Loot box–related risk as a partial mediator between problematic gaming, gambling severity in Spanish adolescents

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INTRODUCTION: Problematic video gaming and gambling-related harm frequently co-occur in adolescence, yet the mechanisms linking these behaviors remain poorly understood (Burleigh et al., 2019; Lucchini et al., 2025). Loot boxes[1] have been proposed as a potential behavioral bridge between Internet Gaming Disorder (IGD) and problem gambling, given their structural similarities to gambling and their widespread presence in games popular among minors (González-Cabrera et al., 2022, 2024; Raneri et al., 2022). Despite being illegal for minors, gambling opportunities among youth have expanded through digitalization, platform convergence and the normalization of gambling-like mechanics within digital leisure (Montiel et al., 2022; Richard et al., 2022). The boundaries between traditional betting (offline) and online gambling have become blurred, reshaping how gambling is accessed, perceived, and regulated. In Spain, 13.2% of adolescent gamers report spending real money on loot boxes monthly, and this figure rises to 45.9% among those who meet criteria for problem gambling (Márquez et al., 2025). In this context, this study estimates youth gambling prevalence and problem gaming in Spain and the statistical pathway through which loot box engagement may account for the relationship between IGD and gambling severity within the digital ecosystem, highlighting their potential implications for quality of life, emotional distress, and heightened vulnerability to suicidal ideation. **METHODS:** Data were drawn from a large, cross-sectional, stratified and representative school-based survey administered to 75,329 students aged 10–20 years across all Spanish autonomous communities (target population: 4.100.000) during the 2024–2025 academic year. The present analyses focused on a subsample of 4,730 regular video game players with valid data on all three key variables: problematic gaming, assessed with the Internet Gaming Disorder Test (IGDT-10); loot box–related risk, assessed with the Risky Loot-Box Index (RLI); and gambling severity, assessed with the Problem Gambling Severity Index (PGSI). Furthermore, self-reported lifetime gambling (offline and online), expenditure patterns, and gambling contexts were assessed, together with quality of life, emotional distress and risk of suicidal ideation. Descriptive and linear regression models were estimated to examine associations between variables, and a bootstrapped mediation analysis (B = 5,000) was conducted to test whether loot box–related risk statistically mediated the relationship between IGD and gambling severity. **RESULTS:** The data reveal that 53.5% of the sample play video games at least 'once a week', and 18.7% recognised do it 'every day or almost every day'. The most popular video game at present for the overall sample is *Brawl Stars* (Supercell, 2018), an online video game for mobile phones historically associated with randomized rewards and currently monetized through in-app purchases, in order, by *Fortnite* (Epic Games, 2017), *Roblox* (Roblox Corporation, 2006) and *Minecraft* (Mojan Studios, 2011). 26.3% spend some money every month on buying video game items (skins, gems, players, etc.),

of whom 4.9% spend more than €30 a month. The same can be said when the calculations are carried out in relative terms, based on the proportion of pupils who regularly play video games. The prevalence among students who play regularly stands at 2.3% (2.9% among boys and 1.1% among girls). This maladaptive use of video games is associated with higher levels of anxiety, somatisation and depression. The risk of suicide is more than three times higher (24.1% vs. 7%). Overall, 11.1% of students (10.6% of minors) reported having gambled for money at least once, 9.6% in person and 5.5% online. Bars and cafés were the most common offline gambling venues, whereas betting websites and video games were the main online channels. Among gamblers, 21.7% met criteria for problem gambling (2.4% of the total sample), with higher prevalence in boys and in Vocational Training[2]. Problem gamblers showed markedly higher levels of depressive symptoms and presenting a potential IGD. Problematic gaming was strongly associated with loot box–related risk, with IGDT-10 scores explaining approximately 18% of the variance in RLI. Loot box risk was, in turn, independently associated with gambling severity ($\beta \approx 0.36$, $p < .001$), controlling for IGD. The direct association between problematic gaming and gambling severity remained significant ($\beta \approx 0.76$, $p < .001$) but was attenuated when RLI was included in the model, indicating partial mediation. The combined model including both IGDT-10 and RLI explained approximately 23% of the variance in PGSI scores. **CONCLUSIONS:** Gambling and gaming are already present in a sizeable minority of Spanish adolescents and are intertwined with internet gaming and loot box monetization. Loot box–related risk appears to partially account for the association between IGD-related gaming problems and gambling-related harm in adolescents. These findings support conceptual models that frame loot boxes as a bridging mechanism problematic gaming with online gambling, reinforcing their relevance for prevention and the need for regulatory action.

BIO

Abel Nogueira López is a professor and researcher at the Faculty of Health Sciences at the University of Burgos. His research interests focus on the field of behavioral addictions, particularly the study of risk behaviors and problematic and/or potentially addictive use related to video games, gambling, and the Internet and the conceptualization and diagnosis of these behaviors. In parallel, within the field of sport psychology, his work has focused on promoting healthy practices and the well-being of individuals engaged in physical activity through the study of pain and personality.

Joaquín Manuel González-Cabrera is a professor and researcher at Universidad Internacional de La Rioja (UNIR), Spain. His work focuses on adolescent digital well-being, problematic gaming, gambling-related harms, loot boxes, cyberbullying, online risks, and technology-mediated psychosocial outcomes. He has led and collaborated on large-scale epidemiological studies with Spanish adolescents and has published extensively on Internet Gaming

Disorder, online gambling, nomophobia, cybervictimization, and digital health. His research aims to inform prevention, assessment, and evidence-based public policy in child and adolescent online safety.

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Ignacio Guadix-García is the Head of Education and Digital Rights of Children at UNICEF Spain. His work focuses on children's rights, educational innovation, digital transformation, and the promotion of safe and responsible technology use among children and adolescents. He has coordinated and contributed to major research projects on the impact of technology on adolescence, including the UNICEF Spain study, conducted with a sample of nearly 90,000 adolescents. His work aims to support evidence-based policies, prevention strategies, and digital environments that protect and empower young people.

Antonio Rial Boubeta is a professor and researcher at the University of Santiago de Compostela (USC). He is a member of the UNESCO High Commissioner's expert group on the global fight against bullying and cyberbullying. He has also been part of the Expert Committee established by the Government of Spain for the development of the Law on the Protection of Minors in the Digital Environment. He led the study on the impact of technology on adolescence, conducted by UNICEF with a sample of more than 90,000 adolescents, which remains one of the largest scientific studies on this topic carried out in Europe.

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CONFLICTS OF INTEREST
None

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ENDOTES

1 Randomized, purchasable reward mechanisms embedded in video games
2 Technical and practical courses designed to prepare students aged 16 and over for the job market in specific trades, combining theory with practical training

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