive statistics including mean, standard deviations and confidence interval. Cronbach's alpha was also used to evaluate the measuring scales' internal consistency and dependability.

The Bergen Social Media Addiction Scale (B.S.M.A.S)

The B.S.M.A.S was developed by (Lemmens et al., 2009) social media-related addictive behaviors. The Likert Scale, developed first for Facebook and then extended to other social media platforms. It consists of six items each rated on a five-point rating system, people indicate how frequently they participate in these activities over the course of a year. Higher scores indicate stronger addiction tendencies. The final score, which is calculated by summing the ratings for each statement, represents the level of social media addiction. (Cecilie Schou Andreassen 1, 2012).

The Perceived Stress Scale (P.S.S)

The Perceived Stress Scale (P.S.S) assesses the perception of stress. This scale is comprised of 10 items. It employs a four-point Likert scale, where 1 represents "never" and 4 represents "very often." This scale evaluates the degree to which individuals perceive their lives as unpredictable, uncontrollable, and overloaded. Respondents are asked to identify the frequency of each encounter in response to questions about their feelings and thoughts from the previous month. Higher PSS scores indicate higher perceived stress levels; the range is 0 to 40. According to Cohen et al. (1994), the scores fall into three categories: low stress (0–13), moderate stress (14–26), and high perceived stress (27–40). (Cohen et al., 1994).

The Three-Item Loneliness Scale

Introduced by Hughes (2004), The Revised U.C.L.A. Loneliness Scale was the source of the Three-Item Loneliness Scale, a short questionnaire used in the current study to assess emotions of loneliness and isolation. This scale uses three items to evaluate loneliness. On a three-point rating system, 1 represents seldom, 2 occasionally, and 3 represents frequently. The questions focus on how often people feel alone, excluded, and isolated from other people. Higher totals are suggestive of higher levels of loneliness. Total scores are obtained by summing up the respondent scores (Hughes, 2004).

Results

Table 3.1

Descriptive statistics of the sample's demographics (N=411)

	M	SD	N	%
AGE	2.18	0.816	411	100
Millennials			147	35.7
Generation Z			263	63.9
Gender	1.30	0.465	411	100
Male			188	45.7
Female			223	54.2

Table 3.2

Correlation between Social Media Addiction, the Perceived Stress and Loneliness (N=411)

	1	2	3
1. BSMAS	1		
2. PSS	0.249**	1	
3. SIS	0.224**	0.470**	1

**. Correlation is significant at the 0.01 level (2-tailed).

Note: The Bergen Social Media Addiction Scale (B.S.M.A.S), The Perceived Stress Scale (P.S.S), Three Item Loneliness Scale (SIS)

The correlation coefficient highlights the links between the study variables. Social media addiction shows a significant positive correlation with perceived stress (r = 0.249, p < 0.01) and social isolation (r = 0.224, p < 0.01). Furthermore, perceived stress is positively correlated with social isolation (r =0.470, p < 0.01). These findings offer concise insights into the interrelationships among social media addiction, perceived stress, and social isolation.

Table 3.3

Loneliness as a Mediating Factor between Bergen Social Media Addiction and Perceived Stress

Analysis	R^2	F	B	95%CI		p
Analysis without mediation				LL	UL	
Total effect: BSMAS-PSS			0.36	0.22	0.50	0.00
	0.059	25.99				
Analysis with mediation						
Social Media Addiction-Loneliness (a)			0.33	0.22	0.44	0.00
	0.07	34.09				
Loneliness-Perceived Stress (b)			1.05	0.84	1.25	0.00
	0.24	66.40				
Direct effect: BSMAS-PSS			0.22	0.08	0.34	0.001
Indirect effect: BSMAS-PSS-Loneliness			0.15	0.08	0.23	0.00

Note: BSMAS = Bergen Social Media Addiction Scale, PSS = Perceived Stress Scale, Loneliness = Social Isolation Scale

The table summarizes results from a mediation analysis exploring the influence loneliness as a mediator between SMA and perceives stress. The total effect of social media addiction (BMAS) on perceived stress (PSS) is significant (B = 0.364, p < .001). Presenting Loneliness as a mediator, the direct effect of BSMAS on PSS remains significant (B = 0.216, p < 0.001). The mediation model reveals a significant indirect effect, indicating Loneliness mediates the BSMAS-PSS relationship (B = 0.148, p < 0.001). The model explains 24.3% of the variance in perceived stress. These findings collectively suggest loneliness plays a mediating role in the link between social media addiction and perceived stress in this study.

Figure 3.1: Mediation Model of the Relationship between Social Media Addiction (BSMAS), Loneliness, and Perceived Stress (PSS)
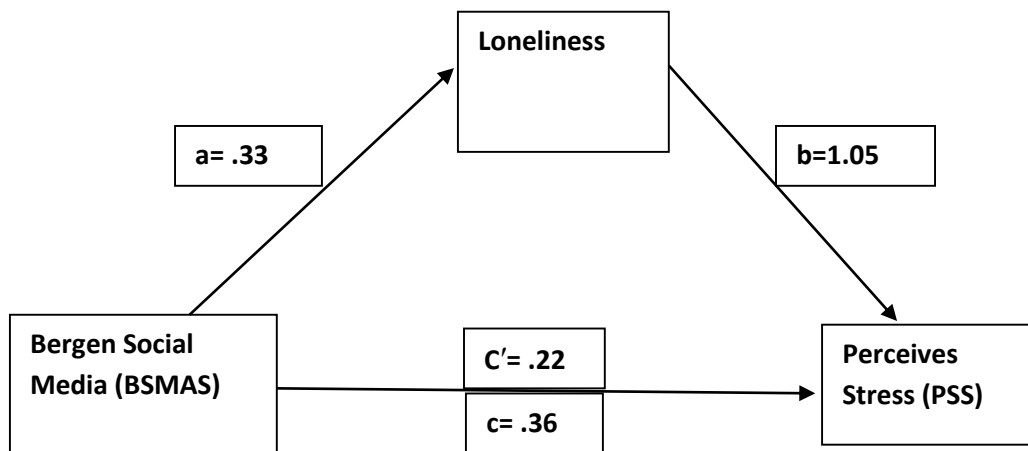
Figure 3.1 illustrates the mediation model examining the association between BSMAS and PSS through loneliness. As seen in Figure 3.1, loneliness plays a substantial mediating role between the direct and indirect effects of social media addiction (BSMAS) on perceived stress (PSS). A heightened sense of loneliness is linked to higher levels of social media addiction, and this in turn is linked to higher levels of perceived stress. The concept emphasizes that one of the most important ways to lessen the stress brought on by social media addiction is to address loneliness.

Table 3.4:

The differences in the Bergen Social Media Addiction Scale (BSMAS) scores between Millennials and the Z generation (N=411)

SCALE	MILLENNIALS		Z GENERATION				
	Mean	Std.	Mean	Std.	df	T	P
BSMAS	15.00	4.29	17.50	4.25	408	-5.37	0.00

Note: BSMAS = Bergen Social Media Addiction Scale

This table 3.4 compares the differences in the Bergen Social Media Addiction Scale (BSMAS) scores between Millennials and the Z generation among 411 participants. The mean score for the Z generation (17.50) is significantly higher than for Millennials (15.00), with a statistically significant t-value of -5.37 and a p-value of 0.000. This suggests that there is a significant difference between the two groups' BSMAS-measured inclinations toward social media addiction. In this sample, there is a notable difference in the social media addiction tendencies of the Z generation and Millennials. The Z generation exhibits greater levels of social media addiction than the Millennials.

Discussion

The present study aimed to investigate the mediating role of loneliness in the relationship between stress and social media addiction among millennials and Generation Z individuals. This study utilized reliable measures to assess social media addiction (BSMAS), perceived stress (PSS), and loneliness (SIS). The findings offer significant insights into the intricate dynamics between these psychological constructs and their interrelationships (Cerniglia et al., 2019; Dailey et al., 2020). To conclude, the following hypotheses were proposed.

The study proposed the first hypothesis that there is a correlation between social media addiction, perceived stress, and social isolation. This hypothesis was accepted by the results which showed that those addicted to using social media

experience more psychological pressure and are lonelier aligning with previous studies (Ciacchini et al., 2023; Santini et al., 2024; Sharma et al., 2023) This information emphasizes on how serious one's mental behavior could be affected by excessive use of online platforms demonstrating these psychological factors' interrelatedness.

The other hypothesis tested was whether Gen Z would have greater degrees of social media addiction than their Millennial counterparts did. This hypothesis was also accepted; thereby, highlighting the fact that Gen Zs are more susceptible to addiction on various platforms when compared to their counterparts. The current results confirm prior studies (Giarla, 2019; Mude & Undale, 2023) in that they point out how vulnerable young people are likely to be towards the pull of social networks.

The statement proposed in the third hypothesis about loneliness being a mediator of social media addiction and perceived stress stated that an increase in social media addiction can cause an increase in loneliness and therefore an increase in perceived stress. This was also supported by evidence from previous studies (Caba Machado et al., 2023) indicating the importance of loneliness on the connection between social-media addiction and stress. These findings suggest that tackling loneliness is one way to reduce stress brought about by too much use of social media.

Conclusion
This paper reveals the intricate interconnection between social media addiction, perceived stress, and loneliness among millennials and Gen Z populations. In this study's exploration, loneliness is revealed to exert considerable meditational influence in the relationship between social media addiction and stress. In a nutshell, findings revealed that social media addiction was positively related to loneliness, and that this played a key role in increasing perceived stress levels, particularly when social media usage was elevated. Furthermore, the analysis sheds light on a generational divide where Gen Z sample has a more severe degree of social media dependency than millennials. Consequently, it underlines the fact that individuals who are younger are more susceptible to the adverse effects of social media utilization on their psychological wellbeing. Some of these findings are a vital reference when it comes to creating interventions that seek to counter the negative impact of social media addiction. The results offer significant implications for theory and practice in the scholarly literature and in the development of usable interventions. These strong correlation coefficients show why concerning connections between social media addiction and stress or loneliness require multifaceted approaches to prevent and counteract. For example, preventive sessions consisting of such topics as social isolation and stress reduction can alleviate the adverse effects of social media dependence. Moreover, knowing the factor that makes Generation Z more susceptible to social media addiction could help in designing appropriate preventive and remedial measures targeted for this age group.

Study Constraints and Recommendations for Future Exploration
The research affirmed connection between study variables. However, there are limitations to this study that need to be recognized while interpreting the findings of this research. Generalization is difficult due to the cross-sectional design and further research could include more longitudinal approaches in order to establish clearer causal links between these variables. Also, the use of self-generated data may provide biased results; other research work should consider using an index that would measure and record social media usage and stress levels.

The population was restricted to millennials / generation Z only. Increasing the sample size of the study and making it more diverse could increase reliability as well. Furthermore, considering other possible variables, like personality characteristics or coping patterns as potential mediators or moderators could enrich the understanding of the antecedents of social networking site dependency and the kind of psychological consequences it entails.

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Competing Interest Declaration:
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