How Personality and Social Media Use Predicts Loneliness – A Correlational Study.

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Declaration

This report is the product of my own work and was conducted in conformity with the British Psychological Society's Code of Conduct and Ethics. I agree that this report can be made available for reference to students and staff at the University of Derby.

Contents

Abstract

Evidence suggests that use of social media has the potential to both increase and decrease feelings of loneliness. Different motivations and behaviours during social media use have been associated with differential outcomes for feelings of loneliness. Personality has been implicated as an individual difference which predicts these motivations and behaviours, but research is limited.

Thus, a cross-sectional correlational design was used to investigate the relationship between social media use (SMU) and personality traits as predictor variables, with loneliness as an outcome variable. Data from 50 participants who completed measures assessing frequency of SMU, personality traits, and levels of loneliness were analysed. Personality traits emerged as significant predictors of loneliness. Specifically, higher levels of neuroticism were associated with increased loneliness. In contrast, extraversion was negatively associated with loneliness. However, results indicated that frequency of SMU did not significantly predict loneliness, therefore personality traits were not found to significantly moderate the association between SMU and loneliness.

Findings support existing theories and research for the negative association between extraversion and loneliness, and the positive association between neuroticism and loneliness. Findings provide insight into the need for research in this area to depart from simple measures of SMU and utilise more nuanced measures of SMU.

Introduction

Increases in Social Media Use and Loneliness in Modern Society

As social media has become increasingly integrated into everyday life, it has revolutionised the way in which individuals develop and maintain relationships. Over the past decade, the number of social media users and average time spent on social media has increased significantly, with increasing use of smartphones resulting in easier access to social media (Statista, 2022). At the same time, research suggests that loneliness has increased significantly over time. These increases have been demonstrated amongst adolescents (Twenge et al., 2021) and young adults (Buecker et al., 2021). Increases in loneliness have been attributed to various societal changes. In popular media, the increasing use of social media has often been cited as a major societal change influencing loneliness (Silard, 2021; Travers, 2023).

Loneliness has been defined as "the feeling of being alone in spite of longing for others" (Younger, 1995), as well as "A feeling of disconnectedness or isolation" (Tiwari, 2013). It is important to highlight the distinction between loneliness and social isolation. Loneliness captures the subjective negative feelings resulting from being alone, whereas social isolation describes the objective state of a lack of social connections (Alspach, 2013). Left unchecked, the consequences of loneliness can be highly detrimental: Evidence shows that loneliness can predict future depression (Lee et al., 2021), along with decreases in physical and mental health related quality of life (Musich et al.,2015). Therefore, loneliness is a pressing issue for psychological research, and it is essential that our understanding of the influence that modern technology has on loneliness is advanced for the purposes of prevention and treatment.

Social Media Use and Loneliness

Across the literature, theories for the relationship between social media use (SMU) and loneliness have highlighted the potential of SMU to predict feelings of loneliness. Many of these theories contrast with each other, emphasising the potential of SMU to either increase or decrease feelings of loneliness.

One theory which highlights how SMU can increase loneliness is the displacement hypothesis. The displacement hypothesis argues that passive consumption of social media content, without active engagement, will displace time which would have previously been spent socialising in-person, which consequently reduces feelings of social connection (Kraut

et al., 1998). The theory further argues that online communication does not provide the same feelings of connection and benefits to well-being as in-person communication does. In more recent explorations of this theory, it has been argued that intense SMU can enhance an individual's number of weak social ties but does not improve close relationships with friends and family. This can then potentially have a negative effect on said close relationships (Ryan et al., 2017).

Support for the displacement hypothesis has been found in studies where SMU has been positively correlated with either loneliness or social isolation. Higher scores on a social media use disorder scale have been significantly associated with higher loneliness (Youssef et al., 2020), and individuals in the highest quartile of SMU have been found to be significantly more likely to have high levels of perceived social isolation (Primack et al., 2017). Additionally, meta-analysis findings observe a significant overall positive association between Facebook use and loneliness (Song et al., 2014).

Another theory for the positive association between SMU and loneliness is that social media elicits feelings of envy and emotional withdrawal in its users, also known as fear of missing out (FOMO) (Milyavskaya et al., 2018). These feelings of envy and emotional withdrawal elicited through SMU then lead to a feeling of loneliness. To evidence this, it has been found that FOMO, as measured by the tendency towards social comparison during SMU, mediates the correlation between loneliness and SMU (Reer et al., 2019). Furthermore, it has been found that individuals who engage in social comparison via social media sites have lower levels of psychological well-being than those who do not engage in social comparison, demonstrating the potential detrimental effects of FOMO (Mackson et al., 2019).

While there is evidence to support both the displacement hypothesis and FOMO hypothesis, these theories are in contrast with theories for the loneliness reducing effect of SMU. A core principle of the displacement hypothesis is that online interaction displaces in-person interaction. However, the stimulation hypothesis contradicts this principle and highlights that this is not always the case.

The stimulation hypothesis proposes that SMU provides opportunities to form new relationships and enhance existing relationships, which increases social connection and reduces loneliness. Early research used this hypothesis to explain relationship formation in chatrooms, demonstrating how relationships formed online could translate into strong in-

person relationships (McKenna et al., 2002). More recent research applies this to modern social media sites (Nowland et al., 2018).

Support for the stimulation hypothesis has been found through many studies. Through analysis of Facebook activity logs, communication via social media from individuals with whom the participant had an existing strong relationship with has been associated with greater improvements in well-being (Burke and Kraut, 2016). Additionally, image-based SMU has been associated with decreases in loneliness, and it has been suggested that this is due to increased intimacy of image-based social media (Pittman and Reich, 2016). Frequent posting of status updates over a week has been associated with decreases in loneliness, indicated to be due to a greater feeling of connection to friends (Deters and Mehl, 2013).

Evidence presented for the stimulation hypothesis demonstrates that not all individuals who engage in heavy SMU experience increased loneliness, as the displacement and FOMO hypotheses might expect. However, this does not negate existing evidence for the potential of SMU to increase loneliness. Rather, research in this area suggests that theories of displacement and stimulation contrast each other but need not to be viewed as mutually exclusive.

To further explain how these two theories exist in conjunction, it has been proposed that they operate within a model of a bidirectional relationship between social media use and loneliness (Nowland et al., 2018). This model integrates these theories and proposes that SMU will reduce loneliness when it is used in ways which develop and maintain existing relationships, but when used in ways that create withdrawal from social interaction, it will increase loneliness.

Evidence for this model is found in studies which have found significant differences in loneliness depending on motivations for SMU and activities engaged in during SMU. For example, a motivation to use social media as a compensation for social skills, predicts increases in peer-related loneliness, whereas a motivation to use social media to meet people predicts decreases in peer-related loneliness (Teppers et al., 2014). Furthermore, a review into SMU and subjective well-being concluded that that there were negative relationships between passive use of social media and subjective well-being, as well as positive relationships between active use of social media and subjective well-being (Verduyn et al., 2017). Other reviews reached similar conclusions, stating that the way social media is engaged with (actively or passively) influences individual’s perceptions of loneliness (Matook et al., 2015).

The evidence presented demonstrates that differences in frequency of SMU, motivations for SMU and behaviours engaged in during SMU are all uniquely associated with varying increases or decreases in loneliness. This highlights that relationship between SMU and loneliness is not a simple one. To further understand this complex relationship between SMU and loneliness, there is a need to examine specific uses and motivations in SMU and their associations with loneliness. Furthermore, the individual differences which could predict these specific behaviours and motivations require further investigation.

Understanding the role of these individual differences will allow for the identification of individuals who are vulnerable to social media induced loneliness. A potential individual difference is personality. Research presented in the following section demonstrates how personality can predict social media behaviours and motivations. It has been observed that there is a need for further research to investigate the role of personality in the relationship between SMU and loneliness (Nowland et al., 2018).

Social Media Use and Personality

To understand the role that personality may play in the relationship between SMU and loneliness, it is important to first outline the relationship between personality and differences in uses of social media. Current research demonstrates how personality traits are uniquely associated with differences in frequency of SMU and differences in specific behaviours during SMU. Firstly, personality traits are associated with overall increases in frequency of SMU. Extraversion, agreeableness, and conscientiousness are all positive predictors of frequency of SMU (Gil de Zúñiga et al., 2017).

Beyond frequency of use, differences in personality traits have also been shown to influence differences in specific uses of social media. For example, problematic social media use (PSMU) has been characterised as SMU which creates impairments in different domains of an individual's life. Personality traits from the Big 5 Inventory, namely neuroticism and conscientiousness, have been correlated with PSMU, which indicates that individuals with these personality traits are more likely to experience negative effects from SMU (Brand et al., 2016; Marino et al., 2018).

Furthermore, neuroticism is linked to use of social media for validation and conformity, whereas conscientiousness is linked to use of social media to communicate (Marshall et al., 2015). Low conscientiousness and high neuroticism are predictors of self-presentational

behaviours (Seidman, 2013), and a higher focus on self-presentation through social media has been associated with increases in mental health problems (Skogen et al., 2021). This indicates that, because low conscientiousness and high neuroticism are associated with greater self-presentational behaviours, individuals with these personality traits may have poorer mental health outcomes.

Overall, there is evidence to suggest that individuals high in neuroticism and low in conscientiousness are more likely to engage in social media behaviours which are associated with reduced mental health. Investigation of the potential of this relationship to extend to increased loneliness would be beneficial, given the detrimental effects of loneliness upon health.

Personality and loneliness

Personality can be defined as an enduring set of traits and styles that an individual exhibits. This set of traits and styles represent the dispositions and tendencies of the individual (Bergner, 2020). The widely influential five-factor model of personality covers the traits extraversion, agreeableness, conscientiousness, neuroticism, and openness (FFM; McCrae & Costa, 2008).

Across the literature, all five personality dimensions have been found to either predict increases or decreases in loneliness. For example, higher levels of extraversion, agreeableness, conscientiousness, and openness have all been associated with lower loneliness, whereas neuroticism has been associated with higher loneliness (Beucker et al., 2020; Mund & Neyer 2018). For extraversion, an association with loneliness has been linked to a preference for engaging in social interactions (John et al., 2008), and experience of more perceived social support (Asendorpf & Van Aken, 2003). These factors may prevent feelings of loneliness. Conversely, a positive association between neuroticism and loneliness may be due to greater sensitivity to social rejection cues (Denissen & Penke, 2008).

Evidence demonstrates that these predictive relationships between personality and loneliness. exist independently of differences in SM. However, SMU may be an additional factor which has significant influence on these relationships. Previously discussed evidence of various loneliness increasing or decreasing behaviours during use of social media, and their associations with personality traits, highlights the potential for a complex interplay between social media use, personality, and loneliness. For example, higher rates of self-presentation

on social media in neurotic individuals, suggests that high SMU can amplify feelings of loneliness in neurotic individuals. Inversely, evidence that conscientious individuals engage in self-presentation on social media less frequently, suggests that high SMU would not amplify loneliness in more conscientious individuals (Seidman, 2013; Skogen et al., 2021).

The present study

The reviewed research highlights that the association between personality and loneliness, and the association between SMU and loneliness have been demonstrated independently. However, to date, research directly investigating how SMU and personality are associated with loneliness is scarce. In this limited research, it has been shown that conscientiousness has a significant interaction term between SMU and social isolation, whereby increased conscientiousness lessens the association between SMU and social isolation (Whaite et al., 2018). However, as previously stated, loneliness and social isolation are different phenomena. Loneliness is the subjective feeling of being alone, and social isolation is the objective state of a lack of social connections (Alspach, 2013). As such, it is necessary to see if the previously demonstrated moderating role of conscientiousness in the relationship between SMU and social isolation also exists between SMU and loneliness.

The discussed research suggests that personality interacts with the ways in which social media is used, which then subsequently predicts either increases or decreases in loneliness. A gap in the research exists for cross-sectional investigations into the relationship between these three variables. This gap is identified as requiring further investigation, as an improved understanding of the role of personality in this relationship could help in the development of targeted interventions for loneliness.

It is widely observed that a great majority of studies investigating SMU and well-being factors have adopted a cross-sectional design with self-report methods (O'Day and Heimberg, 2021). In this area of study, experimental studies are subject to low ecological validity, often manipulating participants SMU in a way that significantly deviates from natural SMU. For example, by limiting SMU significantly (Hunt et al., 2018), or by instructing participants to abstain from SMU completely (Hall et al., 2019). These methods were not feasible for the present study. As such, in the present study, a cross-sectional design using a self-report method was used.

The present study aimed to investigate if personality and SMU together significantly predict loneliness. Based on current research it was hypothesised that together, personality traits and frequency of social media use would predict increases or decreases in loneliness. Exploration of this relationship aimed to contribute to existing literature, providing a greater understanding of the factors which may contribute to individual well-being in the age of social media. Findings could be applied to assist in identification of individuals who have a potential sensitivity to social media induced loneliness due to their personality traits.

The present study hypothesises that:

Hypothesis 1 (H1): Increases in neuroticism will predict an increase in loneliness.

Hypothesis 2 (H2): Increases in extraversion, agreeableness, conscientiousness, and openness will predict a decrease in loneliness.

Hypothesis 3 (H3): Neuroticism will amplify the association between social media use and loneliness.

Hypothesis 4 (H4): Conscientiousness will lessen the association between social media use and loneliness.

Method

Design

In the present study, a cross-sectional survey design was used to investigate the influence of social media use and personality on loneliness. Personality traits were extraversion, agreeableness, conscientiousness, neuroticism, and openness, as measured via the Big Five Inventory (BFI-44) (John & Srivastava, 1999). Social media use was measured via frequency of use per day in hours and minutes. Loneliness was measured via the Short-form loneliness scale (ULS-8) (Hays and DiMatteo, 1987).

Social media use and the five personality traits were predictor variables, and loneliness was the outcome variable. Regression analysis was used to test relationships between social media use, personality traits and loneliness. The ability of neuroticism to predict increases in loneliness was examined using scores on the neuroticism subscale of the Big Five Inventory as a predictor of scores on the loneliness scale. The ability of extraversion, agreeableness, conscientiousness, openness to predict decreases in loneliness was examined by using scores

from the subscale of each of these personality traits as a predictor of scores on the loneliness scale.

Participants

The final sample consisted of 50 participants. Participants' ages ranged from 18 to 71 years (Mean = 33.86; SD = 15.23). The sample was 60.5 percent female and 40.5 percent male. Participation was limited to individuals over the age of 18 years. Participants were recruited using opportunity sampling via either the University of Derby's online Psychology Research Participation System or social media platforms (Facebook and LinkedIn). Participants who were recruited via the University's research participation system were provided with a brief description of the study, before being provided with a link to the survey, and were credited upon completion for their participation. If participation was via social media platforms, participants would be recruited using a text post, which provided a link to the survey at the end (see Appendix E). There was a total of 64 survey responses, but a number of these had incomplete or missing data. A total of 51 participants completed the study, however, data from one participant was removed as data screening revealed an outlier. (see Appendix O).

Materials

Demographic questions

Participants were asked to state their age, sex, and relationship status (Appendix A).

Social media use questions

To measure social media use, participants were asked to state their use of social media per day in hours and/or minutes (see appendix B). This figure was then converted into total minutes.

Big Five Inventory (John & Srivastava, 1999)

Personality was measured using the Big Five Inventory (BFI-44) (John & Srivastava, 1999; see Appendix C). The BFI is a 44-item Likert scale designed to measure an individual on the Big Five Factors of personality (extraversion, agreeableness, conscientiousness, neuroticism, and openness) (Goldberg, 1990; McCrae & Costa, 2008).

The items are formatted as statements an individual may use to describe themselves and pertain to a certain personality trait, such as “worries a lot”, corresponding to neuroticism. Participants are asked to respond with to what extent they agree that each statement applies to them on a scale of 1-5 (Strongly disagree (1) to Strongly agree (5)). Each personality factor has a corresponding subscale within the 44 items. These subscales have between 8-10 items, some of which are reverse scored. Scores for items within each subscale are averaged to produce an overall score for each personality factor (see appendix J for scoring rules). A higher score indicates an increased influence of the factor on the individual’s personality. Average internal reliability across the five dimensions in the current sample was good (a = 0.79; see Appendix L).

Short-form loneliness scale (ULS-8) (Hays and DiMatteo, 1987)

Loneliness was measured by the ULS-8 (Hays & DiMatteo, 1987; see Appendix D). It is a short form version of the Revised UCLA loneliness scale consisting of 8 items (Russell et al., 1980). Results of analysis of items indicates that the ULS-8 is a better substitution for the UCLA loneliness scale than the ULS-4 (Hays & DiMatteo, 1987).

Six of the eight items are formatted as statements describing feelings of loneliness, such as “I feel left out”. Items 3 and 6 are statements describing feelings which describe feelings of connectedness, contrasting with loneliness, for example “I can find companionship when I want it”, and are reverse scored. Participants are asked to respond with how often they feel the statement applies to them on a scale of 1-4 (Never (1) to Often (4)). The sum of the items will result in a total loneliness score (see Appendix K for scoring rules). The score can range from 8 to 32, and a higher score corresponds to higher level of loneliness. Internal reliability in the current sample was good ($\alpha = 0.86$; see Appendix M).

Procedure

If participation was via social media, participants were invited to participate using a text post which provided a link to the survey (see Appendix E). If participation was via the Research Participation System, a simple description of the study and a link were provided. After

following the survey link provided, participants were presented with an information sheet describing the purpose of the study, that the study is voluntary, and how the researchers will protect their data should they choose to participate (see Appendix F). After this, they were presented with a sheet informing them of how their data is stored and processed in accordance with GDPR/Data Protection Act (see Appendix G).

After reading the information sheet, participants were directed to a series of questions relating to informed consent, confirming that they understand the participant information sheet, and that they give their consent to participate. If consent was given, they proceeded to the next section of the survey where they were asked to create a unique ID code (see Appendix H for the informed consent questions). In the next section, participants were asked demographic questions (see Appendix A).

After this, they were asked to answer social media use frequency questions (see Appendix B). Participants were then presented with the Big Five Inventory (BFI) (see appendix C). Then, the Short-Form UCLA Loneliness Scale (ULS-8) was presented (see Appendix D).

After completing these scales, the participants were given a debrief form describing the aims and purpose of the study in full detail (see Appendix I). The participants were again informed that their data will be kept confidential and that they had a right to withdraw from the study within 2 weeks by contacting the research using their unique code. The researcher contact details were provided with the debrief if the participant wished to withdraw their data (see Appendix I). Once data was collected from participants, it was stored in a confidential document for the purpose of data analysis.

Results

Scale Reliability

BFI (see Appendix L)

Within the BFI-44, three subscales were found to have good internal consistency ($\alpha > 0.7$) and did not require removal of items for analysis. These were Extraversion ($\alpha = 0.87$), Conscientiousness ($\alpha = 0.81$) and Neuroticism ($\alpha = 0.86$).

For the Agreeableness subscale, internal consistency was found to be within the acceptable range ($\alpha = 0.74$), however, item 2 was removed from the subscale due to a below ideal correlation to the total scale ($r = 0.23$). After removal of item 2, internal consistency of this subscale increased ($\alpha = .75$).

For the Openness subscale, internal consistency was below the acceptable range ($\alpha = .62$). Four items had below acceptable item-total correlations ($r < .2$). Sequential removal of these items (items 41, 30, 35 and 44) improved internal consistency of the subscale ($\alpha = .62$, followed by $\alpha = .71$).

After removal of items, the remaining 39 items across all subscales had item-total correlations within acceptable range (lowest $r = .29$) and internal consistency within acceptable range (lowest $\alpha = .71$).

ULS-8 (see Appendix M)

The ULS-8 was found to have good internal consistency ($\alpha = .86$) and item-total Corelations were within acceptable range (lowest $r = .42$). As such, no items were removed.

Descriptive Statistics

Variables were screened for normality and outliers (see Appendix N). An outlier was revealed within data from one participant, with data outside of the acceptable range (not between – 3 and +3). This data was removed. Data for the remaining participants was within acceptable range (between – 3 and + 3) (see appendix O). It was revealed that two of the predictor variables, were high in skew (openness $Z_{skew} = -2.23$; social media use $Z_{skew} = 3.50$), which violated the normality assumptions (Coolican, 2019; pg 484). Data for these variables

were transformed using a Square-root transformation (see Appendix Q). Following the transformation procedure, data were within acceptable limits (openness Z_{skew} = 1.11; social media use Z_{skew} = 0.97), and screening of histograms indicated acceptable skew (see Appendix Q). Descriptives are shown in table 1.

Table 1: Means and Standard deviations for variables (n = 50) – values for social media use and openness are untransformed in this table for the purpose of description.

VARIABLE	MEAN	STANDARD DEVIATION
Loneliness	1.95	0.59
Extraversion	3.46	0.85
Agreeableness	3.91	0.64
Conscientiousness	3.84	0.68
Neuroticism	2.97	0.86
Openness	3.83	0.62
Social Media Use	171.72	126.18

Analyses

Using the transformed data, a multiple linear regression analysis was conducted to predict scores on the loneliness scale from both scores of personality traits and frequency of social media use. Inspection of scatter plots revealed linearity in the relationship between all predictor variables and the outcome variable loneliness (see appendix R). Screening of P-P plots and residual scatter plots indicated normality of residuals (see appendix S). Among the residuals, there were no outliers more than 3 standard deviations from the mean, further indicating normality of residuals. Normality and homoscedasticity were present in the current sample (see appendix S).

There was a Durbin-Watson statistic of 1.57, which is within the acceptable range of 1.5 to 2.5, this indicated that autocorrelation was not an issue for the current sample. Collinearity was acceptable with variance inflation factors (VIF) at values between 1.06 and 1.7, indicating that multi-collinearity was not an issue in the current sample (see appendix T).

To determine the presence of multivariate outliers, Mahalanobois' distance values were assessed using χ^2 (6, n = 50) = 22.46, p < .001. All values were less than the critical χ^2 value, with the maximum at 16.68. The maximum of Cook's distance value was at an acceptable

level of .184. Together, these values indicated that multivariate outliers were not present in the current sample (see appendix U).

Multiple regression was performed using the enter method to input the six predictors. Correlations between the predictor variables and outcome variables are shown in table 2.

Table 2: Pearson's r correlation values (with significance values) between the predictor variables (extraversion, agreeableness, conscientiousness, neuroticism, openness and social media use), and the outcome variable of loneliness.

	Extraversion	**Agreeableness**	**Conscientiousness**	**Neuroticism**	**Openness**	**Social Media Use**
Loneliness	**-.633 (p < .001)**	-.277 (p = 0.026)	-.180 (p =.106)	**.570 (p < .001)**	-.044 (p = .381)	.071 (p = .381)
Extraversion		.179 (p = .107)	.046 (p = .376)	**-.523 (p <.001)**	-.100 (p = .244)	.078 (p = .295)
Agreeableness			.366 (p = .004)	-.358 (p = .005)	.072 (p = .311)	-.063 (p = .331)
Conscientiousness				-.266 (p = .031)	.174 (p = .114)	-.151 (p =.147
Neuroticism					-.003 (p = .491)	-.196 (p = .087)
Openness						.092 (p = .262)

Loneliness score correlated significantly with extraversion (r= -0.63) and neuroticism (r = 0.57) scores, each with p< 0.001. Agreeableness (r=.-28), conscientiousness (r=-0.18), openness (r= -0.04) and social media use (r= 0.07) did not correlate significantly with loneliness score (p> 0.005). The regression equation produced a good fit with the data (Cohen, 1988) (R^2 = .523, R^2_{adj} = .457), indicating a large effect size and that 52.3 per cent of the variance of loneliness scores in the general population could be explained by the model $F(6,43) = 7.865$, $p < .001$ (see appendix V).

Across the predictor variables, there was a significant negative relationship between extraversion scores and loneliness scores, t = -0.375, df = 49, p < .001, with the model predicting that a one unit increase in extraversion would predict a decrease in loneliness score by 0.324 units. There was a significant positive relationship between neuroticism and loneliness scores, t = 2.479, df = 49, p = 0.017, with the model predicting that a one unit increase in neuroticism would predict an increase in loneliness score by .232 units.
The remaining predictor variables were not significant predictors of loneliness. Agreeableness, t = -.430, df = 49, p = .670. Conscientiousness, t = -.036, df = 49, p = .971. Openness, t = -.940, df = 49, p = .353. Social media use, t = 1.609, df = 49, p = .115. (See appendix W for ANOVA and coefficient outputs).

Discussion

Main findings

The aim of the present study was to investigate the influence of personality on the relationship between social media use (SMU) and loneliness. The ability of personality traits to predict loneliness was investigated, along with the ability of personality traits to influence the relationship between SMU and loneliness. This was achieved via a cross-sectional, correlational design. Multiple regression analysis of data provided insight into the relationships between predictor and outcome variables. Findings from this study contribute to literature on the complex relationship between these variables. Implications of the present findings, alignment to previous studies, limitations, and suggestions for future research will be discussed.

It was found that the multiple regression model was significant, suggesting that the combined effect of the predictors (personality traits and SMU) significantly predicted the outcome variable of loneliness. Regression coefficients showed that the predictor variable neuroticism had significant positive effects on the outcome variable loneliness, whereas the predictor variable extraversion had significant negative effects on the outcome variable loneliness. This indicated that higher levels of neuroticism predict lower levels of loneliness, and higher levels of extraversion predict higher levels of loneliness. The other variables were not found to be significant predictors of loneliness.

Overall, findings provide support for the hypothesis that neuroticism would predict an increase in loneliness (H1). The hypothesis that increased extraversion, agreeableness, conscientiousness, and openness would predict a decrease in loneliness (H2) was supported by regression analysis but only the predictor variable extraversion was significant within this model. Due to the finding of a non-significant relationship between SMU and loneliness, further analysis for the potential of personality traits to moderate this association was not necessary. Due to this, findings of the present study do not support the hypothesis that neuroticism would amplify the association between social media use and loneliness (H3). Similarly, findings do not support the hypothesis that conscientiousness would lessen the association between social media use and loneliness (H4).

Implications

In the present study, extraversion was significantly associated with a decrease in loneliness, and neuroticism was significantly associated with an increase in loneliness. Findings for these two personality traits are in line with findings of previous research, demonstrating the robustness of these associations (Beucker et al., 2020; Mund & Neyer 2018).

Findings suggest support to theories on the link between extraversion and decreased loneliness. For example, extraverts have a preference for engaging in social interactions (John et al., 2008), and experience more perceived social support (Asendorpf & Van Aken, 2003). This may protect against feelings of loneliness. Conversely, findings suggest support to theories of the link between neuroticism and increased loneliness. Neurotic individuals are more sensitive to social rejection cues (Denissen & Penke, 2008). Findings therefore indicate that Neuroticism and Extraversion may be the most salient personality traits in understanding loneliness.

However, contrary to previous research, in the present study agreeableness, conscientiousness, and openness had no association with loneliness (Beucker et al., 2020). Findings also contradict previous findings of a negative association between agreeableness and loneliness (Mund & Neyer, 2018). Therefore, present findings indicates that these associations may not be as robust as previously found. It is possible that methodological and sample differences between the present study versus previous studies are responsible for this outcome. The latter is more likely, as Buecker et al. (2020) was a large-scale meta-analysis incorporating many participants and studies with a wide range of loneliness measures, and Mund and Neyer (2018) also used a much larger sample. Despite this, present findings still indicate that future research which investigates associations between personality and loneliness should have greater focus on extraversion and neuroticism.

Contrary to the findings of similar studies (Whaite et al., 2018; Youssef et al., 2020; Primack et al., 2017; Song et al., 2014), the present study found no positive association between social media use and loneliness. The displacement hypothesis (Kraut et al., 1998; Ryan et al., 2017) would predict a positive association between the two variables, therefore, the present findings do not suggest support of this theory. Present findings also indicate that the positive association between frequency of social media use and loneliness is not as consistent or robust as is often purported. This suggests that future studies of loneliness should investigate other variables that may predict loneliness.

It is possible however that methodological and sample differences between the present study and previous studies are responsible for this discrepancy in outcomes. Many of these studies investigated the relationship between social isolation and SMU. This highlights the previously noted differences between loneliness and social isolation (Alspach, 2013). Findings of the present study highlight that SMU may more consistently predict social isolation than it predicts loneliness. It is possible that, SMU is in fact displacing time that may have been spent socialising in person, as per the displacement hypothesis. This is then leading to a state of social isolation, but not necessarily the subjective feeling of loneliness.

Present findings could potentially be taken to contradict the FOMO hypothesis (Milyavskaya et al., 2018), as this theory predicts that a positive association between SMU and loneliness would have been found. However, data on an individual's tendency towards social comparison, which has been used in previous studies to measure FOMO (Reer et al., 2019; Mackson et al., 2019), was not collected in the present study, therefore it is difficult to suggest the effects of this phenomenon on participants.

As there was no association between SMU and loneliness found, findings also contradict previous research which found a negative association between the two variables (Burke & Kraut, 2016; Pittman & Reich, 2016; Deters & Mehl, 2013). The stimulation hypothesis would predict a negative association; therefore, present findings do not suggest support of this theory. However, there were several differences in methodology and samples between the present study and previous research which could be responsible for this. For example, much of the previous research differentiated between different behaviours engaged in during SMU, rather than simply measuring the frequency of SMU. This highlights a need to include more nuanced measures of SMU in this area of research.

Findings do not suggest support of the theoretical model by Nowland et al. (2018), which integrates the displacement and stimulation hypotheses, and would have predicted increases or decreases loneliness depending on motivations and activities engaged in during SMU. Based on previous research, these motivations and behaviours would also have been expected to be associated with differences in personality traits (Marshall et al., 2015; Seidman, 2013). However, data on differences in motivations and activities were not collected in the present study, and as such it is difficult to extrapolate results to suggest support or rejection of this model.

Overall, present findings of no significant association between SMU and loneliness leads to a lack of support for theories on the potential of SMU to influence loneliness. However, findings of a negative association between extraversion and loneliness, and a positive association between neuroticism and loneliness, provide support to understanding of the relationship between personality and loneliness. These findings could be used to assist in the identification of individuals who are at risk of loneliness, according to their personality traits.

Limitations and Future Studies

Addressing methodological issues in the present study, data collected for SMU relied on a simple self-report of frequency measured in minutes, which was potentially too simplistic and did not capture the nuances of how social media is used. One such nuanced measure would be active versus passive use, considering that active and passive use have been associated with differences in loneliness (Matook et al., 2015). However, it is widely observed that there is a lack of universal validated scales for active and passive use (Trifiro and Gerson, 2019). The Passive Active Use Measure is a validated measure but is only applicable to Facebook use (PAUM; Gerson et al., 2017). To advance research in this field through more nuanced measures of SMU, there is a need for validated self-report measures which are applicable to a wide range of social media sites/apps. This would allow for future studies to employ valid and reliable investigations on the ability of various social media behaviours to predict a wide range of outcome variables.

However, self-report measures are still subject to the typical deficits in accuracy. This has demonstrated in studies of comparisons between self-reporting of SMU and social media activity logs, where participants have been found to overestimate their SMU in self-report measures when compared to data from an activity log (Boyle et al., 2022). A preferrable way of collecting SMU would be the method used in panel studies such as Burke and Kraut (2016), which involved collecting data from participants Facebook server logs, categorised by different behaviours. This could provide more accurate data, however, obtaining data via this method would have created ethical and data protection concerns which were beyond the scope of the present study. Despite this, it would be beneficial for future studies to adopt this method to provide greater validity of SMU measurement.

Scales for personality (BFI-44) and loneliness (ULS-8) used in the present study were found to be high in reliability but were still potentially subject to the typical validity issues of self-

report methods, such as response and social desirability biases (Podsakoff et al., 2003). However, personality and loneliness pertain to an individual's subjective experiences, and as such may be difficult to measure objectively, lending to the continued use of these self-report methods in future studies.

The study design of the present study was cross-sectional, because of this, causation or directionality of the associations found cannot be established. For example, a cause-effect relationship of the finding of a positive association between neuroticism and loneliness cannot be established. It is not clear if loneliness directly caused neuroticism, or if neuroticism directly caused loneliness. This can also be applied to the finding of a negative association between extraversion and loneliness.

Therefore, present findings can only be used as a suggestion of support or rejection for hypotheses/theories in the area, rather than as conclusive evidence. The over-reliance of cross-sectional designs in this area of study has been previously observed (O'Day & Heimberg, 2021), and the present study further demonstrates this issue. Future studies in this area would benefit from longitudinal or experimental methods.

Conclusion

To conclude, findings indicate that frequency of social media use (SMU) does not directly predict loneliness, and as such, the potential of personality traits to amplify or lessen the association between SMU and loneliness could not be established. Despite this, individual differences in personality, particularly neuroticism and extraversion, significantly predict feelings of loneliness. These results indicate the importance of considering personality traits when examining factors which influence aspects of psychological well-being. Research into the interplay between personality, social media use, and loneliness remains to be a worthwhile area of investigation, but future research should depart from measuring SMU simply by frequency of use. Future research into this relationship should measure different motivations and behaviours in SMU and their relationship with personality and loneliness. Additionally, longitudinal, or experimental designs should be employed to establish causal relationships.

References

Alspach, J. G. (2013). Loneliness and Social Isolation: Risk Factors Long Overdue for Surveillance. *Critical Care Nurse*, *33*(6), 8–13. https://doi.org/10.4037/ccn2013377

Asendorpf, J. B., & Van Aken, M. A. G. (2003). Personality-Relationship Transaction in Adolescence: Core Versus Surface Personality Characteristics: Core Versus Surface. *Journal of Personality*, *71*(4), 629–666. https://doi.org/10.1111/1467-6494.7104005

Bergner, R. M. (2020). What is personality? Two myths and a definition. *New Ideas in Psychology*, *57*, 100759. https://doi.org/10.1016/j.newideapsych.2019.100759

Boyle, S. C., Baez, S., Trager, B. M., & LaBrie, J. W. (2022). Systematic Bias in Self-Reported Social Media Use in the Age of Platform Swinging: Implications for Studying Social Media Use in Relation to Adolescent Health Behavior. *International Journal of Environmental Research and Public Health*, *19*(16), 9847. https://doi.org/10.3390/ijerph19169847

Brand, M., Young, K. S., Laier, C., Wölfling, K., & Potenza, M. N. (2016). Integrating psychological and neurobiological considerations regarding the development and maintenance of specific Internet-use disorders: An Interaction of Person-Affect-Cognition-Execution (I-PACE) model. *Neuroscience & Biobehavioral Reviews*, *71*, 252–266. https://doi.org/10.1016/j.neubiorev.2016.08.033

Buecker, S., Maes, M., Denissen, J. J. A., & Luhmann, M. (2020). Loneliness and the Big Five Personality Traits: A Meta–Analysis. *European Journal of Personality*, *34*(1), 8–28. https://doi.org/10.1002/per.2229

Buecker, S., Mund, M., Chwastek, S., Sostmann, M., & Luhmann, M. (2021). Is loneliness in emerging adults increasing over time? A preregistered cross-temporal meta-analysis and systematic review. *Psychological Bulletin*, *147*(8), 787–805. https://doi.org/10.1037/bul0000332

Burke, M., & Kraut, R. E. (2016). The Relationship Between Facebook Use and Well-Being Depends on Communication Type and Tie Strength: FACEBOOK AND WELL-BEING. *Journal of Computer-Mediated Communication*, *21*(4), 265–281. https://doi.org/10.1111/jcc4.12162

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed). L. Erlbaum Associates.

Coolican, H. (2019). *Research methods and statistics in psychology* (Seventh edition). Routledge.

Denissen, J. J. A., & Penke, L. (2008). Neuroticism predicts reactions to cues of social inclusion. *European Journal of Personality*, *22*(6), 497–517. https://doi.org/10.1002/per.682

Deters, F. große, & Mehl, M. R. (2013). Does Posting Facebook Status Updates Increase or Decrease Loneliness? An Online Social Networking Experiment. *Social Psychological and Personality Science*, *4*(5), 579–586. https://doi.org/10.1177/1948550612469233

Gerson, J., Plagnol, A. C., & Corr, P. J. (2017). Passive and Active Facebook Use Measure (PAUM): Validation and relationship to the Reinforcement Sensitivity Theory. *Personality and Individual Differences*, *117*, 81–90. https://doi.org/10.1016/j.paid.2017.05.034

Gil de Zúñiga, H., Diehl, T., Huber, B., & Liu, J. (2017). Personality Traits and Social Media Use in 20 Countries: How Personality Relates to Frequency of Social Media Use, Social Media News Use, and Social Media Use for Social Interaction. *Cyberpsychology, Behavior, and Social Networking*, *20*(9), 540–552. https://doi.org/10.1089/cyber.2017.0295

Goldberg, L. R. (1990). An alternative 'description of personality': The Big-Five factor structure. *Journal of Personality and Social Psychology*, *59*(6), 1216–1229. https://doi.org/10.1037/0022-3514.59.6.1216

Hall, J. A., Xing, C., Ross, E. M., & Johnson, R. M. (2021). Experimentally manipulating social media abstinence: Results of a four-week diary study. *Media Psychology*, *24*(2), 259–275. https://doi.org/10.1080/15213269.2019.1688171

Hays, R. D., & DiMatteo, M. R. (1987). A Short-Form Measure of Loneliness. *Journal of Personality Assessment*, *51*(1), 69–81. https://doi.org/10.1207/s15327752jpa5101_6

Hunt, M. G., Marx, R., Lipson, C., & Young, J. (2018). No More FOMO: Limiting Social Media Decreases Loneliness and Depression. *Journal of Social and Clinical Psychology*, *37*(10), 751–768. https://doi.org/10.1521/jscp.2018.37.10.751

John, O. P., & Robins, R. W. (Eds.). (2021). *Handbook of personality: Theory and research* (Fourth edition). The Guilford Press.

John, Oliver P, & Srivastava, Sanjay. (n.d.). *The Big Five Trait taxonomy: History, measurement, and theoretical perspectives*.

Kraut, R., Patterson, M., Lundmark, V., Kiesler, S., Mukophadhyay, T., & Scherlis, W. (1998). Internet paradox: A social technology that reduces social involvement and psychological well-being? *American Psychologist*, *53*(9), 1017–1031. https://doi.org/10.1037/0003-066X.53.9.1017

Lee, S. L., Pearce, E., Ajnakina, O., Johnson, S., Lewis, G., Mann, F., Pitman, A., Solmi, F., Sommerlad, A., Steptoe, A., Tymoszuk, U., & Lewis, G. (2021). The association between loneliness and depressive symptoms among adults aged 50 years and older: A 12-year population-based cohort study. *The Lancet Psychiatry*, *8*(1), 48–57. https://doi.org/10.1016/S2215-0366(20)30383-7

Mackson, S. B., Brochu, P. M., & Schneider, B. A. (2019). Instagram: Friend or foe? The application's association with psychological well-being. *New Media & Society*, *21*(10), 2160–2182. https://doi.org/10.1177/1461444819840021

Marino, C., Gini, G., Vieno, A., & Spada, M. M. (2018). A comprehensive meta-analysis on Problematic Facebook Use. *Computers in Human Behavior*, *83*, 262–277. https://doi.org/10.1016/j.chb.2018.02.009

Marshall, T. C., Lefringhausen, K., & Ferenczi, N. (2015). The Big Five, self-esteem, and narcissism as predictors of the topics people write about in Facebook status updates. *Personality and Individual Differences*, *85*, 35–40. https://doi.org/10.1016/j.paid.2015.04.039

Matook, S., Cummings, J., & Bala, H. (2015). Are You Feeling Lonely? The Impact of Relationship Characteristics and Online Social Network Features on Loneliness. *Journal of Management Information Systems*, *31*(4), 278–310. https://doi.org/10.1080/07421222.2014.1001282

McCrae, R. R., & Costa Jr., P. T. (2008). The five-factor theory of personality. In *Handbook of personality: Theory and research, 3rd ed.* (pp. 159–181). The Guilford Press.

McKenna, K. Y. A., Green, A. S., & Gleason, M. E. J. (2002). Relationship Formation on the Internet: What's the Big Attraction? *Journal of Social Issues*, *58*(1), 9–31. https://doi.org/10.1111/1540-4560.00246

Milyavskaya, M., Saffran, M., Hope, N., & Koestner, R. (2018). Fear of missing out: Prevalence, dynamics, and consequences of experiencing FOMO. *Motivation and Emotion*, *42*(5), 725–737. https://doi.org/10.1007/s11031-018-9683-5

Mund, M., & Neyer, F. J. (2019). Loneliness effects on personality. *International Journal of Behavioral Development*, *43*(2), 136–146. https://doi.org/10.1177/0165025418800224

Musich, S., Wang, S. S., Hawkins, K., & Yeh, C. S. (2015). The Impact of Loneliness on Quality of Life and Patient Satisfaction Among Older, Sicker Adults. *Gerontology and Geriatric Medicine*, *1*, 233372141558211. https://doi.org/10.1177/2333721415582119

Nowland, R., Necka, E. A., & Cacioppo, J. T. (2018). Loneliness and Social Internet Use: Pathways to Reconnection in a Digital World? *Perspectives on Psychological Science*, *13*(1), 70–87. https://doi.org/10.1177/1745691617713052

O'Day, E. B., & Heimberg, R. G. (2021). Social media use, social anxiety, and loneliness: A systematic review. *Computers in Human Behavior Reports*, *3*, 100070. https://doi.org/10.1016/j.chbr.2021.100070

Pittman, M., & Reich, B. (2016). Social media and loneliness: Why an Instagram picture may be worth more than a thousand Twitter words. *Computers in Human Behavior*, *62*, 155–167. https://doi.org/10.1016/j.chb.2016.03.084

Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, *88*(5), 879–903. https://doi.org/10.1037/0021-9010.88.5.879

Primack, B. A., Shensa, A., Sidani, J. E., Whaite, E. O., Lin, L. yi, Rosen, D., Colditz, J. B., Radovic, A., & Miller, E. (2017). Social Media Use and Perceived Social Isolation Among Young Adults in the U.S. *American Journal of Preventive Medicine*, *53*(1), 1–8. https://doi.org/10.1016/j.amepre.2017.01.010

Reer, F., Tang, W. Y., & Quandt, T. (2019). Psychosocial well-being and social media engagement: The mediating roles of social comparison orientation and fear of missing out. *New Media & Society*, *21*(7), 1486–1505. https://doi.org/10.1177/1461444818823719

Ryan, T., Allen, K. A., Gray, D. L., & McInerney, D. M. (2017). How Social Are Social Media? A Review of Online Social Behaviour and Connectedness. *Journal of Relationships Research*, *8*, e8. https://doi.org/10.1017/jrr.2017.13

Seidman, G. (2013). Self-presentation and belonging on Facebook: How personality influences social media use and motivations. *Personality and Individual Differences*, *54*(3), 402–407. https://doi.org/10.1016/j.paid.2012.10.009

Silard, A. (2021). How social media exploits our loneliness. Psychology Today. Retrieved March 8, 2023, from https://www.psychologytoday.com/gb/blog/the-art-living-free/202106/how-social-media-exploits-our-loneliness

Skogen, J. C., Hjetland, G. J., Bøe, T., Hella, R. T., & Knudsen, A. K. (2021). Through the Looking Glass of Social Media. Focus on Self-Presentation and Association with Mental Health and Quality of Life. A Cross-Sectional Survey-Based Study. *International Journal of Environmental Research and Public Health*, *18*(6), 3319. https://doi.org/10.3390/ijerph18063319

Song, H., Zmyslinski-Seelig, A., Kim, J., Drent, A., Victor, A., Omori, K., & Allen, M. (2014). Does Facebook make you lonely?: A meta analysis. *Computers in Human Behavior*, *36*, 446–452. https://doi.org/10.1016/j.chb.2014.04.011

Statista. (2022). Global Daily Social Media Usage 2022. Statista. Retrieved March 8, 2023, from https://www.statista.com/statistics/433871/daily-social-media-usage-worldwide/

Teppers, E., Luyckx, K., A. Klimstra, T., & Goossens, L. (2014). Loneliness and Facebook motives in adolescence: A longitudinal inquiry into directionality of effect. *Journal of Adolescence*, *37*(5), 691–699. https://doi.org/10.1016/j.adolescence.2013.11.003

Tiwari, S. (2013). Loneliness: A disease? *Indian Journal of Psychiatry*, *55*(4), 320. https://doi.org/10.4103/0019-5545.120536

Travers, M. (2023). *Are you suffering from social-media-induced loneliness?* Forbes. Retrieved March 8, 2023, from https://www.forbes.com/sites/traversmark/2023/01/21/are-you-suffering-from-social-media-induced-loneliness/?sh=2d3f75951431

Trifiro, B. M., & Gerson, J. (2019). Social Media Usage Patterns: Research Note Regarding the Lack of Universal Validated Measures for Active and Passive Use. *Social Media + Society*, *5*(2), 205630511984874. https://doi.org/10.1177/2056305119848743

Twenge, J. M., Haidt, J., Blake, A. B., McAllister, C., Lemon, H., & Le Roy, A. (2021). Worldwide increases in adolescent loneliness. *Journal of Adolescence*, *93*(1), 257–269. https://doi.org/10.1016/j.adolescence.2021.06.006

Verduyn, P., Ybarra, O., Résibois, M., Jonides, J., & Kross, E. (2017). Do Social Network Sites Enhance or Undermine Subjective Well-Being? A Critical Review: Do Social Network Sites Enhance or Undermine Subjective Well-Being? *Social Issues and Policy Review*, *11*(1), 274–302. https://doi.org/10.1111/sipr.12033

Whaite, E. O., Shensa, A., Sidani, J. E., Colditz, J. B., & Primack, B. A. (2018). Social media use, personality characteristics, and social isolation among young adults in the United States. *Personality and Individual Differences*, *124*, 45–50. https://doi.org/10.1016/j.paid.2017.10.030

Younger, J. B. (1995). The alienation of the sufferer: *Advances in Nursing Science*, *17*(4), 53–72. https://doi.org/10.1097/00012272-199506000-00006

Youssef, L., Hallit, R., Kheir, N., Obeid, S., & Hallit, S. (2020). Social media use disorder and loneliness: Any association between the two? Results of a cross-sectional study among Lebanese adults. *BMC Psychology*, *8*(1), 56. https://doi.org/10.1186/s40359-020-00421-5

Appendix

Appendix A – Demographic Questions

Below are three questions related to your demographic information. All answers are anonymised, and any answer given will not impact your inclusion in the study.

Please enter your age:

What is your gender?

- Male
- Female
- Non-binary / third gender
- Prefer not to say

What is your relationship status?

- Single
- In a relationship
- Married
- Divorced / Separated

Prefer not to say

Appendix B – The ‘Social Media Use’ Questions.

In hours and/or minutes, how much time do you spend on social media per day?

Hours

Minutes

Appendix C – The ‘Big Five Inventory’ Questionnaire.

John, O. P., & Srivastava, S. (1999). The Big-Five trait taxonomy: History, measurement, and theoretical perspectives.

Here are a number of characteristics that may or may not apply to you. For example, do you agree that you are someone who likes to spend time with others? Please indicate the extent to which you agree or disagree with that statement.

I am someone who…

- Disagree strongly – 1
- Disagree a little – 2
- Neither agree nor disagree – 3
- Agree a little – 4
- Agree Strongly – 5

1. Is talkative
2. Tends to find fault with others
3. Does a thorough job
4. Is depressed, blue
5. Is original, comes up with new ideas
6. Is reserved
7. Is helpful and unselfish with others
8. Can be somewhat careless
9. Is relaxed, handles stress well
10. Is curious about many different things
11. Is full of energy
12. Starts quarrels with others
13. Is a reliable worker
14. Can be tense
15. Is ingenious, a deep thinker
16. Generates a lot of enthusiasm
17. Has a forgiving nature
18. Tends to be disorganized
19. Worries a lot
20. Has an active imagination
21. Tends to be quiet
22. Is generally trusting
23. Tends to be lazy
24. Is emotionally stable, not easily upset
25. Is inventive
26. Has an assertive personality
27. Can be cold and aloof
28. Perseveres until the task is finished
29. Can be moody
30. Values artistic, aesthetic experiences
31. Is sometimes shy, inhibited

32. Is considerate and kind to almost everyone
33. Does things efficiently
34. Remains calm in tense situations
35. Prefers work that is routine
36. Is outgoing, sociable
37. Is sometimes rude to others
38. Makes plans and follows through with them
39. Gets nervous easily
40. Likes to reflect, play with ideas
41. Has few artistic interests
42. Likes to cooperate with others
43. Is easily distracted
44. Is sophisticated in art, music, or Literature

Appendix D – The ‘Loneliness’ Questionnaire – ULS-8.

Hays, R. D., & DiMatteo, M. R. (1987). A Short-Form Measure of Loneliness. Journal of Personality Assessment, 51(1), 69–81. https://doi.org/10.1207/s15327752jpa5101_6

Indicate how often each of the statements below is descriptive of you:
Never – 1 Rarely – 2 Sometimes – 3 Always - 4

1. I lack companionship
2. There is no one I can turn to
3. I am an outgoing person
4. I feel left out
5. I feel isolated from others
6. I can find companionship when I want it
7. I am unhappy being so withdrawn
8. People are around me but not with me

Appendix E – Social Media Text Post (Invitation to Participate).

Hello,

Are you interested in participating in a study into the role social media use plays in feelings of loneliness?

My name is Evie England, and I am a BSc Psychology conducting an Independent Study into the relationship between social media use, personality, and loneliness.

If this sounds like something you are interested in, I am currently looking to recruit participants and would be grateful if you are able to take part.

The study is an online survey which will take approximately 10 minutes, please follow this link:

(link goes here)

Appendix F- Participant Information Sheet.

Information about this study

Title: A study into the Relationship Between Social Media Use, Personality and Loneliness.

What is the purpose of the study?

You are invited to participate in a research study being conducted as a part of a final-year assessment for BSc Psychology at the University of Derby. The study is investigating the influence of personality on the relationship between social media use and loneliness. This study is an online survey which includes a series of questions on your social media use, personality, and feelings of loneliness. You will also be asked for demographic information (age, gender and relationship status). Answers to questions will be used to investigate the influence of personality on the relationship between social media use and loneliness.

Do I have to take part?

Your participation is completely voluntary. You can withdraw at any point during the study, without needing to provide an explanation. If you wish to, you can withdraw your data up to two weeks after taking part; to do this, you will need to contact one of the researchers using the contact details at the end of this document. Your data will be anonymised using a unique code consisting of the last three letters of surname followed by your age, and you will need to provide this code to withdraw your data. You will be asked to create this unique code in the next section.

What will happen if I take part?

If you wish to participate, you will be directed to a consent form and asked to give your informed consent to participate. After this, you will be asked to create a unique participant code. You will be asked to provide demographic data related to age, gender, ethnicity, relationship status and educational level. After this, you will be asked to complete questions related to social media use, personality and loneliness. This study is to be completed individually, and it is advised that you participate in an area free from distraction.

Use of your data and your rights

The researcher will be collecting data from your participation in this study. We need these data to understand the influence of personality on the relationship between social media use and loneliness and in the public interest of enhancing academic research. This is the legal basis on which we are collecting your data, and while this
allows us to use your data, it also means we have obligations towards you to:

- not seek more information from you than what is essential and necessary for the study.
- make sure that you are not identified by using anonymised ID codes.
- use your anonymised data for the purposes of this study and for any relevant publications that arise from it.
- store data safely in password-protected databases to which only the named researchers have access.
- not keep your information for longer than is necessary (usually for seven years).
- safely destroy your data by shredding or permanently deleting them

The supervisor of this project, who also has access to the data, is highly qualified and experienced and has been very careful to discuss with the undergraduate researcher processes to ensure the security of your data. Ethics review was completed on behalf of the College of Health, Psychology and Social Care Research Ethics Committee by the supervisor and an independent reviewer. Anonymised data from this project may be used in future publications.

Further information can be obtained from:
Project Student: Evie England, email: 100544879@unimail.derby.ac.uk.
Project Supervisor: Dr Simon Bignell (Senior Lecturer in Psychology, University of Derby), email: s.bignell@derby.ac.uk, Tel: 01332 593043.

Appendix G – GDPR sheet.

Use of your data and your rights – GDPR statement

Privacy notice

Thank you for agreeing to take part in this research project. The information that you supply will be recorded and processed in line with the UK GDPR / Data Protection Act 2018 / EU GDPR.
Data collected will be used by the student researcher to investigate the influence of personality on social media use and loneliness. This is part of an undergraduate Independent Study module project that contributes to a BSc Psychology degree. The University of Derby is the data controller. Anonymised data from this project may be used in future publications.
We retain the data for a minimum period of 7 years after such time it will be securely destroyed. Data will not be retained for longer than is necessary. Our lawful basis for processing this data is your explicit consent. As a data subject you can request withdrawal of consent within two weeks by contacting one of the researchers named below. After this period data are anonymised and we will be unable to extract your individual data. Our Data Protection Officer (DPO) is Mrs Helen Selby on 01332 591954 Alternatively, you can email gdpr@derby.ac.uk. Further information on how we handle your information and details of our DPO can be found on our website: https://www.derby.ac.uk/its/datagov/privnotice

Additional Information

The supervisor of this project, who also has access to the data, is highly qualified and experienced and has been very careful to discuss with the student processes to ensure the security of your data. An ethics review has been completed by the supervisor on behalf of the College of Health, Psychology and Social Care Research Ethics Committee.

We are obliged to:
• Not seek more information from you than what is essential and necessary for this research;
• Make sure that you are not identified by using ID codes;
• Use your anonymised / pseudonymised data for the purposes of this study and for any relevant publications that arise from it;
• Store data safely in password-protected databases to which only the named researchers have access.

Further information about the project can be obtained from the research student Evie England (100544879@unimail.derby.ac.uk) or their research supervisor Dr. Simon Bignell (s.bignell@derby.ac.uk) University of Derby, Kedleston Road, Derby, DE22 1GB.

Appendix H – Informed Consent Form.

I confirm that I have read and understood the participant information sheet for the above study and have had the opportunity to ask any questions.

- Yes
- No

I understand that my participation is voluntary, and I am free to withdraw my data up to two weeks after participating without giving any reason.

- Yes
- No

I agree freely to take part in the study.

- Yes
- No

Please create your unique ID code (Last three letters of surname followed by your age, e.g., ERO25).

Appendix I – Debrief Form.

Participant Debrief

Thank you very much for taking the time to participate in this study.

Study Information

The purpose of this study is to determine whether differences in personality play a role in the relationship between social media use and loneliness. Previous studies into social media use and loneliness have had varying results. Some studies correlate social media use to increased levels of loneliness (Primack et al., 2017, Youssef et al., 2020), whereas others correlate social media use to lower levels of loneliness (Burke & Kraut, 2014). Previous research has stated the need to study the role of personality in this relationship (Nowland, Necka & Cacippo, 2018). This study therefore aims to contribute to our understanding of why social media use is either positively or negative correlated with loneliness in different individuals by investigating the role of personality. The findings could be used to identify risk factors for loneliness in social media users and, for example, be used to develop interventions that encourage social media users to develop conscientiousness.

If you feel that you have been affected negatively by questions related to loneliness and that loneliness is an issue that affects you, please consider following the links below which can give advice on managing loneliness and organisations to contact for support:

NHS: https://www.nhs.uk/mental-health/feelings-symptoms-behaviours/feelings-and-symptoms/feeling-lonely/

Mind: https://www.mind.org.uk/information-support/tips-for-everyday-living/loneliness/tips-to-manage-loneliness/

If you feel that you are spending too much time using social media and it is affecting you negatively, please consider following the link below which can give advice on social media addiction:

Healthline: https://www.healthline.com/health/social-media-addiction

Withdrawing Your Data

Your participation is very much appreciated, but if you decide that you would like to withdraw your data from the study then you can do so without needing to give any reason. Please note that this withdrawal must take place within two weeks of your participation. You can withdraw your data by contacting any of the researchers, using the contact details below. You will need to provide your unique code; as a reminder, this consists of the last three letters of your surname followed by your age, e.g. ERO25.

Researcher Contact Details

Project Student: Evie England: email: 100544879@unimail.derby.ac.uk.
Project Supervisor: Dr Simon Bignell (Senior Lecturer in Psychology, University of Derby), email: s.bignell@derby.ac.uk, Tel: 01332 593043.

References:

Burke, M., & Kraut, R. E. (2016). The Relationship Between Facebook Use and Well-Being Depends on Communication Type and Tie Strength: FACEBOOK AND WELL-BEING. Journal of Computer-Mediated Communication, 21(4), 265–281. https://doi.org/10.1111/jcc4.12162

Nowland, R., Necka, E. A., & Cacioppo, J. T. (2018). Loneliness and Social Internet Use: Pathways to Reconnection in a Digital World? Perspectives on Psychological Science, 13(1), 70–87. https://doi.org/10.1177/1745691617713052

Primack, B. A., Shensa, A., Sidani, J. E., Whaite, E. O., Lin, L. yi, Rosen, D., Colditz, J. B., Radovic, A., & Miller, E. (2017). Social Media Use and Perceived Social Isolation Among Young Adults in the U.S. American Journal of Preventive Medicine, 53(1), 1–8. https://doi.org/10.1016/j.amepre.2017.01.010

Youssef, L., Hallit, R., Kheir, N., Obeid, S., & Hallit, S. (2020). Social media use disorder and loneliness: Any association between the two? Results of a cross-sectional study among Lebanese adults. BMC Psychology, 8(1), 56. https://doi.org/10.1186/s40359-020-00421-5

Appendix J – Score calculation Rules BFI.

Reverse scored items become the ‘opposite’ number. So, for example, if item 6 had a score of 4, this would become 2:

1 → 5

2 → 4

3 → 3

4 → 2

5→ 1

BFI scale scoring (“R” denotes reverse-scored items)

Extraversion: 1, 6R, 11, 16, 21R, 26, 31R, 36

Agreeableness: 2R, 7, 12R, 17, 22, 27R, 32, 37R, 42

Conscientiousness: 3, 8R, 13, 18R, 23R, 28, 33, 38, 43R

Neuroticism: 4, 9R, 14, 19, 24R, 29, 34R, 39

Openness: 5, 10, 15, 20, 25, 30, 35R, 40, 41R, 44

After calculating the reverse score for each item denoted by an R, a total score for each personality trait is calculated by adding the score of the items corresponding to each personality trait. The total for each personality trait indicates the extent to which an individual exhibits this personality trait, with a higher score indicating higher levels.

Appendix K – Score calculation rules ULS-8.

Reverse scored items become the ‘opposite’ number. So, for example, if item 3 had a score of 4, this would become 1:

1 → 4

2 → 3

3 → 4

4 → 1

After calculating the reverse score for items 3 and 6. The total score is calculated by adding the score of each item. The total indicates level of loneliness, with a higher score indicating higher loneliness.

Appendix L – BFI Scale Reliability SPSS.

Below are the internal reliability statistics for each individual dimension along with adjustments made to increase reliability. After adjustments, for this sample, average internal reliability across the five dimensions was good (a = .798).

Extraversion

Reliability Statistics

Cronbach's Alpha	N of Items
.873	8

No items were removed- all corrected item-total correlation was within range (> 0.3 and not <0.2).

Agreeableness

Reliability Statistics

Cronbach's Alpha	N of Items
.740	9

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
BFI2	31.22	26.133	.227	.751
BFI7	29.78	26.213	.461	.715
BFI12	29.94	24.976	.402	.719
BFI17	30.27	23.323	.482	.704
BFI22	30.10	23.970	.425	.715
BFI27	30.76	22.704	.446	.713
BFI32	29.90	27.410	.326	.731
BFI37	30.63	22.038	.595	.681
BFI42	30.02	26.100	.497	.711

Cronbach's alpha was within acceptable range, however, BFI2 was found to have a corrected Item-Total Correlation outside of ideal range and was removed.

Post removal Cronbach's Alpha = 0.751.

Reliability Statistics

Cronbach's Alpha	N of Items
.751	8

Conscientiousness

Reliability Statistics

Cronbach's Alpha	N of Items
.806	9

No items were removed- all corrected item-total correlation was within range (> 0.3 and not <0.2).

Neuroticism

Reliability Statistics

Cronbach's Alpha	N of Items
.856	8

No items were removed- all corrected item-total correlation was within range (> 0.3 and not <0.2).

Openness

Reliability Statistics

Cronbach's Alpha	N of Items
.620	10

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
BFI5	31.08	22.274	.322	.589
BFI10	30.63	22.918	.323	.591
BFI15	31.02	20.620	.378	.573
BFI20	30.59	22.767	.307	.593
BFI25	31.25	20.354	.538	.540
BFI30	31.18	22.748	.180	.623
BFI35	32.18	22.508	.184	.624
BFI40	31.00	22.920	.360	.586
BFI41	32.00	22.800	.156	.631
BFI44	31.96	21.798	.285	.597

Cronbach's Alpha was below the acceptable range ($\alpha = 0.62$). Analysis showed that the Corrected Item-Total Correlation were below acceptable range for items 30, 35 and 41. 44 within acceptable range but below the ideal range of 0.3. As such, items 30, 35, 41 and 44 were removed.

Post removal Cronbach's Alpha = 0.706.

Reliability Statistics

Cronbach's Alpha	N of Items
.706	7

Appendix M – Scale Reliability ULS-8.

For this sample, the internal reliability was good (α = .857)

Reliability Statistics

Cronbach's Alpha	N of Items
.857	8

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
ULS1	13.63	17.638	.576	.844
ULS2	13.96	17.838	.586	.842
ULS3	13.86	19.481	.424	.859
ULS4	13.61	17.363	.726	.826
ULS5	13.67	16.427	.808	.815
ULS6	14.02	18.220	.691	.833
ULS7	13.78	18.613	.395	.868
ULS8	13.41	17.487	.678	.831

Appendix N – SPSS Output – Descriptives for Untransformed Data.

Descriptive Statistics

	N	Mean	Std. Deviation
LonelinessMean	50	1.9450	.58964
ExtraversionMean	50	3.4600	.85470
AgreeableMean	50	3.9125	.64099
ConscientiousMean	50	3.8378	.67650
NeuroticMean	50	2.9700	.86254
OpennessMean	50	3.8333	.61996
SocialMediaTotal	50	171.7200	126.18112
Valid N (listwise)	50		

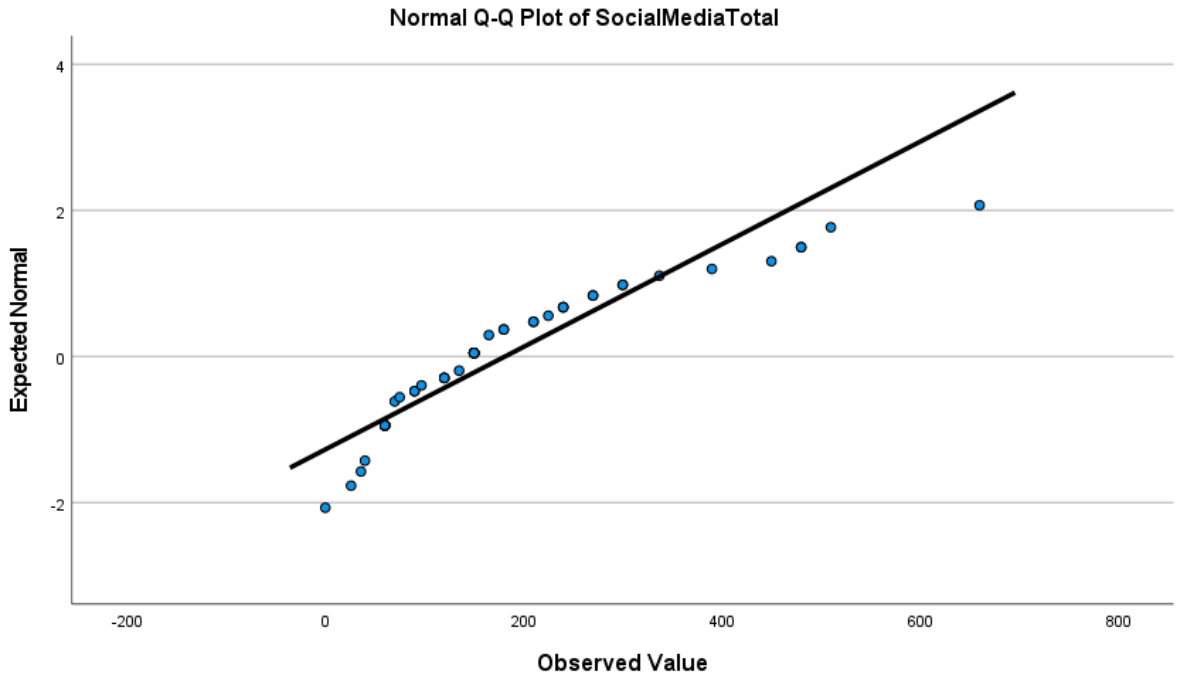
Appendix O – SPSS output outliers

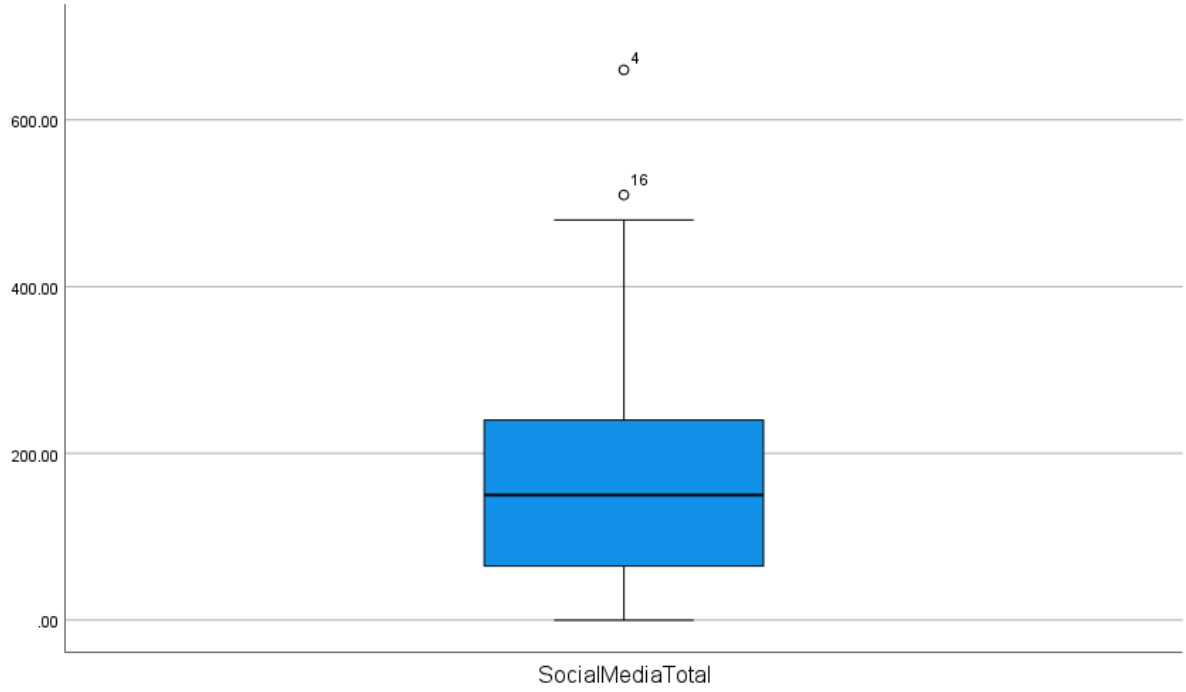
Social Media Use

For total social media use, data from participant 4 were found to be outside of the acceptable range (z > -/+ 3)

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Zscore(SocialMediaTotal)	51	-1.27312	3.36167	.0000000	1.00000000
Valid N (listwise)	51				

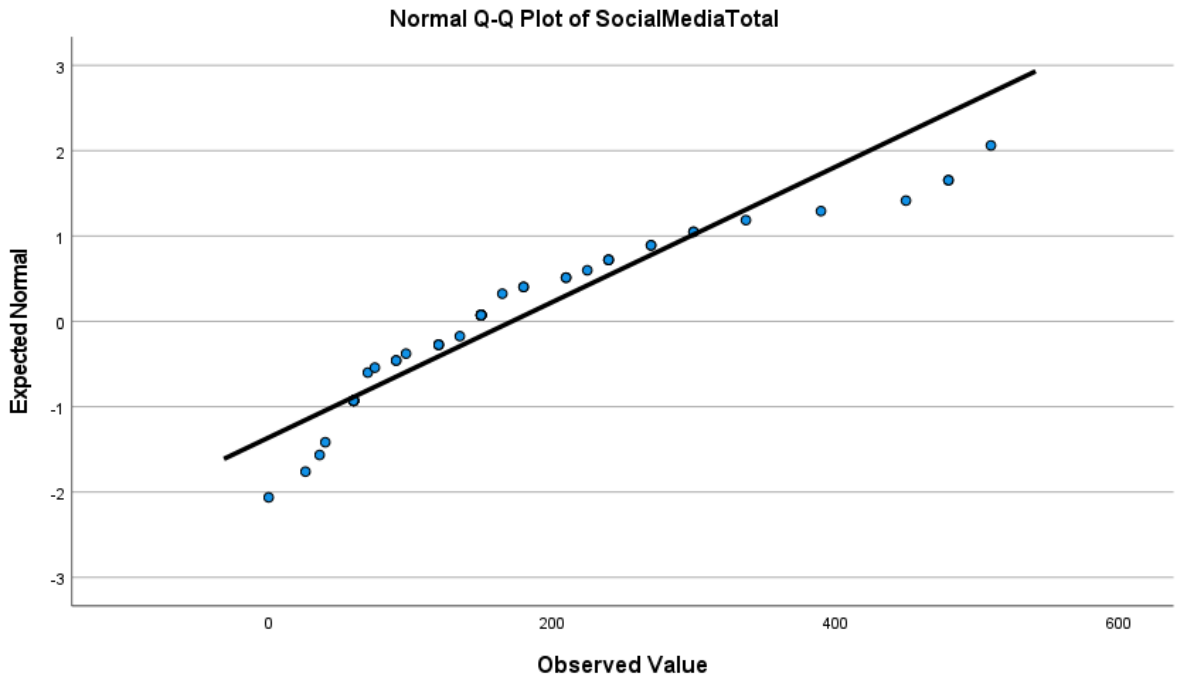


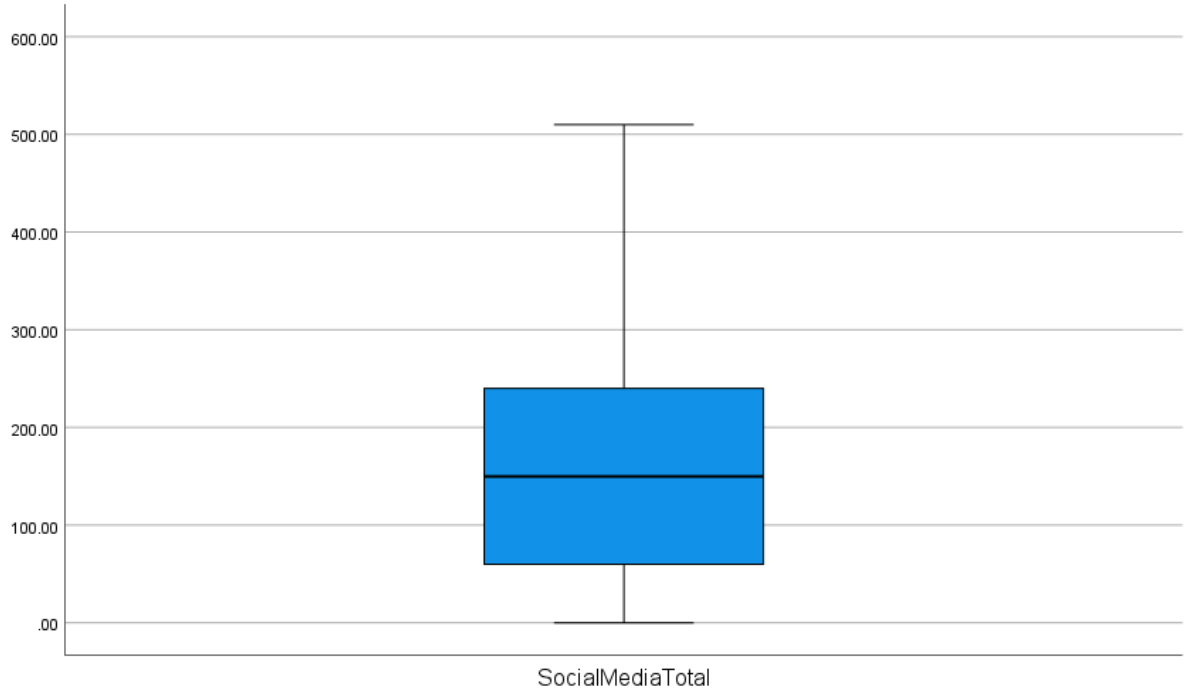


Removal of data from participant 4 yielded data free from outliers:

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Zscore(SocialMediaTotal)	50	-1.27312	2.30831	-.0672334	.88609612
Valid N (listwise)	50				




600.00
500.00
400.00
300.00
200.00
100.00
.00
SocialMediaTotal

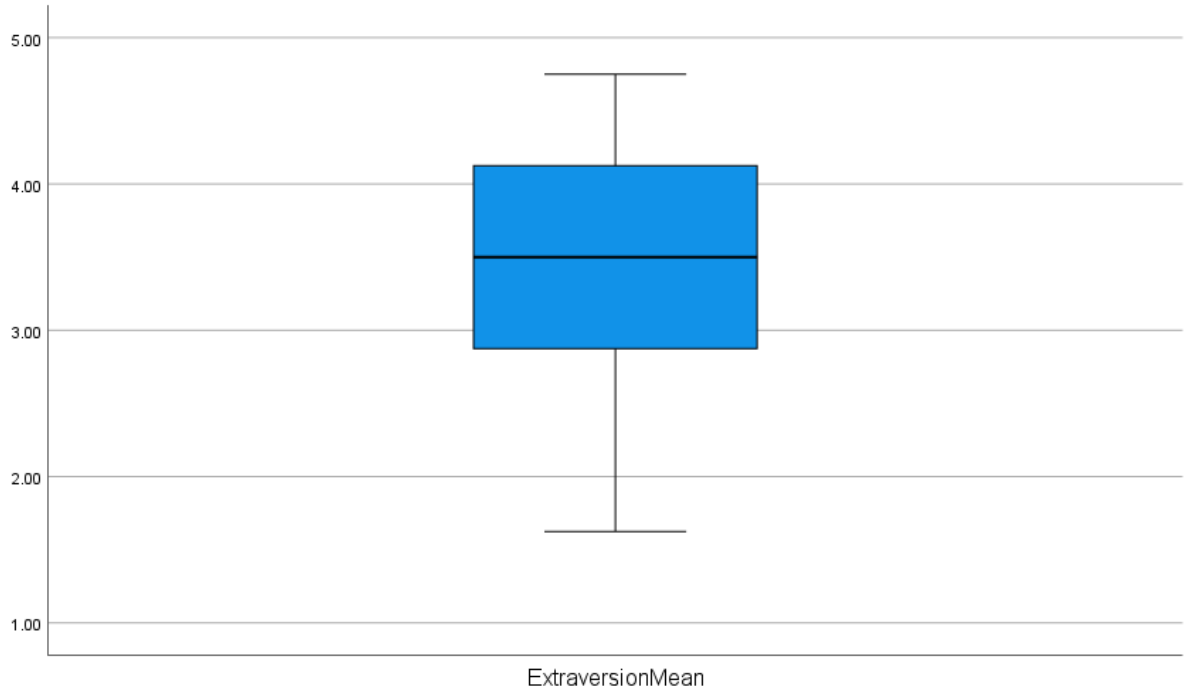
Extraversion, Agreeableness, Conscientiousness, Neuroticism, Openness, Loneliness

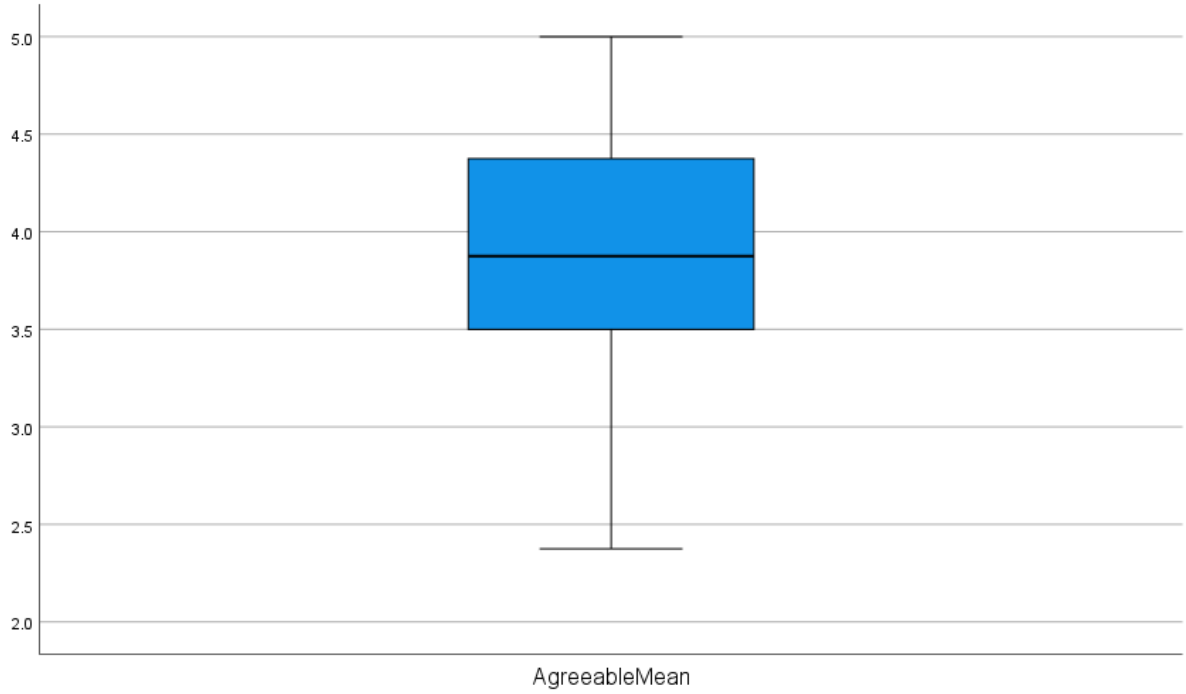
For the remaining variables there were no outliers as data were found to within the acceptable range (z > -/+ 3).

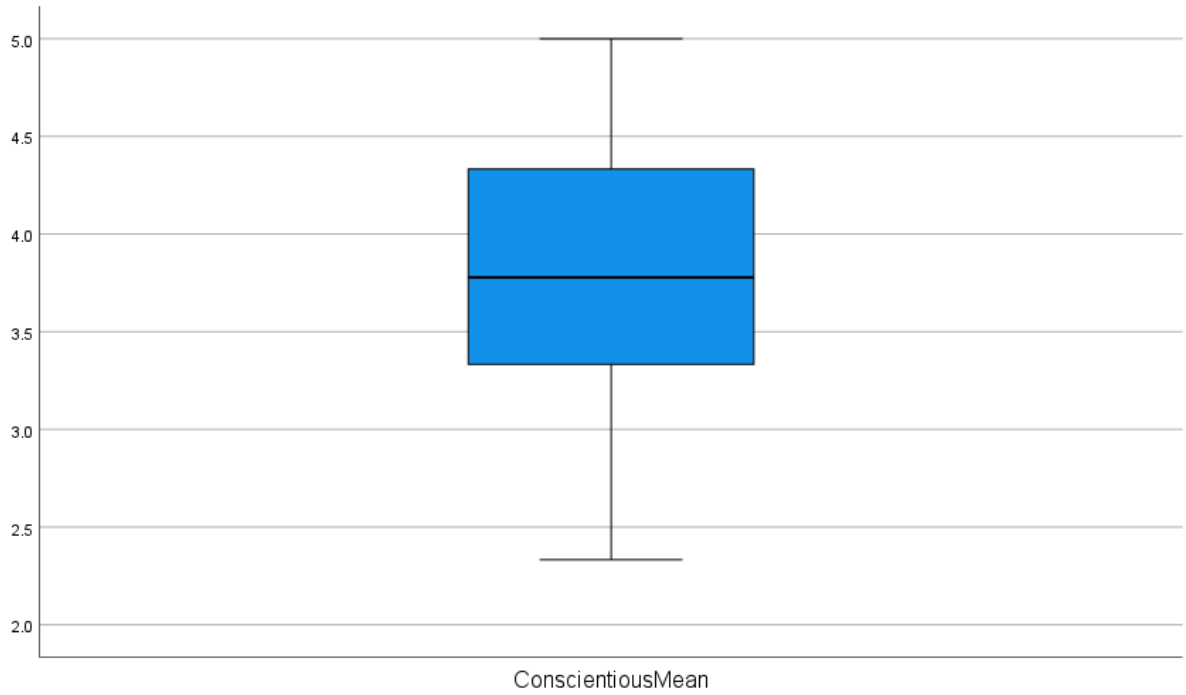
Descriptive Statistics

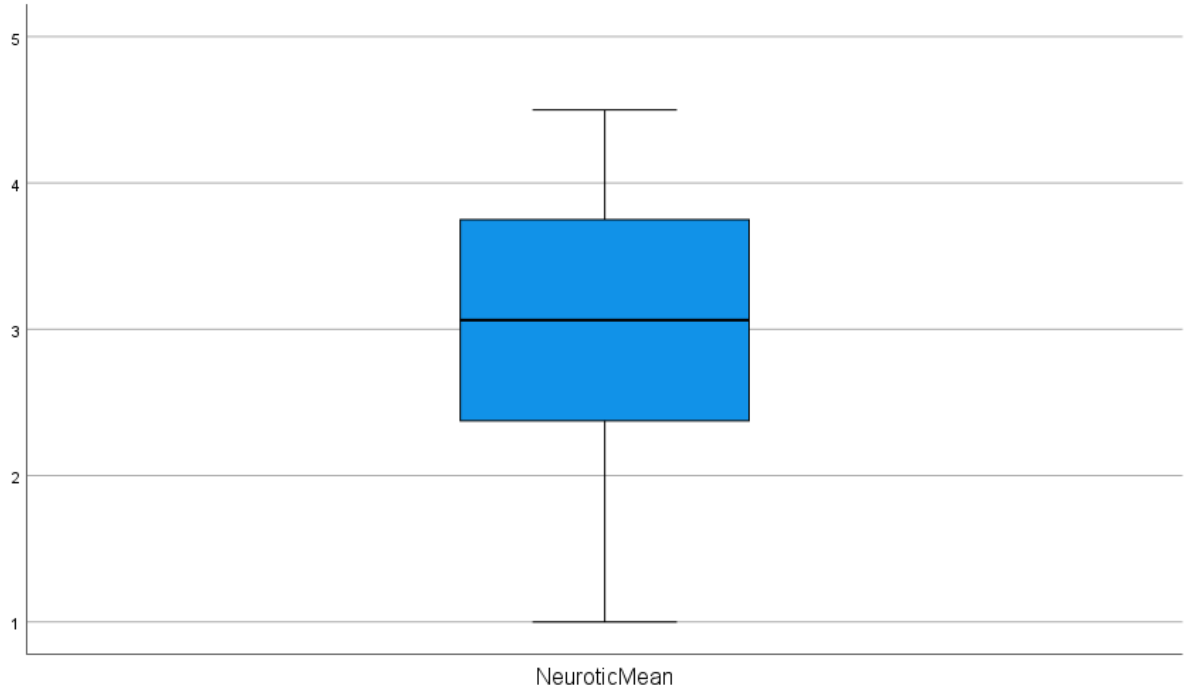
	N	Minimum	Maximum	Mean	Std. Deviation
Zscore(ExtraversionMean)	50	-2.14695	1.50930	.0000000	1.00000000
Zscore(AgreeableMean)	50	-2.39862	1.69658	.0000000	1.00000000
Zscore(ConscientiousMean)	50	-2.22387	1.71799	.0000000	1.00000000
Zscore(NeuroticMean)	50	-2.28395	1.77383	.0000000	1.00000000
Zscore(OpennessMean)	50	-2.41950	1.88183	.0000000	1.00000000
Zscore(LonelinessMean)	50	-1.60267	2.00121	.0000000	1.00000000
Valid N (listwise)	50				

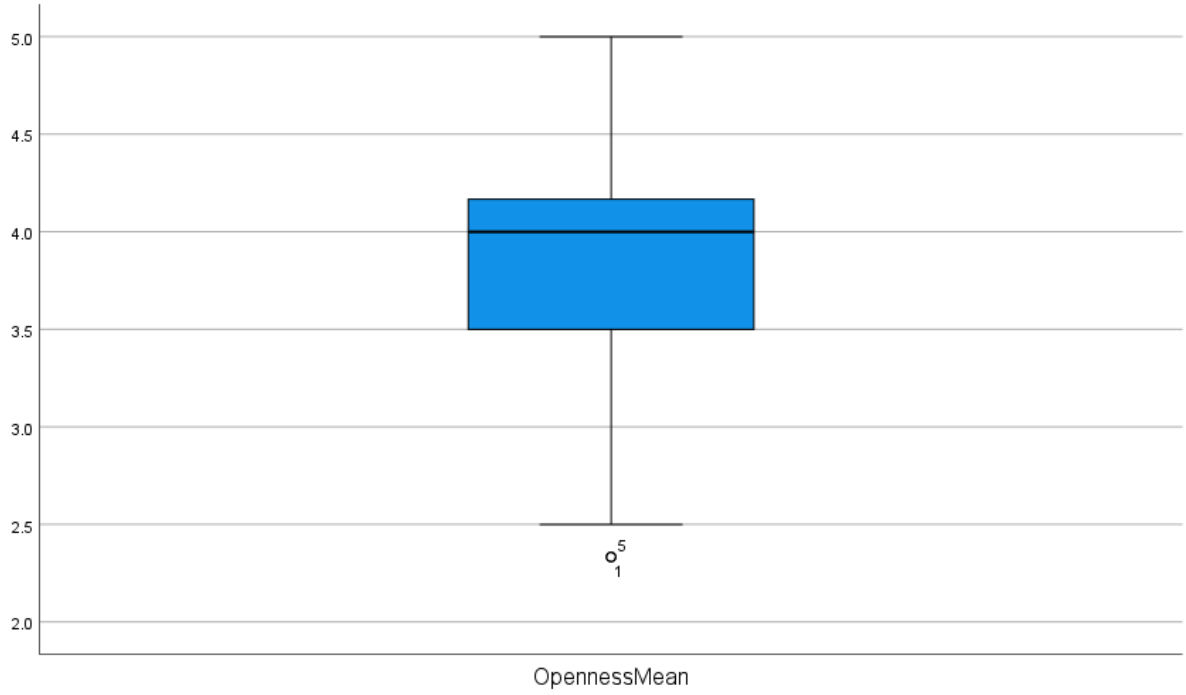
Box plots demonstrated that no significant outliers were found:

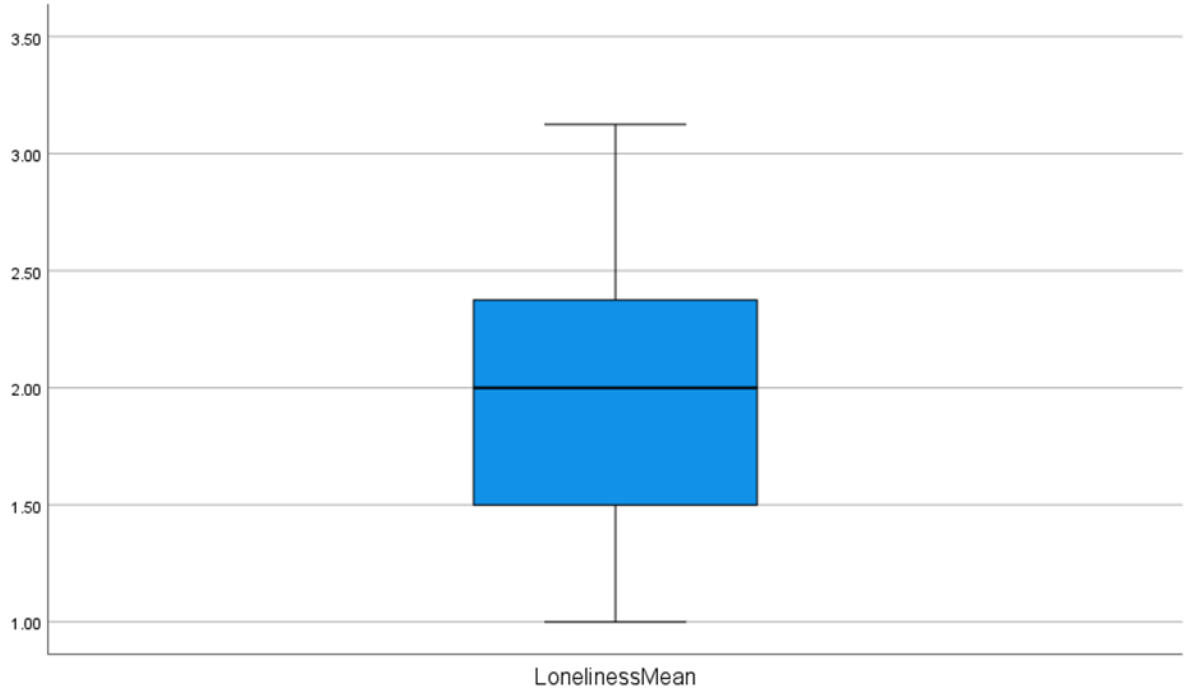



5.0
4.5
4.0
3.5
3.0
2.5
2.0
AgreeableMean


5.0
4.5
4.0
3.5
3.0
2.5
2.0
ConscientiousMean


5
4
3
2
1
NeuroticMean


5.0
4.5
4.0
3.5
3.0
2.5
2.0
5
1
OpennessMean


3.50
3.00
2.50
2.00
1.50
1.00
LonelinessMean

Appendix P – SPSS output – Normal Distribution Screening.

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
AgreeableMean	50	67.6%	24	32.4%	74	100.0%
ConscientiousMean	50	67.6%	24	32.4%	74	100.0%
NeuroticMean	50	67.6%	24	32.4%	74	100.0%
OpennessMean	50	67.6%	24	32.4%	74	100.0%
SocialMediaTotal	50	67.6%	24	32.4%	74	100.0%
LonelinessMean	50	67.6%	24	32.4%	74	100.0%
ExtraversionMean	50	67.6%	24	32.4%	74	100.0%

Descriptive statistics are highlighted in yellow. Data screening checks are highlighted in green.

Descriptives

			Statistic	Std. Error
AgreeableMean	Mean		3.9125	.09065
	95% Confidence Interval for Mean	Lower Bound	3.7303	
		Upper Bound	4.0947	
	5% Trimmed Mean		3.9333	
	Median		3.8750	
	Variance		.411	
	Std. Deviation		.64099	
	Minimum		2.38	
	Maximum		5.00	
	Range		2.63	
	Interquartile Range		.88	
	Skewness		-.383	.337
	Kurtosis		-.116	.662
ConscientiousMean	Mean		3.8378	.09567
	95% Confidence Interval for Mean	Lower Bound	3.6455	
		Upper Bound	4.0300	
	5% Trimmed Mean		3.8531	
	Median		3.7778	
	Variance		.458	
	Std. Deviation		.67650	
	Minimum		2.33	

	Maximum		5.00	
	Range		2.67	
	Interquartile Range		1.06	
	Skewness		-.284	.337
	Kurtosis		-.786	.662
NeuroticMean	Mean		2.9700	.12198
	95% Confidence Interval for Mean	Lower Bound	2.7249	
		Upper Bound	3.2151	
	5% Trimmed Mean		2.9917	
	Median		3.0625	
	Variance		.744	
	Std. Deviation		.86254	
	Minimum		1.00	
	Maximum		4.50	
	Range		3.50	
	Interquartile Range		1.41	
	Skewness		-.266	.337
	Kurtosis		-.643	.662
OpennessMean	Mean		3.8333	.08768
	95% Confidence Interval for Mean	Lower Bound	3.6571	
		Upper Bound	4.0095	
	5% Trimmed Mean		3.8574	
	Median		4.0000	
	Variance		.384	
	Std. Deviation		.61996	
	Minimum		2.33	
	Maximum		5.00	
	Range		2.67	
	Interquartile Range		.67	
	Skewness		-.751	.337
	Kurtosis		.334	.662
SocialMediaTotal	Mean		171.7200	17.84471
	95% Confidence Interval for Mean	Lower Bound	135.8597	
		Upper Bound	207.5803	
	5% Trimmed Mean		162.4889	
	Median		150.0000	
	Variance		15921.675	
	Std. Deviation		126.18112	
	Minimum		.00	
	Maximum		510.00	
	Range		510.00	

	Interquartile Range		180.00	
	Skewness		1.181	.337
	Kurtosis		.873	.662
LonelinessMean	Mean		1.9450	.08339
	95% Confidence Interval for Mean	Lower Bound	1.7774	
		Upper Bound	2.1126	
	5% Trimmed Mean		1.9375	
	Median		2.0000	
	Variance		.348	
	Std. Deviation		.58964	
	Minimum		1.00	
	Maximum		3.13	
	Range		2.13	
	Interquartile Range		.91	
	Skewness		.075	.337
	Kurtosis		-.985	.662
ExtraversionMean	Mean		3.4600	.12087
	95% Confidence Interval for Mean	Lower Bound	3.2171	
		Upper Bound	3.7029	
	5% Trimmed Mean		3.4903	
	Median		3.5000	
	Variance		.731	
	Std. Deviation		.85470	
	Minimum		1.63	
	Maximum		4.75	
	Range		3.13	
	Interquartile Range		1.28	
	Skewness		-.446	.337
	Kurtosis		-.568	.662

Figures for skewness and kurtosis taken from the table. Figures are to 3 decimal places.

Agreeableness

Skewness = -.383 / .337 = -1.136

Kurtosis = -.116 / .662 = -.175

Conscientiousness

Skewness = -.284 / .337 = -.843

Kurtosis = -.786 / .662 = -1.873

Neuroticism

Skewness = -.266 / .337 = -.789

Kurtosis = -.643 / .662 = -.971

Openness

Skewness = -.751 / .337 = -2.228

Kurtosis = .334 / .662 = 0.504

Social media use

Skewness = 1.181 / .337 = 3.504

Kurtosis = .873 / .662 = 1.319

Loneliness

Skewness = .075 / .337 = 0.223

Kurtosis = -.985 / .662 = -1.488

Extraversion

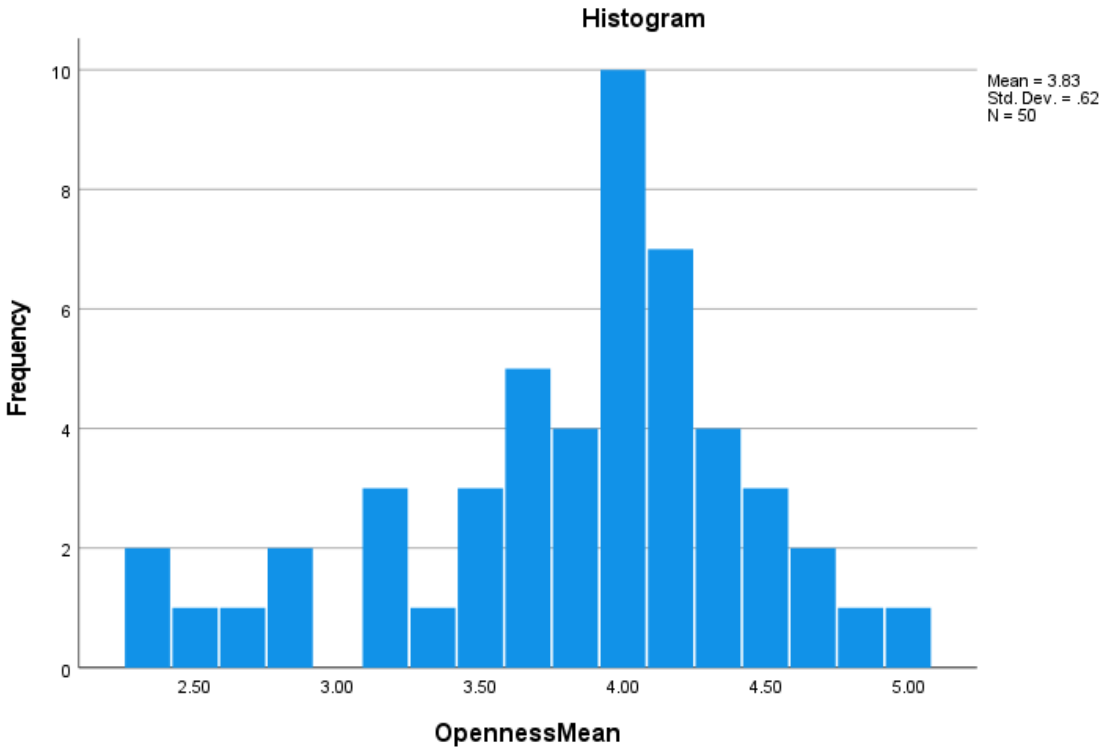
Skewness = -.446 / .337 = -1.323

Kurtosis = -.568 / .662 = -0.858

Data indicated that the scores for openness and social media use violated normality (-/+2) (Coolican, 2019; pg 484).

Appendix Q – transformations

Data indicated a negative skew of -2.228 for openness

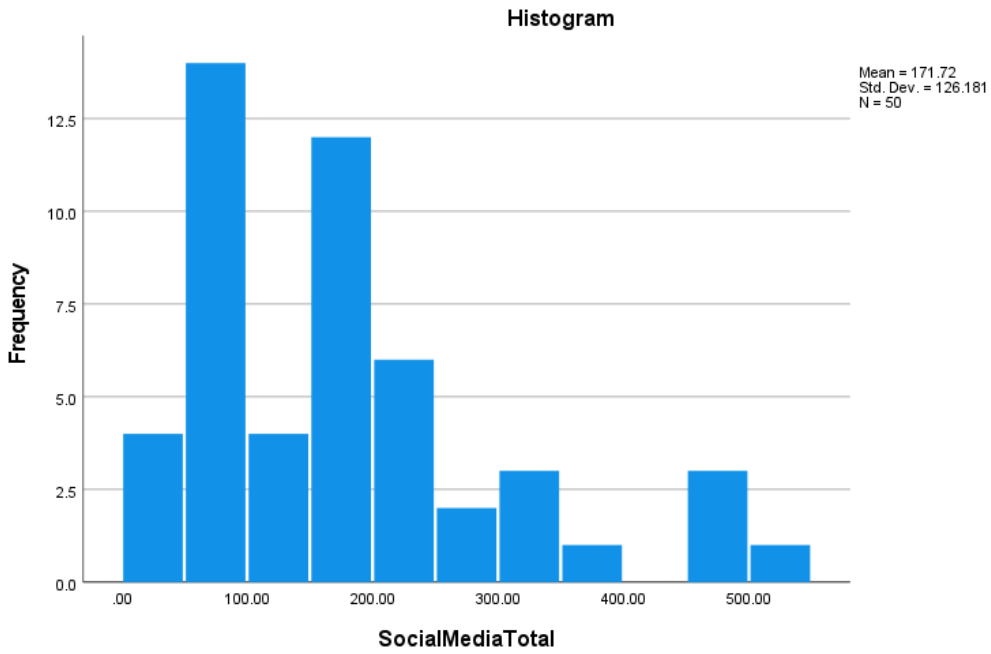


Data were transformed using the transformation procedure outlined by Coolican (2019; pg 485). X is the original score on the untransformed variable. K is the maximum value of X plus 1. The formula to compute the transformed variable for Openness was $\sqrt{K - X}$.

Descriptives

			Statistic	Std. Error
sqrtOpenness	Mean		1.4577	.02920
	95% Confidence Interval for Mean	Lower Bound	1.3990	
		Upper Bound	1.5164	
	5% Trimmed Mean		1.4547	
	Median		1.4142	
	Variance		.043	
	Std. Deviation		.20649	
	Minimum		1.00	
	Maximum		1.91	
	Range		.91	
	Interquartile Range		.23	
	Skewness		.374	.337
	Kurtosis		.102	.662

Data indicated a moderate positive skew of 3.504 for social media use



Data were transformed using the transformation procedure outlined by Coolican (2019; pg 485).
X is the original score on the untransformed variable. The formula to compute the transformed social media use variable was $\sqrt{1 + X}$.

Descriptives

			Statistic	Std. Error
sqrtSocialMedia	Mean		12.2858	.66670
	95% Confidence Interval for Mean	Lower Bound	10.9460	
		Upper Bound	13.6255	
	5% Trimmed Mean		12.2122	
	Median		12.2882	
	Variance		22.225	
	Std. Deviation		4.71430	
	Minimum		1.00	
	Maximum		22.61	
	Range		21.61	
	Interquartile Range		7.71	
	Skewness		.326	.337
	Kurtosis		-.038	.662

(figures to 3 decimal places)

Transformed Social Media Use (SqrtSocialMedia)

Skewness = .326 / .337 = .967

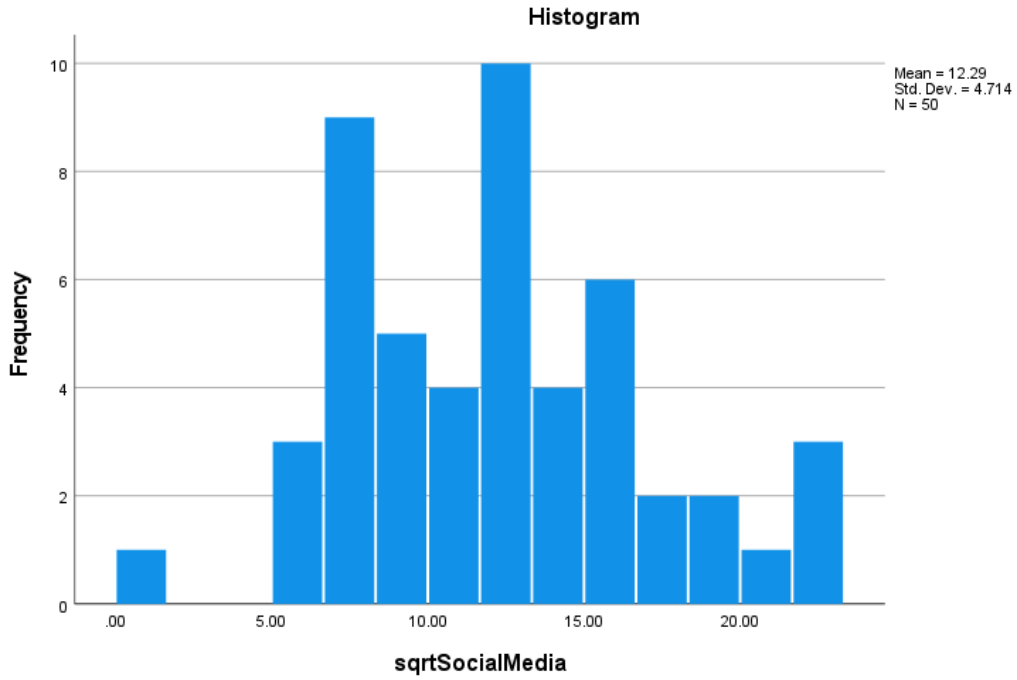
Transformed Openness (SqrtOpenness)

Skewness = .374 / .337 = 1.110

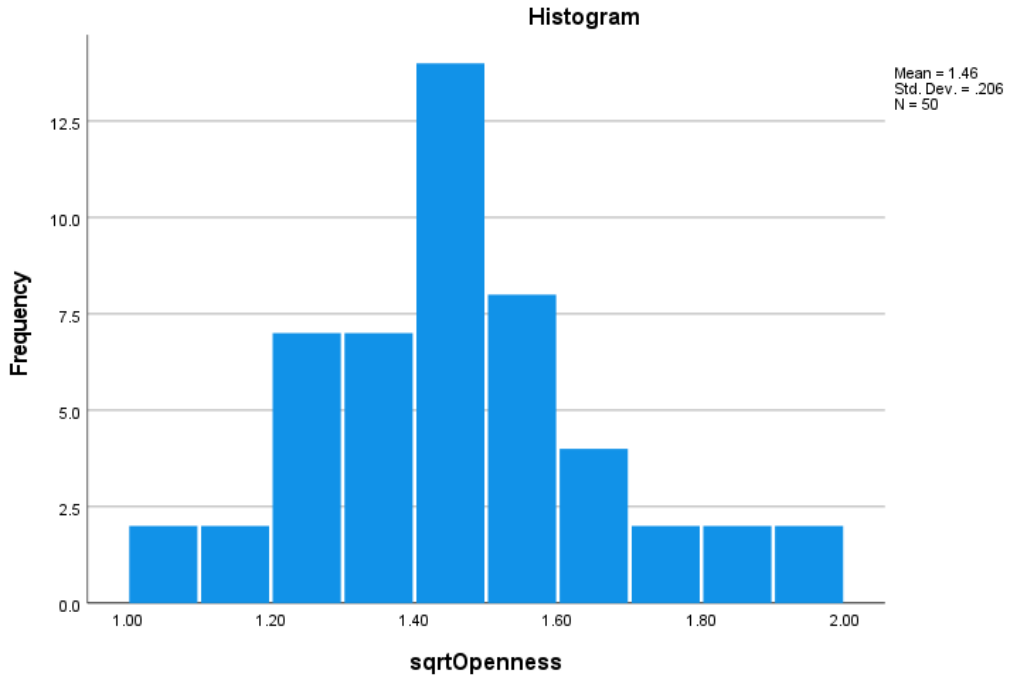
The transformed figures were within the acceptable limits (-/+ 2)

Histograms indicate normal distribution.

Histogram for transformed Total Social Media Use

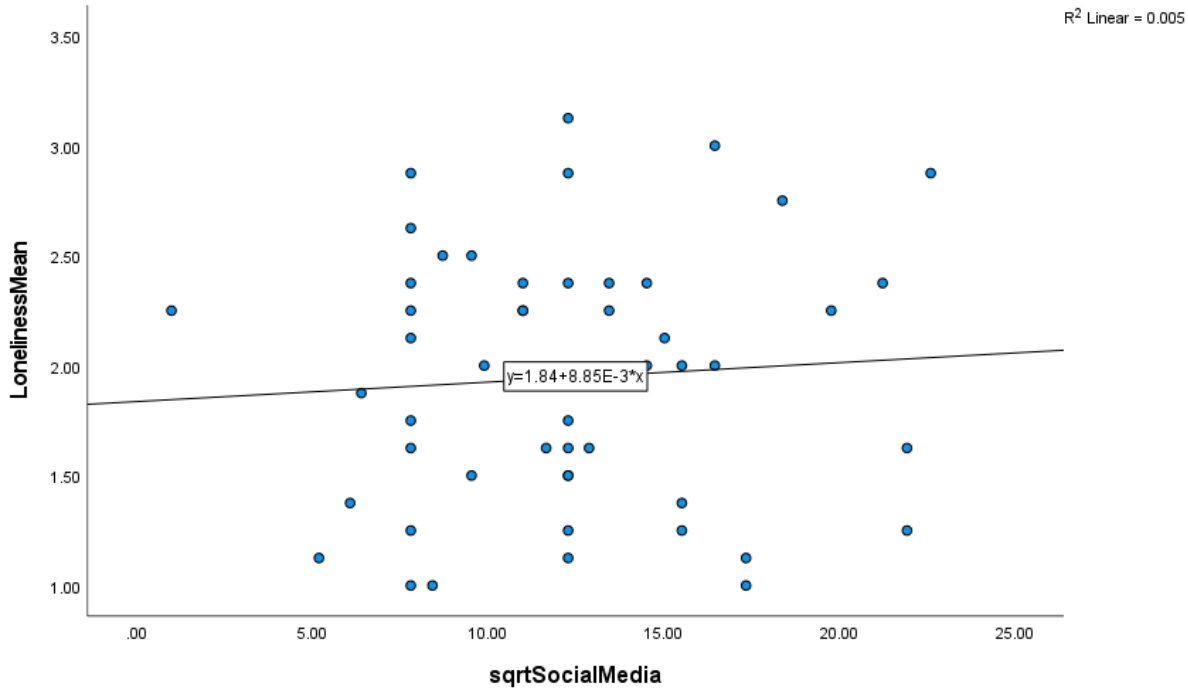


Histogram for Openness

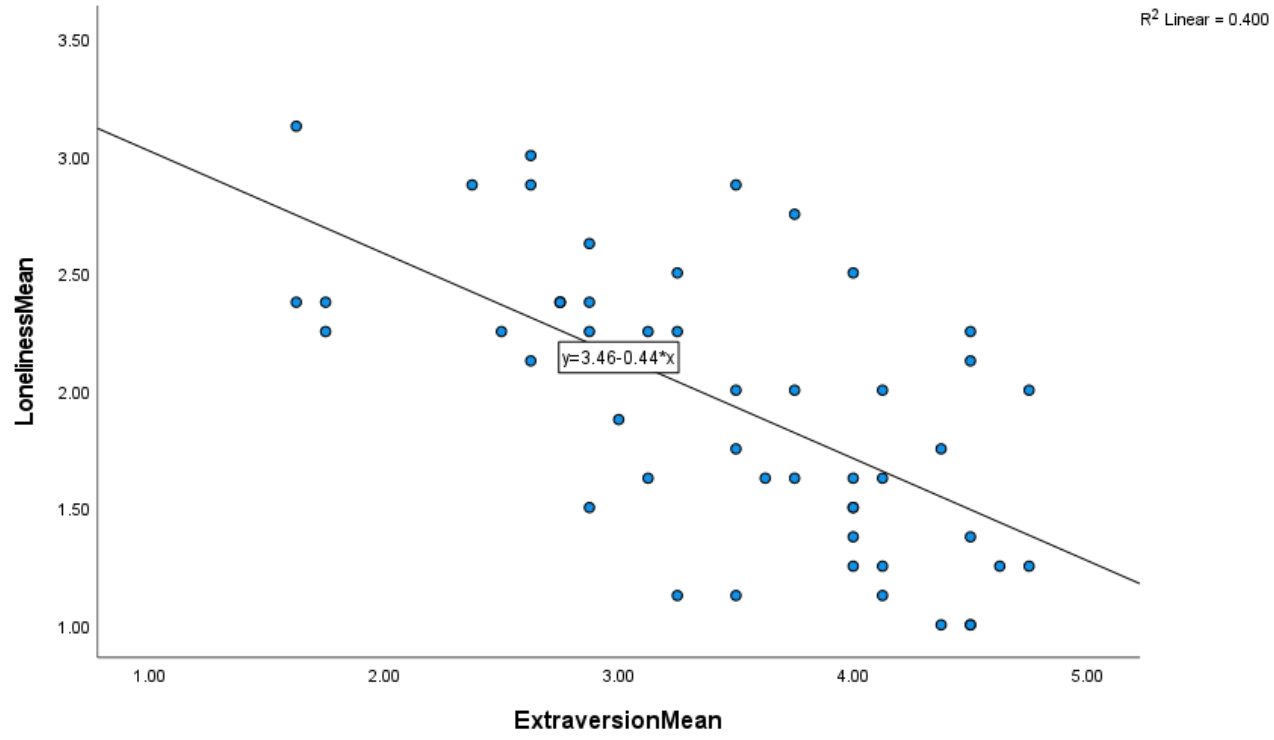


Appendix R – Linearity screening Scatterplots for each predictor variable with loneliness

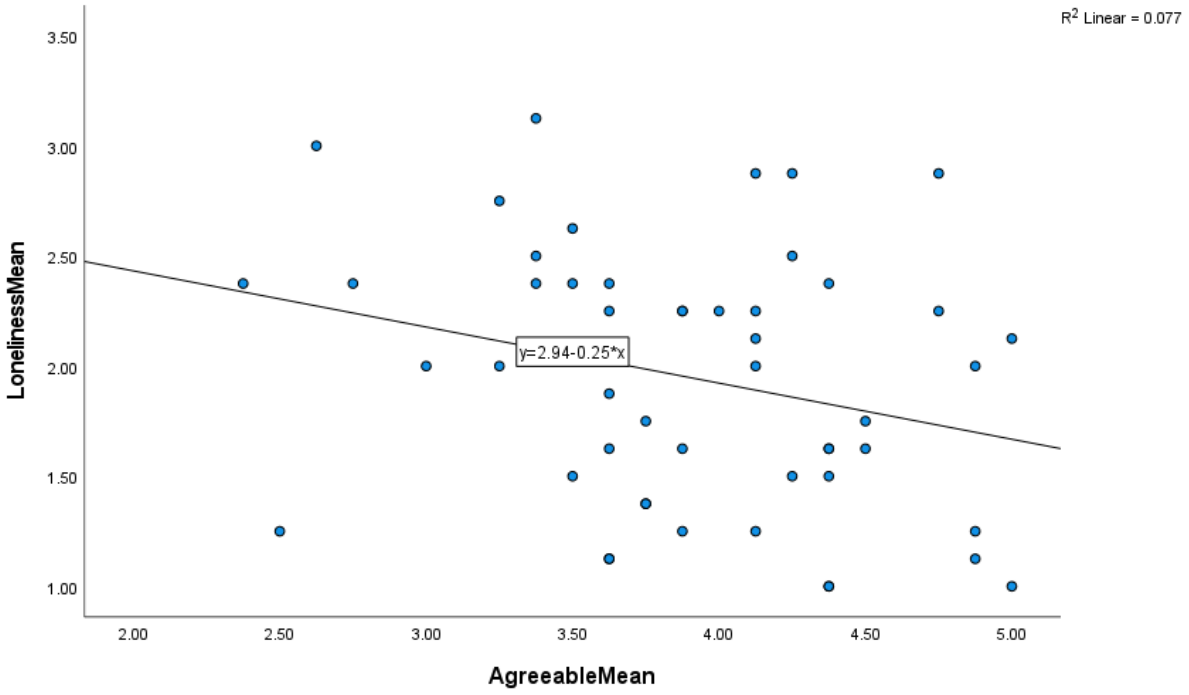
Social media use



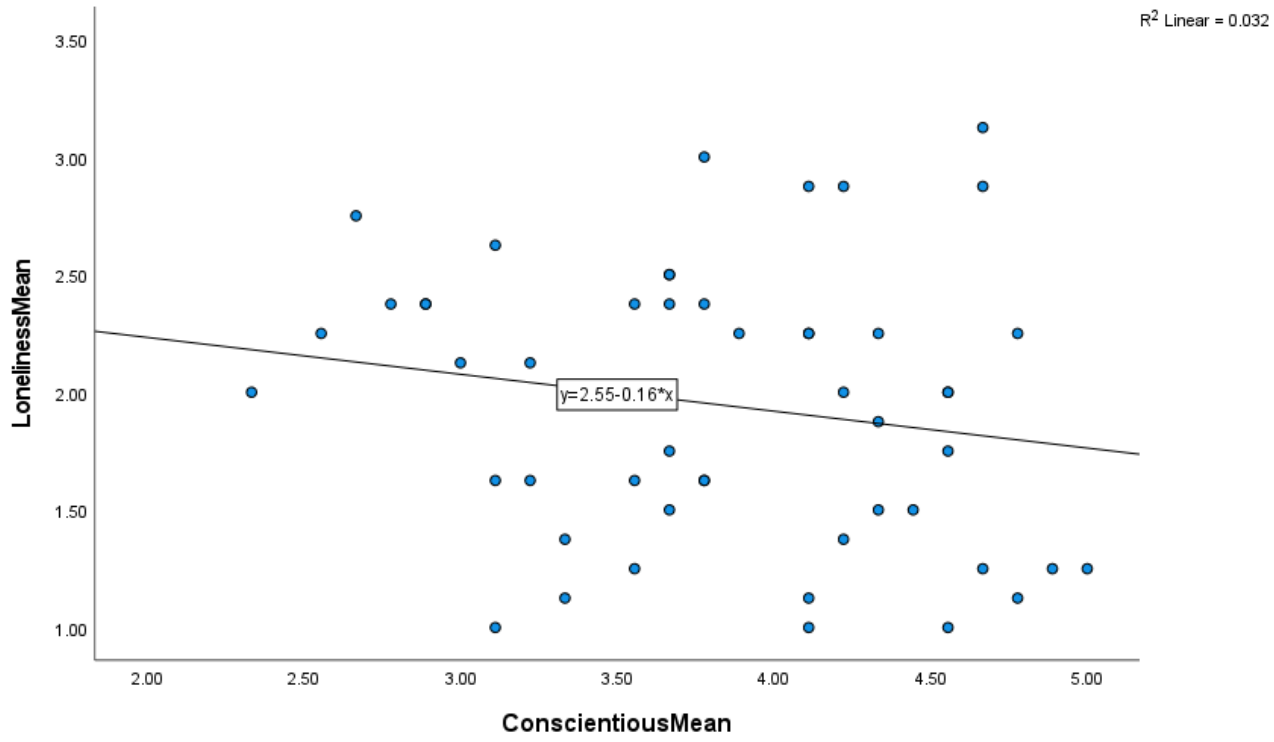
Extraversion



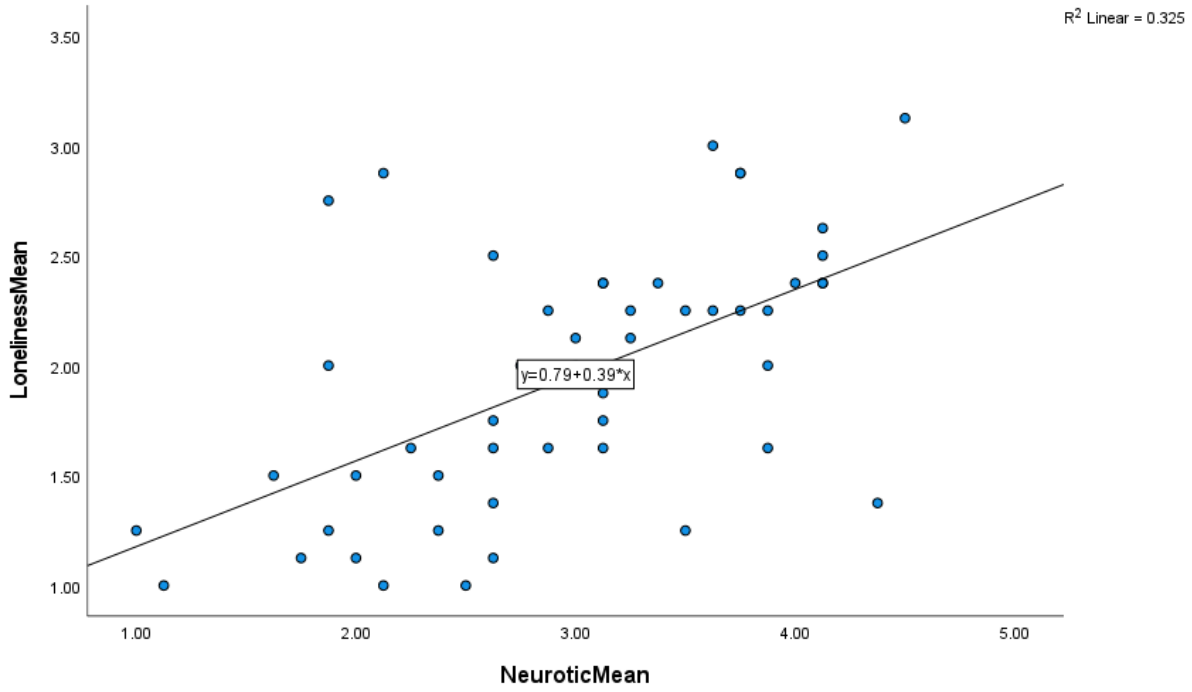
Agreeableness



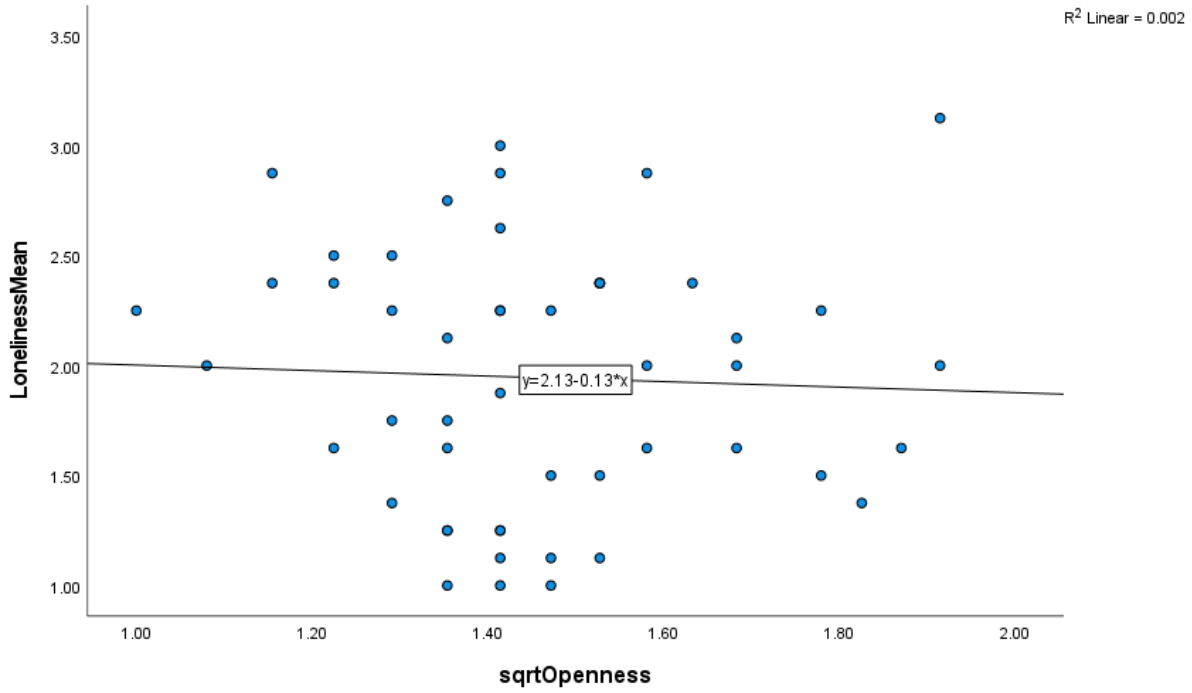
Conscientiousness



Neuroticism



Openness



Appendix S – Multiple Regression outputs – Screening for normality, homoscedasticity of residuals.

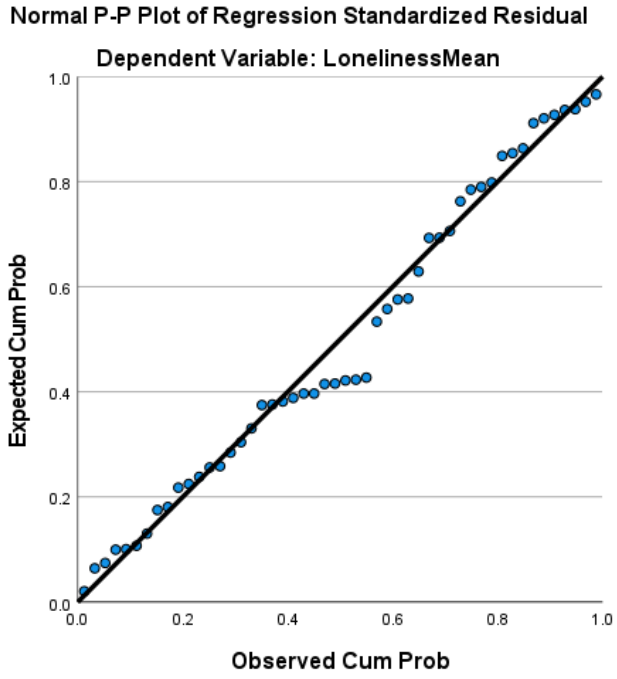
Descriptives for all variables

Descriptive Statistics

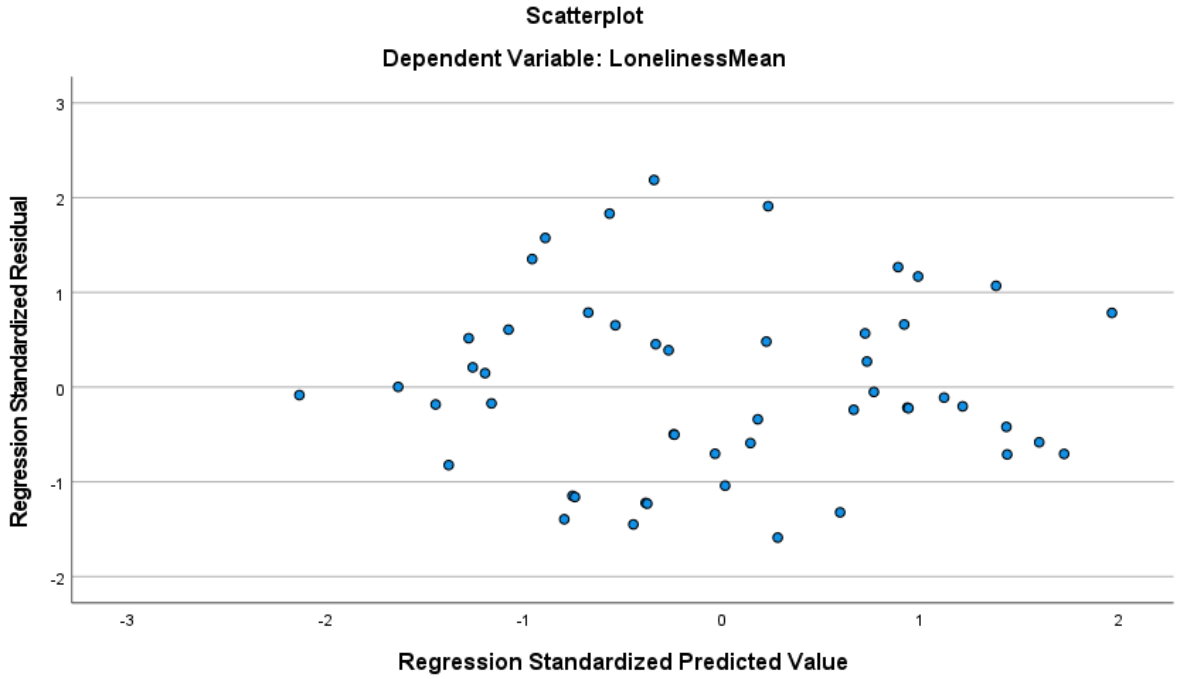
	Mean	Std. Deviation	N
LonelinessMean	1.9450	.58964	50
ExtraversionMean	3.4600	.85470	50
AgreeableMean	3.9125	.64099	50
ConscientiousMean	3.8378	.67650	50
sqrtSocialMedia	12.2858	4.71430	50
sqrtOpenness	1.4577	.20649	50

Screening for normality, linearity and homoscedasticity of residuals

P-P plot indicated normality of residuals



Scatterplot indicated normality, linearity and homoscedasticity of residuals



Appendix T- SPSS outputs - Screening for multi-collinearity

Durbin-Watson figure between 1.5 and 2.5 indicated no multi-collinearity in the sample. Variance inflation factors ranged from 1.064 to 1.696, indicating no multi-collinearity in the sample.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	2.723	.926		2.941	.005		
	ExtraversionMean	-.324	.086	-.470	-3.753	.001	.708	1.413
	AgreeableMean	-.047	.109	-.051	-.430	.670	.786	1.273
	ConscientiousMean	-.004	.104	-.004	-.036	.971	.780	1.282
	NeuroticMean	.232	.094	.340	2.479	.017	.590	1.696
	sqrtOpenness	-.291	.310	-.102	-.940	.353	.940	1.064
	sqrtSocialMedia	.022	.014	.179	1.609	.115	.891	1.122

a. Dependent Variable: LonelinessMean

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.723[a]	.523	.457	.43462	1.568

a. Predictors: (Constant), sqrtSocialMedia, AgreeableMean, sqrtOpenness, ExtraversionMean, ConscientiousMean, NeuroticMean

b. Dependent Variable: LonelinessMean

Appendix U – Mahalonbois and Cook's d outputs

Key values are highlighted in yellow.

Mahalonbois Distance Maximum value = 16.681

Cook's Distance Maximum value = .184

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1.0363	2.7842	1.9450	.42651	50
Std. Predicted Value	-2.130	1.968	.000	1.000	50
Standard Error of Predicted Value	.068	.261	.157	.041	50
Adjusted Predicted Value	1.0438	2.7371	1.9456	.43898	50
Residual	-.69023	.95080	.00000	.40714	50
Std. Residual	-1.588	2.188	.000	.937	50
Stud. Residual	-1.815	2.417	.000	1.015	50
Deleted Residual	-.90197	1.16059	-.00059	.47887	50
Stud. Deleted Residual	-1.867	2.570	.004	1.035	50
Mahal. Distance	.223	16.681	5.880	3.502	50
Cook's Distance	.000	.184	.026	.040	50
Centered Leverage Value	.005	.340	.120	.071	50

a. Dependent Variable: LonelinessMean

Appendix V – Correlation outputs

Correlations

Correlations

		LonelinessMean	ExtraversionMean	AgreeableMean	ConscientiousMean	sqrtSocialMedia	sqrtOpenness
Pearson Correlation	LonelinessMean	1.000	-.633	-.277	-.180	.071	-.044
	ExtraversionMean	-.633	1.000	.179	.046	.078	-.100
	AgreeableMean	-.277	.179	1.000	.366	-.063	.072
	ConscientiousMean	-.180	.046	.366	1.000	-.151	.174
	sqrtSocialMedia	.071	.078	-.063	-.151	1.000	.092
	sqrtOpenness	-.044	-.100	.072	.174	.092	1.000
Sig. (1-tailed)	LonelinessMean	.	.000	.026	.106	.313	.381
	ExtraversionMean	.000	.	.107	.376	.295	.244
	AgreeableMean	.026	.107	.	.004	.331	.311
	ConscientiousMean	.106	.376	.004	.	.147	.114
	sqrtSocialMedia	.313	.295	.331	.147	.	.262
	sqrtOpenness	.381	.244	.311	.114	.262	.
N	LonelinessMean	50	50	50	50	50	50
	ExtraversionMean	50	50	50	50	50	50
	AgreeableMean	50	50	50	50	50	50
	ConscientiousMean	50	50	50	50	50	50
	sqrtSocialMedia	50	50	50	50	50	50
	sqrtOpenness	50	50	50	50	50	50

Model Summary

R = .723. R^2= .523. R^2_{adj}= .457

According to Cohen (1988) an effect size greater than .26 is large. R^2 > .26. Therefore, the effect size is large.

.523 * 100 = 52.3%.

52.3% of variance in loneliness scores (outcome variables) are explained by the predictor variables.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.723[a]	.523	.457	.43462	1.568

a. Predictors: (Constant), sqrtSocialMedia, AgreeableMean, sqrtOpenness, ExtraversionMean, ConscientiousMean, NeuroticMean

b. Dependent Variable: LonelinessMean

Appendix W – ANOVA and coefficients

F(6,43) = 7.865, p < .000

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8.914	6	1.486	7.865	.000[b]
	Residual	8.122	43	.189		
	Total	17.036	49			

a. Dependent Variable: LonelinessMean

b. Predictors: (Constant), sqrtSocialMedia, AgreeableMean, sqrtOpenness, ExtraversionMean, ConscientiousMean, NeuroticMean

Coefficients between predictor variables and loneliness

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	2.723	.926		2.941	.005		
	ExtraversionMean	-.324	.086	-.470	-3.753	.001	.708	1.413
	AgreeableMean	-.047	.109	-.051	-.430	.670	.786	1.273
	ConscientiousMean	-.004	.104	-.004	-.036	.971	.780	1.282
	NeuroticMean	.232	.094	.340	2.479	.017	.590	1.696
	sqrtOpenness	-.291	.310	-.102	-.940	.353	.940	1.064
	sqrtSocialMedia	.022	.014	.179	1.609	.115	.891	1.122

a. Dependent Variable: LonelinessMean

Extraversion:

Significant negative relationship, t = -.3753, df = 49, p = .001. High extraversion predicts lower loneliness scores. If extraversion score increased by 1 unit, loneliness score would decrease by .324.

Agreeableness:

Non-significant relationship, t = -.430, df = 49, p = .670. High agreeableness does not predict lower loneliness scores.

Conscientious:

Non-significant relationship, t = -.036, df = 49, p = .971. High conscientiousness does not predict lower loneliness scores.

Neuroticism:

Significant positive relationship, t = 2.479, df = 49, p = .017. Low neuroticism scores predict lower loneliness scores. If neuroticism score increased by 1 unit, loneliness score would decrease by .232.

Openness:

Non-significant relationship, t = -.940, df = 49, p = .353. High openness does not predict lower loneliness scores.

Social media use:

Non-significant relationship, t = 1.609, df = 49, p = .115. Low social media use does not predict lower loneliness score