

**Exploring the relationship between passive and active TikTok/Instagram use and
mental well-being in people with neurotic or extraverted traits**

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Abstract

Background

In present times, social media (SM) has become part of our daily routine. However, there has been evidence that the personality traits extraversion and neuroticism in SM users and the type of SM use have an effect on mental well-being.

Objective

A cross-sectional study was conducted with the aim to investigate whether neuroticism and extraversion are associated with passive and active SM use and what the role is of neuroticism and extraversion in the relationship between passive and active TikTok/Instagram use and mental well-being in university students.

Method

The data was gathered through a self-report cross-sectional study. The study included 48 participants who were presented a survey consisting of three scales. The shortened version of the Big Five Inventory measured extraversion and neuroticism, the Social Media Activity Questionnaire measured type of SM activity, and the Mental Health Continuum short form measured mental well-being. The data of these questionnaires was statistically analysed using linear regression analyses and moderation analyses.

Results

Results suggested that extraversion positively influenced active SM use and also moderated the relationship between active SM use and mental well-being. Specifically, lower levels of extraversion showed to have a more pronounced effect on the relationship between active SM use and mental well-being, than higher levels of extraversion. Furthermore,

neuroticism did not influence passive SM use and was also not a moderator in the relationship between passive SM use and mental well-being.

Conclusions

Based on the findings, it is suggested to take the underlying factors of extraversion and active SM use into account when designing interventions to improve mental well-being through social media. Specifically, people with lower levels of extraversion could be encouraged to use social media in an active way to help them fulfill social needs. However, because there are some limitations to this research, further research on the topic of type of SM use, neuroticism/extraversion and mental well-being is suggested.

Introduction

In present times, social media has become part of our daily routine, especially among young people. More and more studies are published about the relationship between social media (SM) and many different determinants. There have been studies on the impact of SM use on mental well-being (e.g., Sadagheyani & Tatari, 2020), the differences between active or passive SM use (e.g., Escobar-Viera et al. 2018; Rozgonjuk et al., 2019), and the relationship between neuroticism and extraversion and SM use (e.g., Umegaki & Higuchi, 2022). However, there is not yet much data on the role of neuroticism and extraversion in the relationship between passive and active SM use and mental well-being. Especially in the context of TikTok and Instagram there is missing data, since most studies on these topics have focused on Facebook and Twitter (Faelens et al., 2021). Therefore, the aim of this study is to explore if university students with different levels of neuroticism and extraversion experience the mental effects of active and passive SM use on TikTok and Instagram differently.

Social media & mental well-being

In the last three decades SM has been on the rise. People are exposed to SM every day. In April 2024 there are 5.07 billion social media users, and many different platforms (Statista, 2024). SM can be defined as: “the interaction between groups or individuals in which they produce, share, and sometimes exchange ideas, images, videos and many more over the internet and in virtual communities” (Akram & Kumar, 2017, p. 347). The rising popularity of social media has made it an interesting topic to research, especially the relationship between social media and mental well-being has been a hot topic (Faelens et al., 2021).

Mental well-being is a very important aspect to life and a human right. According to the World Health Organization (WHO) (2022), mental well-being or mental health can be defined as a state in which an individual is able to cope with daily life stress, contribute to their

environment, study or work well and develop their talents. Experiencing good mental well-being is more than just the lack of mental disorders (WHO, 2022), and is the presence of emotional, psychological and social well-being (Keyes, 2002).

Through research, it is becoming clear that the massive uprising in social media use comes with consequences. Numerous studies have shown that social media use is associated with lower psychological well-being (Faelens et al., 2021). However, there are positive and negative sides to social media (Sadagheyani & Tatari, 2020). For example, a positive attribute of SM is that it can be used to create communities (Akram & Kumar, 2017). SM platforms are used to network efficiently and allow people to connect with people from all over the world (Akram & Kumar, 2017). This can give people a sense of familiarity and connectedness, and has a positive impact on mental well-being (Allen et al., 2014). Furthermore, SM can also be used to get help easily from online communities in the form of advice or a funding action and allows you to provide help, which makes you feel good and improves mental well-being (Akram & Kumar, 2017). Moreover, Facebook and Twitter use is associated with increased self-expression and self-identity, which helps build confidence (Sadagheyani & Tatari, 2020). However, social media also comes with negative effects that can put a person's mental well-being at risk. Phenomena that contribute to poorer mental health that often come along with SM use are for example: cyber bullying, the spread of misinformation, and SM addiction (Akram & Kumar, 2017). Moreover, Facebook and Twitter use is associated with increased depression and anxiety (Sadagheyani & Tatari, 2020). Furthermore, SM gives people the opportunity to compare physical appearances and social statuses, which could also be harmful for one's mental well-being because it leads to having distorted body images and being dissatisfied with your own social status (Akram & Kumar, 2017). This was confirmed in an experimental study about social media and mental health by Braghieri et al. (2022), researchers introduced Facebook to an university and then let students complete surveys about their

Facebook usage and their mental health since the introduction to Facebook. Evidence suggested that Facebook usage negatively impacted students' mental health due to engaging in negative and unfavorable social comparisons which lead to unrealistic body images and financial displays (Braghieri et al., 2022). Given these findings, it can be concluded that the negative sides of social media can have a big influence on a person's mental well-being in their daily life. However, it should be kept in mind that the negative and positive effects of SM use are not so black and white. The contrasting effects of SM are not mutually exclusive (Sadagheyani & Tatari, 2020). They create a complex landscape in which the effects on well-being can be investigated.

The studies examining the relationship between SM and mental well-being have mostly examined the influence of the use of SM platforms such as Facebook and Twitter, as these are the most popular social networking platforms (Faelens et al., 2021). However, TikTok and Instagram are commonly used by young adults (Auxier & Anderson, 2021). Especially since the pandemic in 2019, these SM platforms have become extremely popular under adolescents and young adults (Beshay, 2024). The majority (50-58%) indicate that they use these SM platforms daily (Beshay, 2024). However, Instagram and TikTok are rather novel SM platforms and they are hardly represented in research (Faelens et al., 2021). Since every platform has its own functionalities, platforms could have different effects on mental well-being (Baker & Algorta, 2016). The studies mentioned in the previous paragraph mostly focused on Facebook and Instagram use in relationship to mental well-being. Therefore, the results of these studies might not be completely generalizable to Instagram and TikTok, as Instagram and TikTok focus more on image-based content such as photo and video posts (Bahnweg & Omar, 2023; Faelens et al., 2021). Due to this fact, it is a plausible assumption that Instagram and TikTok differ in terms of other social media platforms' intermediate processes and their effect on psychological well-being (Faelens et al., 2021). Given this, and the increasing popularity of TikTok and

Instagram among young adults, it is relevant to get a clearer view of the positive and negative effects of these specific platforms on mental wellbeing. The better understanding of forementioned positive and negative effects could, in the long run, help to improve mental wellbeing of young adults.

TikTok and Instagram

Presently, the majority of young people (50-58%) check their TikTok and Instagram account at least once a day (Beshay, 2024). On these accounts they share, create and scroll through photos and short videos called “Instagram Reels” and “TikTok’s” (Bahnweg & Omar, 2023; Kocak, 2020). They can “like” the content, read and leave comments, and start livestreams (Kocak, 2020). The limited data that is available on TikTok use and mental wellbeing suggests that frequent TikTok use is linked to depressive symptoms (Gentzler et al., 2023). Additionally, empirical studies found that frequent Instagram use was associated with lower mental well-being (Schmuck et al., 2019), and psychological disorders such as depression, eating disorders, general anxiety, social anxiety, and excessive alcohol use (Ceballos et al., 2018; Griffiths et al., 2018; Yurdagül et al., 2019).

However, not all studies have found similar results. Vannucci et al., (2018) found no such’s relations and Brailovskaia & Margraf (2018) even found that Instagram was associated with positive mental well-being outcomes. Therefore, other factors could be at play that account for the discrepancies found in the results of studies on the relationship between SM use and mental well-being. For example, in their research, Umegaki & Higuchi (2022) found that one of the factors that influence the relationship between SM use and mental well-being is personality. Moreover, Gentzler et al. (2023) found that adolescents with certain traits might be at increased risk for mental well-being problems, such as depressive symptoms, when using

TikTok or Instagram regularly. It is therefore desirable to look into the connection between SM and personality.

Personality traits and social media use

Personality can be divided into different traits. The big five personality traits is a theory states that every person possess five basic personality traits to a certain extent (Costa & McCrae, 1992). It includes the traits: extraversion, neuroticism, openness, agreeableness, and conscientiousness (Costa & McCrae, 1992). Specifically, extraversion and neuroticism are interesting to look into, because those traits seem to have a very different effect on SM use and well-being (Umegaki & Higuchi, 2022). Extraversion is the general tendency to experience positive emotions and the possession of traits like assertiveness, talkativeness and being full of energy (John & Srivastava, 1995). On the other hand, neuroticism involves experiencing negative emotions, poor self-regulation and being easily upset (John & Srivastava, 1995). Additionally, it is worthy to note that neuroticism and extraversion are not opposites, but two different dimensions of personality. Everyone possesses both traits in different ratios (John & Srivastava, 1995).

Extraverted people are sociable and sensitive to reward (Lucas et al., 2000). Interacting with people and receiving rewards give high trait extraverted people fulfilment and joy. Core features of SM platforms are the possibility of interacting with a lot of people and getting comments and likes on posted content. In a study about SM use, extraversion and mental health, results showed that increased SM use was associated with stronger symptoms of depression, but that extraversion moderated the relation between social media use and depression, in a way that it counteracted the negative effects of SM use (Weiß et al., 2022). Adding to this finding, Gentzler et al. (2023) found similar results. In their study, frequent Instagram use was associated with more depressive symptoms for adolescents with low levels of extraversion, but

not for adolescents with high levels of extraversion (Gentzler et al., 2023). These findings suggest that extraversion might be a protective factor in the relationship between SM use and mental well-being (Gentzler et al., 2023).

Neurotic people are often tense, moody and experience negative emotions (John & Srivastava, 1995). People with high levels of neuroticism usually use SM platforms more often than people with low levels of neuroticism (Correa et al., 2010), however, the increased SM use has been related to addiction and problematic internet use (Kayaş et al., 2016; Stead & Bibby, 2017). Furthermore, neurotic people might resort to SM to improve their mood and to escape from stress, but in doing so, they might actually experience more negative emotions due to social overload, envy and jealousy (Abbasi & Drouin, 2019). Moreover, Gentzler et al. (2023), found that young people high in neuroticism reported high levels of depressive symptoms when using TikTok.

In an exploratory study about personality traits and mental health of undergraduate Japanese Instagram users, it was found that, when using SM platforms, people with high levels of extraversion are more likely to experience positive mental well-being outcomes such as happiness and are less likely to experience negative mental well-being outcomes such as depression and anxiety (Umegaki & Higuchi, 2022). Whereas, when using SM, people with high levels of neuroticism are more likely to experience negative mental well-being outcomes such as depression and anxiety and are less likely to experience positive mental well-being outcomes such as happiness (Umegaki & Higuchi, 2022). In conclusion, these results suggest that neuroticism and extraversion have a different effect on mental well-being in SM users.

Furthermore, in the study of Gentzler et al. (2023), where they found that extraversion acts like a protective factor in the relationship between SM use and mental well-being, they noted that their research was limited because they did not investigate active and passive SM

use, which they noted could be of significance in this relationship. Previous research has suggested that active SM use has a positive influence on mental well-being, whereas passive SM use has a negative influence (e.g., Escobar-Viera et al., 2018; Frison and Eggermont, 2017).

Active and passive social media use

When we look at social media behavior, we can make a distinction between active and passive use. Active SM use includes posting regularly on social media platforms, receiving likes and comments (Bowden-Green et al., 2020). Passive social media use includes consuming and scrolling through content (Rozgonjuk et al., 2019). Most people engage in both passive and active SM use, as the two forms of usage are not mutually exclusive (Escobar-Viera et al., 2018).

However, highly extraverted people tend to spend more time using one or multiple SM platforms (Bowden-Green et al., 2020). Additionally, they create and post content more often than less extraverted people (Bowden-Green et al., 2020). Therefore, extraverted people tend to engage in active SM use: not only consuming content but also creating and posting content, and receiving comments and likes on it.

On the other hand, there is evidence that highly neurotic people tend to engage in more passive SM use (Rozgonjuk et al., 2019). Meaning that they mostly engage in non-socially oriented behavior and thus mostly consume content and not post content on platforms (Rozgonjuk et al., 2019). Furthermore, neurotic people often report engaging in excessive scrolling and excessively consuming of content on social media (Bowden-Green, et al., 2020). The passive SM use is associated with multiple negative effects, which include loneliness, jealousy, depressed mood and social anxiety (Rozgonjuk et al., 2019).

In their research, Frison and Eggermont (2017) demonstrated that only Instagram browsing and not Instagram linking or posting, is associated with more depressive symptoms

over time. Similarly, Escobar-Viera et al. (2018) found that passive SM use is associated with increased depressive symptoms, while active SM use is associated with decreased depressive symptoms. Passive SM use could lead to negative effects on mental well-being because it can bring about upward social comparison and jealousy, while active SM use could lead to positive effects on well-being because it elicits positive feedback and support (Verduyn et al., 2017). Given these findings, it could possibly mean that the use of SM has a different effect on neurotic people and on extraverted people, because people with neurotic traits tend to be more passive on SM, whereas people with extraversion tend to be more active on SM.

The target group

The target group for this research are university students between the age of approximately 18-25. This is an age group that uses TikTok and Instagram on a daily basis, and watch content as well as post content on these apps (Pew Research Center, 2019). This is why it is interesting to look at this target group. Furthermore, the study was conducted at an university and for convenience the sample consisted of university students.

The aim of the study

There is evidence to suggest that personality, type of SM use, and mental well-being are related in a complex way, and therefore this study will explore if and what kind of role neuroticism and extraversion play in the mental effects of active and passive SM use for university students. The research question that will be answered is: “Are neuroticism and extraversion associated with passive and active SM use and what is the role of neuroticism and extraversion in the relationship between passive and active TikTok/Instagram use and mental well-being in university students?”.

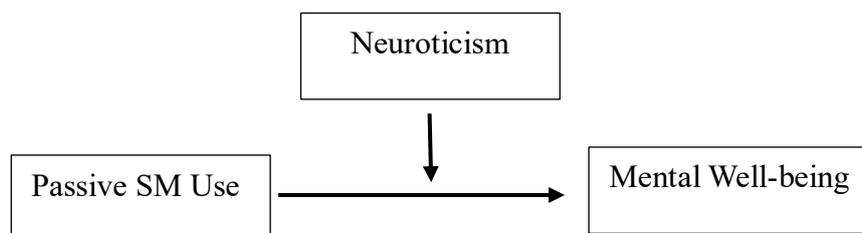
Based on the research question the following hypotheses were formulated:

- Hypothesis 1a: Neuroticism is positively associated with passive SM use in university students.
- Hypothesis 1b: Extraversion is positively associated with active SM use in university students.
- Hypothesis 2a: Neuroticism has a negatively moderating effect on the negative relationship between passive SM use and mental well-being in university students.
- Hypothesis 2b: Extraversion has a positively moderating effect on the positive relationship between active SM use and mental well-being in university students.

Figure 1 shows the schematic representation of the moderation model for hypothesis 2a and Figure 2 shows the schematic representation of the moderation model of hypothesis 2b.

Figure 1

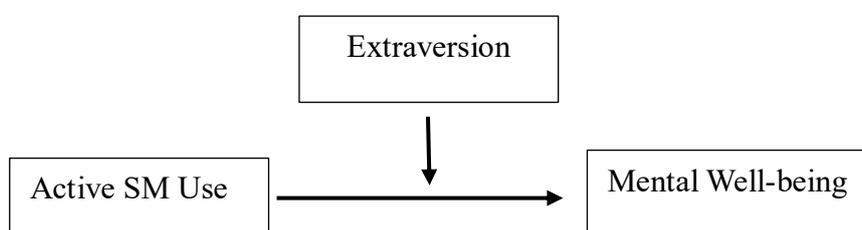
Moderation Model for Hypothesis 2a



Note. This Schematic Representation shows the Expected Relationship Between Passive SM Use (independent variable), Mental Well-being (dependent variable), and Neuroticism (Moderator).

Figure 2

Moderation Model for Hypothesis 2b



Note. This Schematic Representation shows the Expected Relationship Between Active SM use (independent variable), Mental well-being (dependent variable), and Extraversion (Moderator).

This study and its findings aim to contribute to the existing literature on passive and active social media use and its effects on mental well-being, and will give more insight into the influence of neuroticism and extraversion on this relationship.

Methods

Design

For this study, a cross sectional research design was set up. For the first two hypotheses the type of SM use (passive or active) acted as dependent variable and neuroticism or extraversion acted as the independent variables. For the last two hypotheses mental well-being acted as the dependent variable and the type of SM use (passive or active) as independent variable. Neuroticism and extraversion were examined as interaction variables. This was a descriptive survey study design with self-report data. Additionally, this research was ethically approved by the BMS ethics committee of the University of Twente (ethical approval number: 240390).

Participants

For this research, a voluntary response sample was used due to its practicality. Voluntary response sampling is a type of non-probability sampling in which all participants of a research volunteer themselves to take part in the study. To be included in the study, the participants had to be between 18-29 years old, an university student, and regularly use TikTok or Instagram. In total, 51 participants took part, but three participants did not respond to all of the questions and were excluded. An overview of the demographics of the 48 participants can

be found in Table 1. The majority of the sample consisted of females aged between 18 and 21, and most participants were Dutch.

Table 1

Demographics of the Participants

Demographic Variables	<i>n</i>	%
Gender		
Female	35	73
Male	13	27
Other/Prefer not to say	0	0
Age		
18-21	31	65
22-24	16	33
25-29	1	2
Nationality		
Dutch	25	53
German	13	27
Other	10	20

Note. The sample consisted of 48 participants in total and all participants were university students.

Procedure

A survey was made by combining three questionnaires: a short version of the Big Five Inventory, the Social Media Activity Questionnaire and the Mental Health Continuum short form. These questionnaires will be elaborated on in the ‘materials’ section. The program that was used to create the questionnaire was Qualtrics. The participants were recruited through SONA. Students were granted 0.25 SONA credits for participating. Once signed up for the study on SONA, participants were able to fill out the questionnaire on a computer or their mobile devices. They were asked to read a consent form and agree to the terms (see Appendix

A for the consent form). Through this consent form, the participants were informed about the goals and content of the study and that it would approximately take ten minutes to fill out the questionnaire. They also got the contact information of the researcher, in case they had questions regarding the study. After that, demographic questions were asked about the participant's gender, age, ethnicity and if they were an university student (see Appendix B). Then, questions about their personality, social media activity and mental well-being followed (see Appendix B). By means of the questionnaire, data on these topics was collected. Lastly, they were thanked for their participation.

Materials

Personality traits

Three scales were used to conduct this research. Firstly, the Big Five Inventory (BFI) was selected to measure the participant's neuroticism and extraversion. Over the years, the BFI has been successfully used to determine to what extent individuals possess the big five dimensions of personality (i.e., neuroticism, extraversion, openness, agreeableness, conscientiousness). The shortened version of the BFI by John & Srivastava (1999) was used. The questionnaire includes subscales for all five personality traits, but only the subscales neuroticism and extraversion were included in this study. John & Srivastava (1999) demonstrated that the overall scale has a reliable Cronbach's alpha ($\alpha = .83$), as well as the subscales extraversion ($\alpha = .88$) and neuroticism ($\alpha = .84$). The scale also shows discriminant validity (John & Srivastava, 1999). The present study yielded a satisfactory Cronbach's alpha of .85 for the extraversion subscale and .82 for the neuroticism subscale. The survey included 16 items of the shortened BFI and no modifications were made to the items. For the answer options, the questionnaire uses a five point Likert scale consisting of the options: "strongly disagree", "somewhat disagree", "neither agree nor disagree", "somewhat agree" and "strongly agree".

agree”. An example item for the subscale extraversion is: “I see myself as someone who is talkative”. An example item for the subscale neuroticism is “I see myself as someone who can be tense”. Scores are calculated by calculating the mean of the item scores. High scores on the subscale extraversion indicate that a person possesses high levels of the personality trait extraversion. High scores on the subscale neuroticism indicate that a person possesses high levels of the personality trait neuroticism.

Social media engagement

Secondly, the Social Media Activity Questionnaire (SMAQ) by Ozimek et al. (2023) was used to determine the participant’s social media use in context of Instagram and TikTok. The SMAQ is a relatively new scale, that is developed by evaluating existing scales to create a new scale. It measures the passive and active social media activities of participants. The scale consist of two subscales: passive SM use and active SM use. It has been proven to be an overall reliable measurement tool with a Cronbach’s alpha of .85, and with an internal consistency for passive SM use of $\alpha = .85$ and an internal consistency for active SM use of $\alpha = .85$ (Ozimek et al., 2023). The scale has also shown discriminant validity (Ozimek et al., 2023). The current study yielded a satisfactory Cronbach’s alpha of .83 for the subscale passive SM use and .84 for the subscale active SM use. For the answer options, the questionnaire uses a five point Likert scale consisting of the options: “strongly disagree”, “somewhat disagree”, “neither agree nor disagree”, “somewhat agree” and “strongly agree”. The scale included 17 items and some items were altered to fit the context of Instagram and TikTok. This entails for example, adding the words “reels” and “TikTok’s” to the items. For example, an original item from the subscale passive SM use: “I read through the comments on other users’ pictures”, was altered to: “I read through the comments on other users’ pictures/reels/TikTok’s”. Moreover, an original item from the subscale active SM use: “I post videos”, was altered to: “I post reels/TikTok’s”. Some of the questions only referred to Instagram of only to TikTok and some referred to both of the

platforms. All of the altered items of the SMAQ can be found in Appendix B. Furthermore, mean scores were calculated to assess the scores. A high score on the subscale passive SM use indicates that a person tends to engage passively in SM use. A high score on the subscale active SM use indicates that a person tends to engage actively in SM use.

Mental well-being

Lastly, the Mental Health Continuum Short Form (MHC-sf) was used to indicate participant's mental wellbeing. The MHC-sf is a reliable, valid questionnaire that is often used to determine one's mental-wellbeing. The questionnaire has a total score: positive mental health, and three subscales: emotional well-being, psychological well-being and social well-being. The reliability of the MHC-sf is excellent with an internal consistency of $\alpha > .80$ and has shown discriminant validity (Lamers et al., 2010). The current study yielded an overall satisfactory Cronbach's alpha of .86. Furthermore, for the present study only the total score of positive mental health was taken into account. The scale includes 14 items and no modifications were made to the items. An example of an item is: "during the past month how often did you feel happy?". For the answer options, this questionnaire uses a six point Likert scale consisting of the options: "never", "once or twice", "about once a week", "2 or 3 times a week", "almost every day" and "every day". Furthermore, mean scores were calculated to assess the scores. A high score on: positive mental health, indicates that a person experiences good mental well-being. See Appendix B for the whole survey including all the items of the three scales and the demographic questions.

Data analysis

R-studio was used to conduct the data analysis (R Core Team, 2021). Firstly, the outliers and the cases with missing data were removed from the dataset. Then, a descriptive analysis was conducted. Moreover, the demographics were inspected and noted in Table 1.

The chosen significance level to test the hypotheses was .05. All of the models were checked on statistical assumptions. These assumptions included linearity, independence of errors, homoscedasticity, normality of residuals and multicollinearity. All of the statistical assumptions were met (see Appendix C).

To test hypothesis 1a: “Neuroticism is positively associated with passive SM use in university students”, a linear regression model was used, where passive SM use was the dependent variable and neuroticism was the independent variable.

Similarly, to test hypothesis 1b: “Extraversion is positively associated with active SM use in university students”, another linear regression model was used. However, here, the dependent variable was active SM use and the independent variable was extraversion.

Furthermore, to test hypotheses 2a: “Neuroticism has a negatively moderating effect on the negative relationship between passive SM use and mental well-being in university students” and 2b: “Extraversion has a positively moderating effect on the positive relationship between active SM use and mental well-being in university students”, moderation analyses were conducted, as moderation analyses allow to test whether the relationship between SM use and mental-wellbeing is conditional on the level of neuroticism and extraversion separately. The regression model included an interaction term, and looked like this to test hypothesis 2a: mental-wellbeing as the dependent variable, passive SM use and neuroticism as independent variables, and passive SM use * neuroticism as interaction term. Additionally, mean centring was used to reduce multicollinearity and the variance inflation factor (VIF) values were acceptable ($1 < \text{VIF} < 5$).

Lastly, the regression model to test hypothesis 2b looked like this: mental-wellbeing as the dependent variable, active SM use and extraversion as independent variables, and active SM use * extraversion as interaction term. Additionally, mean centring was used to reduce multicollinearity and VIF values were acceptable ($1 < \text{VIF} < 5$).

Results

To test whether neuroticism is positively associated with passive SM use in university students, a linear regression analysis was conducted. The results of the linear regression are presented in Table 2. The overall model was proven not to be significant as the p-value was greater than the significance level of .05 and the R-squared indicated that neuroticism did not collectively explain the variance in passive SM use (see Table 2). Furthermore, neuroticism was not significantly associated with passive SM use as the p-value was greater than the significance level (see Table 2). Therefore, hypothesis 1a: “Neuroticism is positively associated with passive SM use in university students”, could be rejected.

Table 2

Linear Regression Coefficients for Hypothesis 1a

	b	SE	t	p	95% CI	
					Low	High
Intercept	3.654	0.602	6.072	2.09e-07	2.446	4.862
Neuroticism	0.037	0.197	0.187	.852	-0.360	0.434

Note. The R-squared of this model was .001 with an F-statistic of 0.035 on 1 and 47 DF and a p-value of .852.

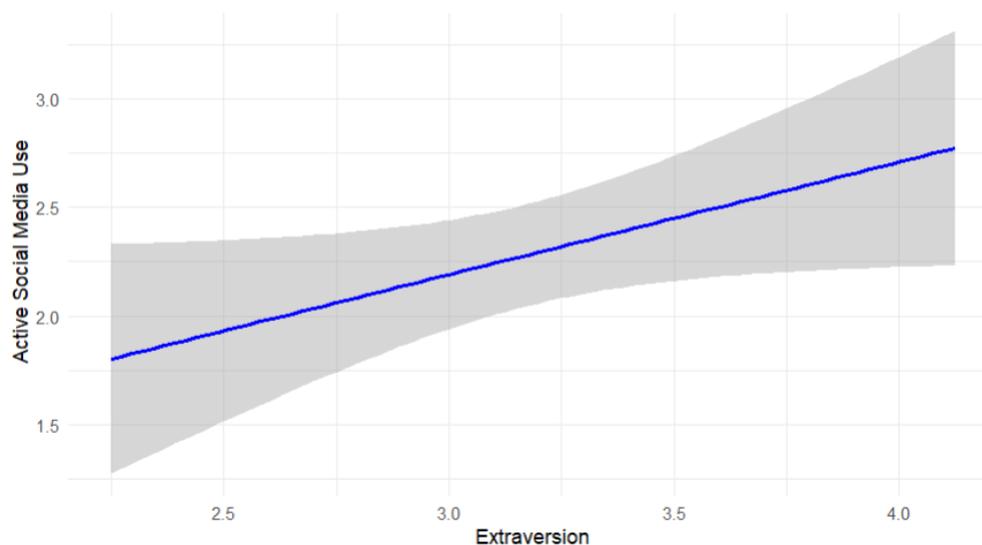
Furthermore, to test whether extraversion is positively associated with active SM use in university students, another linear regression analysis was conducted. The results of this linear regression are presented in Table 3. The overall model was proven to be significant as the p-value was smaller than .05 and the R-squared indicated that extraversion explained a moderate amount of the variance in active SM use (see Table 3). Extraversion was significantly associated with active SM use as the p-value was smaller than the significance level of .05 (see Table 3).

Table 3*Linear Regression Coefficients for Hypothesis 1b*

	b	SE	t	p	95% CI	
					Low	High
Intercept	0.637	0.815	0.781	.439	-1.001	2.282
Extraversion	0.518	0.254	2.041	.047	0.006	1.031

Note. The R-squared of this model was .181 with an F-statistic of 4.15 on 1 and 47 DF and a p-value of .047.

Figure 3 visualizes the relationship between extraversion and active SM use. As can be seen in the figure, there is a positive relationship between the variables. This suggests that the more extraverted a person is, the more the person engages in active SM use. Given these results, hypothesis 1b: “Extraversion is positively associated with active SM use in university students”, could be accepted.

Figure 3*The Relationship between Extraversion and Active SM Use*

Furthermore, a moderation analysis was conducted to explore the interactive effects of passive SM use and neuroticism on mental well-being. The results of the moderation analysis are presented in Table 4. The model was proven to be statistically significant as the p-value was smaller than .05, and the R-squared suggested that the model explains a significant proportion of the variance in mental well-being (see Table 4). The main effect between passive

SM use and mental well-being, as well as the main effect between neuroticism and mental well-being were not significant as the p-values were greater than .05 (see Table 4). These results indicated that that there was no significant direct effect of passive SM use or neuroticism on mental well-being. Additionally, the interaction effect of neuroticism * passive SM use was not significant either, since the p-value was greater than .05 (see Table 4). This suggested that neuroticism did not have a moderating effect on the relationship between passive SM use and mental well-being. Therefore, hypothesis 2a: “Neuroticism has a negatively moderating effect on the negative relationship between passive SM use and mental well-being in university students”, could be rejected.

Table 4

Moderation Regression Coefficients for Hypothesis 2a

	b	SE	t	p	95% CI	
					Low	High
Intercept	3.273	3.243	1.009	.318	-3.259	9.804
Passive SM use	0.455	0.852	0.535	.595	-1.260	2.170
Neuroticism	-0.383	1.046	-0.366	.716	-2.489	1.723
Neuroticism * Passive SM use	-0.036	0.274	-0.132	.896	-0.588	0.588

Note. The R-squared of this model was .275 with an F-statistic of 5.686 on 3 and 45 DF and a p-value of .002.

Moreover, a moderation analysis was conducted to explore the interactive effects of active SM use and extraversion on mental well-being. The results of this moderation analysis are presented in Table 5. The overall model was proven to be significant as the p-value was smaller than .05 and the R-squared showed that the model explained a significant amount of the variance in mental well-being (see Table 5). The main effect of extraversion and mental well-being was proven to be significant (see Table 5). Indicating that the higher the level of extraversion, the higher the mental well-being. The main effect of active SM use and mental

well-being was significant as well (see Table 5). The interaction effect of extraversion an active SM use on mental well-being was significant (see Table 5). Indicating that extraversion moderated the relationship between active SM use and mental well-being.

Table 5

Moderation Regression Coefficients for Hypothesis 2b

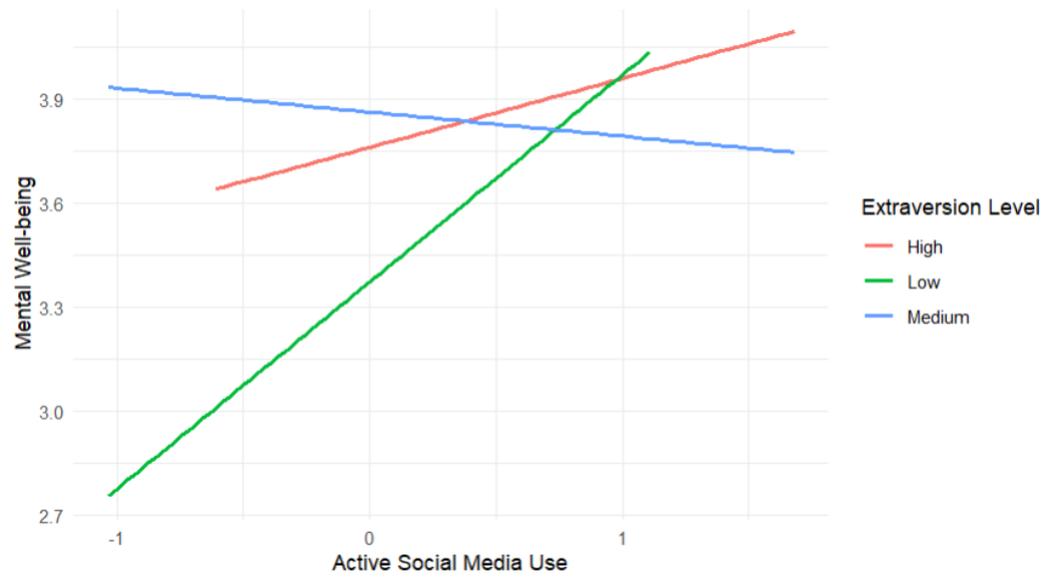
	b	SE	t	p	95% CI	
					Low	High
Intercept	-0.200	1.471	-0.136	.893	-2.997	2.597
Active SM use	0.746	0.329	4.187	.041	0.029	1.463
Extraversion	0.974	0.460	2.117	.040	0.063	1.857
Extraversion * Active SM use	0.564	0.166	3.844	.024	0.233	0.895

Note. The R-squared of this model was .379 with an F-statistic of 9.169 on 3 and 45 DF and a p-value of 7.557e-05.

In figure 4 the moderation effect of high, medium and low levels extraversion on the relationship between mental well-being and active SM use is visualized. It becomes clear from the graph that high levels of extraversion, as well as low levels of extraversion are positively related to the relationship between active SM use and mental well-being. This suggests that the more SM is used actively, the more mental well-being improves, depending on the level of extraversion. As can be seen in Figure 4, the positive effect is greater for people with low levels of extraversion than people with high levels of extraversion. Given these results, hypothesis 2b: “Extraversion has a positively moderating effect on the positive relationship between active SM use and mental well-being in university students”, could be accepted.

Figure 4

The Effect of Active SM Use on Mental Well-being for different Levels of Extraversion



Discussion

Main findings

Previous studies have demonstrated that levels of extraversion and neuroticism in SM users, as well as the type of SM use are possible underlying factors that have an influence on mental well-being (Escobar-Viera et al., 2018; Umegaki & Higuchi, 2022). This study aimed to examine if neuroticism and extraversion are associated with passive and active SM use and what the role is of neuroticism and extraversion in the relationship between passive and active TikTok/Instagram use and mental well-being in university students. Results suggested that extraversion positively influenced active SM use and also positively moderated the positive relationship between active SM use and mental well-being. Specifically, lower levels of extraversion showed to have a more pronounced effect on the relationship between active SM use and mental well-being, than higher levels of extraversion. Furthermore, neuroticism did not influence passive SM use and was also not a moderator in the relationship between passive SM use and mental well-being.

Reflection on the results

In contrast to hypothesis 1a: neuroticism is positively associated with passive SM use in university students, neuroticism was not a significant predictor for passive SM use on TikTok and Instagram in university students. Therefore, hypothesis 1a was rejected. This outcome is contrary to that of Rozgonjuk et al. (2019), who found that highly neurotic people tend to engage in more passive social media use. Meaning that they do not post but mostly consume content on platforms. A possible explanation for this discrepancy could be because of the different SM platform that was examined in the study of Rozgonjuk et al. (2019). They examined Facebook for their study, whereas, in this study Instagram and TikTok were examined. Due to

this fact, results may be different because different social media platforms have unique features, user interfaces, and cultures that might influence user behaviour (Faelens et al., 2021).

Furthermore, extraversion predicted active SM use in university students, which was in line with hypothesis 1b: extraversion is positively associated with active SM use in university students, and therefore this hypothesis was accepted. These results further support the idea that extraverted people tend to engage in more active social media use; they create and post content more often than less extraverted people (Bowden-Green et al., 2020).

Hypothesis 2a suggested that neuroticism would have a negatively moderating effect on the negative relationship between passive SM use and mental well-being in university students. This hypothesis was rejected because neuroticism did not have a moderating effect on the relationship between passive SM use and mental well-being. The non-significant interaction with neuroticism suggests that passive social media use affects mental well-being similarly across different levels of neuroticism. While neurotic individuals may be more prone to negative emotions in general (John & Srivastava, 1995), passive social media use does not exacerbate or alleviate these tendencies to a significant degree. However, this outcome is not what was expected. A possible explanation is that because the baseline of experiencing negative emotions for neurotic people is already respectively high, they are less affected by the negative impact of passive SM use on their mental well-being. The phenomenon that describes that the sensitivity to changes in a stimulus decreases when the baseline level is high is known as Weber's Law (Ekman, 1959). This theory suggests that a high baseline effectively "buffers" a person against small changes (Ekman, 1959). A study by Berkovich and Meiran (2024) recently found that unpleasantness (i.e., negative feeling) follows Weber's Law, just like most sensations do. Therefore, this theory could possibly explain that neurotic people might not be able to perceive a small increase of negative affect caused by the passive SM use, on top of their baseline negative affect. In summary, according to the findings of this study, neuroticism

does not moderate the relationship between passive SM use and mental well-being. This suggests that strategies to improve mental well-being in the context of passive SM use may not need to be tailored to neuroticism.

Hypothesis 2b suggested that extraversion would have a positively moderating effect on the positive relationship between active SM use and mental well-being in university students. Even though this hypothesis can be accepted, previous research suggested that mostly high levels of extraversion are associated with active SM use and positive mental well-being (e.g. Gentzler et al., 2023; Weiß et al., 2022). However, the results of the present study indicated that the beneficial effects of active SM use on mental well-being are more pronounced in individuals with lower levels of extraversion. This effect could possibly be explained by the Social Compensation hypothesis. This hypothesis supports the idea of ‘the poor get richer’, meaning in the context of SM use that users tend to try to increase their online popularity to compensate for their offline inadequate popularity (Zywica & Danowski, 2008). Individuals with lower levels of extraversion may have fewer and less satisfactory face-to-face social interactions (Harris et al., 2017), and may thus rely more on online interactions to fulfill their social needs. Active SM use on TikTok and Instagram could provide these individuals with opportunities to connect, communicate, and maintain social ties that they might otherwise find difficult to establish in offline settings. For these individuals, social media might serve as a crucial platform for social engagement, leading to significant improvements in their mental well-being. Whereas for people with high levels of extraversion there is also a positive effect of active SM use on mental well-being, but this effect is less strong. While these individuals might get satisfaction from actively engaging in SM (Bowden-Green et al., 2020), they also might be more capable to engage in satisfactory face-to-face interactions (Kroencke et al., 2023), and thus rely less on online interactions. These findings suggest that interventions aimed

at improving mental well-being through active SM use might be particularly effective for university students with low levels of extraversion, helping them fulfill their social needs.

Limitations and recommendations

The results of this study must be interpreted with the acknowledgement of certain limitations. Firstly, The generalizability of the results is limited because of a rather small sample size, convenience sample, and because of the inclusion criteria of only university students. Therefore, it is advised for future research to accumulate a bigger and more diverse sample to ensure greater generalizability.

Moreover, due to this study having a cross-sectional design, the present study measured the participants' opinion and mental state at only one point in time. This means that this study does not consider long-time developments and has not generated enough information to make definite conclusions about the direction of the investigated relationships. Therefore, no conclusions about causality can be drawn (Chirico, 2023). Hence, it is advised for future research to conduct longitudinal studies on the present subject.

Additionally, the reliability is impacted by the self-report aspect of this study, which appeals to the participants' self-insight and depends on the honesty of participants. A study by Brenner and DeLamater (2016) showed that participants tend to choose the most socially desirable answers on questionnaires, even in anonymous self-report questionnaires. Therefore, it is advised for future research to use a more reliable approach of data collection. For example, the participant's SM use could be tracked with software.

Conclusion

This research contributes to the existing literature on extraversion and neuroticism, passive and active SM use, and mental well-being in light of TikTok and Instagram. Previous literature has shown multiple connections between these topics (e.g., Escobar-Viera et al.,

2018; Frison & Eggermont, 2017; Umegaki & Higuchi, 2022), but a connection between the role of extraversion and neuroticism on the relationship between active/passive SM use on mental well-being, especially in context of TikTok and Instagram, was missing in literature. According to the findings, neuroticism seemed to be less important than extraversion, since passive SM use was not influenced by neuroticism and neuroticism also seemed to have no influence on the relationship between passive SM use and mental well-being. Whereas extraversion did not only influence active SM use and moderated the relationship between active SM use and mental well-being, it also affected the relationship differently on different levels.

For future research it might be relevant to identify specific active SM behaviors (Escobar-Viera, 2018), that might account for the beneficial effects on the mental well-being of people with high and low levels of extraversion. This could broaden the understanding of the workings of the relationship, and allows for interventions to be more efficiently targeted and effective.

Nonetheless, this study concludes that when designing interventions to improve mental well-being through social media, the underlying factors of personality and the type of social media use should be taken into account. Specifically, people with lower levels of extraversion could be encouraged to use social media in an active way to help them fulfill social needs. This could greatly benefit the treatment for university students with low mental well-being.

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Appendix A

Consent form

Dear participant,

This research study aims to investigate whether personality traits neuroticism and extraversion influence activity on social media (i.e., TikTok and Instagram) and how these traits affect mental well-being.

This research project has been reviewed and approved by the BMS Ethics Committee/domain Humanities & Social Sciences.

I agree to participate in this online questionnaire containing questions about my personality, my social media use and my mental well-being. I understand that the information gathered by this questionnaire is for research purposes only and that my personal data will not be used for any other purpose. All data will be anonymized and cannot be tracked back to your identity. The anonymized data might be used for future research and is therefore stored in the survey database.

I understand that participation is voluntary and I agree to immediately raise any concerns I might have. I understand that I can withdraw from the study at any moment.

If you have any questions after filling out this questionnaire, please contact the researcher Bernice Scheffers by b.j.scheffers@student.utwente.nl.

If you have questions about your rights as a research participant, or wish to obtain information, ask questions, or discuss any concerns about this study with someone other than the researcher, please contact the Secretary of the Ethics Committee/domain Humanities & Social Sciences of the Faculty of Behavioural, Management and Social Sciences at the University of Twente by ethicscommittee-hss@utwente.nl.

I read and I understand the information on this form and any questions that I might have about the study and questionnaire have been answered, I consent to all the above mentioned:

- Yes, I consent
- No, I do not consent

Appendix B

Survey questions

Demographic questions

1. What is your gender?
2. What is your age?
3. What is your ethnicity?
4. Are you an university student?

Items of the shortened Big Five Inventory Scale

Please indicate how much you agree or disagree with the following statements.

I see myself as someone who...

1. Is talkative
2. Is depressed, blue
3. Is reserved
4. Is relaxed, handles stress well
5. Is full of energy
6. Can be tense
7. Generates a lot of enthusiasm
8. Worries a lot
9. Tends to be quiet
10. Is emotionally stable, not easily upset
11. Has an assertive personality
12. Can be moody
13. Is sometimes shy, inhibited

14. Remains calm in tense situations

15. Is outgoing, sociable

16. Gets nervous easily

Items of the Social Media Activity Questionnaire Scale

Please indicate what applies to you when you use Instagram and/or TikTok.

1. I look at photos of other users on Instagram.

2. I look at the profiles/pages of other users, or read through them.

3. I look at the stories of my friends/my subscriptions.

4. I read private messages that other users send me on Instagram and/or TikTok.

5. I read entries on the chronicles and personal pages of other users.

6. I read through the comments on other users' pictures/reels/TikTok's.

7. I read the comments on my own my own pictures/reels/TikTok's.

8. I look at reels/TikTok's posted on other people's profile pages.

9. I look at the profile pages of my relatives.

10. I look at the "newsfeed" to see the latest activities of other users (e.g. if they have new friends).

11. I create events or invite users to events.

12. I post reels/TikTok's.

13. I post photos of my family on Instagram.

14. I create groups.

15. I post photos on Instagram.

16. I respond to event invitations.

17. I create highlights.

Items of the Mental Health Continuum short form Scale

Please indicate during the past month, how often did you feel...

1. Happy
2. Interested in life
3. Satisfied with life
4. That you had something important to contribute to society.
5. That you belonged to a community (like a social group or your neighbourhood).
6. That our society is a good place, or is becoming a better place, for all people.
7. That people are basically good.
8. That the way our society works makes sense to you.
9. That you liked most parts of your personality.
10. Good at managing the responsibilities of your daily life.
11. That you have warm and trusting relationships with others.
12. That you had experiences that challenged you to grow and become a better person.
13. Confident to think or express your own ideas and opinions.
14. That your life has a sense of direction or meaning to it.

Appendix C

Assumptions outcomes

Model hypothesis 1a

The residuals vs. fitted values plot showed that the residuals were randomly scattered around the horizontal line with no clear pattern, thus satisfying the linearity and homoscedasticity assumptions. Furthermore, the Durbin-Watson statistic (DW = 2.05, p-value = .511) was close to 2 with p-value greater than .05, which indicated that the errors are independent. The p-value of the Shapiro-Wilk test is .358, which is greater than 0.05, indicating that the residuals are normally distributed.

Model hypothesis 1b

The residuals vs. fitted values plot showed that the residuals were randomly scattered around the horizontal line with no clear pattern, thus indicating linearity and homoscedasticity. Moreover, the Durbin-Watson statistic (DW = 2.02, p-value = .678) was close to 2 with p-value greater than .05, which indicated that the errors are independent. The p-value of the Shapiro-Wilk test was .470, which is greater than .05, indicating that the residuals are normally distributed.

Model hypothesis 2a

The residuals vs. fitted values plot showed that the residuals were randomly scattered around the horizontal line with no clear pattern, thus indicating linearity and homoscedasticity. Furthermore, the residuals vs. fitted values plot showed a constant spread of residuals across all fitted values, indicating homoscedasticity. Furthermore, the Durbin-Watson statistic (DW = 2.07, p-value = .473) was close to 2 with p-value greater than .05, which indicated that the errors are independent. The p-value of the Shapiro-Wilk test was .390, which is greater than

.05, indicating that the residuals are normally distributed. All VIF values were below 5 (passive SM use = 1.15, neuroticism = 1.20, interaction term = 1.08). This indicated no multicollinearity.

Model hypothesis 2b

The residuals vs. fitted values plot showed that the residuals were randomly scattered around the horizontal line with no clear pattern, thus satisfying the linearity and homoscedasticity assumptions. Furthermore, the Durbin-Watson statistic (DW = 2.05, p-value = .514) was close to 2 with p-value greater than .05, which indicated that the errors are independent. The p-value of the Shapiro-Wilk test was .456, which is greater than .05, indicating that the residuals are normally distributed. All VIF values were below 5 (active SM use = 1.23, extraversion = 1.25, interaction term = 1.02), which indicated no multicollinearity.