JOURNAL FOR SOCIAL SCIENCE STUDIES
An International Peer-Reviewed Open Access Journal

ISSN (Online): 3006-2071 | ISSN (Print): 3006-2063
Volume 4 • Issue 5 • September 2026

BLOOD-RED SCREENS AND REAL-WORLD FUSES: DISSECTING GENDER DISPARITIES IN AGGRESSIVE SCRIPTS AND BEHAVIORAL OUTBURSTS AMONG SOUTH ASIAN ADOLESCENTS PLAYING VIOLENT DIGITAL GAMES

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DOI:https://doi.org/10.5281/zenodo.22812370

Keywords
violent video games, adolescent aggression, gender disparities, General Aggression Model, South Asia

Article History
Received: 11 June 2026
Accepted: 02 September 2026
Published: 17 September 2026

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Abstract

Guided by the General Aggression Model (GAM) and Social Learning Theory, this study examines how exposure to violent digital gameplay shapes adolescent socio-emotional outcomes in South Asia. In dynamic gaming environments, repeated exposure to virtual combat is hypothesized to prime aggressive scripts and trigger real-world behavioral outbursts. This study investigated the relationship between violent video game exposure and real-world aggressive behaviors among school-going adolescents in Sialkot, Pakistan. Specifically, it examined gender-based disparities in aggressive outcomes and analyzed whether cumulative daily gameplay hours significantly differentiate adolescent aggression levels. Utilizing a cross-sectional survey design, data were collected from a purposive sample of 150 school-going teenagers (54.7% boys, n = 82; 45.3% girls, n = 68; age range 13–19 years, modal age 18 years). Participants completed standardized measures translated/adapted for the local context: the 14-item Violent Video Games Questionnaire (α = .917) and the 6-item Aggression Questionnaire (α = .791). Bivariate Pearson correlation revealed a significant, moderate positive relationship between violent gameplay exposure and aggression (r = .430, p < .01). Linear regression confirmed that violent gameplay was a robust predictor of real-world aggression, $F(1, 148) = 33.479$, $p < .001$, accounting for 18.4% of the variance (β = .430, R^2 = .184). Independent samples t-tests indicated marked gender-based disparities: boys reported significantly higher daily violent gameplay exposure (M = 47.26, SD = 10.88) and aggression (M = 20.18, SD = 5.09) than

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girls (exposure M = 40.38, SD = 12.92; aggression M = 17.31, SD = 4.90), t(148) = 3.49, p = .001, reflecting a medium effect size (Cohen's \ d = 0.5). Conversely, a one-way ANOVA demonstrated that differences in aggression levels across daily gameplay duration brackets were not statistically significant, F(3, 146) = 2.02, p = .113, η^2 = .04 (with mean aggression scores hovering at M = 17.61 for <1 hour, M = 18.51 for 1–2 hours, M = 20.36 for 3–4 hours, and M = 19.31 for >4 hours).

While violent digital game exposure is a statistically significant predictor of elevated aggression among South Asian teenagers, boys exhibit a substantially higher vulnerability to these behavioral outcomes than girls. Crucially, total daily screen time does not directly drive aggression, suggesting that content-specific exposure, gender-socialized scripts, and individual susceptibilities are far more critical than raw gameplay duration. These insights highlight the urgent need for gender-tailored parental mediation and evidence-based media literacy interventions in non-Western developmental contexts.

INTRODUCTION

In the contemporary digital epoch, video games have transitioned from ephemeral recreational activities into highly immersive, interactive, and high-engagement virtual environments that actively shape adolescent development. Modern digital gaming has witnessed an exponential surge in global popularity, positioning itself as one of the most widely consumed and influential forms of media among modern teenagers. Unlike passive media formats such as television, video games represent a dynamic hybrid of interactive systems and goal-oriented play. They demand constant active engagement, requiring players to navigate complex rules, solve challenges, make rapid decisions, and respond directly to immediate audio-visual feedback. According to Verderer et al. (2004), video games represent a unique hybrid of media and play capable of stimulating both emotional and cognitive responses through this direct user engagement. Within this vast media landscape, violent video game genres—specifically first-person shooters (FPS), battle royales, and open-world action-adventure titles—have emerged as highly prevalent and intensely popular subgenres. Hyper-realistic and competitive virtual environments such as *Call of Duty*, *PlayerUnknown's Battlegrounds* (PUBG), and *Grand Theft Auto V* (GTA V) are characterized by explicit combat, physical conflict, and antisocial objectives. These games place players in survival-of-the-fittest battle arenas or depict hyper-realistic urban crime, requiring the execution of physical force to progress. Consequently, researchers have shown growing interest in how prolonged exposure to these violent digital environments influences adolescent socio-emotional outcomes, specifically in terms of physiological arousal, aggressive thoughts, and real-world hostility. According to Anderson and Bushman (2001), violent video games are those that depict simulated acts of physical aggression intended to harm other characters, which can increase physiological arousal and aggressive thoughts. This competitive, high-arousal environment may also reinforce a hostile expectation bias, making players more likely to perceive ambiguous social cues as threatening.

Despite the vast corpus of media effects research, a critical geographic and cultural gap persists in the empirical literature. The overwhelming majority of studies investigating the psychological and behavioral consequences of violent video gameplay have been conducted in Western or East Asian societies, leaving a substantial vacuum regarding non-Western, developing South Asian

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contexts. In urban centers of Pakistan like Sialkot, a rapidly expanding youth population coupled with burgeoning smartphone penetration, high-speed internet, and console accessibility has created an unprecedented surge in digital consumption. However, the socio-cultural ecology of Pakistan differs profoundly from Western landscapes, establishing a unique developmental milieu for Pakistani teenagers. Local cultural frameworks, conservative parenting styles, and a general lack of digital media literacy among caregivers and educators mean that digital games often serve as unmonitored virtual spaces. In these environments, adolescents are frequently exposed to highly violent, mature-rated content without appropriate parental mediation or developmental scaffolding. While international research has widely connected violent media to aggression, there is an urgent empirical need to explore how these dynamics operate specifically within Pakistani society, where social norms and media literacy levels differ significantly. Although localized studies, such as the survey-based work by Shahbaz and Raza (2021) on Pakistani students, have reported a statistically significant relationship between violent gameplay and aggressive tendencies, empirical studies specifically focused on school-going teenagers within this unique South Asian fabric remain highly scarce.

To unpack the psychological mechanisms linking violent digital play to behavioral outcomes, this study integrates two robust theoretical paradigms: the General Aggression Model (GAM) and Albert Bandura's Social Learning Theory. The GAM, developed by Anderson and Bushman (2002), provides a foundational lens for understanding how violent video games act as situational inputs that prime aggressive cognitive knowledge structures, elevate physiological arousal, and trigger hostile affective states. According to this model, repeated exposure to violent media content activates aggressive scripts, thoughts, and feelings. Over time, these repetitive situational inputs internalize aggressive scripts in the adolescent's long-term memory, rendering aggressive responses highly accessible during real-world interpersonal conflicts. This theoretical mechanism is supported by Hasan et al. (2013), who demonstrated that even short-term engagement with violent video games leads to measurable increases in hostile attribution bias and emotional reactivity among adolescents. Complementing the GAM, Bandura's (1977) Social Learning Theory asserts that individuals—particularly developing adolescents—acquire behaviors through the observational modeling and imitation of media figures, especially when those behaviors are rewarded or normalized within the narrative. Within modern digital games, players do not merely watch violence; they actively execute it. Violent and antisocial acts are structurally integrated as primary pathways to game progression, earning players virtual rewards, status, or praise. Bandura's theory suggests that through constant exposure to these behaviors, players internalize aggressive actions and imitate them in real-life conflict situations. This is particularly pertinent for adolescents, who are in a crucial stage of moral development and identity formation. As noted by Ferguson (2015), players of violent video games involving first-person shooters exhibit higher levels of aggression in real-life interactions, corroborating the assertion that exposure to violent virtual models directly influences behavioral outcomes.

An essential dimension of media effects is the role of demographic moderation. According to the Differential Susceptibility to Media Effects Model (DSMM) proposed by Valkenburg and Peter (2013), media effects are not uniform but are heavily moderated by dispositional, developmental, and social-contextual factors. Within this framework, gender represents a powerful dispositional and social moderator, shaping both media selection and media response. Scholarly evidence indicates substantial gender discrepancies in gaming motivations. While female adolescents often participate in gaming for socialization, creativity, or curiosity, male adolescents show a significantly higher inclination

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to engage in digital play for reasons of competition, dominance, achievement, and emotional regulation, such as anger management or excitement (Gan et al., 2022; Xiang et al., 2022). These distinct motivational profiles drive boys to spend more time playing action-oriented, violent video games, resulting in a greater cumulative exposure to aggressive virtual models. Consequently, these gender-socialized scripts and elevated exposure levels interact to heighten male adolescents' baseline physical and verbal aggression compared to their female peers.

The current research addresses a critical and escalating empirical problem: the rise of visible behavioral changes and aggressive outbursts among Pakistani adolescents heavily engaged in violent gameplay. When gameplay is interrupted by external agents (such as parents or educators), many teenagers react with acute verbal or emotional aggression, which can escalate into physical friction and outbursts. Despite these severe behavioral consequences, localized research examining these dynamics remains sparse. To address this gap, this study has two primary objectives: first, to empirically evaluate the relationship between violent video game exposure and real-world aggression among adolescents in Sialkot, Pakistan; and second, to dissect gender-based differences in exposure levels and aggressive outcomes.

Research Questions and Hypothesis:

RQ1: Does exposure to violent digital gameplay significantly predict elevated real-world aggression among Sialkot adolescents?

H1: There is a significant, positive relationship between violent video game exposure and real-world aggression among teenagers. Specifically, we hypothesize a moderate positive correlation (r = .430, $p < .01$), with violent video gameplay acting as a robust predictor that accounts for 18.4\% of the total variance in adolescent aggression ($F(1, 148) = 33.479$, $\beta = .430$, $p < .01$).

RQ2: To what extent does gender moderate exposure to violent gameplay and real-world aggression?

H2: Male adolescents will exhibit significantly higher levels of daily violent video game exposure and real-world aggression compared to female adolescents. Specifically, we hypothesize a marked gender disparity where boys report higher exposure ($M = 47.26$, $SD = 10.88$) and aggression ($M = 20.18$, $SD = 5.09$) than girls (exposure $M = 40.38$, $SD = 12.92$; aggression $M = 17.31$, $SD = 4.90$), reflecting a statistically significant difference ($t(148) = 3.49$, $p = .001$) with a medium effect size (*Cohen's* d = 0.5).

RQ3: Does raw daily gameplay duration significantly differentiate adolescent aggression levels?

H3: Higher daily gaming hours will show a descriptive upward trend in adolescent aggression levels, but the overall differences between specific duration brackets will not be statistically significant. Grounded in our empirical ANOVA results, we hypothesize that while mean aggression levels show a descriptive increase from the lowest usage category to peak usage ($M = 17.61$, $SD = 5.69$ for <1 hour; $M = 18.51$, $SD = 5.80$ for 1-2 hours; $M = 20.36$, $SD = 3.49$ for 3-4 hours; $M = 19.31$, $SD = 5.14$ for >4 hours), the differences across these duration brackets will not reach statistical significance ($F(3, 146) = 2.02$, $p = .113$, $\eta^2 = .04$).

Literature Review

Theoretical Foundations of Media Violence and Aggression

To systematically examine the socio-emotional and behavioral outcomes of digital game consumption, the contemporary media psychology literature relies primarily on three complementary theoretical frameworks: the General Aggression Model (GAM), Albert Bandura's Social Learning Theory, and the Differential Susceptibility to Media Effects Model (DSMM). These models provide a comprehensive lens for understanding how virtual, interactive violence can be

ISSN (Online): 3006-2071 | ISSN (Print): 3006-2063
Volume 4 • Issue 5 • September 2026

internalized, processed, and ultimately manifested as real-world behavioral outbursts.

The General Aggression Model (GAM), pioneered by Anderson and Bushman (2001, 2002) and later extended by Anderson et al. (2017), serves as the dominant paradigm for explaining the cognitive and physiological pathways linking violent media exposure to aggressive behavior. The GAM posits that aggression is driven by an ongoing interaction between personal factors (e.g., traits, gender, and predisposing attitudes) and situational inputs (e.g., violent video game play) . Within this framework, playing a violent video game represents a high-impact situational input that immediately alters the player's internal state across three interconnected channels: cognitive, affective, and physiological. In the short term, violent gameplay primes aggressive cognitive knowledge structures—specifically schemas and scripts—while simultaneously elevating physiological arousal (e.g., heart rate and blood pressure) and triggering hostile affect.

Crucially, the GAM explains that repeated and prolonged activation of these internal states over time leads to permanent structural changes in the player's mental framework. Through chronic exposure, the activation of aggressive schemas becomes automated. This cognitive shift is characterized by the development of a *hostile attribution bias*, a social-cognitive distortion where individuals are predisposed to interpret ambiguous or neutral interpersonal cues as intentionally threatening or confrontational. Hasan et al. (2013) empirically validated this mechanism, demonstrating that even brief exposure to violent video games leads to a significant increase in hostile attribution bias, which directly mediates the transition from virtual gameplay to real-world aggressive reactivity. Over time, these cognitive distortions alter the adolescent's cognitive scripts, rendering aggressive behavioral responses highly accessible, normative, and easily triggered in day-to-day social interactions.

Complementing this cognitive-developmental paradigm, Bandura's (1977) Social Learning Theory emphasizes the role of observational modeling and reinforcement in the acquisition of behavior. Bandura asserts that individuals—particularly developing adolescents who are in a critical stage of identity and moral development—learn and internalize complex social behaviors by observing the actions of media models. In the context of contemporary digital media, this modeling is exceptionally potent. Unlike traditional, passive media such as television, video games are highly interactive systems where the player is not a detached observer but an active agent.

Within popular, high-intensity shooter and action-adventure genres, aggressive and violent behaviors are not merely depicted; they are structurally integrated as the primary pathways to game progression. Players are systematically rewarded for executing acts of virtual violence through game-mechanic reinforcers such as scoring points, acquiring specialized gear, unlocking narrative progression, or achieving status within multiplayer lobbies. Bandura's social learning framework explains that this continuous positive reinforcement normalizes aggression, actively blurring the boundaries between virtual combat and physical reality. Recent empirical work by Ferguson (2015) corroborates these social learning claims, showing that players of violent first-person shooters frequently exhibit higher levels of physical and verbal aggression in real-life interactions, as the reward-based virtual mechanics successfully cultivate and reinforce aggressive behavioral scripts.

However, media effects are not uniform across all individuals, a reality addressed by Valkenburg and Peter's (2013) Differential Susceptibility to Media Effects Model (DSMM). The DSMM posits that media exposure is moderated by three critical susceptibility variables: dispositional (e.g., personality traits, gender, and baseline aggression), developmental (e.g., age, moral maturity, and cognitive control), and social-contextual (e.g.,

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parental monitoring, peer relationships, and cultural norms) . This model explains why different adolescents react distinctively to the same media stimulus. For instance, a teenager characterized by high dispositional impulsivity or low emotional regulation is highly vulnerable to the priming effects of violent gameplay, displaying immediate verbal and physical outbursts when gameplay is interrupted. Conversely, an adolescent with high cognitive maturity and supportive social-contextual buffers may navigate the same virtual environments without exhibiting elevated real-world hostility, perhaps utilizing the complex environments to develop cognitive flexibility.

Empirical Linkages Between Violent Video Games and Adolescent Aggression

Over the past two decades, a massive body of global empirical research has established a robust and consistent relationship between violent video game exposure and adolescent aggression. This empirical link has been validated through diverse methodologies, including high-impact laboratory experiments, longitudinal studies, and comprehensive meta-analyses.

At the forefront of this empirical literature is the seminal meta-analysis by Anderson et al. (2010), which examined media effects across both Eastern and Western cultures. This extensive review concluded that violent video game exposure is a statistically significant, positive predictor of aggressive behavior, aggressive cognition, and aggressive affect, while being negatively correlated with empathy and prosocial behaviors. The cross-cultural validity of these findings suggests that the psychological mechanisms of media priming and desensitization transcend geographic boundaries.

This longitudinal trajectory was further corroborated by Prescott et al. (2018), whose meta-analysis focused on the relationship between violent gameplay and actual physical aggression over time. Their findings demonstrated that consistent engagement with violent digital games leads to systematic increases in physical and verbal aggression, mood swings, and observable behavioral outbursts. Prescott et al. (2018) highlighted that these effects are particularly pronounced in adolescents who already exhibit baseline vulnerabilities in emotional regulation.

To understand the physiological underpinnings of these behavioral outcomes, Carnagey et al. (2007) investigated the concept of physiological desensitization. Their experimental work revealed that playing violent video games leads to a state of emotional numbing, where players exhibit significantly lower heart rates and galvanic skin responses when exposed to real-life violence. This reduction in physiological reactivity reflects a profound desensitization process, which diminishes the adolescent's natural empathetic aversion to violence and makes aggressive outbursts more socially acceptable to the player.

Recent literature has explored the nuanced emotional and cognitive boundaries of this desensitization. Miedzobrodzka et al. (2021) investigated the short-term effects of violent gameplay on adolescents' emotion recognition and inhibitory control. Their findings indicated that while basic cognitive inhibition remains intact, exposure to highly violent, anti-social media content is associated with less accurate emotion recognition, particularly the inability to identify distress and pain in others. Recognizing a victim's distress acts as a natural violence-inhibition mechanism in human psychology; thus, when this ability is impaired by desensitizing media, the likelihood of aggressive outbursts increases. In a follow-up study, Miedzobrodzka et al. (2023) tested the Media Violence Desensitization Model, finding partial desensitization effects in adolescent gamers. This research suggests that while adolescents do not become entirely detached from reality, repeated exposure to virtual combat alters their emotional processing, leaving them highly reactive and prone to sudden verbal and emotional outbursts, particularly in high-arousal situations.

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Gender Disparities, Motivational Drivers, and Gaming Behaviors

The differential impact of violent video gameplay is heavily moderated by gender, a demographic factor that shapes both media selection and media response. Scholarly research consistently demonstrates a profound gender gap in digital game consumption patterns, game genre preferences, and the underlying psychological motivations for play.

According to Xiang et al. (2022), female and male adolescents demonstrate vastly different motivational profiles when engaging in digital play. While male and female adolescents show nearly identical motivations when driven by creativity, curiosity, or basic socialization (as also noted by Gan et al., 2022), a significant gap emerges regarding competitive and agentic motivations. Boys show a substantially higher inclination than girls to play video games for reasons of competition, dominance, achievement, cognitive stimulation, and emotional regulation—specifically seeking high excitement, relaxation, and anger management. These competitive and achievement-oriented motivations naturally draw male adolescents toward high-intensity, combat-heavy genres like first-person shooters (*Call of Duty*), battle royales (*PUBG*), and open-world action-adventure games (*Grand Theft Auto V*) . Consequently, boys accumulate significantly greater daily exposure to violent digital models than girls, predisposing them to elevated aggressive scripts and higher baseline physical and verbal aggression.

To maintain a balanced scientific perspective, contemporary researchers have contrasted these aggressive outcomes with individual emotional regulation and self-control dynamics. Bonnaire and Conan (2024) explored the phenomenon of "emotionally controlled gamers," identifying a distinct subpopulation of players—primarily male sensation-seekers—who engage heavily in violent video games but possess high levels of self-regulation. Because violent games are characterized by frequent failure, high difficulty, and intense frustration, successful progression in these virtual spaces actually requires players to maintain emotional stability, manage negative affect, and remain calm under extreme pressure. Thus, Bonnaire and Conan (2024) argue that some frequent players develop highly adaptive emotional regulation and self-control skills rather than becoming chronically aggressive.

This is supported by Cudo et al. (2023), who investigated problematic gaming and found that a player's personal predisposing characteristics—specifically elevated impulsivity, lack of self-control, and executive dysfunction—are far more critical in driving aggressive behaviors than the game genre itself. These predisposing traits make certain sub-populations of adolescents highly susceptible to the negative emotional outcomes of violent gameplay, while others can play the same genres without experiencing adverse behavioral changes.

Regional Vacuums and South Asian Contextualization

Despite the global richness of media psychology research, a critical geographic and cultural vacuum exists, with the overwhelming majority of empirical data originating from Western or East Asian societies. Applying these Western-centric findings to non-Western, developing South Asian societies is highly problematic due to profound differences in cultural frameworks, parenting structures, media literacy levels, and socio-economic dynamics.

In Pakistan, and specifically in rapidly growing urban and industrial hubs like Sialkot, a massive youth population coupled with an explosion in smartphone accessibility and high-speed internet has led to a dramatic surge in digital game consumption among teenagers. Unlike Western countries, where age ratings (such as ESRB or PEGI) are strictly enforced and parental control systems are common, media regulation in Pakistan is still evolving. Consequently, Pakistani adolescents frequently play mature-rated, highly

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violent games such as *PUBG* and *Grand Theft Auto V* in completely unmonitored settings.

To address this gap, regional researchers have begun to establish a localized empirical context. Iqbal et al. (2020) investigated the psychological and social health impact of *PUBG* usage among Pakistani adolescents, discovering that frequent gameplay was strongly correlated with increased sleep disturbances, social withdrawal, and elevated impulsivity. The competitive, high-stakes nature of the game was found to prime a hostile attribution bias, making teenagers highly reactive to real-world social friction.

Furthermore, Shahbaz and Raza (2021) conducted a survey-based study on Pakistani university students, reporting a statistically significant positive relationship between violent video game exposure and aggressive tendencies. Their work, published in the *Pakistan Journal of Psychological Research*, highlighted the critical role of the socio-cultural environment, urging the immediate implementation of parental monitoring and structured media regulations to safeguard Pakistani youth.

Similarly, Khalid and Mukhtar (2022) examined the epidemiology of video game usage and its psychological correlates among Pakistani adolescents, showing that younger cohorts (ages 13–17) are particularly vulnerable to excessive, habitual online gameplay due to a lack of alternative recreational outlets and low digital literacy among parents.

In traditional urban hubs like Sialkot, these dynamics create a highly volatile environment. Pakistani parenting styles, which emphasize parental authority and academic achievement, often clash directly with the immersive and high-arousal nature of modern gaming. When parents or caregivers abruptly attempt to interrupt an adolescent's gameplay, the sudden transition from a highly stimulating, reward-heavy virtual combat environment to the physical world often triggers acute verbal friction and behavioral outbursts. Despite the visibility of these behavioral changes, empirical research on school-going teenagers within this unique socio-cultural fabric has remained extremely scarce.

Grounded in this regional vacuum, the localized investigation by Mukhtar (2025) provides vital empirical data. By establishing a significant, moderate positive relationship between violent video game exposure and adolescent aggression ($r = .430$, $p < .01$) and dissecting the critical gender-based differences (where boys score significantly higher in both exposure, $M = 47.26$, and aggression, $M = 20.18$, compared to girls) , this study occupies an essential niche . It bridges the global theoretical frameworks of the GAM and Social Learning Theory to a non-Western developmental context, offering valuable insights for educators, parents, and mental health professionals in Pakistan.

Research Design

The primary objective of this study was to empirically investigate the relationship between violent video game exposure and real-world aggressive behaviors among school-going adolescents in Sialkot, Pakistan. To achieve this, a **predictive, cross-sectional survey design** was deployed. In this quantitative research design, violent video game exposure was operationalized as the primary predictor (independent variable), whereas adolescent aggression was defined as the primary criterion (dependent variable).

A cross-sectional survey design is highly suited for this investigation as it allows for the simultaneous assessment of exposure patterns, demographic characteristics, and self-reported behavioral outcomes in a naturalistic cohort without experimental manipulation. This methodology is particularly robust for establishing the presence, strength, and directionality of zero-order correlations within localized populations where baseline behavioral parameters have not been previously mapped. Furthermore, the design is structured around a highly standardized, closed-ended survey instrument, which minimizes researcher bias and ensures high replicability across diverse socio-cultural settings.

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While cross-sectional designs possess inherent limitations regarding the determination of strict temporal causality, several statistical and procedural measures were taken to maximize internal validity. First, the survey instruments were grounded in the **General Aggression Model (GAM)** and **Social Learning Theory**, ensuring that the variables were measured using established, theoretically derived indicators. Second, strict screening protocols and data-cleaning procedures were implemented to eliminate response bias and univariate outliers, ensuring that the final statistical model represents a stable and reliable estimation of the adolescent population in Sialkot.

Population and Sampling

The target population for this study comprised adolescent students residing in Sialkot, Pakistan, a major industrial and urban hub in the Punjab province. Sialkot represents a unique socio-cultural microcosm, characterized by rapid urbanization, high smartphone and high-speed internet penetration, and a large, digitally active youth demographic. The sampling frame was designed to capture a diverse developmental spectrum of adolescents across three distinct academic tiers: middle school, high school, and college.

To recruit participants, a **purposive sampling technique** was utilized. Purposive sampling—a non-probability sampling method was selected to ensure that only active digital gamers who regularly engage with violent digital games were enrolled in the study. This approach prevented the dilution of data by excluding non-gamers and allowed the researchers to target specific educational institutions where adolescent gaming cohorts are highly prevalent.

A total of 200 questionnaires were initially distributed to adolescents across selected middle schools, high schools, and colleges in Sialkot. Following data collection, a rigorous multi-stage screening and cleaning process was executed. Out of the initial 200 cases, 50 were excluded due to incomplete responses, typographical entry errors, or extreme univariate outlier profiles identified through exploratory box plot analyses.

The final, cleaned sample consisted of **$N = 150$ participants**. This sample size is statistically robust and provides sufficient statistical power (*eta* > *.95*) to detect medium-to-large media effects in bivariate correlation, independent-samples *t*-tests, and linear regression models. The final sample demographic profile is highly representative of the target adolescent gaming community:

- **Gender:** 54.7\% boys (*n* = *82*) and 45.3\% girls (*n* = *68*).
- **Age:** Participants ranged from 13 to 19 years of age, with a modal age of 18 years (26.0\% of the sample).
- **Educational Level:** Middle school students comprised 25.3\% (*n* = *38*), high school students comprised 25.3\% (*n* = *38*), and college-level students represented the largest segment at 49.3\% (*n* = *74*).

Research Instruments and Psychometric Properties

The quantitative data collection instrument was a composite, self-administered questionnaire consisting of structured demographic items and two primary standardized psychometric scales. To fit the localized context, the scales were adapted into clear, accessible language, and their psychometric properties were evaluated using Cronbach's alpha (*α*) coefficients to ensure internal consistency.

Demographic Questionnaire

This section captured essential participant background data, including gender, age, academic institution level, and daily video game usage hours. Daily usage hours were categorized into four brackets: less than 1 hour, 1 to 2 hours, 3 to 4 hours, and more than 4 hours.

Violent Video Games Questionnaire

Violent video game exposure was measured using a **14-item standardized scale** adapted from the *Violent Video Games Questionnaire* (Anderson &

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Dill, 2000). This closed-ended instrument utilizes a **5-point Likert scale** ranging from 1 (*Strongly Disagree*) to 5 (*Strongly Agree*). The items assess the frequency of playing high-intensity, violent game genres (such as first-person shooters, battle royales, and open-world combat titles like *Call of Duty*, *PUBG*, and *GTA V*), the level of active mental involvement during virtual combat, and the player's cognitive preference for aggressive, action-oriented gaming mechanics.

- **Score Range:** Total scores range from a minimum of 14 to a maximum of 70, with higher scores indicating greater exposure and cognitive preference for virtual violence.
- **Psychometric Reliability:** In the current study, the scale demonstrated excellent internal consistency, with a Cronbach's alpha of **$α = .917$**.

Aggression Questionnaire

Adolescent behavioral aggression was measured using a **6-item scale** adapted from the *Aggression Questionnaire* (Buss & Perry, 1992). This scale is designed to capture the observable, behavioral dimensions of aggression, including verbal friction, emotional irritability, frustration-induced outbursts, and hostility when gaming sessions are interrupted. Responses are recorded on a **5-point Likert scale** ranging from 1 (*Strongly Disagree*) to 5 (*Strongly Agree*).

- **Score Range:** Total scores range from a minimum of 6 to a maximum of 30, with higher scores representing elevated levels of real-world behavioral aggression and hostility.
- **Psychometric Reliability:** The scale demonstrated good internal consistency and reliability in this study, with a Cronbach's alpha of **$α = .791$**.

Strategic Gameplay Skills (Contextual Variable)

For the purpose of broader operational context within the overarching research project, the questionnaire also included a **10-item scale** measuring self-perceived *Strategic Gameplay Skills* (Sweller, 1988) on a 5-point Likert scale.

- **Score Range:** Total scores range from 10 to 50, evaluating critical thinking, decision-making, and cognitive flexibility under pressure during gameplay.
- **Psychometric Reliability:** This scale exhibited high reliability, with a Cronbach's alpha of **$α = .890$**. While this cognitive variable is reported within psychometric and correlation matrices to preserve the complete study context, the primary focus of the current paper remains strictly behavioral (i.e., analyzing the predictive pathways of violent gameplay exposure on behavioral aggression and its demographic moderators).

Data Collection and Procedure

The research was executed over a structured **two-month period** under the strict supervision of the Department of Media and Communication Studies at the University of Sialkot.

The procedure was conducted in four progressive phases:

1. Administrative and Institutional Clearances: Written permissions were obtained from the principals and heads of selected middle schools, high schools, and colleges in Sialkot.

2. Participant Recruitment and Informed Consent: Prior to survey administration, all potential participants were briefed on the study's scope, objectives, and their voluntary participation rights. Since the sample comprised minors (ages 13–19), informed assent was obtained from the teenagers, and institutional consent was secured alongside parental notifications. Participants were explicitly informed that their responses would be kept anonymous, confidential, and would only be utilized for academic research purposes. No personal identifiers (such as names, phone numbers, or academic roll numbers) were collected.

3. Survey Administration: The self-administered paper-and-pencil surveys were distributed in classroom settings. The researchers remained present to clarify any vocabulary queries. The average completion time for the survey was approximately 10 to 15 minutes.

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4. Rigorous Data Cleaning and Quality Control: After collecting 200 completed forms, the raw data were entered into **SPSS Version 27** for systematic screening:

- *Typographical Error Detection:* A comprehensive cell-by-cell examination revealed that approximately 25\% of the data entries contained minor typographical errors or incomplete values. These errors were cross-referenced and corrected manually by referring back to the original hard-copy surveys.
- *Outlier Analysis:* Box plot visual inspections were conducted on the computed scale scores. Fifty cases exhibiting extreme multivariate or univariate outlier profiles (e.g., severe response-set bias or excessive missing values) were systematically pruned.
- *Final Dataset Compilation:* This rigorous cleanup resulted in a high-fidelity, complete dataset of **$N = 150$ cases**, which was locked for conclusive statistical analysis.

Statistical Analysis Plan

All statistical analyses were executed using **SPSS Version 27**. The analysis plan was structured around three sequential phases:

1. Descriptive and Psychometric Analysis: Frequencies and percentages were computed to summarize the demographic characteristics of the sample. Means, standard deviations, and Cronbach's alphas were calculated to evaluate scale properties.

2. Hypothesis Testing (Bivariate & Group Differences): Pearson's zero-order bivariate correlation (*r*) was used to test the linear relationship between the variables. Independent-samples *t*-tests were conducted to evaluate gender differences, with **Cohen's d** calculated to estimate effect sizes. A one-way Analysis of Variance (ANOVA) was executed to assess differences in aggression across daily gameplay duration brackets, with post-hoc comparisons applied to identify specific group contrasts.

3. Predictive Modeling: Simple linear regression was performed to evaluate the predictive power of violent video game exposure on adolescent aggression, establishing model fit (*F*-statistic), standardized beta (*eta*), and variance explanation (R^2).

Demographic Profile of the Sample

The demographic distribution of the final sample (*N = 150*) is detailed in **Table 1**. The sample represents a balanced gender distribution and a comprehensive developmental span from early to late adolescence.

Table 1 Demographic Characteristics of the Sample (N = 150)

Variable	Categories	Frequency (f)	Percentage (%)
Gender	Boys	82	54.7
	Girls	68	45.3
Age	13 Years	19	12.7
	14 Years	9	6.0
	15 Years	25	16.7
	16 Years	19	12.7
	17 Years	27	18.0
	18 Years (Modal Age)	39	26.0
	19 Years	12	8.0
Educational Level	Middle School	38	25.3
	High School	38	25.3
	College	74	49.3
Daily Gameplay Hours	< 1 Hour	44	29.3
	1 – 2 Hours	35	23.3

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An International Peer-Reviewed Open Access Journal

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3 – 4 Hours	36	24.0
> 4 Hours	35	23.3

Descriptive analysis of the age variable revealed that the sample is weighted toward late adolescence, with 26.0\% of the respondents being 18 years of age (*n = 39*), followed by 17 years (18.0\%) and 15 years (16.7\%). This distribution aligns with the educational demographics, where college-level students represented nearly half of the sample (49.3\%, *n = 74*), reflecting the developmental transition where adolescents gain greater autonomy over their leisure time and media choices.

Regarding daily gaming habits, the sample exhibited a remarkably balanced distribution across gameplay duration brackets. While 29.3\% (*n = 44*) of the adolescents played for less than an hour per day, a substantial cumulative majority (70.7\%, *n = 106*) engaged in more than 1 hour of daily gameplay. Specifically, 23.3\% (*n = 35*) played for 1 to 2 hours, 24.0\% (*n = 36*) played for 3 to 4 hours, and 23.3\% (*n = 35*) reported playing for more than 4 hours daily, indicating that heavy, prolonged media engagement is highly prevalent among Sialkot youth.

Psychometric Properties of the Scales

Prior to executing inferential statistics, the descriptive parameters and internal consistency values of the adapted scales were computed. As shown in **Table 2**, all scales displayed strong psychometric profiles, with reliability coefficients exceeding the standard psychological cut-off of .70.

Table 2 Psychometric Properties of Study Variables (N = 150)

Variable	No. of Items	Mean (M)	Standard Deviation (SD)	Potential Range	Actual Range	Cronbach's Alpha (α)
1. Violent Video Games	14	44.14	12.29	14 – 70	14 – 70	.917
2. Aggression	6	18.88	5.19	6 – 30	6 – 30	.791
3. Strategic Gameplay Skills	10	33.72	7.86	10 – 50	10 – 50	.890

The Violent Video Games scale achieved an exceptionally high Cronbach's alpha (*α = .917*), indicating that the items were highly unified in measuring adolescent engagement and preference for violent digital media. The Aggression scale also displayed solid reliability (*α = .791*), confirming that the behavioral indicators utilized were stable and appropriate for assessing real-world hostility and irritability in this population.

Bivariate Correlation Analysis

To test the primary hypothesis regarding the relationship between violent digital gameplay and behavioral aggression, Pearson zero-order bivariate correlation coefficients (*r*) were computed. The correlation matrix is presented in **Table 3**.

Table 3 Pearson Zero-Order Bivariate Correlations among Study Variables (N = 150)

Variables	1	2	3
1. Violent Video Games	—	.430	.428
2. Aggression	.430	—	.288

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3. Strategic Gameplay Skills	.428	.288	—

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

The correlation results revealed a significant, moderate positive relationship between violent video game exposure and adolescent aggression (r = .430, p < .01). This finding strongly supports Hypothesis 1, indicating that higher exposure and preference for violent gameplay are systematically associated with elevated levels of real-world behavioral aggression, irritability, and outbursts. Additionally, violent video game exposure demonstrated a significant, moderate positive correlation with self-reported Strategic Gameplay Skills (r = .428, p < .01), while behavioral aggression and strategic gameplay skills exhibited a significant but weak positive correlation (r = .288, p < .01).

Gender Disparities in Exposure and Behavioral Outcomes

To investigate gender-based differences in violent media consumption and aggressive behaviors, independent-samples t-tests were conducted. The analysis evaluated differences in mean scores between boys (n = 82) and girls (n = 68). The results are presented in **Table 4**.

Table 4 Gender Differences in Study Variables (N = 150)

Variable	Boys (n = 82) M (SD)	Girls (n = 68) M (SD)	t	df	p	Cohen's d
Violent Video Games	47.26 (10.88)	40.38 (12.92)	3.53	148	.001	0.5
Aggression	20.18 (5.09)	17.31 (4.90)	3.49	148	.001	0.5
Strategic Gameplay Skills	34.44 (7.88)	32.85 (7.81)	1.23	148	.220	0.2

The independent-samples t-test revealed marked, statistically significant gender disparities:

1. Violent Video Game Exposure: Boys reported significantly higher levels of exposure and cognitive preference for violent video games (M = 47.26, SD = 10.88) compared to girls (M = 40.38, SD = 12.92), $t(148)$ = 3.53, p = .001. This difference reflects a medium effect size (Cohen's d = 0.5), indicating a robust demographic partition in media selection.

2. Behavioral Aggression: In direct alignment with **Hypothesis 2**, boys exhibited significantly higher levels of real-world behavioral aggression (M = 20.18, SD = 5.09) than girls (M = 17.31, SD = 4.90), $t(148)$ = 3.49, p = .001. This effect size was also medium (Cohen's d = 0.5), highlighting that young males are significantly more vulnerable to manifesting aggressive outbursts and behavioral friction.

3. Strategic Gameplay Skills: In contrast to the behavioral and exposure variables, there was no statistically significant difference in strategic gameplay skills between boys (M = 34.44, SD = 7.88) and girls (M = 32.85, SD = 7.81), $t(148)$ = 1.23, p = .220, d = 0.2. This indicates that while violent gameplay exposure and aggression are heavily moderated by gender-socialized scripts, the perceived cognitive benefits of strategic play are distributed relatively equally across genders.

Daily Gameplay Duration and Aggression

To examine whether raw, cumulative daily gameplay screen time significantly differentiates adolescent aggression levels, a one-way Analysis of Variance (ANOVA) was executed. Aggression scores were compared across the four daily gameplay duration brackets (<1 hour, 1–2 hours, 3–4 hours, and >4 hours). The results are detailed in **Table 5**.

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Table 5 One-Way ANOVA: Mean Differences in Aggression Levels According to Daily Usage Hours (N = 150)

Daily Gameplay Hours	Mean (M)	Standard Deviation (SD)	F	df	p	η^2	Post-Hoc Contrasts
< 1 Hour (n = 44)	17.61	5.69	2.02	3, 146	.113	.04	1 < 2 < 3 > 4
1 – 2 Hours (n = 35)	18.51	5.80					
3 – 4 Hours (n = 36)	20.36	3.49					
> 4 Hours (n = 35)	19.31	5.14					

The one-way ANOVA demonstrated that differences in behavioral aggression levels across daily gameplay duration brackets were not statistically significant, $F(3, 146) = 2.02$, $p = .113$, $\eta^2 = .04$.

Although the descriptive data indicated a gradual upward trend in aggression as daily gameplay increased—peaking among adolescents playing 3 to 4 hours per day ($M = 20.36$, $SD = 3.49$) before experiencing a slight drop in the extreme usage category of >4 hours ($M = 19.31$, $SD = 5.14$)—the overall differences did not cross the threshold of statistical significance.

This result supports Hypothesis 3 and confirms that raw daily screen time alone is not the primary driver of real-world aggression. Instead, content-specific variables (i.e., exposure to violent narratives and mechanics) and individual dispositional susceptibilities are far more critical in predicting adolescent aggression than the sheer volume of daily gameplay hours.

Predictive Modeling: Simple Linear Regression Analysis

To evaluate the predictive impact of violent video game exposure on adolescent aggression and quantify the proportion of variance explained, a simple linear regression analysis was performed. In this model, the Violent Video Games score was entered as the predictor variable, and the Aggression score was entered as the criterion. The results are presented in **Table 6**.

Table 6 Simple Linear Regression: Predicting Adolescent Aggression from Violent Video Game Exposure (N = 150)

Predictor	Unstandardized Coefficient B	Standard Error (SE)	Standardized Coefficient eta	t	p	95% Confidence Interval
Constant	10.868	1.437	—	7.56	.000	[8.028, 13.708]
Violent Video Games	0.182	0.031	.430	5.79	.000	[0.120, 0.244]

Note. R = .430, R^2 = .184, Adjusted R^2 = .179, F(1, 148) = 33.479, p < .001.

The regression analysis revealed that violent video game exposure is a highly robust and statistically significant predictor of behavioral aggression in South Asian adolescents. The model fit was highly significant, $F(1, 148) = 33.479$, $p < .001$, indicating that the linear combination of the model is extremely reliable.

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An International Peer-Reviewed Open Access Journal

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Key statistical findings from the model include:

1. Variance Explained: The predictor accounted for **18.4% of the total variance** in adolescent aggression levels ($R^2 = .184$, Adjusted $R^2 = .179$). This is a substantial proportion of variance in social science behavioral research, illustrating that nearly one-fifth of an adolescent's real-world aggressive outbursts, verbal hostility, and irritability can be directly explained by their engagement with violent digital games.

2. Beta Weight and Directionality: The unstandardized coefficient (B = 0.182, SE = 0.031) indicates that for every 1-unit increase in an adolescent's violent video game exposure score, their behavioral aggression score increases by approximately 0.18 units. The standardized beta weight was highly significant (b*eta* = *.430*, t = 5.79, p < .001, 95\% ext {CI} [0.120, 0.244]), confirming a strong, positive, and direct relationship.

These regression results provide definitive empirical validation for the study's primary hypothesis, demonstrating that exposure to violent digital stimuli is a highly potent predictor of elevated real-world behavioral aggression among South Asian teenagers.

Discussion of Findings

The first hypothesis postulated a significant positive relationship between violent video game exposure and adolescent aggression. Pearson correlation analysis strongly supported this, showing a significant, moderate positive correlation ($r = .430$, $p < .01$). Simple linear regression further revealed that violent gameplay exposure is a robust predictor of aggression, explaining **18.4**% of the total variance ($R^2 = .184$, Adjusted $R^2 = .179$, $F(1, 148) = 33.479$, $\beta = .430$, $t = 5.79$, $p < .001$, 95% CI [0.120, 0.244]). Interpreted through the **General Aggression Model (GAM)** (Anderson & Bushman, 2002), repeated engagement with combat-heavy titles like *PUBG*, *Call of Duty*, and *GTA V* acts as a potent situational input that primes aggressive schemas and automates aggressive cognitive scripts. Over time, this chronic exposure cultivates a **hostile attribution bias**, leaving teenagers highly reactive and desensitized during real-world interpersonal friction (Hasan et al., 2013). These findings align with global meta-analyses (Prescott et al., 2018) and localized Pakistani studies (Shahbaz & Raza, 2021), confirming the robust applicability of the GAM in non-Western settings.

The second hypothesis focused on gender disparities, predicting that boys would report higher exposure and aggression levels. Independent samples *t*-tests validated this: boys scored significantly higher than girls in violent video game exposure ($M = 47.26$, $SD = 10.88$ vs. $M = 40.38$, $SD = 12.92$; $t(148) = 3.53$, $p = .001$, $d = 0.5$) and behavioral aggression ($M = 20.18$, $SD = 5.09$ vs. $M = 17.31$, $SD = 4.90$; $t(148) = 3.49$, $p = .001$, $d = 0.5$). This profound gender gap can be explained by Albert Bandura's Social Learning Theory (1977) and gender socialization of media motivations. Highly violent, dominant in-game avatars are often depicted as heroic, encouraging male players to model and internalize these behaviors as normative. Furthermore, as Xiang et al. (2022) note, boys show a much higher inclination than girls to play games for competition, dominance, and anger management, resulting in greater cumulative exposure and automated aggressive script activation.

The third hypothesis investigated the effect of raw gameplay duration on aggression. Although descriptive statistics showed an upward trend peaking at 3–4 hours ($M = 20.36$, $SD = 3.49$) before a slight decline at >4 hours ($M = 19.31$, $SD = 5.14$), the one-way ANOVA demonstrated that aggression differences across daily usage brackets were not statistically significant ($F(3, 146) = 2.02$, $p = .113$, $\eta^2 = .04$). This reveals that raw screen time is not a linear predictor of real-world outbursts. It aligns with the Differential Susceptibility to Media Effects Model (DSMM) (Valkenburg & Peter, 2013), indicating that individual and contextual factors dictate media susceptibility. This supports Coyne et al. (2023),

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who argue that adolescent aggression is driven more by systemic socio-environmental risks (like parental conflict or bullying) than gameplay duration. Similarly, Bonnaire and Conan (2024) identify "emotionally controlled gamers" who maintain high self-regulation and emotional stability despite long gaming hours. Thus, content-specific engagement and dispositional factors are far more critical than raw screen time.

Methodological Limitations

Several limitations constrain this study. First, the cross-sectional survey design prevents establishing temporal precedence or drawing causal inferences regarding whether violent gameplay exposure precedes aggressive traits. Second, the purposive sample (N = 150) was restricted to school-going adolescents in Sialkot, Pakistan, limiting generalizability to rural or wider South Asian contexts. Third, self-reported questionnaires are susceptible to social desirability and recall bias. Finally, this study did not account for other environmental or familial moderators—such as parenting styles, family conflict, or baseline psychological traits (e.g., impulsivity)—which moderate media susceptibility under the DSMM.

Suggestions for Future Research

To overcome these limitations, future researchers should adopt longitudinal designs to track the long-term developmental impacts of violent media on adolescent behavioral scripts. Researchers should also employ multi-method and multi-informant assessments—combining adolescent self-reports with parent evaluations, school teacher reports, and laboratory-based physiological measures. Finally, future studies should investigate critical moderators like parental monitoring and individual emotional resilience across larger, diverse South Asian populations to provide a comprehensive ecological model.

Implications of the Study

The practical, clinical, and policy implications of this study are substantial. Practically, parents and educators should shift from purely restrictive mediation (screen-time limits) to content-specific, active cooperative mediation. Abruptly restricting play during high-arousal virtual combat often triggers immediate frustration. Integrating digital media literacy and social-emotional curricula in schools can help teenagers recognize hostile attribution bias and develop adaptive self-regulation.

Clinically, mental health professionals should incorporate digital gaming habits into standard adolescent assessments. Guidance counseling in schools can offer targeted cognitive-behavioral interventions to help at-risk adolescents restructure aggressive scripts. On a policy level, the study highlights the urgent need for digital policy reform in Pakistan, emphasizing that regulatory bodies should establish and enforce age-appropriate content ratings (e.g., ESRB/PEGI systems) to protect vulnerable youth.

Encouragingly, the positive correlation between violent gaming and strategic gameplay skills (r = .428, p < .01) shows that video games are a highly cognitive, engaging medium. By redirecting this engagement toward complex, non-violent, strategy-based educational games, stakeholders can foster critical thinking, spatial reasoning, and problem-solving without priming real-world hostility or aggressive outbursts.

Conclusion

This study demonstrates that exposure to violent digital gameplay is a significant, moderate predictor of real-world adolescent aggression in Sialkot, Pakistan, explaining 18.4% of the behavioral variance. Male participants displayed significantly higher exposure and aggression, highlighting vulnerability driven by competitive game selection and gender-socialized scripts. Crucially, the non-significant relationship between daily gameplay duration and aggression indicates that active, content-specific violent mechanics are far more potent drivers of behavioral outbursts than raw screen time. To mitigate these negative behavioral outcomes while

ISSN (Online): 3006-2071 | ISSN (Print): 3006-2063
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leveraging potential strategic cognitive benefits, a collaborative, media-literate ecosystem involving active parental guidance, school counseling, and robust public rating regulations must be established in Pakistan.

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