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Online Ludo Game Addiction, and Aggression in Students: Negative Emotions as a Mediator

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Abstract

In today's tech era, millions of students worldwide are addicted to online games. Ludo's shift from physical to online play has increased its popularity, but studies show excessive gaming can lead to aggression, with unclear mediators between this association. This study aims to explore the direct and indirect effects of online ludo game addiction on aggressive via negative emotions among 250 students (with online ludo game installed on their phones) aged 18-25 (M=20.7, SD=2.34). This study employs a correlational research design and purposive sampling technique. Correlation analyses revealed significant positive associations between online ludo game addiction, negative emotions, and aggression. Mediation analysis indicates that ludo addiction positively influences negative emotions (β =.18, p< .05) and aggression (β =.17, p<.01); however, the indirect path was insignificant. Also, an independent sample t-test for gender demonstrated that men scored higher on online ludo game addiction (M=80.32, SD=11.29, p<.001) and aggression (M=87.72, SD=12.80, p<.05) than women. Implications are provided to reduce the impact of game addiction on mental health impact through awareness and various strategies like reintegrating routines, seeking support, increasing parental involvement, and managing gaming time.

Keywords: online ludo game addiction, aggression, negative emotions

Introduction

Gaming addiction denotes the compulsive or excessive use of technological games, causing clinical distress in addicts (Ballou & Zendle, 2022). Alternative terms for gaming addiction include "internet gaming disorder," "pathological video gaming," "problematic gaming," and "internet gaming addiction" (Billieux et al., 2019; King et al., 2019). This addiction involves compulsive and persistent use that disrupts important areas of functioning (Alavi et al., 2012; Schimmenti, 2023). Gaming addiction is linked with significant social and emotional issues, such as social disengagement, low interest, and isolation (Jeong & Kim, 2011; Sywelem & Alotaibi, 2024; Young, 2009). It can also lead to problems like poor academic performance, sleep disturbances, and even suicidal thoughts (Chamarro et al., 2024; Rehbein et al., 2010). Negative emotions include feelings of misery, sadness, or upset about an event or circumstance. These include anxiety, defined as a state of tense feelings, negative thoughts, and physiological changes such as palpitations (Kurth, 2018; Muir-Cochrane et al., 2017; Xiang et al., 2024).

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Negative emotions, like hate, anger, jealousy, and sadness, bring misery and lower self-esteem, confidence, and life satisfaction. They can make an individual feel bad about themselves and others (Ansari, 2020; Kayi-Aydar, 2022). Aggression is a "behavior intended to harm another who seeks to avoid it" (Bushman, 2010; Chester, 2024; Davis et al., 2018), encompassing physical aggression, verbal aggression, hostility and anger. Physical aggression means physically hurting someone or damaging property or animal (Brown et al., 2024; Card et al., 2008; Tremblay et al., 2004), while verbal aggression means the use of words, tone, or manner to intentionally harm someone, even if no harm occurs (Infante et al., 1984; Poling et al., 2019). Anger refers to a strong feeling of annoyance and displeasure (Berkowitz & Harmon, 2004; Lench et al., 2024) and hostility involves an unfriendly attitude towards others and mediates other forms of aggression (Barefoot, 1992; Griskevicius et al., 2009; Zhang et al., 2024).

Games are increasingly popular across diverse demographics, with mobile platforms expanding their accessibility. Recently, in the last few years online ludo games have gained tremendous popularity among young youth. Ludo, for example, uses Q-learning, a machine learning method that enables a model to progressively learn and enhance its performance over time by selecting the appropriate action, for reinforcement in gameplay, simplifying its complexity and making it widely accessible globally (Chhabra & Tomar, 2015; Fadzli, 2023). Originally from India, Ludo is a common board game for two to four players who move tokens through dice rolls across colored sections (Banerjee et al., 2024; Chhabra & Tomar, 2015). Ludo's adaptation to digital platforms demonstrates its enduring popularity and accessibility, contributing to cognitive skills and strategic thinking (Sarankirthik et al., 2022). Gaming addiction and negative emotions are associated with various social and psychological challenges, including aggression. Understanding these dynamics behind this association can inform strategies for reducing the adverse consequences of gaming and promoting healthier gaming habits. A study in Pakistan has shown that young adults' addiction to ludo games is detrimental to mental health as it leads to aggression in young adults between the ages of 18 to 25. Moreover, it is also noteworthy that the score of men as compared to women was higher in ludo game addiction and aggression (Bashir et al., 2024). Moreover, a similar study on young adults in Pakistan also depicts that addiction to online games can causes aggression and the score of men was reported higher in online game addiction and aggression than their counterpart women (Kausar et al., 2024).

In general aggression model (Anderson & Bushman, 2002), it was suggested that exposure to game can lead to increased aggression as games increase negative emotions such as frustration, anger and irritation that influence aggression (Irmak & Erdogan, 2016; Kahila et al., 2022; Zhao et al., 2021). Research indicated that addiction to games is related to negative emotions that could be due to poor performance, frequent losing, and not achieving the target, these negative emotions can lead to aggression either while online gaming, or towards their surrounding people in the physical world (Akbaş & Işleyen, 2024; Allen & Anderson, 2018; Bhagat et al., 2020; Eker & Tas, 2022; Tan & Chen, 2022). Various studies have shown that

negative emotions due to online digital games often lead to aggressive behavior (Bopp et al., 2016; Elson & Ferguson, 2014; Lee et al., 2024; Przybylski et al., 2014; Saarinen, 2017).

There is an increasing concern regarding addiction to online games and its potential association with aggression. A substantial body of literature highlights this connection, with statistical evidence supporting that addiction to online platforms and games, such as ludo, leads to higher levels of aggressive behaviors (Bashir et al., 2024; Fareed et al., 2024; Shahid et al., 2024a). Specifically, Bashir et al. (2024) reported a negative association between playing ludo and psychological well-being, suggesting that excessive engagement with this game may be harmful to mental health. While several recent studies have explored the association between Ludo gaming and aggression, the mediating role of negative emotions in this association remains under-explored, particularly among young adults in Pakistan. One recent study demonstrated that addiction to online networking platforms can lead to depression, which is a negative emotional state that, in turn, fostering aggression in individuals aged 18 to 30 years (Shahid et al., 2024a). This study was followed by another related study that suggested that while social networking addiction may contribute to aggression, the impact can be mitigated by increasing social and physical connectedness in young adults aged 18 to 25 (Shahid et al., 2024b). Negative emotions, including worry, fear, disgust, anger, and frustration have been identified as particularly influential in gaming contexts, with anger, in particular, having the most significant impact on gamers' behavior (Lin et al., 2017). Furthermore, research indicates that the time spent playing violent games, specifically, rather than gaming in general, is linked to an increase in aggressive behaviors regardless of whether the content of the game is violent or not (Lemmens et al., 2011; Piccininno & Perrotta, 2024). In university students, the association between negative emotions such as depression, and anxiety, aggression and online gaming and internet addiction was reported more in boys (Ko et al., 2005; Rehbein et al., 2013; Shabbir et al., 2020; Terroso et al., 2022). Moreover, the relationship between gaming addiction and aggression is also found to be significant in college and university students and more prevalent in male students than female students (Bashir et al., 2024; Bonanno & Kommers, 2005; Chou & Tsai, 2007; Kausar et al., 2024; Su et al., 2020).

While existing literature extensively documents the association between online gaming and aggression, the role of negative emotions as a mediating factor has been largely overlooked, particularly in the context of popular digital games such as the online ludo game in Pakistan. Given this gap, the current study aims to explore the mediating role of negative emotions between online ludo gaming and aggression among students. By investigating this mediation, the study seeks to provide insights that could inform strategies to mitigate the negative impact of these variables. Filling this gap is important because ludo is a widely played online in Pakistan, and its association with aggressive behavior is becoming evident. Although the mediation of negative emotions has not been thoroughly studied, it is apparent in real-world observations of ludo players. Addressing this gap will contribute not only to academic literature but also to offer practical implications that could benefit young adults.

Objectives of the Study

- To examine the relationship between online ludo game addiction, negative emotions, and aggression in students.
- To explore the mediating role of negative emotions between online ludo game addiction (independent variable) and aggression (dependent variable) in students.
- To analyze gender differences in online Ludo game addiction, negative emotions, and aggression among students.

Hypotheses

H1: Online game addiction is likely to be related positively and significantly to negative emotions and aggression.

H2: The negative emotions are likely to mediate between online ludo game addiction and aggression in students.

H3: There are likely to be gender differences in online Ludo game addiction, negative emotions, and aggression among students.

Method

Research Design

A correlational research design was used.

Participants

For the current study, 250 students who have been playing online ludo game for the last six months participated in this study. Purposive sampling was used for data collection in this study and sample size was finalized using G-power. The frequency of men was 135(54%), while women were 115(46%) with a mean age of 20.70 years (*SD*=2.34). The sample included intermediate students (127, 49%), undergraduate students (83, 33%), post graduate students (27, 11%), and school students (17, 7%). The details of the participants are given in the following Table 1.

Inclusion Criteria

College and university students both genders between the age range of 18 to 25 who got smartphones and have been playing online ludo game for last six months were included.

Table 1

Demographic Characteristics (N= 250)

Variables	*n*	%
Gender		
Men	135	54
Women	115	46
Education		
Matric	17	7
Intermediate	127	49
Bachelor	83	33
Masters	27	11

Measures

Gaming Addiction Scale for Adolescents (GASA)

GASA is a 29-item Likert scale with scores ranging from “never” (1) to “very often” (5). The Cronbach’s reliability for this scale was .94 (Lemmens et al., 2009). This scale was used to measure online ludo game addiction. The scale reliability in this study is .75 which is satisfactory.

Abbreviated Profile of Mood State (PMOS-Revised Version)

POMS’s revised version is a 40-item questionnaire. It measures fatigue, anger, vigor, tension, esteem, confusion, and depression. It is a Likert scale, items ranged from "not at all" *(1) to “extremely” (4). The Cronbach's reliability for this scale was .80 (Grove & Prapavessis, 1992). The use of this scale in this study was to assess negative emotions. The reliability of the scale in this study is .71 which is acceptable.

Buss Perry Aggression Questionnaire (BPAQ)

The Buss-Perry Aggression Questionnaire (1992) contains 29 items on a 1-5 Likert scale. With a Cronbach's alpha of .91, it measured aggression. In this study, its reliability was .74, indicating good consistency.

Procedure

The study adopted a correlational design and purpose sample technique to measure online ludo game addiction, negative emotions and aggression. Three established instruments were administered: the Gaming Addiction Scale for Adolescents, which measures online ludo game addiction; the Abbreviated Profile of Mood States (Revised Version), which evaluates various mood states including tension, depression, and anger; and the Buss and Perry Aggression Questionnaire, which aggression of study participants. The study participants were selected from different colleges and universities in Lahore and Karachi. The participants completed a demographic questionnaire and other three instruments of the study after obtaining consent via an online Google form. The participants took about 10 to 15 minutes to complete the questionnaire.

Ethical Considerations

- Upon completion of the surveys, participants were debriefed about the research and they were thanked for their participation.
- It is important to mention that approval for the study was obtained from the psychology department, and the data collection questionnaire was in English, as the study involved an educated cohort.

Results

For data analysis, IBM SPSS 22 was used to conduct frequency analyses of demographic characteristics and to perform correlational analysis to assess relationships between the study variables. Furthermore, Hayes Process 4.2 was utilized to test a mediation model, where negative emotion was examined as a potential mediator between study variables.

Table 2

Pearson Product Moment Correlation among Study Variables (N=250).

Variables	*M*	*SD*	1	2	3
1. Online Ludo Game Addiction	77.74	11.46	-		
2. Negative Emotions	127.74	16.21	.06	-	
3. Aggression	86.23	12.72	.16*	.13*	-

Note. *p<.05.

Table 2 showed that online ludo game addiction is significantly and positively related to negative emotions and aggression, however, the relationship between negative emotions and aggression is positive but not significant.

Hayes Process Macro (Version 4.1) was used to find mediation of negative emotions between online ludo game addiction and aggression.

Table 3

Meditation Analysis Showing the Role of Negative Emotions in the Relationship between Online Ludo Game Addiction and Aggression (N=250)

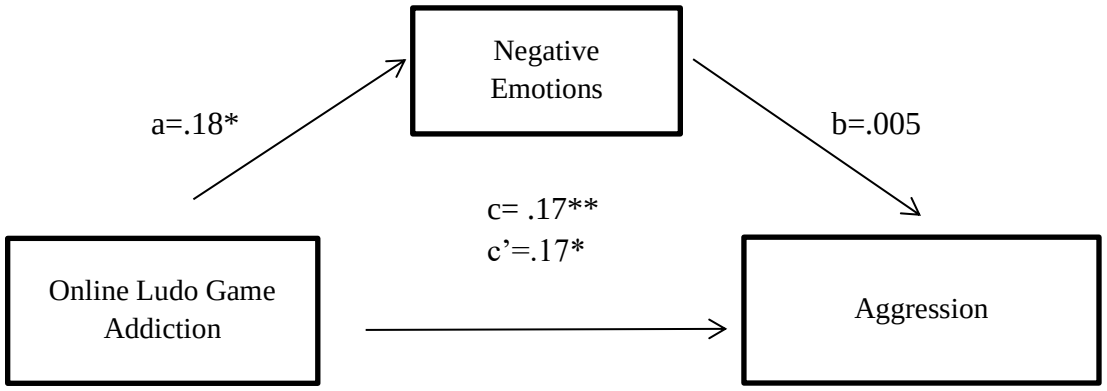
		Consequents										
		NE (M)				Aggression (Y)				Aggression (Y)		
											95% CI	
Antecedents		*B*	*SE*	*P*		*B*	*SE*	*p*		*β*	*SE*	*LL*	*UL*
OLGA (*X*)	*a*	.18	.08	.03	*c'*	.17	.07	.01	a.b	.001	.01	-.01	.02
NE(*M*)	-	-	-	-	*b*	.005	.05	.91					
Constant	*I*	113.1	7	<.001	*I*	71.81	7.84	<.001					
		R^2 =.02				R^2 =.02				R^2 =.02			
		F=4.51				*F=3.23*				*F=6.48*			

Note. LGA= Online Ludo Game Addiction, NE= Negative Emotions, A= Aggression

The Table 3 shows that the direct effect of online Ludo game addiction on negative emotions is positively significant (β = .18*, p < .05). Similarly, the direct effect of online Ludo game addiction on aggression is also positive and significant (β = .17**, p < .01). However, the direct effect of negative emotions on aggression is not significant (β = .005, p > .05). The indirect effects indicate that the total indirect effect of online Ludo game addiction on aggression through negative emotions is statistically insignificant.

Figure 1

Showing the Indirect Effect of Negative Emotions between Online Gaming Addiction and Aggression (N=250)



The statistical mediation model above demonstrates that the effect of online ludo game addiction on negative emotions (path a) is positively significant (β = .18, p < .05). However, the effect of negative emotions on aggression (path b) is insignificant (β = .005, p > .05). The direct effect (path c') shows a statistically significant positive relationship, indicating that online ludo game addiction has a significant positive effect on aggression (β = .17**, p < .01). The total effect (path c) is also statistically positive and significant, suggesting that online ludo game addiction influences aggression through negative emotions (β = .17**, p < .01)

Table 4

Independent Sample t-Test Showing the Mean Differences in Gender among the Variables (N=250)

	Men		Women				
Variables	*M*	*SD*	*M*	*SD*	*t*(248)	*p*	Cohen's *d*
OLGA	80.32	11.29	74.80	10.99	3.90	.000	0.49
NE	127.96	15.93	127.50	16.60	.22	.827	0.03
Aggression	87.72	12.80	84.49	12.46	2.01	.045	0.26

Note. Men = 135, Women = 115, OLGA= Online Ludo Game Addiction, NE= Negative Emotions, AG=Aggression

Table showed that men scored significantly higher than women on online Ludo game addiction (M = 80.32, SD = 11.29) and aggression (M = 87.72**,** SD = 12.80). Women scored lower than men on negative emotions, but the difference was not significant.

Discussion

Online gaming has been increasingly popular, particularly among young people. The transition of games from the physical world to online platforms, such as online ludo games is

particularly fascinating. However, addiction to these games often leads to aggression, as reported by numerous studies. To explore this phenomenon, this study was conducted focusing on negative emotions as potential mediators of aggression stemming from online gaming. The researcher specifically chose the online ludo game for its popularity and the limited research conducted on it.

Hypothesis 1 aimed to investigate the relationships among the study variables in students. Correlation analysis revealed a significant positive association between online ludo game addiction and negative emotions. This finding aligns with previous research by Savci and Aysan (2017), which demonstrated that addiction to smartphones and gaming correlates positively with negative emotions. Additionally, results indicated that online ludo addiction is significantly related to aggression, consistent with findings showing a link between online game addiction, aggression, and narcissism (Jeong et al., 2020). This study is also similar to a recent study conducted by Shahid et al. (2024a) on young adults which depicts that social networking platform addiction is related to aggression in adults aged 18 to 25. One similar study depicts that addiction to PUBG game is related to aggression in young adults (Kausar et al., 2024). Correlation analysis also suggested a positive association between negative emotions and aggression, though it was not statistically significant. This finding is in line with research indicating that socially connected peer groups during online gaming may exhibit aggressive behavior as gameplay intensifies (Dishion & Tipsord, 2011). Another similar study depicts that negative emotions have been identified as particularly influential in gaming contexts, with anger, in particular, having the most significant impact on gamers' aggressive behavior (Lin et al., 2017).

Hypothesis 2 proposed that negative emotions would mediate the association between the study variables. The direct effect of online ludo game addiction (path c') significantly influenced aggression, and the total effect via negative emotions (path c) was also positive and significant, despite an insignificant path b in the statistical model. This supports previous studies suggesting that excessive online gaming triggers aggressive behavior in young adults (Lemmens et al., 2015). The finding of this study is similar to the general aggression model that exposure to games elevates aggression as games situation increases negative emotions such as frustration, anger and irritation that influence aggression (Irmak & Erdogan, 2016; Kahila et al., 2022; Zhao et al., 2021). Studies have depicted that addiction to games is related to negative emotions that could be due to poor performance, frequent loss, and not achieving the target, these negative emotions lead to aggression either while online gaming, or to their surrounding people in the physical world (Akbaş & Işleyen, 2024; Allen & Anderson, 2018; Bhagat et al., 2020; Eker & 2022L; Tan & Chen, 2022). Studies have shown that negative emotions due to online digital games often lead to aggressive behavior (Bopp et al., 2016; Elson & Ferguson, 2014; Jamil et al., 2024; Przybylski et al., 2014; Saarinen, 2017). The insignificant indirect path in the present study could be attributed to factors such as a smaller sample size, the reappraisal of negative emotions, and the personality traits of the participants.

Hypothesis 3 assumed significant gender differences in online ludo game addiction, negative emotions, and aggression among students. Independent sample t-tests showed that scores

on online ludo game addiction and aggression were higher for men. This is consistent with the findings of studies indicating that men are more engaged in online gaming due to social norms, genre preferences, and other factors (Bashir et al., 2024; Kausar et al., 2024; Lange et al., 2021). Moreover, Archer (2004) reported that testosterone levels and cultural norms that encourage dominance and aggressiveness can also contribute to increased aggressive behaviors in men (Archer, 2004). Findings also shows that scores on negative emotions were higher in men but it was not significant. This is parallel to the previous study finding which states that men are more prone to negative emotions anger and irritability by suppressing anxiety and depression symptoms due to societal norms (Addis, 2008; Genuchi & Valdez, 2015; Jakupcak et al., 2005; Pătrașcu et al., 2024).

Conclusion

It is concluded from the study that online ludo game addiction is positively and significantly related to negative emotions and aggression among young adults. Moreover, negative emotions do not mediate the association of the independent variable (online ludo game addiction) and the dependent variable (aggression) in young adults. Lastly, men showed higher scores on online ludo game addiction and aggression as compared to women.

Limitation and Recommendations

The first limitation is that the study findings cannot be generalized beyond students, as the data was exclusively collected from this group. Future research should consider including employed and unemployed individuals to broaden the scope of applicability. Another limitation is the length of the scales used in the study, which caused fatigue during questionnaire completion. Shorter scales are recommended for future studies to improve participant engagement and data quality. Finally, there was heterogeneity in the educational backgrounds of the participants, with most coming from intermediate education. This may restrict the study’s ability to make conclusions across various educational subgroups. Future research should incorporate balanced categories in the inclusion criteria to better represent individuals from diverse educational backgrounds.

Implications

This study explored the negative consequences of game addiction to minimize its impact on mental health. The study can be used to create awareness regrating the adverse consequences of online ludo game. Furthermore, parental awareness is crucial, as neglect can contribute to addiction. Educating parents and youth on the harmful effects of online ludo gaming can promotes mental well-being. This research offers valuable insights for professionals to raise awareness about gaming's negative effects and coping strategies.

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