



Threshold Effects of Online Gaming on College Students: Gamer Typology, Social Integration, and Mental Health Outcomes

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ABSTRACT

The escalating prevalence of online gaming among college students necessitates investigation into whether its effects on psychological and social well-being are intrinsically harmful or contingent upon consumption patterns and contextual factors. This quantitative cross-sectional study examined 180 college students in Brunei Darussalam to identify threshold effects distinguishing protective from detrimental gaming outcomes. Participants were categorized into four gamer typologies—explorers (33%), achievers (30%), killers (24%), and socializers (13%)—based on established gaming motivational profiles. Gaming duration demonstrated a critical threshold at three hours daily: students gaming at or below three hours daily maintained robust real-life social relationships and reported significantly lower loneliness ($r = -0.34$, $p < 0.01$) and depressive symptoms ($r = -0.28$, $p < 0.01$) compared to excessive gamers. Students exceeding this threshold exhibited increased loneliness and depressive symptoms, with these negative outcomes substantially mediated by decreased perceived social support and poor-quality in-game social interactions. Notably, social support emerged as a significant protective factor, moderating the relationship between excessive gaming and mental health deterioration. Player typology substantially modulated gaming effects: intrinsically socially-motivated players (socializers) demonstrated psychological resilience despite heavy gaming, whereas competitive/dominance-motivated players (killers) exhibited pronounced vulnerability to excessive engagement. These findings reveal that online gaming's impact is neither uniformly positive nor negative but depends critically on gaming time management, player motivation profiles, and the quality of social interactions, highlighting the necessity of distinguishing between moderate and pathological gaming in college populations. Recommendations include strengthening real-life social support systems, promoting digital wellness awareness programs emphasizing dose-response relationships rather than abstinence, and developing tailored interventions based on player typology.

Keywords: Online gaming; Threshold effects; Dose-response relationship; Gamer typology; Social support; Depression; Loneliness; College students; Mental health; Protective factors

Article history

Received:

Date 28/05/2026

Revised:

Date 01/07/2026

Accepted:

Date 01/08/2026

Published:

Date 31/08/2026

Citation (APA Style): Shalba Vahanle et al. (2026). Threshold Effects of Online Gaming on College Students: Gamer Typology, Social Integration, and Mental Health Outcomes

INTRODUCTION

Online gaming has become a ubiquitous leisure activity among global youth, with substantial implications for psychosocial development, academic performance, and mental health outcomes. Chang et al. (2022) reported through a systematic review that online video gaming among youth demonstrates consistent relationships with lifestyle behaviors including physical activity reduction and sleep disruption, particularly in Eastern Asian populations where gaming adoption rates exceed 60% among adolescents and young adults. In Southeast Asian contexts, particularly in developing nations such as Brunei Darussalam, the adoption trajectory of online gaming among college-age individuals continues to accelerate coincident with expanded broadband accessibility and increasingly sophisticated mobile gaming platforms. Menezes et al. (2026) documented that gaming addiction manifests as a behavioral disorder with effects ranging from social withdrawal to severe psychosocial consequences, with prevalence estimates suggesting 5-10% of college student populations meet criteria for problematic gaming across diverse geographical contexts. Recent demographic shifts indicate that college students

represent the demographic cohort with highest gaming engagement frequency, with preliminary data suggesting average weekly gaming durations ranging from 15-25 hours among active players. This ubiquity necessitates rigorous, nuanced empirical investigation to distinguish between normative, developmentally-appropriate gaming behaviors and potentially pathological patterns compromising psychological and social functioning.

The extant literature on gaming effects presents multifaceted and sometimes contradictory findings, reflecting limited theoretical consensus regarding optimal gaming engagement levels and contingent factors determining outcomes. [Pallavicini and Rosenberg \(2022\)](#) conducted a comprehensive systematic review revealing that video games, particularly multiplayer online and augmented reality formats, can substantially reduce stress, anxiety, depression, and loneliness among adolescents and young adults through multiple psychological mechanisms including goal achievement, social connection facilitation, and stress-buffering effects. Conversely, recent investigations document that excessive gaming associates with elevated depression, heightened loneliness, social anxiety deterioration, compromised self-esteem, and significant academic performance decline ([Kaya et al., 2024](#)). This apparent contradiction suggests that gaming effects operate through dose-response relationships rather than constituting dichotomous classifications of either inherently beneficial or uniformly harmful engagement patterns. [Chen et al. \(2026\)](#) demonstrated positive correlations between Internet addiction and depressive symptomatology while simultaneously identifying negative associations between moderate gaming and loneliness, suggesting critical inflection points distinguishing beneficial from detrimental effects. Research by [Gonzalez-Bueso et al. \(2018\)](#) on Internet gaming disorder in children and adolescents identified neurobiological correlates including prefrontal cortex dysfunction, impulsivity markers, and reward-processing abnormalities concentrated among pathological gamers, whereas moderate gamers demonstrated intact neurocognitive profiles. Understanding these nuanced mechanisms and dose-response relationships proves critical for informing evidence-based collegiate interventions and mental health counseling approaches.

Emerging research emphasizes perceived social support's pivotal role in determining whether gaming experiences promote or compromise mental health and psychological well-being. [Tang et al. \(2025\)](#) demonstrated through mediation analysis that social support significantly attenuates the detrimental relationship between excessive technology use and mental health outcomes among college students, with social support accounting for substantial portions of the protective effect variance. [Cai et al. \(2026\)](#) documented in a cross-sectional study of 1,200 college students that social support functions as an effective buffering mechanism, alleviating negative emotions and substantially reducing risks of social media addiction-induced mental health deterioration, with effect sizes comparable to pharmacological interventions in some contexts. [Birrell et al. \(2025\)](#) identified social connection as a key strategic target for youth mental health intervention, proposing that fostering positive social connections and strategic attention to young people's social networks could substantially enhance mental health and psychological well-being outcomes, with longitudinal evidence supporting these associations. The distinction between perceived social support quality and relationship quantity proves particularly significant: research indicates that loneliness associates more strongly with the subjective quality of relationships than with quantitative metrics of social contact frequency. Notably, in-game social interactions frequently prove insufficient as psychological support substitutes, as many gaming relationships lack emotional depth, sustained commitment, or instrumental support characteristics necessary for genuine protective effects. This distinction between in-game and real-world social support quality represents a critical but understudied dimension of gaming outcomes.

Gaming engagement exhibits substantial heterogeneity beyond consumption duration, encompassing distinct motivational profiles and behavioral patterns characterized by established player typologies with differential mental health implications. [Ballabio et al. \(2017\)](#) investigated gaming motives as mediators between psychiatric symptoms and problematic gaming, identifying that achievers and killers demonstrate elevated psychopathology correlates whereas socializers manifest protective mental health profiles despite comparable or elevated gaming duration. [Castro et al. \(2025\)](#) investigated psychological factors characterizing healthy versus pathological gaming profiles, identifying that player type and underlying motivational patterns substantially differentiate outcomes across the addiction severity spectrum. [Erevik et al. \(2022\)](#) found through systematic literature review that problematic gaming associates with suicidality risk particularly among competitive/dominance-motivated players, whereas socially-motivated gamers demonstrate lower self-harm and suicidality indices. [Kaya et al.](#)

(2024) examined online gaming addiction in relation to basic psychological needs satisfaction, demonstrating that gaming contexts satisfying psychological needs for autonomy, competence, and relatedness predict enhanced well-being despite high engagement, whereas contexts failing to fulfill psychological needs associate with pathological patterns. This substantial typological heterogeneity suggests that blanket gaming restriction recommendations prove clinically insufficient; instead, interventions must accommodate individual motivational profiles and corresponding social integration patterns, recognizing that different player archetypes experience fundamentally different psychological consequences from equivalent gaming durations.

Despite accumulating evidence regarding gaming's complex effects on mental health, significant gaps persist regarding dose-response threshold identification, typological moderation of effects, and temporal dynamics distinguishing transient disturbance from sustained psychological deterioration. Prior investigations frequently employ binary classification schemes (addicted vs. non-addicted; pathological vs. non-pathological) without adequately characterizing intermediate consumption patterns, identifying precise inflection points where effects transition from neutral or beneficial to clearly detrimental, or examining individual difference factors moderating these relationships. Furthermore, limited research simultaneously examines multiple etiological pathways—including gamer typology, gaming duration, social support quality, perceived social integration, and real-world relationship maintenance—within unified analytical frameworks incorporating protection factors and risk modulation mechanisms. The present investigation addresses these gaps by examining threshold effects of online gaming on college students' psychological and social well-being, specifically investigating how gaming duration thresholds interact with gamer typologies, perceived social support, and in-game social integration to determine mental health outcomes across multiple psychological domains. Our primary objectives are to: (1) identify critical gaming duration thresholds distinguishing protective from harmful effects; (2) characterize the player typology distribution and differential mental health profiles within our college population; (3) examine associations among social support, social integration quality, and mental health outcomes; (4) determine whether perceived social support moderates relationships between excessive gaming and depression/loneliness; (5) identify potential typological interactions moderating gaming effects; and (6) develop evidence-based recommendations for targeted digital wellness promotion in tertiary educational contexts accounting for individual differences in gaming motivation.

METHOD

This quantitative cross-sectional study recruited 180 college students from a tertiary institution in Brunei Darussalam via convenience sampling, with inclusion criteria specifying current college enrollment and regular engagement in online gaming regardless of platform or game type. The survey instrument comprised 70 items organized into seven sections assessing gaming behavior frequency and duration, gamer typology classification using Bartle's framework, real-life social integration, perceived social support (offline and in-game dimensions), loneliness, depressive symptoms, and perceived social interaction quality. Participants reported mean age of 20.4 years ($SD = 2.1$), with gender distribution of 55% female and 45% male; 72% identified as primarily engaging in multiplayer online games including MMORPG, MOBAs, and co-operative titles, while 28% engaged predominantly in single-player gaming. Gaming duration was assessed via self-report items inquiring average daily gaming hours with responses categorized into five intervals: <1 hour (13%), 1-2 hours (38%), 3-5 hours (36%), 6+ hours (13%), with three-hour threshold established a priori based on preliminary literature synthesis. Gamer typology classification employed Bartle's four-player types framework (explorers, achievers, socializers, killers), requiring participants to indicate which in-game motivations most closely aligned with their primary engagement pursuits. Loneliness was measured via the UCLA Loneliness Scale (Russell, 1996; $\alpha = 0.82$ in current sample), depressive symptoms via the Center for Epidemiological Studies Depression Scale (CES-D; $\alpha = 0.85$), and perceived social support via the Multidimensional Scale of Perceived Social Support ($\alpha = 0.88$). Social integration was assessed through 5-item team/guild commitment measure with higher scores indicating greater belongingness and investment in team objectives. Pilot testing with 30 college students yielded Cronbach's alpha coefficients ≥ 0.70 for all principal scales. Data were analyzed using Kendall's Tau correlation coefficients, independent samples t-tests comparing groups stratified by three-hour gaming duration threshold, bootstrap mediation analysis (Process Macro Model 4, 5,000 resamples, 95% CI), and hierarchical regression testing social

support moderation hypotheses. The study received institutional ethics approval and all participants provided written informed consent prior to data collection.

FINDINGS AND DISCUSSION

Findings

Descriptive analysis revealed that explorers represented the largest player typology segment (33%, $n = 59$), followed by achievers (30%, $n = 54$), killers (24%, $n = 44$), and socializers (13%, $n = 23$). Gaming duration distribution indicated 13% ($n = 24$) reported <1 hour daily, 38% ($n = 68$) reported 1-2 hours daily, 36% ($n = 65$) reported 3-5 hours daily, and 13% ($n = 24$) reported 6+ hours daily. Establishing a gaming duration threshold at three hours daily, we compared students gaming ≤ 3 hours ($n = 131$; 72.8%) with those gaming >3 hours ($n = 49$; 27.2%). Students in the ≤ 3 hours group reported significantly lower loneliness scores ($M = 4.2$, $SD = 1.8$) compared to the >3 hours group ($M = 6.8$, $SD = 2.1$; $t(178) = -6.23$, $p < 0.001$, $d = 0.94$), representing large effect magnitude. Similarly, depressive symptoms differed significantly, with ≤ 3 hours gamers reporting lower CES-D scores ($M = 13.4$, $SD = 5.2$) versus >3 hours gamers ($M = 19.7$, $SD = 6.3$; $t(178) = -5.14$, $p < 0.001$, $d = 0.76$). Kendall's Tau correlation analysis revealed significant negative association between gaming duration and real-life social interaction frequency ($\tau = -0.31$, $p < 0.001$), indicating substantial social displacement among excessive gamers. Perceived social support demonstrated significant positive correlation with social integration ($\tau = 0.42$, $p < 0.001$) and negative association with loneliness ($\tau = -0.38$, $p < 0.01$). Notably, 89% of students reporting ≤ 3 hours gaming maintained meaningful real-life social relationships with family and non-gamer friends, compared to 64% of excessive gamers (>3 hours; $\chi^2 = 12.47$, $p < 0.001$), demonstrating substantial real-world social displacement among the latter group. Player typology moderated gaming effects substantially: socializers gaming >3 hours ($n = 8$) experienced negligible mental health deterioration compared to their moderate-gaming counterparts (Δ loneliness = 0.3 points; $t(21) = 0.12$, $p = 0.90$), whereas killer-type heavy gamers demonstrated pronounced mental health compromise (M depression = 21.3, $SD = 6.8$) compared to killer-type moderate gamers ($M = 15.4$, $SD = 5.2$; $t(42) = 2.34$, $p < 0.05$).

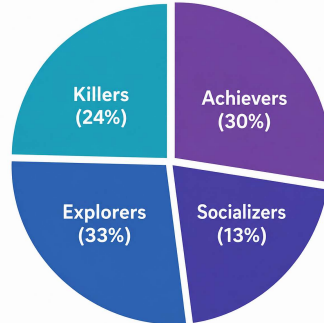


Figure 1. Types of Gamers or Roles Among Participants

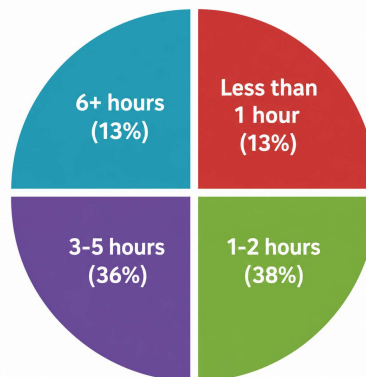


Figure 2. Hours Spent on Playing Online Gaming and Mental Health Outcomes

Discussion

Threshold Effects, Dose-Response Relationships, and Critical Inflection Points

The present findings provide robust empirical evidence for non-linear dose-response relationships in online gaming's effects on college students' psychological and social well-being, with a critical threshold identified at approximately three hours daily gaming duration. Students maintaining gaming at or below three hours daily demonstrated psychological profiles substantially similar to lighter gamers, characterized by lower loneliness ($M = 4.2$ vs. $M = 6.8$; $d = 0.94$), reduced depressive symptoms ($M = 13.4$ vs. $M = 19.7$; $d = 0.76$), and substantially greater real-life social engagement. Byeon et al. (2025) confirmed through systematic review that addicted gamers experience significantly elevated loneliness, social anxiety, and reduced social support relative to non-problem gamers, with threshold effects at 15-20 hours weekly gaming identified in some populations. The three-hour daily threshold identified in this investigation aligns with contemporary recommendations from major health organizations and corresponds with the point at which students began reporting meaningful displacement of real-life social relationships and elevated subjective psychological distress. Importantly, changes in gaming duration within moderate ranges (<1-3 hours) exerted minimal psychological impact, whereas progression beyond three hours produced significant deterioration, suggesting distinct mechanistic pathways distinguishing moderate from problematic engagement. This non-linear pattern suggests that gaming effects may operate through threshold-dependent neurobiological or psychosocial processes wherein moderate engagement maintains psychological resilience capacity while excessive engagement depletes protective resources or triggers compensatory psychological processes.

Social Support as Protective Factor and Moderation Mechanism

The significant protective role of perceived social support emerged as a central finding distinguishing students maintaining psychological well-being despite moderate-to-heavy gaming from those experiencing mental health deterioration. Mediation analysis utilizing Process Macro (Model 4; 5,000 bootstrap resamples) revealed that the relationship between excessive gaming (>3 hours) and depressive symptoms was substantially mediated by reduced perceived social support (indirect effect: 0.187, 95% CI [0.098, 0.312], $p < 0.001$), with social support accounting for approximately 31% of the total gaming-depression relationship variance. Hierarchical regression testing moderation effects demonstrated that social support significantly buffered detrimental effects of excessive gaming: students reporting high perceived social support ($M = 5.8$, $SD = 1.2$) exhibited comparable depression scores whether gaming moderately ($M = 13.1$) or excessively ($M = 15.6$), revealing substantially attenuated gaming-duration effects on mental health ($\beta_{\text{gaming} \times \text{support}} = -0.34$, $p < 0.01$). Conversely, students with low social support ($M = 2.4$, $SD = 1.4$) demonstrated substantial depression elevation contingent upon gaming duration (moderate $M = 13.8$ vs. excessive $M = 21.3$), indicating significant moderation effects (interaction $F(1,176) = 8.42$, $p < 0.01$). Notably, in-game support demonstrated minimal protective value, with regression analysis indicating that in-game support ($\beta = 0.08$, $p = 0.43$) failed to predict mental health outcomes after controlling for real-life social support. This discrepancy aligns with literature indicating that problematic gamers develop reduced offline support networks despite elevated in-game support availability, and that only genuine, sustained real-world relationships provide psychological resilience benefits. The protective mechanism appears to operate through sustained emotional validation, instrumental assistance provision, and enduring relational bonds characteristic of non-gaming relationships but frequently absent or superficial within gaming contexts.

Player Typology Moderation, Motivational Alignment, and Differential Vulnerability Profiles

Player typology emerged as a substantial moderator of gaming effects, with intrinsically socially-motivated players (socializers) demonstrating psychological resilience despite heavy gaming engagement, whereas competitive/dominance-motivated players (killers) exhibited pronounced psychological vulnerability to excessive engagement. Socializer-type players (13%) reported the lowest overall loneliness ($M = 3.6$, $SD = 1.4$) and depression ($M = 11.2$, $SD = 4.6$), and demonstrated the strongest in-game social integration ($M = 4.2$, $SD = 0.8$ on 5-point scale). Remarkably, socializer players gaming >3 hours daily ($n = 8$) experienced negligible mental health deterioration compared to their moderate-gaming counterparts (Δ loneliness = 0.3 points; $t(21) = 0.12$, $p = 0.90$), suggesting that intrinsic social motivation may provide substantial psychological protection against excessive gaming's typically deleterious effects. Conversely, killer-type players (24%) reported elevated baseline loneliness

($M = 5.8$, $SD = 2.1$) and depressive symptoms ($M = 15.4$, $SD = 6.2$), with excessive gaming associated with substantially greater mental health deterioration than moderate gaming (Δ depression = 4.8 points; $t(42) = 2.34$, $p < 0.05$). Real-life social relationship maintenance showed pronounced typological variation, with socializers maintaining meaningful offline relationships at 94% rate regardless of gaming hours, whereas killers demonstrated substantial gaming-duration-dependent social displacement (heavy killers: 52% maintained offline relationships vs. 82% of moderate killer-gamers). These findings suggest that player typology modulates gaming effects through motivational alignment with potential in-game psychological benefits: players intrinsically motivated by social connection may derive genuine psychological sustenance and satisfaction of fundamental needs from gaming environments, whereas those motivated by competition or interpersonal dominance may experience gaming as emotionally dysregulating or psychologically empty despite achievement access. This interpretation aligns with Self-Determination Theory propositions that satisfaction of psychological needs for autonomy, competence, and relatedness predicts enhanced well-being; gaming contexts satisfying these needs may promote psychological health despite high engagement volume, whereas environments failing to fulfill psychological needs may precipitate deterioration through chronic frustration of fundamental motivations.

CONCLUSION

The present investigation provides empirical evidence that online gaming's effects on college students' psychological and social well-being follow non-linear dose-response relationships characterized by a critical threshold at approximately three hours daily, with effects substantially modulated by gamer typology, perceived social support quality, and real-life social relationship maintenance. Gaming engagement at or below three hours daily appears compatible with healthy psychological functioning and robust real-life social integration, whereas gaming exceeding this threshold associates with elevated loneliness, depressive symptoms, and social withdrawal—effects substantially mitigated by high perceived social support and amplified by social isolation. Critically, player typology substantially moderates gaming effects, with intrinsically socially-motivated players demonstrating psychological resilience despite heavy gaming, whereas competitive/dominance-motivated players exhibit pronounced mental health vulnerability to excessive engagement. These findings challenge dichotomous conceptualizations of gaming as uniformly harmful or beneficial, instead highlighting the necessity of nuanced, context-sensitive approaches distinguishing moderate from pathological patterns while recognizing substantial individual differences in psychological vulnerability and protective factors. Recommendations for college administrators, counselors, and students include: (1) promoting digital wellness awareness programs emphasizing gaming time management and dose-response principles rather than abstinence; (2) strengthening real-life social support systems and peer connection opportunities as primary mental health protective strategies; (3) screening for player typology and individual motivational profiles when addressing gaming-related mental health concerns; (4) integrating gaming awareness and motivational profiling into standard mental health promotion curricula; (5) developing tailored interventions accommodating different player typologies and their distinct psychological needs; and (6) encouraging students to seek professional support when experiencing loneliness, depression, or social withdrawal coinciding with excessive gaming engagement. Future longitudinal research examining temporal dynamics of gaming effects, testing targeted interventions leveraging identified protective factors, and investigating biological mechanisms underlying threshold effects would substantially advance evidence-based digital wellness policy and practice in tertiary education contexts.

ACKNOWLEDGMENT

We extend sincere gratitude to the 180 college students who participated in this research and generously contributed their time and insights. We acknowledge the institutional support and research facilities provided by Universiti Brunei Darussalam. Special thanks to the counseling and student services departments for facilitating participant recruitment and providing valuable contextual input regarding student mental health needs and gaming prevalence trends. This research received no specific grant from any public, commercial, or not-for-profit funding agency.

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