Research Article

PERR
PSYCHO-EDUCATIONAL RESEARCH REVIEWS

Psycho-Educational Research Reviews
13(*3*), 2024, 159-168
www.perrjournal.com

The Mediating Role of Rumination and Emotion Regulation on the Relationship between Perceived Stress and Problematic Smartphone Use Among Adolescents

Shimaa Abdelaal Mohamed Ibrahim, Assist Prof. Dr., Cairo University, Egypt,
goldenflute20@gmail.com 0009-0009-2271-514X

Keywords

Rumination
Emotion regulation
Problematic smartphone
Perceived stress

Article Info:
Received : 08-06-2024
Accepted : 01-12-2024
Published : 22-12-2024

DOI: 10.52963/PERR_Biruni_V13.N3.03

Abstract

Smartphones have become the most commonly used Internet tool for young people. This study aims to explore the relationship between perceived stress and problematic smartphone use, as well as the mediating role of rumination and emotion regulation. 500 middle school students participated. This study employed random sampling method. SPSS macro PROCESS program was used to test the mediation effect. This study found that there is a significant positive correlation between perceived stress and problematic smartphone use among junior high school students. The mediation effect test results show that perceived stress can not only positively predict problematic smartphone use, but also indirectly and positively predict problematic smartphone use. This result reveals the relationship between rumination and emotional regulation. The level of individual rumination directly predicts emotions.

To cite this article: Ibrahim, S. (2024). The mediating effects of rumination and emotion regulation on the relationship between perceived stress and problematic smartphone use among adolescents. *Psycho-Educational Research Reviews, 13*(3), 159-168. doi: 10.52963/PERR_Biruni_V13.N3.03

INTRODUCTION

Smartphones have become the most commonly used Internet tool for young people (Fathalla, 2019). The benefits of the Internet and smartphones are unquestionable, but if smartphones are used inappropriately, it will cause safety problems. Problematic smartphone use has quickly become an important area of research for scholars. Excessive use of smartphones can lead to impaired daily life functions and bring adverse consequences. For example, excessive use late at night can lead to sleep problems, affected daily work and study (Mayerhofer et al., 2024), slow reaction speed (Zhang, & Yang, 2024) and increase in depression (Bouazza et al., 2023).

Studies have shown that adolescents who are exposed to more stressful events are more likely to fall into the Internet and cause problematic Internet use (Aziz et al., 2024; Xue et al., 2023). When faced with family conflicts, academic pressure and peer pressure, adolescents are more inclined to turn their attention to the Internet (Aziz et al., 2024; Chen et al., 2024; Saad, 2020), and expect to be released and relieved from the Internet. A few studies have jointly explored the impact of cognitive and emotional factors on problematic smartphone use. As indicated by Jeong &Bae's(2024) results, perceived stress was positively related to smartphone addiction. Rumination mediated the relationship between perceived stress and smartphone addiction.

The I-PACE model (the Interaction of Person-Affect-Cognition-Execution model) proposed by Brand et al. (2016) believes that personal characteristics, affective and cognitive responses, and individual executive function factors (Execution) will lead to the formation of Internet use problems. Specific Internet use disorders (such as Internet game addiction, Internet gambling addiction, Internet pornography addiction, Internet shopping addiction, or Internet social addiction) are considered to be the result of the interaction between inducing variables (such as neurobiological factors and psychological qualities), moderating variables (such as coping styles and Internet-related cognitive biases), and mediating variables (such as affective and cognitive responses). Internet use may bring us some kind of positive experience, which will strengthen our attention bias and craving for Internet use cues. This experience will also consolidate Internet-related cognitive biases and coping styles. All these consolidation mechanisms will make us repeat the behavior of social network use.

LITERATURE REVIEW

THE RELATIONSHIP BETWEEN PERCEIVED STRESS AND PROBLEMATIC SMARTPHONE USE

Perceived stress refers to the emotional experience of tension, anxiety, fear and other emotions generated through cognitive evaluation when an individual faces challenging and threatening situations (Attia et al., 2022). According to the Internet compensation theory and use gratification theory (Wei et al., 2024), individuals' motivation and behavior to use the Internet are induced by negative emotions, social anxiety and study pressure in life, and the Internet can provide the satisfaction, security and online social support that individuals need. Stress is significantly positively related to problematic smartphone use (Jiang & Zhang, 2024) Teenagers who experience more life stress are more likely to be addicted to mobile phones (Zhang et al., 2024).

Once an individual finds that they can get satisfaction from mobile phone network interaction, they will be more inclined to regard using mobile phones and the Internet as an effective coping method, causing the individual's brain to automatically adjust when dealing with stress and negative emotions. Initiate the method of turning to mobile phone networks to relieve discomfort and thereby become dependent on mobile phones (Lian et al., 2021). Some studies support this view and find that psychological distress and stress are related to problematic Internet use among adolescents (Anand et al., 2021; Cai et al., 2023; Mougharbel et al., 2023). Accordingly, hypothesis 1 is set forward:

H.1. Stress perception positively predicts problematic smartphone use among adolescents.

THE MEDIATING ROLE OF RUMINATION

Stressful life events have a significant positive prediction effect on rumination (Van Grieken et al., 2023). People go online because they want to relieve negative emotions caused by stressors specifically, ruminators may psychologically escape negative thoughts by playing games or visiting websites on their smartphones. Internet compensation theory has gained empirical support in explaining ruminants' excessive smartphone use (Benedetto et al., 2024).

Ruminists may turn to smartphones to relieve rumination by searching in large quantities for information related to the problem (KHOO et al., 2021). In order to support this view, the research found that in common People who ruminate are more likely to frequently use smartphones to send text messages (Şakiroğlu et al., 2017; Turan& Yılmaz,2024). Therefore, it is conceivable that ruminants will use smartphones to manage their ruminations, and smartphones may play a compensatory coping role. Accordingly, hypothesis 2 is set forward:

H.2. Rumination plays a mediating role between perceived stress and problematic smartphone use.

THE MEDIATING ROLE OF EMOTION REGULATION

The person-emotion-cognition-executive model (Brand et al., 2016) emphasizes that Internet use disorders are caused by the interaction between inducing factors (psychological traits, biological traits), moderating factors (coping styles, cognitive biases), mediating factors (emotions, cognitive reactions) and decreased executive function. Emotion regulation theory believes that there are two most commonly used emotion regulation strategies for individuals: cognitive reappraisal and expression suppression. Cognitive reappraisal is an individual's way of alleviating his or her negative emotions by changing his or her cognition of events. It is a proactive emotion regulation strategy; while expression suppression is an individual's effort to control his or her negative emotions and reduce the occurrence of emotional experiences, but in fact the emotions do not improve. It is a reactive emotion regulation strategy. The former is an adaptive strategy, while the latter is a non-adaptive strategy (Brand et al., 2016).

Studies have shown that expression suppression is associated with negative outcomes (Yan et al., 2022). Cognitive reappraisal is associated with positive outcomes (Pauw et al., 2022). When individuals suffer from stressful events in life for a long time and are unable to cope with them, they will experience negative emotions such as anxiety and depression, which will lead to difficulty in emotion regulation (Pauw et al., 2022). Stress positively predicts difficulty in emotion regulation (Zhou et al., 2024).

Adolescents facing stressful life events are more inclined to adopt maladaptive strategies (Kamel,2018), and the maladaptive strategy of expression inhibition is significantly positively correlated with problematic smartphone use (Saad & Kamel, 2020). An increasing number of studies have found that emotion regulation deficits are related to problematic social media use (Saad,2020). Accordingly, hypothesis 3 is set forward:

H.3. Emotion regulation plays a mediating role between perceived stress and problematic smartphone use.

MEDIATING EFFECT OF RUMINATION AND EMOTION REGULATION

Rumination refers to the phenomenon that individuals constantly think about the causes of negative emotions and the possible serious consequences, but do not take positive and effective measures to solve the problem (Joubert et al., 2022). Current research on rumination is closely related to negative emotions, such as anxiety and depression. According to cognitive emotion regulation strategies, individuals are more inclined to adopt non-adaptive strategies when they are lost in thought (Zhou & Zhou, 2024).

When they adopt expression inhibition strategies to adjust their emotions, they are prone to negative emotions such as anxiety and depression, and negative cognitive emotions can cause individuals to become dependent on mobile phones (Cui et al., 2024). Information processing theory believes that the control, retention and processing of information will continuously consume individuals' limited information resources, thereby affecting their response and decision-making abilities (Lai et al., 2022).

When individuals fall into rumination and adopt emotion regulation strategies, they need to consume their own psychological resources to cope with other activities. Insufficient psychological resources and lack of self-regulation and control ability lead to irrational decisions and negative coping (Zagaria et al., 2023). Smartphones and the Internet are the "best" coping methods for individuals. Other studies have found that rumination can positively predict emotional exhaustion (Liu, 2024). Negative stress life events induce individuals to have rumination, and rumination will shift the individual's attention to negative emotions and cognition, leading to their emotional coping style regulation (Liu, 2024). Studies have found that the frequency of use of expression suppression strategies significantly predicts college students' mobile phone dependence (Zhang & Jiang,2017). Accordingly, hypothesis 4 is set forward:

H.4.: Rumination and emotion regulation play a chain mediating role in the mechanism of the influence of perceived stress on problematic smartphone use.

Thus, this study intends to explore the relationship between perceived stress and problematic smartphone use, as well as the mediating role of rumination and emotion regulation.

METHODS

SAMPLE

Random sampling was used to select middle school students from four middle schools in Nasr City, Egypt. 600 questionnaires were distributed. After eliminating invalid questionnaires, 500 valid questionnaires were collected, and the effective recovery rate reached 83.3%. The age of the subjects was between 13 and 15 years old. The sample included 280 boys and 220 girls; 100 were in the first grade, 300 were in the second grade, and 100 were in the third grade.

DATA COLLECTION INSTRUMENTS

The Arabic version of the Cohen perceived stress scale (Ali et al., 2021). İt is a 10- item scale. Responses come at a 5-point response scale (0 = never, 1 = almost never, 2 = sometimes, 3 = fairly often, 4 = very often). A total score of the PPS-10 is obtained by summing up all item scores. Higher scores denote higher levels of perceived stress. The scale has internal reliability of r=. 92 and test-retest reliability of .78.

Rumination scale (Marchetti et al., 2018). It is an 8- item scale. The scale used a 4-point Likert-type scale, ranging from 1 (almost never) to 4 (almost always). In this study, the internal consistency coefficient of the scale was 0.92. A back translation was performed by a bilingual Arabic-English person. The translated English version, when compared to the original one, proved to be semantically equivalent.

The Arabic version of Cognitive Emotion Regulation Questionnaire (Saad& Kamel, 2020). This study adopted the positive reappraisal from this scale. It has 8 items. In this study, the internal consistency coefficient of the subscale was 0.92.

The Arabic version of Smartphone Addiction Scale (Fathalla, 2019). It is a 10 items with a 6-point Likert scale from 1 = strongly disagree, 6 = strongly agree. Total scores typically range from 10 –60, with higher score indicating Problematic Smartphone Usage. In this study, the internal consistency coefficient of the subscale was 0.90.

RESULTS

DESCRIPTIVE STATISTICS ANALYSIS

As shown in Table 1, perceived stress is significantly and positively correlated with rumination, emotional regulation (expressive suppression), and problematic smartphone use. Rumination, emotional regulation (expressive suppression), and problematic smartphone use are significantly related. There is a significant positive correlation between emotional regulation (expressive suppression) and problematic smartphone use. There is a significant negative correlation between perceived stress and emotional regulation (cognitive reappraisal). Emotion regulation (cognitive reappraisal) was not related to problematic smartphones.

Table 1. *Descriptive statistics of each variable and correlation matrix*

Variable	M	S D	1	2	3	4	5
1. Perceived stress	3.18	1.02	-				
2. Rumination	3.00	1.05		-			
3. Cognitive Reappraisal	3.02	1.00	—0.17	0.19	-		
4. Expression inhibition	3.10	1.01	0.39	0.36	0.30	-	
5. Problematic smartphone use	3.11	1.03	0.37	0.40	0.13	0.41	-

Note: n = 500. p < 0.01.

CHAIN MEDIATION MODEL TEST

As can be seen from Table 2, the model fitting index RMSEA = 0 09, CFI = 0 94, TLI = 0 92, SR MR = 0 04, Data versus model The fit is good. Perceived stress significantly and positively predicts problematic smartphone use among adolescents (β = 0 61, t = 8 45, p < 0 001).Thus, hypothesis 1 is supported. Secondly, the mediating effect of rumination on perceived stress and problematic smartphone use was analyzed. The results found that the model fitting index RMSEA = 0 08, CFI = 0 94, TLI = 0 92, SRMR = 0 0 4. The data fits the model well. Bias correction The quantile Bootstrap mediation effect significance test results show that the 95% confidence interval of the mediating effect of rumination on stress perception and problematic smartphones is [0. 28, 0. 54], the interval does not include 0, and the mediating effect is significant, that is, rumination thinking is the mediating variable between perceived stress and problematic smartphone use. Thus, hypothesis is supported. The mediating effect of emotion regulation (expression suppression) between perceived stress and problematic smartphone use was analyzed again. The results found that the model fitting index RMSEA = 0 08, CFI = 0 94, TLI = 0 92, SRMR = 0 04.

The results of the bias-corrected percentile Bootstrap mediation effect significance test show that the 95% interval of the mediating effect of emotion regulation (expression suppression) on perceived stress and problematic smartphone use is [0 27, 0 49], and the interval Excluding 0, the mediating effect is significant, that is, emotion regulation (expression suppression) is the mediating variable between perceived stress and problematic smartphone use. Hypothesis 3 is supported.

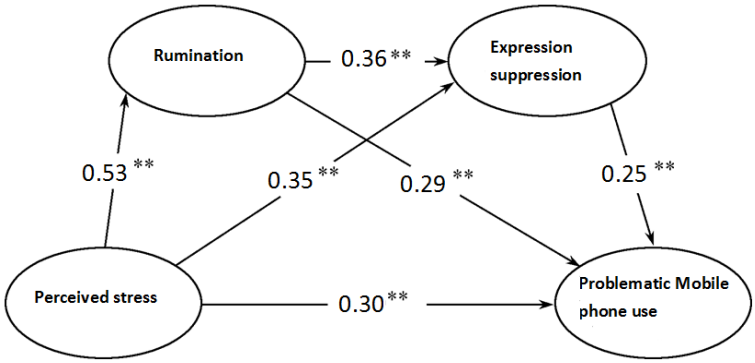
Finally, the chain mediation model is analyzed. Model fitting index RMSEA = 0 08, CFI ＝ 0 94, TLI ＝ 0 92, SRMR ＝ 0 04. Figure 1 shows that perceived stress can significantly and positively predict rumination (β ＝ 0.53, t＝18.33, p<0 001). Rumination thinking can significantly and positively predict emotion regulation (expression suppression) (β = 0.36, t = 3. 18, p<0 001), and emotion regulation (expression suppression) can significantly and positively predict problematic smartphone use (β = 0.25, t = 3. 88, p <0 001). Perceived stress can significantly and positively predict emotion regulation (expressive suppression) (β = 0. 35, t = 3. 19, p <0 001) . Rumination can positively predict problematic smartphone use (β = 0.29, t = 3. 87, p < 0 001). In addition, the direct effect of perceived stress on problematic smartphone use is still significant (β = 0.30, t = 4. 13, p < 0 001). Bias correction percentage Bootstrap significance test of mediation effect and mediation effect results. The effect value and effect size are shown in Table 2. The 95% confidence interval of the chain

mediation effect of rumination and emotion regulation (expressive suppression) between stress perception and problematic smartphone use is [0. 01, 0 .09], the interval does not include 0, the chain mediation effect is significant, hypothesis 4 is supported.

Table 2 *Analysis of the Effects of Perceived Stress on Problematic Smartphone Use*

Path	Effect	Boot SE	95%CI	Effect size (%)
Perceived stress → rumination → problematic smartphone use	0.17	0.5	[0.13- 0.33]	26.77
Perceived stress → Expressive suppression → Problematic smartphone use	0.08	0.4	[0.8-0.28]	13.22
Perceived stress → Rumination → Expressive inhibition → Problematic smartphone use	0.4	0.2	[0.02-0.18]	8.20
Direct effect	0.30	0.5	[0.01-0.07]	46.17
Indirect effect	0.28	0.6	[0.23-0.36]	49.19
Total effect	0.54	0.8	[0.40-0.70]	

Figure 1 *Results of the Chain Mediation Effect Model Between Perceived Stress and Problematic Smartphone Use*



(Note: p<0.01)

DISCUSSION

The aim of this study was to explore the relationship between perceived stress and problematic smartphone use, as well as the mediating role of rumination and emotion regulation. This study found that there is a significant positive correlation between perceived stress and problematic smartphone use among junior high school students. The mediation effect test results show that perceived stress can not only positively predict problematic smartphone use, but also indirectly and positively predict problematic smartphone use.

Individuals with high perceived stress are more likely to engage in problematic smartphone use, which is consistent with prior studies (e.g. Yang et al., 2021; Zhang et al., 2022), and supports the Internet compensation theory (Kardefelt-Winther, 2014), indicating that when individuals experience negative life events, negative emotions, and stress, they tend to seek emotional and social support on the Internet to relieve their own stress and loneliness.

Adolescents are in adolescence and are susceptible to stressful events in life. When they face pressure in adapting to a new environment, interpersonal relationships, academics, and society and are unable to cope effectively, they will look for resources on the Internet to relieve discomfort (Li et al., 2022). The inclusiveness and convenience of mobile phones have made them the best choice for relieving stress. The prevalence of mobile phone use and the existence of various social media software and virtual games have made mobile phones an increasingly popular way for teenagers to

relieve stress. Over time, teenagers will become addicted to online social networking and develop problematic smartphone use.

The structural equation model found that in addition to the direct effect of perceived stress on problematic smartphone use, rumination also had an indirect effect on problematic smartphone use, with the indirect effect reaching 27.82%. Specifically, perceived stress positively predicted rumination, and rumination also positively predicted problematic smartphone use. This is consistent with previous research results (Feng & Dou, 2024). The stress response model of rumination believes (Robinson & Alloy, 2003) that individuals who have experienced stressful events are more likely to fall into rumination. This causes individuals to shift their attention from negative events to their mobile phones, leading to problematic mobile phone use.

Perceived stress has a negative impact on problematic smartphone use through emotion regulation (expressive suppression). Specifically, stress perception positively predicts emotion regulation. At the same time, emotion regulation (expressive suppression) also positively predicts problematic smartphone use. When faced with pressure, students who are not good at expressing their thoughts may turn their negative emotions to their mobile phones. Cognitive reappraisal is a positive emotion regulation strategy. Adolescents who are good at using cognitive reappraisal strategies will be more proactive in thinking about and solving problems. , look optimistically at some sudden crises and adverse events in life. Previous research has also shown that cognitive reappraisal is related to positive outcomes (Shumet al., 2024), and expression inhibition is related to negative outcomes.

CONCLUSION

This study verified the hypothesis that perceived stress has an indirect effect on problematic smartphone use through the chain mediation effect of rumination and emotion regulation. This may reflect the role of rumination and emotion regulation in the relationship between perceived stress and problematic smartphone use in adolescents. Rumination plays an important role. Long-term exposure to stress can cause adolescents to develop negative emotions of anxiety and depression. This result reveals the relationship between rumination and emotional regulation. The level of individual rumination directly predicts emotions. Regulatory strategies, rumination and expression inhibition are significantly positively correlated. According to the stress response model and the Internet compensation theory, long-term exposure to stress and other stressful events will trigger rumination in individuals. Individuals who adopt expression suppression strategies to regulate their emotions will transfer their negative emotions to the mobile phone network and gain satisfaction from it, which will lead to problematic smartphone use.

LIMITATIONS

This study is not without limitations. The most important of which is that it is a cross-sectional study, which makes it difficult to reveal the impact of adolescents' perceived stress regarding the effects of problematic smartphone use, future longitudinal studies with large samples should be conducted to explore the influencing factors and mechanisms of problematic smartphone use among adolescents. Gender differences were not addressed. Future research should consider the differences based on gender.

Availability of Data: Upon request from the author
Conflicts of Interest: None
Author Contributions: The author is the only person who contributed to this paper
Funding Statement: None

REFERENCES

Ali, A. M., Hendawy, A. O., Ahmad, O., Sabbah, H. A., Smail, L., & Kunugi, H. (2021). The Arabic version of the Cohen Perceived stress scale: Factorial validity and measurement invariance. *Brain Sciences*, *11*(4), 419. https://doi.org/10.3390/brainsci11040419

Van Grieken, A., Luo, J., Horrevorts, E. M. B., Mieloo, C. L., Kruizinga, I., Bannink, R., & Raat, H. (2023). The longitudinal association between potential stressful life events and the risk of psychosocial problems in 3-year-old children. *Frontiers in Public Health*, *11*. https://doi.org/10.3389/fpubh.2023.1100261

Anand, N., Sharma, M. K., & Marimuthu, P. (2021). Problematic Internet Use and its Association with Psychological Stress among Adolescents. *Indian Journal of Social Psychiatry*, *37*(3), 269–274. https://doi.org/10.4103/ijsp.ijsp_225_21

Attia, M., Ibrahim, F. A., Elsady, M. A., Khorkhash, M. K., Rizk, M. A., Shah, J., & Amer, S. A. (2022). Cognitive, emotional, physical, and behavioral stress-related symptoms and coping strategies among university students during the third wave of COVID-19 pandemic. *Frontiers in Psychiatry*, *13*. https://doi.org/10.3389/fpsyt.2022.933981

Aziz, M., Chemnad, K., Al-Harahsheh, S., Abdelmoneium, A. O., Baghdady, A., & Ali, R. (2024). Depression, stress, and anxiety versus internet addiction in early and middle adolescent groups: the mediating roles of family and school environments. *BMC Psychology*, *12*(1). https://doi.org/10.1186/s40359-024-01659-z

Benedetto, L., Rollo, S., Cafeo, A., Di Rosa, G., Pino, R., Gagliano, A., Germanò, E., & Ingrassia, M. (2024). Emotional and Behavioural Factors Predisposing to Internet Addiction: The Smartphone Distraction among Italian High School Students. *International Journal of Environmental Research and Public Health*, *21*(4), 386. https://doi.org/10.3390/ijerph21040386

Bouazza, S., Abbouyi, S., Kinany, S. E., Rhazi, K. E., & Zarrouq, B. (2023). Association between Problematic Use of Smartphones and Mental Health in the Middle East and North Africa (MENA) Region: A Systematic Review. *International Journal of Environmental Research and Public Health*, *20*(4), 2891. https://doi.org/10.3390/ijerph20042891

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

Cai, Z., Mao, P., Wang, Z., Wang, D., He, J., & Fan, X. (2023). Associations between problematic internet use and mental health Outcomes of Students: A Meta-analytic review. *Adolescent Research Review*, *8*(1), 45–62. https://doi.org/10.1007/s40894-022-00201-9

Chen, J., Li, S., & Nie, Y. (2024). Parent-adolescent conflict and problematic internet use among Chinese adolescents: the mediating role of depression and the moderating role of school climate. *BMC Psychology*, *12*(1). https://doi.org/10.1186/s40359-024-01781-y

Cui, M., Wang, S., Gao, Y., Hao, Y., & Dai, H. (2024). The effect of emotion regulation strategies on nomophobia in college students: The masking role of resilience. *Heliyon*, *10*(9), e30075. https://doi.org/10.1016/j.heliyon.2024.e30075

Fathalla, M. M. (2019). Egyptian Validation of Smartphone Addiction Scale Short Version for Adolescents (SAS-SV). *Psycho-Educational Research Reviews*, *8*(3), 7–10. Retrieved from https://www.perrjournal.com/index.php/perrjournal/article/view/149

Feng, B., & Dou, G. (2024). Depression and smartphone addiction among college students: The Mediating effect of emotional exhaustion. *ALPHA PSYCHIATRY, 25*(2), 269-276. https://doi.org/10.5152/alphapsychiatry.2024.231496

Jeong, J., & Bae, S. (2024). The relationship between perceived stress and smartphone addiction: the mediating effect of rumination and the mediated moderating effect of mindfulness. *Psychiatry Investigation*, *21*(4), 340–351. https://doi.org/10.30773/pi.2022.0288

Jiang, S., & Zhang, L. (2024). Perceived stress of COVID-19 pandemic and problematic mobile phone use during quarantine conditions among Chinese adolescents: a mediated moderation model. *Frontiers in Psychology*, *15*. https://doi.org/10.3389/fpsyg.2024.1333869

Joubert, A. E., Moulds, M. L., Werner-Seidler, A., Sharrock, M., Popovic, B., & Newby, J. M. (2022). Understanding the experience of rumination and worry: A descriptive qualitative survey study. *British Journal of Clinical Psychology*, *61*(4), 929–946. https://doi.org/10.1111/bjc.12367

Kamel, O. (2018). The Relationship between Adaptive / Maladaptive Cognitive Emotion Regulation Strategies and Cognitive Test Anxiety among University Students. *Psycho-Educational Research Reviews*, *7*(1), 100-105. Retrieved from https://perrjournal.com/index.php/perrjournal/article/view/253

Khoo, S. S., & Yang, H. (2021). Mental disengagement mediates the effect of rumination on smartphone use: A latent growth curve analysis. *Computers in Human Behavior*, *120*, 106757. https://doi.org/10.1016/j.chb.2021.106757

Kardefelt-Winther, D. (2014). A conceptual and methodological critique of internet addiction research: Towards a model of compensatory internet use. *Computers in Human Behavior, 31,* 351–354. https://doi.org/10.1016/j.chb.2013.10.059

Lai, S. A., Pang, K. Y., Siau, C. S., Chan, C. M. H., Tan, Y. K., Ooi, P. B., Ridzuan, M. I. B. M., & Ho, M. C. (2022). Social support as a mediator in the relationship between perceived stress and nomophobia: An Investigation among Malaysian university students during the COVID-19 pandemic. *Current Psychology*, *42*(25), 21659–21666. https://doi.org/10.1007/s12144-022-03256-y

Li, Y., Xu, Z., Hao, Y., Xiao, P., & Liu, J. (2022). Psychosocial impacts of mobile game on K12 students and trend exploration for future educational mobile games. *Frontiers in Education*, *7*. https://doi.org/10.3389/feduc.2022.843090

Lian, S., Sun, X., Niu, G., Yang, X., Zhou, Z., & Yang, C. (2020). Mobile phone addiction and psychological distress among Chinese adolescents: The mediating role of rumination and moderating role of the capacity to be alone. *Journal of Affective Disorders*, *279*, 701–710. https://doi.org/10.1016/j.jad.2020.10.005

Liu,M.(2024) *The relationship between perceived stress, rumination, mobile phone addiction and academic achievement, and the protective effect of mental health literacy: A moderated chain mediation effect in the context of the Czech Republic and China*. Ústav pedagogiky a sociálních studií

Marchetti, I., Mor, N., Chiorri, C., & Koster, E. H. W. (2018). The Brief State Rumination Inventory (BSRI): validation and psychometric evaluation. *Cognitive Therapy and Research*, *42*(4), 447–460. https://doi.org/10.1007/s10608-018-9901-1

Mayerhofer, D., Haider, K., Amon, M., Gächter, A., O'Rourke, T., Dale, R., Humer, E., Probst, T., & Pieh, C. (2024). The Association between Problematic Smartphone Use and Mental Health in Austrian Adolescents and Young Adults. *Healthcare*, *12*(6), 600. https://doi.org/10.3390/healthcare12060600

Mougharbel, F., Chaput, J., Sampasa-Kanyinga, H., Hamilton, H. A., Colman, I., Leatherdale, S. T., & Goldfield, G. S. (2023). Heavy social media use and psychological distress among adolescents: the moderating role of sex, age, and parental support. *Frontiers in Public Health*, *11*. https://doi.org/10.3389/fpubh.2023.1190390

Pauw, L. S., Medland, H., Paling, S. J., Moeck, E. K., Greenaway, K. H., Kalokerinos, E. K., Hinton, J. D. X., Hollenstein, T., & Koval, P. (2022). Social Support Predicts Differential Use, but not Differential Effectiveness, of Expressive Suppression and Social Sharing in Daily Life. *Affective Science*, *3*(3), 641–652. https://doi.org/10.1007/s42761-022-00123-8

Robinson, L. A., & Alloy, L. B. (2003). Negative Cognitive Styles and Stress-Reactive Rumination Interact to Predict Depression: A Prospective Study. *Cognitive Therapy and Research, 27*, 275-292. http://dx.doi.org/10.1023/A:1023914416469

Saad, M. A. E. (2020). Self-Regulated Learning and Academic Procrastination as Predictors of Smartphone Addiction among Second Year-Middle School Learning Disabled Students. *Revista Amazonia Investiga*, *9*(26), 236–243. https://doi.org/10.34069/ai/2020.26.02.27

Saad, M. & Kamel , O. (2020). Arabic Adaptation of Adolescents Version of the Cognitive Emotion Regulation Questionnaire: Validity and Reliability. *Psycho-Educational Research Reviews*, *9*(1), 61–65. Retrieved from https://perrjournal.com/index.php/perrjournal/article/view/142

Şakiroğlu, M. ., Gülada, G., Uğurcan, S., Kara, N., & Gandur, T. (2017). The Mediator Effect of Mindfulness Awareness on The Relationship Between Nomophobia and Academic University Adjustment Levels in College Students. *Psycho-Educational Research Reviews*, *6*(3), 69–79. Retrieved from https://perrjournal.com/index.php/perrjournal/article/view/263

Shum, C., Dockray, S., & McMahon, J. (2024). The Relationship between Cognitive Reappraisal and Psychological Well-Being During Early Adolescence: A scoping review. *The Journal of Early Adolescence*, *45*(1), 104–133. https://doi.org/10.1177/02724316241231918

Turan, Z., & Yılmaz, R. M. (2024). Do personality traits influence nomophobia? An investigation of the Big five personality traits and nomophobia levels in university students. Psycho-Educational Research Reviews, 13(1). https://doi.org/10.52963/PERR_Biruni_V13.N1.03

Wei, D., Chan, L., Du, N., Hu, X., & Huang, Y. (2024). Gratification and its associations with problematic internet use: A systematic review and meta-analysis using Use and Gratification theory. *Addictive Behaviors*, *155*, 108044. https://doi.org/10.1016/j.addbeh.2024.108044

Xue, Y., Xue, B., Zheng, X., Shi, L., Liang, P., Xiao, S., Dong, F., Zhang, J., Chen, Y., Liu, Y., Qin, Z., & Zhang, C. (2023). Associations between internet addiction and psychological problems among adolescents: description and possible explanations. *Frontiers in Psychology*, *14*. https://doi.org/10.3389/fpsyg.2023.1097331

Yan, C., Ding, Q., Wang, Y., Wu, M., Gao, T., & Liu, X. (2022). The effect of cognitive reappraisal and expression suppression on sadness and the recognition of sad scenes: An event-related potential study. *Frontiers in Psychology*, *13*. https://doi.org/10.3389/fpsyg.2022.935007

Yang, H., Liu, B., & Fang, J. (2021). Stress and problematic smartphone use severity: smartphone use frequency and fear of missing out as mediators. *Frontiers in Psychiatry*, *12*. https://doi.org/10.3389/fpsyt.2021.659288

Zagaria, A., Vacca, M., Cerolini, S., Terrasi, M., Bacaro, V., Ballesio, A., Baglioni, C., Spinhoven, P., & Lombardo, C. (2023). Differential Associations of Cognitive Emotion Regulation Strategies with Depression, Anxiety, and Insomnia in Adolescence and Early Adulthood. *International Journal of Environmental Research and Public Health*, *20*(10), 5857. https://doi.org/10.3390/ijerph20105857

Zhang, Y., Han, M., Lian, S., Cao, X., & Yan, L. (2024). How and when is academic stress associated with mobile phone addiction? The roles of psychological distress, peer alienation and rumination. *PLoS ONE*, *19*(2), e0293094. https://doi.org/10.1371/journal.pone.0293094

Zhang, J., & Jiang, Y. (2017). Study on the effect of college students' emotion regulation strategies on interpersonal distress and mobile phone addiction. *Modern Preventive Medicine, 44*(18), 3356-3359.

Zhang, L., & Yang, B. (2024). Aggressiveness mediates the relationship between self-esteem and problematic smartphone use. *Social Behavior and Personality an International Journal*, *52*(5), 13019E-13028E. https://doi.org/10.2224/sbp.13019

Zhou, L., Qiao, C., Huang, J., Lin, J., Zhang, H., Xie, J., Yuan, Y., & Hu, C. (2024). The impact of recent life events, internalizing symptoms, and emotion regulation on the Severity of Non-Suicidal Self-Injury in Adolescents: A Mediation analysis. *Neuropsychiatric Disease and Treatment*, *Volume 20*, 415–428. https://doi.org/10.2147/ndt.s444729

Zhou, Y., & Zhou, Y. (2024). Non-adaptive cognitive emotion regulation mediates the relationship between disease uncertainty and acute stress disorder in patients with ischaemic stroke. *Frontiers in Psychiatry*, *15*. https://doi.org/10.3389/fpsyt.2024.1319848