



AEGIS

Current Criminology

2026 / 1 (1) / 14-28

RESEARCH ARTICLE

Should Gaming Disorder Shoulder the Blame for Crime? Empirical Evidence of Subjective Social Status and Gaming Disorder Mediating the Effect of Adverse Childhood Experiences on Juvenile Delinquency

Zhan Thor Tuo¹; Dianshi Moses Li^{1*}

¹ Centre for Empirical Legal Studies, Faculty of Law, University of Macau, Taipa, Macau

Corresponding author: Dianshi Moses Li (yc37228@connect.um.edu.mo)

Submitted: 2026-2-26 / Accepted: 2026-2-28 / Published: 2026-2-28

Abstract: Gaming disorder is increasingly viewed as a serious social issue, and its potential harm has attracted widespread concern. This study has documented a positive association between gaming disorder and adolescents' aggressive behaviors and tendencies. Yet conclusive empirical evidence on how gaming disorder is associated with juvenile delinquency remains limited. Using a survey of students from seven juvenile training schools in Chongqing, a centrally administered municipality in China (N = 378), we examined the association between adverse childhood experiences (ACEs) and juvenile delinquency, and assessed the potential mediating roles of subjective social status and gaming disorder. Adolescents reporting more ACEs also reported lower subjective social status and higher levels of gaming disorder; in turn, gaming disorder was significantly and negatively associated with juvenile delinquency. One possible mechanism is that gaming provides an outlet for negative emotions (e.g., anger) and offers feelings of achievement and self-worth that may be difficult to obtain offline, partially compensating for lower subjective social status. These findings suggest that high engagement in gaming may help explain why juvenile delinquency does not necessarily increase among adolescents with gaming disorder. Overall, the negative association observed between gaming disorder and juvenile delinquency in this sample complicates the common assumption that gaming disorder is always linked to higher delinquency and suggests the need for more nuanced and targeted gaming-related policies.

Keywords: Adverse childhood experiences, Subjective social status, Gaming disorder, Juvenile delinquency

Data Availability Statement : Given that the subjects of this study are minors, and the data collected contains sensitive information that could potentially identify individual participants, the data will not be made publicly available to ensure the privacy of the minors involved. The de-identified version of the data used in this article, along with the code, will be made available at <https://github.com/dianshili/GamingDisorder> after the article is published.

Ethics Committee Approval : This study was conducted in compliance with local regulations and received the necessary approvals from the Chongqing Juvenile Delinquency Prevention Research Association and other relevant authorities in Chongqing, China.

Informed Consent : Written informed consent was obtained from the guardian (the Juvenile training schools) who agreed to take part in the study.

Acknowledgments : We would like to thank the youth who participated in this study for their trust and authenticity.

Declaration of Interests : The authors have no conflict of interest to declare.

Funding : None.

Gaming disorder is increasingly viewed as a serious social issue, and its potential harm has attracted widespread concern. Research has documented a positive association between gaming disorder and adolescents' aggressive behaviors and tendencies. Yet conclusive empirical evidence on how gaming disorder is associated with juvenile delinquency remains limited. Using a survey of students from seven juvenile training schools in Chongqing, a centrally administered municipality in China (N = 378), we examined the association between adverse childhood experiences (ACEs) and juvenile delinquency, and assessed the potential mediating roles of subjective social status and gaming disorder. Adolescents reporting more ACEs also reported lower subjective social status and higher levels of gaming disorder; in turn, gaming disorder was significantly and negatively associated with juvenile delinquency. One possible mechanism is that gaming provides an outlet for negative emotions (e.g., anger) and offers feelings of achievement and self-worth that may be difficult to obtain offline, partially compensating for lower subjective social status. These findings suggest that high engagement in gaming may help explain why juvenile delinquency does not necessarily increase among adolescents with gaming disorder. Overall, the negative association observed between gaming disorder and juvenile delinquency in this sample complicates the common assumption that gaming disorder is always linked to higher delinquency and suggests the need for more nuanced and targeted gaming-related policies.

Keywords: Adverse childhood experiences, Subjective social status, Gaming disorder, Juvenile delinquency

Introduction

Gaming disorder has been recognized as a potential psychological disorder. The American Psychiatric Association (APA) has included gaming disorder among conditions considered for diagnosis (Association, 2000). A substantial body of research links gaming disorder to symptoms such as anxiety, social impairment, and attention deficits (Sioni et al., 2017; Wang et al., 2017). Among adolescents, exposure to violent game content is often cited as a risk factor for aggressive thoughts, emotions, and behaviors (Mihara & Higuchi, 2017). According to the Entertainment Software Association (ESA), nearly two-thirds of U.S. adults play video games regularly, and the proportion rises to 76% among children under 18. To reduce the risk of gaming disorders in adolescents, many countries have implemented policies and initiatives. For example, the United States established the Entertainment Software Rating Board (ESRB) in 1994 to evaluate and rate video games. In 2020, China introduced the "Online Game Age-appropriate Hints," which classify gamers by age group. Similar rating systems, such as Japan's Computer Entertainment Rating Organization (CERO) and Europe's Pan-European Game Information (PEGI), have also been developed to regulate and guide video game content.

Despite the documented correlation between internet gaming disorder and juvenile delinquency, a critical question remains insufficiently answered: does gaming disorder actually lead to criminal or delinquent behavior? Existing studies show that gaming disorder correlates with characteristics such as low self-control, aggression, paranoia, and psychopathy (Jeong et al., 2020; Kim et al., 2018), traits often observed among offenders. Necessary such traits are neither necessary nor sufficient conditions for committing a crime (Freese & Kevern, 2013; Pearl, 2009). Thus, the directionality and underlying processes linking gaming disorder and juvenile delinquency remain unclear and warrant further empirical research.

One reason for this evidentiary gap may be limited access to relevant data (Wang et al., 2020). Gaming disorder is prevalent among adolescents, yet juvenile criminal records are typically protected as private information in many countries and regions (Liu, 2008; Liu & Li, 2024). To safeguard minors, minimize adverse impacts on their futures, and preserve opportunities for rehabilitation, obtaining approval to survey juvenile offenders is often exceedingly difficult (Wu & Wu, 2023; Zhang et al., 2023).

With official authorization and participants' informed consent, we conducted a survey of students (N = 378) enrolled in seven juvenile training schools for minors with non-criminal legal violations or behavioral problems (similar to juvenile detention centers in the United States) in Chongqing, China. Focusing on this at-risk population, we examined the associations among ACEs, subjective social status, gaming disorder, and juvenile delinquency using mediation models. This study adds empirical evidence on the association between gaming disorder and juvenile delinquency and discusses possible explanations. We also draw on the criminological theory of unstructured spare time to interpret the findings.

Literature Review

Gaming disorder and juvenile delinquency

Gaming disorder refers to a pattern of problematic gaming behavior. The DSM-5 proposes nine criteria for gaming disorder (Petry et al., 2014; Regier et al., 2013): preoccupation with gaming; withdrawal symptoms when gaming stops; tolerance; unsuccessful attempts to reduce or stop gaming; loss of interest in other activities and hobbies; continued gaming despite awareness of its negative impact on life; deception about the amount of time spent gaming; gaming to alleviate negative moods; and significant impairment in work, study, or social functioning due to gaming.

Adolescents' exposure to video games has long been debated in both scholarly and public discussions. On one hand, evidence suggests that video games can contribute positively to children's development. For instance, studies have found that preschool children who engage with video games demonstrate improved school readiness and cognitive growth (Li & Atkins, 2004; Webster et al., 2019). Furthermore, the social interactions involved in video gaming often feature a sophisticated mix of cooperative and competitive elements, which can boost motivation and support learning (Gee, 2003; Steinkuehler, 2012).

Nevertheless, gaming disorder among adolescents has attracted sustained concern because addictive patterns of play may contribute to social impairment and health problems. Adolescents are particularly vulnerable to developing gaming disorders, and multiple contributing factors have been identified. Negative emotional states are often associated with the onset and maintenance of gaming disorder (Jauregui et al., 2023). Starcevic et al.

(2020) observed that gaming disorder frequently co-occurs with attention deficit hyperactivity disorder (ADHD), with gaming sometimes serving as a coping strategy to escape real-life stressors. Moreover, frequent engagement with video games, especially those featuring violent content, may intensify aggressive cognitions and behaviors (Colwell & Kato, 2003; David Acevedo-Polakovich et al., 2007). For example, Müller et al. (2015) suggested that gaming disorder could be linked to externalizing behaviors such as rule-breaking or aggression.

Although substantial literature links gaming disorder to adverse outcomes, much of this evidence relies on student samples or participants recruited via crowdsourcing platforms such as Amazon Mechanical Turk (Miller et al., 2017). As a result, a key gap remains: direct empirical evidence on the relationship between gaming disorder and juvenile delinquency is still limited. Addressing this gap is important for clarifying whether and how gaming disorder is associated with delinquent behavior.

Adverse childhood experiences and juvenile delinquency

ACEs are associated with numerous health risks and higher adult mortality rates (Greeson et al., 2013). They encompass a range of traumatic experiences, including different forms of abuse (physical, emotional, and sexual) and neglect (physical and emotional) (Hardt & Rutter, 2004). Moreover, ACEs are closely linked to a wide range of emotional and cognitive disorders (Chapman et al., 2004; LeTendre & Reed, 2017; Sahle et al., 2021).

ACEs have been shown to increase adolescents' likelihood of engaging in violence and of being victimized (Forster et al., 2017; Reavis et al., 2013). A large body of research indicates that individuals exposed to abuse or neglect during childhood exhibit higher rates of mental health problems than those without such experiences (Nagin & Tremblay, 1999). In the United States, for example, approximately 90% of justice-involved youth report childhood trauma (Dierkhising et al., 2013). Youth who are mistreated by caregivers may be especially prone to violent tendencies. From a developmental psychopathology perspective, ACEs may trigger heightened physiological stress responses that lead to lasting biochemical changes and adverse physical and behavioral outcomes, including outwardly directed violence (Cicchetti & Olsen, 1990). Consistent with this account, studies have documented associations between ACEs and later criminal behavior (Baglivio et al., 2014; Barrett et al., 2014; Craig et al., 2017; Fox et al., 2015; Levenson & Socia, 2016). Specifically, childhood physical abuse and other forms of maltreatment are linked to elevated risks of both property and violent offending (Teague et al., 2008).

How subjective social status links adverse childhood experiences and gaming disorder

Gaming disorder is influenced by parenting practices. A supportive parent-child relationship can protect against gaming disorder, whereas neglect or abuse, such as ACEs, may increase the risk of developing problematic gaming (Cuong et al., 2021).

Beyond parenting practices, subjective social status may also play a key role in this pathway. Available evidence suggests a significant inverse association between ACEs and subjective social status (Mei et al., 2022). Subjective social status reflects an individual's perceived position within a socioeconomic hierarchy (Demakakos et al., 2008; Jackman & Jackman, 1973). It can be assessed by asking respondents to form an overall appraisal of their socioeconomic standing based on indicators such as household income and educational attainment (Wang & Liu, 2020). Lower subjective social status is frequently correlated with emotional neglect and strained family relationships (Chen & Zhu, 2021; Qin et al., 2021).

Subjective social status is closely related to how adolescents perceive family resources and parental attitudes. Adolescents who have suffered abuse or neglect during childhood often develop feelings of inferiority, a desire to escape reality, and difficulties in social interaction. Compared with peers without adverse childhood experiences, these adolescents tend to rate their social and economic standing lower (Higashiyama et al., 2019). Such underestimation may reflect reduced confidence in their worth and abilities, as well as internalized perceptions shaped by the socioeconomic conditions of their upbringing.

Adolescents with lower perceived socioeconomic standing may be more likely to use video games to cope with or escape from real-life difficulties (Jauregui et al., 2023). A key attraction of gaming is its capacity to regulate emotion by providing temporary relief from stressors or unwanted realities (Starcevic et al., 2020). In virtual environments, players can attempt actions that may feel risky or unattainable offline. By casting players as competent protagonists, games can offer a sense of mastery, achievement, and affirmation of self-worth that may be harder to obtain in everyday life (Olson, 2010).

Hypothesis

H1: ACEs are expected to negatively predict subjective social status.

H2: Subjective social status is expected to negatively predict gaming disorder.

H3: ACEs are expected to positively predict gaming disorder.

H4: Gaming disorder is expected to negatively predict juvenile delinquency.

H5: Subjective social status and gaming disorder are expected to mediate the association between ACEs and juvenile delinquency.

Method

Data collection

We conducted a survey of all students enrolled in juvenile training schools for minors with non-criminal legal violations or behavioral problems (similar to juvenile detention centers in the United States) in Chongqing, China, between 11 July 2024 and 15 August 2024. The study complied with local regulations and was approved by the Chongqing Juvenile Delinquency Prevention Research Association and other relevant authorities on 30 May 2024. Chongqing is one of China's direct-administered municipalities, an administrative level equivalent to a province.

In China, juvenile training schools (Gongdu Xuexiao, 工读学校) are specialized educational institutions for minors who exhibit serious behavioral problems or engage in unlawful acts. They primarily admit adolescents with persistent disciplinary issues, those who have committed minor offenses, or those who have received warnings from public security authorities. Their primary objective is to correct behavior and facilitate reintegration into society through a combination of education and labor/vocational training.

Students in these institutions receive standard academic instruction alongside labor and vocational training. Because their mission is rehabilitative and educational, attendance is often mandatory. In some cases, placement

in a juvenile training school serves as an educational alternative to formal punishment, although it is not a penal sanction.

Students in juvenile training schools may have engaged in conduct that violates public security regulations or involves minor unlawful acts (e.g., theft, property damage, fighting, or commercial sex). Alternatively, they may display serious disciplinary problems that do not rise to the level of criminal or public security violations, such as severe gaming disorder, persistent defiance of parents and teachers, running away from home, or associating with delinquent peers.

In total, 378 responses were collected from seven schools across districts and counties in Chongqing (Dazu District, Fengdu County, Wanzhou District, Changshou District, Tongliang District, Jiangjin District, Hechuan District, and Bishan District). Written informed consent was obtained before data collection. The consent form was provided to participants, their teachers, and juvenile training school authorities prior to questionnaire administration. Questionnaires were administered only after all parties had read the consent form and agreed to participate. Respondents were aged 12-18, covering the age range relevant to juvenile justice under Chinese law. The survey included ACEs, gaming disorder, juvenile delinquency, and demographic information.

Measures

ACEs served as the independent variable in our study. We used the Chinese adaptation of the Adverse Childhood Experiences International Questionnaire (ACE-IQ) (Ho et al., 2019; Organization, 2018). The original instrument encompasses 13 categories, including emotional and physical neglect, emotional and physical abuse, sexual abuse, living with a substance abuser, living with a household member who was mentally ill or suicidal, living with a household member who was imprisoned, parental death, separation or divorce, domestic violence, and violence outside the home such as bullying, witnessed community violence, and exposure to war or collective violence. Following recommendations of the Ethics Committee and considering the non-anonymous nature of the questionnaire and the fact that all respondents were minors, we excluded items related to sexual abuse. In addition, because the adolescents surveyed have not experienced war in the urban areas of China where they have resided since birth, we removed items concerning war. After these adjustments, the survey covered 11 categories. Moreover, the category of “parental death, separation, or divorce” was treated as a binary variable (presence vs. absence), whereas the remaining categories were measured using a 7-point Likert scale to record respondents’ scores. In the current study, Cronbach’s alpha coefficient was 0.7224. We used the mean of emotional and physical abuse as a proxy for overall abuse and the mean of emotional and physical neglect as a proxy for neglect.

We measured gaming disorder using the scale proposed by Petry et al. (2014), which comprises nine dimensions: pre-occupation, withdrawal, tolerance, reduce/stop, give up other activities, continue despite problems, deceive/cover-up, escape adverse moods, and risk/lose relationships/opportunities. Items were rated on a 7-point Likert scale. In the current study, Cronbach’s alpha coefficient was 0.8503. The mean of the nine dimensions was used as the composite indicator of gaming disorder.

We assessed subjective social status using the measure proposed by Adler et al. (2000). Participants were presented with a 10-rung ladder representing social position in society. Level 1 represents the bottom of society, where individuals experience the most challenging living conditions, have the lowest levels of education, hold the least respected jobs, and earn the lowest income. Level 10 represents the top of society, where individuals enjoy

the most comfortable living conditions, have the highest levels of education, hold the most prestigious jobs, and earn the highest income. Participants selected a number between 1 and 10 to indicate their perceived social status.

Age thresholds for juvenile delinquency vary by country. In the UK, the range is 10 to 16 years old, while in the US it typically spans from 7 to 17 years old across states. In China, criminal responsibility for minors is generally defined as under age 16, with lower thresholds applied only for particularly serious criminal acts. None of the cases in this study met the criteria for criminal responsibility based on offense severity. When analyzing delinquent behavior, we considered three main types of offenses: property, violent, and sexual. Because property offenses accounted for the largest share, property crime was used as the proxy measure for juvenile delinquency in subsequent analyses (Farrington & Liu, 2023; Zhao et al., 2015).

Data analysis strategy

Based on the survey data from seven juvenile training schools in Chongqing, China (see Table 1), some variables exhibited imbalanced distributions, with certain categories having small cell sizes and potential long-tail behavior. In such settings, conventional OLS inference may be sensitive and yield biased standard errors. Therefore, when estimating direct and indirect effects and their standard errors, we employed the percentile bootstrap method, which provides more robust results (Mackinnon et al., 2004; Mallinckrodt et al., 2006; Zhao et al., 2010). To improve interpretability and comparability of effect sizes, this study reported percentage coefficients (b_p), defined as regression coefficients when both the dependent variable (DV) and independent variable (IV) are on conceptual 0-1 percentage scales. This metric provides a comprehensible interpretation and facilitates cross-scale comparison (Zhao et al., 2024) and has been used in psychology (Ao et al., 2023), medicine (Zhang, Qiu, et al., 2024), and communication (Zhang, Harris Ao, et al., 2024). All analyses were conducted using Python 3.11. Descriptive statistics and reliability calculations were performed using Stata 18.0 driven by Python 3.11. Mediation analyses followed the procedures outlined by Hayes (2022) and Zhao et al. (2010), with relevant code available in Zhao et al. (2024).

Table 1. Descriptive Characteristics of the Sample (N = 378)

Variable	Mean	SD	Min	Max
Gender (female)	.106	.308	0	1
Age	14.676	1.293	10	18
<i>hukou</i>	.611	.488	0	1
Father's education	3.206	1.289	1	7
Subjective social status	5.560	2.369	1	10
Abuse	2.056	1.176	1	7
Neglect	3.028	.900	1	7
Gaming disorder	2.692	1.158	1	7
Juvenile delinquency	.602	.490	0	1

Results

Sample demographics

Among the respondents (N = 378), 10.6% were female. Ages ranged from 10 to 18 years (M = 14.676). The variable hukou was coded as 0 for urban and 1 for rural residence; its mean value of 0.611 indicates that 61.1% of respondents were from rural areas. Father's education was coded from 1 ("below primary school or no education") to 9 ("doctoral degree"). No respondents reported fathers with master's or doctoral degrees; therefore, the maximum observed value was 7 (undergraduate degree). The mean father's education score was 3.206, indicating an average level between junior high school and general high school. Regarding ACEs, the mean abuse score was 2.056, while neglect was 3.028. The mean gaming disorder score was 2.692. The prevalence of juvenile delinquency was 60.2%.

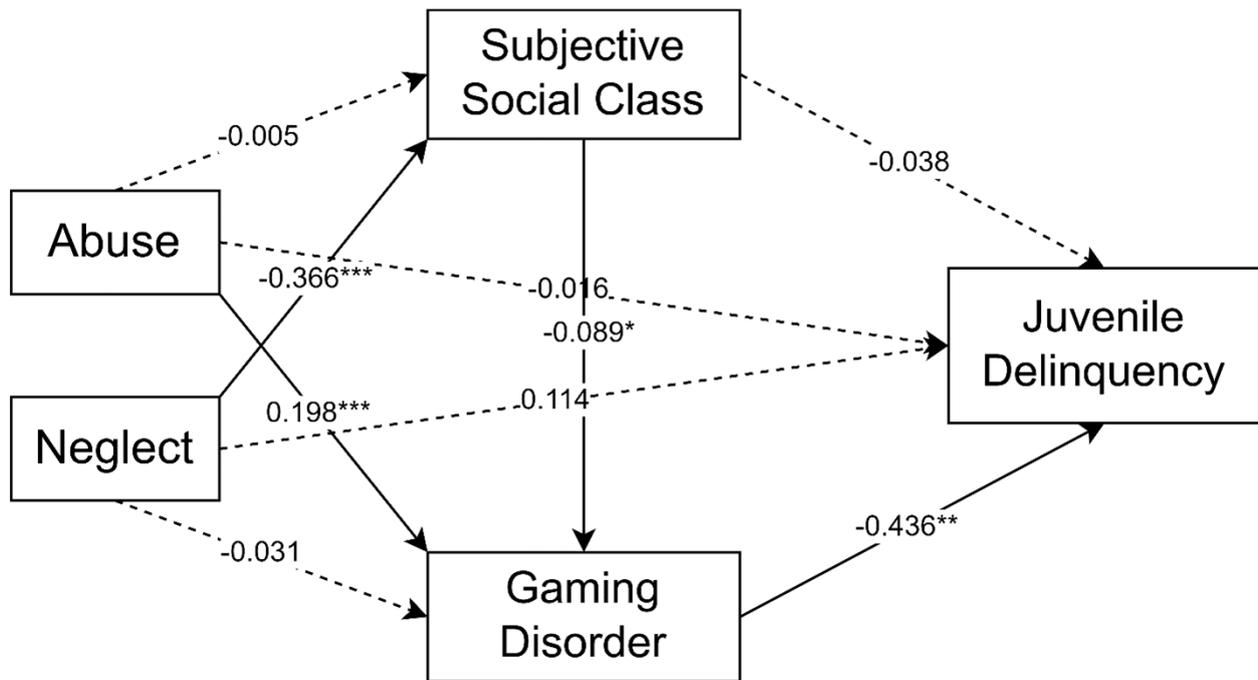
Establishing the mediation models

Table 2. Regression Coefficient or Direct and Remainder Effect of Mediation Models (N = 378)

	Subjective social class	Gaming disorder	Juvenile delinquency
	b_p (SE)	b_p (SE)	b_p (SE)
Gaming disorder			-.436 (.141) **
Subjective social class		-.089 (.043)	-.038 (.098)
Abuse	-.005 (.074)	.198 (.054) ***	-.016 (.153)
Neglect	-.366 (.097) ***	-.031 (.074)	.114 (.180)
Age	.012 (.013)	-.007 (.008)	.005 (.023)
Gender	-.017 (.047)	-.008 (.032)	-.497 (.073) ***
<i>Hukou</i>	-.038 (.029)	-.015 (.020)	.102 (.054)
Father's education	.011 (.011)	-.01 (.008)	-.021 (.022)

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

Figure 1. Mediation Model of ACEs on Juvenile Delinquency through Subjective Social Class and Gaming Disorder (N = 378)



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

Table 3. Indirect Effects of Mediation Models (N = 378)

	<i>b</i> (<i>SE</i>)	95% CI	<i>p</i>
Model 1: Abuse			
Abuse → Subjective social class → Gaming disorder	.000 (.007)	-.014 to .016	.999
Abuse → Subjective social class → Juvenile delinquency	.000 (.008)	-.016 to .017	.989
Abuse → Gaming disorder → Juvenile delinquency	-.086 (.038)	-.168 to -.022	.000
Abuse → Subjective social class → Gaming disorder → Juvenile delinquency	-.000 (.003)	-.007 to .007	.999
Model 2: Neglect			
Neglect → Subjective social class → Gaming disorder	.032 (.018)	.002 to .073	.041
Neglect → Subjective social class → Juvenile delinquency	.014 (.037)	-.059 to .091	.774
Neglect → Gaming disorder → Juvenile delinquency	.014 (.034)	-.053 to .0871	.713

	<i>b_p</i> (SE)	95% CI	<i>p</i>
Neglect → Subjective social class → Gaming disorder → Juvenile delinquency	-.014 (.010)	-.037 to-.000	.041

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

As shown in Table 2 and Fig. 1, neglect had a significant negative effect on subjective social status ($b_p = -.366$, $SE = .097$, $p < .001$), whereas the effect of emotional and physical abuse on subjective social status was not significant ($b_p = -.005$, $SE = .074$, $p > .05$), providing partial support for H1. Subjective social status significantly negatively predicted gaming disorder ($b_p = -.089$, $SE = .043$, $p < .05$), supporting H2. Emotional and physical abuse had a significant positive effect on gaming disorder ($b_p = .198$, $SE = .054$, $p < .001$), whereas the effect of emotional and physical neglect on gaming disorder was not significant ($b_p = -.031$, $SE = .074$, $p > .05$), partially supporting H3. Gaming disorder had a significant negative effect on juvenile delinquency ($b_p = -.436$, $SE = .141$, $p < .01$). Interpreted as a percentage coefficient, this implies that for every 100% increase in gaming disorder, the risk of juvenile delinquency decreases by 43.6%. Therefore, H4 is supported by statistical evidence.

According to Table 3, several specific indirect effects were significant. First, the path Neglect → Subjective social status → Gaming disorder was significant ($b_p = .032$, $SE = .018$, $p < .05$): when controlling for the other mediator and covariates, higher neglect was associated with lower subjective social status, which in turn predicted higher gaming disorder. Second, the indirect effect Abuse → Gaming disorder → Juvenile delinquency was significant ($b_p = -.086$, $SE = .038$, $p < .01$): higher abuse predicted higher gaming disorder, which predicted lower juvenile delinquency. Third, Subjective social status → Gaming disorder → Juvenile delinquency was significant ($b_p = .039$, $SE = .023$, $p < .05$): higher subjective social status predicted lower gaming disorder, which in turn predicted higher juvenile delinquency. Finally, the serial pathway Neglect → Subjective social status → Gaming disorder → Juvenile delinquency was significant ($b_p = -.014$, $SE = .010$, $p < .05$). Together, these findings provide statistical support for H5.

Controlling for covariates and the alternative mediator, the indirect effects can be summarized as follows: neglect was linked to lower subjective social status, which predicted higher gaming disorder ($b_p = .032$, $SE = .018$, $p < .05$); abuse predicted higher gaming disorder, which predicted lower juvenile delinquency ($b_p = -.086$, $SE = .038$, $p < .01$); and higher subjective social status predicted lower gaming disorder, which in turn predicted higher juvenile delinquency ($b_p = .039$, $SE = .023$, $p < .05$). In addition, neglect exhibited a significant serial indirect effect through subjective social status and gaming disorder ($b_p = -.014$, $SE = .010$, $p < .05$).

Discussion

The core contribution of this study is to provide direct empirical evidence on the association between gaming disorder and juvenile delinquency. We also examined pathways leading to gaming disorder and found that subjective social status mediated the association between ACEs and gaming disorder.

Childhood neglect was associated with lower subjective social status, which in turn was related to higher gaming disorder. Several mechanisms may account for this pattern. First, neglect may undermine self-worth and foster feelings of inferiority, limiting opportunities to achieve or display competence in daily life. Video games can provide structured goals, feedback, and recognition, allowing adolescents to experience accomplishment and respect that may be difficult to obtain offline. Second, for adolescents, gaming is also a social arena: gaming skill can translate into peer status and social capital. These rewards may create a reinforcing cycle that increases engagement and, for some, entrenches addictive patterns of play.

Our results also indicate that when adolescents become more engrossed in gaming, juvenile delinquency decreases. This finding challenges the prevailing assumption that gaming disorder necessarily increases criminal behavior. It also underscores the distinction between aggressive tendencies and actual delinquent conduct.

One possible explanation is that gaming disorder involves spending substantial time on electronic games, often immersive titles that may include violent elements, which can channel aggressive impulses into a virtual setting. This may reduce both the time and opportunity to engage in offline delinquency. According to the “unstructured spare time” theory, widely used in research on child welfare and adolescent psychosocial development (Abbott & Barber, 2007; Meeks & Mauldin, 1990; Osgood et al., 2005), delinquency is more likely when youth have abundant unstructured time. Even when ACEs increase motivations or propensities for delinquency, engagement in gaming may constrain opportunities by occupying discretionary time. Consistent with evidence that ACEs can contribute to violence and offending later in life, gaming disorder may therefore, in some cases, divert attention and reduce opportunities for juvenile delinquency.

These findings invite a reassessment of the appropriateness and fairness of prevailing policy approaches to prevent gaming disorder. While gaming disorder can entail harms, such as links with attention deficit hyperactivity disorder (ADHD) (Paulus et al., 2018), potential impacts on eyesight and psychological health (Chen et al., 2018), and concerns about violent and pornographic content, our results suggest that, under some conditions, intensive gaming may coincide with lower juvenile delinquency.

For policymakers and educators, this implies that responses to adolescents’ gaming and behavioral problems should be more nuanced than a one-size-fits-all restriction strategy (Colder Carras et al., 2021). Moreover, research on the motivations and determinants of gaming disorder, especially pathways from adverse childhood experiences to problematic gaming, remains limited. Additional empirical work is needed to clarify these mechanisms and to identify when and for whom gaming becomes harmful versus potentially protective.

Because our data come from a single provincial-level unit in China, the findings may not generalize to other contexts. Replication across regions and countries is needed to assess the robustness and broader applicability of these conclusions (Liu, 2022, 2024). We encourage future studies to extend this line of research, and we will further examine these issues in subsequent articles.

References

- [1] Abbott, B. D., & Barber, B. L. (2007). Not Just Idle Time: Adolescents’ Developmental Experiences Provided by Structured and Unstructured Leisure Activities. *The Australian Educational and Developmental Psychologist*, 24(1), 59-81. <https://doi.org/10.1017/S0816512200029102>
- [2] Adler, N. E., Epel, E. S., Castellazzo, G., & Ickovics, J. R. (2000). Relationship of subjective and objective social status with psychological and physiological functioning: Preliminary data in healthy, White women. *Health Psychology*, 19(6), 586-592. <https://doi.org/10.1037/0278-6133.19.6.586>

- [3] Ao, S. H., Zhang, L., Liu, P. L., & Zhao, X. (2023). Social media and partnership jointly alleviate caregivers' psychological distress: exploring the effects of online and offline connectedness. *BMC Psychology*, *11*(1), 394. <https://doi.org/10.1186/s40359-023-01415-9>
- [4] Association, A. P. (2000). Diagnostic and statistical manual of mental disorders. *Text revision*.
- [5] Baglivio, M. T., Epps, N., Swartz, K., Huq, M. S., Sheer, A., & Hardt, N. S. (2014). The prevalence of adverse childhood experiences (ACE) in the lives of juvenile offenders. *Journal of juvenile justice*, *3*(2).
- [6] Barrett, D. E., Katsiyannis, A., Zhang, D., & Zhang, D. (2014). Delinquency and recidivism: A multicohort, matched-control study of the role of early adverse experiences, mental health problems, and disabilities. *Journal of emotional and behavioral disorders*, *22*(1), 3-15.
- [7] Chapman, D. P., Whitfield, C. L., Felitti, V. J., Dube, S. R., Edwards, V. J., & Anda, R. F. (2004). Adverse childhood experiences and the risk of depressive disorders in adulthood. *Journal of affective disorders*, *82*(2), 217-225.
- [8] Chen, H., & Zhu, Z. (2021). Social trust and emotional health in rural older adults in China: the mediating and moderating role of subjective well-being and subjective social status. *BMC Public Health*, *21*, 1-13.
- [9] Chen, K. H., Oliffe, J. L., & Kelly, M. T. (2018). Internet Gaming Disorder: An Emergent Health Issue for Men. *American Journal of Men's Health*, *12*(4), 1151-1159. <https://doi.org/10.1177/1557988318766950>
- [10] Cicchetti, D., & Olsen, K. (1990). The Developmental Psychopathology of Child Maltreatment. In M. Lewis & S. M. Miller (Eds.), *Handbook of Developmental Psychopathology* (pp. 261-279). Springer US. https://doi.org/10.1007/978-1-4615-7142-1_21
- [11] Colder Carras, M., Stavropoulos, V., Motti-Stefanidi, F., Labrique, A., & Griffiths, M. D. (2021). Draconian policy measures are unlikely to prevent disordered gaming. *JOURNAL OF BEHAVIORAL ADDICTIONS*, *10*(4), 849-853. <https://doi.org/10.1556/2006.2021.00075>
- [12] Colwell, J., & Kato, M. (2003). Investigation of the relationship between social isolation, self-esteem, aggression and computer game play in Japanese adolescents. *Asian Journal of Social Psychology*, *6*(2), 149-158. <https://doi.org/10.1111/1467-839X.t01-1-00017>
- [13] Craig, J. M., Piquero, A. R., Farrington, D. P., & Ttofi, M. M. (2017). A little early risk goes a long bad way: Adverse childhood experiences and life-course offending in the Cambridge study. *Journal of Criminal Justice*, *53*, 34-45.
- [14] Cuong, V. M., Assanangkornchai, S., Wichaidit, W., Hanh, V. T. M., & Hanh, H. T. M. (2021). Associations between gaming disorder, parent-child relationship, parental supervision, and discipline styles: Findings from a school-based survey during the COVID-19 pandemic in Vietnam. *JOURNAL OF BEHAVIORAL ADDICTIONS*, *10*(3), 722-730. <https://doi.org/10.1556/2006.2021.00064>
- [15] David Acevedo-Polakovich, I., Lorch, E. P., & Milich, R. (2007). Comparing Television Use and Reading in Children With ADHD and Non-Referred Children Across Two Age Groups. *Media Psychology*, *9*(2), 447-472. <https://doi.org/10.1080/15213260701291387>
- [16] Demakakos, P., Nazroo, J., Breeze, E., & Marmot, M. (2008). Socioeconomic status and health: the role of subjective social status. *Social science & medicine*, *67*(2), 330-340.
- [17] Dierkhising, C. B., Ko, S. J., Woods-Jaeger, B., Briggs, E. C., Lee, R., & Pynoos, R. S. (2013). Trauma histories among justice-involved youth: findings from the National Child Traumatic Stress Network. *European Journal of Psychotraumatology*, *4*(1), 20274. <https://doi.org/10.3402/ejpt.v4i0.20274>
- [18] Farrington, D. P., & Liu, J. H. (2023). Self-reported antisocial behaviour of 10-year-old boys in Zhuhai (China) versus Pittsburgh (USA). *Journal of criminal psychology*, *13*(4), 405-416. <https://doi.org/10.1108/Jcp-04-2023-0018>
- [19] Forster, M., Gower, A. L., McMorris, B. J., & Borowsky, I. W. (2017). Adverse Childhood Experiences and School-Based Victimization and Perpetration. *Journal of Interpersonal Violence*, *35*(3-4), 662-681. <https://doi.org/10.1177/0886260517689885>
- [20] Fox, B. H., Perez, N., Cass, E., Baglivio, M. T., & Epps, N. (2015). Trauma changes everything: Examining the relationship between adverse childhood experiences and serious, violent and chronic juvenile offenders. *Child Abuse & Neglect*, *46*, 163-173.
- [21] Freese, J., & Kevern, J. A. (2013). Types of Causes. In S. L. Morgan (Ed.), *Handbook of causal analysis for social research* (pp. 27-41). Springer Netherlands. https://doi.org/10.1007/978-94-007-6094-3_3
- [22] Gee, J. P. (2003). What video games have to teach us about learning and literacy. *Comput. Entertain.*, *1*(1), 20. <https://doi.org/10.1145/950566.950595>
- [23] Han, T., Zhang, L., Zhao, X., & Deng, K. (2023). Total-effect Test May Erroneously Reject So-called" Full" or" Complete" Mediation. *arXiv preprint arXiv:2309.08910*.
- [24] Hardt, J., & Rutter, M. (2004). Validity of adult retrospective reports of adverse childhood experiences: review of the evidence. *Journal of child psychology and psychiatry*, *45*(2), 260-273.
- [25]

Hayes, A. F. (2022). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach* (3 ed.). The Guilford Press.

- [26] Higashiyama, M., Hayashida, T., Sakuta, K., Fujimura, Y., Masuya, J., Ichiki, M., Tanabe, H., Kusumi, I., & Inoue, T. (2019). Complex effects of childhood abuse, affective temperament, and subjective social status on depressive symptoms of adult volunteers from the community. *Neuropsychiatric Disease and Treatment*, *15*(null), 2477-2485. <https://doi.org/10.2147/NDT.S209100>
- [27] Ho, G. W. K., Chan, A. C. Y., Chien, W.-T., Bressington, D. T., & Karatzias, T. (2019). Examining patterns of adversity in Chinese young adults using the Adverse Childhood Experiences—International Questionnaire (ACE-IQ). *Child Abuse & Neglect*, *88*, 179-188. <https://doi.org/10.1016/j.chiabu.2018.11.009>
- [28] Jackman, M. R., & Jackman, R. W. (1973). An interpretation of the relation between objective and subjective social status. *American Sociological Review*, 569-582.
- [29] Jauregui, P., Estévez, A., Rodríguez, M., Lopez-Gonzalez, H., & Etxaburu, N. (2023). Interplay between alexithymia, emotion regulation, and positive and negative affect as predictors of gambling and gaming disorders in adolescents and young adults. *REVISTA LATINOAMERICANA DE PSICOLOGIA*, *55*, 149-159. <https://doi.org/10.14349/rlp.2023.v55.17>
- [30] Jeong, H., Yim, H. W., Lee, S.-Y., Lee, H. K., Potenza, M. N., Jo, S.-J., Son, H. J., & Kim, G. (2020). Low self-control and aggression exert serial mediation between inattention/hyperactivity problems and severity of internet gaming disorder features longitudinally among adolescents. *JOURNAL OF BEHAVIORAL ADDICTIONS*, *9*(2), 401-409. <https://doi.org/10.1556/2006.2020.00039>
- [31] Jiang, Y. K., Zhao, X. S., Zhu, L. X., Liu, J. S., & Deng, K. (2021). Total-Effect Test Is Superfluous for Establishing Complementary Mediation. *Statistica Sinica*, *31*(4), 1961-1983. <https://doi.org/10.5705/ss.202019.0150>
- [32] Kim, E., Yim, H. W., Jeong, H., Jo, S.-J., Lee, H. K., Son, H. J., & Han, H.-H. (2018). The association between aggression and risk of Internet gaming disorder in Korean adolescents: the mediation effect of father-adolescent communication style. *Epidemiology and health*, *40*.
- [33] LeTendre, M. L., & Reed, M. B. (2017). The effect of adverse childhood experience on clinical diagnosis of a substance use disorder: Results of a nationally representative study. *Substance use & misuse*, *52*(6), 689-697.
- [34] Levenson, J. S., & Socia, K. M. (2016). Adverse childhood experiences and arrest patterns in a sample of sexual offenders. *Journal of Interpersonal Violence*, *31*(10), 1883-1911.
- [35] Li, X., & Atkins, M. S. (2004). Early Childhood Computer Experience and Cognitive and Motor Development. *Pediatrics*, *113*(6), 1715-1722. <https://doi.org/10.1542/peds.113.6.1715>
- [36] Liu, J. (2008). Data sources in Chinese crime and criminal justice research. *Crime, Law and Social Change*, *50*, 131-147.
- [37] Liu, J. (2022). Asian Criminology-Elaborating Its Concepts, Approach, Paradigm, and Future. *Asian Journal of Criminology*, *17*(4), 391-399. <https://doi.org/10.1007/s11417-022-09375-6>
- [38] Liu, J. (2024). The Relationism Theory of Criminal Justice-A Paradigm Shift. *Asian Journal of Criminology*, *19*(1), 1-25. <https://doi.org/10.1007/s11417-024-09419-z>
- [39] Liu, J., & Li, D. M. (2024). Is Machine Learning Really Unsafe and Irresponsible in Social Sciences? Paradoxes and Reconsideration from Recidivism Prediction Tasks. *Asian Journal of Criminology*, *19*(2), 143-159. <https://doi.org/10.1007/s11417-024-09429-x>
- [40] Mackinnon, D. P., Lockwood, C. M., & Williams, J. (2004). Confidence Limits for the Indirect Effect: Distribution of the Product and Resampling Methods. *Multivariate Behav Res*, *39*(1), 99. https://doi.org/10.1207/s15327906mbr3901_4
- [41] Mallinckrodt, B., Abraham, W. T., Wei, M. F., & Russell, D. W. (2006). Advances in testing the statistical significance of mediation effects. *Journal of counseling psychology*, *53*(3), 372-378. <https://doi.org/10.1037/0022-0167.53.3.372>
- [42] Meeks, C. B., & Mauldin, T. (1990). Children's time in structured and unstructured leisure activities. *Lifestyles*, *11*(3), 257-281. <https://doi.org/10.1007/BF00987003>
- [43] Mei, X., Li, J., Li, Z.-S., Huang, S., Li, L.-L., Huang, Y.-H., & Liu, J. (2022). Psychometric evaluation of an Adverse Childhood Experiences (ACEs) measurement tool: an equitable assessment or reinforcing biases? *Health & Justice*, *10*(1), 34. <https://doi.org/10.1186/s40352-022-00198-2>
- [44] Mihara, S., & Higuchi, S. (2017). Cross-sectional and longitudinal epidemiological studies of Internet gaming disorder: A systematic review of the literature. *Psychiatry and Clinical Neurosciences*, *71*(7), 425-444. <https://doi.org/10.1111/pcn.12532>
- [45] Miller, J. D., Crowe, M., Weiss, B., Maples-Keller, J. L., & Lynam, D. R. (2017). Using online, crowdsourcing platforms for data collection in personality disorder research: The example of Amazon's Mechanical Turk. *Personality Disorders: Theory, Research, and Treatment*, *8*(1), 26.
- [46] Müller, K. W., Janikian, M., Dreier, M., Wölfling, K., Beutel, M. E., Tzavara, C., Richardson, C., & Tsitsika, A. (2015). Regular gaming behavior and internet gaming disorder in European adolescents: results from a cross-national

representative survey of prevalence, predictors, and psychopathological correlates. *European child & adolescent psychiatry*, 24(5), 565-574. <https://doi.org/10.1007/s00787-014-0611-2>

- [47] Nagin, D., & Tremblay, R. E. (1999). Trajectories of boys' physical aggression, opposition, and hyperactivity on the path to physically violent and nonviolent juvenile delinquency. *Child development*, 70(5), 1181-1196.
- [48] Olson, C. K. (2010). Children's Motivations for Video Game Play in the Context of Normal Development. *Review of General Psychology*, 14(2), 180-187. <https://doi.org/10.1037/a0018984>
- [49] Organization, W. H. (2018). Adverse childhood experiences international questionnaire. *Adverse childhood experiences international questionnaire (ACE-IQ)*, 245-258.
- [50] Osgood, D. W., Anderson, A. L., & Shaffer, J. N. (2005). Unstructured leisure in the after-school hours. In *Organized activities as contexts of development* (pp. 57-76). Psychology Press.
- [51] Paulus, F. W., Sinzig, J., Mayer, H., Weber, M., & von Gontard, A. (2018). Computer Gaming Disorder and ADHD in Young Children—a Population-Based Study. *International Journal of Mental Health and Addiction*, 16(5), 1193-1207. <https://doi.org/10.1007/s11469-017-9841-0>
- [52] Pearl, J. (2009). Causal inference in statistics: An overview. *Statistics Surveys*, 3, 96-146. <https://doi.org/10.1214/09-Ss057>
- [53] Petry, N. M., Rehbein, F., Gentile, D. A., Lemmens, J. S., Rumpf, H.-J., Mößle, T., Bischof, G., Tao, R., Fung, D. S. S., Borges, G., Auriacombe, M., González Ibáñez, A., Tam, P., & O'Brien, C. P. (2014). An international consensus for assessing internet gaming disorder using the new DSM-5 approach. *Addiction*, 109(9), 1399-1406. <https://doi.org/https://doi.org/10.1111/add.12457>
- [54] Qin, X., Wang, M., Lu, X., Sun, J., Dong, Q., Zhang, L., Liu, J., Ju, Y., Wan, P., & Guo, H. (2021). Childhood emotional neglect is associated with low social support in Chinese patients with major depressive disorder. *Frontiers in Psychiatry*, 12, 781738.
- [55] Reavis, J. A., Looman, J., Franco, K. A., & Rojas, B. (2013). Adverse childhood experiences and adult criminality: how long must we live before we possess our own lives? *The Permanente Journal*, 17(2), 44.
- [56] Regier, D. A., Kuhl, E. A., & Kupfer, D. J. (2013). The DSM-5: Classification and criteria changes. *World Psychiatry*, 12(2), 92-98. <https://doi.org/https://doi.org/10.1002/wps.20050>
- [57] Sahle, B. W., Reavley, N. J., Li, W., Morgan, A. J., Yap, M. B. H., Reupert, A., & Jorm, A. F. (2021). The association between adverse childhood experiences and common mental disorders and suicidality: an umbrella review of systematic reviews and meta-analyses. *European child & adolescent psychiatry*, 1-11.
- [58] Sioni, S. R., Burleson, M. H., & Bekerian, D. A. (2017). Internet gaming disorder: Social phobia and identifying with your virtual self. *Computers in Human Behavior*, 71, 11-15. <https://doi.org/https://doi.org/10.1016/j.chb.2017.01.044>
- [59] Starcevic, V., Choi, T. Y., Kim, T. H., Yoo, S. K., Bae, S., Choi, B. S., & Han, D. H. (2020). Internet gaming disorder and gaming disorder in the context of seeking and not seeking treatment for video-gaming. *JOURNAL OF PSYCHIATRIC RESEARCH*, 129, 31-39. <https://doi.org/10.1016/j.jpsychires.2020.06.007>
- [60] Steinkuehler, C. A. (2012). Learning in massively multiplayer online games. In *Embracing Diversity in the Learning Sciences* (pp. 522-529). Routledge.
- [61] Teague, R., Mazerolle, P., Legosz, M., & Sanderson, J. (2008). Linking childhood exposure to physical abuse and adult offending: Examining mediating factors and gendered relationships. *Justice Quarterly*, 25(2), 313-348.
- [62] Wang, C.-Y., Wu, Y.-C., Su, C.-H., Lin, P.-C., Ko, C.-H., & Yen, J.-Y. (2017). Association between Internet gaming disorder and generalized anxiety disorder. *JOURNAL OF BEHAVIORAL ADDICTIONS*, 6(4), 564-571. <https://doi.org/https://doi.org/10.1556/2006.6.2017.088>
- [63] Wang, Q., & Liu, X. (2020). Peer Victimization and Nonsuicidal Self-Injury Among Chinese Left-Behind Children: The Moderating Roles of Subjective Socioeconomic Status and Social Support. *Journal of Interpersonal Violence*, 36(23-24), 11165-11187. <https://doi.org/10.1177/0886260519897346>
- [64] Wang, X., Zhang, J., Wang, X., & Liu, J. (2020). Intervening Paths From Strain to Delinquency Among High School and Vocational School Students in China. *International Journal of Offender Therapy and Comparative Criminology*, 64(1), 22-37. <https://doi.org/10.1177/0306624x19856513>
- [65] Webster, E. K., Martin, C. K., & Staiano, A. E. (2019). Fundamental motor skills, screen-time, and physical activity in preschoolers. *Journal of Sport and Health Science*, 8(2), 114-121. <https://doi.org/https://doi.org/10.1016/j.jshs.2018.11.006>
- [66] Wu, Z. X., & Wu, S. S. (2023). The Past, Present, and Future of Restorative Justice in the Chinese Mainland: A Systematic Review of Chinese Literature. *Asian Journal of Criminology*, 18(2), 89-112. <https://doi.org/10.1007/s11417-023-09400-2>
- [67]

- Zhang, L., Harris Ao, S., Francis Ye, J., & Zhao, X. (2024). How does health communication on social media influence e-cigarette perception and use? A trend analysis from 2017 to 2020. *Addictive Behaviors, 149*, 107875. <https://doi.org/https://doi.org/10.1016/j.addbeh.2023.107875>
- [68] Zhang, L., Qiu, S. S., Ao, S. H., & Zhao, X. (2024). Association between health-related social media use and E-cigarette use among current cigarette users: the roles of anti-tobacco messages and harm perception. *BMC Public Health, 24*(1), 1278. <https://doi.org/10.1186/s12889-024-18756-8>
- [69] Zhang, Y., Liu, J., & Braithwaite, J. (2023). The Pluralism of Restorative Justice in Greater China: an Introduction. *Asian Journal of Criminology, 18*(2), 83-87. <https://doi.org/10.1007/s11417-023-09402-0>
- [70] Zhao, R., Zhang, H., & Liu, J. (2015). China's juvenile justice: A system in transition. *Juvenile justice: International perspectives, models, and trends*, 137-162.
- [71] Zhao, X., Li, D. M., Lai, Z. Z., Liu, P. L., Ao, S. H., & You, F. (2024). Percentage Coefficient (b_p)--Effect Size Analysis (Theory Paper 1). *arXiv preprint arXiv:2404.19495*.
- [72] Zhao, X. S., Lynch, J. G., & Chen, Q. M. (2010). Reconsidering Baron and Kenny: Myths and Truths about Mediation Analysis. *Journal of Consumer Research, 37*(2), 197-206. <https://doi.org/10.1086/651257>