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The Association Between Loneliness, Social Anxiety, and Gaming Addiction in Male University Students

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Abstract
Gaming addiction is notably associated with increased levels of social anxiety and loneliness among adolescents. The current study intends to explore the relationship between online gaming addiction, social anxiety, and loneliness among male university students. Non-probability purposive sampling was employed to select male participants between the ages of 20 to 30 years. Data was collected using the Gaming Addiction Scale, the De Jong Gierveld Loneliness Scale, and the Social Anxiety Scale (SAS), along with a demographic sheet. SPSS 23 was employed for the data analysis. Correlation analysis revealed that there is a positive correlation between addiction, loneliness, social anxiety, and gaming addiction. The multiple regression analysis indicated that social anxiety and loneliness are positive predictors of gaming addiction. An independent sample t-test showed a significantly higher level of interaction anxiety and evaluation anxiety among adolescents experiencing loneliness and being involved in addictive gaming behavior. The results of this study highlight the role of social anxiety and loneliness in the development of gaming addiction in adolescents, offering insight into the intricate interplay between these variables. Furthermore, it emphasizes the need for additional research to better understand behavioral patterns in gaming activities, strengthening our ability to address the problem effectively.
Keywords: Gaming addiction, loneliness, social anxiety

1. Introduction

With the advancement in the digital world, addictions are no more limited to substance abuse, however seemingly harmless behaviors such as online gaming in some circumstances can severely interfere with one daily life functioning. The trend of online gaming started in the 1990s, and within no time it became popular and easily accessible to the general public. The number of people playing online games has increased significantly in the past few years (Darvesh et al., 2020). According to the data from the United States, the business of video games is about $18.8 billion with customers including around 53% of adults and approximately 90% of teenagers (Ostinelli et al., 2021). King and colleagues (2017) reported the prevalence of pathological gaming in their review study as ranging from 0.3% to 47% around the world, with greater prevalence observed in the studies related to Asian countries, among people with other psychiatric problems. Various studies on disordered gaming suggest that men are more likely than women to engage in disordered gaming (Stevens et al., 2021; Bonnaire et al., 2019), and the prevalence is observed to be significantly higher among adolescents (Stevens et al., 2021). However, still there is little knowledge regarding gender-specific health correlates and sex differences in gaming.

Gaming addiction is characterized by an attitude toward playing video or computer games for longer periods, and the people involved in gaming addiction mostly find it difficult to avoid the urge to play these games. This behavior significantly impairs the functioning of an individual in social, occupational, family, personal, educational, and other principal areas of life (WHO, 2018). World Health Organization included the gaming disorder in the International Classification of Diseases (ICD-11) in 2019 (WHO, 2019). To receive a formal diagnosis of GD, a patient must demonstrate the following three symptoms (e.g., impaired control, gaming becoming the priority, and continuance of gaming despite facing negative consequences) (WHO, 2018). The American Psychiatry Association (APA, 2013), also included Internet Gaming Disorder (IGD) as a potential diagnosis in the DSM-5, considering it as a "condition for further studies." The DSM-5 lists nine criteria for IGD: remaining preoccupied with gaming, experiencing withdrawal symptoms while not indulging in gaming, growing tolerance and wanting more time for gaming, losing control over gaming, neglecting other activities for gaming, persistent excessive gaming while facing the negative consequences, lying to others about the gaming attitude, using gaming habit to get rid of negative emotions, and experiencing negative consequences due to gaming. An individual must meet a minimum of five of these criteria within one year (American Psychiatric Association, 2013). However, APA emphasized, that additional clinical data and studies are crucial before legally classifying IGD as a clinical condition (American Psychiatric Association, 2013).

It has been demonstrated that regardless of the type or form of the activity, it seems evident that spending excessive time playing video games is linked with reduced sleep quality, and poor academic performance (Darvesh et al., 2020; Bai et al., 2024), limited leisure time, difficulty paying attention, depression, anxiety, family conflicts, and youth crimes (Wang et al., 2022). The level of self-regulatory activity is considered to be important in helping to avoid the detrimental impact of online gaming like pathological use and addiction. The sensible use of online games and the internet has proved to be a positive recreational activity that provides plenty of time for social entertainment and adaptive deviation for many people (Li et al., 2023). However, failure to control online gaming behavior can significantly lead to addiction or feelings of dependency (Carras et al., 2020). The indulgence of adolescents in gaming and its impact on mental health changed drastically during the COVID-19 epidemic (Chen et al., 2020; Su & Hi, 2024).

Loneliness reflects a person's evaluation of their social involvement or isolation. The absence of meaningful relationships is the root cause of the illness known as loneliness. "Situations where the desired intimacy has not been realized, and the number of the existing relationships is fewer than what is considered desirable" are included in this (Gierveld, 1987). Loneliness is the indication that there are a few very critical shortcomings in an individual's social relationships, it is a clue that points out some wrong things that need to be corrected (Tus et al., 2021). During the COVID-19 outbreak people faced significant psychological disturbance due to social distancing, this social isolation changed the pattern and intensity of internet and online gaming usage (Chan et al., 2020). Studies suggest that there is a reciprocal association between gaming addiction and loneliness, loneliness is considered both the cause and consequence of gaming addiction (Lemmens, 2011). Similarly, it is reported that higher levels of anxiety, depression, and social loneliness are generally observed in young adults addicted to video games (Nurmagandi & Suratmini, 2024). As the difficulty faced by the individual to develop social connections outside the online setup creates a cycle of loneliness and internet addiction (Wang, 2021). Gonzalez-Bueso et al., (2018) reported that gaming addiction can be considered as an attempt to deal with perceived loneliness among adolescents. Additionally, social anxiety is also reported as a mediator in the relationship between internet addiction and loneliness (Caplan, 2007). The literature emphasizes a complex relationship between loneliness, mental health issues, and gaming addiction, demonstrating that loneliness can both cause and result from gaming addiction.

Social anxiety is not just shyness, and for most of the victims, it does not always involve the lack of ability to speak in public. It is a persistent and intense fear or anxiety related to some specific social situations, like fear of being judged, humiliated, or embarrassed. The individual develops a fear that he/she will be evaluated negatively or will show some anxiety symptoms (Kessler et al., 2005). It is reported that in adolescents with social anxiety, there is a tendency to avoid disturbing social situations and to find escape in online networks, they find it easy to socially interact

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with others through an online medium (Shaheen et al., 2023). Thus, it is proposed that mostly social anxiety is linked with social media addiction, and pathological internet use (Yang et al., 2023). In a study on the anticipated role of psychiatric symptoms in the development of addiction related to the internet, internet addiction was predicted by depression, social anxiety, anger, and ADHD (Carras et al., 2020). Similarly, social anxiety and loneliness are reported as significant contributors to internet addiction and vice versa (Wang, 2021; Wu et al., 2024). The duration of playing games is also important as it increases social anxiety and significantly deteriorates the quality of interpersonal relationships (Darvesh et al., 2020). Online platforms are considered a potential escape from real-life social situations, there is a strong association between social anxiety and gaming addiction among adolescents. Additionally, excessive gaming can exacerbate social anxiety and worsen interpersonal associations, highlighting the significance of a balanced approach to online involvement for improved mental health.

To comprehend addictive behaviors the I-PACE (Interaction of Person Affect Cognition Execution) model of addiction provides a detailed framework taking into account various elements such as emotional state, psychological processes, cognitive functioning, and behavioral representation (Brand et al., 2019). When it comes to gaming addiction in male university students, this model suggests that loneliness and social anxiety could have a substantial influence. Social anxiety can create excessive mental distress and disrupt social associations leading to loneliness, therefore they may resort to increased gaming as a coping method (Dong et al., 2024). Similarly, loneliness can exacerbate feelings of loneliness, leading teens to engage in excessive gaming to find social connections (Wu et al., 2024). The I-PACE model emphasizes how these connected elements interact, potentially increasing the risk of gaming addiction in male university students by providing valuable insight into the intricate interplay of psychological processes at gaming (Brand et al., 2016).

1.1. Rationale of the study

The study intends to investigate the relationship between gaming addiction, social anxiety, and loneliness among male university students. To the best of author's knowledge, apart from the few aforementioned studies, there are no other valuable studies conducted in Pakistan to explore this highly prevailing and limiting phenomenon in emerging adults. Thus, it is imperative to conduct more research in the future targeted at identifying some behavioral tendencies of the people involved in problematic gaming and promoting a balanced approach to technology use while prioritizing the mental well-being of emerging adults.

1.2. Hypotheses of the study

The following are the hypotheses of the current study:

H1: There will be a significantly positive association between gaming addiction, social anxiety, and loneliness in university students.

H2: Social Anxiety and Loneliness will be positive predictors of Gaming Addiction in university students.

H3: There will be a significant mean difference in the level of social anxiety and loneliness in two groups of students with and without gaming addiction.

2. Methodology

2.1. Participants and Study Design

This correlational research design was employed to study the sample of 300 male university students, with an age range of 20 to 30 years (M = 22.84, SD = 2.91) from multiple private and public sector universities in Lahore involved in online gaming. The sample was recruited using the non-probability purposive sampling technique.

2.2. Inclusion/Exclusion Criteria

The sample consisted of students within the age range of 20 to 30 years, enrolled in any public or private university, and having gaming habits. Students above or below the given age range and with no gaming habits and/or having any psychological or psychiatric ailment were excluded from the study.

2.3. Instruments

This cross-sectional study consists of four sections, including the demographic sheet, gaming addiction scale, social anxiety scale, and loneliness scale.

Demographic Sheet: This section investigated the participants's basic details regarding age, education, marital status, family system, residence, number of hours spent on gaming, and other necessary details.

The Gaming Addiction Scale (GAS): The gaming addiction scale by Lemmens et al., (2011) was developed to assess the problematic gaming pattern in adolescents. The scale consists of seven items measuring different aspects of gaming addiction (tolerance, salience, relapse, mood modification, withdrawal, conflict, and other issues). Items are scored on 5 point likert scale format ranging from 0 = not at all to 4 = always. Greater scores indicate a higher level of gaming addiction. The scale is found as a reliable measure of gaming addiction, having good internal consistency (0.77).

Social Anxiety Scale (SAS): The social anxiety scale developed by Ejaz et al., (2020) was used to assess the level of social anxiety among adolescents. The scale consists of 22 items to measure three different components of social anxiety eg., interaction anxiety, performance anxiety and avoidance, and evaluation anxiety. The scale is graded on 5 point likert scale with a response format ranging from 0 = never to 4 = always. The internal consistency of the scale is found excellent with an overall value of 0.90, for the subscales; interaction anxiety (0.84), performance and avoidance anxiety (0.84), and evaluation anxiety (0.78) (Ejaz et al., 2020).

The De Jong Gierveld Loneliness Scale: The scale was used to measure loneliness in adolescents. The revised short version of the scale consists of 6 items containing three questions for each subscale to measure social and emotional loneliness. There are three negatively (1-3) and three positively (4-6) worded items on the scale. The items are scored on five five-point likert scale ranging from 0 = none of the items to 4 = all of the items (Gierveld & Tilburg, 2006). The scale is proven to be highly reliable with Cronbach's value $\alpha = 0.89$ for the total scale $\alpha = 0.89$, for social loneliness and $\alpha = 0.78$ for emotional loneliness (Giraldo-Rodriguez et al., 2023).

2.4. Procedure

In the beginning, the respondents were provided with the Gaming Addiction Scale, Loneliness Scale, and Social Anxiety Scale along with a demographic sheet. Informed consent was signed by the participants after being informed about the study protocols and the confidentiality of their details. Data was analyzed using SPSS 23, while descriptive analysis was used to analyze basic variables. To explore the correlation among scores of gaming addiction, social anxiety, and loneliness correlation analysis was employed. To find out if social anxiety and loneliness predict gaming addiction, a multiple regression analysis was employed. Finally, to explore the mean differences between the two levels of loneliness in social anxiety and gaming addiction independent sample t-test was used.

3. Results

The sample of the study comprised 300 male university students with a mean age of (M=22.84, SD=2.91). Of the total 170(56.7%) students were studying at BS/Masters level and 130(43.3%) in MS/MPhil. The majority of the participants 226(75.3%) were living in nuclear families. Most of the participants were single 286(95.3%) and 240(80%) participants belonged to the middle class. Most of the students 139(46.3%) reported that they were playing games for about 2-3 hours daily, 240(80%) were playing whenever they had the opportunity, and 183(61%) reported that they were playing games on mobile.

The mean, standard deviation, and Cronbach's value were analyzed for the scales used in the study. The findings revealed that the gaming addiction scale, social anxiety scale and its subscales, and loneliness scale along with its subscales are found highly reliable in the current study (Table 1).

Table 1: Mean, Standard deviation, and Coefficient Alpha of the Study Measures (N=300).

Variables	K	M	SDS	a
Gaming Addiction	7	16.45	4.49	.60
Social Anxiety Total	22	38.28	17.10	.83
PAA	8	15.13	7.05	.81
IA	10	17.27	7.64	.80
EA	4	5.87	4.36	.80
Loneliness Total	6	32.33	4.49	.80
SL	3	18.88	4.15	.77
EL	3	23.43	5.79	.76

K=Number of items, M=Mean, SD=Standard Deviation, a=Cronbach's alpha, PAA=Performance Anxiety and Avoidance, IA=Intercation Anxiety, EA=Evaluation Anxiety

The relationship among gaming addiction, social anxiety, and loneliness in male adolescents studying at university was explored by employing the Pearson product-moment correlation. A significant positive relationship was found between gaming addiction and social anxiety, the significant correlation was found in all sub-scales of social anxiety including interaction anxiety, evaluation anxiety, performance anxiety, and avoidance ($p < .01$). Similarly, for the loneliness scale significant positive relationship was observed between gaming addiction and loneliness, and with both the sub-scales e.g., social loneliness ($p < .05$), and emotional loneliness ($p < .01$) (Table 2).

Table 2: Pearson Product-moment Correlation, between Gaming Addiction, Social Anxiety, and Loneliness (N=300).

Variables	GA	SATotal	IA	EA	PAA	LTotal	SL	EL	M	SD
GA	--	.76**	.72**	.71**	.75**	.19**	.12*	.16**	24.66	4.16
SATotal		--	.97**	.94**	.98**	.28**	.23**	.20**	59.87	17.41
IA			--	.86**	.92**	.20**	.18**	.13*	26.37	7.27
EA				--	.92**	.29**	.23**	.22**	11.33	3.58
PAA					--	.33**	.25**	.25**	22.17	7.12
LTotal						--	.72**	.79**	5.16	1.39
SL							--	.15**	2.55	.87
EL								--	2.62	.98

*Note. * p <0.05, ** p < 0.01, GA=Gaming Addiction, SA=Social Anxiety, IA=Interaction Anxiety, EA=Evaluation Anxiety, PAA=Performance Anxiety and Avoidance, L= Loneliness, SL=Social Loneliness, EL=Emotional Loneliness, M=Mean, SD=Standard Deviation*

Multiple regression analysis was used to test if social anxiety and loneliness predict gaming addiction in male university students. The findings with an R^2 value of 0.61 indicated that predictors explained 61% variance in the outcome variable. The findings suggested that social anxiety is a positive predictor of gaming addiction ($p < 0.001$), along with interaction anxiety ($p < 0.001$) and performance anxiety and avoidance ($p < 0.05$) which are subscales of social anxiety also being positive predictors of gaming addiction. Moreover, the analysis revealed that loneliness is also a positive predictor of gaming addiction ($p < 0.001$), with social loneliness ($p < 0.05$) and emotional loneliness ($p < 0.001$) both being significant positive predictors of gaming addiction ($p > 0.05$) (Table 3).

Table 3: Summary of Multiple Regression Analysis for Social Anxiety and Loneliness Predicting Gaming Addiction (N=300).

Predictors	Gaming Addiction					
	B	S.E	B	t	p	95% CI
Constant	21.24	5.23		5.46	.000**	[13.18, 24.14]
Social Anxiety	.77	.01	0.272	19.27	.000**	[.16, .20]
SA(IA)	.08	.06	0.343	.710	.008*	[.16, .08]
SA(EA)	-.03	.11	0.241	-.29	.770	[-.26, .19]
SA(PAA)	.29	.08	0.321	2.22	.027	[.61, .32]
Loneliness	.86	.15	0.287	7.28	.000**	[.60, 1.13]
L(S)	.07	.18	0.283	1.85	.005*	[.70, .02]
L(E)	.271	.019	0.425	14.64	.000**	[.234, .308]

*Note. R^2 = .61, B=Standardized coefficient, * p < 0.05, IA= Interaction Anxiety, EA= Evaluation Anxiety, PAA= Performance Anxiety and Avoidance, L(S)= Social Loneliness, L(E)=Emotional Loneliness*

To investigate the differences in two groups of loneliness for male university students regarding gaming addiction and social anxiety an independent sample t-test was employed. Significant results on evaluation anxiety were observed, as students scored higher on loneliness ($p < 0.01$) (M = 11.78, SD = 3.42). the value of Cohen's d was 0.48 (<0.05) which indicated a small effect size. Similarly for interaction anxiety higher scores were observed on loneliness ($p < 0.001$) (M = 23.20, SD = 6.74). The value of Cohen's d was 0.43 (<0.05) which indicated a small effect size. Findings indicated non-significant results on performance anxiety and avoidance, social loneliness, and emotional loneliness ($p > 0.05$). (Table 4).

Table 4: Independent Sample T-test Comprising Difference of Two Levels of Loneliness in Social Anxiety and Gaming Addiction among University Students (N=300).

Variables	Lonely (n=201)		Not-Lonely (n=99)					
	M	SD	M	SD	df	t	p	Cohan's d
SA(EA)	11.78	3.42	10.41	3.75	298	-3.14	.002	0.38
SA(IA)	23.20	6.74	20.08	7.45	298	-3.64	.001	0.43

Note. IA=Interaction Anxiety, EA=Evaluation Anxiety

4. Discussion

Gaming addiction is a behavioral pattern that is characterized by the deterioration of a person's ability to control their urge to play, with gaming taking the place of other important daily life activities. The most prominent feature of gaming addiction is the inability to quit despite being aware of the obvious negative outcomes associated with it (King et al., 2017).

The study explored the association between gaming addiction, social anxiety, and loneliness in university students was explored in this study. A significant positive correlation among the study variables was observed. Recent researches also confirm the fact that gaming addiction, smartphone addiction, and internet addiction are all linked with an increased level of social anxiety and loneliness (Elhai et al., 2018; Darvesh et al., 2020; Shaheen et al., 2023). It is believed that loneliness, social anxiety, and depression are some of the most prominent risk factors responsible for developing gaming addiction, particularly among adolescents (Ostinelli et al., 2021; Li et al., 2023). Additionally, people experiencing social anxiety are more likely to get involved in excessive online gaming to cope with their loneliness and avoid real-life contact with others (Wang et al., 2022). Online gaming enables people to connect with others while maintaining a certain level of privacy (Carras et al., 2020; Bonnaire, & Baptista, 2019). This can lead to a vicious cycle where gaming becomes a major coping mechanism for dealing with loneliness and social anxiety resulting in more addictive behaviour (Chen et al., 2018). Thus it is determined that loneliness and social anxiety are significantly associated variables among adolescents.

The predictive role of loneliness and social anxiety for gaming addiction was explored, and findings suggest that social anxiety and loneliness are positive predictors of gaming addiction in male university students. Previous literature is also in line with the findings, suggesting that loneliness and social anxiety are notable risk factors for the development of gaming addiction (Darvesh et al., 2020; Marraudino et al., 2022). It is a well-documented fact that in case of having insufficient family relations, and social anxiety adolescents tend to search for some socialization opportunities through gaming, this behavior can also be interpreted as an effort to deal with the feeling of loneliness (Kessler et al., 2005; Eren & Orsal, 2018; Li et al., 2023). Loneliness is not only reported as the consequence of gaming addiction but is also considered one of the strongest predators of gaming addiction in online gamers (2018; Caplan, 2007; Gierveld, 1987). Therefore, we conclude that adolescents experiencing social anxiety and facing loneliness might use gaming as a medium to cope with their feelings, leading to gaming addiction.

The current study also suggests that there is a significant mean difference in the types of social anxiety and gaming addiction for the two groups of students based on loneliness. These findings correspond with the existing literature suggesting that adolescents who reported social inhibition tend to spend excessive time playing online games and experience significantly increased loneliness (Gierveld, 1987; Carras et al., 2020). Darvesh et al., (2020) also support the idea that people with social anxiety mostly find it difficult to make social connections in the real world, mainly due to fear of being negatively evaluated by others, thus they tend to compensate for it by making social connections within the gaming environment which leads to gaming addiction and eventually loneliness. Adolescents who usually spend most of their time playing online games, face a notable decline in their real-world social relationships, exacerbating their loneliness (Wang et al., 2022) and this avoidance of social interaction could finally result in the developing social anxiety (Caplan, 2007; Yang et al., 2023). It seems possible that young adults having higher levels of social anxiety tend to avoid real-life connections, spend more time gaming, and experience loneliness.

5. Conclusion

The findings of the study suggest that loneliness, social anxiety, and gaming addiction are all important risk factors for the mental health and growth of emerging adults. There is a significant relationship between gaming addiction, social anxiety, and loneliness in male university students. The findings of this study suggest that teenagers struggling with loneliness and social anxiety could be more susceptible to developing gaming addiction as a coping mechanism or a method to block out their negative emotions.

5.1. Limitations and Suggestions

The current study exploring the relationship between loneliness, social anxiety, and gaming addiction among male university students provides useful information, but it must be examined within certain parameters. First of all, the study employed a cross-sectional research design and thus cannot determine the causal relationship among study variables, but can only identify the association among them. Secondly, relying on self-reported data can lead to biased responses as the respondents could provide socially desirable answers. Despite the limitations current study highlights the importance of recognizing the potential link between gaming addiction and its psychosocial aspects, and calls for more diligent research for a better understanding of the complexity of gaming.

5.2. Implications and Future Recommendations

For future implications, the study emphasizes the need for comprehensive prevention strategies and focused therapies that take into account the underlying emotional and social issues experienced by university students, especially males. Teachers, mental health professionals, and policymakers can develop plans to encourage better social interactions, improve emotional well-being, and instill in students responsible gaming habits by recognizing the potential role of loneliness and social anxiety as precursors to gaming addiction. Universities and colleges must provide mental health screening, counseling services, and other forms of support services so that students can get assistance for emotional and social problems associated with gaming addiction. In the context of modern technology and society, it is critical to continue investigating and developing methods to address the changing difficulties of gaming addiction.

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