Screen Time on Multiplayer Online Battle Arena (MOBA) as Mediator Between Trash-Talking and Aggressive Behavior of Esports Players

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Abstract

While extensive research has examined the relationship between gaming and aggression, few studies have focused on the factors that mediate the connection between trash-talking behavior and aggressive outcomes in multiplayer online battle arena (MOBA) games. This study addresses this gap by investigating the role of screen time as a mediator between trash-talking and aggressive behaviors in young players of *Mobile Legends: Bang Bang (MLBB)*. Unlike previous research that primarily explored direct links between gaming and aggression, this study introduces screen time as a novel variable that influences this relationship. The study sampled 390 gamers aged 10 to 24 years, all enrolled at Southern Luzon State University in Lucban, Quezon, Philippines. Key variables, including verbal aggression, hostility, and anger, were assessed using standardized questionnaires, along with measures of trash-talking attitudes and screen time. Using mediation analysis, the study identified screen time as a key factor that explains the relationship between trash-talking and aggression. The findings revealed that trash-talking indirectly contributes to aggressive behavior through prolonged gaming exposure. In other words, the negative effects of trash-talking on aggression are amplified by increased screen time. This discovery offers a fresh perspective by highlighting screen time as a critical channel through which trash-talking influences aggression. The results underscore the importance of addressing both toxic communication and excessive screen time to foster a healthier and more sustainable gaming environment. As mobile gaming continues to dominate youth leisure activities, these findings provide actionable insights for developing interventions that reduce aggression and encourage positive competition in esports.

Keywords: Mobile legends: bang bang, MLBB, trash-talking, aggression, screen time

Introduction

With the exponential rise of online gaming, the landscape of leisure activities has undergone significant changes. Today, millions of individuals engage in immersive virtual worlds, dedicating substantial amounts of time to online gaming (Raymer, 2021). However, while online gaming reshapes how

individuals spend their leisure time, it has also ignited critical discussions about its potential influence on player aggression.

Historically, video games were perceived as utopian realms, ostensibly insulated from societal issues such as sexism, racism, and other prejudices due to the anonymity afforded by the internet. However, as esports gain popularity, it has become evident that these virtual environments are not immune to structural inequities and prejudices prevalent in the real world. This has resulted in the emergence of toxic online environments characterized by harassment targeting women, people of color, LGBTQ+ individuals, and those with disabilities (Hoffman et al., 2022).

Building on this understanding of the challenges within the digital gaming community, Dr. Bruce Bartholow stated in an interview with Columbia Broadcasting System (CBS) News, "One experience with a bloody video game won't make someone a murderer, but too much exposure to such violent material can harm children in the long run" (as cited in Jaslow, 2011).

Alternatively, violent content and genres in video games are not the only factors associated with triggering aggression. Adachi and Willoughby (2011) explored the relationship between players' aggressive behaviors and video game competitions. Their research examined various aspects of gaming that could fuel aggression and concluded that competitiveness, rather than violent content, is the most significant factor driving aggressive behavior. Similarly, Anderson et al. (2017) investigated the effects of screen violence on young people's behavior, particularly in the context of online gaming. Their laboratory-based experiments consistently demonstrated that exposure to violent media heightened aggressive thoughts, anger, nervousness, hostile intent, and desensitization to violence, while reducing positive behaviors such as helping others and displaying empathy.

The interplay between trash-talking, screen time, and aggression in online gaming is a complex dynamic that requires careful investigation. While prior studies have examined these factors individually, their
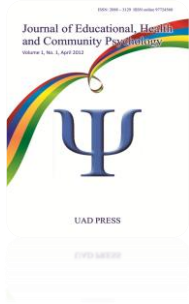
interconnected nature within multiplayer online gaming environments remains underexplored. Extended screen time in competitive online gaming settings may increase exposure to trash-talking and amplify its effects on players' aggressive behaviors. As gamers spend more time in environments where trash-talking is prevalent, the cumulative impact on their aggressive tendencies may surpass the influence of either factor alone. Understanding this potential mediating role of screen time between trash-talking and aggression is essential for developing effective interventions within gaming communities.

Moreover, the influence of online gaming extends beyond individual behavior, with implications for broader societal issues such as cyberbullying. The U.S. Department of Health and Human Services has highlighted the undeniable connection between cyberbullying and online gaming (Assistant Secretary for Public Affairs [ASPA], 2021). The anonymity and competitive nature of online gaming environments often exacerbate hostile confrontations among players, underscoring the need for further research and intervention strategies.

Gender dynamics within online gaming communities have become a significant area of interest. BBC Three (2016) highlighted the experiences of female gamers, documenting the gender-based discrimination and harassment they often face. This work brought much-needed attention to the hostility and aggression pervasive in these settings. Similarly, Pulos and Lee (2017) examined the prevalence of harassment and racial discrimination among players, noting a spectrum of behaviors ranging from seemingly harmless teasing about domestic matters to provocative and antagonistic statements about national identities and political ideologies.

Given the popularity of violent video games among consumers (Dill et al., 2005), Hollingdale and Greitemeyer (2014) conducted a study to investigate the link between violent video games and increased aggression. Their findings revealed that violent games heightened aggression regardless of whether they were played in online or offline contexts. While the study utilized experimental design

and post-survey validation to thoroughly examine this relationship, its focus was limited to first-person shooter games. Additionally, the decision to disable game audio during the experiment introduced a potential limitation in fully capturing the gaming experience. To address these gaps, future research should expand to include other genres, such as Multiplayer Online Battle Arena (MOBA) games, which represent a significant portion of the gaming market. This aligns with the current study's focus on the impact of violent games on aggression, emphasizing the importance of exploring a broader range of genres for a more comprehensive understanding.

Bunaqan's (2002) study investigated children's exposure to violent video games and similarly found a significant association between such exposure and higher aggression scores, particularly in physical and verbal aggression. These findings align with those of Hollingdale and Greitemeyer (2014), who explored the effects of playing *Counter-Strike*, a popular first-person shooter game. Their research focused on a pubescent age group and demonstrated the potential for violent games intended for adults to influence minors. However, their study faced limitations, including a restricted sample of urban private school students and the use of an older game. To address these gaps, the planned research aims to encompass a broader spectrum of mobile gamers, regardless of access to specific gaming devices. This approach seeks to provide a more inclusive perspective on the relationship between video game exposure and aggression among youth. Additionally, the upcoming study will employ mediation analysis to explore variables like screen time, offering deeper insights into the mechanisms linking video game exposure to aggressive behavior in adolescents.

Regarding verbal aggression, Deloy (2022) examined *trash talk* in the context of *Defense of the Ancients* (DOTA) gaming, focusing on speech acts and identifying themes such as insults related to devils, mothers, sex, violence, and other provocative topics. While trash-talking is considered part of gaming culture (Cote, 2016; Nakamura, 2012), Deloy's ethnographic study provided an in-depth look at the norms and practices of trash-talking within the DOTA community. However, it also had limitations, including a lack of focus on gender differences in trash-talking, an offline-centric perspective despite the

predominantly online nature of MOBA games, and an absence of interventions to address this behavior. While Deloy's work significantly advanced understanding of trash-talking culture, the planned research aims to extend this foundation by exploring the psychological impacts of trash-talking and proposing practical strategies to mitigate its negative effects within esports.

Three distinct categories of aggressive acts in MOBA games were identified: psychological, passive, and active, each with varying impacts on gameplay outcomes. These categories were established through an in-game intra-group assessment using motivation theory and neutralization theory as analytical frameworks (Tan & Chen, 2022). While their study effectively highlighted intra-group aggression and the application of these theories, it primarily focused on aggression towards teammates, potentially overlooking the broader spectrum of player behavior. To address this gap, the latest study aims to diversify respondents and expand the scope of analysis to include interactions with opponents. This approach seeks to provide a more comprehensive understanding of player behavior within the MOBA gaming environment.

Not all studies have found significant links between violent gameplay and aggression. For example, Mistry and Shetty (2020) conducted a study involving 40 students aged 15–20, categorized as players or non-players based on their gaming habits. Their findings revealed no significant differences in aggression levels between the two groups, suggesting no direct link between violent gameplay and youth aggression. The study included both violent and non-violent games, as well as a control group of non-players, but was limited by its small, non-representative sample size and the absence of personal history data. Addressing these limitations would require larger, more representative samples, the use of probability sampling techniques, and robust statistical analysis. Such improvements could yield deeper insights into the relationship between violent video games and aggression among youth.

The increasing time spent on online gaming has become a defining feature of contemporary leisure culture, raising concerns about its potential influence on aggressive behavior. As society navigates the

digital age's impact on human behavior and interactions, understanding this multifaceted issue becomes critical. Accordingly, this research investigates the level of aggression among esports players, focusing on physical aggression, verbal aggression, anger, and hostility. It also explores respondents' trash-talking behaviors and examines the relationship between aggression and trash-talking, with screen time as a potential mediating factor.

The Rise of Esports and Aggressive Behavior in Gaming

The reasons consumers engage with esports have been a topic of growing interest in recent literature. Hamari and Sjöblom (2017) analyzed factors influencing esports participation and found that escapism, gaining knowledge about games, and novelty (e.g., new players or teams) were positively correlated with viewing frequency. Interestingly, aesthetic appreciation had a negative correlation with viewership, while social interaction and drama showed no correlation. Such findings lay the groundwork for examining more specific behavioral traits within multiplayer online battle arena (MOBA) games.

The relationship between video games and aggression has been widely studied, with results often proving complex and context-sensitive. For example, a pilot study conducted by Aleissa et al. (2022) in Saudi Arabia revealed higher levels of verbal and physical aggression among action-game players. Their cross-sectional analysis also highlighted gender differences: males exhibited higher physical aggression, while females scored higher on measures of anger. These insights are particularly relevant to MOBA games, which blend elements of action and strategy. Further supporting this connection, Shao and Wang (2019) found that violent video game content was positively related to aggression among Chinese adolescents, mediated by normative beliefs about aggression. Notably, they identified family environment as a moderating factor, suggesting that external contexts significantly influence the extent to which gaming behaviors contribute to aggression.

Recently, the phenomenon of toxic behavior in online gaming has garnered increased attention from researchers. Kordyaka et al. (2024) introduced the concept of a "toxic triad," comprising aggression,

anger, and authoritarianism, which collectively explained 68% of toxic behavior among MOBA players. While aggression and anger emerged as significant predictors, authoritarianism functioned as a proxy predictor by exacerbating the other two traits. Similarly, Beres et al. (2021) examined how toxic behavior becomes normalized in gaming cultures. Their study revealed that participants with higher moral disengagement and toxic online disinhibition were less likely to view toxic behavior as problematic, often dismissing it with statements like "boys will be boys" or "this is just how gamers are." This normalization process offers a compelling explanation for the persistence of toxic behavior in MOBA environments.

The Role of Screen Time and Gaming Engagement

Screen time has been extensively studied in relation to behavior. In their systematic review, Keikha et al. (2020) found that screen time was positively associated with various aggressive behaviors, such as physical fighting and bullying. This relationship becomes particularly significant when players spend extended hours engaging with Multiplayer Online Battle Arena (MOBA) games, as is common in this genre. Huang et al. (2024) focused specifically on the emotional aspects of MOBA game addiction, concluding that personal emotions play a role in addiction, with the audio-visual experience being the most influential factor. They also found that behavioral reflection was positively associated with gaming addiction, while gratification was linked to continued gaming intention.

Recent studies have expanded the understanding of player behavior in gaming communities. For example, Irwin et al. (2024) examined the effects of social norms on trash-talking within First-Person Shooter (FPS) esports communities. Analyzing 1,724 comments, they observed that acceptable levels of trash talk varied depending on the event's timing: pre-match, during-match, and post-match. This temporal perspective on toxic behavior provides insights relevant to player interactions in MOBA environments. Additionally, Zhu et al. (2022) explored how mutual dependence, power, and passion shape both toxic and prosocial behaviors in multiplayer online games. Their study found that perceived power was positively associated with prosocial behaviors, while mutual dependence and power,

mediated by passion, highlighted the complex social dynamics of online gaming environments, challenging earlier simplistic views.

Technological Interventions and Behavioral Modification

Wang et al. (2023) introduced innovative approaches to enhancing the negative atmosphere in MOBA games through artificial teammates and social robots. Their findings revealed that AI teammates were more effective than human teammates in improving player mood. However, integrating social robots with AI teammates did not yield additional positive effects. These results suggest potential technological interventions for moderating toxic conduct on online gaming platforms. Similarly, Abbasi et al. (2022) investigated different engagement states in violent video games, shedding light on the relationship between gaming engagement and aggressive behavior. Their research, conducted with Generation Z participants, found that while the cognitive dimension had no impact on aggression, the affective and behavioral dimensions were positively associated with it. This highlights that the way players interact with games may be more influential in predicting behavioral outcomes than the act of playing itself. Additionally, the study demonstrated that game features influenced all three engagement states, emphasizing the importance of game design in understanding player behavior and potential aggression.

Although prior research has examined various aspects of aggressive behavior in gaming, little attention has been paid to the mediating role of screen time in the relationship between trash-talking and aggressive behavior in MOBA games. Abbasi et al. (2022) and Yao et al. (2019) both emphasized the importance of investigating mediators to better explain observed relationships in gaming behavior. However, most existing studies have focused on toxic behavior or aggressive behavior independently, overlooking the potential causal pathway linking trash-talking, screen time, and subsequent aggression. Elbo et al. (2024) addressed this gap by examining Mobile Legends players, highlighting the scarcity of research on the long-term effects of gaming and behavioral patterns, particularly regarding how prolonged exposure to gaming environments influences player behavior over time. Irwin et al. (2024) also emphasized the temporal aspects of toxic behavior, calling for further research to explore how

increased screen time mediates the relationship between initial exposure to trash-talking and subsequent aggression.

Theoretical Framework

This study is grounded in the General Aggression Model (GAM), developed by Anderson and Bushman (2002). The GAM provides a systematic framework for examining the relationships between trash-talking, screen time in Multiplayer Online Battle Arena (MOBA) games, and aggressive behavior among esports players. According to the GAM, aggression arises from the interaction between personal and environmental factors, specifically an individual's current internal state, which consists of cognition, affect, and physiological arousal.

In this context, trash-talking serves as a situational input variable that can provoke aggressive thoughts and emotions. The GAM suggests that repeated exposure to aggressive cues, such as hostile communication in gaming environments, strengthens aggressive knowledge structures and behavioral scripts over time (Anderson & Carnagey, 2004).

Screen time in MOBA games is proposed as a mediating variable within this framework. Anderson et al. (2010) argued that extended exposure to aggressive content or competitive conditions facilitates learning, rehearsal, and reinforcement of aggressive behaviors, ultimately reducing reaction time to aggression. Given the highly competitive nature of MOBA games, which rely on team-based conflict, players are regularly exposed to aggressive communication and behaviors. The episodic processes of the GAM explain how external factors, like trash-talking, interact with internal states—such as hostile cognitions, angry emotions, and physiological arousal—resulting in aggression (Anderson & Bushman, 2002). Additionally, the personality processes component of the GAM suggests that prolonged exposure to aggressive content during gaming sessions may foster aggressive beliefs, attitudes, and scripts (DeWall et al., 2011).

Empirical research supports the GAM's applicability to gaming behavior in MOBA contexts. For instance, Kordyaka et al. (2020) demonstrated how toxic chat in *League of Legends* led to hostile attributions and aggressive behavior, with players developing cognitive scripts that normalized aggressive responses, consistent with the GAM's learning processes. Similarly, McDermott and Lachlan (2021) found that competitive trash-talking in MOBA games triggered aggressive thoughts, as participants reported hostile thinking and retaliatory intentions when targeted by verbal aggression.

The GAM is particularly relevant for analyzing trash-talking behaviors in MOBA gaming. For example, when a player receives comments like "You're trash" or "Uninstall the game" during *Mobile Legends*, the GAM explains how these aggressive inputs elicit anger (affect), thoughts of retaliation (cognition), and physiological arousal. Over time, repeated exposure to such situational variables can result in the formation of learned aggressive scripts. Breuer et al. (2021) found that MOBA players who spent more time gaming were more likely to exhibit aggression after experiencing trash talk, aligning with the GAM's emphasis on the cumulative impact of aggression on personality development.

Based on this theoretical perspective, this study hypothesizes that trash-talking in MOBA games has both a direct effect on aggression and an indirect effect mediated by screen time. According to the GAM, greater exposure to aggressive communication (trash-talking) and longer durations of competitive gaming (screen time) increase the likelihood of aggressive behavior among esports players by reinforcing aggressive thoughts and emotions.

Objectives of the Study

The primary objective of this study is to examine how screen time mediates the relationship between trash-talking behavior and aggression in players of Multiplayer Online Battle Arena (MOBA) games. Specifically, it aims to identify the demographic characteristics of the respondents, focusing on gender, and analyze the extent of their trash-talking behavior during gameplay. The study also seeks to quantify the respondents' screen time spent playing MOBA games and assess their levels of aggression.

Ultimately, it aims to provide insights into the mediating role of screen time in the link between trash-talking and aggression among MOBA players.

Hypothesis

H_o: Screentime does not mediate the effect of Trash-talking behavior to Aggression of MOBA players.

H_1: Screentime mediates the effect of Trash-talking behavior to Aggression of MOBA players.

Method

Research Design

The research employed a quantitative research design, enabling the collection of numerical data on variables such as screen time, hostility, and trash-talking behavior. This approach allows for precise measurement and statistical analysis, providing a robust foundation for drawing meaningful conclusions about the relationships among these factors (Gravetter & Forzano, 2018). A simple mediation analysis was used to explore the underlying mechanisms through which screen time influences aggression and trash-talking behavior. This method identifies the mediating component and quantifies its impact, offering a more comprehensive understanding of the interactions involved (Hayes, 2017).

Specifically, the study utilized a cross-sectional, correlational research design, meaning data were collected at a single point in time to examine the relationships between variables without manipulating them (Kumar, 2014). This design was chosen for its high external validity and ecological relevance, as it allows researchers to observe the natural effects of independent variables on dependent variables. Moreover, the correlational approach is particularly appropriate for studying complex behavioral patterns that would be unethical or impractical to manipulate in experimental settings (Chiang et al., 2015).

Respondents

The respondents consisted of adolescents aged 10 to 24 years (Sawyer et al., 2018) who actively engage in mobile gaming, specifically playing *Mobile Legends: Bang Bang*. These participants were students of Southern Luzon State University who frequently use smartphones for gaming, making them relevant subjects for examining the mediating role of screen time in aggression and trash-talking behaviors within the context of esports.

To ensure data quality and relevance, the study included the following inclusion criteria:

1. Participants must have been regularly playing *Mobile Legends: Bang Bang* for at least six months.
2. Participants must play at least three games per week.
3. Participants must have achieved at least an Elite rank in the game.

The exclusion criteria were as follows:

1. Students with diagnosed attention or behavioral disorders that could influence the results.
2. Students who were suspended from the game for violating its rules.
3. Students without access to a personal mobile device for gaming.

The selected age range of 10 to 24 years encompasses both early adolescence and young adulthood. This broad spectrum allows for the observation of diverse behaviors and emotional responses to provocations like trash-talking. However, variations in maturity, cognitive development, and social experiences across this age range could influence participants' reactions, potentially distorting the results.

To address this limitation, age was included as a covariate in the analysis, though the primary focus remained on the total mediating effect of screen time rather than age-specific patterns. Future studies could benefit from examining these relationships within narrower age categories to clarify how

developmental phases influence the connections between trash-talking, screen time, and aggressive behavior.

In this study, a random sampling method was employed to select respondents from the specified population of adolescents at Southern Luzon State University who frequently play *Mobile Legends: Bang Bang*. This method, as supported by Babbie (2016), Fraenkel et al. (2015), and Trochim and Donnelly (2008), ensures that every potential respondent has an equal and unbiased chance of inclusion, thereby enhancing the representativeness of the sample, reducing selection bias, and improving the generalizability of the findings. The random sampling process involved defining the population, creating a sampling frame, using a random number generator for unbiased participant selection, and obtaining informed consent from the selected respondents. The target sample size of 390 was calculated using Cochran's (1977) formula, with an additional 20% allowance for non-response or dropouts to ensure sufficient statistical power for examining the relationships between key variables in the university setting.

To further mitigate selection bias, several measures were implemented. First, anonymity and confidentiality were emphasized to encourage honest reporting of gaming behavior. Second, the pre-survey was distributed via email, student organizations, and class announcements to reach both active and passive gamers who might not readily disclose their gaming habits. Third, efforts were made to minimize social desirability bias by framing gaming behavior neutrally and clarifying that there were no right or wrong answers. Lastly, the sampling frame was regularly reviewed, and students who initially declined to participate were revisited to maintain sample representativeness.

Measurement

A research questionnaire was used to collect basic information about respondents, including their age and gender. Screen time was assessed by asking participants to report their average daily screen time spent playing *Mobile Legends: Bang Bang*.

The Aggression-Problem Behavior Frequency Scale (A-PBFS) was employed to measure participants' aggressive behavior. This 18-item scale assesses the frequency of aggressive behaviors across three dimensions: physical, non-physical, and relational aggression (Dahlberg et al., 2005). Participants rated their engagement in aggressive behaviors over the past 30 days on a six-point scale (1 = never, 6 = 20 or more times). Examples of items include "shoved or pushed another kid" (physical aggression), "picked on someone" (non-physical aggression), and "spread a false rumor about someone" (relational aggression). Previous reliability studies conducted in the United States reported Cronbach's alpha values ranging from 0.70 to 0.87 (Miller-Johnson et al., 2004), while studies in Bulgaria reported values between 0.83 and 0.87 (Bilić, 2013). Despite the high reliability of the A-PBFS in English-speaking contexts, minor cultural adjustments were made to adapt the scale to the Filipino context.

The scale items were translated into Filipino through a back-translation process, guided by native Filipino speakers and bilingual Filipino psychology experts. Special care was taken to ensure cultural sensitivity, particularly regarding definitions of aggression, as assertive behavior can vary across cultures. Some items in the physical aggression scale were modified to align with the cultural context of university-aged Filipino youth while maintaining the construct validity of the scale. These adaptations were pilot-tested with 50 Filipino students, requiring only minor wording changes to fit the local context without compromising the psychometric properties of the scale.

To evaluate trash-talking behaviors, a custom questionnaire was developed to measure the frequency, content, and motivations behind trash-talking during gameplay. The questionnaire's development followed a systematic process that included: (1) a literature review on gaming behavior and esports psychology, (2) input from three academic experts in gaming psychology and two professional esports players for content validation, and (3) integration of theoretical models related to competitive behavior and online gaming toxicity. Initially, 20 items were drafted, and after undergoing a Content Validity

Index (CVI) assessment, the final 10 items were selected, yielding an aggregated Scale-CVI of 0.85 (Polit & Beck, 2006).

The final questionnaire used a 10-point Likert scale (0 = strongly disagree, 10 = strongly agree) to measure participants' agreement with statements about trash-talking behavior. These items were carefully designed to capture distinct dimensions of the phenomenon. For example: Item 1 examined participants' inclination to use trash-talking to provoke opponents, drawing on research linking trash-talking with psychological strategies in competitive gaming (Irwin et al., 2021). Item 2 assessed the perceived role of trash-talking in esports culture, reflecting its acceptance within the community (Hamari & Sjöblom, 2017). Item 3 explored the strategic use of trash-talking to alters a competitor's mental focus (McDermott & Lachlan, 2021). Item 4 measured the belief that trash-talking enhances competitiveness and excitement during gameplay. Item 5 evaluated the view that trash-talking asserts dominance in competitive settings (Conmy et al., 2013). Item 6 focused on whether trash-talking motivates improved performance (McDermott & Lachlan, 2021). Item 7 addressed concerns about trash-talking contributing to toxic gaming environments (Kordyaka et al., 2020). Item 8 explored opinions on the need for regulation of trash-talking in professional esports settings. Item 9 differentiated between lighthearted banter and malicious trash-talking. Item 10 assessed comfort levels with trash-talking's prevalence in the esports community.

The questionnaire was pilot-tested with 100 respondents not included in the final study. Stratified random sampling was employed to ensure diverse age groups and gaming experience levels were represented. During the pilot, three items with item-total correlations below 0.3 were revised, and two were reformulated based on participant feedback. The final version of the questionnaire demonstrated good internal consistency, with a Cronbach's alpha of 0.84.
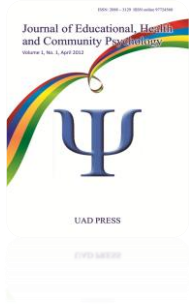
Data Gathering Procedures

The researcher initiated the study by obtaining permissions from relevant authorities through formal letters addressed to the Dean, the Chairperson of the involved students, and offices such as Student Affairs and Services, including the Sports and Development Office. To compile a list of potential respondents, a pre-survey was conducted with the assistance of student council governors to identify students who play Mobile Legends: Bang Bang and collect their names and university email addresses. From this list, a random sample was selected to ensure a representative participant pool.

Before data collection, potential participants were contacted via their university email with an official message containing details about the study, the estimated time required to complete the survey (30-45 minutes), and an explanation that participation was entirely voluntary. To maximize the response rate, follow-up emails were sent 72 hours and 168 hours after the initial invitation. Additionally, class representatives assisted in scheduling suitable data collection times for their respective sections.

The research utilized paper-and-pencil questionnaires that included an integrated informed consent section. During a detailed briefing session, participants were informed about (1) the study's aims, potential risks, and benefits, (2) their right to withdraw from the study at any time without providing a reason, (3) the measures taken to protect their identity and personal information, and (4) the researcher's contact information for any complaints or inquiries. To ensure anonymity, participants were assigned code numbers, and completed questionnaires were sealed in separate envelopes.

To track responses, the researcher implemented a response tracking system and conducted personal follow-ups with non-respondents while maintaining the principle of voluntary participation. Due to logistical constraints and to improve response rates, data collection sessions were scheduled at various times and locations across the university.

Once the responses were collected, the data was carefully tabulated and analyzed using the Statistical Package for the Social Sciences (SPSS) and Jeffreys's Amazing Statistics Program (JASP). The analysis involved descriptive statistics and mediation analysis. Finally, the results were interpreted to draw meaningful conclusions, contributing valuable insights to the research.

Data Analysis

The data analysis phase involved calculating descriptive statistics—such as mean, standard deviation, and frequency distributions—for demographic variables, screen time, aggression, and trash-talking behaviors. To explore the relationships between these variables, a robust simple mediation analysis was conducted to examine screen time as a mediator between trash-talking behavior and aggression scores. Before conducting the mediation analysis, key assumptions were evaluated to ensure the validity of the results. Linearity was examined through scatter plots and Pearson correlation coefficients, while the normality of residuals was assessed using Q-Q plots and the Shapiro-Wilk test. Homoscedasticity was tested with the Breusch-Pagan test, and multicollinearity was analyzed using variance inflation factors (VIF). These checks were essential to confirm that the data met the necessary criteria for mediation analysis.

A robust mediation analysis was chosen, employing bootstrapping with 5,000 resamples to address potential violations of normality assumptions and the influence of outliers without removing them (Hayes & Scharkow, 2013). This method provides more reliable estimates of indirect effects and confidence intervals compared to conventional approaches, particularly in behavioral data, where non-normal distributions are common.

Ethical Consideration

The study began with obtaining informed consent from all participants, ensuring they fully understood the research objectives, data collection methods, and their right to withdraw from the study at any time without consequences. The research adhered to strict principles of anonymity and confidentiality

by securely de-identifying personal data and assigning unique alias codes. Robust data security measures were employed, including the use of password-protected devices, encrypted storage, and restricted access limited to authorized research personnel.

Special care was taken to minimize potential harm to respondents, particularly in studies involving sensitive topics such as aggression or trash-talking behavior. Questions were framed sensitively, and appropriate resources were made available to those who may have been impacted by the research. Provisions for the responsible handling and retention of data were also established, including a defined timeline for data storage and secure disposal methods upon completion of the study.

Transparency and honesty were maintained throughout the research process. This included clear communication about the purpose and methodology of the study and the accurate, unbiased reporting of findings. Additional consent was sought from participants if their data were intended for publication, ensuring they were fully informed about the implications. The research also demonstrated cultural sensitivity by respecting the unique norms and values of the Philippines, particularly regarding topics like aggression and trash-talking.

When disseminating research findings, strict adherence to ethical guidelines ensured the protection of participants' privacy. This comprehensive ethical framework aligned with Republic Act 10173, also known as the Data Privacy Act of 2012, as well as international ethical standards. By prioritizing the rights and privacy of participants, the study upheld the principles of responsible and ethical quantitative research.

Results

Table 1 presents the gender distribution of respondents who play *Mobile Legends: Bang Bang* at Southern Luzon State University. Males represent the largest group, accounting for 28.2% of the total sample, while females and LGBTQI++ respondents make up slightly smaller proportions, with the

latter being the smallest group at 22.6%. The dominance of male players in this game reflects existing research suggesting that competitive gaming often attracts more male participants compared to other genders (Kaye & Pennington, 2016).

Table 1
Frequency distribution of respondents' gender

Gender	f	%
Male	110	28.2
Female	101	25.9
LGBTQI++	88	22.6
Prefer not to say	91	23.3
Total	390	100

Table 2 presents descriptive statistics for three key variables: aggression, screen time and trash-talking behavior in a sample of 390 respondents. The trash-talking measure has the highest mean score of 48.49 (SD = 29.39, SE = 1.488), there is therefore moderate level of trash-talking behavior given the fact that the scale used in the study is 0 – 100. The relatively high standard deviation points to the existence of considerable variability in the use of trash-talking behaviors by the participants. The total mean time spent on gaming was 3.43 hours (SD = 2.11, SE = 0.107), thus, the participants indeed spent sufficient amount of time on gaming while also indicating the inter individual variability. The aggression measure was scored and gave a mean of 18.42 (SD = 11.92, SE = 0.604) implying that participants had moderate level of aggression. The standard errors obtained for all the three variables are however small relative to their means implying good precision in the estimated population parameters.

Table 2
Descriptive Statistics of scores on Trash-talking, Screentime, and Aggression

	N	Mean	SE	SD
Trash-talking	390	48.49	1.488	29.39
Screen Time	390	3.43	0.107	2.11
Aggression	390	18.42	0.604	11.92

Table 3 presents the parameter estimates for the direct and indirect effects of respondents' trash-talking behavior on aggression, mediated by screen time. The direct effect of trash-talking on aggression is not significant ($z = 0.751$, $p = 0.453$). However, the indirect effect of trash-talking on aggression through screen time is significant ($z = 9.959$, $p < 0.001$), leading to the rejection of the null hypothesis. These findings suggest full mediation, as the indirect effect is significant while the direct effect is not.

Table 3
Parameter estimates on the direct and indirect effect of trash-talking on aggression

	Estimate	Std. Error	z-value	p value	95% CI Lower	Upper
Direct Effects						
Trash-talking→ Aggression	0.027	0.036	0.751	0.453	-0.043	0.097
Indirect Effects						
Trash-talking→ Screen Time→ Aggression	0.340	0.034	9.959	<0.001	0.273	0.407

Note: Robust standard errors, ML estimator

Figure 1 illustrates the path plot of the mediation analysis, examining the effects of trash-talking behavior on aggression as mediated by screen time. The analysis reveals a positive relationship between trash-talking behavior and screen time (path coefficient a = 0.07). Similarly, screen time shows a positive association with aggression (path coefficient b = 4.8). Additionally, trash-talking behavior directly maintains a positive relationship with aggressive behavior (path coefficient c = 0.03).
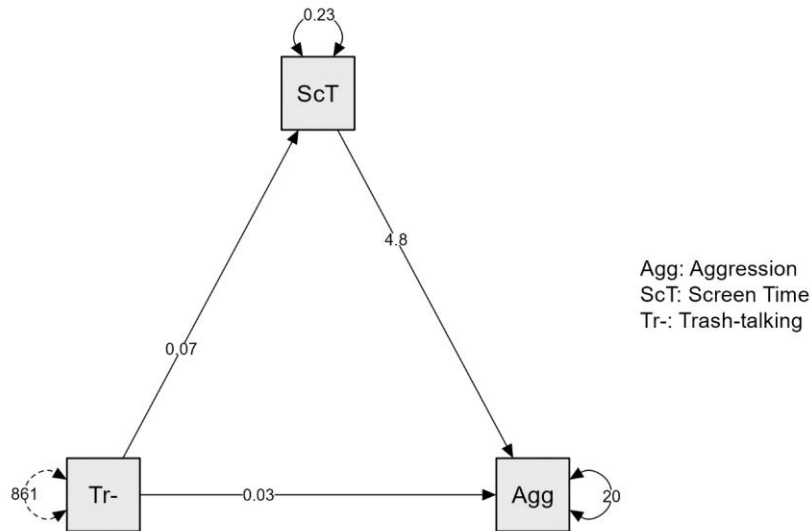
Figure 1. *Path plot of the effect of trash-talking on aggression as mediated by screen time*

Discussion

The results suggest that the gender distribution of *Mobile Legends: Bang Bang* players reflects broader gender imbalances in esports gaming. The predominance of male players likely stems from gender socialization processes that encourage males to engage in competitive pursuits, while societal biases against women in gaming may discourage female participation. Further research is necessary to fully understand the factors influencing gender disparities in competitive mobile gaming and esports culture.

This male-skewed distribution aligns with previous research on gender ratios among esports players. For instance, Ruvalcaba et al. (2018) found that only 35% of esports players across multiple games identified as female. The even lower female representation in *Mobile Legends: Bang Bang* aligns with findings by Hartmann and Klimmt (2006) that female gamers often prefer different genres. The 22.6% female participation in this study reflects *Mobile Legends'* positioning as a multiplayer online battle arena (MOBA) game, a genre heavily dominated by male players. This imbalance has implications for the gaming community. Developers could consider implementing features that foster a more welcoming environment for women and LGBTQI+ gamers, such as measures to curb toxic masculinity and

aggressive trash-talking (Breuer et al., 2021). Collegiate esports programs might also better engage female gamers through targeted recruitment and mentorship initiatives. Promoting inclusion is essential for the growth and sustainability of the esports industry.

The predominance of male players (28.2%) in this study also reflects deeply rooted cultural patterns in the Philippines, where competitive gaming is often perceived as a male activity. This trend may be further reinforced by the patriarchal history of Filipino society, which has traditionally discouraged women from engaging in competitive activities. Additionally, the male-dominated environment of local internet cafés in the Philippines likely contributes to the gender imbalance in mobile gaming. Addressing these cultural factors requires considering both global and local contexts to create a more inclusive esports landscape.

The mediation analysis indicates that screen time significantly mediates the relationship between trash-talking behavior and aggression in esports players. Increased screen time amplifies the effects of trash-talking, fueling greater aggression during gameplay. This finding aligns with prior research linking toxic chat to aggression (Breuer et al., 2021). Similarly, Li et al. (2019) found that time spent gaming mediates the relationship between cyberbullying and aggression, suggesting consistent mediation effects across gaming contexts.

Given the exacerbating role of screen time, limiting gameplay could be an effective strategy for reducing aggression. Developers might introduce interventions such as alerts after prolonged gaming sessions or when players display increasingly negative behavior. Educational institutions could implement gaming literacy programs to teach students about the risks of extended gaming and the importance of managing aggression. Peer mentoring programs, where experienced players model positive behaviors, may also help reduce toxic interactions.

The findings highlight the need to directly address trash-talking. Strategies such as penalizing toxic players, implementing muting systems, and promoting healthy competition mindsets could mitigate aggressive responses. Further research should explore additional mediators and solutions to foster a more positive gaming culture.

The results suggest that toxic gaming environments are sustained by prolonged exposure, not merely isolated incidents of negative behavior. These findings could inform the development of industry-wide behavioral standards and anti-harassment policies. While moderate levels of trash-talking are present, there is significant potential for cultural shifts toward inclusivity and respect within gaming communities.

The path analysis further supports these conclusions, visually demonstrating positive correlations between trash-talking, screen time, and aggression. Increased screen time exacerbates the impact of trash-talking, leading to heightened aggression among players at Southern Luzon State University. The clear interrelationship between these factors underscores the importance of interventions targeting both screen time and toxic behaviors.

Interestingly, the mediating effect of screen time differs from some previous findings. For example, Kneer and Rieger (2015) found no mediation effect of gaming time on aggression in problematic gaming behaviors. However, their study did not focus on trash-talking specifically. This distinction highlights the importance of evaluating mediators for specific negative behaviors within gaming contexts.

To mitigate these issues, developers could introduce daily time limits or mandatory breaks after detecting excessive trash-talking. Schools and parents can also play a role by setting healthy screen time limits for student gamers. Ultimately, reducing screen time alone is insufficient—addressing the root causes of toxic behaviors, such as trash-talking, remains essential for creating a healthier gaming environment.

Conclusion

The study highlights a significant mediation effect of screen time between trash-talking and aggressive behaviors, illustrating how prolonged exposure to toxic gaming environments amplifies negative behavioral outcomes. While the findings suggest that reducing gameplay time may mitigate aggression, the reliance on self-reported data and a cross-sectional design necessitates cautious interpretation. Moreover, the sample's limitation to a single Philippine university constrains the generalizability of the results. Future research should adopt longitudinal approaches to better capture the evolution of trash-talking behaviors over time. Despite these limitations, the findings offer actionable insights for fostering healthier gaming communities. Game developers can implement automated systems to detect and limit excessive trash-talking during extended sessions; educational institutions can introduce programs promoting healthy competition; and gaming platforms can incorporate features that encourage positive interactions. Such evidence-based interventions are increasingly essential as mobile gaming becomes a dominant form of youth recreation, with the overarching goal of creating inclusive, non-toxic gaming spaces that sustain competitive spirit while reducing aggressive behaviors.

Conflict of Interest
The researchers declare that this paper has no conflicts of interest.

Author Contribution
All authors have contributed equally to the study's conceptualization, interpreting data, reviewing, and editing the manuscript.

Data Availability
Data can be provided upon request to the author.

Declarations Ethical Statement
The study followed the guidelines of the Declaration of Helsinki.

Informed Consent Statement
Informed consent was obtained from all persons involved in the study.

References

Abbasi, A. Z., Rehman, U., Hussain, K., Ting, D. H., Hlavacs, H., & Qummar, H. (2022). The effect of three violent videogame engagement states on aggressive behavior: A partial least squares structural equation modeling approach. *Frontiers in Psychology*, *13*, 918968. doi : 10.3389/fpsyg.2022.918968

Adachi, P. J. C., & Willoughby, T. (2011). The effect of video game competition and violence on aggressive behavior: Which characteristic has the greatest influence? *Psychology of Violence*, *1*(4), 259–274. doi : 10.1037/a0024908

Aleissa, M. A., Alenezi, S., Saleheen, H. N., Bin Talib, S. R., Khan, A. H., Altassan, S. A., & Alyahya, A. S. (2022). The association between video game type and aggressive behaviors in saudi youth: A pilot study. *Behavioral Sciences*, *12*(8), 289. doi : 10.3390/bs12080289

Anderson, C. A., & Bushman, B. J. (2002). Human aggression. *Annual Review of Psychology*, *53*(1), 27–51. doi : 10.1146/annurev.psych.53.100901.135231

Anderson, C. A., Bushman, B. J., Bartholow, B. D., Cantor, J., Christakis, D. A., Coyne, S. M., Donnerstein, E., Brockmyer, J. F., Gentile, D. A., Green, C. S., Huesmann, R., Hummer, T. A., Krahé, B., Strasburger, V. C., Warburton, W., Wilson, B. J., & Ybarra, M. L. (2017). Screen violence and youth behavior. *Pediatrics*, *140*(2), 142–147. doi : 10.1542/peds.2016-1758t

Anderson, C. A., & Carnagey, N. L. (2004). *Violent evil and the General Aggression Model*. In A. G. Miller (Ed.), The social psychology of good and evil (pp. 168–192). The Guilford Press.

Anderson, C. A., Shibuya, A., Ihori, N., Swing, E. L., Bushman, B. J., Sakamoto, A., Rothstein, H. R., & Saleem, M. (2010). Violent video game effects on aggression, empathy, and prosocial behavior in eastern and western countries: a meta-analytic review. *Psychological bulletin*, *136*(2), 151–173. doi : 10.1037/a0018251

Assistant Secretary for Public Affairs (ASPA). (2021). *Cyberbullying and online gaming*. StopBullying.gov. https://www.stopbullying.gov/cyberbullying/cyberbullying-online-gaming

Babbie, E. R. (2016). *The practice of social research*. Cengage Learning.

BBC Three. (2016). *The dark side of gaming - The females fighting back | exclusive* [Video]. YouTube. https://www.youtube.com/watch?v=tZMjGwjCAuQ

Beres, N. A., Frommel, J., Reid, E., Mandryk, R. L., & Klarkowski, M. (2021). Don't you know that you're toxic: Normalization of toxicity in online gaming. *Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems*, 1–15. doi : 10.1145/3411764.3445157

Bilić, V. (2013). Violence among peers in the real and virtual world. *Pedijatrija Danas*, *9*(1), 78–90. doi : 10.5457/p2005-114.65

Breuer, J., Kowert, R., Festl, R., & Quandt, T. (2021). The effects of online toxicity in gaming: The mediating role of moral disengagement and the moderating role of gaming frequency. *The International Journal of Health Promotion and Education*, *59*(2), 78-90.

Bunaqan, J. J. B. (2002). Association of exposure to video games and aggression among children ages 10 to 12 years old in an urban private school: A cross-sectional study. *Philippine Journal of Pediatrics*, *51*(3), 107–111.

Chiang, I.-C. A., Jhangiani, R. S., & Price, P. C. (2015). *Research methods in psychology—2nd canadian edition*. BCcampus. https://opentextbc.ca/researchmethods/

Cochran, W. G. (1977). *Sampling techniques* (3d ed). Wiley.

Conmy, B., Tenenbaum, G., Eklund, R. C., Roehrig, A. D., & Filho, E. (2013). Trash talk in a competitive setting: Impact on self-efficacy and affect. *Journal of Applied Social Psychology*, *43*(5), 1002–1014. doi : 10.1111/jasp.12064

Coté, A. C. (2016). "I can defend myself": Women's strategies for coping with harassment while gaming online. *Games and Culture*, *12*(2), 136–155. doi : 10.1177/1555412015587603

Dahlberg, L. L., Toal, S. B., Swahn, M. H., & Behrens, C. B. (2005). Measuring violence-related attitudes, behaviors, and influences among youths: A compendium of assessment tools: Second edition [Dataset]. In *PsycEXTRA Dataset*. doi : 10.1037/e554402012-001

Deloy, E. D. A. (2022). The culture of trash talks among dota players: An ethnography. *International Journal of Research Publications*, *109*(1). doi : 10.47119/ijrp1001091920223906

DeWall, C. N., Anderson, C. A., & Bushman, B. J. (2011). The general aggression model: Theoretical extensions to violence. *Psychology of Violence*, *1*(3), 245–258. doi : 10.1037/a0023842

Dill, K. E., Gentile, D. A., Richter, W. A., & Dill, J. C. (2005). Violence, sex, race, and age in popular video games: A content analysis. In *American Psychological Association eBooks* (pp. 115–130). doi : 10.1037/11213-008

Elbo, K. S., Dionisio, M. P., Badiola, K., Dayson, A. C. M., Dorado, C. P., Yambao, H. M. B., Sabado, R. D., Castro, J. H., & Juan, R. N. J. S. (2024). Influence of playing mobile legends on the behavior of grade 6 students. *Influence of Playing Mobile Legends on the Behavior of Grade 6 Students*, *147*(1), 18. https://www.ijrp.org/paper-detail/6255

Fraenkel, J. R., Wallen, N. E., & Hyun, H. H. (2015). *How to design and evaluate research in education*. McGraw-Hill Education.

Gravetter, F. J., & Forzano, L. B. (2018). *Research methods for the behavioral sciences*. Cengage Learning.

Hamari, J., & Sjöblom, M. (2017). What is esports and why do people watch it? *Internet Research*, *27*(2), 211–232. doi : 10.1108/intr-04-2016-0085

Hartmann, T., & Klimmt, C. (2006). Gender and computer games: Exploring females' dislikes. *Journal of Computer-Mediated Communication*, *11*(4), 910–931. doi : 10.1111/j.1083-6101.2006.00301.x

Hayes, A. F. (2017). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. Guilford Press.

Hayes, A. F., & Scharkow, M. (2013). The relative trustworthiness of inferential tests of the indirect effect in statistical mediation analysis: Does method really matter? *Psychological Science*, *24*(10), 1918–1927. doi : 10.1177/0956797613480187

Hoffman, J. L., Pauketat, R., & Varzeas, K. A. (2022). *Understanding collegiate esports: A practitioner's guide to developing community and competition*. Routledge.

Hollingdale, J., & Greitemeyer, T. (2014). The effect of online violent video games on levels of aggression. *PLOS ONE*, *9*(11), e111790. doi : 10.1371/journal.pone.011179

Huang, E., Xing, Y., & Song, X. (2024). Emotional analysis of multiplayer online battle arena games addiction. *Frontiers in Psychology*, *15*, 1347949. doi : 10.3389/fpsyg.2024.1347949

Irwin, S. V., Naweed, A., & Lastella, M. (2024). Consuming esports and trash talking: How do social norms and moderating attributes influence behaviour? *Sport in Society*, *27*(1), 14–32. doi : 10.1080/17430437.2023.2200732

Irwin, S. V., Naweed, A., & Lastella, M. (2021). The mind games have already started: An in-depth examination of trash talking in counter-strike: Global offensive esports using practice theory. *Journal of Gaming & Virtual Worlds*, *13*(2), 173–194. doi : 10.1386/jgvw_00035_1

Jaslow, R. (2011). Violent video games make kids aggressive, study suggests. *CBS News*. https://www.cbsnews.com/news/violent-video-games-make-kids-aggressive-study-suggests/

Kaye, L., & Pennington, C. R. (2016). "Girls can't play": The effects of stereotype threat on females' gaming performance. *Computers in Human Behavior*, *59*, 202–209. doi : 10.1016/j.chb.2016.02.020

Keikha, M., Qorbani, M., Kazemi Tabaee, M., Djalalinia, S., & Kelishadi, R. (2020). Screen time activities and aggressive behaviors among children and adolescents: A systematic review. *International Journal of Preventive Medicine*, *11*(1), 59. doi : 10.4103/ijpvm.IJPVM_71_20

Kneer, J., & Rieger, D. (2015). Problematic gameplay: The diagnostic value of playing motives, passion, and playing time in men. *Behavioral Sciences*, *5*(2), 203–213. doi : 10.3390/bs5020203

Kordyaka, B., Laato, S., & Niehaves, B. (2024). A toxic triad: Aggression, anger and authoritarianism—A study with multiplayer online battle arena game players. *CEUR Workshop Proceedings*, *3669*, 23–32.

Kordyaka, B., Jahn, K., & Niehaves, B. (2020). Towards a unified theory of toxic behavior in video games. *Internet Research*, *30*(4), 1081–1102. doi : 10.1108/intr-08-2019-0343

Kumar, R. (2014). *Research methodology: A step-by-step guide for beginners* (Fourth edition). Sage.

Li, D., Zhou, Y., Li, X., & Rao, L. (2019). Understanding the relationship between cyberbullying victimization and cyberbullying perpetration: The mediating role of anger rumination and moderating role of social support. *Computers in Human Behavior*, *100*, 148-156.

McDermott, K. C. P., & Lachlan, K. A. (2021). Emotional manipulation and task distraction as strategy: The effects of insulting trash talk on motivation and performance in a competitive setting. *Communication Studies*, 72(5), 915–936. doi : 10.1080/10510974.2021.1975139

Miller-Johnson, S., Sullivan, T. N., Simon, T. R., & Project, M. V. P. (2004). Evaluating the impact of interventions in the multisite violence prevention study: Samples, procedures, and measures. *American Journal of Preventive Medicine*, *26*(1), 48-61. doi : 10.1016/j.amepre.2003.09.015

Mistry, J.M., & Shetty, V. (2020). Relationship between playing violent video games and aggression. *International Journal of Creative Research Thoughts (IJCRT)*, *8*(4), 4007-4010.

Nakamura, L. (2012). *"It's a nigger in here! kill the nigger!"* The International Encyclopedia of Media Studies. doi : 10.1002/9781444361506.wbiems159

Polit, D. F., & Beck, C. T. (2006). The content validity index: Are you sure you know what's being reported? critique and recommendations. *Research in Nursing & Health, 29*(5), 489–497. doi : 10.1002/nur.20147

Pulos, A., & Lee, S. A. (2017). *Transnational contexts of culture, gender, class, and colonialism in play: Video games in East Asia*. Palgrave Macmillan. doi : 10.1007/978-3-319-43817-7

Raymer Jr., D. (2021). *Internet gaming disorder: A real mental health issue on the rise in adolescents and young adults*. Counseling Today. https://www.counseling.org/publications/counseling-today-magazine/article-archive/article/legacy/internet-gaming-disorder--a-real-mental-health-issue-on-the-rise-in-adolescents-and-young-adults

Ruvalcaba, O., Shulze, J., Kim, A., Berzenski, S. R., & Otten, M. P. (2018). Women's experiences in esports: Gendered differences in peer and spectator feedback during competitive video game play. *Journal of Sport & Social Issues*, *42*(4), 295–311. doi : 10.1177/0193723518773287

Sawyer, S. M., Azzopardi, P., Wickremarathne, D., & Patton, G. C. (2018). The age of adolescence. *The Lancet Child & Adolescent Health*, *2*(3), 223–228. doi : 10.1016/s2352-4642(18)30022-1

Shao, R., & Wang, Y. (2019). The relation of violent video games to adolescent aggression: An examination of moderated mediation effect. *Frontiers in Psychology*, *10*, 384. doi : 10.3389/fpsyg.2019.00384

Tan, W., & Chen, L. (2022). That's not my fault: Excuses given by players exhibiting in-game intra-team aggressive behavior in online games. *Computers in Human Behavior*, *127*, 107045. doi : 10.1016/j.chb.2021.107045

Trochim, W. M., & Donnelly, J. P. (2008). *The research methods knowledge base*. Atomic Dog Publishing.

Wang, Y., Dai, Y., Chen, S., Wang, L., & Hoorn, J. F. (2023). Multiplayer online battle arena (Moba) games: Improving negative atmosphere with social robots and ai teammates. *Systems*, *11*(8), 425. doi : 10.3390/systems11080425

Yao, M., Zhou, Y., Li, J., & Gao, X. (2019). Violent video games exposure and aggression: The role of moral disengagement, anger, hostility, and disinhibition. *Aggressive Behavior*, *45*(6), 662–670. doi : 10.1002/ab.21860

Zhu, Z., Zhang, R., & Qin, Y. (2022). Toxicity and prosocial behaviors in massively multiplayer online games: The role of mutual dependence, power, and passion. *Journal of Computer-Mediated Communication*, *27*(6). doi : 10.1093/jcmc/zmac017