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Resilience fully mediated in the link between risk of smartphone addiction and life satisfaction among college students

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ABSTRACT

Objective: Life satisfaction is one of the most important indicators of psychological health for college students. Therefore, investigating the factors that influence the level of life satisfaction of college students can help develop intervention programs to improve student life satisfaction. This study investigates the mediating effect of resilience in the link between risk of smartphone addiction (RSA) and life satisfaction among college students.

Method: A cross-sectional study design was used. Four hundred twenty-three Vietnamese university students ($M_{\text{age}} = 18.78$, $SD = 0.925$) completed The Smartphone addiction scale – Short version (SAS –SV), The Connor – Davidson Resilience scale (CD-RISC-10) and The Life satisfaction scale (SWLS). The SPSS 20 and PROCESS 3.5 (Model 4) were used to test the hypotheses.

Results: The results indicated that RSA did not predict life satisfaction among Vietnamese students ($B = -0.052$, $SE = 0.035$, $p > 0.05$, $95\% \text{ CI} = [-0.120, 0.017]$). More importantly, resilience fully mediated the link between RSA and life satisfaction ($B = -0.020$, $SE = 0.010$, $95\% \text{ CI} = [-0.041, -0.004]$).

Discussion: The findings of this study not only contribute to expanding the mechanism of the association between RSA and life satisfaction, but also provide a theoretical basis for interventions to improve life satisfaction for students.

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Resilience; risk of smartphone addiction; life satisfaction; mediating effect; college students

1. Introduction

Life satisfaction refers to an individual's cognitive and judgmental process that assesses their quality of life based on a series of subjective criteria (Pavot & Diener, 2009). Previous data reported that life satisfaction is related to resilience (Moser et al., 2020; Aboalshamat et al., 2018) and RSA (Kula et al., 2020; Song et al., 2019a; Kwon, 2019). For students, life satisfaction is a factor that protects them from adverse situations (Lane, 2016). According to Civitci (2015), life satisfaction is one of the most important indicators of psychological health for college students. Therefore, investigating the factors that influence the level of life satisfaction of college students can help develop intervention programs to improve the life satisfaction of students.

In Vietnam, a handful of studies have reported life satisfaction (Tran & Van Vu, 2018; Takahashi et al., 2011; Tran & Chantagul, 2018), resilience (Minh-Uyen & Im, 2020; Le, 2020) and RSA (Nhân et al., 2016; Nguyễn et al., 2020) among Vietnamese high students and college students. However, there is a lack of research to explore the mechanism of the link between risk of smartphone addiction (RSA) and life satisfaction. To fill gaps in the literature, this study investigates the mediating effect of resilience in the link between RSA and life satisfaction.

1.1 RSA and life satisfaction

Smartphone addiction can be defined as an inability to regulate a person's use of smartphones, which ultimately involves negative outcomes in daily life (Billieux, 2012). It is estimated that 29.8–63.8% of college students experience RSA (Chen et al., 2017; AL Mahrooqi et al., 2020). An inverse correlation between RSA and life satisfaction has been found in the literature (Kula et al., 2020; Song et al., 2019a; Kwon, 2019). Low life satisfaction was found to be associated with the RSA. In the literature, life satisfaction has not only a direct (Song et al., 2019b) but also an indirect impact on the RSA through perceived stress (Vujić & Szabo, 2022). Additionally, RSA was found to be a factor in reducing life satisfaction (Kula et al., 2020; Dayapoğlu et al., 2016). Accordingly, life satisfaction levels decreased as RSA levels of students increased (Kula et al., 2020; Dayapoğlu et al., 2016). However, other studies found that the relationship between RSA and life satisfaction does not exist, and that RSA may be related to life satisfaction through mediating factors (Cao et al., 2021; Lepp et al., 2014; Samaha & Hawi, 2016).

According to previous studies, excessive internet and smartphone use causes mental and physical disorders, thereby reducing life satisfaction (Dayapoğlu et al., 2016; van den Eijnden, Meerkerk, Vermulst, Spijkerman, & Engels, 2008; Beranuy et al., 2009). RSA can lead to poor sleep quality and poor self-health, and that reduces individuals' life satisfaction (Cao et al., 2021). In a sample of college students, RSA can increase an individual's stress levels and decrease their academic performance, thereby reducing their life satisfaction (Samaha & Hawi, 2016). In this study, we focus on investigating the impact of RSA on life satisfaction in a sample of Vietnamese college students.

1.2 Resilience as a mediator

Resilience is defined as an individual's ability to mentally adapt to adversity, uncertainty, and challenges (Afek et al., 2021). Resilience is different for each person and depends on environmental factors as well as individual factors (Southwick & Charney, 2012). Some studies have found that RSA is negatively correlated with resilience (Kim & Sim, 2018; Kim & Roh, 2016). According to previous findings, excessive or uncontrolled use of smartphones can lead to high academic stress (Akinci, 2021), high perceived stress (Samaha & Hawi, 2016) and high general life stress among students (Kang & Park, 2018). Individuals with high levels of stress or academic stress reported low resilience (Kim, 2020; Urban et al., 2021). Therefore, it could be assumed that RSA may be negatively related to resilience.

Resilience is an important psychological resource that helps an individual maintain or restore well-being in the face of adversity (Wolf et al., 2018; Liu et al., 2013). By reducing

the negative effects of risky situations, high resilience can maintain an individual's physical and psychological health, so they can have a high level of life satisfaction (Liu et al., 2015). There are studies reporting that resilience has been found to contribute significantly to changes in life satisfaction scores (Moser et al., 2020; Aboalshamat et al., 2018). According to previous studies, individuals with low resilience are at risk of experiencing low life satisfaction.

This study aims to examine the mediating role of resilience in the link between RSA and life satisfaction among Vietnamese college students. This study tests the following two hypotheses: (hypothesis 1) RSA would be negatively correlated with life satisfaction; and (hypothesis 2) resilience would mediate the link between RSA and life satisfaction.

2. Methods

2.1. Sample

The cross-sectional study was conducted at an Economics University in Vietnam with data collected from January to February 2021. A convenience sampling method was used and 459 students volunteered for the study. To determine the sample size, we used the Slovin's formula with $N = 7,000$ and $e = 0.05$. Therefore, the sample size is 378 and more. After removing the incomplete questionnaires, data from 423 students (329 female; 77.8%) were used in this study. The age range of participants is 18–23 (Mean = 18.78, SD = 0.925). Freshman comprised 51.3% among them, sophomore are 36.9%, and junior are 11.8% (see Table 1). Each participant received a gift worth 20,000 VND after completing the scales. All participants signed the consent form.

2.2. Measures

In this study, we used Smartphone addiction scales (SAS – Short version), Connor – Davidson Resilience scale (CD-RISC-10) and Life satisfaction scale (SWLS).

Smartphone addiction scales – Short version (SAS – SV) (Kwon et al., 2013) is used to assess participants' RSA. SAS-SV is composed of 10 items (e.g., 'Missing planned work due to smartphone use') with 6-point responses from 1 (strongly disagree) to 6 (strongly agree). The scores ranges from 10 to 60. The higher the score, the higher the RSA. The SAS-SV is commonly used in the sample of Vietnamese students (Hỗ Thu et al., 2019; Nhân et al., 2016; Trọng Hà et al., 2021). The reliability of this scale was determined

Table 1. Socio-demographic characteristics of subjects (n = 423).

Variable	Participants
Age, $M \pm SD$	18.78 (0.925)
Gender	
Male, n (%)	94 (22.2)
Female, n (%)	329 (77.8)
Permanent residence	
Urban, n (%)	126 (29.8)
Rural, n (%)	297 (70.2)
School level	
Freshman, n (%)	217 (51.3)
Sophomore, n (%)	156 (36.9)
Junior, n (%)	50 (11.8)

to be 0.71 in a recent study by Hồ Thu Hà et al., (2019). In this sample, the reliability of the scale was 0.795.

Connor – Davidson Resilience scale (CD-RISC-10): The Connor-Davidson Resilience Scale was developed by Conner and Davidson. CD-RISC-10 is a scale for resilience that consisted of 10 items (such as ‘Able to adapt to change’) with a 5-point Likert scale (0 = “not true at all” and 4 = “true nearly all the time”) based on self-reporting (Minh-Uyen & Im, 2020). The total scores ranges from 0 to 40 with lower scores indicating lower resilience. In Vietnam, the CD-RISC-10 has good reliability and validity ($\alpha = 0.84$, $\chi^2/df = 3.64$, TLI = 0.94, CFI = 0.95, RMSEA = 0.08) to measure the resilience of university students (Minh-Uyen & Im, 2020). In this sample, the reliability of the scale was 0.854.

Life satisfaction scale (SWLS): Life satisfaction was measured using the 5-item SWLS (Diener et al., 1985). It is a 7-point Likert style response scale (1 = strongly disagree and 7 = strongly agree). The total scores ranges from 5 to 25 with lower scores indicating lower life satisfaction. In Vietnam, the SWLS was used in many studies (Tran & Van Vu, 2018; Takahashi et al., 2011; Tran et al., 2022). In a recent study, the reliability of this scale was found to be 0.90 (Tran et al., 2022). In our study, α coefficient identified was 0.737.

2.3. Statistical analysis

In this study, descriptive statistics were used to summarise the demographic characteristics of the participants and calculated the mean score and standard deviation for all variables. Correlation analysis was used to calculate the correlation coefficients among variables. In addition, we used PROCESS Macro version 3.3 (Model 4) for SPSS (Hayes, 2012) to estimate mediating effect. In the mediation models, RSA was independent variable, resilience was the mediator variable, life satisfaction was dependent variable and age was control variable.

3. Results

3.1. Descriptive statistics and inter-correlations between variables

Descriptive statistics and inter-correlations between variables were given in Table 2. According to Table 2, there were significant negative and positive relationship between the independent variables, mediator and dependent variable. RSA were significantly negatively related to resilience ($r = -0.142$, $p < 0.01$). Resilience was significantly positively related to life satisfaction ($r = 0.197$, $p < 0.01$). RSA was not significantly negatively related to life satisfaction ($r = -0.092$, $p > 0.05$). There is a statistically significant but weak positive correlation between age and life satisfaction ($r = 0.137$, $p < 0.01$).

Table 2. Pearson correlations among study variables.

	Mean	SD	1	2	3
1. RSA	34.057	7.333	—		
2. Resilience	22.624	6.748	−0.142**	—	
3. Life satisfaction	18.832	5.351	−0.092	0.197**	—
4. Age	18.78	0.925	0.041	−0.020	0.137**

Notes. **: $p < 0.01$; ***: $p < 0.001$; RSA: risk of smartphone addiction.

3.2. Mediation analyses

The unstandardised direct and indirect effects for the proposed model were presented in Table 3.

Table 3 indicated that RSA was a negative predictor of resilience ($B = -0.130$, $SE = 0.045$, $p < 0.001$, $95\% CI = [-0.218, -0.043]$) as well as resilience was a positive predictor of life satisfaction ($B = 0.150$, $SE = 0.038$, $p < 0.001$, $95\% CI = [0.076, 0.225]$). The RSA did not predict life satisfaction ($B = -0.052$, $SE = 0.035$, $p > 0.05$, $95\% CI = [-0.120, 0.017]$). In addition, the indirect effect of RSA on life satisfaction was statistically significant ($B = -0.020$, $SE = 0.010$, $95\% CI = [-0.041, -0.004]$). These results showed that resilience fully mediated the link between RSA and life satisfaction (see Figure 1).

4. Discussion

The purpose of this study was to investigate the link between RSA and life satisfaction. Not in line with the Hypothesis 1, we found that a direct link between RSA and life satisfaction did not exist. This result is consistent with the finding of Cao et al. (2021); Lepp et al. (2014) and Samaha and Hawi (2016) in samples of university students from China, the United States, and Lebanon. Aligned with previous studies (Cao et al., 2021; Lepp et al., 2014; Samaha & Hawi, 2016), results of the present study suggest that this relationship may be mediated by another factor. Thus, the mediating role of resilience in this relationship was investigated. The results of this study demonstrated that the association between RSA and life satisfaction was fully mediated by resilience. This finding supports Hypothesis 2. RSA is negatively correlated with resilience, which supports previous findings (Kim & Roh, 2016; Kim & Sim, 2018). It could be explained that individuals at higher RSA may experience higher academic stress (Akinci, 2021), higher perceived stress (Samaha & Hawi, 2016), higher general life stress (Kang & Park, 2018), anxiety and depression (Wu et al., 2020; Ziaian et al., 2012), which in turn reduces their resilience. In line with previous studies (Moser et al., 2020; Aboalshamat et al., 2018; Liu et al., 2015), this study found that resilience was positively associated with life satisfaction. Individuals with low resilience may experience problems related to physical and mental health, which in turn leads to a reduction in life satisfaction (Liu et al., 2015). Moreover, individuals with high resilience often have more positive emotions, leading to higher subjective happiness. Thus, the higher the resilience, the higher one's life satisfaction (Kim & Sim, 2018). The above findings have shown that RSA indirectly affects life satisfaction through resilience.

Table 3. The direct and indirect effects of RSA on life satisfaction.

Paths	B	SE	95%CI	
			Low	High
RSA – Resilience	–0.130***	0.045	–0.218	–0.043
RSA – Life satisfaction	–0.052	0.035	–0.120	0.017
Resilience – Life satisfaction	0.150***	0.038	0.076	0.225
RSA – Resilience – Life satisfaction	–0.020	0.010	–0.041	–0.004
Age – Resilience	–0.103	0.353	–0.796	0.590
Age – Life satisfaction	0.828**	0.274	0.290	1.366

Notes: ***: $p < 0.001$; **: $p < 0.01$; RSA: risk of smartphone addiction.

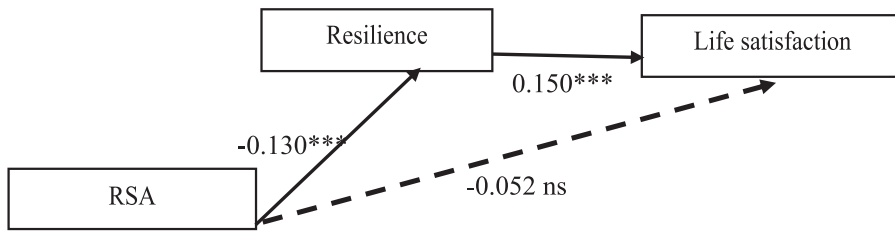


Figure 1. Mediation model of the indirect effect of RSA on life satisfaction. Note: ns: not significant; RSA: risk of smartphone addiction.

The novelty of this study was that it found a fully mediating role of resilience in the relation between smartphone addiction and life satisfaction, which previous studies had not found. Prior to this, there have been studies investigating the mediating role of sleep quality, self-health, stress and academic performance in the connection between RSA and life satisfaction (Cao et al., 2021; Samaha & Hawi, 2016). In Korea, Choi and Kim (2018) found that the connection of RSA with subjective happiness among university students through the path of resilience. However, this study is the first indication that the connection between RSA and life satisfaction among Vietnamese college students was fully mediated by resilience. These findings contribute to broadening the mechanism of the link between RSA and life satisfaction (Cao et al., 2021; Lepp et al., 2014; Samaha & Hawi, 2016; Vujić & Szabo, 2022). More importantly, these findings might provide the theoretical basis for interventions aimed at improving life satisfaction and promoting the resilience of college students at RSA. According to this study, it can be seen that not all college students at RSA have low life satisfaction, but only those with impaired resilience due to smartphone addiction. Therefore, interventions should focus on college students with low resilience due to smartphone addiction. College students at RSA can improve their life satisfaction by promoting resilience. Previous studies have determined that resilience enhancement measures include stress implantation therapy, acceptance and commitment therapy, mindfulness-based therapy (Helmreich et al., 2017). In addition, interventions aimed at reducing anxiety, depression, and improving empathy have also been found to be effective in enhancing an individual's resilience (Venegas et al., 2019). Therefore, the above resilience-enhancing measures may be useful for the students at RSA in this study.

4.1 Limitations

The present study is not without limitations. Firstly, this study is a cross-sectional study which has inherent limitations around nonresponse bias, recall bias, and difficulty in making causal inferences. Therefore, longitudinal studies are needed. Secondly, gender and residence of the participants are critical factors in RSA, life satisfaction and resilience (Erdogan et al., 2015; Vujić & Szabo, 2022; Yildiz Durak, 2019). However, in this study, the prevalence of male and female students as well as the proportion of rural and urban students was not balanced. Thirdly, due to the sample size of college students, which had a limited age range, there was a problem with the generalizability of the results to a

population perspective including in Vietnam. Finally, stress can play an important role in the relationship between RSA, resilience and life satisfaction, which this study did not examine.

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Disclosure statement

No potential conflict of interest was reported by the author(s).

Declaration of conflicting interests

The author declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

Informed consent

Informed consent was obtained from all individual participants included in this study.

Ethical approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee.

Data availability statement

Research data are not shared.

Authors' contributions

Thi Truc Quynh Ho: Conception and design of study, analysis and/or interpretation of data, drafting the manuscript and revising the manuscript, revising the manuscript critically for important intellectual content and contact the journal. Ba Phu Nguyen, Van Bac Nguyen, Thi Khanh Linh Tran: Acquisition of data.

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