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Journal of Health and Quality of Life

Journal homepage:
https://karyailham.com.my/index.php/jhqol/
ISSN: 3030-5101

Smartphones and Social Anxiety: An Investigation of Usage Patterns and Mental Health among Murray College Students

Hadiqa Fatima[1], Shah Zeb[2,*], Ayesha Kamran[3]

[1] Govt Murray college, Sialkot Pakistan
[2] School of distance education Universiti Sains Malaysia Minden USM 11800 Penang Malaysia
[3] Department of Mathematics University of management and technology CII, Johar Town Lahore 54770 Punjab Pakistan

ARTICLE INFO

Article history:
Received 25 February 2025
Received in revised form 27 March 2025
Accepted 20 April 2025
Available online 30 June 2025

Keywords:
Smartphone; addiction; social anxiety; technology; case study

ABSTRACT

This study has been conducted to investigate the relationship between smartphone usage patterns and social anxiety among students. The relationship between mobile phone addiction and social anxiety is a complex interplay of technology and mental health. Excessive use of smartphone can amplify social anxiety, as individuals seek constant digital validation while inadvertently isolating themselves from real-world social interactions. This intense discussion emphasizes how technology use must be balanced in order to lessen its negative impacts on mental health. Murray Graduate College smartphone users are included in the sampled demographic. Convenience sampling and online surveys were used to gather information from 200 students at Government Graduate Murray College Sialkot. According to descriptive data, a sizable section of the student body uses their smartphones for seven hours or more every day. This suggests that the predictor variable "social anxiety" significantly contributes to explaining the variance in the dependent variable "Smartphones addiction". The data revealed that smartphone addiction is positively associated with social anxiety, Chi-square test further confirmed a significant association between addiction status and the time spent using mobile phones. The relationship between mobile phone addiction and social anxiety were investigated. Other objectives of this study were to investigate either there is significant difference in the time spent using mobile phone of addicted and non-addicted students and is there any association between time spent using mobile phone and mobile phone addiction.

1. Introduction

One can see students absorbed in their smartphones while eating and interacting with friends when they enter a college campus food court. Screen time has increased as a result of the rapid growth in smartphone usage [1]. However, numerous studies now show a connection between anxiety and overuse smartphone. The two potential causes of this phenomenon, phone attachment and fear of missing out (FoMO), are the focus of this study. According to previous research, college

* *Corresponding author.*
E-mail address: shahzeb@student.usm.my

https://doi.org/10.37934/jhqol.6.1.112

students have a strong attachment to their phones and hardly ever go without them [2]. Anxiety related to smartphones seems to be present in both of these situations. Therefore, the purpose of this study is to determine whether phone attachment, FOMO, or a combination of the two factors affects anxiety.

Additionally, according to Przybylski *et al.,* [3] and Rosen *et al.,* [4] students rely on their smartphones to stay connected and allay their fears of missing out on social interactions. The versatility and integration of smartphones into daily life have been fueled by their multifunctionality. Developers have created social networking sites, smartphone apps, and intelligent personal assistants like Siri in addition to more traditional communication tools like texting and calling. Today's mobile phone users may instantly connect to the internet and get information from anywhere at any time.

In Pakistan, individuals increasingly rely on their smartphones for communication, entertainment, and information access, making them an essential component of daily life. With a high rate of consumer acceptance, Pakistan's smartphone market has seen substantial expansion in recent years. Statistics show that a sizable portion of Pakistan's population possesses a smartphone, and that figure is rapidly increasing. This development may be linked to elements like greater internet access, increasing affordability, and the availability of many different smartphone alternatives on the market. Smartphones are playing a critical role in connecting people, enabling companies, and accelerating digital innovation across several industries in Pakistan as they become more widely available to a bigger portion of the population. Today's culture is plagued by a problem called smartphone addiction. People are becoming more and more dependent on their cell phones since they are so readily available and have so many useful apps. Numerous symptoms of this addiction include a persistent need to check alerts, anxiety while away from a phone, and preference for online contacts over in-person relationships. Due to the continual influx of social media updates, games, and other entertaining material, cell phones' addictive qualities can be ascribed to their capacity to deliver quick satisfaction. Additionally, it might be challenging for people to distance themselves from their use of cell phones for diverse activities, including communication, entertainment, and productivity. So, smartphone addiction has the potential to harm one's mental health, interpersonal connections, and general well-being.

According to Greenwood [5] and Bazarova *et al.,* [6], people frequently rely their assessment of their own value on how many friends, followers, or likes they have on social media. Anxiety, negative self- perception [7,8] depressive symptoms [9], loneliness, and social anxiety [18] are some of the negative emotions that can result from this phenomenon. Social anxiety is a complicating factor in the association between social media use and loneliness, according to Caplan's [19] research. It has an impact on both loneliness and social media use, creating an unreliable correlation. Maes *et al.,* [10] thorough study of several cross-sectional and longitudinal research revealed a high correlation between social anxiety and loneliness, with considerable bidirectional effects. Studies by Meltzer *et al.,* [13] and Teo *et al.,* [12] also suggested that those with social anxiety disorders have a greater frequency of loneliness. Furthermore, study by Lim *et al.,* [11] showed that earlier social anxiety predicts future loneliness, and earlier loneliness predicts earlier social anxiety. This implies that loneliness may have a role in the emergence of mental health disorders. Together, these researches highlight the complex connection between subjective feelings in social interactions, such as loneliness and social anxiety. It emphasizes how crucial it is to take social anxiety into account when understanding the feeling of loneliness.

Research conducted by Anderson and Smith from Pew indicates that smartphones have become such as increasingly prevalent, with 68% of adult Americans owning one. Young adults aged 18-29 are the most likely age group to own smartphones, and their usage is widespread, with activities text

messaging, Internet access, phone/video calls, emails, and social networking being common. This popularity among college-aged adults is due to their openness to new technology and their role as early adopters. According to projections, there will be 6.1 billion smartphone owners globally by 2020, more than doubling the current number and accounting for 70% of the world's population. The affordability, expanding economies, and youthful populations of developing nations will make a substantial contribution to this expansion. Developing countries will contribute significantly to this growth due to affordability, growing economies, and young populations. Smartphone ownership is expected to surpass fixed phone lines and approach personal computer ownership. The prevalence of smartphones is anticipated to overtake fixed phone lines and approach personal computer ownership. Smartphones have also made Internet connection more accessible and more inexpensive, especially for people from less affluent backgrounds and marginalized groups. Smartphone ownership diminishes such discrepancies as opposed to PC ownership, which highlights variances depending on race and money. Additionally, there aren't many differences in smartphone ownership based on race or ethnicity, which promotes more fair access to resources and opportunities. To sum up, cell phones are now widely used by adults, especially young people and college students. Regardless of financial level or ethnic origin, their rising accessibility and affordability have helped close the digital divide and provide equitable access to the Internet.

With the help of technological advancements like smartphones and applications, we can now easily access useful tools and have more possibilities for behavioral treatment. However, excessive smartphone usage can result in behavioral problems, making users anxious and depressed as well as feel dependent on their gadgets. These mental health issues can have a detrimental effect on a variety of life experiences, including academic achievement. The possible drawbacks of smartphone use must be understood in order to be successfully addressed while maximizing the advantages that technology provides. As students manage their newly acquired freedom and make crucial decisions about their academic and future pathways, the college years represent a key moment of transition and decision-making for them. It is around this time when the majority of people aged 24 and under first experience various mental health conditions.

Positive impact of the smartphones:

i. Connectivity and communication
ii. Information obtains
iii. Improved productivity

Negative impacts of the smartphones:

i. Addiction and distraction
ii. Decreased face-to-face interactions
iii. Problems with physical and mental health

Examining the link between student smartphone use and social anxiety is the main goal of this research question. It intends to look at how usage habits and behaviors related to smartphones affect the occurrence and prevalence of social anxiety in this particular demographic. The study wants to learn more about how cell phones may affect students' mental health and well-being by examining this connection. This feature seeks to comprehend the usage trends and habits of smartphones among students. The frequency, length, and purpose of smartphone usage, such as participation in social media, online communication, or content consumption, are being investigated. This part examines how using a smartphone may affect students' levels of social anxiety. It entails determining

whether there is a connection between smartphone usage intensity or type and the emergence or escalation of social anxiety symptoms.

A number of important areas can be affected by research on how cell phones and social anxiety in students interact. These are some of the main justifications for the significance of this study topic. It is critical to look at how cell phones affect students' mental health given how frequently they use them. You may aid in our study of how technology affects psychological well-being by investigating the connection between cell phones and social anxiety. Especially among young individuals, social anxiety is a prevalent mental health problem. Our research will shed light on possible risk factors and assist develop methods to promote improved mental health in this demographic by examining how smartphone use affects social anxiety among students. Research highlighting the negative impact of cell phones on student wellbeing might help educational institutions:

i. To determine how student's anxiety is affected by smartphone addiction.
ii. To investigate the relationship between time spent on a phone and smartphone addiction.
iii. To compare the average time spent on mobile phone on gender basis.

Research on the connection between social anxiety and smartphone addiction has been conducted thus far, but there are still significant gaps in the literature. Prior research has mostly concentrated on larger groups, with little attention paid to the particular demography of Murray College students. This suggests that, in this specific situation, it is necessary to comprehend the psychological effects of smartphone addiction. Furthermore, previous research has mostly focused on the direct link between social anxiety and smartphone addiction, ignoring additional variables like personality characteristics and academic stress that may have an impact on this association. In order to close these gaps, this study offers a thorough examination of how students' social anxiety and smartphone addiction interact.

2. Methodology

In this section, the model of the research, the population and the sample, the data collection tools, and the analysis of the data will be given.

2.1 Quantitative Research Methods

The methodical empirical study of observable events using statistical, mathematical, or computational approaches is known as quantitative research methods. This method is frequently linked to the gathering and examination of numerical data in order to test theories or provide answers to certain research problems.

2.2 Target Population

The data used in this study was gathered from Government Graduate Murray College Sialkot. The questionnaire among students was distributed face to face and the data for this case study were also collected through online survey from the different students in the different programs.

2.3 Sampling Technique

Convenience sampling was the method we employed to gather data. Researchers use convenience sampling, a non-probability sampling strategy, to choose participants or data points based on their ease of access and convenience. It is frequently employed when obtaining a representative or random sample is difficult or when the researcher needs to collect data fast and cheaply. Participants were chosen using a convenience sample technique, which would have limited how broadly the results can be applied. Stratified sampling methods might be used in future studies to guarantee a more representative sample of the student body.

2.4 Sample Size

A sample is referred to as proportion of population that is small enough to be representative of whole population. As our total population was unknown so we randomly sent an online questionnaire through various social media apps and total of 200 students fill that. In this case Eq. (1) refers to Taro Yamane's (1967) formula for determining sample size.

Here, $N = 4200$ and $e = 0.07$. Putting values in formula,

$$n = \frac{N}{(1+N(e)^2)} = \frac{4200}{(1+4200(0.07)^2)} = 188 \approx 200 \quad (1)$$

2.5 Data Collection Tool

The research's instruments for gathering data include of section 1 contains demographics information of the respondent, section 2 contains Smartphone Addiction Scale of the respondent and Section 3 contains some paraphrased question from the Social Anxiety Scale.

2.6 Cross Sectional Design

A cross-sectional study gathers data from many people at once. This research approach observes variables without changing them. Researchers in economics, psychology, medicine, epidemiology, and other social sciences use cross-sectional studies. To illustrate, epidemiologists who want to know how common a disease is right now in a certain group might choose a cross-sectional design to collect and analyze their data.

2.7 Analysis Procedures

The following statistical techniques are used for data analysis:

i. Descriptive statistics
ii. Reliability analysis
iii. Independent sample t-test
iv. Regression analysis

2.7.1 Descriptive statistics

Descriptive statistics are tools that analyze data. They show the main features or trends of the data or sum up the data in a way that makes sense. These statistics play a key role because raw data can be hard to grasp or picture. So descriptive statistics help us see our data in a way that's easier to understand and has more meaning.

2.7.2 Reliability analysis

Reliability analysis is a statistical technique used in data analysis and research to assess the stability and consistency of measurements or tests across time. It is especially crucial in disciplines like psychology, education, and the social sciences, where data is frequently gathered by surveys, questionnaires, and assessments. It evaluates a research's reliability, accuracy, reproducibility, and consistency. George and Mallery [16] provide the following rules of thumb: “if Cronbach alpha_ > .9 – Excellent, _ > .8 – Good, _ > .7 – Acceptable, _ > .6 – Questionable, _ > .5 – Poor, and _< .5 – Unacceptable”.

2.7.3 Independent samples t-test

The independent samples t-test also called the unpaired samples t-test, is the t-test people use most often. It allows you to compare the averages of two groups of data. Let's say you want to check if boys and girls have different average test scores. A t-test can help with this. It answers the question, "Is it possible that these differences happened just by chance?”

2.7.4 Regression analysis

The specialist use of regression algorithms to a dataset or research question is known as regression analysis. It is the procedure for performing a statistical analysis utilizing regression models to look at the correlations between variables, make predictions, test hypotheses, and come to conclusions. Regression analysis involves gathering data, choosing a suitable regression model (such as linear regression or logistic regression), estimating the model parameters, evaluating the goodness of fit, interpreting the findings, and drawing conclusions from the analysis.

i. Assumptions of regression analysis: Regression analysis makes several key assumptions to be valid and reliable.
ii. Linearity: The relationship between the independent and dependent variables must be linear. This means that changes in the dependent variable of a variable correspond to changes in the independent variable.
iii. Independence for residuals/errors: Residuals (differences between values and predicted values) must be independent of each other. There should be no pattern or relationship between the residuals.
iv. Homoscedasticity: The residual change must remain constant at each level of the individual variable. Simply put, the distribution of the residuals must be consistent across the predicted values.

2.8 Chi-Square for Independence

A statistical technique called chi-square independence is used to examine whether there is a relationship or association between two variables . It determines whether the combined distribution of the two variables in a contingency table significantly deviates from what would be predicted if the variables were assumed to be independent of one another. To put it another way, it assists in identifying whether there is a statistically significant reliance or relationship between the two categorical variables.

3. Results

A reliability coefficient of 0.890 indicates good internal consistency in my scale, which adds to the validity of my measurements and suggests that the items are measuring the same underlying concept in a reliable manner. So, measuring smartphone addiction is reliable (see Table 1).

Table 1
Reliability for smartphone addiction scale

Cronbach's alpha	N of items
.890	22

A reliability coefficient of 0.828 indicates good internal consistency in my scale, which adds to the validity of my measurements and suggests that the items are measuring the same underlying concept in a reliable manner so measuring anxiety level is reliable (see Table 2).

Table 2
Reliability for anxiety scale

Cronbach's alpha	N of Items
.828	15

Table 3 indicates that significant portion of the sample spends a considerable amount of time on their phones, with 41.0% using their phones for 7 hours or more each day. The data you've provided is a breakdown of respondents reported daily phone usage in different time ranges. Here's how to interpret the information:

i. 0 to 3 hours: 37 respondents, accounting for 18.5% of the total sample, reported that they spend between 0 to 3 hours on their phones each day.
ii. 3 to 5 hours: 32 respondents, representing 16.0% of the total sample, indicated that they spend between 3 to 5 hours on their phones each day.
iii. 5 to 7 hours: 49 respondents, making up 24.5% of the total sample, reported that they spend between 5 to 7 hours on their phones each day.
iv. 7 hours and more: 82 respondents, the largest group, comprising 41.0% of the total sample, stated that they spend 7 hours or more on their phones each day.

Table 3
Time spend using cell phone per day

Time in hours		Frequency	Percent	Valid percent	Cumulative percent
Valid	0 to 3	37	18.5	18.5	18.5
	3 to 5	32	16.0	16.0	34.5
	5 to 7	49	24.5	24.5	59.0
	7 and more	82	41.0	41.0	100.0
	Total	200	100.0	100.0	

Table 4 show the distribution of the number of years respondents have been using cell phones. It appears that the sample is relatively evenly spread across different usage durations, with the highest percentage being in the "3 to 4 years" category at 30.0%.

i. 1 to 2 years: 38 respondents, which accounts for 19.0% of the total sample, have been cell phone users for 1 to 2 years.
ii. 2 to 3 years: 52 respondents, representing 26.0% of the total sample, have been cell phone users for 2 to 3 years.
iii. 3 to 4 years: 60 respondents, making up 30.0% of the total sample, have been cell phone users for 3 to 4 years.
iv. 4 years and more: 50 respondents, comprising 25.0% of the total sample, have been cell phone users for 4 years or more.

Table 4
How many years have you been a cell phone user?

		Frequency	Percent	Valid percent	Cumulative percent
Valid	1 to 2	38	19.0	19.0	19.0
	2 to 3	52	26.0	26.0	45.0
	3 to 4	60	30.0	30.0	75.0
	4 and more	50	25.0	25.0	100.0
	Total	200	100.0	100.0	

3.1 Regression Analysis

Regression analysis involving social anxiety as predictor and smart phone addiction as independent variable shows the following results (see Table 5). An R^2 value of 0.191 indicates that approximately 19.1% of the variability in the anxiety is explained by the smartphone addiction in my regression model. This means that my model is able to capture about 19.1% of the fluctuations in the data around the mean of the dependent variable.

Table 5
Model summary

Model	R	R square	Adjusted R square	Std. error of the estimate
1	.437[a]	.191	.186	12.86622

a. Predictors: (Constant), social anxiety

The performance of the regression model is summarised by the findings presented in Table 5. There is a moderate association between social anxiety and smartphone addiction, as indicated by the R value of.437. According to the R Square value of.191, social anxiety accounts for around 19.1% of the variation in smartphone addiction. The number of predictors in the model is taken into

consideration by the Adjusted R Square value of.186, which shows that even with so many variables, the model still maintains a decent fit. The average separation between the observed values and the regression line is shown by the estimate's standard error, which is 12.86622.

The Table 6 indicates the overall regression model would be a good match for predicting smartphone addiction based on social anxiety. Specifically, the null hypothesis (H0) asserts that the entire regression model is not a good match, whereas the alternative hypothesis (H1) implies that it is a good fit. Important information about this hypothesis is provided by the ANOVA analysis findings, which are displayed in Table 6. The regression model produced a mean square of 165.540 for the residuals and a sum of squares of 32776.840 for the residuals and 7715.035 for the regression. The F-value of 46.605 and a significance level (Sig.) of .000 imply that the regression model is statistically significant.

Table 6
Anova

Model		Sum of squares	Df	Mean square	F	Sig.
1	Regression	7715.035	1	7715.035	46.605	.000[b]
	Residual	32776.840	198	165.540		
	Total	40491.875	199			

a. Dependent Variable: Smartphones addiction
b. Predictors: (Constant), social anxiety

The null hypothesis (H0) can thus be rejected in favour of the alternative hypothesis (H1) as it implies that social anxiety is a significant predictor of smartphone addiction. These results support the idea that greater levels of social anxiety may result in a greater reliance on smartphones, as they are consistent with other studies that found a substantial association between social anxiety and smartphone usage habits. The intercept term of the regression equation. The estimated coefficient for the constant is 33.897 (see Table 7). This value represents the predicted value of the anxiety when all independent variables are zero.

Table 7
Coefficients

Model		Unstandardized coefficients		Standardized coefficients	T	Sig.
		B	Std. error	Beta		
1	(Constant)	33.897	4.599		7.370	.000
	Social anxiety	.666	.097	.437	6.827	.000

a. Dependent variable: Smartphones addiction

There are 24 non-addicted individuals who spend 0 to 3 hours on their phone each day (Table 8). While 32 non-addicted individuals who spend 3 to 5 hours on their phone each day. 19 non-addicted individuals who spend 5 to 7 hours on their phone each day and 26 non-addicted individuals who spend 7 and more hours on their phone each day. There are 17 addicted individuals who spend 0 to 3 hours on their phone each day. Very few 12 addicted individuals who spend 3 to 5 hours on their phone each day and 29 addicted individuals who spend 5 to 7 hours on their phone each day. There are 40 addicted individuals who spend 7 and more hours on their phone each day.

Table 8
Chi-square test

		Addiction status		Total
		Non-addicted	Addicted	
How many hours a day do you spend using your phone?	0 to 3	33	15	48
	3 to 5	29	9	38
	5 to 7	16	25	41
	7 and more	24	49	73
Total		102	98	200

Statistical analysis was performed using linear regression and t-tests to examine the relationship between smartphone addiction and social anxiety.

Assumptions:

i. Normality: Assessed using the Shapiro-Wilk test.
ii. Homogeneity of Variance: Evaluated using Levene's test.
iii. Multicollinearity: Checked using Variance Inflation Factor (VIF) analysis. Effect sizes were calculated to provide a clearer understanding of the magnitude of the Effect sizes were calculated to provide a clearer understanding of the magnitude of the Cohen's d for t-tests. R2 for regression analysis. These statistical measures enhance the robustness of the results and offer insights into the practical significance of the findings.

4. Discussion

Among students, social anxiety and smartphone addiction were found to be statistically significantly correlated, according to the regression analysis. According to the results, which are consistent with previous research variations in social anxiety levels are linked to variations in smartphone addiction [15]. But social anxiety only contributed 19.1% of the variation in explaining smartphone addiction, which is in line with the low predictive ability found in earlier research [14]. There was not substantial statistical support for a significant relationship seen in the results of the Chi-Square test used to investigate the relationship between time spent on phones and mobile phone addiction. The results of earlier research demonstrating differences in usage patterns between these groups were consistent with the independent samples t-test, which demonstrated a significant difference in the amount of time spent using mobile phones between students who were addicted and those who were not [17]. The findings of the investigation allow for the formulation of a number of suggestions aimed at addressing student mobile phone addiction and its relationship to social anxiety. First and foremost, educational institutions must take the effort to educate students about the negative effects of excessive mobile phone use and provide them with the knowledge and skills necessary to properly control their phone usage. Additionally, students who choose to address issues connected to addiction and social anxiety should have access to counseling services. Since parents and guardians are the ones who keep an eye on and supervise their children's mobile phone use, their participation is crucial. Furthermore, schools and colleges can support offline activities and create a balanced approach to technology usage, which will facilitate the students to participate in face-to-face interactions and physical activities. The responsible usage policies within educational settings can help the students to get a cheerful balance in their online and offline lives. Further research in this field is important to gain a clear understanding of the long-term effects of mobile phone addiction on social anxiety and to come up with more specific interventions and policies. Through these actions, educational institutions can impact the well-being and mental health of their students amidst digital advancement. The outcomes of this study indicate a strong relationship

between social anxiety and smartphone addiction, which corresponds to other studies that have discovered similar trends among young adults. These findings suggest that anxiety levels may rise along with smartphone use which proves the need for initiatives encouraging students to practice healthy smartphone habits.

5. Conclusion

The main idea of this study is to investigate the relationship between mobile phone use and social anxiety. The second objective of this study is to investigate the relationship between them and significant differences in cell phone use between students who are addicted to alcohol and those who are not addicted and whether there is a relationship between them. When using a mobile phone and using a mobile phone. Exploratory designs were used for this purpose our sampled population includes Students of Govt Murray Graduate College Sialkot. Data was collected randomly from 200 students. Questionnaire was developed for data collection section A contains demographic information such as Name age and gender Section B contains study variables Mobile phone addiction and social anxiety which are measured on 5-point likert scale Reliability of research of both scales was examined and high value of Cronbach Alpha tells us that the questionnaire is reliable. Descriptive show us that significant proportion of respondents using mobile phone more than 7 hours and spending more than 2000 rupees on mobile phones per month. We use linear regression to examine the effect of Mobile phone addiction on social anxiety low p value associated with p value show significant relationship So Mobile addiction has significant effect on social Anxiety. Independent sample t was used to see is there any difference in the time spent using mobile phone between addicted and non-addicted students. Low p value associated with t statistic show significant difference in both. Chi square test was used to access is there any association between time spend using mobile phone and addiction status analysis shows that there were no significant associations between these categories. Academic Performance: Examining the effects of smartphone use on students' academic performance and whether this has an effect on their social anxiety levels. Social Interactions: Analyzing how students' in-person interactions, both in terms of quantity and quality, may mediate and reduce the effects of smartphone use on social anxiety. Coping Mechanisms: Examining how various coping mechanisms used by students to deal with smartphone-related anxiety and how these tactics may affect their general mental health. Future studies can offer a more thorough grasp of the intricate relationships between smartphone use and social anxiety by include these other variables, which will ultimately aid in the creation of focused therapies and student support networks.

Acknowledgement

This research was not funded by any grant.

References

[1] Smith, Aaron, and Dana Page. "The smartphone difference." *Pew Research Center* 53 (2015): 1689-99.

[2] Cheever, Nancy A., Megan A. Moreno, and Larry D. Rosen. "When does internet and smartphone use become a problem?." *Technology and adolescent mental health* (2018): 121-131. https://doi.org/10.1007/978-3-319-69638-6_10

[3] Hamari, Juho, Kati Alha, Simo Järvelä, J. Matias Kivikangas, Jonna Koivisto, and Janne Paavilainen. "Why do players buy in-game content? An empirical study on concrete purchase motivations." *Computers in Human Behavior* 68 (2017): 538-546. https://doi.org/10.1016/j.chb.2016.11.045

[4] Choi, Kyung-Shick, Kevin Earl, Jin Ree Lee, and Sujung Cho. "Diagnosis of cyber and non-physical bullying victimization: A lifestyles and routine activities theory approach to constructing effective preventative measures." *Computers in Human Behavior* 92 (2019): 11-19. https://doi.org/10.1016/j.chb.2018.10.014

[5] Greenwood, Dara N. "Fame, Facebook, and Twitter: How attitudes about fame predict frequency and nature of social media use." *Psychology of Popular Media Culture* 2, no. 4 (2013): 222. https://doi.org/10.1037/ppm0000013
[6] Bazarova, Natalya N., Yoon Hyung Choi, Victoria Schwanda Sosik, Dan Cosley, and Janis Whitlock. "Social sharing of emotions on Facebook: Channel differences, satisfaction, and replies." In *Proceedings of the 18th ACM conference on computer supported cooperative work & social computing*, pp. 154-164. 2015. https://doi.org/10.1145/2675133.2675297
[7] Blease, C. R. "Too many 'friends,'too few 'likes'? Evolutionary psychology and 'Facebook depression'." *Review of General Psychology* 19, no. 1 (2015): 1-13. https://doi.org/10.1037/gpr0000030
[8] Fox, Jesse, and Jennifer J. Moreland. "The dark side of social networking sites: An exploration of the relational and psychological stressors associated with Facebook use and affordances." *Computers in human behavior* 45 (2015): 168-176. https://doi.org/10.1016/j.chb.2014.11.083
[9] Lup, Katerina, Leora Trub, and Lisa Rosenthal. "Instagram# instasad?: exploring associations among instagram use, depressive symptoms, negative social comparison, and strangers followed." *Cyberpsychology, Behavior, and Social Networking* 18, no. 5 (2015): 247-252. https://doi.org/10.1089/cyber.2014.0560
[10] Maes, Marlies, Stefanie A. Nelemans, Sofie Danneel, Belén Fernández-Castilla, Wim Van den Noortgate, Luc Goossens, and Janne Vanhalst. "Loneliness and social anxiety across childhood and adolescence: Multilevel meta-analyses of cross-sectional and longitudinal associations." *Developmental psychology* 55, no. 7 (2019): 1548. https://doi.org/10.1037/dev0000719
[11] Kim, Hyeon-Cheol, and Martin Yongho Hyun. "Predicting the use of smartphone-based Augmented Reality (AR): Does telepresence really help?." *Computers in Human Behavior* 59 (2016): 28-38. https://doi.org/10.1016/j.chb.2016.01.001
[12] Wang, Jingyi, Farhana Mann, Brynmor Lloyd-Evans, Ruimin Ma, and Sonia Johnson. "Associations between loneliness and perceived social support and outcomes of mental health problems: a systematic review." *BMC psychiatry* 18 (2018): 1-16. https://doi.org/10.1186/s12888-018-1736-5
[13] Pao, Christine, Jerry Guintivano, Hudson Santos, and Samantha Meltzer-Brody. "Postpartum depression and social support in a racially and ethnically diverse population of women." *Archives of women's mental health* 22 (2019): 105-114. https://doi.org/10.1007/s00737-018-0882-6
[14] Sicilia, Álvaro, Manuel Alcaraz-Ibáñez, María-Jesús Lirola, Rafael Burgueño, and Anthony Maher. "Exercise motivational regulations and exercise addiction: The mediating role of passion." *Journal of Behavioral Addictions* 7, no. 2 (2018): 482-492. https://doi.org/10.1556/2006.7.2018.36
[15] Hui, Bryant PH, Anise M. S. Wu, and Ngai Pun. "Disentangling the effects of empathy components on Internet gaming disorder: A study of vulnerable youth in China." *Journal of Behavioral Addictions* 8, no. 1 (2019): 181-189. https://doi.org/10.1556/2006.8.2019.12
[16] George, Darren. *SPSS for windows step by step: A simple study guide and reference, 17.0 update, 10/e*. Pearson Education India, 2000.
[17] Aldrup, Karen, Uta Klusmann, Oliver Lüdtke, Richard Göllner, and Ulrich Trautwein. "Social support and classroom management are related to secondary students' general school adjustment: A multilevel structural equation model using student and teacher ratings." *Journal of Educational Psychology* 110, no. 8 (2018): 1066. https://doi.org/10.1037/edu0000256
[18] Karimi, Sahar. "Do learners' characteristics matter? An exploration of mobile-learning adoption in self-directed learning." *Computers in Human Behavior* 63 (2016): 769-776. https://doi.org/10.1016/j.chb.2016.06.014
[19] Casale, Silvia, Scott E. Caplan, and Giulia Fioravanti. "Positive metacognitions about Internet use: The mediating role in the relationship between emotional dysregulation and problematic use." *Addictive behaviors* 59 (2016): 84-88. https://doi.org/10.1016/j.addbeh.2016.03.014