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THE MEDIATING ROLE OF SOCIAL CONNECTEDNESS IN LINKING LUDO STAR GAME ADDICTION AND MENTAL HEALTH PROBLEMS IN YOUNG ADULTS

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KEYWORDS	ABSTRACT
<p>Social Connectedness, Game Addiction, Aggression, Ludo Star Game, Mental Health & Young Adults</p>	<p>The trend of online games with chatting options has been rising; however, addiction to these games leads to adverse consequences. Ludo Star, the most popular game in Pakistan, has shifted from physical to online play due to convenience and lower device requirements. This study investigates the relationship amid Ludo Star game addiction & psychological well-being, mediated by social connectedness amid young adults. correlational design & purposive sampling was used. The Ludo Star game addiction correlates positively with social connectedness ($r=.02, p>.05$) and aggression ($r=.13^*, p<.05$). The social connectedness also correlates positively with aggression ($r=.01, p>.05$), though not significantly. The statistical model shows social connectedness partially mediates effect of Ludo Star game addiction on aggression in young adults since direct & total effect is positively significant but indirect effect is insignificant. The men score significantly higher than women in the Ludo Star game addiction; no significant gender difference exists in social connectedness or aggression, despite men's higher mean scores. Study concluded that social connectedness significantly mediate relationship of Ludo Star game addiction and aggression in young adults. Recommendations, limitations & implications for society benefits are offered in the study.</p>
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INTRODUCTION

In the 1990s, online video games quickly became popular due to their accessibility (Kalsoom, Cheema, Ahmad & Bibi, 2022). Recently, many young adults in Pakistan have been dedicating hours to collaborative gameplay. While gaming fosters social connections (Singh, 2021), it has raised concerns about addiction and its impact on daily life. The research shows that gaming addiction is behavioral issue, not just impulse control, often leading to detrimental personality

traits (Salvarlı & Griffiths, 2021). Compulsive gaming disrupts daily functioning and is linked with social withdrawal and psychological isolation (Koban, Biehl, Bornemeier & Ohler, 2021). Recognized as a disorder similar to gambling addiction (Jeong, Lee, Kwon, Yim & Lee, 2020), excessive gaming may heighten aggressive behaviors amid tech-reliant young adults (Abbasi, Asif, Hollebeek, Islam, Ting & Rehman, 2020). Aggression, which involves behaviors intended to harm others, is linked to gaming addiction, especially among the smartphone users who fear losing device access (Yilmaz, Sulak, Griffiths & Yilmaz, 2023). In this connection, the research shows a significant correlation between aggression and smartphone addiction, as these devices become the main platform for diverse gaming and social interaction (Yilmaz, Avci & Yilmaz, 2023).

A systematic review and meta-analysis of 50 studies examined relationship amid problematic gaming and various health outcomes, finding significant associations with depression, anxiety, obsessive-compulsive disorder, and somatization (Männikkö, Ruotsalainen, Miettunen, Pontes & Kääriäinen, 2020). Additionally, traits like aggression, narcissism, and low self-control have been identified as risk factors for online gaming addiction (Jeong et al., 2020). The longitudinal research confirms that social connectedness predicts the long-term psychological well-being in adolescents (Tejada, Belled & Alsinet, 2023). The interventions using motivational interviewing have shown promise in improving psychological well-being among gamers and psychological health is associated with aggressive behavior (Afriwilda & Mulawarman, 2021; Gismero, Jódar, Martínez, Carrasco, Cagigal & Ursúa, 2020). It includes structural and functional aspects of the social relationships that shape individual's perception of meaningful & reciprocal connections with others (Bergman, Bethell, Hassink & Stange, 2020). The Esports participation measured by in-game communication frequency among gamers is inversely related to social connectedness in physical connectedness & positively linked to online connectedness during game (McDonald, 2022).

LITERATURE REVIEW

The compensatory model indicates that perceived stress significantly influences both positive and negative relationships amid gaming behaviors and harmful outcomes, highlighting that pressured (obsessive) engagement leads to the bad effects, while self-determined (harmonious) engagement promotes healthier gaming practices. These insights provide solid empirical basis for developing active prevention and intervention strategies for problematic gaming (Koban, Biehl, Bornemeier & Ohler, 2021; Giardina, Schimmenti, Starcevic, King, Blasi & Billieux, 2024). A popular game, Ludo, employs Q-learning, the type of reinforcement learning, to simplify its complexity & offers strategic challenge requiring players to apply basic knowledge for decision-making. The game features non-player characters (NPCs) that mimic human-like intelligence while adhering to rules, causal to its global popularity (Sarankirthish, Narayanan, Gopinath & ME, 2022). This aligns with excessive use of social media triggers aggressive behavior in young adults Originating from an ancient Indian game, Ludo accommodates two to four players who move four tokens from Start position to finish based on dice rolls, with victory realized by navigating all tokens across the board (Tubaihsat, Anwar, Shah & Razzaq, 2023; Sève & Wolfe, 2024).

A recent systematic review of the online gaming addiction among children and young adults, published in **Addictive Behaviors** (Rosendo, Trott & Shukla, 2022), notably excluded many relevant studies due to limited search terms that did not include key phrases like "adolescent," "gaming disorder," or "video game addiction." The review also included studies with samples averaging up to 25 years, allowing ineligible participants and missing studies with mean ages below 26. Consequently, this review should be seen as the "suggestive" rather than "definitive" regarding problematic gaming in youth (Griffiths, 2022). In game development, the Ludo Star exemplifies decision-making in the fuzzy, unpredictable environment, showcasing techniques for automating resource management and strategic decisions (Khodizah, Irwandani & Kholid, 2019; Chiapello, 2021; Sarankirthik et al., 2022; Blom, 2021). Playing Ludo lifts logical thinking, fosters social connections, and develops cognitive skills over experiences of success and failure aim to boost IQ and enrich game's educational value (Sarankirthik et al., 2022). Still, the recent study revealed that in young adults Ludo Star game addiction is detrimental to psychological welfare in young adults via social connectedness as mediator (Bibi, Bashir, Shahid & Mukhtar, 2024).

The pathological gaming is associated with elevated aggressive behavior which is reported to be more in men than in women (Heng & Rabbani, 2020; Attanasi, Maffioletti, Shalukhina, Bel & Cherikh, 2021; Gómez, Lázaro & Martínez, 2021; Yu, Mo, Zhang, Li & Lau, 2021; Fahrizal & Pratama, 2021; Joshi, Sharma, Sigdel, Thapa & Mehta, 2022). Internet connectedness i.e., social networking sites are related to aggression and cyber bullying (Kee, Al-Anesi & Al-Anesi, 2022; Lucas et al., 2022; Shahid et al., 2024). Literature reviewed indicates that addiction to gaming online has the detrimental impact on mental health by promoting aggression. However, many studies have overlooked intermediary role of social connectedness, creating a notable research gap. In this study, gaming addiction is defined through Ludo Star, game widely popular in the subcontinent but relatively under-researched. Mental health problems, mainly aggression, are operationalized as primary outcome, an area extensively studied in existing literature. Ludo Star was chosen due to its widespread play in subcontinent, with the potential for heightened aggression among players. Game chat function facilitates player interaction, sometime leading to contentious exchanges when game tensions escalate resulting in aggression mainly in young adults.

Hypothesis of Study

- H1: There is likely to be significant positive relationship between Ludo Star game addiction, social connectedness and aggression in young adults.
- H2: Social Connectedness would positively and significantly mediate between relationship of Ludo Star game addiction and aggression in young adults.
- H3: There is likely to a gender difference between study variable Ludo Star game addiction, social connectedness and aggression in young adults.

RESEARCH METHODOLOGY

Co-relational research design was used in study to find relationship between study variables. Non-probability purposive sampling was used in this study. In this linking, the participants

aged between 18 and 25 years were included in the present research study if they possessed a mobile phone with the Ludo Star game installed and have been playing it for the last twelve months.

Assessment Measures

Gaming Addiction Scale for Adolescents (GASA)

The GASA, developed by Lemmens, Valkenburg, and Peter in 2009, consists of a 21-item Likert scale ranging from "never" (1) to "very often" (5). The scale demonstrated high reliability with a Cronbach's alpha of 0.94 and was utilized to assess addiction to the Ludo Star game in this study.

Social Connectedness Scale (SCS-R)

The Revised Social Connectedness Scale (SCS-R), a 20-item questionnaire developed by Lee in 2001, uses scoring range of 1 to 6, where 1 signifies "strongly disagree" and 6 signifies "strongly agree". In this connection, the scale exhibited the good internal consistency with the reported Cronbach's alpha of .92 values. In this study, items 3, 6, 7, 9, 11, 13, 15, 17, 18, and 20 were reverse-scored. This scale is used to measure social connectedness of Ludo game players in this study.

Buss Perry Aggression Questionnaire(BPAQ)

The Buss and Perry aggression questionnaire was developed by [Buss and Perry \(1992\)](#), the Buss Perry Aggression Questionnaire comprises 29 items ranging from extremely uncharacteristic (1) to extremely characteristic (5). Similarly, the higher score shows higher aggression. In this linking, the scale demonstrated a Cronbach's alpha of 0.82, assessing levels of aggression in participants.

Ethical Consideration

All ethical considerations were strictly followed during the research process. Permissions were obtained from original authors for use of their scales, and necessary approvals were secured from related authorities for data collection. Informed consent was acquired from participants, who were debriefed about study's objectives to minimize biases. Confidentiality & anonymity of responses were ensured, and participants could withdraw from study at any time without repercussions. In this regard, no psychological, amotional or physical harm was inflicted upon any participant. All reported data were accurate and properly cited, and ethical approval was granted.

Procedure of Study

The study adhered to the ethical guidelines set by the APA. Before data collection, permissions were obtained from scale authors, and a demographic form was administered to gather basic participant information, including gender, age, education, and employment status of young adults. Institutional approvals were secured, and participants were thoroughly briefed on the study's objectives to minimize bias. In this linking, informed consent was obtained, ensuring their anonymity and confidentiality, and participants were informed of their right to withdraw

at any time. Only those meeting the inclusion criteria and providing informed consent were included. Thus, the survey took approximately 15 minutes to complete, and participants were thanked for their involvement at the end of data collection. Likewise, ethical standards were meticulously upheld throughout the study, following the APA's 7th edition ethical code of the conduct.

RESULT OF STUDY

Table 1

Relationship among Research Variables (N=300)

Variables	1	2	3	Mean	SD
1.Ludo Star Game Addiction	-	.02	.13*	78.95	10.23
2. Social Connectedness		-	.01	67	18
3. Aggression			-	76.62	18.6

Note. *p <.05, **p<.01.

The table above shows the relationships among Ludo Star game addiction shows a positive but not significant correlation with Social connectedness ($r=.02, p>.05$). Moreover, the relationship between the Ludo game addiction with the aggression is significantly positive ($r=.13^*, p<.05$) Social connectedness also positively though not significantly correlates with aggression ($r=.01, p>.05$).

Table 2

Regression Coefficients for Study Variables in Sample of 300 Young Adults (N=300).

Antecedent	Consequent							
	SC (M)			Aggression(Y)				
	B	SE	P	c'	B	SE	P	
Ludo Star Game Addiction (X)	A	.04	.10	.65	c'	.25	.10	.01
Social Connectedness(M)	-				b	.01	.05	.86
Constant	I	63.43	8.1	<.001	I	56.13	9.13	<.001
		R2 =.02				R2 =.01		
		F=.65				F=2.91		

Note. *p<.05, **p<.01, ***p<.001

According to the table above, there is the positive but not significant direct effect of Ludo Star game addiction on social connectedness ($\beta = .04, SE = .10, p>.05$). Furthermore, direct effect Ludo Star game addiction on the aggression is positively significant ($\beta = .25^{**}, SE = .10, p<.01$). The social connectedness effect on aggression is positive but not significant ($B=.01, SE=.05, p>.05$).

Table 3

Indirect Effect (N=300)

Indirect Path	B	SE	Lower Level CI	Upper Level CI
Social Connectedness	.0005	.006	-.006	.01

Note. B= Standardized Effect, SE= Standardized Error, CI=Confidence Interval

The above table demonstrate that the indirect path is not significant as lower level confidence interval and upper level confidence interval signs are different thus effect of Ludo Star game addiction on aggression via social connectedness is not significant in young adults as shown in results.

Table 4
Gender Difference between Study Variables (N=300)

Variables	Men (n=153)		Women (n=147)		t(298)	P	Cohen's d
	Mean	SD	Mean	SD			
Ludo Star Game Addiction	81.77	10.73	76.06	8.82	5	<.001	0.58
Social Connectedness	67.35	15.36	66.58	20.35	.37	.71	0.04
Aggression	77.22	17.73	76	19.50	.57	.56	0.06

Note. *p<.05. **p<.01, SD= Standard deviation

According to the table above there is significant difference between genders when it comes to study variable Ludo Star game addiction as men score significantly higher than women. There is no significant difference social connectedness & aggression but the mean score shows from table.

DISCUSSION

The trend of online games with chatting options has been on the rise in recent years. However, addiction to these games can cause mental health problems, such as aggression. The objective of this study is to investigate relationship between Ludo Star game addiction and aggression, mediated by social connectedness in young adults. Several statistical analyses were performed to test hypotheses. Demographic information was obtained by computing descriptive statistics. H1 aimed to explore relationship between Ludo Star game addiction, social connectedness and aggression in young adults. Correlation analysis showed positive relationship between Ludo Star game addiction and social connectedness. This finding is consistent with a study by which found that addiction to video games, smartphones correlates positively & significantly with social connectedness (Karaoglan et al., 2023; Yilmaz et al., 2023; Nuri et al., 2021). Results show that Ludo Star game addiction is significantly related to aggression, similar to results showing that online game addiction correlates with psychological traits like aggression and narcissism (Jeong et al., 2020; Akbaş & İşleyen, 2024; Caner & Evgin, 2021; Yifei, & Motevalli, 2023; Kyung, 2021).

Correlation analysis also suggests that social connectedness, while not significant, is positively associated with aggression. This result is supported by study revealing that socially connected peer groups during gaming and using social networking sites are prone to aggressive behavior (Verheijen et al., 2021; Shahid et al., 2024). The H2 proposed that social connectedness would mediate relationship between Ludo Star game addiction and aggression in young adults. The direct effect of Ludo Star game addiction (path c') had positive significant effect on aggression, and total effect of Ludo Star game addiction on aggression via mediator social connectedness

(path c) was significantly positive, despite paths a and b being insignificant in statistical model. This aligns with similar study, suggests that excessive use of social media triggers aggressive behavior in young adults (Shahid et al., 2024). One more study shows the positive relationship amid social media addiction & aggression in adolescents via mediator night time social media use (Lin et al., 2024). This study aims to address this gap by investigating relationship between gaming & mental health issues, specifically focusing on mediator social connections in young adults.

The limited research exists on social connectedness as a mediator between addiction to online gaming and aggression, motivating this study's focus on Ludo Star game addiction, a rarely studied variable. Hypothesis 3 posited that significant gender differences exist in addiction to the Ludo Star game, social connectedness, and psychological well-being among young adults. Independent samples t-tests revealed that men exhibited markedly higher levels of Ludo Star game addiction, while their mean scores for social connectedness and aggression, although not significantly different, were elevated compared to women. This aligns with previous research suggesting that men are more immersed in online gaming, driven by genre preferences, social norms, and additional factors (Kuss & Griffiths, 2021). A meta-analysis on sex differences in aggression indicates that cultural norms that promote dominance and aggression among men, combined with elevated testosterone levels, contribute to their enhanced social connectedness and aggression (Su et al., 2020). Thus, the social connectedness is defined as the feeling of being connected to group and experiencing closeness to others (Bailey, Farrell, Kuchler & Stroebel, 2020).

Our findings corroborate the literature indicating a higher prevalence of the social media and internet gaming addiction among male university students (Burén et al., 2021). Moreover, they align with meta-analytic studies that suggest men exhibit greater aggression than women in both online and offline contexts, influenced by the cultural norms, societal expectations, and biological factors such as testosterone levels (Koester & Marcus, 2024). The elevated levels of social connectedness observed in men are also consistent with research indicating that men often possess larger social networks, which they leverage for social support and integration (Holmes, 2021). Besides, a meta-analysis on aggression confirms that cultural norms fostering dominance and aggression in men, along with higher testosterone levels, contribute to their increased social connectedness and aggression (Tevlin, 2021). Thus, given that this study was conducted in conservative context like Pakistan, where men frequently occupy dominant roles and women may experience subordination, cultural backdrop may elucidate the significantly higher scores observed in men concerning social connectedness, Ludo Star game addiction, & aggression.

CONCLUSION

The study aimed to fill the gap in previous research by examining social connectedness as a mediator between Ludo Star game addiction and aggression in young adults. Results indicated that Ludo Star game addiction is positively, but not significantly, related social connectedness and significantly and positively associated with aggression. The relationship between social connectedness and aggression was positive but not significant. Statistical model demonstrated

that social connectedness partially mediates effect of Ludo Star game addiction on aggression, with direct and total path effects being statistically significant, while indirect path remained insignificant. An independent samples t-test for gender differences revealed that men scored significantly higher on Ludo Star game addiction, and while they had higher scores on social connectedness and aggression, these differences were not significant. A t-test for employment status showed that unemployed participants scored significantly higher on the Ludo Star game addiction and although not significantly, on aggression, employed participants scored higher on social connectedness compared to unemployed participants, though this difference was not significant.

Limitations & Recommendation

This study included a sample of only 300 students, which may not fully represent the broader population of young adults. Additionally, the study focused exclusively on individual's aged 18 to 25, omitting PhD students due to age restrictions. Future research should encompass a wider age range to ensure inclusivity insights. The study encompassed cross sectional research design and purposive sampling technique, in the future it is suggested to conduct longitudinal study with stratified sampling to generalize finding, with sampling technique generalizability is limited.

Implications

This study successfully demonstrated that addiction to Ludo Star game significantly influences aggression over social connectedness amid young adults addressing gaps in previous research. It makes a substantial contribution to the fields of social sciences and media by highlighting the detrimental impact of Ludo Star game addiction on aggression, linked to social connectedness. Mental health professionals & educators should raise awareness amid young people, parents, and guardians about potential adverse effects of excessive gaming on aggression. Government authorities & policymakers should develop effective strategies to prevent youth from becoming addicted to online games promoting alternate activities like meditation, yoga, physical sports, and exercise to reduce technology exposure. Awareness campaigns should also stress seeking help from mental health professionals if gaming significantly disrupts an individual's life and well-being.

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