

Gamblification and Persuasive Design Patterns in Video Games: Results of a Survey of Young People in Spain

GAMBLIFICACIÓN Y PATRONES DE DISEÑO PERSUASIVO EN LOS VIDEOJUEGOS: RESULTADOS DE UNA ENCUESTA A JÓVENES EN ESPAÑA

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Abstract: Contemporary digital gaming has become a central infrastructure of youth leisure, characterized by mechanics of chance, continuous monetization, and persuasive design. Based on a survey of young people aged 16 to 25 in Spain, this study analyzes the relationship between integration into gamblified environments, exposure to dark patterns, emotional impact, and levels of critical awareness. The results show that monetization intensity, measured primarily through financial expenditure, explains both exposure to dark patterns and their normalization better than playtime. This integration into monetized architectures is associated with higher levels of frustration, stress, and emotional distress. Furthermore, greater affinity for and spending on games of chance attenuates support for regulation and critical distance, highlighting a structural tension between enjoyment and critical awareness.

Keywords: Gamblification; Dark Patterns; Loot Boxes; Spain; Youth; Video Games.

Resumen: El juego digital contemporáneo se ha configurado como una infraestructura central del ocio juvenil, atravesada por mecánicas de azar, monetización continua y diseños persuasivos. A partir de una encuesta aplicada a jóvenes de 16 a 25 años en España, este estudio analiza la relación entre la integración en entornos *gamblificados*, la exposición a patrones oscuros, el impacto emocional y los niveles de conciencia crítica. Los resultados muestran que la intensidad de la monetización, medida principalmente a través del gasto económico, explica mejor que el tiempo de juego tanto la exposición a patrones oscuros como su normalización. Esta integración en arquitecturas monetizadas se asocia con mayores niveles de frustración, estrés y malestar emocional. Asimismo, una mayor afinidad y gasto vinculados al azar atenúan el apoyo a la regulación, evidenciando una tensión estructural entre disfrute y conciencia crítica.

Palabras clave: gamblificación; patrones oscuros; cajas botín; España; juventud; videojuegos.



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1. Introduction

The progressive inclusion of chance-based mechanics, continuous monetisation systems and persuasive design strategies has substantially transformed the gaming experience, shifting it towards logics of anticipation, risk and financial reward. This process, widely described in the literature as *gamblification* (Macey & Hamari, 2024), raises important questions about current gaming practices and their social, emotional and cultural implications, particularly for young people.

Many studies on the convergence of video games and gambling have examined these trends through specific artefacts, most notably loot boxes. These randomised purchasable rewards have been analysed in terms of their structural similarity to gambling and their association with problematic spending behaviours (Brooks & Clark, 2023; Macey & Hamari, 2024; Zendle & Cairns, 2018).

While this research has been instrumental in highlighting the risks associated with certain game mechanics, the focus on individual features tends to fragment the analysis of gamblification as a broader, more systemic phenomenon. To understand it fully, it must be situated within a framework that recognises it as a sociotechnical assemblage greater than any one of its components, while also considering the infrastructures, mediations and conditions that organise the gaming experience as a whole.

Gardner's (2025) periludic approach begins with an analytical redefinition of gameplay as an expanded system encompassing not only the game's internal mechanics, but also the devices, infrastructures and access conditions that surround and enable it. In this sense, periludic refers to the elements at the game's thresholds (e.g. interfaces, authentication systems, virtual economies, monetisation architectures and temporal logics) that influence what is possible and steer the player experience, despite not being part of play in the strictest sense. This approach challenges the notion of gameplay as a closed or autonomous space, viewing it instead as a relational ecosystem in which these peripheral elements are constitutive of the gaming experience, not external to it. This framework makes it possible to analyse how practices involving chance-based outcomes, risk and monetisation are integrated at these operational edges, reconfiguring the conditions of participation, progression and enjoyment (Macey *et al.*, 2024).

Building on these premises, the present study examines the gamblification of video games from a media-material and empirical perspective, focusing on the experiences of young players in Spain. Within the framework of

media materiality, video games are understood not only as cultural texts or spaces of representation, but also as sociotechnical artefacts whose interfaces, algorithms and digital objects shape practices, emotions and power relations (Gillespie *et al.*, 2014; Lievrouw, 2014).

Using survey data from a sample of 1,000 young people aged 16 to 25 living in Spain, the study explores the relationship between exposure to gamblified mechanics, perceptions of dark design patterns, the emotional consequences of these dynamics, and levels of critical awareness with regard to regulation, transparency and the legitimacy of game design. To this end, it adopts a sociotechnical and critical-material approach that regards these dynamics not as discrete phenomena, but as part of the design, monetisation and affect infrastructures embedded in present-day video games.

2. Theoretical Approach

This article analyses contemporary video games as sociotechnical environments marked by the convergence of gaming and gambling dynamics (Arnedo-Moreno *et al.*, 2026, King *et al.*, 2010; Macey & Hamari, 2024; Sánchez Chamorro *et al.*, 2024; Zagal *et al.*, 2013; Zendle & Cairns, 2018).

This process, known as gamblification, involves the systematic use of uncertain outcomes, randomised rewards and continuous monetisation in video game design and economies (Macey & Hamari, 2024; Zendle & Cairns, 2018). According to Gutiérrez-Manjón *et al.* (2026), gamblification is not an isolated or exceptional phenomenon, but a structural trait of freemium models and video games conceived as services (games as a service, or GaaS), in which player progression and engagement are centred on expectation, risk, and monetary and emotional investment.

From this perspective, a gaming environment becomes gamblified when chance is normalised as a legitimate means of advancing and acquiring rewards. Mechanics such as loot boxes, battle passes and variable reward-based progression systems mirror the intermittent reinforcement schedules widely studied in gambling research. As a result, they encourage repeated behaviours and recurrent spending, particularly among younger groups (Larche *et al.*, 2021).

This environment is further bolstered by dark patterns, defined as design strategies that steer players' decisions towards forms of consumption, retention or spending that prioritise the platform's financial interests over user autonomy (Brignull, 2011). In video games, dark patterns manifest as countdown timers, artificial scarcity, opaque monetisation and pay-to-win options, which combine to create choice architectures that induce prolonged

engagement and unplanned spending (Gutiérrez-Manjón *et al.*, 2026; Zagal *et al.*, 2013). These patterns also operate through social pressures and expectations of continued participation in multiplayer environments and community dynamics (Krassen & Aupers, 2021). Media materiality frames these practices as invisible infrastructures within the interface and code that both mediate the experience and actively structure it (Gillespie *et al.*, 2014).

The consequences are particularly evident in players' emotional responses. Sustained exposure to gamblified environments is associated with frustration, anxiety, stress and guilt, elicited by the pressure not to miss out on rewards, the randomness of outcomes and the constant monetisation of in-game progression (Wardle & Zendle, 2021). These emotions should not be viewed as side effects, but as structural components of a design strategy intended to maximise affective engagement. In this sense, gamblified video games operate as infrastructures that capture and monetise not only players' time and money, but also their emotional states, in line with critiques of surveillance capitalism and the behavioural data economy (Paasonen, 2018; Zuboff, 2019).

However, players' relationships with these architectures are not entirely passive. In reception and cultural studies, subjects are treated as situated actors who interpret, negotiate and re-signify technologies in relation to their social, cultural and biographical backgrounds (Bonini & Treré, 2024; Hall, 1980; Martín-Barbero, 1987; Morley, 1986; Orozco, 1996; Siles, 2023). This perspective emphasises that media technologies do not determine practices in any fixed or uniform way, but are appropriated differently depending on trajectories, competencies and shared frameworks of meaning (Livingstone, 2009; Siles, 2023; Silverstone, 1994). In digital and gaming environments, this tradition has been taken up to examine how players produce ambivalent readings that combine enjoyment, pragmatic acceptance and explicit critique of the economic and design logics that structure the gaming experience (Bonini & Treré, 2024; Consalvo, 2007; de Certeau, 1984; Fiske, 1987; Shaw, 2010). In gamblified video games, this engenders a form of critical awareness regarding design features, the lack of transparency around probabilities and the legitimacy of certain monetisation practices.

The present study aims to analyse and explain gamblification as a sociotechnical assemblage that intertwines structural exposure, manipulative design, affect and critical awareness. This shifts the analysis of video games away from leisure as a neutral activity and towards digital play as a power infrastructure, where pleasure, attention and emotion are treated as contested resources in contemporary digital capitalism (Brock & Johnson, 2021).

3. Research Design and Analytical Strategy

3.1. Materials and Indicators

This study uses data from a structured survey of 16- to 25-year-olds residing in Spain. Fieldwork was conducted via an online panel, resulting in a total sample of 1,000 respondents. To ensure balance, quotas were established for gender, age group and region within Spain (defined according to Nielsen areas). Of all the respondents, 927 reported playing video games regularly, making them the primary subsample for analyses of gaming practices, exposure to persuasive design patterns, spending and emotional experiences.

The self-administered online survey was specifically designed for this study, drawing on a systematic review of the literature concerning gamblification, dark patterns, monetisation, randomised rewards and persuasive design in video games (Arnedo-Moreno *et al.*, 2026). As there were no widely established instruments for measuring all these dimensions together among young people, indicators were developed ad hoc on the basis of theoretical and content-related criteria identified in the review. The instrument's validation should therefore be regarded as a form of conceptual validation aimed at ensuring a match between the study's theoretical dimensions and the survey items.

The instrument also included screener questions, items on sociodemographic characteristics and indicators of gaming habits, spending frequency and intensity, exposure to monetisation mechanics, affinity for chance-based dynamics, critical perceptions of design patterns and emotional experiences associated with gaming. Prior to analysis, the dataset was reviewed to identify incomplete responses, screening inconsistencies and out-of-range values.

Participants took approximately 20 minutes to complete the survey, which consisted primarily of Likert-type agreement scales (1–5), as well as categorical, binary and open-ended questions. The full instrument, together with the codebook and items, is available in the supplementary material.

The survey is organised into three sections. Section F contains the screener questions and items on sociodemographic characteristics, including an eligibility filter (“Do you play video games regularly?”) that classifies respondents as regular players ($n = 927$) or non-players ($n = 73$). Section A (Players) characterises gaming practices, exposure to specific design features, and responses to three sets of mechanisms widely discussed in the gamblification literature: (i) chance-based mechanics, loot boxes and randomised rewards; (ii) time-pressure dynamics, limited-time offers and virtual currencies; and (iii) payment-related features, battle passes and progression systems.

Section B (Non-players) captures general perceptions of these mechanisms without requiring direct personal experience. Given the purposes of this study, the analysis focuses on the first of these subgroups: respondents who reported playing video games regularly ($n = 927$).

Owing to the large number of items and the study's theoretical orientation, the analytical strategy involved constructing theoretically grounded indicators from conceptually related sets of questions. The resulting indicators are defined below:

- A. Affinity for chance-based mechanics (*Chance affinity*): enjoyment, excitement, engagement and repeated actions associated with randomised rewards.
- B. Propensity to spend on randomised rewards (*Chance spending*): spending money on randomised items, spending more than intended, or doing so despite low odds of success.
- C. Time-related dark patterns (*Time-related patterns*): time pressure, limited-time offers, disruptions to the player's routine and fear of falling behind.
- D. Money-related dark patterns (*Money-related patterns*): opacity of virtual currencies, bundle purchases, paywalled content and pay-to-win options.
- E. Negative emotional impact (*Emotional impact*): frustration, stress and guilt associated with limited rewards and battle passes.
- F. Players' critical awareness (*Critical awareness*): demands for transparency (e.g. disclosure of probabilities), the availability of non-randomised alternatives and support for stronger regulation of these practices.
- G. Normalisation of gambling-like dynamics (*Normalisation*): standard integration, acceptance and enjoyment of chance as a legitimate way to progress through a game and obtain rewards.

All indicators were calculated as the mean of valid items on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), such that higher values indicate greater intensity. The internal consistency of each scale was assessed using Cronbach's alpha, with coefficients reported in Table 1. Two key ordinal variables were also used: weekly play time and monthly in-game spending. Sociodemographic variables (age, gender, education level and employment status) were drawn from the relevant section of the survey and included in the analysis as controls.

Table 1. Descriptive statistics for constructed indicators (regular players only, n = 927)

Indicator	No. of items	Item codes in survey	Cronbach's α	Mean	Std. Dev.
a. Chance affinity	4	(A4_1, A4_3, A4_4, A4_5)	0.723	3.54	0.80
b. Chance spending	3	(A4_7, A4_8, A4_9)	0.798	2.67	1.22
c. Time-related patterns	7	(A6_1, A6_2, A6_6, A6_7, A6_8, A6_9, A6_11)	0.714	3.27	0.75
d. Money-related patterns	12	(A6_3, A6_4, A6_5, A6_10, A7_1–A7_6, A7_10, A7_11)	0.777	3.18	0.68
e. Emotional impact	4	(A6_8, A7_4, A7_8, A7_9)	0.535	3.37	0.83
f. Critical awareness	4	(A4_10, A4_11, A4_12, A4_13)	0.703	3.94	0.71
g. Normalisation	3	(A4_1, A4_3, A4_4)	0.687	3.52	0.84

Source: Authors' own work.

Overall, the indicators exhibit acceptable levels of internal consistency, with the exception of *Emotional impact*, whose reliability is moderate to low ($\alpha = .535$). Nevertheless, the indicator was retained due to its theoretical relevance for capturing a range of negative emotional experiences linked to persuasive design (e.g. frustration, stress, pressure and emotional distress). The indicator should thus be understood as exploratory in nature rather than as a psychometric scale.¹

3.2. Proposed Modelling Approach, Variables and Hypotheses

Building on the indicators above, four sets of regression models were estimated, corresponding to the conceptual blocks defined in the theoretical section: exposure to gamblified mechanics, dark patterns, emotional consequences and

¹ The study does not use other quantitative analytical techniques, such as exploratory or confirmatory factor analysis, as its primary objective is not the psychometric validation of scales but the initial examination of associations between variables that have been repeatedly identified in the literature. This represents a relevant avenue for future research, particularly for refining the measurement of emotional impact and evaluating the latent structure of the indicators used, as noted in the conclusions.

critical awareness (for a summary of the empirical models, their indicators and variables, see Appendix 1).

In order to articulate the theoretical framework and empirical strategy more clearly, and to prevent an excessive number of independent model specifications, the analysis was structured around four analytical models (M1–M4), each comprising two submodels. In this approach, submodels (a) and (b) share the same set of predictors and controls, but differ in terms of their dependent variable.

Model 1 (M1). Exposure to gamblification: gaming intensity, spending and affinity for chance-based mechanics. This first model examines how the structural intensity of players' engagement with video games, operationalised as weekly play time and total monthly in-game spending, relates to their affinity for chance-based mechanics and spending on randomised rewards. In M1a, the dependent variable is *Chance affinity* (an index constructed from items in Section A4 on attitudes towards randomised rewards). The main predictors are weekly play time, total monthly in-game spending and age. In M1b, the dependent variable is *Chance spending*, with the same set of main predictors.²

The two submodels include sociodemographic controls and are used to test the following gamblification-related hypotheses (H) concerning play time and spending (H1 and H2) and the normalisation of gambling-like dynamics (H3).

- H1. Among young people who play video games, greater weekly play time is associated with greater affinity for chance-based mechanics.
- H2. Among young people who play video games, higher total monthly in-game spending is associated with higher levels of spending on randomised rewards.
- H3. Among young people who play video games, greater affinity for chance-based mechanics and higher spending on randomised rewards are associated with greater normalisation of gamblification as a legitimate or desirable way to progress through a game and obtain rewards.

² This study distinguishes between total monthly in-game spending, as measured by the original survey item (A5), and chance spending, an indicator constructed from multiple items (see Table 1). While A5 captures all in-game expenditure, including premium currencies, skins, battle passes, downloadable content (DLC) and other items, chance spending refers specifically to purchases associated with randomised reward mechanics, such as loot boxes, packs and time-limited passes. Therefore, chance spending constitutes a more specific subset of total monthly in-game spending.

Model 2 (M2). Dark patterns: exposure to time- and money-related infrastructures. The second model focuses on players' perceptions of time-related dark patterns (M2a) and money-related dark patterns (M2b). In each case, the dependent variable is the corresponding indicator (*Time-related patterns* and *Money-related patterns*), while the main independent variables are the exposure indicators (*Chance affinity* and *Chance spending*), together with play time and monthly spending. These submodels assess the extent to which greater exposure to gamblified mechanics is associated with perceptions of intrusive time-related and money-related infrastructures, in line with H4, H5 and the monetary dimension of H6.

- H4. Greater perceived exposure to time-related dark patterns is associated with longer weekly play time and behaviours indicative of fear of missing out (FOMO).
- H5. Greater perceived exposure to time-related dark patterns is associated with higher levels of monthly in-game spending, after controlling for play time and sociodemographic characteristics.
- H6. Greater exposure to money-related dark patterns is associated with higher levels of monthly in-game spending.

Model 3 (M3). Emotional consequences and normalisation of gambling-like dynamics. The third model directly addresses the emotional consequences of gamblification. In M3a, the dependent variable is the indicator capturing negative emotional impact (*Emotional impact*), while the main independent variables are *Time-related patterns* and *Money-related patterns*, together with *Chance affinity* and *Chance spending*. In all cases, play time, monthly spending and sociodemographic variables are included as controls. In M3b, the dependent variable is the normalisation of gambling-like dynamics (*Normalisation*), modelled as a function of *Chance affinity* and *Chance spending*, again including dark patterns and the control variables. These models test H7 (emotional dimension), H8 and the attitudinal dimension of H9.

- H7. Greater exposure to money-related dark patterns is associated with greater negative emotional impact from gaming.
- H8. Greater affinity for randomised rewards combined with greater exposure to time-related and money-related dark patterns is associated with a more intense negative emotional impact from gaming, even after controlling for play time and spending.

H9. As proposed in M1, greater affinity for chance-based mechanics and a greater propensity to spend on randomised rewards (e.g. loot boxes, packs or time-limited passes) are associated with greater normalisation of gambling-like dynamics, as tested in M3b.

Model 4 (M4). Critical awareness and emotional impact. The fourth model includes critical awareness as both an outcome and a moderating variable. In M4a, *Critical awareness* serves as the dependent variable, modelled according to exposure to gamblified mechanics (*Chance affinity* and *Chance spending*), time- and money-related patterns, and levels of engagement, while controlling for sociodemographic characteristics. This model assesses whether greater exposure to gamblified ecosystems translates into greater critical awareness (H10). In M4b, the dependent variable is once again *Emotional impact*, but interaction terms are introduced between time- and money-related dark patterns and *Critical awareness* to test whether the latter moderates the relationship between exposure and emotional distress (H11 and H12).

H10. Among players, greater engagement with gamblified ecosystems is associated with higher levels of critical awareness regarding gamblified mechanics.

H11. Higher levels of critical awareness regarding gamblified mechanics are associated with lower levels of negative emotional impact from gaming, after controlling for exposure to time- and money-related dark patterns.

H12. Critical awareness moderates the relationship between exposure to dark patterns and negative emotional impact: the positive association between exposure to time- and money-related patterns and negative emotional impact is weaker among players with higher levels of critical awareness.

Given that the constructed indicators can be approximated as continuous variables (Likert scales), the models in which these indicators served as dependent variables (i.e. all submodels from M1 to M4) were estimated using ordinary least squares (OLS) regression with robust standard errors. Although several indicators were derived from items measured using Likert-type scales, they were treated as approximately continuous variables because they were constructed as aggregated or averaged indices. This strategy allows for the direct interpretation of the direction, magnitude and statistical significance of associations between independent and dependent variables, while also ena-

bling the estimation of interactions and marginal effects in a manner that is comparable across models. The use of OLS in this context is justified by the study's dual exploratory and explanatory purpose, the aggregated construction of the indicators, and the aim of facilitating a substantive interpretation of the coefficients. Accordingly, and owing to the cross-sectional nature of the survey design, the results should be interpreted as statistical associations.

For analyses in which play time and spending acted as ordinal dependent variables, ordinal regression models were used, alongside robustness checks in which these variables were treated as approximately continuous.

4. Results

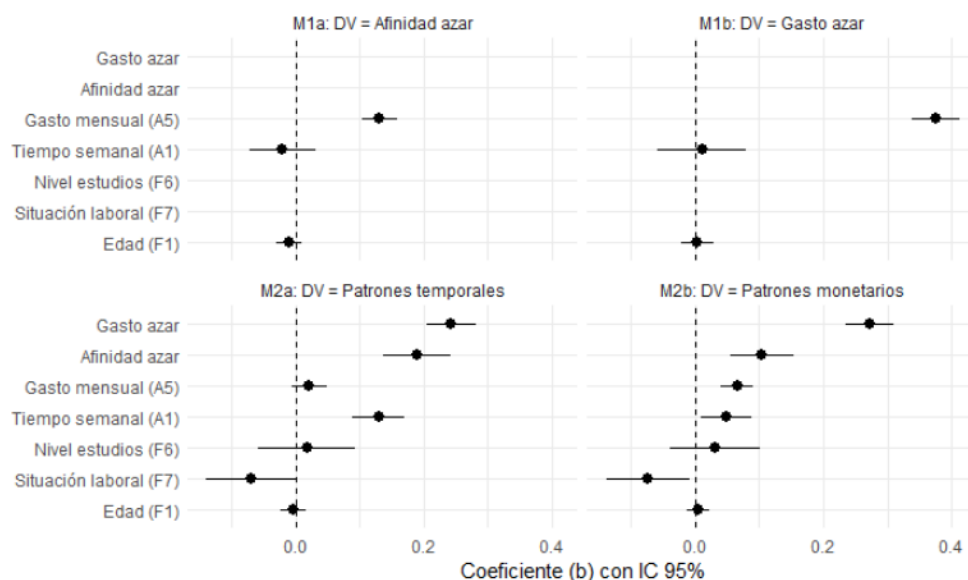
The first set of models (M1) examines the relationship between play intensity, monthly spending and the two indicators of exposure to gamblification: affinity for chance-based mechanics (*Chance affinity*) and propensity to spend on randomised rewards (*Chance spending*). The results show that, when controlling for total monthly in-game spending and age, weekly play time does not significantly predict *Chance affinity* or *Chance spending* (see Appendix 2). In contrast, total monthly in-game spending is robustly and positively associated with both indicators. Each one-category increase in monthly spending is associated with a 0.13-point increase in *Chance affinity* and a 0.37-point increase in *Chance spending* ($p < 0.001$). Furthermore, the *Chance affinity* model (M1a) explains around 8% of the variance, while the *Chance spending* model (M1b) reaches an R^2 of approximately 0.31, indicating that overall in-game spending is a strong predictor of spending on randomised rewards.

These findings suggest that affinity for chance-based mechanics depends less on the number of hours played than on the amount of money spent. Players who spend more on video games overall also tend to report more strongly enjoying and relying on randomised rewards, while concentrating a larger share of their spending on gamblified dynamics. Monetary investment appears to serve as a way of progressing more quickly through the game, as players who do not spend money must invest more time to advance.

The second set of models (M2) examines the factors associated with perceptions of time- and money-related dark patterns (*Time-related patterns* in M2a and *Money-related patterns* in M2b). The results show that both types of patterns are concentrated among players who are already more heavily exposed to the gamblified ecosystem. In the case of time-related patterns, affinity for chance-based mechanics, propensity to spend on randomised rewards and weekly play time are all positively associated with time pressure

($R^2 \approx .33$), while total monthly in-game spending does not have a significant effect. In contrast, money-related patterns (e.g. pay-to-win options, paywalled content and virtual currencies) depend strongly on both overall spending and spending on randomised rewards. Each additional point in *Chance spending* is associated with a 0.27-point increase in *Money-related patterns* ($p < .001$), with the model explaining nearly 44% of the variance ($R^2 \approx .44$) (see Figure 1 and Appendix 2). The coefficients for these first two model sets are presented in Figure 1.

Figure 1. Conditional marginal effects of gamblified exposure and dark patterns, with 95% confidence intervals (CIs) (models M1–M2)



Source: Authors' own work.

The third set of models (M3) examines the emotional consequences of the gamblified ecosystem and the normalisation of gambling-like dynamics. The *Emotional impact* model (M3a) shows that dark patterns are the main predictors of emotional distress, with both time- and money-related patterns robustly associated with higher levels of frustration, stress and guilt. In fact, *Money-related patterns* emerges as the strongest predictor of *Emotional impact* (see Appendix 3): holding the remaining model variables constant, a one-point increase in the former is associated with an average increase of 0.67 points in the latter ($p < .001$). In addition, the model exhibits a high degree of explanatory power, accounting for over half of the observed variations in emo-

tional distress among players based on the intensity of their exposure to monetised architectures ($R^2 \approx .56$). Thus, the greater the prevalence of dynamics such as pay-to-win options, virtual currencies, paywalled content and spending-contingent rewards within the gaming experience, the greater the emotional distress experienced by players.

However, when dark patterns enter the model, neither weekly play time nor total monthly in-game spending has a significant effect on emotional distress. Furthermore, *Chance affinity* and *Chance spending* lose statistical robustness. This suggests that the problem lies not simply in playing or spending a lot, but in participating in environments designed around time pressure, artificial scarcity and systems of continuous monetisation that keep players in a constant state of tension between expectation, reward and frustration.

Meanwhile, submodel M3b shows that the normalisation of gambling-like dynamics (*Normalisation*) depends almost exclusively on *Chance affinity* (see Appendix 3). The coefficient for the latter indicator is close to 1, while the remaining predictors, including dark patterns, cease to be relevant. Substantively, players who enjoy, emotionally invest and repeatedly engage with chance-based mechanics are also the most likely to regard these practices as legitimate forms of progression and reward. Accordingly, the two indicators exhibit a strong attitudinal overlap, with both capturing the same favourable disposition towards randomness in game design.

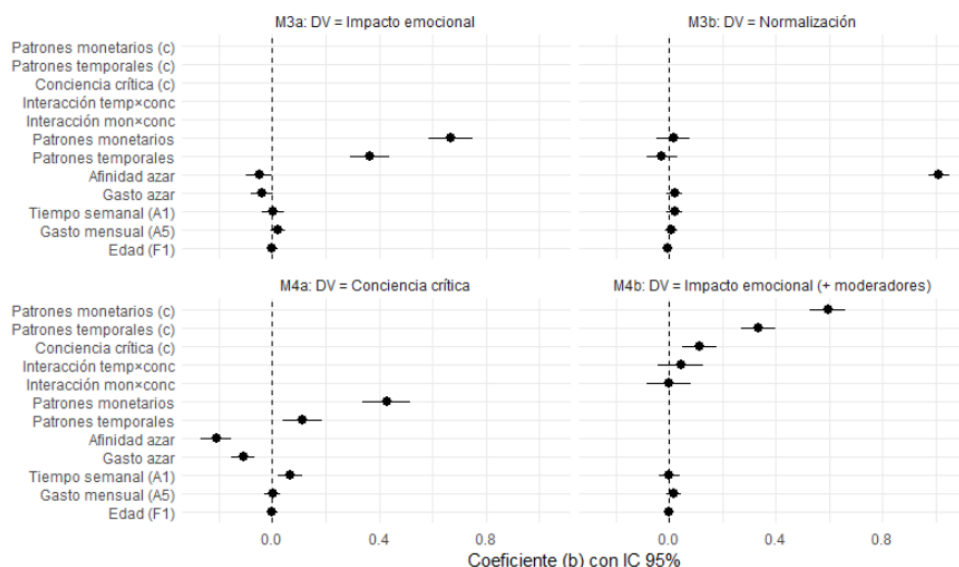
The fourth set of models (M4) introduces the dimension of players' critical awareness (*Critical awareness*). The results of M4a indicate that this awareness is particularly pronounced among players most exposed to money-related dark patterns (see Appendix 3). A one-point increase in *Money-related patterns* is associated with a 0.43-point increase in *Critical awareness* ($p < .001$), while *Time-related patterns* and greater weekly play time also contribute modestly to higher levels of *Critical awareness*. By contrast, both *Chance affinity* and *Chance spending* show significant negative effects, indicating that players who most enjoy and invest in these dynamics tend to be less supportive of measures aimed at bolstering transparency and regulation.

M4b further questions the hypothesis that a player's critical awareness may act as a protective factor against emotional distress (see Appendix 3). The interactions between *Critical awareness* and dark patterns are not statistically significant, meaning that increases in emotional distress associated with exposure to time- and money-related patterns occur among both more and less critical players. Moreover, *Critical awareness* itself exhibits an independent positive coefficient (0.11; $p < .001$), suggesting that players who are more cog-

nisant of these predatory dynamics tend to experience slightly higher levels of frustration and emotional distress. Overall, the results point to an ambivalent situation: exposure to the gamblified ecosystem increases critical awareness and demands for regulation, yet chance affinity and chance spending reduce that critical distance, and awareness of being caught within these systems may itself intensify perceptions of unfairness and frustration.

Together, the results of M3 and M4 show that the main factor associated with emotional distress among young players is not simply spending more time or money on video games, but rather exposure to dark patterns of monetisation and time pressure embedded within the architectures of contemporary video games. The coefficients for these models are presented in Figure 2.

Figure 2. Conditional marginal effects of the emotional and critical consequences of gamblification, with 95% confidence intervals (CIs) (models M3–M4)



Source: Authors' own work.

5. Discussion

The findings presented above point towards a complex gamblified economy in which economic intensity (spending), infrastructural intensity (dark patterns) and affective intensity (enjoyment, frustration and critical awareness) are closely intertwined.

It was initially assumed that greater structural engagement with video games, operationalised as more weekly play time and higher monthly in-game spending, would be associated with greater affinity for chance-based mechanics and higher spending on randomised rewards such as loot boxes. However, the results only partially confirm this expectation: while monthly spending is strongly associated with both these dimensions, weekly play time does not show a substantive effect.

This asymmetry suggests that, within gamblified infrastructures, economic intensity matters more than temporal intensity. That is, gamblification operates less as a function of being a heavy player and more as a function of being a valuable customer whose attention and emotional investment can be capitalised on more aggressively. This resonates with Zuboff's (2019) notion of surveillance capitalism, in which the central aim is not merely to prolong engagement or gameplay, but to transform behavioural data and affective attachment into forms of value extraction.

In addition, the study examined the relationship between affinity for / spending on randomised rewards and exposure to specific dark patterns, particularly time-limited FOMO mechanics and monetary patterns such as pay-to-win options, virtual currencies and battle passes. Here, the hypotheses are clearly supported by the finding that greater chance affinity and chance spending predict greater exposure to both time- and money-related patterns.

Beyond the individual coefficients, the correlation structure among the subindicators shows that these patterns operate as a tightly interconnected cluster, in which chance spending, time-limited events, virtual currencies, battle pass incentives and pay-to-win mechanics are all strongly correlated with one another and intensify alongside higher total monthly in-game spending.

Dark patterns can thus be interpreted as media infrastructures that operate continuously and systematically within video games' technical, economic and temporal architectures. Far from functioning as isolated add-ons, these mechanisms structure the gaming experience from within by setting paces for in-game connection and progression, introducing artificial scarcity and temporal urgency, and closely tying progression, status and competition to recurring monetisation dynamics.

The data suggest that everyday exposure is organised as an interdependent assemblage of monetisation, temporal scarcity and competitive pressure that determines practices, choices and affects over time. Understood in these terms, dark patterns mediate the gaming experience in the same way as other invisible infrastructures, such as algorithms, monetisation systems or

progression rules. Although they may operate in the background, they nevertheless play a decisive role in delimiting which options appear plausible, what is perceived as natural, and which forms of desire, frustration or belonging are activated within video games.

Observed through media materiality theories (Gillespie *et al.*, 2014), this cluster exemplifies the operation of digital artefacts with performative agency, understood not as neutral tools but as objects and interfaces that structure the conditions of play. Taken together, these patterns constitute an infrastructure in which in-game progression, status and belonging remain continuously tied to microtransactions.

The third set of submodels proposed that greater exposure to time- and money-related dark patterns would be associated with greater emotional impact, operationalised as frustration, stress and negative affect surrounding these mechanics. These hypotheses are strongly confirmed, as both types of pattern show robust positive associations with emotional impact, even after controlling for play time, spending and chance affinity.

This finding is crucial for dispelling moral panic and sweeping generalisations about screen time. What matters is not simply how much young people play, but the extent to which their gaming experience involves architectures that link progression, rewards and social status to spending and risk. In this regard, although Paasonen (2018) does not focus specifically on video games, her notion of infrastructures of intimacy is analytically useful for contextualising gamblified digital play. When applied to the present field of study, this concept helps to explain how today's video games synchronise the affective highs and lows of excitement, anticipation and disappointment with the continuous monetisation of gameplay, producing forms of sustained emotional engagement that transcend the occasional entertainment experience.

Significantly, neither monthly spending nor weekly play time emerges as a primary predictor of emotional distress when dark patterns are incorporated into the models. This suggests that emotional harm stems from power structures encoded within the interface and reward logic. The empirical evidence indicates that the frustration and stress experienced by young people are less related to excessive use than to repeated exposure to environments deliberately designed to sustain a constant tension between expectation and loss, and between the desire to progress and the limits imposed by monetisation.

Perhaps the most striking findings concern the hypotheses associated with the final model, which shows that exposure to time- and money-related dark patterns, together with greater weekly play time, predicts higher levels of

critical awareness. Players who are more heavily exposed to these infrastructures not only recognise these patterns, but are also more likely to view them as problematic and support transparency and regulation. However, this tendency exists in tension with the finding that greater affinity for chance-based mechanics and higher spending on randomised rewards are associated with lower levels of critical awareness.

In other words, the young people who derive the greatest enjoyment from and invest the most emotionally and monetarily in these systems also tend to be less critical of their risks, even when exposed to similar architectures. This dual dynamic – whereby exposure fosters criticism while enjoyment and spending attenuate it – complicates simplistic portrayals of players as either deceived or fully resistant. Furthermore, hypotheses proposing that critical awareness acts as an emotional protector are not supported. Contrary to expectations, greater critical awareness is associated with greater emotional impact and does not moderate the relationship between dark patterns and emotional distress. Young people who perceive these mechanics as unfair, opaque or predatory are also those who report higher levels of stress and negative affect associated with them.

Overall, the findings suggest that gamblification places young people in a kind of double bind. On the one hand, they are exposed to infrastructures that intensify spending, normalise risk and tie progression to monetised mechanics. For those who spend the most, dark patterns cluster together in an everyday environment that deeply intertwines chance, FOMO and pay-to-win dynamics. On the other hand, this exposure also generates significant levels of critical awareness and demands for regulation, particularly regarding pay-to-win systems and randomised rewards.

However, this critical awareness is not sufficient to neutralise these systems' emotional and economic appeal. Players may simultaneously enjoy chance-based dynamics such as loot boxes while also facing FOMO-driven pressure, experiencing payment-related competitive disadvantages and calling for greater regulation. In other words, criticism does not deactivate capture: players may recognise the problem while still being caught within dynamics designed to incentivise spending and continuous engagement.

This is in no way contradictory. In fact, the coexistence of enjoyment, frustration and criticism is exactly what one would expect from gameplay that is heavily mediated by economic and affective infrastructures. Instead of alleviating emotional distress, critical awareness may intensify it when players

continue to participate in environments that they perceive as problematic but find difficult to disengage from due to social, affective and economic factors.

Together, the four empirical models proposed in this study support the conclusion that gamblification transforms not only the play economy, but also its affective and political conditions. This process shapes what it feels like to play, who can compete on equal terms, and how well players can turn their emotional distress into effective demands for change.

6. Conclusions

This article examines how young players' exposure to gamblified infrastructures relates to their attitudes, emotional experiences and critical awareness of dark patterns in contemporary digital video games.

The survey results suggest that young people's involvement in the video game economy, driven primarily by monetisation, has greater explanatory power with respect to affinity for chance-based mechanics and exposure to dark patterns than play time. While this central finding echoes the established notion that spending is a critical marker in loot box dynamics (Close & Lloyd, 2021), it repositions that notion within a broader framework in which the issue is not playing too much, but rather being heavily engaged with gamblified monetisation architectures.

Meanwhile, exposure to dark patterns emerges as an interdependent cluster (chance-based mechanics such as loot boxes, time pressure and FOMO, virtual currencies, battle passes and pay-to-win options), bolstering the idea that these mechanisms function as media infrastructures rather than isolated add-ons. This assemblage is robustly associated with emotional impact, indicating that the issue lies not simply in playing more, but in doing so within a system that encourages desire while also making achievements more difficult without payment. This dynamic is intensified by features that pressure players to decide before time runs out.

Finally, the article introduces a key agential nuance: exposure to these infrastructures increases critical awareness and demands for regulation, while chance affinity and chance spending tend to attenuate that critical perspective. These demands for regulation are consistent with recent international debates advocating specific regulatory frameworks for chance-based mechanics in video games, particularly in relation to children and young people (Xiao *et al.*, 2022). Far from functioning as an emotional buffer, critical awareness coexists with frustration and indignation among players. This suggests that youth agency within platform capitalism may be ambivalent, insofar as players may

simultaneously recognise the predatory nature of certain mechanics while also remaining emotionally and monetarily entangled in them.

These results should be interpreted in light of the study's limitations, which constrain its scope while also opening up important avenues for future research. First, while the empirical design captures perceptions of monetary patterns, it does not sufficiently distinguish between experiences of payment-related inequality and experiences of competition based on merit, skill or time invested. Second, although gender appears in the models as a control variable and shows some associations, the study was not designed to systematically examine gender inequalities or gendered mediations in gamblification.

Third, the moderate internal consistency of the *Emotional impact* indicator may stem from the fact that it groups together related negative emotional experiences that are not necessarily unidimensional. Future research could refine this measure, explore its factorial structure and assess the possibility of distinguishing specific dimensions of emotional distress, such as frustration, stress, anxiety, financial pressure or feelings of loss of control.

Finally, the study does not directly capture specific forms of everyday resistance that players employ to avoid certain gamblified mechanics or play against the system. Exploring this line of inquiry would shed further light on the ambivalence of agency within platform capitalism, where young players are not merely passive consumers, but may also actively interpret, negotiate and resist platform monetisation (Bonini & Treré, 2024; Siles, 2023).

Tactics of use and appropriation, in the sense proposed by de Certeau (1984), are relevant because they show that agency cannot be reduced to capture or critical awareness alone. Rather, it is also expressed through practical negotiation, circumvention and the reappropriation of devices strategically designed by the video game industry. From this perspective, players may deploy situated practices that exploit the system's edges, partially reconfiguring its logics without necessarily challenging the structural framework of platform capitalism that shapes mainstream video games.

Future research could also comparatively examine how different national regulatory frameworks shape gaming experiences, monetisation dynamics and young people's exposure to gamblified mechanics. In this regard, the study's findings point to the need for more transparent regulatory approaches to reward probabilities, randomised item acquisition systems and monetisation mechanisms targeting the youth population.

Ethics and Transparency

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Conflict of Interest

The authors declare that they have no financial, personal or institutional conflicts of interest that could have influenced the way this study was conducted, analysed or published.

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Author Contributions

Role	Author 1	Author 2	Author 3	Author 4
Conceptualisation	X			
Data curation			X	
Formal analysis		X		
Funding acquisition	X			
Research	X		X	
Methodology		X		
Project management	X			
Resources	X			
Software		X		
Supervision	X		X	
Validation	X	X		
Visualisation		X		
Writing – original draft	X	X		
Writing – review & editing	X	X	X	

Data Availability Statement

The data supporting the findings of this study are openly available at: <https://doi.org/10.6084/m9.figshare.30467558.v3>.



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