



KORKUT ATA TÜRKİYAT ARAŞTIRMALARI DERGİSİ

Uluslararası Dil, Edebiyat, Kültür, Tarih, Sanat ve Eğitim Araştırmaları Dergisi

The Journal of International Language, Literature, Culture, History, Art and Education Research

Sayı/Issue 14 (Şubat/February 2024), s. 1030-1039.

Geliş Tarihi-Received: 11.01.2024

Kabul Tarihi-Accepted: 09.02.2024

Araştırma Makalesi-Research Article

ISSN: 2687-5675

DOI: 10.51531/korkutataturkiyat.1417947

The Mediating Role of Rumination in the Relationship between Nomophobia and Depression

Nomofobi ve Depresyon Arasındaki İlişkide Ruminasyonun Aracı Rolü

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Abstract

This research aims to understand the mediating role of rumination in the relationship between nomophobia and depression levels among university students. The study's participant group consists of 529 university students, 300 (57%) female, and 219 (43%) male, all registered at the Faculty of Education at Selçuk University as of April 2023. A Personal Information Form, Interpersonal Rumination Scale, and Beck Depression Inventory for University Students were utilized. The proposed model's direct and indirect effects were analyzed using Hayes's Process macro and bootstrapping technique. The study employed a cross-sectional model to examine the distribution and relationships of variables. The results of the research reveal significant relationships among nomophobia, rumination, and depression. It was determined that rumination plays a partial mediating role in the relationship between nomophobia levels and depression. The findings suggest that an increase in nomophobia and rumination levels among university students may contribute to an escalation in depression. Conversely, an increase in depression may lead to elevated levels of rumination and nomophobia. The study's results contribute substantially to understanding the intricate relationships between young adults' use of digital technology and their psychological well-being, providing a foundational guide for interventions in this field.

Keywords: Nomophobia, depression, rumination.

Öz

Bu araştırma, üniversite öğrencilerinin nomofobi ve depresyon düzeyleri arasındaki ilişkide ruminasyonun aracı rolünü anlamayı amaçlamaktadır. Araştırmanın katılımcı grubu, Selçuk Üniversitesi Eğitim Fakültesi'nde Nisan 2023 itibarıyla kayıtlı olan, toplamda 529 üniversite öğrencisinden oluşmaktadır; bunların 300'ü (%57) kadın ve 219'u (%43) erkektir. Kişisel Bilgi Formu, Kişilerarası Ruminasyon Ölçeği, Üniversite Öğrencileri için Beck Depresyon Envanteri kullanılmıştır. Hayes'in Process makrosu ve bootstrapping tekniği kullanılarak önerilen modelin doğrudan ve dolaylı etkilerinin anlamı çözülmeye çalışılmıştır. Bu çalışma, değişkenlerin dağılımını ve ilişkilerini incelemek için kesitsel bir model kullanmıştır. Araştırmanın sonuçları, nomofobi, ruminasyon ve depresyon arasında önemli ilişkileri ortaya koymaktadır. Nomofobi düzeyleri ile depresyon arasındaki ilişkide ruminasyonun kısmi aracılık rolü olduğu belirlenmiştir. Bulgular, üniversite öğrencilerinin nomofobi ve ruminasyon düzeylerindeki artışın depresyonu artırabileceğini, aynı zamanda depresyonun

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artmasıyla ruminasyon ve nomofobi düzeylerinin de yükseldiğini göstermektedir. Araştırmanın sonuçları, genç yetişkinlerin dijital teknoloji kullanımı ile psikolojik sağlıkları arasındaki karmaşık ilişkileri anlamada önemli bir katkı sağlamakta ve bu alanda yapılacak müdahalelere rehberlik etmek için temel oluşturmaktadır.

Anahtar Kelimeler: Nomofobi, depresyon, ruminasyon.

Introduction

The rapid proliferation of mobile technology has significantly impacted individuals' lives, leading to new psychological dynamics (Suliman et al., 2016). There is a growing struggle with mobile device dependency among university students who face academic, social, and technological demands, resulting in nomophobia (Forgays et al., 2014). Nomophobia, defined as the fear of being without a smartphone, is considered an anxiety disorder associated with the increasing significance of smartphones in daily life (Kwon et al., 2013; Montag et al., 2015). The widespread use of smartphones indicates the prevalence of this technology (Statista, 2017).

The Technology Stress Model by Birkou and Trauth (2005) explores the stress effects of technology use, elucidating how nomophobia reactions may heighten the risk of depression. Lazarus and Folkman's (1984) Stress and Coping Model provides a framework for understanding coping mechanisms, emphasizing problem-focused and emotion-focused coping in dealing with stress. Several studies support a positive relationship between depression and nomophobia (Çelik & Alan, 2023; Aljomaa et al., 2016; Heliyon, 2023; Frassini et al., 2021; Al-Mamun et al., 2023).

Nolen-Hoeksema's (1991) rumination theory focuses on cognitive processes in coping with stressful situations, particularly thought patterns associated with depression. In the context of nomophobia, concerns about staying away from mobile devices and coping processes may lead to negative thoughts, contributing to depression. The positive relationship between depression and nomophobia aligns with the rumination theory.

Research by Sun et al. (2023) suggests that rumination regulates the relationship between thought flow, work conflict, and smartphone addiction, exacerbating smartphone addiction in individuals with high rumination levels. Lian et al. (2022) indicate that mobile phone addiction is associated with mind wandering, regulated by thought flow, especially in individuals with high rumination levels. You et al. (2020) demonstrate that internal thoughts and procrastination mediate the relationship between internet addiction and poor sleep quality, particularly in individuals with high rumination levels. These studies highlight the close relationship between rumination and nomophobia.

The connection between rumination and depression is crucial. Coping with nomophobia, constant thoughts about mobile phones may increase rumination, enhancing the likelihood of individuals exhibiting depressive symptoms over time (Sun et al., 2023; Lian et al., 2022; You et al., 2020; Gezgin et al., 2018). Rumination is not only associated with nomophobia but also with depression, as indicated by numerous studies emphasizing a strong relationship between depression and rumination (Longenecker et al., 2023; Gallagher et al., 2023; Li et al., 2023; Çağlar Özdoğan, 2023; Borders, 2020).

The complex interaction between depression and rumination creates a reinforcing cycle where continuous thought repetition and excessive focus on negative thoughts trigger depressive symptoms in individuals with depression (Çağlar Özdoğan, 2023; Gallagher et al., 2023). Recognizing this interaction is essential for developing effective intervention strategies. Teaching coping strategies for negative thoughts and intervening

in the rumination cycle can positively impact depressive symptoms (Longenecker et al., 2023).

This study on the mediating role of rumination in the relationship between nomophobia and depression enhances understanding of the interaction between mobile phone addiction and depression. It offers a critical perspective on how the connection between nomophobia and depression is shaped through rumination. This insight is crucial for developing effective intervention strategies and supporting the psychological health of university students. The study aims to contribute to filling knowledge gaps and improving psychological well-being by comprehending the effects of mobile technology use.

H0: There is a significant relationship between nomophobia, depression, and rumination among university students.

H1: Rumination mediates the relationship between depression and nomophobia. In other words, as nomophobia increases, depression will also increase, and rumination will further amplify this relationship.

Method

The Research Model

This study employed a cross-sectional model to examine the variables' distribution and relationships. A cross-sectional study is a significant methodological approach that assesses the prevalence of outcomes and exposure to potential risk factors at a specific time. The study design is guided by the fundamental principles of epidemiological research that inform the implementation of cross-sectional study designs. Rothman et al. provide a comprehensive methodological framework for planning, implementing, and analyzing cross-sectional studies (Rothman et al., 2008). Additionally, Bradford Hill's criteria for causality, one of this research's fundamental methodological approaches, were employed (Hill, 1965). The research was conducted over a specific period and geography, using a sample representing the research population, and standardized surveys and existing data sources were utilized in the data collection process.

This study examined the relationship between independent and dependent variables using Hayes's mediation model (Hayes, 2018) to understand how it is shaped through the mediating variable. In the model, the bootstrap method was preferred to measure the impact of the independent variable on the dependent variable through the mediating variable. This method allows for directly estimating the mediation effect and provides reliable results even if the dataset does not follow a normal distribution.

Our research model is structured as follows: The impact of the independent variable on the mediator (path a). The effect of the mediator on the dependent variable while controlling for the independent variable (path b). The total effect of the independent variable on the dependent variable (path c). The direct effect of the independent variable on the dependent variable while controlling for the mediator (path ca). In this model, the product of paths a and b ($a*b$) represents the mediation effect. The bootstrap method has been employed to test whether this effect is significant statistically.

Study Group

The study group for the research consists of 529 university students, 300 (57%) female and 219 (43%) male, all enrolled in the Faculty of Education at Selçuk University as of April 2023. The selection of participants will utilize the purposive sampling method, aiming for accessibility in participant selection.

Data Collection Tools

Personal Information Form: A personal information form prepared by the researcher will be used to measure the gender and age levels of the sample.

Interpersonal Rumination Scale (IRS): The scale, developed by Wade et al. (2008), was adapted into Turkish by Oral and Arslan (2017). The scale, consisting of 6 items, is a 5-point Likert scale ranging from “strongly disagree=1” to “strongly agree=5.” Confirmatory factor analysis resulted in fit indices; $\chi^2/df=3.82$, $p<.001$, RMSEA=.096, SRMR=.04, GFI=.97, AGFI=.92, CFI=.98. The obtained fit indices indicate that the Interpersonal Rumination Scale (IRS) is well-fitted.

Nomophobia Scale: In the study, the Nomophobia Scale (NMP-Q) was used to measure individuals’ levels of nomophobia. This scale was developed by Yıldırım and Correia (2015) and later adapted into Turkish by Yildirim et al. (2015). The Nomophobia Scale consists of four subscales: “inability to access information,” “giving up convenience,” “inability to communicate,” and “losing connection.” The scale comprises 20 statements, and participants use a Likert-type seven-point rating system to evaluate these statements (1=Strongly Disagree and 7=Strongly Agree). This rating system forms a scale with a minimum score of 20 and a maximum score of 140. The following intervals are used to interpret nomophobia levels: 0-20 score range: No nomophobia. 21-60 score range: Low level of nomophobia. 61-100 score range: Moderate level of nomophobia. 101-140 score range: High level of nomophobia. In this study, Cronbach’s alpha internal consistency coefficient was found to be 0.90 to assess the scale’s internal reliability (Gezgin et al., 2017).

Beck Depression Inventory for University Students: The Beck Depression Inventory for University Students, developed by Hisli (1989), will be used to measure participants’ levels of depression. The scale consists of 21 items, ranging from 0 for depression-related statements to 3 for statements negatively associated with depression, and it has a 4-point structure. Each item consists of a self-assessment sentence expressing a behavioral condition specific to depression. The self-assessment proceeds from low to high.

Findings

No significant differences were found among groups in terms of research variables based on t-tests conducted for the age and gender of university students. The figure below illustrates the mediating role of rumination in the relationship between nomophobia and depression.

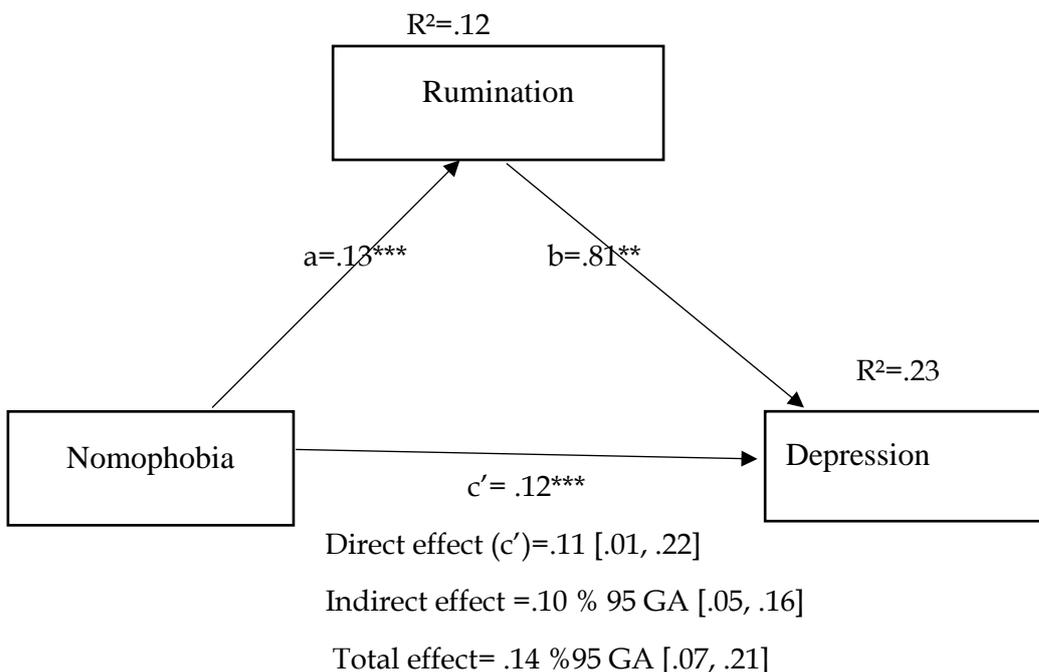


Figure 1. The Mediating Role of Rumination in the Relationship between Nomophobia and Depression.

Figure 1 illustrates the mediation model conducted to examine the influence of university students’ nomophobia levels on depression through rumination. It is observed that all path coefficients in the mediation model are statistically significant.

Nomophobia positively predicts depression ($\beta = .12, p < .001$), rumination positively predicts depression ($\beta = -.81, p < .001$), and nomophobia positively predicts rumination ($\beta = .13, p < .001$). When examining the indirect effect (Indirect effect = $-.11, 95\% \text{ CI } [-.19, -.10]$), a significant effect is observed.

As a result, upon examining the above values, it is observed that rumination plays a partial mediating role in the relationship between university students’ nomophobia levels and depression levels. Based on this, it can be stated that as nomophobia and rumination levels increase among university students, depression is likely to increase. Simultaneously, an increase in depression is associated with an increase in rumination and nomophobia levels. Additionally, findings related to the lower and upper limits of bootstrapping confidence intervals are presented in Table 2.

Table 1. Regression Results for the Mediation Test

Variables	β	SE	LLCI	ULCI
Nomophobia (X) → Depression (Y)	.12***	.05	.01	.22
Nomophobia (X) → Rumination (M)	.13***	.35	.08	.18
Rumination (M) → Depression (Y)	.81***	.15	.52	1.09
Nomophobia → Rumination → Depression	.10	.03	.05	.16
Total Effect	$\beta = .14 \text{ \% } 95 \text{ GA } [.07, .22]$			

* $p < .05$, ** $p < .01$, *** $p < .001$, $n = 536$, SE = standard error LLCI = low confidence interval, ULCI = upper confidence interval, bootstrap resampling = 5000, nonstandardized beta coefficients (β) are reported.

When examining Table 1, it is observed that nomophobia levels ($\beta = .12^{***}$, 95% CI = [.01, .22], $t=5.69$, $p<.001$) and rumination ($\beta = .81^{***}$, 95% CI = [.52, 1.09], $t=5.54$, $p<.001$) positively and significantly influence depression levels. In addition to these findings, it has been determined that the indirect effect of nomophobia on depression is significant, indicating that rumination mediates the relationship between nomophobia and depression ($\beta = .10^{***}$, 95% CI = [.07, .22], $SE=.03$). The fully standardized effect size of the mediating effect is 0.1033. Therefore, the mediating effect in the tested model is close to a small effect size (Preacher & Kelley, 2011). In line with these findings, the research hypothesis has been supported.

Conclusion and Discussion

This study identified a significant relationship between nomophobia levels and depression among university students and demonstrated that rumination plays a partial mediating role in this relationship. The findings indicated that the indirect effect of nomophobia on depression is significant and that rumination mediates the relationship between nomophobia and depression. In this context, it has been concluded that an increase in nomophobia and rumination levels among university students may elevate the level of depression. Conversely, an increase in depression may lead to an elevation in rumination and nomophobia levels. These findings support the research hypotheses.

These results provide a valuable foundation for understanding the relationships between young adults' use of digital technology and their psychological well-being, guiding interventions in this field. The findings highlight the intricate interplay between technology-related anxiety, rumination, and depression among university students, shedding light on the importance of addressing these factors for the overall mental health of young adults.

In the context of evaluating theoretical frameworks proposed in the literature, the increase in depression symptoms in cases of nomophobia and its further reinforcement by rumination is crucial. Within John Bowlby's attachment theory framework, the underlying factor in the elevation of depression risk due to nomophobia reactions may be individuals struggling to fulfill their emotional attachment needs in the technological context (Bowlby, 1969). The loss of social connections established through mobile phones in a state of nomophobia could lead to an increase in depression symptoms.

Birkou and Trauth's (2005) Technology Stress Model emphasizes the stress effects that emerge in nomophobia situations, suggesting that increased mobile technology usage can trigger stress in individuals, potentially amplifying symptoms of depression. The model posits that prolonged engagement with mobile technology contributes to stress, and this stress may be further intensified by rumination, ultimately deepening the experience of depression (Birkou & Trauth, 2005).

This perspective highlights the interconnected relationship between technology use, stress, and depression symptoms. In support of Birkou and Trauth's model, Johnson and Smith's (2008) study examining the effects of mobile technology usage on cognitive processing aligns with the notion that technology-induced stress can impact cognitive functioning. Additionally, research by Garcia et al. (2012) investigating mobile technology's impact on emotional well-being corroborates similar findings. These studies contribute to a broader literature supporting the relationship between technology stress and depression, as proposed by Birkou and Trauth. By addressing individuals' coping processes with stress, Lazarus and Folkman's Stress and Coping Model can focus on concerns about staying away from their mobile devices in nomophobia situations. Insufficient problem-focused coping efforts and difficulties in emotion-focused coping

may trigger ruminative thought processes, thereby increasing symptoms of depression (Lazarus & Folkman, 1984).

Nolen-Hoeksema's Rumination Theory, on the other hand, emphasizes the continuous mental spinning of negative thoughts in the context of nomophobia. Concerns about mobile devices and the processes of coping with these concerns may lead individuals to get stuck in negative thought cycles, contributing to the exacerbation of depression through rumination (Nolen-Hoeksema, 1991).

The increase in nomophobia levels is directly associated with the rise in students' depression levels, and this relationship becomes even more pronounced with the influence of rumination. The research findings parallel other studies conducted (Çelik and Alan, 2023; Aljomaa, et al, 2016; Heliyon, 2023; Frassini, et al, 2021; Al-Mamun et al, 2023; Sun et al, 2023; Lian et al, 2022; You et al, 2020; Gezgin et al, 2018; Langenecker et al, 2023; Gallagher et al, 2023; Li et al, 2023; Çağlar Özdoğan, 2023; Borders, 2020).

In conclusion, the obtained findings highlight the complex relationships among nomophobia, depression, and rumination in university students. These results provide a significant foundation for developing intervention strategies to understand and support university students' psychological health. When the effects of mobile technology use are combined with the mediating role of rumination, it can offer better insights for creating more effective support systems and enhancing the emotional well-being of students.

Limitations: Among the study's limitations is that the university students in the sample were selected from a specific region; therefore, the findings' generalizability may be limited to other student groups with geographical or demographic differences. Additionally, obtaining information about participants' emotional states through self-reports may present a subjective assessment and rely on participants' perceptions rather than an objective measurement. The cross-sectional design of the study may introduce limitations in thoroughly assessing changes over time, and a longitudinal design could provide more insights into monitoring the effects of mobile technology addiction on depression and rumination over time. Furthermore, there needs to be a predetermined theoretical framework for identifying dependent and independent variables in the study to ensure the causal interpretation of the relationships derived. Lastly, the inability to completely control external factors that could influence participants' emotional states, such as social environment and family situation, can constitute limitations of the study.

Recommendations: Universities must organize awareness campaigns to inform students about the potential effects of mobile technology addiction. These campaigns can contribute to students becoming more conscious about the impact of mobile technology addiction and nomophobia on emotional health by emphasizing the potential consequences. Furthermore, universities can provide support to students in coping with emotional challenges such as mobile technology addiction and depression by expanding psychological support services. Developing policies regulating mobile technology use and encouraging balanced technology usage should be the aim of universities. Educational programs are also vital in this context. Universities can organize educational programs guiding students on enhancing their emotional intelligence and preserving their emotional well-being, providing practical information on coping with stress, maintaining emotional balance, and understanding the relationships between technology use and emotional health. Lastly, the findings of this study may encourage further research on similar topics.

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