The Relationship Between Mindfulness and Problematic Internet Use: The Mediating Role of Fear of Negative Evaluation

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Abstract

Internet use is increasing and accordingly concern about its influence on mental health and well-being. Research has linked adverse psychological outcomes to the excessive use of the internet, thus emphasizing the study of problematic internet use and its underlying mechanism. This study examined the potential mediating role of Fear of Negative Evaluation (FNE) in the relationship between mindfulness and Problematic Internet Use (PIU). A growing body of literature suggests a negative association between mindfulness and PIU, however, the underlying mechanism of this relationship is underexplored. Thus, this study aimed to address this gap by exploring the role of FNE as a possible mediator. The hypothesis proposed was that mindfulness is negatively associated with PIU and FNE, and FNE is positively associated with PIU. Moreover, it was hypothesized that FNE acts as a mediator between mindfulness and PIU. A cross-sectional design was used and the sample compromised 139 university students (M = 23.13, SD = 3.33). Validated scales were used to measure mindfulness, FNE and PIU. Findings revealed a negative association between mindfulness and PIU (r = -.29, p < .001), mindfulness and FNE (r = -.44, p < .001), and a positive association between FNE and PIU (r = .41, p < .001), consistent with previous literature. Importantly, mediation analysis showed that FNE fully mediates the relationship between mindfulness and PIU, providing new insight into the mechanism underlying the relationship between mindfulness and PIU. Further empirical evidence is needed to establish the mediation role of FNE. Limitations and future recommendations are discussed.

Introduction

The internet is used by around 5.16 billion users representing 64.4% of the total world population (Kemp, 2023). Internet use is increasing (Pew Research Center, 2021) and technology is becoming more and more part of everyday life. Accordingly, the concern about the influence of internet use on our mental health and well-being is increasing (Twenge et al., 2017). Research has linked an increase in mental health problems to the use of digital media (Lattie et al., 2019). Additionally, a mental health crisis can be observed in the college population. A large epidemiological study on US college students shows that the diagnosis of psychopathologies has risen from 22% to 36% from 2007 to 2017 (Lipson et al., 2019). Therefore, it seems important to investigate problematic internet use in the college and university student population.

Problematic Internet Use

Problematic internet use (PIU) as defined by Lozano-Blasco et al. (2022) " is a lack of control in the use of the internet, in such a way that it impacts the personal life of the user" (p. 1). Several negative consequences of PIU have been outlined by research. The systematic review of Lozano-Blasco et al (2022) explored factors associated with internet addiction in young adults. The study identified various factors that are linked to addictive internet use, including interpersonal problems, depression, anxiety, very low self-concept, extreme social retreat and low quality of life in physical, psychological, social and environmental aspects. Moreover, the review of clinical research on PIU by Kuss & Lopez-Fernandez (2016) concluded that comorbidities with psychopathologies seem to be highly prevalent in PIU and multiple studies indicated that comorbidity seems to be the norm. Thus, emphasizing the relevance of researching PIU. Furthermore, the prevalence of PIU ranges from 3.2 among UK university students (Kuss et al., 2013) to 15.3 % among college students in Taiwan (Lin et al., 2011), showing that PIU is a relevant problem in the student population. Additionally, lower

age seems to be a risk factor for developing PIU, as research shows higher prevalence in younger age populations and a negative correlation between age and PIU (Bakken et al., 2009; de Vries et al., 2018; Heo et al., 2014; Tran et al., 2017).

Protective Factors

To mitigate the adverse effects of PIU, it is essential to identify factors that protect from the development of PIU (Calvete et al., 2017). Identifying these factors can help to further develop the understanding of PIU and help to develop effective prevention and intervention strategies. One factor that can potentially reduce the risk or the impact of PIU is mindfulness (Calvete et. al, 2017; Gamez-Guadix & Calvete, 2016). Mindfulness can be defined as the non-evaluative awareness, focused on the present, resulting from intentionally focusing on one's sensations, thoughts, and feelings as they occur (Creswell, 2017). It is associated with enhanced subjective well-being, reduced psychological symptoms and emotional reactivity, and improved behavioural regulation (Keng et al., 2011). Moreover, mindfulness-based interventions have demonstrated efficacy in treating a range of mental problems like anxiety disorder, substance use disorder, eating disorder, attention deficit hyperactivity disorder, and behavioural addiction (Baer, 2003; Chiesa & Serretti, 2011; Shonin et al., 2013).

Mindfulness and PIU

Mindfulness is associated with PIU. The study of Gamez-Guadix and Calvete (2016) investigated the relationship of mindful awareness with the four facets of PIU according to the cognitive behavioural model (Davis, 2001), namely preference for online social interactions, using the Internet for mood regulation, deficient self-regulation of internet use and negative outcomes. The statistical analysis showed a significant low to moderate negative correlation of mindfulness awareness with all of the four components of PIU. Gamez-Guadix

and Calvete (2016) concluded that mindfulness may serve as a protective factor for the development of PIU.

Moreover, the longitudinal study of Calvete et al. (2017) investigated the associations between mindfulness facets and problematic internet use in adolescents over half a year. Results showed that mindfulness predicts a decrease in PIU over time. The main effect they observed was that the non-judging facet of mindfulness negatively affects the preference for online social interactions and through that indirectly affects other facets of PIU. Calvete et al. (2017) concluded that interventions aiming to protect against the development of PIU should focus on developing the outlined mindfulness facets that have been shown to affect PIU.

Furthermore, first studies investigating the effectiveness of Mindfulness Interventions PIU have shown promising results. Mindfulness-based group therapy has been found to decrease internet addiction and increase general health (Shadbad, 2017). Moreover, a group mindfulness-based cognitive-behavioural intervention on smartphone addiction showed a significant reduction in smartphone use and smartphone addiction scores (Lan et al., 2018). Lastly, a logotherapy-based mindfulness intervention showed a significant decrease in scores of internet addiction, an increase in positive coping scores, a decrease in negative coping scores and a decrease in anxiety and depression scores (Liu et al., 2021).

To conclude, Calvete et al. (2017), showed in their longitudinal study that mindfulness predicts a decrease in PIU over time and mindfulness-based intervention have shown efficacy (Lan et al., 2018; Liu et al., 2021; Shadbad, 2017). Accordingly, Calvete et al. (2017), pointed out that studies should investigate the mechanism through which mindfulness and mindfulness intervention affect PIU, to provide information for theoretical and research application (Kazdin, 2007, as cited in Calvete et al., 2017). Most of the studies between Mindfulness and PIU so far have focused on the direct relationship between the two variables

and focused on determining relations between the facets of the two variables, while a limited amount of studies aimed at investigating the underlying mechanism in this relationship. Therefore, it was decided to investigate a potential mediator in the relationship between mindfulness and PIU.

Fear of negative evaluation

Fear of negative evaluation (FNE) as defined by Watson and Friend (1969) is the "apprehension about others evaluations, distress over their negative evaluations, avoidance of evaluative situations, and the expectations that others would evaluate oneself negatively" (p. 449). Gamez-Guadix & Calvete (2016) revealed in their study that mindfulness is negatively associated with a preference for online communication over face-to-face communication and PIU in general. Gaumez-Guadix & Calvete (2016) hypothesized that this relation might be mediated by fear of negative evaluation, as higher levels of mindfulness could be associated with less FNE and through that associated with less preference for online communication and PIU. They argued that this hypothesis is supported by research showing that individuals with higher levels of mindfulness have better interpersonal skills and less social anxiety (Dekeyser et al., 2008, as cited in Gamez-Guadix & Calvete, 2016) and because PIU is associated with social anxiety, isolation and poor social skills (Caplan, 2010, as cited in Gamez-Guadix & Calvete, 2016).

Further literature search, revealed additional evidence for this hypothesis, as research shows an association between both mindfulness and FNE and between FNE and PIU. Firstly, FNE is associated with PIU. Studies investigating FNE and PIU have shown a positive relationship between FNE and PIU (Casale et al., 2014; Naidu et al., 2023). Additionally, research indicates that socially anxious individuals are often drawn to online communication, to reduce the perceived probability of face-to-face threat, especially concerning encountering

potential negative evaluation (Lee & Stapinski, 2012). Secondly, relations between mindfulness and FNE have been found (Burton et al., 2012) and Mindfulness-based interventions have shown efficacy in reducing FNE (Irani, 2020; Sohrabi & Dortaj, 2020; Zohrabi et al., 2016). Sohrabi & Dortaj (2020) concluded that mindfulness reduces FNE by reducing psychological worries, and social anxiety symptoms and increasing coping skills and emotional self-regulation.

Considering both the association between FNE and PIU, and the association between mindfulness and FNE established by research, it was decided to investigate FNE as a potential mediator. This will further develop the literature on mindfulness and PIU and explore the mediation role of FNE, as hypothesized and discussed by Gamez-Guadix & Calvete (2017).

Aim of the Study

This study aims at investigating the mediating role of fear of negative evaluation in the relationship between mindfulness and PIU. Research has established that there is a negative relationship between mindfulness and PIU, and identified it as a potential protective factor. Moreover, the first studies on mindfulness-based intervention show promising results in reducing PIU. To better our understanding of PIU, we need to understand which factors are related to PIU and why. As mindfulness is one of those factors, further understanding the underlying mechanism of its relationship with PIU, develops our understanding of PIU and informs us for the development of interventions. Based on the discussed literature, it is hypothesized that FNE will mediate the relationship between mindfulness and PIU (see Figure 1). During the literature search, no study was found investigating this relationship, therefore this study aims at making a novel contribution to the literature by doing so.

Based on the information presented the following research questions (RQ) and hypothesis (HQ) have been formulated:

RQ1: *To what extent does fear of negative evaluation mediate the relationship between mindfulness and PIU?*

H1: There is a negative relationship between Mindfulness and PIU

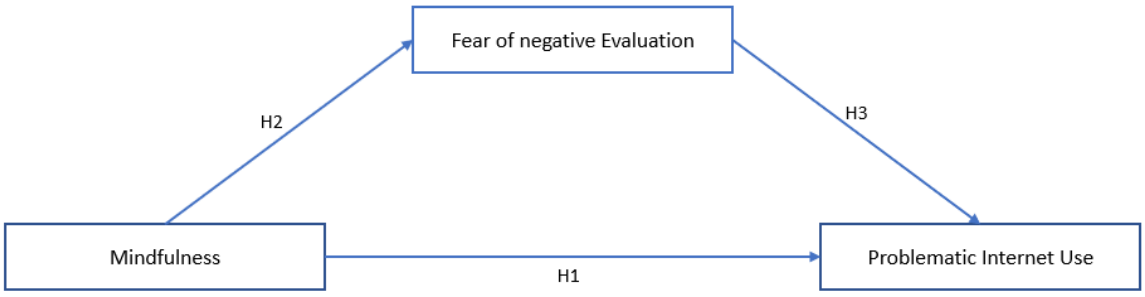
H2: There is a negative relationship between Mindfulness and FNE

H3: There is a positive relationship between FNE and PIU

H4: FNE will mediate the relationship between mindfulness and PIU

Figure 1

Model of the Relationship between Mindfulness and Problematic Internet Use Mediated by Fear of Negative Evaluation



Methods

Design

A correlational study design with convenience sampling was used to investigate the relationship between mindfulness and PIU and to examine the mediating role of FNE.

Participants

To be eligible, participants had to be actively enrolled at a university. 158 Participants were recruited for this study using convenience sampling. Participants that were not actively enrolled at a University, had no sufficient English skills or did not complete the survey were excluded from the data analysis. This led to a final sample of 139 participants, with a mean age of 23.13 (*SD* = 3.33). The sample comprised 102 women, 36 men, and 1 non-binary individual. Nationalities were diverse, with 68 participants from the Netherlands, 29 participants from Germany, and 43 participants from various other countries. The highest level of education completed varied, with 57 participants holding a Bachelor's degree, 50 participants having a high school diploma or equivalent, 21 participants holding a Master's degree and 11 participants holding some college or associated degree.

Materials

To create the online questionnaire used for this study, Qualtrics.com was used. The questionnaire consists of a section asking for demographic information and one scale for each problematic internet use, mindfulness and fear of negative evaluation. Demographic data on age, nationality, gender, highest level of education completed and at which university they are enrolled, were collected.

Problematic Internet Use

To measure PIU the Generalized and Problematic Internet Use Scale 2 (Caplan, 2019) was used. The scale consists of 15 items and 5 distinct subscales: (a) preference for online social interactions (consisting of 3 items; e.g., "I prefer online social interaction over face-to-face communication."), (b) mood regulation (consisting of 3 items; e.g., "I have used the Internet to talk with others when I was feeling isolated."), (c) cognitive preoccupation (consisting of 3 items; e.g., "I would feel lost if I was unable to go online."), (d) compulsive Internet use (consisting of 3 items; e.g., "I find it difficult to control my Internet use.") and (e) negative outcomes (consisting of 3 items; e.g.," My Internet use has made it difficult for me to manage my life."). Participants responded to each item on a 6-point Likert scale ranging from 1 *(strongly agree)* to 6 *(strongly disagree).* The GPIUS2 has been shown to have good psychometric properties, with good construct and convergent validity, and adequate reliability (α = .91) and has been validated with a university student sample (Caplan 2010; Gamez-Guadix et al. 2013). The internal consistency in the present study was α = *.88.*

Mindfulness

To measure mindfulness the Cognitive and Affective Mindfulness Scale-Revised (CAMS-R; Feldman et al., 2007) was used. The CAMS-R consist of 12 items (e.g., "It is easy for me to concentrate on what I am doing") and measures 4 components of mindfulness, namely attention, awareness, present focus, and acceptance. Participants responded to each item on a 4-point scale from 1 (*rarely/not at all)* to 4 (*almost always),* with which the overall mindfulness score was computed. The CAMS-R shows acceptable internal consistency (α = .74) and evidence of convergent and discriminant validity with concurrent measures of mindfulness (Feldman et al., 2007). Moreover, it has been validated in a student sample (Feldman et al. 2022). In the present study, the internal consistency of the scale was α = .79.

Fear of negative evaluation

To measure fear of negative evaluation the Brief Version of the Fear of Negative Evaluation (BFNE; Leary, 1983) Scale was used. The BFNE consist of 12 items measuring the apprehension or distress as a result of others' evaluations (e.g., “I am afraid others will not approve of me.”). Participants responded to each item on a five-point Likert scale from 1 *(not at all characteristic of me*) to *(extremely characteristic of me).* The BFNE highly correlates (r = .96) with the original scale and shows high internal consistency (α = .90) and high test-retest correlation (r = .75) in a 4-week interval in a student sample (Leary, 1983). In the present study, the internal consistency of the scale was $\alpha = .90$.

Procedure

After ethical approval was given by the ethics committee of the University of Twente (see Appendix A) the questionnaire was sent to university students accessible by the researcher. Subsequently, the survey was published and distributed via Sona systems (Application of the University of Twente), surveycircle.com, surveyswap.io and poll-pool.com. Participants are first presented with general information about the study, including information about the study procedure, risks and benefits, confidentiality and about voluntary participation (see Appendix B). Subsequently, participants are asked whether they consent to participate in the study or not. If consent was not given participants were forwarded to the end of the survey, if consent was given the first block consisting of several questions regarding demographic information was presented. Next, participants were presented with the GPIUS-2, CAMS-R and BFNE scales. If every question of the survey was answered participants were directed to the end page of the survey, where participants were thanked for their time spent completing the survey and where it was indicated that their response has been recorded.

Data Analysis

The collected data was analyzed with the statistical software R using R Studio. First, data was screened for incomplete responses and non-student responses. Both were removed and the final dataset got determined (n = 139). Secondly, a descriptive analysis of the demographic data was conducted, to get an overview of the characteristics of the sample. Next, the scores of each participant for the three scales were calculated. Subsequently, boxplots were created to check for outliers. Furthermore, descriptive analyses were calculated for the total scores of the three scales and mean scores between gender were compared and tested for significance using a t-test. Moreover, Cronbach's alpha was computed to check the internal consistency of the three scales. Next, relevant assumptions for linear regression and mediation were checked. Normality was checked by conducting a Shapiro-Wilk test. Linearity and Homoscedasticity were checked by creating residuals vs fitted values plots. Lastly, multicollinearity was checked by calculating the Variance Inflation Factor (VIF) values for the independent and mediator variable. The VIF values were interpreted using commonly used criteria that a VIF factor above five indicates high multicollinearity (Hair et al., 2010). Next, Person correlations between the variables were calculated and the strength of the correlations was interpreted using the Cohen guidelines (Cohen, 1988). To test the linear relationship between the variables linear regression models were created. Lastly, to test the potential mediating role of FNE a mediation analysis was conducted, using a confidence interval of 95% and a bootstrapping of 1000 to test the total, direct and indirect effects.

Results

Preliminary Analysis

First, relevant assumptions for the correlation and linear regression analysis were checked. The Shapiro-Wilk test showed that for the three linear regression models, the residuals are approximately normally distributed. Moreover, scatterplots (See Appendix C)

were created to check for linearity and homoscedasticity, which show linearity and no indication of homoscedasticity. Furthermore, to check for multicollinearity VIF values were calculated. The VIF value for the Mindfulness and FNE, were both 1.24, indicating no multicollinearity. Furthermore, boxplots were created to check for outliers. One outlier in the Problematic Internet Use Scores was identified. It was decided to not remove this outlier, as there was no indication of a false response and as analysis with and without the outlier showed only minor differences.

Descriptive Analysis

The descriptive statistics for mindfulness, problematic internet use, and fear of negative evaluation scale scores are presented in Table 1. For exploratory reasons, the mean scores of female and male participants were compared. Non-binary individuals were excluded in this analysis, as the sample only included one individual identifying as non-binary. A non-significant difference in PIU scores was found between the scores of male participants (M = 57.2, SD = 20.6) and female participants (M = 56.8, SD = 15.2); $t(50.74) = -0.10$, $p = .923$. Moreover, a significant difference in mindfulness scores was found between male (M = 28.2, SD = 5.3) and female participants (M = 25.9, SD = 4.4); $t(54.92) = -2.40$ $p = .019$. Furthermore, a significant difference in FNE scores was found between male (M = 35.05, SD = 8.78) and female participants (M = 40.6, SD = 9.2); $t(66.20) = 3.23$, $p = .002$.

Table 1

Results of the descriptive analysis of Problematic Internet Use, Mindfulness and Fear of Negative Evaluation

Variable	Minimum	Maximum	Mean	Std. Deviation (*SD*)
Problematic Internet Use	15	101	57.21	17.10
Mindfulness	13	40	26.48	4.69
Fear of negative evaluation	20	60	39.09	9.33

Correlation Analysis

Pearson correlation analyses were conducted to investigate the relationships between the three variables and the strength of the correlations were interpreted according to the Cohen guidelines (Cohen, 1988). The results are presented in Table 2. A significant moderate negative correlation was found between mindfulness and PIU and between mindfulness and FNE. Furthermore, a significant small positive correlation was found between FNE and PIU.

Table 2

Pearson correlations between the three variables: Problematic Internet Use, Mindfulness and Fear of negative evaluation

Variable	1	2	3
1. Problematic Internet use	—		
2. Mindfulness	-0.289*	—	
3. Fear of negative evaluation	0.413*	-0.436*	—

*p <.001

Linear Regression and Mediation Analysis

H1: There is a negative relationship between mindfulness and PIU

To test hypothesis 1, a regression analysis was performed, with mindfulness as the independent variable and PIU as the dependent variable. The regression analysis showed that mindfulness negatively predicts PIU (b = -1.04, SE = 0.30, R^2 = *0.08* , $F(1,138) = 12.44$, $p <$ .001 95% *CI* [-1.63, -0.46]). Therefore the hypothesis was accepted.

H2: There is a negative relationship between mindfulness and FNE

To test hypothesis 2, a regression analysis was performed, with mindfulness as the independent and FNE as the dependent variable. The regression analysis showed that

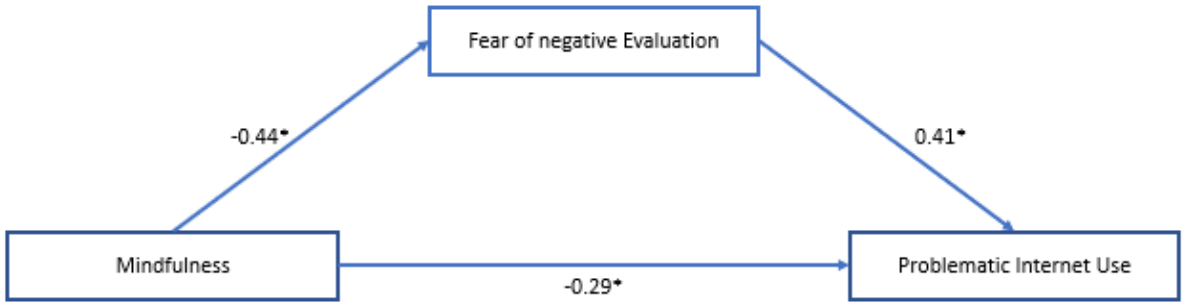
mindfulness negatively predicts FNE (b = -0.87, SE = 0.15, R^2 = *0.20* , F(1,138) = 33.65, p < .001, 95% *CI* [-1.18, -0.58]). Therefore, the hypothesis was accepted.

H3: There is a positive relationship between FNE and PIU

To test hypothesis 3, a regression analysis was performed, with FNE as the independent and PIU as the dependent variable. The regression analysis FNE positively predicts PIU (b = 0.76, SE = 0.14, R^2 = 0.17, F(1,138) = 28.03, p < .001, 95% *CI* [0.47, 1.03]). Therefore, the hypothesis was accepted. Accordingly, all linear paths showed significance, standardized estimates were calculated and are presented in Figure 2.

Figure 2

Standardized estimates for linear regression paths according to the proposed model (p < .001)*



H4: FNE will mediate the relationship between mindfulness and PIU

Furthermore, to test the potential mediating role of fear of negative evaluation in the relationship between mindfulness and problematic internet use a mediation analysis was conducted. The total effect of mindfulness on problematic internet use was significant (b = -1.05, *CI* = [-1.66, -0.48], p = .002). The indirect effect of mindfulness on problematic internet use through fear of negative evaluation was also significant (b = -0.57, *CI* = [-0.93, -0.27], p < .001). Moreover, the direct effect of mindfulness on problematic internet use was not

significant (b = -0.48, CI = [-1.11, 0.11], p = .108). These results suggest that fear of negative evaluation fully mediates the relationship between mindfulness and problematic internet use. Therefore, the hypothesis was accepted. The results of the mediation analysis are presented in Table 3.

Table 3

Results of the mediation analysis

			95 % CI		
Effect	Path	Estimate	Lower	Upper	p
Total	Mindfulness → PIU	-1.052	-1.660	-.48	.002
Indirect	Mindfulness → FNE → PIU	-.571	-.930	-.27	< .001
Direct	Mindfulness → PIU	-.482	-1.108	0.11	.108

Discussion

This study aimed to investigate the relationship between mindfulness, PIU and FNE. The goal was to explore the potential mediating role of FNE in the relationship between mindfulness and FNE. Uncovering the underlying mechanism between the association of mindfulness and PIU may help to explain why mindfulness seems to predict a decrease in PIU and reveal how it helps to protect and reduce negative outcomes related to PIU.

The present study found a negative relationship between mindfulness and PIU, thus replicating the findings of prior studies that revealed this association (Calvete et. al, 2017; Gamez-Guadix & Calvete, 2016). While the majority of previous studies have explored this relationship in an adolescent sample, the current research provides new insight by focusing on a university student population. Therefore, showing that this relationship seems to be also present in university students.

Secondly, the present study investigated relationships between the variables according to the proposed mediation model. The results showed a significant negative relationship between mindfulness and FNE, thus supporting the second hypothesis. This suggests that

individuals with higher levels of mindfulness will experience a lesser degree of FNE. This association was anticipated, as previous studies on the efficacy of mindfulness-based interventions in reducing FNE showed positive results (Irani, 2020; Sohrabi & Dortaj, 2020; Zohrabi et al., 2016). My study, therefore, provides additional empirical evidence for the negative relationship between mindfulness and FNE. Moreover, my results revealed a significant positive relationship between FNE and PIU, thus supporting the third hypothesis. This suggests that individuals with higher levels of FNE will also show higher levels of PIU. The finding of the positive association between FNE and PIU is in line with my expectations, as past studies have shown a positive relationship between FNE and PIU (Casale et al., 2014; Naidu et al., 2023). Thus, this study gives further support for the association between FNE and PIU, emphasizing the importance of researching FNE within the context of PIU.

Beyond examining the direct effects, the main aim of this study was to explore the underlying mechanism in the relationship between mindfulness and PIU. Only two studies were found to investigate mediator in this relationship and to my knowledge, no other study has investigated the mediating role of FNE. The present study revealed a full mediation effect of FNE between mindfulness and PIU, thus supporting the fourth hypothesis. This finding was in line with the hypothesis by Gamez-Guadix & Calvete (2016) which suggested that mindfulness might be linked to FNE in a way that it reduces FNE levels, and thereby predict a decrease in preference for online communication and subsequently PIU. This finding is also in line with research showing an association between mindfulness and FNE (Irani, 2020; Sohrabi & Dortaj, 2020; Zohrabi et al., 2016), and between FNE and PIU (Casale et al., 2014; Naidu et al., 2023).

To explain the theoretical underpinning and mechanism between the relation of FNE and PIU, Lee & Stapinski (2012) discussed that socially anxious individuals are drawn to online communication, to reduce the perceived threat of face-to-face communication,

especially concerning encountering potential negative evaluation. Through this mechanism higher levels of FNE would lead to higher levels of PIU, thus underpinning the relation between FNE and PIU. Furthermore concerning the relationship between mindfulness and FNE, Sohrabi & Dortaj (2020) discussed that mindfulness could reduce FNE by reducing psychological worries, and social anxiety symptoms and increasing coping skills and emotional self-regulation. Thus, the full mediation of FNE between mindfulness and PIU might be observed through the following mechanism. As discussed, mindfulness could lead to a reduction of psychological worries and social anxiety symptoms, which could lead to a decrease in FNE. Additionally, mindfulness is associated with increased coping skills and emotional self-regulation, which might help with coping with and regulating FNE, further facilitating a reduction in FNE. This reduction in FNE could then lead to a decrease in preference for online communication over face-to-face communication, as the concern of encountering potential negative evaluation might be reduced. This reduction of preference for online communication, which is an essential aspect of PIU, might then lead to a reduction of PIU. This would be in line with the findings of Calvete et al. (2017) that showed in their longitudinal study that the non-judging dimension of mindfulness predicts a decrease in preference for online communication over time and this decrease in preference for online communication was shown to indirectly predicted a decrease in the other facets of PIU, namely less use of the internet to regulate mood, difficulties in self-regulation of internet use and negative outcomes. Thus giving a potential explanation of why a full mediation was found in this present study.

While previous studies focused on studying the relationship between mindfulness and PIU and the efficacy of mindfulness-based interventions, only two studies were found to investigate the underlying mechanism in this relationship. These studies show a partial mediation role of self-control (Sinha et al., 2020; Wu & Li, 2021) and negative affect (Sinha

et al., 2020). Sinha et al. (2020) discussed that the self-awareness and attention components of mindfulness might facilitate self-control and through that help to develop the regulation of thoughts and impulses to use the internet. Moreover, they proposed that mindfulness promotes active engagement with thoughts and emotions, without being absorbed in them. This could lead to better coping with negative affect, as active engagement with negative thoughts and emotions can lead to positive adjustments within the individual concerning these cognitions (Hayes & Strohsahl, 1999; as cited in Sinha et al., 2020). Moreover, Sinha et al. (2020) discussed that fewer negative affect could then leads to a reduction in PIU, as negative affect is positively associated with addictive behaviour.

The current study discovered that FNE fully mediates the relationship between mindfulness and PIU, but findings from Sinha et al. (2020) and Wu & Li (2021) suggest the presence and relevance of additional mediators. This underscores the complexity of the relationship between mindfulness and PIU, emphasizing further research into the underlying mechanism at play. The different mediators outlined by research might influence different aspects of PIU, as PIU is a complex problem underlying multiple essential facets for its conceptualization. According to the behavioural cognitive model (Davis, 2001), PIU is conceptualized to include four essential facets, namely a preference for online social interactions, using the Internet for mood regulation, deficient self-regulation of Internet use and negative outcomes. It might be hypothesized that the identified mediators each influence different facets of PIU. As outlined in the previous section, FNE, as a full mediator, may predominately influence preference for online communication, which has been shown to indirectly affect the other facets of PIU, and thereby PIU itself. Thus FNE as a mediator might show its main effect over influencing the preference for online communication facets. On the other hand, Sinha et al. (2020) explained the partial mediation by self-control through its enhancement by mindfulness, thereby supporting the regulation of internet use impulses.

Thus, this mediator may exhibit its partial mediating effects primarily on the deficient self-regulation facet of PIU. Furthermore, the partial mediation by negative affect was explained by Sinha et al. (2020) to be through mindfulness reducing negative affect and leading to less PIU, as negative affect is associated with addictive behaviours. Seéing their finding in light of the facets proposed by the cognitive behavioural model of PIU, this mechanism might influence and show its effect through effecting the facet of using the internet for mood regulation. As Sinha et al. (2020) proposed that mindfulness might lead to fewer negative affect by facilitating better coping with negative thoughts and cognitions. Consequently, this might lead to a decrease in the use of the internet for mood regulation, thus showing its partial mediation effect through influencing this facet of PIU. Based on the present findings and the findings of Sinha et al. (2020), it is hypothesized that the three discussed mediators, explain the effect of mindfulness on different facets of PIU according to the cognitive behavioural model of PIU. Future research should explore the mediating effects of FNE, self-control and negative affect on the individual facets of mindfulness, to establish whether these mediators explain the effect of mindfulness on different facets of PIU and to further develop our understanding of the underlying mechanism of the relationship between mindfulness and PIU.

Strength, Limitations and Recommendations

In regards to the limitation of this study, a lack of generalizability of the results needs to be emphasized. Convenience sampling was used and therefore generalization to the student population is limited (Etikan et al., 2016). To get a clearer picture of whether the found results apply to the whole student population, randomized sampling should be applied in future research. Furthermore, it should be noted that the sample used is a predominantly female sample, underrepresenting the male and non-binary gender. Moreover, descriptive

analysis of gender differences revealed that there were significantly different means for mindfulness and FNE scores between male and female participants.

Moreover, the study utilized a cross-sectional design, therefore only showing that there are relationships between the variables studied, but not establishing a cause-effect relationship. Longitudinal studies should be conducted in the future to establish whether the variables affect each other over time according to the found mediation model and proposed mechanism.

Furthermore, the variables used in the study were measured using self-report measures. Therefore, the study relied on self-report data and potential biases should be mentioned. Due to the social desirability bias (van de Mortel, 2008), participants might have underreported their PIU or FNE or overreported their mindfulness. This could lead to inaccurate measurements and data, influencing the observed relationship. This bias, seems relevant for this study, as answering a questionnaire about PIU or FNE might be sensitive for some individuals.

Additionally, this study used a university student sample while most other studies on the relationship between mindfulness and PIU use adolescent samples. As studies have shown a higher prevalence in the younger age population and a reverse correlation between age and PIU (Bakken et al., 2009; de Vries et al., 2018; Heo et al., 2014; Tran et al., 2017), it seems important to research PIU in adolescents population. Moreover, to extend previous research it would seem important to conduct this study with the same population, thus with an adolescent sample. But in the scope of this bachelor thesis, it was not possible to recruit an adolescent sample and university students were conveniently available, therefore it was decided to use a university student sample. This, both build the literature but also leads to a recommendation, as it shows that the relation between mindfulness and PIU is also present in

a university student sample, but also emphasizes the need to investigate whether the mediation effect of FNE between mindfulness and PIU is also present in the adolescents' population.

Furthermore, based on the finding that FNE fully mediates the relationship between mindfulness and PIU, it might be relevant to investigate whether mindfulness-based interventions focusing on reducing FNE or a mixture between mindfulness and FNE intervention would be more effective in dealing with PIU. Researchers developing and testing interventions for PIU should consider the results of the present study, as FNE seems to be an important factor in explaining the effects of mindfulness on PIU. Moreover, future studies should investigate the mediation effects of mindfulness, self-control and negative affect on the different facets of PIU, as it was hypothesized that these mediators might show their effect by influencing different facets of PIU.

The primary strength of this study is in its exploration of PIU, an area of growing interested and urgency for investigation and research, as internet use has been consistently increasing and concurrently the worries about potential negative effects (Twenge et al., 2018). Moreover, connecting PIU with Mindfulness, a field showing increasing research interest, brings value to our understanding of PIU. Investigating how and why mindfulness is negatively associated with PIU, deepens our understanding of related concepts and informs the development of effective treatments.

Conclusion

In conclusion, this study has provided significant insight into the relationship between mindfulness, PIU and FNE. It has replicated support for the negative association between mindfulness and PIU and shown a positive relationship between FNE and PIU. The most significant finding, however, was that FNE fully mediates the relationship between

mindfulness and PIU. It was the first study conducted on the mediation role of FNE and the limitation was high, therefore the results need to be interpreted as preliminary and exploratory, thus indicating that FNE might be an essential underlying factor in the relationship between mindfulness and PIU. Further studies are needed to establish the empirical validity of this finding.

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Appendix A

APPROVED BMS EC RESEARCH PROJECT REQUEST

Dear researcher,

This is a notification from the BMS Ethics Committee concerning the web application form for the ethical review of research projects.

Requestnr. :	230527
Title :	Understanding the relationship between Mindfulness and Problematic Internet Use
Date of application :	2023-04-03
Researcher :	Andres, B.K.
Supervisor :	Ayas, S.
Commission :	Klooster, P.M. ten
Usage of SONA :	Y

Your research has been approved by the Ethics Committee.

The BMS ethical committee / Domain Humanities & Social Sciences has assessed the ethical aspects of your research project. On the basis of the information you provided, the committee does not have any ethical concerns regarding this research project.

Appendix B

Relationships between Problematic Internet Use, Mindfulness and Fear of negative evaluation in University Students

Dear Participant,

You are invited to participate in a research study that investigates the relationship between Problematic Internet Use, Mindfulness and fear of negative evaluation. This study is being conducted as part of a Bachelor Thesis of a Psychology Student at the University of Twente. (The BMS ethical comittee of the University of Twente gave its ethical approval for this study). Your participation is voluntary, and you may choose to withdraw from the study at any time.

Study Procedure:

If you agree to participate and consent is given, you will be asked to fill out three short questionnaires on problematic internet use, mindfulness and fear of negative evaluation. Moreover, basic demographic information such as age, gender and nationality, and if you are a student at a university will be asked of you. The survey will take approximately 10 minutes to complete.

Risks and Benefits:

There are no known risk associated with participating in this study. Some participants may find some of the questions to be sensitive or uncomfortable, such as questions about problematic internet use or fear of negative evaluation. If you experience any distress while answering the questions, you may choose to stop the survey at any time. However, we hope that your participation in this study will help me to better understand the investigated

relationships, which may ultimately benefit future research and interventions in this area. In any case, you are able to withdraw from the study.

When you think that you need personal help after filling out the questionnaire, please contact a counselor or doctor you trust in your region. If you are a student at the University of Twente, you can request an appointment with the student psychologist: https://www.utwente.nl/en/ces/sacc/coaching-counselling/psychologist-for-students/

Confidentiality

All information that you provide will be kept strictly confidential. Your responses will be anonymous, and we will not collect any personally identifiable information such as your name or email address. The data will be stored securely and only accessed by the researcher and research supervisor. The findings of the study will be reported in aggregate form, meaning that individual responses will not be identifiable or reported.

Voluntary Participation:

Your participation in this study is voluntary, and you may choose to withdraw at any time without penalty or prejudice. If you choose to withdraw, you may do so by simply closing the survey windows or by contacting the researcher. Moreover, if you have any questions or concerns about the study, feel free to contact the research via E-Mail: b.k.andres@student.utwente.nl

Consent:

By completing the survey, you are indicating that you have read and understood this consent

form, and that you freely and voluntarily consent to participate in this study. If you have any questions or concerns about the study afterwards, please feel free to contact the researcher via E-Mail.

Thank you for you participation,

Sincerely, Benedikt Andres

Appendix C

Figure C1

Scatterplot residuals vs fitted values for linear regression of Mindfulness and PIU

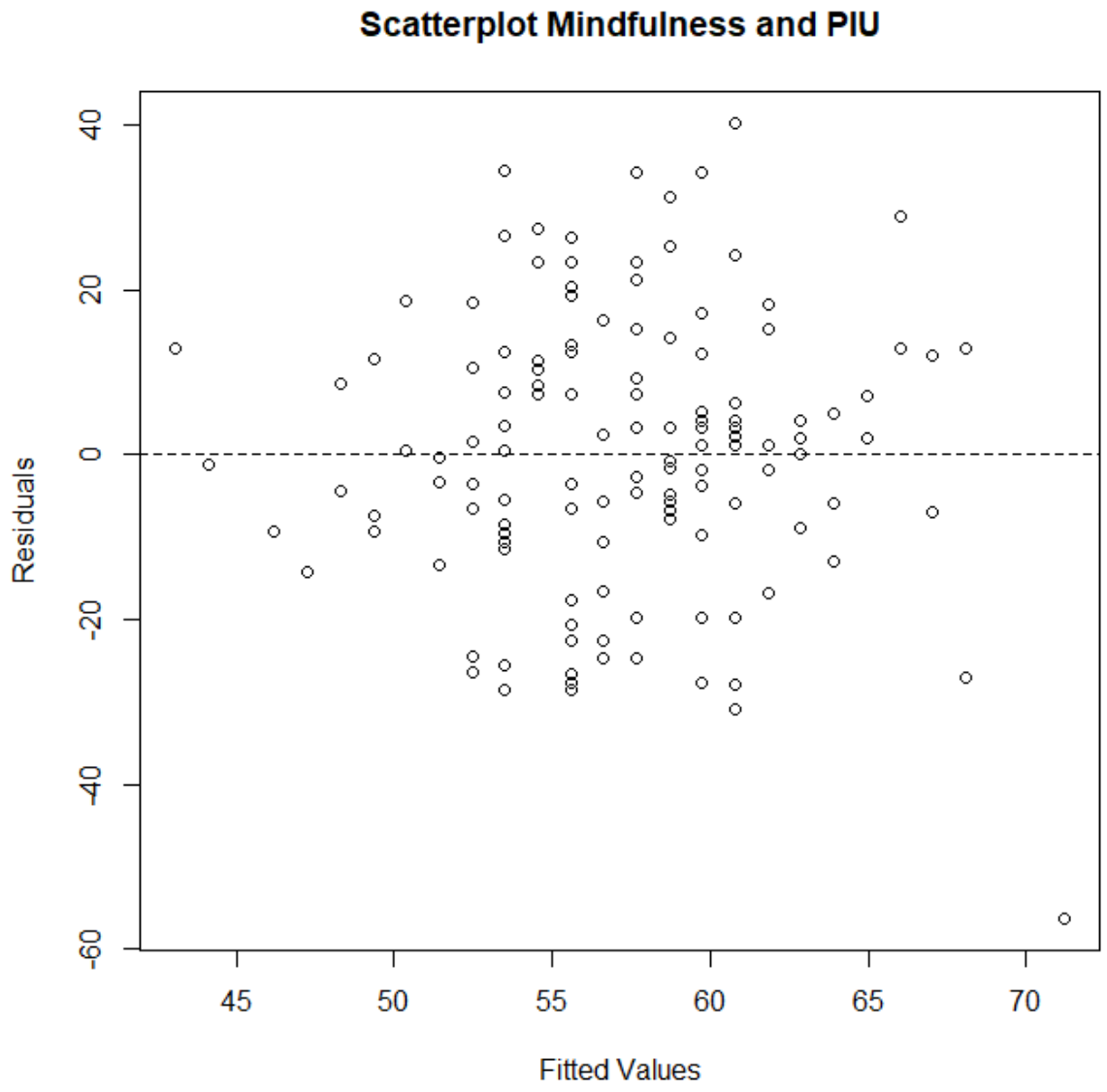

Figure C2

Scatterplot residuals vs fitted values for linear regression of Mindfulness and FNE

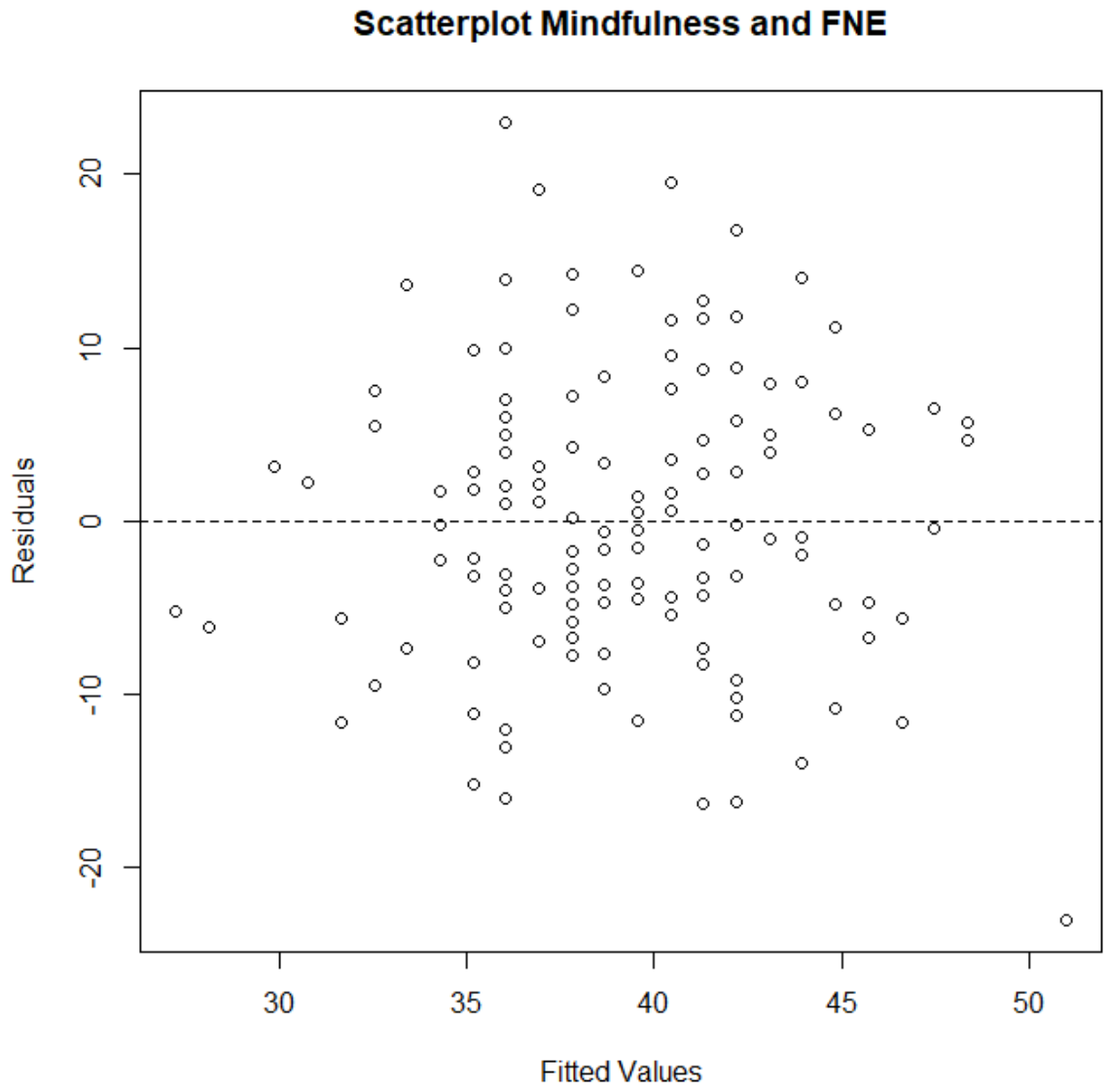

Figure C3

Scatterplot residuals vs fitted values for linear regression of FNE and PIU