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Massively multiplayer online gaming addiction and psychological state: aggression in the boat of sadistic tendencies

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Ethical Approval and Informed Consent

Although our institution does not have a formal ethics committee, it is claimed that informed permission was obtained, and the authors followed all applicable ethical guidelines.

Availability of Data

Data sets will be made available upon request or requirement.

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Author Contributions

The conceptualization and design of the study were collective efforts of all the writers. Hayat Muhammad, Imtiaz Ali, and Summiya Ahmad prepared the materials, gathered the data, and analyzed them. Hayat Muhammad wrote the initial draft of the manuscript, and subsequent versions received feedback from all contributors. This final paper was reviewed and approved by all of the writers.

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ABSTRACT

MMOG addiction has been related to unfavorable psychological results and mental health and well-being in the recent decade. MMOG addiction and psychological condition (aggression, sadistic tendencies, anxiety, despair, and stress) were examined in university undergraduates. Three hundred fifty-five Peshawar University undergraduates were selected using convenient purposive sampling. The MMOG-MS (Demetrovics et al., 2011) measured gaming addiction, the K-6 measured psychological distress, the SABS-10 measured sadistic tendencies, and the DASS-21 measured depression, anxiety, and stress. MMOG players may have higher rates of depression, anxiety, and stress. MMOGs also increase sadistic behavior and aggressiveness. Sadistic behavior may also partially mediate MMOG aggression. Urban and rural kids did not differ on six variables. MMOGs and mental health outcomes may be complex and context-dependent; therefore, additional research is needed to understand the mechanisms. MMOG addiction and undergraduate psychology were studied. MMOGs were linked to sadness, anxiety, and stress.

Keywords: MMOG; Psychological State; Aggression; Sadistic Tendencies; Gaming Addiction

INTRODUCTION

Massively Multiplayer Online Gaming (MMOG) addiction has become a growing concern in recent years due to the increasing popularity of online gaming. While gaming can be an enjoyable pastime, some individuals may develop problematic patterns of behavior that can negatively impact their psychological state (Liu & Peng, 2009; Theil, Buchweitz, Schulz, & Korn, 2022) and relationships (Utz, Jonas & Tonkens, 2012). One potential consequence of

MMOG addiction is increased aggressive behavior, including sadistic tendencies. This can manifest in various ways, such as actively seeking out opportunities to harm other players or taking pleasure in the suffering of others (Greitemeyer, 2015). These behaviors can harm others and the individual, leading to feelings of guilt, shame, and isolation (Kinnunen, Taskinen, & Mayr, 2020).

MMOGs allow players to interact in a virtual environment, creating a sense of community and social connection (Badrinarayanan, Sierra, & Taute, 2014). However, some players may become addicted to the game, spending excessive time playing and neglecting other aspects of their lives, such as work, relationships, and self-care (Chen, Mari, Grech & Levitt, 2020). This addiction can lead to changes in their psychological state, including increased aggression and sadistic tendencies (Chester & DeWall, 2017).

Research has shown that MMOG addiction can lead to increased aggressive behavior both in-game and real life (Barnet & Coulson, 2010). Players addicted to the game may develop a strong attachment to their virtual character or avatar, giving them a sense of ownership over their virtual possessions and territory (Kiraly, Nagygyorgy, Griffiths & Demetrovics, 2014). This can result in territoriality and aggression towards other players, whom they perceive as threatening their in-game possessions. Moreover, MMOGs often involve violent themes and scenarios, which can desensitize players to violent content and encourage sadistic tendencies (Bender & Barlett, 2021). Some players may enjoy the power and control they feel when engaging in violent or sadistic behavior in the game, leading them to seek out these experiences (Atkinson & Rodgers, 2016), which may make them more aggressive and sadistic in real life.

Massive Multiplayer Online Gaming (MMOG) addiction has been associated with anxiety, depression, and stress in several studies. Findings revealed that the psychological risk

factors of addiction to social networking sites, including MMOGs, among Chinese smartphone users showed that addiction to social networking sites was positively associated with anxiety and stress (Wu, Cheung, Ku & Hung, 2013). Furthermore, analyzing comorbid psychiatric symptoms of internet addiction, including MMOG addiction, revealed that individuals with internet addiction, including MMOG addiction, had higher levels of depression, anxiety, and hostility than those without addiction (Yen et al., 2007). These studies suggest that MMOG addiction may be associated with anxiety, depression, and stress. However, more research is needed to understand the causal relationship between MMOG addiction and these mental health issues.

Recently, numerous studies have been conducted in Pakistan on gaming addiction, i.e., assessing aggression in gaming addict youths (Shabir, Saleem, Mahmood & Perveen, 2021), effect on body mass index (Sahmsi, Sindhu & Fatima, 2023), analyzing distress in MMOG addicted medical students (Aziz, Ayub, Ullah & Hussain, 2023), the effect of gaming on mental health and physical health of adolescents in Karachi (Shabih, Gohar, Ahmed & Danish, 2021), and gaming addiction in educated youths (Bajwa, Inam & Arif, 2022). To our knowledge, no study has MMOG addiction and psychological state, i.e., anxiety, depression, stress, and sadistic tendencies. For this purpose, the present study tends to assess the predicting role of sadistic tendencies via aggression in MMOG players and to examine relationships among MMOG, aggression, and psychological states. Furthermore, this study would observe the regional differences among university undergraduates on MMOG, aggression, sadistic behavior, anxiety, stress, and depression.

Hypotheses

1. Massively Multiplayer Online Games (MMOG) will predict aggression via sadistic tendencies among university undergraduates.

2. Games Massively Multiplayer Online Games (MMOG) will lead to the development of depression, anxiety, and stress.
3. There will be a significant correlation between the study's variables.
4. There will be significant regional differences among university undergraduates.

MATERIALS AND METHODS

Participants

The sample was chosen through purposive sampling based on accessibility and via an invitation to university students. It had 355 students from various faculties and departments of the University. The treatment of participants was done following moral principles that ensured their anonymity, free and informed permission, and complete secrecy.

Instruments

1. Massively Multiplayer Online Games Motivations Scale (MMO-MS)

To assess motivation in MMOG addiction, the Massively Multiplayer Online Games Motivation Scale (MMO-MS) is used in the current study with 20 items having four subscales, i.e., Socialization (3 items), Exploration and Achievement with five items each, and Dissociation (7 items). Each item in this version of the MMO-MS is also rated on a 7-point Likert scale, ranging from 1 (strongly disagree) to 7 (strongly agree). The Cronbach alpha of the scale ranged from 0.78 to 0.89, showing high reliability. Also, with a duration of 2 weeks, the test-retest showed a correlation of 0.74-0.91, indicating good stability over time (Demetrovics et al., 2011).

2. The Kessler Psychological Distress Scale (K-6)

The K-6 is a six-item screening tool that measures an individual's psychological and non-psychological distress levels. It was developed by Kessler and his colleagues in 2003. It consisted of six questions that assess the presence and frequency of symptoms such as feeling

nervous, hopeless, restless, depressed, or that everything is an effort. It is a short and time-friendly scale, which can quickly be completed in various studies. The score of K-6 ranged from 0 to 24 with a response range of "none of the time" to "all of the time." High scores indicate more distress, while the Cronbach α reported was 0.88 (Kessler et al., 2002).

3. Sadistic Tendencies

The Sadistic Attitudes and Behaviors Scale (SABS) is designed to assess the severity of sadistic tendencies in individuals. The 10-item version of the SABS with a 5-point scoring range, i.e., strongly disagree=1 to strongly agree=5, also known as the SSIS (Short Sadistic Impulse Scale), is a shorter version of the scale that aims to provide a quicker and more efficient way of assessing sadistic tendencies. The SSIS includes items such as "I enjoy hurting people," "I have fantasies about hurting people," and "I like to see people suffer." Test-retest reliability showed a high correlation coefficient of .89 with a four-week duration, while Cronbach alpha showed 0.90 demonstrating high internal reliability (O'Meara et al., 2011).

4. Depression, Anxiety, and Stress Scale (DASS-21)

The DASS-21 item questionnaire was developed by Lovibond and Lovibond in 1995 and is widely used to assess depression, anxiety, and stress levels. The self-reported test comprises seven items for each subscale (depression, anxiety, and stress), with responses rated on a four-point Likert scale ranging from 0 ("never") to 3 ("always"). The depression, anxiety, and stress levels were classified as usual, mild, moderate, or severe, based on the scores obtained. The reliability of the short-form DASS subscales was found to be satisfactory for all three subscales, i.e., .70 for each depression, anxiety, and stress.

Procedure

Before data collection, several steps were implemented. The first step was obtaining permission from the head of various departments, and then a purposive sampling technique was employed to access the students in the second step. The purpose of the study was briefed to the students and to be informed that their participation was voluntary and no reward would be given to them. Then, booklets with study questionnaires were administered during class, which took almost 15 to 20 minutes. Lastly, the data was entered into SPSS-26 and AMOS and then analyzed.

RESULTS

The goal of the study aimed to study the influence of MMOG addiction and its relation to the psychological state, including aggression, sadistic tendencies, anxiety, depression, and stress. For this purpose, an empirical study was conducted on undergraduates at the University. Three hundred fifty-five undergraduate students from various departments of the concerned university were selected through a purposive sampling technique. The study employed several instruments such as the MMOG-MS (Demetrovics et al., 2011) to measure gaming addiction, the K-6 (Kessler et al., 2002) to assess psychological distress, the SABS-10 (O'Meara et al., 2011) to measure sadistic tendencies, and the DASS-21 (Lovibond & Lovibond, 1995) to evaluate depression, anxiety, and stress. The result generated and tabulated were;

Table 1 - *Regression Coefficient of Depression via MMOG*

			95% CI			
Variable	**Beta**	**SE**	**LL**	**UL**	**β**	***P***
MMOG	.116	.010	.097	.136	.532	.000

Dependent Variable: Depression

The table 1 of linear regression model revealed that the beta coefficient for MMOG is 0.116, which indicates a positive relationship between playing MMOGs and experiencing depression. 0.01 standard error showed precise estimation, while a range of beta coefficients portrayed a significant relationship between MMOG and depression. Hence, results revealed that individuals involved in MMOGs may be more likely to experience depression.

Table 2 - ***Regression Coefficient of Anxiety via MMOG***

			95% CI			
Variable	**Beta**	**SE**	**LL**	**UL**	**β**	***P***
MMOG	.095	.010	.078	.114	.458	.000

Dependent Variable: Anxiety

The table 2 reveals a beta coefficient of .095, indicating a positive relationship between MMOG and anxiety, meaning that as MMOG increases, anxiety also tends to increase. The results suggest that playing MMOG may be a risk factor for increased anxiety, although the magnitude of the effect is relatively small.

Table 3- *Regression Coefficient of Stress via MMOG*

			95% CI			
Variable	**Beta**	**SE**	**LL**	**UL**	**β**	***P***
MMOG	.095	.010	.077	.114	.469	.000

Dependent Variable: Stress

Table 3 presents a positive and significant relationship between MMOG and stress, meaning individuals may face stress while engaging in MMOGs.

Figure 1 – Conceptual Model

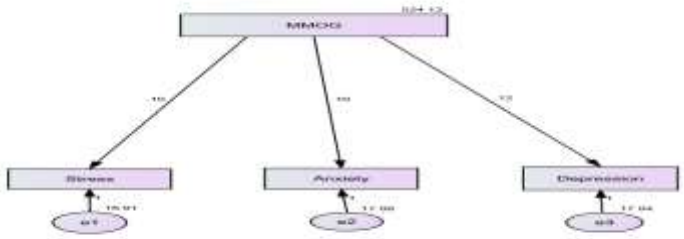

Figure 1 shows the path model of the study in which MMOG predicts depression, anxiety and stress.

Figure 2 – Conceptual Model

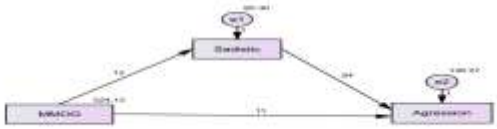

Figure 1 shows the path model of the study in which MMOG predicts aggression through the median of sadistic tendency.

Table 4 - SPSS PROCESS output for a simple mediation model

Model: 4

Y: Aggression

X: MMOG

M1: Sadistic

Sample Size: 355

Outcome Variable (Sadistic)							
Model Summary	**R**	**R-sq**	**MSE**	**F**	**Df1**	**Df2**	**P**
	.3153	.0994	85.76	38.96	1.0000	353.0000	.0000
Model							
	coeff	**se**	**t**	**p**	**LL(CI=95%)**	**UL(CI=95%)**	
Constant	47.4601	2.2530	21.06	.0000	43.02	51.89	
MMOG	.1340	.0215	6.24	.0000	.0918	.1763	

Table 4 reveals a 9.94% variance in the outcome variable, while the regression coefficients show that the intercept is 47.4601, indicating that when MMOG is zero, Sadistic is predicted to be 47.4601. The coefficient for MMOG is 0.1340, indicating that for every unit increase in MMOG, Sadistic is predicted to increase by 0.1340. The standard error of the coefficient and t-value are also reported, and the t-value is significant at $p<.001$, indicating that the coefficient is statistically significant.

Consequently, the analysis suggests that MMOG has a positive relationship with Sadistic, with higher levels of MMOG predicting higher levels of Sadistic behavior.

Table 5

Outcome Variable (Aggression)							
Model Summary	**R**	**R-sq**	**MSE**	**F**	**Df1**	**Df2**	**P**
	.6589	.4341	137.43	135.01	2.0000	352.0000	.0000
Model							
	coeff	**se**	**t**	**p**	**LL(CI=95%**	**UL(CI=95%)**	

					)	
Constant	42.64	4.2842	9.9544	.0000	34.22	51.07
MMOG	.1107	.0286	3.8653	.0001	.0544	.1670
Sadistic	.9390	.0674	13.93	.0000	.8065	1.0715

Direct effect of X on Y

Effect	**se**	**t**	**p**	**LL(CI=95%)**	**UL(CI=95%)**
.1107	.0286	3.86	.0001	.0544	.1670

The indirect effect of X on Y

	Effect	**BootSE**	**BootLL(CI=95%)**	**BootUL(CI=95%)**
Sadistic	.1259	.0260	.0796	.1821

Level of confidence for all confidence intervals in the output: 95.0000

Number of bootstrap samples for percentile bootstrap confidence intervals: 5000

Table 5 results showed 43% the variance in the outcome variable, i.e., aggression, and the coefficient for MMOG is 0.1107 with a standard error of 0.0286, indicating that MMOG has a significant direct effect on aggression (p-value < 0.001). The coefficient for Sadistic is 0.9390 with a standard error of 0.0674, indicating that Sadistic also has a significant direct effect on aggression (p-value < 0.001). Both predictor variables are positively associated with aggression, as their coefficients are positive.

The indirect effect of MMOG on Aggression through Sadistic is also presented in the table. The indirect effect is calculated as the product of the coefficient for MMOG and Sadistic, which is 0.1107 x 0.9390 = 0.1040. The bootstrap standard error for the indirect effect is 0.0260, and the 95% confidence interval for the indirect effect is (0.0796, 0.1821). This suggests that the

indirect effect is statistically significant, meaning that Sadistic partially mediates the relationship between MMOG and Aggression.

Hence, the results suggest that MMOG and Sadistic directly affect aggression, and Sadistic partially mediates the relationship between MMOG and Aggression.

Table 6 - ***Evaluation Table of Correlation among Variables of the study model***

Variable	**Mean**	**SD**	**1**	**2**	**3**	**4**	**5**	**6**
MMOG	102.40	22.92	-	-	-	-	-	-
Sadistic	61.18	9.74	.315**	-	-	-	-	-
Aggression	111.43	15.53	.349**	.640**	-	-	-	-
Depression	13.25	5.00	.532**	.171**	.219**	-	-	-
Anxiety	13.43	4.76	.458**	.166**	.254**	.830**	-	-
Stress	13.70	4.66	.469**	.134*	.203**	.811**	.803**	-

p<.001 *. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Note. It is revealed in table 6 that there is a significant correlation between MMOG, sadism, aggression, depression, anxiety, and stress.

Table 6 presents the results of the correlation among variables of six variables: MMOG, Sadistic, Aggression, Depression, Anxiety, and Stress, which reveal that there are significant correlations between all pairs of variables. Specifically, there is a positive correlation between MMOG and all other variables, including sadism (r = .315**), aggression (r = .349**), depression (r = .532**), anxiety (r = .458**), and stress (r = .469**). Moreover, there are positive correlations between sadism and aggression (r = .640**) and depression and anxiety (r =

.830**). Finally, there are positive correlations between anxiety and stress (r = .803**) and depression and stress (r = .219**).

Table 7- ***Means, standard deviations, and t-value of the Urban and Rural students (N=355)***

Variables	**Urban (n=138)**		**Rural (n=217)**				**95% CI**		**Cohen's d**
	M	**SD**	**M**	**SD**	**t**	**p**	**LL**	**UL**	
MMOG	100.73	23.88	103.46	22.28	-1.09	.275	-7.63	2.17	0.118
Sadistic	60.80	10.31	61.42	9.38	-.588	.577	-2.71	1.46	0.062
Aggression	111.84	15.94	111.17	15.30	.393	.695	-2.66	3.99	0.042
Depression	13.07	5.08	13.35	4.97	-.512	.609	-1.35	.793	0.055
Anxiety	13.13	5.02	13.62	4.59	-.957	.339	-1.51	.523	0.101
Stress	13.44	4.60	13.87	4.69	-.845	.399	-1.42	.569	0.092

p<.001

The means, standard deviations, t-values, p-values, Cohen's d effect sizes, and 95% confidence intervals (CI) for six variables (MMOG, Sadistic, Aggression, Depression, Anxiety, and Stress) for two groups of students: Urban (n=138) and Rural (n=217) portrayed in Table 7. The result shows non-significant differences between Urban and Rural students on the six variables, with small effect sizes.

DISCUSSION

The present tended to analyze the effect of MMOG addiction on Psychological State, i.e., aggression, sadistic tendencies, anxiety, depression, and stress, in 355 undergraduates from the University via purposive sampling technique. Instruments used for this purpose were MMOG-MS (Demetrovics et al., 2011), K-6 for measuring psychological distress (Kessler et al., 2002),

SABS-10 for sadistic tendencies (O'Meara et al., 2011) and DASS-21 (Lovibond & Lovibond, 1995). Before administering the questionnaires during class, the students were given a comprehensive explanation of the research objectives. Consent was obtained from each participant before completing the questionnaires, which took approximately 15 to 20 minutes. Once the data collection process was finished, all the questionnaire responses were collated and entered into a data management software (SPSS & AMOS), where they were analyzed and computed.

Online gamers are stereotyped due to their many undesirable habits. The study found higher depression in MMOG players **(table 1 and conceptual model 1)**, which is consistent with previous findings (Hagstrom & Kaldo, 2014; You, Kim & Lee, 2017). Online gamers also reported lower loneliness than offline gamers (Martoncik & Loksa, 2016). Intensive practices cause depression, anxiety, and MMOG (Marchetti, Sankey & Varescon, 2016). MMOGs may cause depression due to social isolation and time constraints. Thus, social isolation increases depression risk (Ni & Jia, 2023). MMOG addiction can disrupt job, school, and relationships. Addiction can cause pessimism, helplessness, and depression (Jeong, Kim, Lee & Lee, 2016). Online gaming environments can be toxic, resulting in cyberbullying, harassment, and discrimination. Negative social interaction can lower self-esteem, sorrow, and depression (Ünal-Aydın et al., 2023). Finally, some people utilize MMOGs to escape tension, worry, and sadness. However, avoidance and incapacity to cope with real-world obstacles can increase depression symptoms (Demetrovics et al., 2011).

Similarly, playing MMOGs may increase anxiety **(table 2 and conceptual model 1)**, though the effect is minor. MMOGs have grown in popularity, raising worries about their mental health effects. Przybylski et al. (2010) found that MMOG players who played more had higher

anxiety levels than those who played less, suggesting that MMOGs may increase anxiety. They believe that societal influences and game demands may cause a sense of commitment to play well. Király et al. (2015) evaluated mental health and online gaming in 3,256 Hungarian individuals. Problematic online gaming increased anxiety and depression. These findings complement our findings. The effect magnitude is minimal, however MMOGs may raise anxiety. More research is needed to understand this association and whether some people are more prone to gaming-related mental health issues. However, Van Rooij et al. (2012) found that while problematic gaming was associated with increased anxiety, there was no significant relationship between non-problematic gaming and anxiety, Ferguson et al. (2011) found no relationship between playing MMOGs and anxiety or depression in a sample of 400 college students, and Kuss et al. (2017) found that while problematic gaming was associated with increased anxiety, non-problematic gaming was not. These data reveal a dynamic, context-dependent connection. Game content, player motivation, and individual characteristics may modify the anxiety-MMOG association. More study is needed to comprehend this complexity and find MMOG-anxiety moderators and mediators.

We found that excessive MMOG use may cause stress **(table 3 and conceptual model 1)**. Hussain, Griffiths, and Baguley (2012) surveyed 540 gamers to examine the relationship between gaming addiction, gaming engagement, and stress and found that excessive gaming was positively associated with stress. In another study of 3,000 German adolescents, online gaming addiction was positively associated with psychological strain, suggesting that excessive online gaming may increase stress and strain (Rehbein, Kleimann, & Mössle, 2010). Recently, Pakistani authors discovered no influence of gaming on stress (Ahmed, Ahmed & Baneen, 2022), however students who play after midnight are more stressed than those who play in the morning, evening,

or early night (Zahra et al., 2020). Because sample factors like age, gender, and culture might affect generalizability, such associations may vary. College students in China may yield different findings than adults in Korea. Some research employs self-reported measurements, others objective or physiological markers. Many studies don't account for personality features, social support, and coping techniques, which can affect the stress-MMOG link. These factors can distort results if ignored.

The conclusion showed that MMOGs have a positive link with sadistic conduct, with higher levels of MMOG predicting higher levels of sadistic behavior **(table 4 & 5 and conceptual model 2)**. Researchers are divided on this subject. Some research showed a positive correlation, while others found none. For instance, internet gaming addiction was linked to cruel personality traits. The scientists cautioned that this association did not prove causality and that more research was needed to determine the link between online gaming and sadism (Choi et al., 2017). In a meta-analysis of 24 studies on video game use and sadistic personality traits, Ferguson et al. (2013) found no significant link between video game use and aggression. MMOG players were less sadistic in a 2018 study. MMOGs allow users to help each other and work together, which may explain this negative correlation (Kicaburun, Jonason & Griffith, 2018). MMOGs often involve competition, and players may engage in aggressive or sadistic behavior to gain an advantage over others or assert dominance. Online anonymity may make players feel less accountable for their actions. There was significant correlation among the current study variables **(table 6)**. There was no significant difference found between urban and rural respondents in the present study **(table 7)**.

Limitations

Despite significant findings, the study has several limitations, i.e., studies may have a limited sample size or may not represent the entire population, leading to skewed results because the sample was only chosen from the University. Also, the participants may only sometimes be honest in reporting their behaviors or may not be aware of the extent of their addiction, causing self-report biases. Regarding the generalizability of findings, the findings may only apply to some types of online games or different populations. Lastly, online gaming addiction is challenging to study because of the limited ability to control external factors, i.e., the present study should have taken social and environmental factors.

Implications

The implications of the study are:

- Studies can help researchers and clinicians better understand the addictive nature of online gaming and its potential impact on students' psychological well-being.
- Identifying risk factors for online gaming addiction can help individuals and professionals intervene earlier.
- Findings can help inform the development of effective interventions and treatment options for those struggling with online gaming addiction.
- Studies can inform efforts to prevent online gaming addiction before it becomes a problem, such as through public education campaigns or interventions to reduce risk factors.
- Findings can help clinicians and healthcare professionals better diagnose and treat online gaming addiction, mainly if there are distinct psychological profiles associated with addiction.

- Studies can help identify the prevalence of co-occurring mental health conditions in individuals with online gaming addiction, such as depression or anxiety, which could inform treatment approaches.

Conclusion

In conclusion, the study examined the relationship between Massively Multiplayer Online Gaming addiction and psychological state (aggression, sadistic tendencies, anxiety, depression, and stress) in undergraduates from the University. The findings revealed that playing MMOGs may increase the risk of depression and anxiety, while excessive use of MMOGs may lead to stress. Cyberbullying, social isolation, lack of social support, and the use of MMOGs to escape real-world problems were identified as possible reasons for the negative impact of MMOGs on mental health. However, the relationship between MMOGs and mental health outcomes may be complex and context-dependent, and more research is needed to understand the mechanisms underlying this relationship.

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