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Risky Games? Exploring Adolescent Gaming and Gambling in Northern Italy

ABSTRACT

L'uso di videogiochi (gaming) e il gioco d'azzardo (gambling) durante l'adolescenza stanno sollevando crescenti preoccupazioni per la salute pubblica. Come suggerisce la letteratura, i videogiochi possono facilitare il passaggio al gioco d'azzardo e al gioco d'azzardo problematico, un processo spesso definito *gateway hypothesis*.

I dati dell'indagine *Health Behaviour in School-aged Children* (HBSC) condotta in regione Lombardia sono stati utilizzati per esaminare l'associazione tra gaming e gambling negli studenti di età compresa tra i 15 e i 17 anni. L'analisi ha mostrato che gli adolescenti con un uso problematico dei videogiochi presentano maggiori probabilità di diventare giocatori d'azzardo problematici rispetto ai loro coetanei senza problemi di gioco.

Le evidenze emerse suggeriscono la necessità di ulteriori ricerche per approfondire la comprensione della relazione tra gaming e gambling in adolescenza, per corroborare eventualmente la *gateway hypothesis* e per informare le strategie di prevenzione e promozione della salute.

Parole chiave: gioco d'azzardo, videogiochi, adolescenti, prevenzione, promozione della salute

Gaming and gambling in adolescence are raising growing concerns for public health. As suggested in literature, video games can facilitate the transition to gambling and problem gambling (i.e. *gateway hypothesis*).

Data from the *Health Behaviour in School-aged Children* (HBSC) survey conducted in

the Lombardy region - Northern Italy - were used to examine the association between gaming and gambling in students aged 15 to 17. The analysis showed that adolescents with problematic video game use are more likely to become problem gamblers than their peers without gaming problems.

According to the findings, further research is needed to deepen our understanding of the relationship between gaming and gambling in adolescence, to possibly corroborate the *gateway hypothesis* and to inform prevention and health promotion strategies.

Keywords: gambling, gaming, adolescent, prevention, health promotion.

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Introduction

In recent years, the prevalence of gambling among adolescents has been recognized as an important public health issue and an emerging field of research.^{1,2} Adolescents are considered a high-risk group for the development of gambling-related problems because they tend to underestimate the risks and often fail to seek forms of help or assistance.³ As is the case for adults, even in this age group gambling habit can lead to several negative consequences such as, for example, school difficulties, impaired social relationships, substance abuse, depression, criminal behavior and suicidal ideations⁴. Despite legal bans, gambling has now become a popular form of entertainment even among adolescents, in both physical and online modes.

Several national and international researches shed light on the prevalence of gambling among young people and on the emergence of problematic behavior: with regard to the Italian context, 53% of 15-19 year-old students gambled (among them, more than 60% were minors), while about 120,000 students had a problematic profile (more than half were minors).⁵ Adolescents who engage in gambling may experience feelings of guilt that can escalate into depression. Additionally, their involvement in gambling can lead to a lack of meaningful social experiences, which can disrupt their relationships with family and friends. Furthermore, they may face financial consequences, resorting to borrowing or even to theft in order to fuel their gambling habits.⁶

Similarly, the use of new technologies has spread throughout the world, becoming popular in all age groups but especially among adolescents and young people; the Internet is available 24 hours a day and therefore used for a variety of reasons: playing online video games, searching for information, spending time and establishing and maintaining relationships with others through the use of social media, which have become inextricably part of daily life.⁷ However, as shown by several studies,

1 Molinaro, S., Benedetti, E., Scalese, M., Bastiani, L., Fortunato, L., Cerrai, S., ... & Urdih Lazar, T. (2018). Prevalence of youth gambling and potential influence of substance use and other risk factors throughout 33 European countries: First results from the 2015 ESPAD study. *Addiction*, 113(10): 1862-1873.

2 Calado F., Alexandre J., Griffiths M. D. (2017). Prevalence of Adolescent Problem Gambling: A Systematic Review of Recent Research. *J Gambl Stud.* 2017;33(2):397-424.

3 Canale N. et al. (2016). Adolescent Gambling-Oriented Attitudes Mediate the Relationship Between Perceived Parental Knowledge and Adolescent Gambling: Implications for Prevention. *Prev Sci.* 2016;17(8): 970-980.

4 Lorains F. K., Cowlishaw S., Thomas S. A. (2011). 'Prevalence of comorbid disorders in problem and pathological gambling: systematic review and meta-analysis of population surveys', *Addiction*, 106(3): 490-498.

5 Epidemiologia e Ricerca sui Servizi Sanitari – IFC – CNR (2024). European School Survey Project on Alcohol and other Drugs – Italy (ESPAD@Italia). <https://www.espad.it/giochi-d-azzardo/>.

6 Lombardi, G., Molinaro, S., Cotichini, R., Cerrai, S., Scalese, M., and Benedetti, E. (2024). The cards they're dealt: types of gambling activity, online gambling, and risk of problem gambling in European adolescents. *Social Science & Medicine*, 363: 117482.

7 Griffiths M. D., Kuss D. J., Billieux J., Pontes H. M. (2016). The evolution of Internet addiction: A global perspecti-

excessive and/or problematic use of social media can affect the psycho-physical health of younger people in terms of higher levels of anxiety, depression, physical symptoms and psychological distress.^{8,9} Likewise, the use of video games, when it becomes excessive and difficult to control, can lead to several negative consequences on lifestyle (stress, obesity risk, sleep disorders), the onset of depression and anxiety, the emergence of relational problems and the worsening of school performance.^{10,11}

Still referring to Italy, and as in the case of gambling, the video game (gaming) market is growing. The sector's turnover exceeded EUR 2.4 billion in 2024, with a growth trend of 3% compared to 2023.¹² Commercial models such as free-to-play (i.e. video games offering basic functionality for free, with the possibility of unlocking extra free content) and social network gaming introduced gambling elements in video games. In addition, the use of virtual currencies in video games to pay for gambling-like activities has become increasingly common, leading to growing uncertainty about the differences between gaming and gambling among the users¹³: indeed, for some people, playing video games has become a way to earn money.¹⁴

Thus, gaming increasingly resembles gambling, since in video games the role of chance is relevant, with direct betting opportunities (as, for example, in electronic sports - eSports), and the opportunity of "investing" money to increase the odds of winning. On the one hand, eSports make it possible to compete in organized tournaments, whether amateur or professional, online or live: betting on eSports is an activity quite similar to ordinary sports betting. On the other hand, there is the possibility for video game users to make small economic transactions by purchasing loot boxes (i.e. "coffers" containing virtual game items such as weapons, clothes or equipment to be used in the game). These objects, in addition to the functional value of giving an advantage, often have a social value for gamers, related to being recognized and appreciated by friends in multi-player games. In addition to loot boxes, several games have implemented other forms of microtransactions, including

ve. *Addictive Behaviors*, 53: 193-195.

8 Van Den Eijnden R., Koning I., Doornwaard S., Van Gorp F., Ter Bogt T. (2018). The impact of heavy and disordered use of games and social media on adolescents' psychological, social, and school functioning. *Journal of behavioral addictions*, 7(3): 697-706.

9 Keles B., McCrae N., Grealish A. (2020). A systematic review: the influence of social media on depression, anxiety and psychological distress in adolescents. *International journal of adolescence and youth*, 25(1): 79-93.

10 Bender P. K., Kim E. L., Gentile D. A. (2020). Gaming disorder in children and adolescents: risk factors and preventive approaches. *Current Addiction Reports*, 7: 553-560.

11 Macur M., Pontes, H. M. (2021). Internet Gaming Disorder in adolescence: investigating profiles and associated risk factors. *BMC public health*, 21: 1-9.

12 Italian Interactive & Digital Entertainment Association (IIDEA) (2025). I videogiochi in Italia nel 2024. https://iideassociation.com/wp-content/uploads/2025/04/IIDEA_I-Videogiochi-in-Italia-nel-2024.pdf

13 Gainsbury S. M., Russell A. M., King D. L., Delfabbro P., Hing N. (2016). Migration from social casino games to gambling: Motivations and characteristics of gamers who gamble. *Computers in Human Behavior*, 63, 59e67.

14 Griffiths M. D. 2017. The psychosocial impact of professional gambling, professional video gaming and e-sports. *Casino and Gaming International*, 28: 59-63.

downloadable content, purchasable upgrades, and play passes, which can be acquired with real-world money or via intermediary in-game currencies.¹⁵ There is also a process of gamification of gambling, which is “borrowing” elements from video games, with some types of online gambling - e.g. online slot machines and live casinos - increasingly resembling video games.¹⁶

Similar to Gambling Disorder (GD), Internet Gaming Disorder (IGD) is recognized as a behavioral addiction in the Diagnostic and Statistical Manual of Mental Disorders - DSM-5.¹⁷ IGD is associated with depression, anxiety, attention and behavioral disorders, social phobia, and low school performance: the disorder appears to be more prevalent in males, particularly adolescents and young adults, with a prevalence varying from 1 to 15% of the population, depending on the context^{18,19}: a recent meta-analysis reporting a worldwide prevalence rate of 1.9% among studies with data defined as high quality depending on cultural differences, age groups and variety of screening instruments.^{20,21} With specific reference to the Italian situation, the risk of video game use disorder affects 12% of students. Males are more affected, with the percentage reaching 18% in male middle school students and 13.8% in those in high school (against, respectively, 10.8% and 5.5% for females). With respect to age, the highest risk percentage is found in middle school with 14.3% of students at risk, while the figure drops to 10.2% in high school.²²

15 Drummond A., Sauer J.D. (2018). Video game loot boxes are psychologically akin to gambling. *Nat Hum Behav.*, 2(8): 530-532. Doi: 10.1038/s41562-018-0360-1.

16 Clarke L., Wu R., Brooks G. (2024). The gamblers of the future? Migration from video games to gambling among young adults. Centre for Gambling Research at UBC, International Center for Responsible Gaming (ICRG) webinar, 22 Feb 2024.

17 American Psychiatric Association (APA), ed. 2022. *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, Text Revision (DSM-5-TR)*. Washington, DC, USA: American Psychiatric Publishing. ISBN 978-0-89042-575-6.

18 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.

19 Saunders J. B., Hao W., Long J., King D. L., Mann K., Fauth-Bühler M., ... and Poznyak, V. (2017). Gaming disorder: Its delineation as an important condition for diagnosis, management, and prevention. *Journal of behavioral addictions*, 6(3): 271-279.

20 Ciccarelli M., Cosenza M., Nigro G., Griffiths M., D'Olimpio, F. (2022). Gaming and gambling in adolescence: the role of personality, reflective functioning, time perspective and dissociation. *International Gambling Studies*, 22(1): 161-179.

21 Stevens M. W., Dorstyn D., Delfabbro P. H., King D. L. (2020). Global prevalence of gaming disorder: A systematic review and meta-analysis. *Australian & New Zealand Journal of Psychiatry*, Advance online publication. 0004867420962851.

22 Istituto Superiore di Sanità (ISS) (2023). Comunicato Stampa N°23/2023 Dal cibo ai social, quasi 2 milioni di adolescenti della 'Generazione Z' a rischio dipendenze comportamentali. <https://www.iss.it/-/comunicato-stampa-n%C2%B023/2023-dal-cibo-ai-social-quasi-2-milioni-di-adolescenti-della-generazione-z-a-rischio-dipendenze-comportamentali>.

As anticipated, gaming market changed significantly to include purchasable and randomized rewards that make gaming similar to gambling²³: if risking losing something of value in the hope of gaining something of greater economic value is inherent to gambling, some research points to video gamers' desire to experience the same emotions when gambling (especially online), such as excitement, a sense of fun and competition.^{24,25,26} The socio-economic benefits of skilled and professional gamers are often counterbalanced by the reduced sense of individual control of other users. For example, microtransactions in gaming may encourage future gambling behavior²⁷: some Massively Multiplayer Online Role-Playing Games (MMORPGs) allow virtual in-game currency to be used to place real sports bets on eSports matches, with possible detrimental consequences on gamers in the real world.^{28,29} The association between gaming and gambling as potential addictive behaviors also emerges from the work of Garea and colleagues³⁰ - who find an association between loot box spending and risky gambling -, Montiel et al.³¹ - who show a relationship between loot box engagement and problem gaming/gambling - and Brooks and Clark³² - who find that increased loot box use predicts future gambling (the link appears to be driven by randomized reward). In a study on young gamers' (14-17

23 Cleghorn J., Griffiths M. D. (2015). Why do gamers buy 'virtual assets? An insight into the psychology behind purchase behaviour. *Digital Education Review*, 27: 98–117. Doi:10.1344/der.2015.27.85-104.

24 Cosenza M., Griffiths M. D., Nigro G., Ciccarelli M. (2017). Risk-taking, delay discounting, and time perspective in adolescent gamblers: An experimental study. *Journal of gambling studies*, 33(2): 383-395. Doi: 10.1007/s10899-016-9623-9.

25 Teichert T., Gainsbury S., Mühlbach C. (2017). Positioning of online gambling and gaming products from a consumer perspective: A blurring of perceived boundaries. *Computers in Human Behavior*. [https:// doi. org/ 10. 1016/j. chb. 2017. 06. 025](https://doi.org/10.1016/j.chb.2017.06.025).

26 Burleigh T. L., Griffiths M. D., Sumich A., Stavropoulos V., Kuss D. J. (2019). A systematic review of the co-occurrence of gaming disorder and other potentially addictive behaviors. *Current Addiction Reports*, 6(4): 383-401. Doi: 10.1007/s40429-019-00279-7.

27 Gibson E., Griffiths M. D., Calado F., Harris, A. (2025). The role of videogame micro-transactions in the relationship between motivations, problem gaming, and problem gambling. *Journal of Gambling Studies*, 41(3): 1087-1118. <https://doi.org/10.1007/s10899-024-10365-9>

28 Macey J. 2021. A whole new ball game. The growing prevalence of video game-related gambling. *Academic*

29 Mathieu S., Barrault, S., Brunault P., Varescon I. (2020). The role of gambling type on gambling motives, cognitive distortions, and gambling severity in gamblers recruited online. *PLoS ONE*, 15(10), e0238978. [https:// doi. org/ 10. 1371/ journ al. pone. 02389 78](https://doi.org/10.1371/journal.pone.0238978).

30 Garea S. S., Drummond A., Sauer J. D., Hall L. C., Williams M. N. (2021). Meta-analysis of the relationship between problem gambling, excessive gaming and loot box spending. *International Gambling Studies*, 21(3): 460-479.

31 Montiel I., Basterra-González A., Machimbarrena J. M., Ortega-Barón J., González-Cabrera J. 2022. Loot box engagement: A scoping review of primary studies on prevalence and association with problematic gaming and gambling. *PLoS One*, 17(1): e0263177.

32 Brooks G. A., Clark L. (2023). The gamblers of the future? Migration from loot boxes to gambling in a longitudinal study of young adults. *Computers in human behavior*, 141, 107605.

years old) perceptions of similarities and differences between gaming and gambling,³³ respondents considered various aspects of video games to be similar to gambling and were aware of the potential for gaming addiction. In particular, video gamers considered some modes of gaming as real gambling, even if they do not involve cash prizes (e.g., loot boxes, social casinos³⁴): even if the winnings were not real money, they were still perceived as valuable rewards. Again, study participants associated gambling with monetary loss, randomness, and the risk of addiction -characteristics shared by many popular video games. Moreover, respondents identified negative outcomes of gaming, similar to those of gambling, including wasted time and angry outbursts, and reported awareness of strategies employed by the gaming industry to increase profits.

In this regard, because the two activities share certain characteristics, it is also hypothesized in literature that video games may act as a “*gateway*” to gambling and problem gambling^{35,36}: video games with gambling-like elements often present gambling as an everyday practice, contributing to its normalization, promoting gambling beliefs by using inflated payout rates, misrepresenting the true chances of winning, and desensitizing to the value of real money.³⁷ Not to mention the proliferation of targeted gambling advertisements in video games.³⁸ Delfabbro and King³⁹, in a review of studies on the relationship between gaming and gambling, found little evidence to support the *gateway hypothesis*: those who play video games also tend to gamble, but this could be due to underlying socio-demographic and personality factors (e.g. being young, male and “risk-taker”).

33 Rolando S., Wardle H. (2024). ‘That’s why it’s gambling, because you don’t know what you find in it!’ Perceptions of the relationship between gaming and gambling among young adult gamers. *Journal of Youth Studies*, 27(6): 869-884.

34 Social casinos are a light version of online casinos where it is possible to bet without betting real money, sharing the results with friends.

35 Kim H. S., King D. L. (2020). Gambling-gaming convergence: New developments and future directions. *International Gambling Studies*, 20(3): 373-379.

36 Molde H., Holmoy B., Merkesdal A. G., Torsheim T., Mentzoni R. A., Hanns D., Sagoe D., Pallesen S. (2019). Are video games a gateway to gambling? A longitudinal study based on a representative Norwegian sample. *Journal of Gambling Studies*, 35(2): 545–557. <https://doi.org/10.1007/s10899-018-9781-z>.

37 Grosemans, E., De Cock, R., Bradt, L., and Zaman, B. (2024). More than loot boxes: the role of video game streams and gambling-like elements in the gaming-gambling connection among adolescents. *Journal of Gambling Issues*.

38 Siste, K., King, D. L., Hanafi, E., Sen, L. T., Adrian, A., & Murtani, B. J. (2025). Scrutinizing the gateway relationship between gaming and gambling disorder: scoping review with a focus on the Southeast Asian region. *JMIR Serious Games*, 13, e59740.

39 Delfabbro P., King D. L. (2020). Gaming-gambling convergence: Evaluating evidence for the ‘gateway’ hypothesis. *International Gambling Studies*. Advance online publication. <https://doi.org/10.1080/14459795.2020.1768430>.

In a study on the potential motivations and determinants of the transition process from video games to gambling, among gamers and gamblers there is an awareness of the similarities of risks and harms associated with these activities.⁴⁰

Considering that adolescents are particularly vulnerable to the excessive use of video games and gambling, it is therefore of interest to investigate the association between gaming and problem gambling in this population. In this regard, in a post COVID-19 syndemic society characterized by the complex interplay between social, economic, environmental variables and risk factors, the aim is also to reflect on the implications for prevention and health promotion.^{41,42,43}

Materials and methods

Data from the Health Behavior in School-aged Children (HBSC) study were considered and analyzed. HBSC is a multicenter study conducted in over 40 countries in Europe and North America, in collaboration with the Regional Office for Europe of the World Health Organization (WHO), with the aim of learning about the determinants of health in adolescents in order to better orientate prevention and health promotion policies. In Italy, the population selected for the sampling consists of adolescents aged between 11 and 17 years; at the methodological level, the survey is based on a closed-ended questionnaire administered to the adolescents of the schools in the sample, including questions on the social context, health and well-being.

Based on the gaming and gambling sections of the HBSC 2022 study, we focused on adolescent students living in the Lombardy Region, Northern Italy.⁴⁴ The starting population considered corresponds to the sample of 15- and 17-year-olds from the HBSC 22 surveillance, representing the two age groups to whom the gambling-related questions were proposed (8,923 students; gender 47.3% females / 52.7 males; age 47.9% 15 years / 52.1% 17 years).

The topic was explored in more detail taking into account socio-demographic characteristics and abuse behaviors, using logistic regression models to study

40 Wieczorek Ł., Bujalski M., Dąbrowska K. (2024). 'I Can Tell You It's a Bit of a Gamble': A Qualitative Analysis of How People Who Engage in Gaming and Gambling Understand a Link Between These Two Behaviours. *Journal of Gambling Studies*, 40(2): 859-871.

41 Giarelli G. (2023). COVID-19 and Social and Health Inequalities in Italy: A Syndemic Approach. *e-cadernos CES*, 39.

42 Mendenhall E., Newfield T., Tsai A. C. (2022). Syndemic theory, methods, and data. *Social Science & Medicine* (1982), 295: 114656.

43 Singer M. (1996). A dose of drugs, a touch of violence, a case of AIDS: conceptualizing the SAVA syndemic. *Free Inq Creat Sociol*, 24: 99-110.

44 Gelmi G., Gabellini E., Lucchini F., Negri L., Celata C. (2024). Health Behaviour in School-aged Children (HBSC) 2022. *Stili di vita e salute dei giovani italiani tra 11 e 17 anni*" (Regione Lombardia), Istituto Superiore di Sanità (ISS) e Regione Lombardia.

relevant statistical associations. The scales proposed to the students were the *Internet Gaming Disorder-Short Form (IGDS9-SF)*^{45,46} - which detects problematic use of online video games in the 12 months prior to the survey -, the *South Oaks Gambling Screen-Revised for Adolescents (SOGS-RA)*^{47,48} - which focuses on the negative consequences and emotions associated with gambling behavior in the 12 months prior to the survey -, the *Social Media Disorder Scale (SMD-Scale)*⁴⁹ - which focuses on problematic social media use in the 12 months prior to the survey -, and the *Family Affluence Scale (FAS)* - which measures the material well-being of households.⁵⁰

To explore the relationship between gaming and gambling behaviors, we considered both socio-demographic factors and individual behavioral patterns related to risk or addiction. Logistic regression models were employed to estimate the likelihood of engaging in at risk/problem gambling (SOGS-RA ≥ 3), while accounting for potential risk and protective factors. The analysis included problem gaming, age, gender, nationality, socio-economic status and problematic social media use as explanatory variables. The quantitative analysis was conducted using the software SAS 9.4. Initially, simple logistic regression analyses were carried out to explore how each variable was associated with at risk/problem gambling. Socio-demographic factors (gender, age, nationality, and socio-economic status) and behavioral factors (problem gaming and problematic social media use) were first examined separately. Afterwards, all predictor variables were included together in a multiple logistic regression model to control for the influence of the other factors.⁵¹

45 The Internet Gaming Disorder Scale-Short-Form (IGDS9-SF) produces final scores between 9 and 45 and an optimal cut-off score for a positive diagnosis is 32.

46 Qin L., Cheng L., Hu M., Liu Q., Tong J., Hao W., ... and Liao Y. (2020). Clarification of the cut-off score for nine-item Internet Gaming Disorder Scale-Short Form (IGDS9-SF) in a Chinese context. *Frontiers in Psychiatry*, 11: 470.

47 The SOGS-RA consists of twelve items, each of which has a score of 1 (affirmative) or 0 (non-affirmative). Although there is some variation between studies in the interpretation of the scores, generally a score of 4 or higher is labelled as “problem gambling”, a score of 2-3 as “at risk” and a score of 0-1 as “no problem”.

48 Colasante E., Gori M., Bastiani L. et al. (2014). Italian Adolescent Gambling Behaviour: Psychometric Evaluation of the South Oaks Gambling Screen: Revised for Adolescents (SOGS-RA) Among a Sample of Italian Students. *J Gambli Stud* 30: 789-801. <https://doi.org/10.1007/s10899-013-9385-6>.

49 Van den Eijnden R.J.J.M., Lemmens J.S., Valkenburg, J.M. (2016). The Social Media Disorder Scale. *Computers in Human Behavior*, 61: 478.

50 Hartley J.E., Levin K., Currie C. (2016). A new version of the HBSC Family Affluence Scale - FAS III: Scottish Qualitative Findings from the International FAS Development Study. *Child Indic Res.*, 9: 233-245.

51 All variables included in the model were treated as categorical.

Results

As part of the HBSC Lombardy 2022 survey, 15- and 17-year-olds were asked to indicate on how many occasions they had gambled and/or played money in their life and in the last 12 months. With reference to the frequency of gambling in their lives among 15-year-olds, 30.9% of respondents stated that they had gambled at least once, with a greater tendency to gamble on the part of males (40% vs. 20.1% of females); when looking at the frequency of gambling in the last 12 months, males stood at 27.7% and females at 10.3% (compared to 19.6% overall). The overall trend and gender differences were also confirmed among 17-year-olds: 36.1% declare having gambled in their lives (51.3% males vs. 20.2% females) and 24.4% in the 12 months preceding the survey (38.3% males vs. 10.3% females).

In the simple logistic regression analyses, positive associations were observed with age, gender, problem gaming and problematic social media use (Table 1).

Table 1. Individual characteristics and at risk/problem gambling

Simple logistic regression	OR	95% CI	p-value
Age			
15	1.0 (ref.)	n.a.	
17	1.549	1.257-1.908	<.0001
Gender			
F	1.0 (ref.)	n.a.	
M	5.900	4.433-7.853	<.0001
Nationality			
Italian	1.0 (ref.)	n.a.	
Foreign	1.122	0.728-1.729	.6011
Socio-economic status			
High	0.838	0.627-1.118	.2291
Low	1.0 (ref.)	n.a.	
Medium	0.626	0.489-0.801	.0002
Problem gaming			
No	1.0 (ref.)	n.a.	
Yes	3.399	2.659-4.344	<.0001
Problematic social media use			
No	1.0 (ref.)	n.a.	
Yes	1.797	1.345-2.402	<.0001



Age, gender, socio-economic status, problem gaming and problematic social media use were significantly associated with problem/risk gambling. Estimates of statistical associations expressed as odds ratios, in the 95% confidence intervals (95% CI) obtained by Wald's Method⁵² are shown in Table 2 and Figure 1.

Table 2. Estimates of odds ratios from multivariate logistic regression

Effect	OR	95% Wald Confidence Interval
Problem gaming 1 vs 0	2.092	1.503 - 2.911
Age 17 vs 15	2.049	1.556 - 2.698
Gender M vs F	6.398	4.388 - 9.328
High socio-economic status vs low	0.836	0.583 - 1.199
Medium socio-economic status vs low	0.608	0.445 - 0.832
Problematic social media use 1 vs 0	2.011	1.322 - 3.058

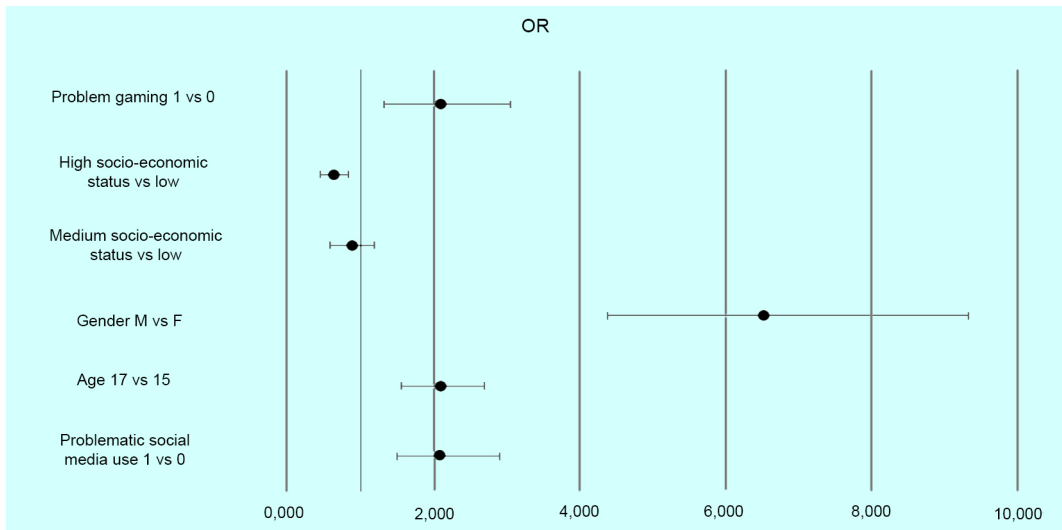


Figure 1. Estimates of odds ratios

With regard to the intersection of abuse behaviors, the odds of those with problematic video game use (IGDS9-SF) of being risky/problematic gamblers were approximately two times higher (OR=2.092; 95% CI: 1.503-2.911) than those who do not play video games or do not have problematic behavior. At the same time, having

52 Hosmer D.V., Lemeshow S., Sturdivant R.X. (2000). Applied logistic regression. New York: Wiley.

a problematic use of social media also appeared to be an associated risk factor, as the odds of having risky/problematic gambling behavior were approximately two times higher (OR=2.011; 95% CI: 1.322-3.058) for those who do use social media sparingly.

With respect to socio-demographic and socio-economic data, the chance of developing a gambling addiction was six times higher for males (OR=6.398; 95% CI: 4.388-9.328). At the same time, the chances of having risky/problematic gambling behavior increased with age, 15 to 17 years (OR: 2.049; 95% CI: 1.556-2.698). Having an average socio-economic status appeared as a protective factor - the odds of reporting harm decrease by 16.4 % compared to those reporting low FAS levels - while the association with high socio-economic status was not statistically significant.

Discussion and conclusion

Overall, positive associations between gender, age, socio-economic status, problem gaming, problematic social media use and risk/problem gambling emerge from the analysis.

Firstly, with respect to socio-demographic data, the chance of developing a gambling addiction is higher if one is male, as age increases and in case of low household income. These findings are largely in line with the existing literature, where male gender has been associated with both problem behaviors. Several studies suggest the role of social norms and perceived benefits and risks in explaining gender differences. Ronay and Kim⁵³ note how masculinity stereotypically shares a link with risk-taking and the fact that the company of other males facilitates such behavior. A substantial body of research indicates that male adolescents spend more time playing video games than females, either because they are more interested in activities involving competition, or they are more confident in their gaming performance, or due to the distinctly masculine features of many video game characters.^{54,55}

While male adolescents are more impulsive and prone to risk-taking, as well as more willing to engage in different forms of gambling, being female appears to be

53 Ronay R., Kim D.Y. (2006). Gender differences in explicit and implicit risk attitudes: a socially facilitated phenomenon. *Br. J. Soc. Psychol.* 45 (2): 397-419.

54 Rehbein F., Staudt A., Hanslmaier M., Kliem S. (2016). Video game playing in the general adult population of Germany: Can higher gaming time of males be explained by gender specific genre preferences? *Computers in Human Behavior*, 55: 729-735. Doi:10.1016/j.chb.2015.10.016.

55 Ciccarelli M., Cosenza M., Nigro G., Griffiths M., D'Olimpio, F. (2022). Gaming and gambling in adolescence: the role of personality, reflective functioning, time perspective and dissociation. *International Gambling Studies*, 22(1): 161-179.

a protective factor from problem gaming and gambling.⁵⁶ Splevins and colleagues⁵⁷ note how adolescent girls view gambling as a risky and not economically rewarding activity. Another possible interpretation of gender differences with respect to gambling can be traced back to the national context. Recognizing the role of advertising in introducing young people to gambling,⁵⁸ Bastiani and colleagues⁵⁹ note how in Italy, until recently, gambling marketing has mainly targeted males including young people, by offering and promoting gambling opportunities attractive to this kind of consumer (e.g., sports betting, online poker, slot machines): in this sense, the recent increased advertising focus on female audiences may not yet have fully unfolded its effects in terms of criticality and harm.

In the sample considered, older age (late adolescence) predicts problem gambling. This may be explained by the fact that individuals closer to the age of 18 (the legal age for gambling in Italy) begin to approach gambling, increasing the likelihood - compared to younger adolescents - of developing related disorders. This leaves open the question of the possible preparatory role of gaming⁶⁰: in fact, the latter does not set age limits for participation (although most games now have an age classification) and some studies point to greater involvement and likelihood of developing problem gaming behavior in early adolescence.^{61,62}

As reported in the results, there is no robust evidence regarding differences between students with high income and those with low income. In fact, the association with high socio-economic status is not statistically significant. Instead, the likelihood of harmful gambling decreases for middle-income adolescents compared to low-income ones. The impact of low household income on gambling, besides highlighting how socio-economic inequality negatively affects adolescents' health,⁶³ is in line with

56 Gainsbury S. M., Russell A., Hing N., Wood R., Lubman D. I., Blaszczynski A. (2014). The prevalence and determinants of problem gambling in Australia: Assessing the impact of interactive gambling and new technologies. *Psychology of Addictive Behaviors*, 28(3), 769–779. Doi: 10.1037/a0036207.

57 Splevins K., Mireskandari S., Clayton K., Blaszczynski A. (2010). Prevalence of adolescent problem gambling, related harms and help-seeking behaviours among an Australian population. *J. Gambl. Stud.* 26 (2): 189–204.

58 Labrador F. J., Estupiñá F. J., Vallejo-Achón M., Sánchez-Iglesias I., González Álvarez M., Fernández-Arias, I., Labrador, M., Bernaldo-de-Quirós M. (2021). Exposure of adolescents and youth to Gambling advertising: a systematic review. *Annals of psychology*, 37(1): 149-160. <https://doi.org/10.6018/analesps.428921>

59 Bastiani L., Gori M., Colasante E., Siciliano V., Capitanucci D., Jarre P., Molinaro S. 2013. Complex factors and behaviors in the gambling population of Italy. *J. Gambl. Stud.* 29 (1): 1–13.

60 Ciccarelli M., Nigro G., Griffiths M.D., D'Olimpio F., Cosenza M. (2020). The associations between maladaptive personality traits, craving, alcohol use, and adolescent problem gambling: an Italian survey study. *J. Gambl. Stud.* 36: 243–258.

61 Wittek C. T., Finseras T. R., Pallesen S., Mentzoni R. A., Hanss D., Griffiths M. D., Molde H. (2016). Prevalence and predictors of video game addiction: A study based on a national representative sample of gamers. *International Journal of Mental Health and Addiction*, 14(5): 672-686. Doi: 10.1007/s11469-015-9592-8.

62 Marinaci T., Venuleo C., Ferrante L., Della Bona S. (2021). What game we are playing: the psychosocial context of problem gambling, problem gaming and poor well-being among Italian high school students. *Heliyon*, 7(8).

63 Elgar, F.J., Pfortner, T.K., Moor I., De Clercq B., Stevens G.W., Currie C. 2015. Socioeconomic inequalities

several studies suggesting that low-income groups spend proportionally more than high-income groups and are more vulnerable to risk/problematic gambling.⁶⁴ However, the available research refers mostly to the adult population, although an Italian study shows that adolescent students living in disadvantaged regions are more likely to be at risk/problem gamblers.⁶⁵ While it can be hypothesized that family economic difficulties hinder adolescents from seeking other forms of recreation or socializing - thereby potentially fostering a discomfort that may predispose to risky behaviors - there is no solid evidence that gaming and gambling can be simply considered as attempts to compensate for feelings of economic deprivation.⁶⁶ Further studies are therefore needed to examine the role of other individual (e.g., attitudes, beliefs) and contextual (e.g., policies, social and recreational activities) factors in mediating the association between socio-economic disadvantage and gambling.

The results, finally, as well as highlighting a general co-occurrence between problem gaming, problematic social media use and problem gambling among adolescents,⁶⁷ confirm the specific association between problem gaming and at risk/problem gambling in this same population. However - and that is a limitation of the present research - further longitudinal studies with large and representative samples of participants are needed to corroborate the gaming-to-gambling transition (*gateway hypothesis*).

Specifically, it is important to separate general transition effects from maturation effects: young people may switch from video games to gambling as they grow up, but this does not necessarily mean that gaming facilitates subsequent access to gambling. Given that video games and gambling may satisfy similar individual and social needs, it is possible that some people exhibit a greater propensity to gaming and gambling due to personal characteristics and/or contextual factors and not that one activity actually increases the likelihood of switching to the other.⁶⁸ At the same time, gaming and gambling share similar characteristics, as they are characterized by the persistent pursuit of winning in interactive activities that involve varying degrees

in adolescent health 2002–2010: a time-series analysis of 34 countries participating in the Health Behaviour in School-aged Children study. *Lancet* 385: 2088–2095.

64 Lucchini F., Molinaro, S. (2020). Socio-economic status and problem gambling: An analysis of the Italian case. *Salute e società*, (2020/3).

65 Molinaro S., Canale N., Vieno A., Lenzi M., Siciliano V., Gori M., Santinello M. (2014). Country-and individual-level determinants of probable problematic gambling in adolescence: a multi-level cross-national comparison. *Addiction* 109: 2089–2097.

66 Mishra S., Barclay P., Sparks A. (2017). The relative state model: integrating need-based and ability-based pathways to risk-taking. *Pers. Soc. Psychol. Rev.* 21: 176–198.

67 Akbari M., Bahadori M. H., Khanbabaei S., Milan B. B., Horvath Z., Griffiths M. D., Demetrovics Z. (2023). Psychological predictors of the co-occurrence of problematic gaming, gambling, and social media use among adolescents. *Computers in Human Behavior*, 140: 107589.

68 King D., Ejova A., Delfabbro P. (2012). Illusory control, gambling, and video gaming: An investigation of regular gamblers and video game players. *Journal of Gambling Studies*, 28(3): 421–435. <https://doi.org/10.1007/s10899-011-9271-z>.

of chance and skill. Therefore, the presence of shared underlying risk factors cannot be ruled out.⁶⁹ In fact, playing video games may be associated with having false expectations about the degree of control over gambling, especially when it comes to online gambling: since many video games require skill and strategy, some gamers may believe - through gaming experience - that they become skilled enough to be successful in gambling⁷⁰. However, further investigation is needed to ascertain the link between gaming and harmful gambling and to possibly explore the hypothesis of a reverse pathway between the two phenomena.

In conclusion, the plausibility that certain populations of gamers - e.g., adolescents and vulnerable young adults - are more frequently sensitized to gambling suggests a preventive and health promotion perspective that focuses on peer-to-peer approaches to increase risk awareness among adolescents and adult caregivers (parents, educators, teachers) and on parents' negotiating skills in agreeing limitations to the time spent on video games⁷¹. Moreover, the advertising of gambling companies in video games should be thoroughly analyzed as a potential risk factor for the development of gambling-related problems.⁷² In this regard, specific regulation of the use of gambling elements in video games (e.g., loot boxes and social casinos) and, in general, of online gambling advertising (also on social media) could be useful in order to increase risk awareness among individuals who engage in gaming and to protect them from gambling-related harm.^{73,74,75}

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69 Delfabbro P., King D. L. (2020). Gaming-gambling convergence: Evaluating evidence for the 'gateway' hypothesis. *International Gambling Studies*. Advance online publication. <https://doi.org/10.1080/14459795.2020.1768430>.

70 Gainsbury S. M., Russell A. M., King D. L., Delfabbro P., Hing N. (2016). Migration from social casino games to gambling: Motivations and characteristics of gamers who gamble. *Computers in Human Behavior*, 63, 59e67.

71 Marinaci T., Venuleo C., Ferrante L., Della Bona S. (2021). What game we are playing: the psychosocial context of problem gambling, problem gaming and poor well-being among Italian high school students. *Heliyon*, 7(8).

72 In Italy, the Law No. 96 of August 9, 2018 (the so-called "*Dignity Decree*") banned "any form of advertising, even indirect, relating to games or betting with cash prizes, as well as gambling, however carried out and on any medium, including sporting, cultural, or artistic events, television or radio broadcasts, daily and periodical press, publications in general, posters and IT, digital and telematic channels, including social media". However, the advertising ban, partially modified due to an interpretation by the Italian Communications Regulatory Authority (AGCOM), is under evaluation by Italian government.

73 Di Censo G., Delfabbro P., King D. L. (2024). The impact of gambling advertising and marketing on young people: A critical review and analysis of methodologies. *International Gambling Studies*, 24(1): 71-91.

74 Rossi R., Nairn A. (2022). New developments in gambling marketing: the rise of social media ads and its effect on youth. *Current Addiction Reports*, 9(4): 385-391.

75 Thomas S., Van Schalkwyk M. C., Daube M., Pitt H., McGee D., McKee M. (2023). Protecting children and young people from contemporary marketing for gambling. *Health Promotion International*, 38(2): daac194.