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Relationships of Problematic Internet Use, Online Gaming, and Online Gambling with Depression and Quality of Life Among College Students

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Abstract

Young adults on college campuses have easy access to information and communications technology (ICT) which they use extensively for study, work, and leisure. The purpose of this study was to investigate the prevalence and extent of problematic Internet use, online gaming behavior, and online gambling behavior (together referred to as dysfunctional online behaviors), and their relationships with depression and quality of life among college students. Two hundred and twenty two valid surveys were used in the data analyses. Five instruments, Beck Depression Inventory-II (BDI-II), the WHO Quality of Life Scale-BREF (WHOQOL-BREF), the Internet Addiction Test (IAT), the Problematic Online Gaming Questionnaire (POGQ), and the Online Gambling Symptom Assessment Scale (OGSAS), were selected to measure the variables being studied. A non-experimental research design was employed to answer one descriptive and two research questions. The results of the analyses indicated that dysfunctional online behaviors predicted a higher level of depression ($R^2 = .14, p < .05$) and a lower level of quality of life ($R^2 = .20, p < .05$). The findings of the current study inform clinical practice and the treatment of dysfunctional online behaviors among college students.

Key words: Problematic Internet use, Online gaming, Online gambling, Depression, Quality of life

Introduction

In today's world, the Internet has become ubiquitous. Eighty-nine percent of adults in the USA use the Internet, and in the 18-29 years age bracket, 98% use the Internet (Pew Research Center, 2018a). Among this group of younger adults in the USA (18-29 years), 39% report being online all the time and 49% report accessing the Internet several times per day (Pew Research Center, 2018b). Young adults connect to the Internet for varied and various purposes, such as education, communication, information gathering, and leisure such as gaming, gambling, and social media that have both positive and negative effects on people. The purpose of this study was to explore the prevalence and extent of problematic Internet use, online gaming behavior, and online gambling behavior, and their relationships with depression and quality of life among college students. The combination of problematic Internet use, online gaming behavior, and online gambling behavior (independent variables of the study) has not been examined in previous studies in the field of counseling. Therefore, this study is unique in the counseling research field.

Internet Use

Since the millennium, a considerable number of researchers have studied the role and effects of Internet use. In the last decade, the pervasive and unlimited use of the Internet for work, study, and leisure on college campuses has been researched. On a positive note, Cotten (2008) reported that Internet access helps college students make an easier transition to higher education by improving communication, lessening ambiguity, and promoting online connection (p. 67). Kang (2007), and Shaw and Gant (2002), suggested that moderate Internet use and online communication may decrease depression and loneliness, and could increase feelings of happiness, self-esteem, and social support. Amichai-Hamburger and Furnham (2007) lent further support to this notion with findings indicating that when the Internet is used appropriately, it might improve the user's psychological well-being and quality of life. Romer, Bagdasarov, and More (2013) noted that moderate Internet use may positively affect participation in social activities through teams or clubs in a diverse range of interest areas

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Identifying what constitutes moderate or excessive use of the Internet is challenging. A decade ago, overuse of the Internet was defined as going online for more than 20 hours a week (Ko, Yen, Yen, Lin, & Yang, 2007), and more recently, as using the Internet more than 2 hours a day every day (Cassidy-Bushrow, Johnson, Peters, Burmeister, & Joseph, 2015). However, as reported by The Pew Research Center, 39% of users between the age of 18-29 are online constantly, and 49% are online several times a day (Pew Research Center, 2018b). Young, Yue, and Ying (2011) cautioned that heavy Internet usage may be linked to mental health issues such as depression and loneliness, and could have a negative impact on the user's quality of life.

Problematic Internet Use

Because the DSM-5 has no official diagnosis for problematic Internet use or Internet addiction, researchers use different terms in the literature, referring to problematic Internet use (Caplan, 2002; Young, 1998), Internet addiction (Young, 1998), and pathological Internet use (Davis, 2001; Young, 1998). Despite there being no official diagnosis for Internet addiction, instruments have been developed to identify Internet addiction and problematic Internet use. The DSM-5 suggests that the amount of Internet usage should be taken into consideration, but does not identify excessive usage as a diagnostic anomaly (American Psychiatric Association [APA], 2013). However, the International Classification of Diseases (ICD) has added gaming disorder (predominantly online) and gambling disorder (predominantly online) as addictive behaviors in the 11th revision of the ICD (International Classification of Diseases, 2018).

Negative Outcomes of Problematic Internet Use

A considerable body of research has been conducted regarding the relationship between problematic Internet use and mental health. Despite the advantages of Internet usage in our daily lives, it might be related to negative consequences depending on the extent and purpose of usage. South Korean researchers reported that an Internet dependent group displayed higher levels of "depression, loneliness, and compulsiveness" compared to people who were not dependent on the Internet (Whang, Lee, & Chang, 2003, p. 148). Ceyhan and Ceyhan (2008) reported that depression, loneliness, and computer self-efficacy are linked to increases in problematic Internet use (p. 700). Additional studies have detailed the relationships between types of online usage and mental health, such as social network usage and loneliness (Amichai-Hamburger & Ben-Artzi, 2003), and chatting and unhappiness (Kang, 2007).

Online Gaming

Online games are increasingly popular with children, adolescents, and young adults, and are often used for stress relief. People with high levels of stress may play online games excessively in order to escape from offline problems (Kraut et al., 2002; Snodgrass et al., 2014). When people engage in problematic online gaming, their engagement in daily life activities, such as work, school, social life, family life, and their general daily functioning may suffer (van Rooij, 2011). Problematic online gamers may try to fulfill needs that they believe are unattained in the offline world (Khan & Muqtadir, 2014). Given the increasing prevalence of online gaming and the associated problems, problematic online gaming was proposed for inclusion in the DSM-5, Section III as "Internet Gaming Disorder", with the intention of identifying it as a condition requiring further study (APA, 2013, p. 795). Gaming disorder is included in the 11th revision of the ICD (see 6C51.0 Gaming disorder, predominantly online, International Classification of Diseases, 2018).

Online Gambling

Online gambling is simply defined by Business Insights (2010) as an entertainment in the virtual world by placing, receiving, or transmitting a bet. It has increased in the past decade (Matthews, Farnsworth, & Griffiths, 2009), and in the USA, it is legal to gamble online in some states including Delaware, Nevada, New Jersey, and Pennsylvania (PlayUSA, n.d.). Petry and Gonzalez-Ibanez (2015) have indicated that online gambling is popular among college students and is associated with problematic gambling. Griffiths, Parke, Wood, and Rigbye (2010) noted that online poker is becoming an alternative to traditional poker and is one of the fastest growing types of online gambling. In Griffiths et al.'s (2010) study on problematic gambling behavior among university students, the researchers reported that online gamblers, who played regularly and for a long time, did not adhere to a budget and misreported their biological sex while gambling online. Griffiths et al.'s report showed these behaviors were predictive of problematic gambling. Matthews et al. (2009) found approximately one in five online gamblers (19%) in their study met the criteria for a pathological gambler using the South Oaks Gambling Screen (SOGS) (Lesieur & Blume, 1987). Owing to study results and symptoms of people who suffer from gambling problem, the DSM-5 recognizes problematic offline gambling behavior as "Gambling

Disorder” (APA, 2013, p. 585) and online gambling disorder is included in the 11th revision of the ICD (see 6C50.1 Gambling disorder, predominantly online, International Classification of Diseases, 2018).

Methodology

Grounded in prior research, the following variables were identified in the current study: problematic Internet use (Lee, 2009; Widyanto & McMurrin, 2004; Young, 1998); online gaming behavior (Demetrovics et al., 2012; Linderoth & Ohrn, 2014; Papay et al., 2013); online gambling behavior (Hornle & Zammit, 2010; Kim, Grant, Potenza, Blanco, & Hollander, 2009); depression (Beck, Steer, Ball, et al., 1996; Brown & Bobkowsky, 2011; Harrison & Hefner, 2008); and quality of life (Berlim, Pavanello, Caldieraro, & Fleck, 2005; Castro, Driusso, & Oishi, 2014; Krageloh et al., 2013). The independent variables of this study are problematic Internet use, online gaming behavior, and online gambling behavior; the dependent variables are depression and quality of life. This study was approved by the Social/Behavioral Institutional Review Board committee of Ohio University (IRB#: 16-X-193).

Research Questions

Researchers in the current study aimed to answer one descriptive and two research questions:

Descriptive Question: What is the prevalence of problematic Internet use, online gaming, and online gambling among college students?

Research Question 1: Is there a relationship between depression and the linear combination of problematic Internet use, online gaming, and online gambling among college students?

Research Question 2: Is there a relationship between quality of life and linear combination of problematic Internet use, online gaming, and online gambling among college students?

Research design

This study utilized a quantitative non-experimental and cross-sectional research design, measuring the variables a single point in time, without repeated measures (Cohen, Manion, & Morrison, 2007). A web-based survey was created via Qualtrics and the link was emailed to students by the university’s Office of Information Technology. Data were obtained through the survey completed by students who volunteered to participate in the study.

Instrumentation

The instruments used in this study are listed below:

Demographic Questionnaire: Through the demographic questionnaire information on participants’ age, gender, race/ethnicity, grade level, GPA, residential status, participation in clubs, employment status, and average weekly Internet usage time were collected.

The Beck Depression Inventory-II: BDI-II is a 21-item multiple-choice self-report inventory designed to measure the severity of depression (Beck, Steer, & Brown, 1996).

The World Health Organization Quality of Life Questionnaire-BREF: WHOQOL-BREF is a 26-item questionnaire designed to measure an individual’s quality of life (The WHOQOL Group, 1998).

The Internet Addiction Test: IAT is a 20-item Likert scale instrument designed to measure Internet addiction (Young, 1998).

The Problematic Online Gaming Questionnaire: POGQ is an 18-item questionnaire designed to measure problematic and non-problematic online gaming behavior (Demetrovics et al., 2012).

The Online Gambling Symptom Assessment Scale: OGSAS is a 12-item scale designed to measure the severity of gambling behavior (Kim et al., 2009). It has been modified by Kalkan and Griffiths (2018) with the permission of Kim et al. (2009) to measure the severity of online gambling behavior.

Reliability and Validity

Beck, Steer, Ball, et al. (1996) reported that the BDI-II has acceptable reliability and validity, test-retest reliability was $r = .93, p < .001$ ” (p. 590), the Cronbach’s alpha reliability coefficient was $\alpha = .92$ (Beck, Steer, Ball, et al., 1996; Pearson Clinical, n.d., para. 5). In a New Zealand sample, Krageloh et al. (2013) found that the WHOQOL-BREF Cronbach’s alpha reliability coefficient for the total score was $\alpha = .91$. Moreover, in a Brazilian sample, Castro et al. (2014) found the Cronbach’s alpha reliability coefficients were $\alpha = .83$ for the WHOQOL-BREF total score. Frangos, Frangos, and Sotiropoulos’s (2012) meta-analysis indicated the overall Cronbach’s alpha reliability coefficients computed from studies using the IAT was $\alpha = .88$. Papay et al. (2013)

found the POGQ Cronbach's alpha reliability coefficient for the test was $\alpha = .91$. Kiraly et al. (2014) also found that the POGQ Cronbach's alpha internal reliability coefficient for the test was $\alpha = .93$. Kalkan and Griffiths (2018) showed that the OGSAS had a high level of reliability. The Cronbach's alpha reliability coefficient of the OGSAS was 0.83.

In the current study, reliability analyses of the instruments showed that the instruments had a high level of reliability. Cronbach's alpha reliability coefficient for IAT was .90, POGQ was .95, OGSAS was .73, BDI-II was .92, and WHOQOL was .92.

Sample

The random sampling method was used in selecting participants. The sample comprised undergraduate and graduate students at a large public Midwestern university in the USA. The total sample size of 112 needed for the study was determined by using the Precision Efficacy Analysis for Regression (PEAR) method (Brooks & Barcikowski, 2012). In order to arrive at sample size, an estimated p^2 .25 value was set at an alpha level of .05. The selected level of cross-validity shrinkage was limited to .20 with three predictors.

Results

Description of the Sample

After screening the data for invalid or missing data, 222 valid surveys were used in data analyses. Of the final sample of 222 participants, the mean age was 25.04 years, with a range between 18 and 69, and a standard deviation of 7.07 years. Eighty-seven of the participants were male (39.2%) and 135 of the participants were female (60.8%). One hundred sixty six participants identified themselves as White, nine identified as African-American, one identified as American Indian or Alaska Native, three identified as Hispanic, Latino, or Spanish origin, 14 identified as Asian-American, and 28 identified as other, such as Asian, Middle-Eastern, Black, and Multiple-Race. One person did not indicate his/her racial-ethnic identity. The sample included 18 freshmen, 33 sophomores, 33 juniors, 50 seniors, 40 master's, and 48 doctoral students. Of these participants, 195 students were enrolled full-time, 24 were part-time, and three students did not indicate their enrollment status. The mean GPA of the students was 3.40, with a range between 1.80 and 4.00 with a standard deviation of .53. Forty-one students resided on-campus and 181 students resided off-campus. Ninety-one students indicated that they participated in clubs and activities, 131 students indicated that they did not participate in clubs and activities. One hundred forty-three students were employed and 79 were not employed. Participants ranked the technology tools they use the most as mobile phone ($n = 107$), laptop computer ($n = 99$), tablet ($n = 79$), and desktop computer ($n = 69$).

Hours Online

Within the past six months, 15 students indicated that they spent 1-10 hours per week online, 66 students indicated that they spent 11-20 hours per week online, 61 students indicated that they spent 21-30 hours per week online, 40 students indicated that they spent 31-40 hours per week online, and 40 students indicated that they spent 40 or more hours per week online.

Descriptive Statistics of Study Variables

Descriptive statistics are presented in Table 1. Minimum and maximum scores for the IAT were 0 and 5; POGQ 1 and 5; OGSAS 0 and 4; BDI-II 0 and 3, where higher score was indicative of concern; and the WHOQOL 1 and 5, where lower scores were of concern.

Table 1. Descriptive Statistics of Study Variables

Variables	n	M	SD	Range		skew
				min	max	
IAT	222	1.48	.62	.15	3.60	.41
POGQ	222	1.55	.65	1.00	3.66	1.01
OGSAS	222	.09	.21	.00	1.66	3.48
BDI-II	222	.51	.49	.00	2.38	1.31
WHOQOL	222	3.77	.57	2.15	5.00	-.38

Note. IAT = Internet Addiction Test; POGQ = Problematic Online Gaming Questionnaire; OGSAS = Online Gambling Symptom Assessment Scale; BDI-II = Beck Depression Inventory-II; WHOQOL = World Health Organization Quality of Life Questionnaire–BREF.

The correlation statistics are presented in Table 2. Results show that there was a nonsignificant correlation between OGSAS and BDI-II ($r = .07, p > .05$). All other pairs of variables were significantly correlated with each other.

Table 2. Correlations of Study Variables

	IAT	POGQ	OGSAS	BDI-II	WHOQOL
1 IAT	-				
2 POGQ	.51**	-			
3 OGSAS	.18**	.25**	-		
4 BDI-II	.37**	.14*	.07	-	
5 WHOQOL	-.44**	-.17**	-.13*	-.74**	-

Note. * $p < .05$ (2-tailed) ** $p < .01$ (2-tailed); IAT = Internet Addiction Test; POGQ = Problematic Online Gaming Questionnaire; OGSAS = Online Gambling Symptom Assessment Scale; BDI-II = Beck Depression Inventory–II; WHOQOL = World Health Organization Quality of Life Questionnaire–BREF.

Research Question 1

Hierarchical multiple linear regression analysis was used to test the hypothesis that there is a relationship between scores on the BDI-II and IAT, POGQ, and OGSAS. The result of the regression analyses indicated that the first model was statistically significant and explained 14% of the variance in depression, $R^2 = .14, p < .05$. It was found that IAT significantly predicted depression in the baseline model, $\beta = .374, p < .05$. The other R^2 changes related to online gaming and online gambling were nonsignificant (see Table 3).

Table 3. Regression Analyses in Predicting Depression from IAT, POGQ, and OGSAS

Model	R	R ²	Adjusted R ²	Std. Error of the Estimate	Change Statistics				
					R ² Change	F Change	df1	df2	Sig. F Change
1	.374 ^a	.140	.136	.463	.140	35.797	1	220	.000
2	.379 ^b	.144	.136	.463	.004	.936	1	219	.334
3	.380 ^c	.144	.132	.464	.000	.110	1	218	.740

Note. Dependent Variable = BDI-II; ^aPredictors = IAT; ^bPredictors = IAT, POGQ; ^cPredictors = IAT, POGQ, OGSAS.

Research Question 2

Hierarchical multiple linear regression analysis was used to test the hypothesis that there is a relationship between scores on the WHOQOL and IAT, POGQ, and OGSAS. The results of regression analyses indicated

that the baseline model was statistically significant and explained 20% of the variance in quality of life, $R^2 = .20$, $p < .05$. It was found that IAT significantly predicted quality of life in the baseline model, $\beta = -.449$, $p < .05$. The other R^2 changes related to online gaming and online gambling were nonsignificant (see Table 4).

Table 4. Regression Analyses in Predicting Quality of Life from IAT, POGQ, and OGSAS

Model	R	R ²	Adjusted R ²	Std. Error of the Estimate	Change Statistics				
					R ² Change	F Change	df1	df2	Sig. F Change
1	.449 ^a	.201	.198	.513	.201	55.509	1	220	.000
2	.453 ^b	.205	.198	.512	.004	1.074	1	219	.301
3	.458 ^c	.210	.199	.512	.005	1.303	1	218	.255

Note. Dependent Variable = WHOQOL; ^aPredictors = IAT; ^bPredictors = IAT, POGQ; ^cPredictors = IAT, POGQ, OGSAS.

Supplemental Analyses

Supplemental analyses were conducted in order to gather more information from the data and to learn if the groups differed in terms of gender and college class level to further understand students' Internet usage time, online behaviors, depression, and quality of life.

ANOVA analyses results showed that there was a statistically significant difference between freshmen and masters students' mean scores on the BDI-II [$F(5,216) = 2.97$, $p < .05$]. Post hoc Tukey results also showed a statistically significant difference in mean depression scores between freshmen and master's students (.46, $p < .05$).

Weekly Internet usage statistics showed that 6.8% ($n = 15$, 4 males and 11 females) of the participants reported their weekly Internet usage as 1-10 hours, 29.7% ($n = 66$, 24 males and 42 females) reported as 11-20 hours, 27.4% ($n = 61$, 27 males and 34 females) reported as 21-30 hours, 18% ($n = 40$, 19 males and 21 females) reported as 31-40 hours, and 18% ($n = 40$, 13 males and 27 females) reported as 41 and more hours.

Discussion

Through the descriptive question, the prevalence of problematic Internet use among college students was explored. Previous research indicated a link between the overuse of the Internet and mental health problems (Young et al., 2011). Thus, there is a potential link between the overuse of the Internet and the quality of life.

In this rapidly evolving field, in 2007, researchers defined the overuse of the Internet as being online for more than 20 hours a week (Ko et al., 2007), and in 2015, as using the Internet more than two hours a day every day (Cassidy-Bushrow et al., 2015). In 2019, with the widespread use of smartphones, these definitions of overuse may no longer be relevant. Descriptive statistics in the current study indicated that 63.5% of participants reported a weekly Internet usage of over 20 hours. Although Ko et al. (2007) had indicated that more than 20 hours a week of Internet usage constituted "overuse", the researchers of that study provided no differentiation between educational, professional, and leisure usage. Romer et al. (2013) proposed that Internet usage for information gathering or educational use was to be considered moderate use, while Internet usage with no purpose or for gaming or gambling was to be considered as heavy use. Owing to a lack of clarity in what constitutes problematic Internet use, a new definition is proposed here as "using the Internet for educational/professional or leisure purposes in a manner that interferes with the user's ability to engage in daily life activities and fulfill personal and professional responsibilities."

The first research question explored relationships between scores on the BDI-II and IAT, POGQ, and OGSAS. As presented in the results section, IAT significantly predicted depression in the baseline model. Preliminary analyses also showed that IAT and BDI-II were correlated significantly. Therefore, this relationship was expected and is supported by prior research.

Previous studies indicate that overuse of the Internet is related to depression (Ceyhan & Ceyhan, 2008; van der Aa et al., 2009), loneliness and anxiety (Clifton, Goodall, Ban, & Birks, 2013), lower psychological well-being

(Bell, 2007; Chen, 2012; Green et al., 2005; Kraut et al., 1998), and low self-esteem (van der Aa et al., 2009). Also, mobile phone and social network sites use are related to depression (Lauckner, Hill, & Ingram, 2018).

The second research question explored relationships between scores on the WHOQOL and IAT, POGQ, and OGSAS. As presented in the results section, IAT significantly predicted quality of life in the baseline model. Preliminary analyses also showed that IAT and WHOQOL had a significant negative correlation.

Negative outcomes of overuse of the Internet are related to quality of life including neglecting responsibilities and disrupting relationships (Young, 1998), insomnia, craving, and loneliness (Young et al., 2011), avoiding daily life activities (Caplan, Williams, & Yee, 2009), and social isolation (Clifton et al., 2013; Davis, 2001). Although the present study cannot assume a causal relationship due to the non-experimental design of the study, findings are consistent with existing literature in regards to problematic Internet use and depression and quality of life. Quality of life might be affected negatively because excessive Internet use decreases users' social interaction, face-to-face communication, time spent with friends and family, and fulfilling responsibilities both in school and at home. Further research is needed in order to understand if there is any causal relationships between problematic Internet use and quality of life.

As reported in the results section, the results of ANOVA analyses showed that freshmen and masters students differ significantly in depression levels. Post hoc Tukey results also indicated that freshmen and master students' depression levels are significantly different. The results showed that freshmen students are higher in depression than upper classmen. The results of the present study corroborate findings from previous studies that show decreases in depression levels from the first to the fifth semester of college (Chen & Lin, 2016), and among young adults from age of 17 to 21 (Rawana & Morgan, 2014). It is possible that with the transition from high school, and the adjustment to college and a new social environment, students' depression levels are highest initially, and decrease gradually throughout the college years.

Prior researchers presented different Internet usage time for males and females. For example, Widyanto and McMurrin (2004) reported that overall Internet use of males was 31.62 hours per week compared to females at 26.61 hours. However, others reported no significant difference between males and females concerning Internet usage time (Chang, Yeh, Chen, & Lin, 2013). The current study results show gender differences in Internet usage time. Crosstabs results show that (a) more females spend between 1-20 hours online compared to males, (b) more males spend between 21-40 hours online compared to females, and (c) more females spend over 40 hours online compared to males.

Supplemental analyses concerning gender and class comparisons were needed because the existing literature does not provide detailed and comparative information of these variables. Therefore, the results of the present study not only contribute to the literature, but also provide general information for future research.

Theoretical Implications

The current study findings support prior research demonstrating a positive correlation between problematic Internet use and depression, and a negative correlation between problematic Internet use and quality of life. Findings of this study raise a question regarding what other variables might be related to depression and quality of life aside from problematic Internet use among college students. Since the findings of the current study showed significant differences in depression levels between undergraduate and graduate students, and depression levels decrease throughout the college years, adjustment could be another variable that might be related to depression. The current study findings contribute to the literature by showing that male and female college students differ in their Internet usage time.

Implication for Practitioners

Owing to significant study results, the staff at college counseling centers need to pay close attention to the effects of dysfunctional online behaviors that may impede college students' ability to succeed. Screening instruments cannot diagnose problematic Internet use because this phenomenon is not included in the DSM-5 (APA, 2013) as a diagnosable mental health disorder. However, college counseling centers may use existing instruments to identify potential problematic Internet use and related issues. Since the existing instruments do not measure Internet usage time, it will be beneficial to collect descriptive data, such as educational/professional and leisure usage time. With the 11th revision of ICD, clinical descriptions and manifestations of online gaming and online gambling disorders are available that will help practitioners to identify problematic online gaming and online gambling behaviors.

Another question raised after identifying problematic online behaviors is what treatment modality should be used. Although the literature does not suggest a specific treatment modality in order to treat problematic Internet use (Abreu & Goes, 2011, p. 155), CBT is suggested by Young (2011) as the most efficacious treatment for problematic online behaviors. Since the existing instruments do not measure Internet usage time, Young suggests a daily Internet use log to assess Internet usage time. Young also focuses on underlying issues in order to prevent relapse after the termination of the client.

Limitations and Directions for Future Research

The sample of respondents was a small percentage of the accessible population due to sampling procedures, limiting the generalizability of findings. Another potential limitation is related to the self-report nature of the survey and the possibility of underreporting due to social desirability. Finally, causal connections could not be drawn from the data due to the non-experimental design of the study. Further research with college population needs to be conducted in order to identify the at-risk status of college students who are having issues with dysfunctional online behaviors. Future researchers could consider replicating this study with college students in other regions of the USA or internationally. Also, the sample size of the current study was modest. Replication of this study with larger sample sizes is needed in order to generalize the findings. In addition, qualitative research with students identified as having problematic Internet use, or engaging in heavy online gaming or gambling could yield findings divergent from the current study. Moreover, further examination is needed in order to identify other possible factors that could influence depression and quality of life among college students.

Disclosure statement

No potential conflict of interest was reported by the authors.

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References

- Abreu, C. N., & Goes, D. S. (2011). Psychotherapy for Internet addiction. In Kimberly S. Young and Cristiano Nabuco de Abreu (Eds). *Internet addiction: A handbook and guide to evaluation and treatment*. Hoboken, NJ: John Wiley & Sons, Inc.
- American Psychiatric Association (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: American Psychiatric Publishing.
- Amichai-Hamburger, Y., & Ben-Artzi, E. (2003). Loneliness and Internet use. *Computers in Human Behavior*, 19, 71-80. doi:10.1016/S0747-5632(02)00014-6
- Amichai-Hamburger, Y., & Furnham, A. (2007). *The Positive Net*. *Computers in Human Behavior*, 23(2), 1033-1045. doi:10.1016/j.chb.2005.08.008
- Beck, A. T., Steer, R. A., & Brown, G. (1996). *Beck Depression Inventory II manual*. San Antonio, TX: The Psychological Corporation.
- Beck, A. T., Steer, R. A., Ball, R., & Ranieri, W. F. (1996). Comparison of Beck Depression Inventories-IA and-II in psychiatric outpatients. *Journal of Personality Assessment*, 67(3), 588-597. doi:10.1207/s15327752jpa6703_13
- Bell, V. (2007). Online information, extreme communities and Internet therapy: Is the Internet good for our mental health? *Journal of Mental Health*, 16(4), 445-457. doi:10.1080/09638230701482378
- Berlim, M. T., Pavanello, D. P., Caldieraro, M. A. K., Fleck, M. P. A., (2005). Reliability and validity of WHOQOL-BREF in a sample of Brazilian outpatients with major depression. *Quality of Life Research*, 14(2), 561-564. doi:10.1007/s11136-004-4694-y

- Brooks, G. P., & Barcikowski, R. S. (2012). The PEAR method for sample sizes in multiple linear regression. *Multiple Linear Regression Viewpoints*, 38(2), 1-16. Retrieved from www.mlrv.ua.edu/ejournal.html
- Brown, J. D., & Bobkowski, P. S. (2011). Older and newer media: Patterns of use and effects on adolescents' health and well-being. *Journal of Research on Adolescence*, 21(1), 95-113. doi:10.1111/j.1532-7795.2010.00717.x
- Business Insights (2010, March 1), The Future of Digital Gambling: The Impact of Regulation, the Rise of Online Services and the Evolving Competitive Environment. *Market Research*. Retrieved from <http://www.marketresearch.com/product/display.asp?productid=2637052&xs=r&g=1&curr=USD&kw=&view=toc>
- Caplan, S. E. (2002). Problematic Internet use and psychosocial well-being: Development of a theory-based cognitive-behavioral measurement instrument. *Computers in Human Behavior*, 18, 553-575. doi:10.1016/S0747-5632(02)00004-3
- Caplan, S., Williams, D., & Yee, N. (2009). Problematic Internet use and psychosocial well-being among MMO players. *Computers in Human Behavior*, 25(6), 1312-1319. doi:10.1016/j.chb.2009.06.006
- Cassidy-Bushrow, A. E., Johnson, D. A., Peters, R. M., Burmeister, C., & Joseph, C. L. M. (2015). Time Spent on the Internet and Adolescent Blood Pressure. *The Journal of School Nursing*, 31(5), 374-384. <http://doi.org/10.1177/1059840514556772>
- Castro, P. C., Driusso, P., & Oishi, J. (2014). Convergent validity between SF-36 and WHOQOL-BREF in older adults. *Revista de Saude Publica*, 48(1), 63-67. doi:10.1590/S0034-8910.2014048004783
- Ceyhan, A. A., & Ceyhan, E. (2008). Loneliness, depression, and computer self-efficacy as predictors of problematic Internet use. *CyberPsychology & Behavior*, 11(6), 699-701. doi:10.1089/cpb.2007.0255
- Chang, S.-M., Yeh, Y.-C., Chen, S.-K., & Lin, S. S. J. (2013). *High risk college Internet users' deadly attraction: a blending of social charms with practical and critical activities*. Presented at the 2013 annual meeting of American Psychological Association, Hawaii, USA.
- Chen, S. (2012). Internet use and psychological well-being among college students: A latent profile approach. *Computers in Human Behavior*, 28(6), 2219-2226. doi:10.1016/j.chb.2012.06.029
- Chen, S.-K., & Lin, S. S. J. (2016). A latent growth curve analysis of initial depression level and changing rate as predictors of problematic Internet use among college students. *Computers in Human Behavior*, 54, 380-387. doi:10.1016/j.chb.2015.08.018
- Clifton, A., Goodall, D., Ban, S., & Birks, E. (2013). *New perspectives on the contribution of digital technology and social media use to improve the mental wellbeing of children and young people: A state of the art review*. *Neonatal Pediatric & Child Health Nursing*, 16(1), 19-26. Retrieved from <http://eprints.hud.ac.uk/id/eprint/16790>
- Cohen, L., Manion, L., & Morrison, K. (2007). *Research methods in education* (6th ed.). London, UK: Routledge.
- Cotten, S. R. (2008). Students' technology use and the impacts on well-being. *New Directions for Student Services*, 124, 55-70. doi:10.1002/ss.295
- Davis, R. A. (2001). A cognitive-behavioral model of pathological Internet use. *Computers in Human Behavior*, 17, 187-195. doi:10.1016/S0747-5632(00)00041-8
- Demetrovics, Z., Urban, R., Nagygyorgy, K., Farkas, J., Griffiths, M. D., Papay, O., ... Olah, A. (2012). The development of the Problematic Online Gaming Questionnaire (POGQ). *PLoS ONE*, 7(5), 1-9. doi:10.1371/journal.pone.0036417
- Frangos, C. C., Frangos, C. C., & Sotiropoulos, I. (2012). A meta-analysis of the reliability of Young's Internet addiction test. *Proceedings of the World Congress on Engineering*, 368-371. Retrieved from http://www.iaeng.org/publication/WCE2012/WCE2012_pp368-371.pdf
- Green, M. C., Hilken, J., Friedman, H., Grossman, K., Gasiewskj, J., Adler, R., & Sabini, J. (2005). Communication via Instant Messenger: Short- and Long-Term Effects. *Journal of Applied Social Psychology*, 35(3), 445-462. doi:10.1111/j.1559-1816.2005.tb02130.x
- Griffiths, M.D., Parke, J., Wood, R.T.A. & Rigbye, J. (2010). Online poker gambling in university students: Further findings from an online survey. *International Journal of Mental Health and Addiction*, 8, 82-89. doi:10.1007/s11469-009-9203-7
- Harrison, K., & Hefner, V. (2008). Media, body image, and eating disorders. In S. L. Calvert & B. J. Wilson (Eds.), *The handbook of children, media, and development* (pp. 381-406). Malden, MA: Blackwell.
- Hornle, J. & Zammit, B. (2010). *Cross-border online gambling law and policy*. Cheltenham, UK: Edgar Elgar.
- International Classification of Diseases (2018). ICD-11 Revision. Retrieved from <https://icd.who.int/dev11/l-m/en>
- Kalkan, B., & Griffiths, M. D. (2018). The psychometric properties of the Online Gambling Symptom Assessment Scale (OGSAS). *International Journal of Mental Health and Addiction*.
- Kang, S. (2007). Disembodiment in online social interaction: Impact of online chat on social support and psychological well-being. *CyberPsychology and Behavior*, 10, 475-477. doi: 10.1089/cpb.2006.9929

- Khan, A., & Muqtadir, R. (2014). Problematic online gaming in Pakistan. *International Journal of Science and Research*, 3(6), 2522-2525.
- Kim, S. W., Grant, J. E., Potenza, M. N., Blanco, C., & Hollander, E. (2009). The Gambling Symptom Assessment Scale (G-SAS): A reliability and validity study. *Psychiatry Research*, 166, 76-84. doi:10.1016/j.psychres.2007.11.008
- Kiraly, O., Griffiths, M. D., Urban, R., Farkas, J., Kokonyei, G., Elekes, Z., ... Demetrovics, Z. (2014). Problematic Internet use and problematic online gaming are not the same: Findings from a large nationally representative adolescent sample. *Cyberpsychology, Behavior, and Social Networking*, 17(12), 749-754. doi:10.1089/cyber.2014.0475
- Ko, C.-H., Yen, J.-Y., Yen, C.-F., Lin, H.-C., & Yang, M.-J. (2007). Factors predictive for incidence and remission of Internet addiction in young adolescents: A prospective study. *CyberPsychology & Behavior*, 10(4), 545-551. doi:10.1089/cpb.2007.9992
- Krägeloh, C. U., Kersten, P., Billington, D. R., Hsu, P. H. C., Shepherd, D., Landon, J., & Feng, X. J. (2013). Validation of the WHOQOL-BREF quality of life questionnaire for general use in New Zealand: Confirmatory factor analysis and Rasch analysis. *Quality of Life Research*, 22(6), 1451-1457. doi:10.1007/s11136-012-0265-9
- Kraut, R., Kiesler, S., Boneva, B., Cummings, J., Helgeson, V., & Crawford, A. (2002). Internet paradox revisited. *Journal of Social Issues*, 58(1), 49-74. doi:10.1111/1540-4560.00248
- Kraut, R., Patterson, M., Lundmark, V., Kiesler, S., Mukophadhyay, T., & Scherlis, W. (1998). Internet paradox: A social technology that reduces social involvement and psychological well-being? *American Psychologist*, 53(9), 1017-1031. doi:10.1037/0003-066X.53.9.1017
- Lauckner, C., Hill, M., & Ingram, L. A. (2018). An exploratory study of the relationship between social technology use and depression among college students. *Journal of College Student Psychotherapy*. doi:10.1080/87568225.2018.1508396
- Lee, S. (2009). *Problematic Internet use among college students: An exploratory survey research study* (Doctoral dissertation). Retrieved from <https://etd.ohiolink.edu> (UMI No. 3439312).
- Lesieur, H. R., & Blume, S. B. (1987). The South Oaks Gambling Screen (SOGS): A new instrument for the identification of Pathological gamblers. *American Journal of Psychiatry*, 144(9), 1184-1188. doi:10.1176/ajp.144.9.1184
- Linderoth, J. & Ohn, E. (2014). Chivalry, subordination and courtship culture: Being a “woman” in online games. *Journal of Gambling & Virtual Worlds*, 6(1), 33-47. doi:10.1386/jgvw.6.1.33_1
- Matthews, N., Farnsworth, B., & Griffiths, M. D. (2009). A pilot study of problem gambling among student online gamblers: Mood states as predictors of problematic behavior. *CyberPsychology & Behavior*, 12(6), 741-745. doi:10.1089/cpb.2009.0050
- Pápay, O., Urbán, R., Griffiths, M. D., Nagygyörgy, K., Farkas, J., Kökönyei, G., ... Demetrovics, Z. (2013). Psychometric properties of the Problematic Online Gaming Questionnaire short-form and prevalence of problematic online gaming in a national sample of adolescents. *Cyberpsychology, Behavior and Social Networking*, 16(5), 340-348. doi:10.1089/cyber.2012.0484
- Pearson Clinical (n.d.). Beck Depression Inventory - II. Retrieved from <http://www.pearsonclinical.com/psychology/products/100000159/beck-depression-inventoryii-bdi-ii.html#tab-details>
- Petry, N. M., & Gonzalez-Ibanez, A. (2015). Internet gambling in problem gambling college students. *Journal of Gambling Studies*, 31, 397-408. doi:10.1007/s10899-013-9432-3
- Pew Research Center (2018a). *Internet/Broadband Fact Sheet*. Retrieved from <http://www.pewInternet.org/factsheet/Internet-broadband/>
- Pew Research Center (2018b). *About a quarter of U.S. adults say they are ‘almost constantly’ online*. Retrieved from <http://www.pewresearch.org/fact-tank/2018/03/14/about-a-quarter-of-americans-report-going-online-almost-constantly/>
- PlayUSA, (n.d.). *Legal US online gambling guide*. Retrieved from <https://www.playusa.com/us/>
- Rawana, J. S., & Morgan, A. S. (2014). Trajectories of depressive symptoms from adolescence to young adulthood: the role of self-esteem and body-related predictors. *Journal of Youth and Adolescence*, 43(4), 597-611. doi:10.1007/s10964-013-9995-4
- Romer, D., Bagdasarov, Z., & More, E. (2013). Older versus newer media and the well-being of United States youth: Results from a national longitudinal panel. *Journal of Adolescent Health*, 52(5) 613-619. doi:10.1016/j.jadohealth.2012.11.012
- Shaw, L. H., & Gant, L. M. (2002). In defense of the Internet: The relationship between Internet communication and depression, loneliness, self-esteem, and perceived social support. *Cyberpsychology and Behavior*, 5(2), 157-171. doi:10.1089/109493102753770552

- Snodgrass, J. G., Lacy, M. G., Dengah II, H. J., Eisenhauer, S., Batchelder, G., Cookson, R. J. (2014). A vacation from your mind: Problematic online gaming is a stress response. *Computers in Human Behavior*, 38, 248-260. doi:10.1016/j.chb.2014.06.004
- The WHOQOL Group (1998). Development of the world health organization WHOQOL-BREF quality of life assessment. *Psychological Medicine*, 28(3), 551-558. doi:10.1017/S0033291798006667
- van der Aa, N., Overbeek, G., Engels, R. C. M. E., Scholte, R. H. J., Meerkerk, G. J., & van der Eijnden, R. J. J. M. (2009). Daily and compulsive Internet use and well-being in adolescence. A diathesis-stress model based on big five personality traits. *Journal of Young Adolescence*, 38, 765-776. doi:10.1007/s10964-008-9298-3
- van Rooij, A. J. (2011). *Online video games addiction. Exploring a new phenomenon* (PhD Thesis). Rotterdam, The Netherlands: Erasmus University Rotterdam.
- Whang, L. S.-M., Lee, S. & Chang, G.-Y. (2003). Internet over-users' psychological profiles: A behavior sampling analysis on Internet addiction. *CyberPsychology & Behavior*, 6(2), 143-150. doi:10.1089/109493103321640338
- Widyanto, L., & McMurrin, M. (2004). The psychometric properties of the Internet Addiction Test. *CyberPsychology & Behavior*, 7(4), 443-450. doi:10.1089/cpb.2004.7.443
- Young, K. S. (1998). Internet addiction: The emergence of a new clinical disorder. *CyberPsychology & Behavior*, 1(3), 237-244. doi:10.1089/cpb.1998.1.237
- Young, K. S. (2011). CBT-IA: The first treatment model for Internet addiction. *Journal of Cognitive Psychotherapy: An International Quarterly*, 25(4), 304-312. doi:10.1891/0889-8391.25.4.304
- Young, K. S., Yue, X. D., & Ying, L. (2011). Prevalence estimates and etiological models of Internet addiction. In Kimberly S. Young and Cristiano Nabuco de Abreu (Eds). *Internet addiction: A handbook and guide to evaluation and treatment*. Hoboken, NJ: John Wiley & Sons, Inc.