

# Factors affecting phubbing of students in the context of COVID-19

Anh Duc Do\*, Thi Diu Nguyen

*National Economics University*

Received 15 March 2022; accepted 13 June 2022

## **Abstract:**

This study proposes a structural model of the relationships among fear of COVID-19 (FOC), fear of missing out (FOMO), and phubbing by two factors, communication disturbance (CD) and phone obsession (FO), to explore how these factors affect each other. University students in Vietnam were randomly selected to participate in the study's questionnaire. In this research, exploratory factor analysis (EFA) was performed to test the validity of the constructs together with analysis of moment structure (AMOS). Confirmatory factor analysis (CFA) was used to test the significance of the proposed hypothesis model. Results of the relationships among FOC, FOMO, CD, and FO were revealed. Specifically, FOC and FOMO were found to have a positive impact on phubbing by two factors: CD and FO. Besides, FOC was found to be positively related to FOMO. The research reveals that FOC has the most impact on phubbing, followed by FOMO. From the research results, the study proposes some solutions to reduce phubbing for students and recommendations for their families.

**Keywords:** fear of COVID-19, fear of missing out, phubbing.

**Classification number:** 4.1

## **Introduction**

In recent years, people have witnessed a great innovation of information technology and means of communication [1] with smartphones becoming indispensable in daily life [2]. Admittedly, smartphones have a lot of benefits. However, they can also cause users physical or mental harm [3]. A new term, "phubbing" has been introduced and it is defined as a behaviour in which people are so concentrated on their phone that they ignore other people in communicative situations [4]. Thus, phubbing results in several detrimental effects and there have been studies around the world on reasons for these activities. For instance, phubbing might originate from phone addiction [5] or instability in people's character [6].

According to research conducted by E. Karadağ, et al. (2015) [7] found that smartphone addiction impacts phubbing. Similarly, from a technological and psychological point of view, S. Chatterjee's research showed that smartphone addiction is a major factor affecting phubbing [8]. J. Fang, et al. (2020) [9] indicated that social media plays a mediating role in the relationship between the FOMO and phubbing in students. In context of the COVID-19 pandemic, there have been studies showing the relationship between the FOC and mobile phone addiction - one of the factors that causes phubbing. A.R. Kayis, et al. (2021) [10] investigated the relationship between COVID-19 fear and mental health by examining the mediating role of loneliness and smartphone addiction. The

\*Corresponding author: Email: ducda@neu.edu.vn

results showed that FOC can affect mental health through loneliness and smartphone addiction, respectively. Based on the findings of the study, it can be seen that higher fears of COVID-19 cause higher levels of smartphone addiction. This was further proven in the study by I.S. Albursan, et al. (2021) [11] with results showing that anxiety about COVID-19 can lead to smartphone addiction with all its negative psychological and physical effects. Despite these studies, there is almost no research in Vietnam on the underlying causes of phubbing, and awareness of these problems in the country is low. Therefore, this study aims to measure the factors affecting phubbing in undergraduate students and provide several solutions to improve these situations. In addition, considering the FOC, this research becomes more relevant than those before in COVID-19 context. With the two factors of CD and FO, this study clearly confirms a significant relationship between FOC, FOMO, and phubbing.

A quantitative method was used to meet the research goals of this study with ANOVA and t-test approaches applied to investigate the differences in phubbing between undergraduates groups according to gender, years of undergraduate education, and average phone usage time.

## **Literature review**

Phubbing can be described as an individual looking at his or her mobile phone while conversing with others, handling the mobile phone, and/or exiting communication with other people. The term phubbing became known and widely used when it was included in an update of the famous Macquarie Dictionary in 2012. The update team combined the two words "phone" and "snubbing" to create "phubbing". According to J.A. Roberts and M.E. David (2016) [12], phubbing is defined

as a social behaviour related to smartphone use in which the user ignores his or her interlocutor to use their phones. In discussions, phubbing disrupts the sense of communication [13], leaves an impression of impoliteness and impatience, and creates poor quality conversation [14]. To date, several studies have been conducted on the factors that impact phubbing within a higher education institution. Some studies focused on the impact of smartphone addiction, SMS (message) addiction, social network addiction, internet addiction, and to some extent gaming addiction to phubbing. S. Davey, et al. (2018) [15] showed that internet addiction and smartphone addiction have an effect on phubbing. In addition to addictions, S. Davey, et al. (2018) [15] further investigated that FOMO and self-restraint also predict phubbing. The study by V. Chotpitayasunondh and K. Douglas (2016) [5] revealed that internet addiction, FOMO, and self-control affected phubbing. Y. Al-Saggaf (2020) [16] examined the relationship between boredom, FOMO, and phubbing. According to this study, boredom also significantly predicts phubbing by mediating FOMO.

Limited studies have attempted phubbing in the context of the COVID-19 pandemic. The study of J. Zhao, et al. (2021) [17] has investigated the factors of peer phubbing on students in China. Research showed that the behaviour of phubbing is positively correlated with smartphone addiction. In other words, students who were phubbing were more likely to be addicted to smartphones. J. Zhao, et al. (2021) [17] explained that because schools were closed during the COVID-19 pandemic, interaction between students and friends becomes more important. A.R. Kayis, et al. (2021) [10] investigated the relationship between the FOC and mental health by examining the role of loneliness and smartphone addiction. The results showed that

FOC can affect mental health through loneliness and smartphone addiction, respectively. Based on the findings of the study, higher fears of COVID-19 caused higher levels of smartphone addiction. In another aspect, a 2019 study of the relationship between the phubbing, loneliness, self-esteem, and Facebook by A. Błachnio and A. Przepiórka (2019) [18] examined phubbing by two factors: CD and FO. Research results showed a negative relationship between CD and life satisfaction. A.K. Butt and T. Arshad (2021) [19] indicated that the FOMO predicted phubbing including CD and FO. Research by M.J. Blanca and R. Bendayan (2018) [20] also found that FOMO was positively associated with both factors of phubbing: CD and FO.

The FOC has a direct impact on smartphone addiction. Although smartphones have many positive benefits, smartphone use disorders are specifically associated with excessive social media use [21]. Cell phones help people find information related to COVID-19 and communicate with others while in quarantine [22]. Smartphones make life easier when used properly [23, 24], however, if you use in excess, smartphones can disrupt physical and mental health [25]. According to A.R. Kayis, et al. (2021) [10], one of the reasons that the FOC increased smartphone addiction and negatively affected lives is that almost all people had to spend time at home more often because of the pandemic. The research by C. Montag, et al. (2021) [26] observed positive associations between COVID-19 fear and smartphone addiction.

Smartphone addiction is also a determining factor in phubbing. According to some studies, phubbing is the sum total of all virtual addictions [7]. While phubbing can be limited if phone addiction is controlled [8], phubbing can be considered the

norm [5]. Hence, this research proposes a model with a new scale that examines phubbing by two factors: CD and FO. Hence, two hypotheses are proposed:

Hypothesis 1a (H1a): *There is a positive relationship between FOC and CD.*

Hypothesis 1b (H1b): *There is a positive relationship between FOC and FO.*

Social networks allow us to connect with social contacts both online and offline, and these connections are equally important. As a result, not being able to contact or keep up with people online can lead to feeling out of touch with reality [27]. The fear of being socially excluded plays an important role in experiencing FOMO [28]. The intense COVID-19 pandemic has completely changed academic and daily life in universities with fear of the spread of the pandemic forcing online teaching. Therefore, the study, work, and exchange of students in particular has moved to a digital platform, which also means that students feel it is even more necessary to maintain online communication as not to miss work or interacting with friends.

V. Franchina, et al. (2018) [29] showed that the FOMO has an impact on phubbing. M.J. Blanca and R. Bendayan (2018) [20] researched phubbing with Spanish adults, and their study showed the relationship between FOMO and phubbing in that phubbing is divided into two elements and that FOMO was positively associated with both elements of phubbing. The research of A.K. Butt and T. Arshad (2021) [19] on university students who abused their phones in Pakistan also came to the same conclusion as previous studies. In particular, FOMO has a relationship with phubbing, which includes CD and FO. FOMO has also been shown to have an indirect effect on ignoring others

to use the phone through smartphone addiction in an earlier study [5]. FOMO has impacts on different objects and spaces, hence, this study hypothesizes as follows:

Hypothesis 2a (H2a): *FOMO is positively related to CD.*

Hypothesis 2b (H2b): *FOMO is positively related to FO.*

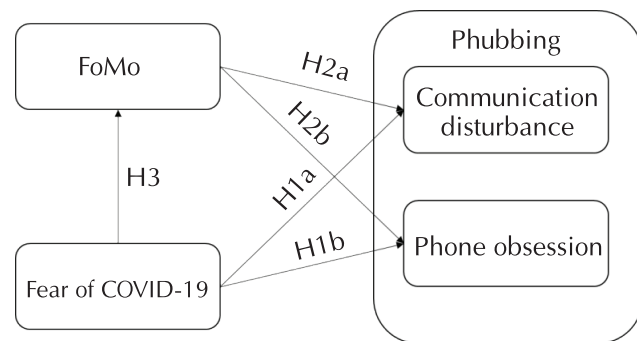
Studies have shown that the COVID-19 pandemic has posed serious threats to an individual's physical health and life such as increasing anxiety and stress [30]. Health anxiety is also one of the factors that cause FOC [31, 32]. Health anxiety refers to the tendency to misinterpret normal or benign physical symptoms and believe that a person has or is suffering from a serious illness in the absence of any actual illness [33]. Research by G. Mertens, et al. (2020) [31] has shown that health anxiety is associated with increased fear about the current COVID-19 pandemic. Particularly, in addition to concerns about their own health and safety, that of others, and related safety and prevention behaviours, respondents are also concerned about the impact of COVID-19 on the health care system, economy, society, job loss, and change in daily routine.

According to the studies of L. Lan, et al. (2020) [34] and B. Oosterhoff, et al. (2020) [35], during the COVID-19 pandemic, a higher level of health anxiety can increase the level of social distancing and time spent at home to prevent contact. COVID-19 precautions taken by national governments during the pandemic have also caused individuals to spend a lot of time alone because of self-isolation and limited social interaction. This promotion of social distancing, together with a decline in social activities and social capital during the pandemic, may increase the level of

FOMO because of unmet social needs [36]. From the above study, this research hypothesizes the following:

Hypothesis 3 (H3): *There is a positive relationship between FOC and FOMO.*

The following Fig.1 summarises the theoretical framework for this research with the following factors: FOC, FOMO, and phubbing.



**Fig. 1. Proposed research model.**

## Methodology

### Research design

A questionnaire was formed based on the literature review and was modified based on the results of interviews with twenty undergraduate students. The questionnaire included 35 objects. Five-Point Likert scales were used for evaluation with 1 = totally disagree, 2 = somewhat disagree, 3 = neither agree nor disagree (neutral), 4 = somewhat agree, and 5 = totally agree.

The data were gathered from November 2021 to February 2022. A non-probability sampling method was carried out in the formal survey stage, and a total of 403 responses were received from northern Vietnam. There were 95 biased observations that were eliminated leaving 308 observations valid for analysis in the future. All of observations were collected from an online survey via Google Forms. Table 1 shows the descriptive statistics of the participants' demographics.

**Table 1. Descriptive statistics of participants' demographics.**

Variables		Number	%
Gender	Female	221	71.7
	Male	87	28.3
Years of undergraduate education	Freshman	59	19.2
	Sophomore	67	21.7
	Junior	165	53.6
	Senior	17	5.5
Average phone usage time	<1 hour	4	1.3
	1-3 hours	47	15.3
	4-6 hours	133	43.2
	>6 hours	124	40.2

Source: Authors' estimation.

Table 1 shows the ratio of females and males as 71.7 and 28.3%, respectively. In terms of years of undergraduate education, the majority of undergraduates (53.6%) fell into the junior group, 21.7% fell into the sophomore group, 19.2% fall into the freshman group, and only 5.5% of the undergraduates were seniors. With targeted participants and research objectives, the majority of learners use phones on average 4 hours per day (83.4%), with 43.2 and 40.2% using the phone for 4-6 hours and over 6 hours, respectively. Meanwhile, the number of undergraduates using phones under 1 hour and from 1 to 3 hours a day only accounted for 1.3 and 15.3%, respectively.

**Table 2. Summary of and t-test and ANOVA results.**

Group	Dependent variables	Sig. of Levene's test	Sig. of t-test/Welch/F-test	N	Mean
Gender					
Female	FO	0.182	Sig. of t-test 0.009	221	2.353
Male				87	2.203
Years of undergraduate education					
Freshman	CD	0.325	Sig. of F-test 0.018	59	2.192
Sophomore				67	2.497
Junior				165	2.240
Senior				17	2.765
Average phone usage time					
<1 hour	FO	0.695	Sig. of F-test 0.000	4	2.250
1-3 hours				47	2.759
4-6 hours				133	3.125
>6 hours				124	3.368

Source: Authors' estimation.

### **Data analysis techniques**

Firstly, t-test and ANOVA approaches were adopted to determine the differences in phubbing between undergraduates groups according to gender, years of undergraduate education, and average phone usage time. Then, SPSS were applied for determining sample features consisting of sex, age, sector, phone time, and communication time according to their demographic characteristics. Next, Cronbach's alpha reliability coefficient was used to analyse data reliability and scales such that we can remove variables with small correlation coefficients. Then, EFA was employed to eliminate variables with small parameters by checking factor loading and extractable variance. By using CFA, observed variables were tested for quality. Structural equation modelling (SEM) was employed to show relationships between latent variables and to check research hypotheses. By regression analysis, the research evaluates the impact of the following independent variables: FOC, FOMO to dependent variables: FO and CD.

## **Results**

### **T-test and ANOVA**

Table 2 presents a summary of t-test and ANOVA results to demonstrate the difference between undergraduates' phubbing among demographic variables.



The difference in phubbing of undergraduate groups is summarized hereafter. Regarding gender, there is a difference in phubbing between the sexes, shown by the sig. of the t-test being <0.05. More specifically, the mean value shows that female students are more likely to have a FO than male students.

Concerning years of undergraduate education, there is a difference in phubbing between these year groups as shown by the sig. of the F-test being <0.05. More specifically, the mean value of the year of undergraduate education shows that CD ability increases in the order of the following groups: freshman, junior, sophomore, and senior.

In terms of average phone usage time, there is a difference in phubbing among undergraduate groups with different times spent on the phone as shown by the sig. of the F-test being <0.05. More specifically, the mean values of the groups show that FO rate increases by the level of time spent on the phone.

#### **Measurement assessment of the proposed research model**

Firstly, to evaluate the reliability and validities of the measurements, the data were examined through EFA. Then, the statistics were included in the SEM model on Amos Graphic version 20. The SEM model contained four constructs, namely, FOC, FOMO, FO, and CD. To test measurements of this model, composite reliability and convergent and discriminant validity were carried out.

Table 3 shows several figures to measure convergent validity and reliability of the model and all of the quality standards were reached. In particular, factor loadings were greater than 0.7 [37], Cronbach's alpha values were above 0.7 [38] composite reliability values were higher than 0.7 [39], and average variance extracted (AVE) values were greater than 0.5 [40].

Discriminant validity is the degree to which items recognize constructs. Table 3 indicates that the square root of the average variance

extraction is greater than the inter-construct correlations [38]. Regarding the cross-loadings standard, to assure the discriminant validity of the construct, the factor loadings of each item have to be greater than the rest of its cross-loadings [41]. Table 4 presents the square roots of AVEs, which are the diagonal elements in bold [42] and the off-diagonal elements are the bivariate correlations between two constructs. All the diagonal elements are larger than any other correlation coefficients, so discriminant validity criterion was achieved.

**Table 3. Convergent validity and reliability.**

Constructs	Items	Loadings	Cronbach's alpha	Composite reliability	Average variance extracted (AVE)
FOC	FOC1	0.743	0.864	0.866	0.565
	FOC2	0.862			
	FOC3	0.774			
	FOC5	0.800			
	FOC6	0.784			
FOMO	FOMO1	0.843	0.775	0.781	0.544
	FOMO2	0.834			
	FOMO3	0.774			
CD	CD1	0.792	0.777	0.777	0.539
	CD2	0.828			
	CD3	0.798			
FO	FO1	0.787	0.762	0.763	0.518
	FO2	0.749			
	FO3	0.845			

Source: Authors' estimation.

**Table 4. Discriminant validity.**

Scales	FOC	CD	FOMO	FO
FOC	<b>0.751</b>			
CD	0.422	<b>0.738</b>		
FOMO	0.413	0.369	<b>0.735</b>	
FO	0.422	0.629	0.352	<b>0.720</b>

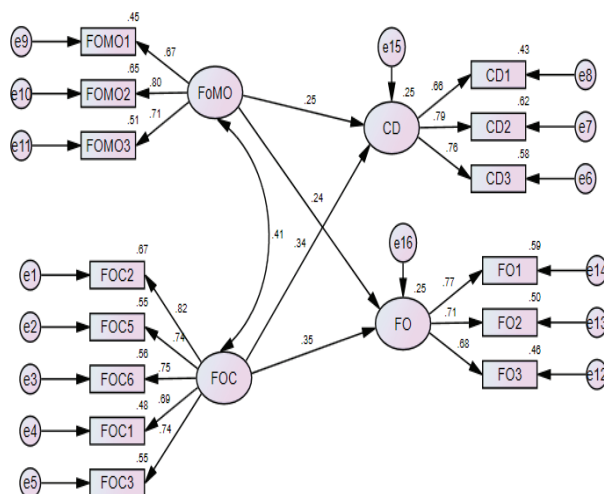
Source: Authors' estimation.

In Table 5, the outcome of hypothesis testing by SEM and the fulfilment of this standard for all the subscales indicated the discriminant validity of the tested instrument. The values of sig. in all hypotheses are less than 0.05. Therefore, there is linear correlation between independent variables and dependent variables.

**Table 5. Hypotheses testing.**

Relationship	Hypothesis	Std. Beta	Sig.	p values	Decision
FOC->CD	H1a	0.34	0.000	0.000	supported
FOC->FO	H1b	0.35	0.000	0.000	supported
FOMO->CD	H2a	0.25	0.000	0.001	supported
FOMO->FO	H2b	0.24	0.000	0.003	supported
FOC->FOMO	H3	0.41	0.000	0.000	supported

Source: Authors' estimation.



**Fig. 2. Confirmatory factor analysis result.**

### Testing research hypotheses

Table 5 and Fig. 2 indicate the relationships between four variables in the model. In particular, phubbing presented by FO and CD shares a significant relationship with FOC and FOMO ( $p < 0.05$ ). In addition, this result illustrates the correlation between 2 independent variables, which are FOC and FOMO. Therefore, all hypotheses

in the research model were fully supported. Among these hypotheses, the relationships between FOC and FOMO had the most effective correlation ( $\beta = 0.41$ ,  $p = 0.000$ ). The second and third strongest relationships were FOC having an impact on FO and CD, respectively, ( $\beta = 0.35$ ,  $p = 0.000$ ;  $\beta = 0.34$ ,  $p = 0.000$ ). FOMO was also a significant factor that affected FO and CD ( $\beta = 0.24$ ,  $p = 0.001$ ;  $\beta = 0.25$ ,  $p = 0.003$ , respectively). The standardized regression equations are  $Y(FO) = 0.35 FOC + 0.24 FOMO + \varepsilon$  and  $Y(CD) = 0.34 FOC + 0.25 FOMO + \varepsilon'$ .

For the hypothesized structural model, the RMSEA is 0.065, demonstrating a “moderate fit” because 0.065 is less than 0.08 [43]. All other fit indices were above the recommended threshold values (CFI=0.945>0.09, GFI=0.928>0.90; TLI=0.929>0.90) [42], illustrating that the tested model is a sound structural model. Table 5 and Fig. 2 above represent the hypothesis test results.

### Discussion

Our analysis results have confirmed three of the proposed hypotheses in the theoretical framework regarding determinants of phubbing from the perspective of FOC and FOMO. Regarding Hypothesis 1, the result indicates that FOC is positively related to phubbing by both factors: CD and FO. This finding corroborates A.J. Deursen's (2020) [22] finding that smartphones providing internet access can be useful equipment for obtaining information related to COVID-19 and communicating with others in quarantine. Besides, the increasing trend of smartphones will form the basis of phubbing [7].

Next, the obtained results demonstrate that FOMO had a significant influence on phubbing. This finding provides a comprehensive assessment of how FOMO affects phubbing. In fact, FOMO promotes an individual's phone and social media usage because it makes them feel secure that they

are not missing any events or opportunities [28]. In addition, individuals with higher levels of FOMO are more likely to abuse their phones under any circumstances to address their anxiety. While this helps the person keep up with the happenings online, at the same time it also directly affects their actual social interactions, leading them to phubbing. Our findings are also in agreement with the results of other studies in phubbing [20] in that the relationships of FOMO and phubbing have two factors: CD and FO, which are strongly consistent with the proposed hypotheses.

The last hypothesis of this study, which states that higher FOC corresponds to more FOMO, has been validated and supported. This is also in line with previous research. Indeed, the work of S. Casale and G.L. Flett (2020) [36] demonstrated that the promotion of social distancing along with the decline in social activities and social capital during the pandemic may increase the level of FOMO because of unmet social needs.

The t-test and ANOVA results indicate that there is a difference between the groups of students. More specifically, the FO is more prevalent in females than in males. The mean value of the groups shows that FO rate increases by the level of time spent on the phone. CD ability increases in the order of the following groups: freshman, junior, sophomore, and senior.

The finding of this research shares logic with the previous studies. However, provided with FOC, this research becomes more relevant than those studies before COVID-19 context. The two factors of CD and FO make this study clearly confirm a significant relationship between FOC, FOMO, and phubbing.

## Conclusions

In conclusion, this study provided a theoretical model to understand the relationships between

FOC, FOMO, and phubbing. Using the SEM method, this study adds empirical support to the literature by testing three hypotheses related to the FOC and FOMO on phubbing. The results of this study identified several advantages that are helpful for reducing phubbing in school. Furthermore, the results also suggest that decreasing the link between FOC and FOMO is highly recommended to reduce phubbing in students. Through the research results, this study proposes a number of recommendations for students and their families to reduce phubbing. It is recommended for students to engage in more outdoor activities to promote good mental health, reduce time spent on smartphones, and add balance to life. Besides, students should receive instruction and training on how to use the internet and smartphones in the correct way. In communication, students and anyone in general should put their phones down during conversation, which is more polite and does not disturb communication. Regarding families, firstly, family should guide their children on how to use the phone properly including usage time, the purpose of using the phone, etc. Secondly, the family should be role models for children by limiting phone use at home and confiding with children more.

This study has contributed to theoretical and practical implications, however, the model could be developed for further improvement in the future in regard to life satisfaction. Namely, a different construct could be introduced and tested as it may have a strong impact on promotional activities and expectations. In addition, future studies with larger samples could be conducted to allow for comparisons between behaviours by region. Besides, the survey sample collected is not equal in quantity between universities and is limited to the university in the capital of Vietnam. Finally, the study could be further expanded when considering these factors in the future.



## COMPETING INTERESTS

The authors declare that there is no conflict of interest regarding the publication of this article.

## REFERENCES

- [1] E. Gummesson (2004), "From one-to-one to many-to-many marketing", *Service Excellence in Management: Interdisciplinary Contributions*, Proceedings from the QUIS 9 Symposium, Karlstad University Karlstad, Sweden, pp.16-25.
- [2] A. Oulasvirta, T. Rattenbury, L. Ma, E. Raita (2012), "Habits make smartphone use more pervasive", *Personal and Ubiquitous Computing*, **16**(1), pp.105-114.
- [3] N.S. Baron, E.M. Campbell (2012), "Gender and mobile phones in cross-national context", *Language Sciences*, **34**(1), pp.13-27.
- [4] A. Haigh (2015), "Stop phubbing", <https://www.stopphubbing.com>.
- [5] V. Chotpitayasunondh, K.M. Douglas (2016), "How 'phubbing' becomes the norm: The antecedents and consequences of snubbing via smartphone", *Computers in Human Behavior*, **63**, pp.9-18.
- [6] Ö. Çikrikci, M.D. Griffiths, E. Erzen (2019), "Testing the mediating role of phubbing in the relationship between the big five personality traits and satisfaction with life", *International Journal of Mental Health and Addiction*, **20**, pp.44-56.
- [7] E. Karadağ, et al. (2015), "Determinants of phubbing, which is the sum of many virtual addictions: A structural equation model", *Journal of Behavioral Addictions*, **4**(2), pp.60-74.
- [8] S. Chatterjee (2020), "Antecedents of phubbing: From technological and psychological perspectives", *Journal of Systems and Information Technology*, **22**(2), pp.161-162.
- [9] J. Fang, X. Wang, Z. Wen, J. Zhou (2020), "Fear of missing out and problematic social media use as mediators between emotional support from social media and phubbing behaviour", *Addictive Behaviours*, **107**, pp.1-7.
- [10] A.R. Kayis, B. Satıcı, M.E. Deniz, S.A. Satıcı, M.D. Griffiths (2021), "Fear of COVID-19, loneliness, smartphone addiction, and mental wellbeing among the Turkish general population: A serial mediation model", *Behavior and Information Technology*, **41**(11), pp.1-13.
- [11] I.S. Albursan, et al. (2021), "Anxiety about COVID-19 infection, and its relation to smartphone addiction and demographic variables in middle eastern countries", *International Journal of Environmental Research and Public Health*, **18**(21), pp.1-14.
- [12] J.A. Roberts, M.E. David (2016), "My life has become a major distraction from my cell phone: Partner phubbing and relationship satisfaction among romantic partners", *Computers in Human Behaviour*, **54**, pp.134-141.
- [13] T. Kadylak, et al. (2018), "Disrupted copresence: Older adults' views on mobile phone use during face-to-face interactions", *Mobile Media and Communication*, **6**(3), pp.331-349.
- [14] M.M.V. Abeeel, M.L. Antheunis, A.P. Schouten (2016), "The effect of mobile messaging during a conversation on impression formation and interaction quality", *Computers in Human Behavior*, **62**, pp.562-569.
- [15] S. Davey, et al. (2018), "Predictors and consequences of 'phubbing' among adolescents and youth in India: An impact evaluation study", *Journal of Family and Community Medicine*, **25**(1), pp.35-42.
- [16] Y. Al-Saggaf (2020), "Phubbing, fear of missing out and boredom", *Journal of Technology in Behavioral Science*, **6**, pp.1-6.
- [17] J. Zhao, B. Ye, L. Yu (2021), "Peer phubbing and Chinese college students' smartphone addiction during COVID-19 pandemic: The mediating role of boredom proneness and the moderating role of refusal self-efficacy", *Psychology Research and Behavior Management*, **14**, pp.1725-1736.
- [18] A. Błachnio, A. Przepiórka (2019), "Be aware! If you start using Facebook problematically you will feel lonely: phubbing, loneliness, self-esteem, and Facebook intrusion. A cross-sectional study", *Social Science Computer Review*, **37**(2), pp.270-278.
- [19] A.K. Butt, T. Arshad (2021), "The relationship between basic psychological needs and phubbing: Fear of missing out as the mediator", *PsyCh Journal*, **10**(6), pp.916-925.
- [20] M.J. Blanca, R. Bendayan (2018), "Spanish version of the phubbing scale: Internet addiction, Facebook intrusion, and fear of missing out as correlates", *Psicothema*, **30**(4), pp.449-454.
- [21] D.J. Kuss, et al. (2018), "Problematic mobile phone use and addiction across generations: The roles of psychopathological symptoms and smartphone use", *Journal of Technology in Behavioral Science*, **3**(3), pp.141-149.
- [22] A.J. van Deursen (2020), "Digital inequality during a pandemic: Quantitative study of differences in COVID-19-related internet uses and outcomes among the general population", *Journal of Medical Internet Research*, **22**(8), DOI: 10.2196/20073.

- [23] E. Fino, M. Mazzetti (2019), "Monitoring healthy and disturbed sleep through smartphone applications: A review of experimental evidence", *Sleep and Breathing*, **23**(1), pp.13-24.
- [24] M.Y. Gavali, D.S. Khismatrao, Y.V. Gavali, K.B. Patil (2017), "Smartphone, the new learning aid amongst medical students", *Journal of Clinical and Diagnostic Research*, **11**(5), DOI: 10.7860/JCDR/2017/20948.9826.
- [25] J.Y. Kim, et al. (2020), "The first case of 2019 novel coronavirus pneumonia imported into Korea from Wuhan, China: Implication for infection prevention and control measures", *Journal of Korean Medical Science*, **35**(5), pp.1-4.
- [26] C. Montag, et al. (2021), "How to overcome taxonomical problems in the study of Internet use disorders and what to do with "smartphone addiction?", *Journal of Behavioral Addictions*, **9**(4), pp.908-914.
- [27] R.B. Clayton, G. Leshner, A. Almond (2015), "The extended iSelf: The impact of iPhone separation on cognition, emotion, and physiology", *Journal of Computer-Mediated Communication*, **20**(2), pp.119-135.
- [28] J.P. Abel, C.L. Buff, S.A. Burr (2016), "Social media and the fear of missing out: Scale development and assessment", *Journal of Business and Economics Research*, **14**(1), pp.33-44.
- [29] V. Franchina, et al. (2018), "Fear of missing out as a predictor of problematic social media use and phubbing behaviour among Flemish adolescents", *International Journal of Environmental Research and Public Health*, **15**(10), pp.1-18.
- [30] W. Cao, et al. (2020), "The psychological impact of the COVID-19 epidemic on college students in China", *Psychiatry Research*, **287**, pp.1-5.
- [31] G. Mertens, et al. (2020), "Fear of the coronavirus (COVID-19): Predictors in an online study conducted in March 2020", *Journal of Anxiety Disorders*, **74**, pp.1-33.
- [32] S.M. Jungmann, M. Witthöft (2020), "Health anxiety, cyberchondria, and coping in the current COVID-19 pandemic: Which factors are related to coronavirus anxiety?", *Journal of Anxiety Disorders*, **73**, pp.1-9.
- [33] S. Taylor, et al. (2007), "Robust dimensions of anxiety sensitivity: Development and initial validation of the Anxiety Sensitivity Index-3", *Psychological Assessment*, **19**(2), pp.176-188.
- [34] L. Yan, et al. (2020), "An interpretable mortality prediction model for COVID-19 patients", *Nature Machine Intelligence*, **2**(5), pp.283-288.
- [35] B. Oosterhoff, C.A. Palmer, J. Wilson, N. Shook (2020), "Adolescents' motivations to engage in social distancing during the COVID-19 pandemic: Associations with mental and social health", *Journal of Adolescent Health*, **67**(2), pp.179-185.
- [36] S. Casale, G.L. Flett (2020), "Interpersonally-based fears during the COVID-19 pandemic: Reflections on the fear of missing out and the fear of not mattering constructs", *Clinical Neuropsychiatry*, **17**(2), pp.88-93.
- [37] J.F. Hair, R.E. Anderson, B.J. Babin, W.C. Black (2010), *Multivariate Data Analysis: A Global Perspective*, 7, Pearson Education, 800pp.
- [38] C. Fornell, D.F. Larcker (1981), "Evaluating structural equation models with unobservable variables and measurement error", *Journal of Marketing Research*, **18**(1), pp.39-50.
- [39] J. Hulland (1999), "Use of partial least squares (PLS) in strategic management research: A review of four recent studies", *Strategic Management Journal*, **20**(2), pp.195-204.
- [40] J.F. Hair, M. Sarstedt, L.M. Matthews, C.M. Ringle (2016), "Identifying and treating unobserved heterogeneity with FIMIX-PLS: Part I - method", *European Business Review*, **28**(1), pp.63-76.
- [41] J.F. Hair, G.T.M. Hult, C.M. Ringle, M. Sarstedt (2021), *A Primer on Partial Least Squares Structural Equation Modelling (PLS-SEM)*, SAGE Publications, 384pp.
- [42] A. Diamantopoulos, N. Kakkos (2007), "Managerial assessments of export performance: Conceptual framework and empirical illustration", *Journal of International Marketing*, **15**(3), pp.1-31.
- [43] L.T. Hu, P.M. Bentler (1999), "Cut off criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives", *Structural Equation Modelling: A Multidisciplinary Journal*, **6**(1), pp.1-55.