

REVIEW ARTICLE



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Psychological mechanisms in video game monetization: A typology of contemporary strategies beyond loot boxes

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ABSTRACT

Background and aims: Contemporary video game monetization systems are increasingly embedded within gameplay, structuring decision-making and spending. While research has focused on loot boxes, other strategies remain under examined despite relying on similar mechanisms. This study develops a structured typology of monetization systems as integrated design architectures operating through embedded psychological processes. **Methods:** A structured, theory-informed synthesis of literature on video game monetization, behavioral design, gambling research, and consumer behavior was conducted. Strategies were organized across mode of value extraction, gameplay integration, and underlying psychological mechanisms. **Results:** Four categories were identified: traditional sales, microtransactions, gamblification, and in-game advertising. Across these, recurring mechanisms, including reinforcement processes and cognitive biases (e.g., fear of missing out, loss aversion, near-miss effects), operate across structurally distinct systems and may be associated with outcomes ranging from engagement and consumer-related effects to problematic gaming, gambling-related harm, and behavioral addiction. **Conclusions:** Monetization strategies function as integrated design systems in which recurring mechanisms shape player behavior. The typology provides a framework for identifying vulnerability markers and informing transparency, consumer protection, and safety-by-design.

KEYWORDS

video game monetization, psychological mechanisms, microtransactions, gamblification, loot boxes, internet gaming disorder

INTRODUCTION

Revenue from software sales, microtransactions, subscriptions, and downloadable content (DLC) increased from approximately USD 92 billion in 2015 to USD 189 billion in 2025 (Newzoo, 2015, 2025). This growth is driven not only by an expanding player base, rising from around 2 billion players in 2015 to nearly 3.5 billion in 2025 (Priori Data, 2025), but also by shifts in revenue optimization strategies, reflecting how contemporary games increasingly integrate monetization within core design (Bank, 2023). These developments have transformed player interactions, influenced developers' design decisions, and reshaped publishers' competitive strategies in increasingly saturated and regulated markets (Fang, Zheng, Ye, & Goes, 2019; Goh, Al-Tabbaa, & Khan, 2023; King et al., 2019; Perks, 2020).

Central to this transformation are monetization strategies, understood as revenue-generation systems embedded within gameplay. Although research has primarily focused on loot boxes, a broader range of monetization features has received comparatively less attention

despite growing evidence of their relevance for player behavior and risk (Rehbein, Gentile, Lemmens, & Rumpf, 2024; Saini et al., 2024). These systems influence not only spending patterns but also structure gameplay mechanics (Derevensky & Griffiths, 2019).

Analyzing monetization strategies and their psychological effects provides insight into how commercial design objectives shape player experience, engagement, and decision-making. These mechanisms may contribute to persistent engagement, altered control, and, in some cases, patterns associated with addiction or gambling-related harm, while also producing broader consumer-related outcomes such as financial pressure and distorted cost perception. Such patterns may be associated with increased vulnerability to internet gaming disorder (IGD), as defined in the DSM-5-TR (American Psychiatric Association, 2022), and gaming disorder (GD), as defined in the ICD-11 (World Health Organization, 2019), as well as related constructs such as gambling disorder and, conceptually, compulsive buying disorder (CBD) (Castren, Järvinen-Tassopoulos, & Raitasalo, 2021; Kim et al., 2023; Oka, Kubo, Murakami, & Kobayashi, 2024; Petrovskaya & Zendle, 2022a). At the same time, other monetization mechanisms may primarily influence consumer behavior, cost perception, or user experience without necessarily implying disordered use.

The present paper proposes a structured typology of contemporary video game monetization strategies, derived through a theory-informed synthesis of the literature on video game monetization, behavioral design, and digital consumption, with strategies iteratively grouped across the literature. Monetization strategies are grouped based on shared structural characteristics, including their mode of value extraction and degree of integration within gameplay, alongside the psychological mechanisms they incorporate. This approach focuses on describing and organizing the structural features of monetization systems rather than evaluating their outcomes.

The resulting typology is organized into four primary categories: (i) traditional sales (premium purchases, subscriptions, and downloadable content [DLC]); (ii) microtransactions (virtual currencies, cosmetic purchases, pay-to-win mechanics, pay-to-skip or pay-to-accelerate systems, extra chances or moves, inactivity penalties, and battle passes); (iii) gamblification (loot boxes or gachas, embedded casino mechanics, social casino games, sweepstakes casinos, skin gambling or wagering, cryptogames or play-to-earn systems, and user-created gambling); and (iv) in-game advertising (static, interruptive, incentivized, deceptive, and adaptive formats). These categories capture the principal structural configurations through which monetization is implemented in contemporary games. By systematizing these strategies and the psychological mechanisms they incorporate, the present framework provides a structured basis for examining monetization systems as design features. This structural organization enables analysis of how monetization systems operate through the interaction of embedded psychological mechanisms.

MONETIZATION STRATEGIES

Modern video games employ a wide range of monetization strategies that shape how players allocate time, attention, and resources. These structural features shape the player experience by modulating motivation, spending patterns, and stress, while potentially contributing to vulnerability to persistent or compulsive engagement. This has raised concerns regarding manipulation, player autonomy, and consumer protection in interactive media environments (André, Bore, Toresson, Andersson, & Claesdotter-Knutsson, 2024; Bank, 2023; Costes & Bonnaire, 2022; Gibson, Griffiths, Calado, & Harris, 2025; King & Delfabbro, 2019; Petrovskaya & Zendle, 2022b; Sirola, Nyrhinen, Nuckols, & Wilska, 2023).

The risks associated with monetization strategies are heterogeneous, spanning both patterns related to problematic gaming and broader consumer-related harms that do not necessarily reflect addictive behavior (Gibson, Griffiths, Calado, & Harris, 2022; Kim et al., 2023; Petrovskaya & Zendle, 2022a). Not all monetization strategies are inherently problematic, and their psychological effects vary with implementation and context, ranging from consumer-related or experiential effects (e.g., frustration, financial pressure, or social desirability) to more persistent or maladaptive patterns of use. Therefore, the current framework focuses on the psychological mechanisms embedded in these systems, which give rise to this range of player responses.

The outlined potential risks do not imply that all monetization strategies are inherently harmful. Rather, they reflect possible outcomes depending on implementation, context, and player vulnerability. These mechanisms, summarized in Table 1, are grounded in established frameworks from behavioral psychology, gambling research, and consumer behavior, including reinforcement processes, cognitive biases, and persuasive design principles (Abbasi, Rehman, Hussain, Ting, & Islam, 2021; Gao & Liu, 2023; Guo, Hao, Mukhopadhyay, & Sun, 2019a; Hartanto & Kasturiratna, 2024; Keogh & Richardson, 2018; Larche, Musielak, & Dixon, 2017; Petrovskaya & Zendle, 2022a; Xiao, Henderson, & Newall, 2023). The Appendix provides concise definitions of the psychological mechanisms referenced in Table 1.

Traditional sales

Traditional monetization refers to revenue generated through upfront or recurring payments that grant players access to a game or its content, including premium purchases, subscriptions, and downloadable content (DLC). Although often regarded as straightforward and self-contained, these models have increasingly incorporated additional monetization features, such as microtransactions. As a result, the total cost of play may extend beyond the initial access payment, particularly in high-budget titles typically priced between USD 60 and USD 80, such as *EA Sports FC* (formerly *FIFA*) (Lemmens, 2022).

Table 1. Typology of video game monetization strategies, associated psychological mechanisms, and potential risks

Monetization strategy	Psychological mechanism	Potential risk	Example
i. Traditional sales			
Premium purchases (one-time full game payment)	Expectation violation; sunk-cost bias → continued investment to justify prior spending	May contribute to financial escalation through continued spending aimed at justifying prior investment, thereby undermining the self-contained purchase model	<i>EA Sports FC</i> (USD 60–80) includes paid advantages in Ultimate Team
Subscriptions (recurring payment for continued access)	Loss aversion; routine-based habit formation → persistence driven by fear of losing access	May contribute to sustained engagement when combined with retention strategies and continuous content updates	<i>World of Warcraft</i> requires a subscription for continued access
Downloadable content (DLC) (paid additional game content)	Task completion bias; narrative closure motivation → perceived need to complete the experience	May contribute to perceived incompleteness and financial pressure to purchase content framed as essential to the full experience	<i>Asura's Wrath</i> sells its true ending as paid DLC
ii. Microtransactions			
Virtual currencies (in-game purchasable exchange medium)	Price obfuscation; mental accounting → decoupling of real and perceived value	May impair cost tracking and facilitate overspending, particularly among users with lower financial literacy	<i>Overwatch 2</i> sells premium currency bundles that obscure real-world cost
Cosmetics (non-functional visual customizations)	Social comparison; identity signaling; peer visibility → status-driven purchasing	May reinforce social evaluative pressure and recurrent discretionary spending linked to identity expression and group belonging	<i>League of Legends</i> sells cosmetic skins that signal status without affecting gameplay
Pay-to-win (paid gameplay advantages)	Competitive pressure; status anxiety → spending to avoid disadvantage	May induce competition-driven spending escalation and perceived loss of control in maintaining relative status	<i>Raid: Shadow Legends</i> provides paying players with stronger characters and gear
Pay-to-skip/pay-to-accelerate (paid progression shortcuts)	Delay-related frustration; time-gating → spending to relieve progression barriers	May condition avoidance-based spending patterns, reinforcing purchases that alleviate artificially imposed friction	<i>Clash of Clans</i> allows players to skip building timers and accelerate upgrades
Extra chances/moves (paid retries after failure)	Near-miss effects; loss-chasing → continued engagement following failure	May promote persistent loss-chasing and reduced inhibitory control, leading to repeated spending despite prior losses	<i>Candy Crush</i> offers extra moves after near-failure states
Inactivity penalties (loss of progress for non-engagement)	Loss aversion; streak-based habit formation → avoidance of progress loss through engagement or spending	May foster repeated checking behaviors and incentivize spending on penalty avoidance or recovery mechanisms	<i>Duolingo</i> resets daily streaks when a session is missed, while offering paid streak protection
Battle passes (paid access to time-limited progression rewards)	Fear of missing out (FoMO); sunk-cost bias → sustained goal-directed engagement following purchase	May drive persistent engagement after purchase and incentivize additional spending to maximize value within time-limited systems	<i>Fortnite</i> unlocks time-limited rewards through seasonal progression after purchasing a battle pass
iii. Gambification			
Loot boxes/gachas (randomized rewards for payment/action)	Variable-ratio reinforcement; reward uncertainty; near-miss effects → persistent reward-seeking	May be associated with loss of control over spending, sustained gambling-like engagement, and financial harm	<i>Clash Royale</i> uses randomized chest rewards
Embedded casino mechanics (simulated gambling within monetized game environments)	Intermittent reinforcement; audiovisual cue conditioning; arousal responses → conditioned engagement	May produce conditioned arousal responses and facilitate transition toward monetized gambling-like systems or related spending behaviors	<i>Red Dead Redemption 2</i> includes poker and blackjack with realistic audiovisual feedback

(continued)

Table 1. Continued

Monetization strategy	Psychological mechanism	Potential risk	Example
Social casino games (simulated gambling without real-money payout)	Intermittent reinforcement; illusion of control → overestimation of influence over outcomes	May reinforce cognitive distortions and increase transition risk to real-money gambling	<i>Zynga Poker</i> simulates casino gambling with perceived player skill
Sweepstakes casinos (chance-based rewards with real-world value)	Intermittent reinforcement; monetary incentive salience → heightened reward sensitivity	May contribute to the development of reward sensitivity toward gambling-related cues among non-gamblers	<i>Chumba Casino</i> offers rewards convertible into real-world prizes
Skin gambling/wagering (betting using in-game items)	Intermittent reinforcement; real-world value attachment → risk-reward loop	May facilitate high-risk financial behaviors and impulsive wagering	<i>Counter-Strike 2</i> skins are used as stakes in third-party gambling
Cryptogames/play-to-earn (blockchain-based reward monetization systems)	Intermittent reinforcement; speculative motivation; loss aversion → volatility-driven engagement	May expose users to financial volatility, emotional dysregulation, and compulsive engagement	<i>Axie Infinity</i> rewards players with tradable crypto assets
User-created gambling (player-designed chance-based systems)	Intermittent reinforcement; social normalization → normalization of chance-based systems	May increase exposure to unregulated gambling-like mechanics, particularly among minors	<i>Roblox</i> enables player-created chance-based systems
iv. In-game advertising			
Static (non-interactive embedded advertisements)	Mere exposure effect → implicit attitude formation	May subtly condition brand preferences through passive, low-awareness and exposure	<i>NBA 2K</i> features real-world brand advertisements (e.g., Gatorade) in-game
Interruptive (ads disrupting gameplay flow)	Forced attention; cognitive fatigue → attentional disruption	May increase frustration and disrupt immersion through unwanted or forced ad exposure	<i>Angry Birds 2</i> includes frequent unskippable ads
Incentivized (ads rewarded with in-game benefits)	Operant conditioning; reward-based reinforcement → habitual ad engagement	May condition repeated ad engagement, increasing exposure and monetization through reward-driven viewing	<i>Subway Surfers</i> rewards players with in-game bonuses for watching ads
Deceptive (ads misrepresenting gameplay/content)	Expectation manipulation; misrepresentation → violated expectations	May increase acquisition and engagement under false expectations, reducing informed decision-making and trust	<i>Royal Match</i> ads misrepresent gameplay to drive installs and ad revenue
Adaptive (personalized ads based on user data)	Behavioral profiling; personalization → targeted engagement optimization	May increase susceptibility to persuasive influence by optimizing ad exposure and monetization based on player data, raising privacy concerns	<i>Call of Duty: Mobile</i> personalizes in-game ads based on player behavior

DLC, which provides additional missions, storylines, or characters sold separately from the main game, represents a common mechanism for extending both content and revenue over time (Sim, Chung, & Park, 2025). Compared to microtransactions, DLC is generally perceived as less controversial, as it is more often associated with single-player or non-competitive content. However, concerns arise when content appears to be withheld from the base game or when additional purchases affect progression or balance. For example, *Pokémon Legends: Z-A* (2025) is priced at USD 60–70, with key features requiring a Nintendo Switch Online subscription and additional DLC announced at launch, raising the total cost for full access to approximately USD 110–120. Such pricing structures may shape players’

expectations and decision-making by fragmenting costs across multiple transactions, potentially reducing price transparency and increasing cumulative spending over time (Genovesi, 2018).

Subscription-based models represent a parallel extension of traditional monetization, shifting payment from one-time purchases to ongoing access fees. Services such as Nintendo Switch Online, PlayStation Plus, and Xbox Game Pass, originally introduced to support online functionality, now provide access to large game libraries and additional content for a recurring fee. These systems reinforce sustained engagement by linking continued access to ongoing payment. Subscription models gained prominence with Massively Multiplayer Online Role-Playing Games

(MMORPGs) such as *World of Warcraft* (2004), which offered persistent online worlds, regular updates, and community features (Fuster, Chamarro, Carbonell, & Vallerand, 2014). By normalizing recurring payment structures, subscriptions contribute to the broader transition toward games-as-a-service models (Dubois & Weststar, 2022; Husain et al., 2022).

Microtransactions

Microtransactions are purchases embedded within ongoing gameplay systems, originally conceptualized as small, recurring payments relative to the cost of a full game (Gibson et al., 2025). Although the term initially referred to low-cost transactions, contemporary implementations can involve substantially higher expenditures. For example, the “Hall of Legends” skins in *League of Legends* (2009) were effectively priced at approximately USD 500 through a tiered, limited-time bundle system requiring players to purchase multiple bundled items to access the highest-tier cosmetic rewards. Early examples of microtransactions date back nearly two decades, including the USD 2.50 “horse armor” cosmetic in *The Elder Scrolls IV: Oblivion* (2006). Since the early 2010s, microtransactions have become the primary monetization mechanism across the largest segments of the gaming industry, particularly in mobile and free-to-play markets (Hamari, Hanner, & Koivisto, 2020).

Microtransaction systems rely on a range of structural features designed to influence player decision-making and spending behavior. These practices frequently involve premium virtual currencies that obscure real-world costs and distort cost perception, alongside item bundles—packages combining multiple virtual goods—that can misrepresent value by inflating perceived savings relative to the cumulative price of individual items, as well as multiple in-game currencies with shifting exchange rates (Denoo, Dupont, Zaman, Grosemans, & Malliet, 2023; Guo et al., 2019a). Such design elements may alter cost perception and purchasing behavior, contributing to ongoing regulatory concerns regarding transparency and consumer protection (Bureau Européen des Unions de Consommateurs, 2024; Consumer Financial Protection Bureau, 2024; European Commission, 2025). Recent work has also developed measures of video game structural features that capture how these systems structure engagement and spending behavior (Carmona, Carbonell, Bonilla, Ivern, & Chamarro, 2025).

A central distinction within microtransactions concerns their relationship to gameplay outcomes and monetization pathways. In competitive multiplayer contexts, monetization may take the form of pay-to-win systems, which provide gameplay advantages such as improved equipment or performance enhancements. These systems may influence perceived fairness and player motivation, potentially affecting engagement among non-paying users while incentivizing spending to remain competitive (King & Delfabbro, 2019; Lelonek-Kuleta, Bartczuk, & Wiechetek, 2021; Steinmetz, Fiedler, Von Meduna, & Ante, 2021). In contrast, cosmetic monetization focuses on non-functional

items, such as skins, emotes, and avatars, which emphasize self-expression and social signaling without altering gameplay balance. This model has become particularly prominent in Multiplayer Online Battle Arenas (MOBAs) such as *League of Legends* and *DOTA 2* (2013), and is often perceived as preserving competitive fairness while supporting revenue generation (Dreier et al., 2017; Jarrett, 2021; Koles, Nagy, & Vollet, 2025; Marder et al., 2019; Syahrivar, Chairy, Juwono, & Gyulavári, 2022).

Alongside these models, additional monetization features have been developed to shape progression and engagement. Pay-to-skip and pay-to-accelerate systems, first popularized in social network games such as *FarmVille* (2009), allow players to bypass delays or reduce progression time through payment (Burroughs, 2014). Although progression without payment remains possible, enforced waiting periods and repetitive gameplay loops may increase the likelihood of spending to reduce friction (Keogh & Richardson, 2018; Lundy, Raman, Fu, & Leyton-Brown, 2024; Ravoniarison & Benito, 2019). Early stages of gameplay are often characterized by frequent rewards, which may decrease over time as progression slows, potentially shaping expectations and incentivizing spending (Greenfield, 2018).

Related mechanisms are present in systems offering extra moves or additional chances, commonly implemented through “lives” or “energy” mechanics. These features enable continued play following failure and are often monetized by offering paid retries or continuation options, frequently associated with near-miss effects that increase persistence and spending (Gray, Kou, Battles, Hoggatt, & Toombs, 2018; Larche et al., 2017; Sheng, Zhao, & Thomas Ryan, 2025). Similarly, systems that penalize inactivity or reward consistent engagement, such as daily login bonuses or streak-based incentives, may reinforce habitual play patterns while integrating monetized features that protect or restore progress (Frommel & Mandryk, 2022; Norwegian Consumer Council, 2024).

One of the most prominent developments in engagement-driven monetization is the battle pass (or season pass), which combines progression systems with time-limited rewards tied to paid access. Popularized by *Fortnite* (2017), this model structures rewards across tiers linked to ongoing participation and short-term objectives (Fernandez de Henestrosa, Billieux, & Melzer, 2023; Gibson, Griffiths, Calado, & Harris, 2023; Joseph, 2021; Ohno, 2022). Battle passes are frequently tied to seasonal events, introducing temporal scarcity through limited availability (Gibson et al., 2022; Hodge et al., 2022; Neely, 2021; Whittaker, Russell-Bennett, & Mulcahy, 2021). These systems may engage motivational processes such as fear of missing out (FoMO) and sunk-cost dynamics, particularly when rewards are contingent on sustained participation and positioned toward later stages of progression, thereby reinforcing both engagement and spending (Kawamura, Koyama, Mori, Motonishi, & Ogawa, 2023; Li, L. et al., 2020; Zanesco, French, & Lajeunesse, 2021a).

Gamblification

Gamblification in video games refers to the integration of gambling-like elements into monetization systems, game structures, reward systems, and in-game economies, often without the safeguards typically associated with regulated gambling. Although chance-based mechanics are not unique to gambling and are widely present across games, their integration with monetization systems and perceived value can produce experiences that closely resemble gambling processes (Macey & Hamari, 2022). Central to gamblification are randomized reward systems powered by random number generators (RNGs), which reproduce core gambling characteristics such as uncertainty, anticipation, and variable-ratio reinforcement, thereby shaping engagement and spending behavior.

The most well-known gambling-like system is the loot box—a virtual item such as a chest or envelope that provides randomized in-game rewards, including equipment, characters, or cosmetics, and may require an additional mechanism (e.g., a key or currency) to access it (Montiel, Basterra-Gonzalez, Machimbarrena, Ortega-Baron, & Gonzalez-Cabrera, 2022; Zendle, Meyer, Cairns, Waters, & Ballou, 2020b). Loot boxes may function as direct purchases or as rewards obtained through gameplay but are typically embedded within monetization systems that encourage repeated spending. Variants include gacha systems, which employ “pull” mechanics inspired by physical capsule toy machines. These systems are often accompanied by audiovisual cues and animations that transform reward acquisition into a salient and engaging event, extending the experience beyond the outcome itself and reinforcing repeated monetized interaction (Brady & Prentice, 2021; Larche, Chini, Lee, Dixon, & Fernandes, 2021).

These mechanics are frequently embedded within broader progression and monetization systems, enabling their integration across genres and platforms (Carmona et al., 2025; Marder et al., 2019). They are often combined with features that regulate progression and can be bypassed through payment (Ballou, Gbadamosi, & Zendle, 2022; Keogh & Richardson, 2018), or integrated into systems such as battle passes, where structured progression may incorporate elements of uncertainty alongside paid access (Hartanto & Kasturiratna, 2024; Joseph, 2021).

The release of *Star Wars: Battlefront II* (2017), which tied character progression to randomized, monetized rewards, intensified public and academic debate on these systems (Johnson & Brock, 2020; McCaffrey, 2022). Empirical research has associated loot box engagement with gambling-related behaviors, including problem gambling, problematic gaming, excessive spending, and psychological distress (Brooks & Clark, 2023; Drummond, Hall, & Sauer, 2022; González-Cabrera et al., 2023; Irie, Shinkawa, Tanaka, & Yokomitsu, 2023; Wardle & Zendle, 2021). A substantial proportion of players also perceive loot boxes as comparable to gambling activities (Brooks & Clark, 2019; Hing et al., 2022b; Hodge et al., 2022; Spicer et al., 2022).

Beyond loot boxes, gamblification encompasses additional forms of gambling-like monetization. These include embedded casino-style mechanics in non-casino games that replicate gambling environments through realistic audiovisual design and game structures (King, Delfabbro, Derevensky, & Griffiths, 2012). Although often limited to optional or single-player contexts, these systems reproduce key features of gambling experiences and may serve as complements to engagement or monetization. Similar mechanics have appeared in features such as *RuneScape*’s “Squeal of Fortune” (2012–2014) and continue to be integrated into contemporary titles (Griffiths & King, 2015). Such elements may be less explicitly monetized but still contribute to the normalization of gambling-like processes (Sato, Brückner, Kurabayashi, & Waragai, 2020; Tham & Perreault, 2021).

Social casino games embody these principles more directly, simulating real-world gambling environments through immersive audiovisual design and reinforcement structures. Operating within free-to-play models, these systems allow players to purchase virtual credits without offering monetary payouts (Kim et al., 2023; Ross & Nieborg, 2021). Despite the absence of direct financial return, spending on virtual credits can still generate substantial revenue and lead to financial harm, particularly when free resources are limited and replenishment is monetized (Kim, Hollingshead, & Wohl, 2017; King, Russell, Gainsbury, Delfabbro, & Hing, 2016). Research indicates that individuals with higher levels of gambling-related vulnerability engage more frequently and spend more in these environments, and that participation may be associated with subsequent engagement in real-money gambling (Gainsbury, Russell, King, Delfabbro, & Hing, 2016; Kim, Rockloff, McGrath, Wohl, & Hodgins, 2019, 2022; Macey & Kinnunen, 2020).

Building on these systems, sweepstakes casinos introduce real-world rewards through dual-currency structures. These platforms typically use one currency for gameplay and another that can be exchanged for prizes such as cash or gift cards. Although designed to operate within promotional gaming regulations, the combination of reinforcement processes, monetized currency systems, and real-world incentives may be associated with increased risk-taking and spending behavior (Gainsbury, King, Russell, Delfabbro, & Hing, 2017; Li, W. et al., 2020).

Recent developments in digital economies have further expanded gamblification through mechanisms such as skin gambling, in-game wagering, and blockchain-based systems (Zhang & Bi, 2024). Skin gambling assigns real-world value to virtual items, allowing them to be used as stakes in betting on esports events, games of chance, or gameplay outcomes (Greer, Rockloff, Browne, Hing, & King, 2019; Hing et al., 2022a). Originating in ecosystems such as *Counter-Strike* (2012), these practices have been facilitated by trading infrastructures and continue to operate across both official and third-party platforms despite regulatory efforts (Martinelli, 2017; Minnesota Alliance on Problem Gambling, 2021; Thorhauge & Nielsen, 2021; Zanesco, Lajeunesse, & French,

2021b). Similar dynamics are present in in-game systems such as player auctions or wagering tokens, which introduce monetized risk–reward structures within virtual economies (Kelling & Tham, 2021; Lemmens, 2022; Zanesco et al., 2021a).

The integration of blockchain technologies has enabled the emergence of cryptogames, which incorporate ownership, scarcity, and value through non-fungible tokens (NFTs) and decentralized economies (Delic & Delfabbro, 2024; Egliston & Carter, 2024; Nadini et al., 2021; Serada, Sihvonen, & Harviainen, 2021). These systems often adopt play-to-earn models that emphasize financial incentives and encourage speculative behaviors such as asset trading and market monitoring (Ahsan & Gupta, 2024; Delfabbro, Delic, & King, 2022). In such contexts, gameplay becomes intertwined with financial decision-making, particularly in environments characterized by market volatility and monetized asset exchange (Lee & Park, 2023; Vidal-Tomás, 2022). Within these systems, for many players—especially in low-income contexts—the promise of income may increase pressure to remain active, often under unstable or potentially exploitative conditions (Howson & De Vries, 2022).

Variants such as virtual real estate speculation on platforms such as *Decentraland* (2020), as well as models such as move-to-earn or tap-to-earn, extend these dynamics by linking gameplay to financial outcomes or behavioral incentives (Akbari, Seydavi, Bouruki Milan, & Griffiths, 2025; Dowling, 2022; Yu, Liu, Ren, Zhou, & Liu, 2025). These systems may intensify engagement through mechanisms such as loss aversion, fear of missing out (FoMO), and sunk-cost dynamics, particularly when real-world financial stakes are involved (Chen, Doekemeijer, Noël, & Verbruggen, 2022; Meyer, Friederich, Matute, & Schwarz, 2024; Sood, Pathak, Jain, & Gupta, 2025).

Finally, user-generated environments such as *Roblox* (2006) and *Minecraft* (2009) illustrate how decentralized systems can reproduce gambling-like monetization mechanics. These platforms enable the creation of chance-based systems, including loot boxes, virtual casinos, and wagering games, often outside direct developer control (Bonales-Daimiel, Moreno-Albarracín, & García-Rivero, 2024; Kang, Lee, & Lee, 2024; Kou & Gui, 2023; Xiao et al., 2023). Since younger age groups represent a substantial proportion of users, such systems raise additional concerns regarding exposure, oversight, and regulatory enforcement (Statista, 2025).

In-game advertising

In-game advertising has evolved from static product placements, such as virtual billboards and advergames, into a widespread, interactive, and highly integrated monetization system, particularly in mobile and free-to-play games (Terlutter & Capella, 2013). Contemporary advertising models function both as complements to microtransactions and as primary revenue streams, generating income through player exposure while embedding commercial incentives directly into gameplay (Christino, Cardozo, & Martins, 2024; Sato et al., 2020).

Advertising formats can be differentiated based on their integration within gameplay and the mechanisms they engage. Static advertisements operate through repeated exposure, shaping implicit attitudes and preferences with minimal interaction (Terlutter & Capella, 2013). In contrast, interruptive formats, such as pop-ups and interstitials, impose forced attention that may disrupt the flow of gameplay and increase cognitive fatigue or frustration (Abbasi et al., 2021; Hussain et al., 2022). Incentivized advertising more directly links gameplay and monetization by rewarding ad viewing, engaging reinforcement processes that may encourage repeated exposure and interaction, in some cases resembling variable-reward structures (Abbasi et al., 2021; Guo, Zhao, Hao, & Liu, 2019b; Lundy et al., 2024). These mechanisms may be particularly salient among younger players, who may be more susceptible to persuasive design and less able to distinguish between gameplay and promotional content, a concern that is further amplified by deceptive advertisements that misrepresent gameplay (Mago, 2020; Martínez, 2019; Smith et al., 2020; Tham & Perreault, 2021).

Contemporary in-game advertising also increasingly relies on adaptive, data-driven personalization. These systems use behavioral and demographic information to tailor content and optimize engagement, introducing targeted persuasion mechanisms that may influence attention, decision-making, and exposure, raising concerns about autonomy, privacy, and user control (Christino et al., 2024; Gao & Liu, 2023; Kröger, Raschke, Percy Campbell, & Ullrich, 2023).

DISCUSSION

Building on this typology, monetization systems in video games can be understood as integrated design architectures in which structural features and embedded mechanisms interact to structure player behavior. Rather than operating as discrete elements, these systems are embedded within gameplay structures, progression systems, and interface design, influencing how players allocate attention, perceive value, and make spending decisions (Delfabbro et al., 2022; Gray et al., 2018). Structural elements such as premium currencies, seamless payment systems, and complex pricing models may alter cost perception and reduce transparency, making it more difficult to track cumulative spending and evaluate real-world value, particularly among minors and other vulnerable groups (Guo et al., 2019a; Nicklin et al., 2021). In parallel, behavioral profiling and personalization extend monetization beyond individual transactions by dynamically shaping engagement patterns, decision-making environments, and exposure to monetized content (Abbasi et al., 2021; Gao & Liu, 2023).

The findings indicate that monetization strategies are best understood as interacting systems that combine multiple psychological mechanisms. These mechanisms operate across three interacting levels: reinforcement processes, cognitive biases, and design-mediated features, which together structure player responses (King & Delfabbro, 2019;

Rehbein et al., 2024). These elements frequently co-occur within the same monetization system (Ballou et al., 2022; Zendle, Meyer, & Ballou, 2020a). For instance, battle passes combine time-limited rewards, progression structures, and prior investment, engaging both FoMO and sunk-cost dynamics (Joseph, 2021; Zanesco et al., 2021a), while virtual currencies obscure price and facilitate repeated transactions (Denoo et al., 2023). These configurations may produce stronger and more persistent effects than individual mechanisms alone, suggesting that risk emerges from the interaction and accumulation of design features rather than isolated elements (King et al., 2019; Petrovskaya & Zendle, 2022a). As illustrated in Table 1, similar psychological mechanisms recur across different monetization strategies, indicating that structurally distinct systems may produce comparable behavioral effects.

Within this framework, outcomes can be differentiated into three levels. First, some mechanisms primarily influence behavioral engagement, shaping time investment, habit formation, and persistence without necessarily implying harm (Gray et al., 2018; King & Delfabbro, 2019; Saini et al., 2024). Second, others may lead to consumer-related harms, including overspending, reduced price transparency, and impaired decision-making (Guo et al., 2019a; Petrovskaya & Zendle, 2022a; Norwegian Consumer Council, 2024). Third, in certain cases, these systems may contribute to clinical risk, including problematic gaming, gambling-related harm, or related behavioral addictions (Gibson et al., 2022; Kim et al., 2023; Montiel et al., 2022). This distinction helps avoid overgeneralization while acknowledging that specific configurations of monetization features may disproportionately affect vulnerable individuals.

The analysis further shows that gambling-like mechanics represent only one manifestation of a broader set of design strategies that rely on similar psychological processes (Johnson & Brock, 2020; Macey & Hamari, 2022). While loot boxes have received substantial regulatory and academic attention (McCaffrey, 2022; Spicer et al., 2022), comparable mechanisms are embedded in non-randomized systems such as pay-to-skip models, battle passes, cosmetic economies, and in-game advertising (Joseph, 2021; Lundy et al., 2024; Marder et al., 2019). These systems employ reinforcement schedules, temporal constraints, and persuasive design techniques to shape engagement and spending (Hadan, Sgandurra, Zhang-Kennedy, & Nacke, 2024; King et al., 2019), often operating outside regulatory frameworks that have primarily targeted chance-based monetization (European Commission, 2025). This suggests that a narrow focus on loot boxes may overlook structurally similar systems that produce comparable behavioral effects.

These findings support a shift from individual-level explanations of problematic engagement toward system-level analyses that foreground monetization design as a determinant of player behavior. This perspective aligns with emerging regulatory approaches that emphasize transparency, fairness, and “safety-by-design” principles (European Commission, 2026; *K.G.M. v. Meta Platforms, Inc.*, 2026). In this context, the proposed typology provides a

structured basis for identifying and evaluating monetization mechanisms as components of broader interactive systems. Such an approach may support more comprehensive regulatory frameworks that address underlying design practices rather than targeting specific implementations.

Although the mechanisms examined are discussed within video games, similar dynamics are increasingly observed across digital consumer environments. Systems such as blind boxes, collectible card packs, and other randomized or engagement-driven products share structural and psychological similarities with in-game monetization (Mattinen, Macey, & Hamari, 2023; Xiao, 2022). However, video games provide a particularly concentrated context in which these mechanisms are systematically integrated into progression systems, feedback loops, and user interaction, potentially intensifying their behavioral and economic effects (Zendle, Walasek, Cairns, Meyer, & Drummond, 2021).

Several limitations should be considered when interpreting these findings. The proposed typology is based on a theory-informed synthesis of interdisciplinary literature rather than a systematic review and therefore does not aim to provide exhaustive coverage of all monetization practices or empirical studies. In addition, the framework operates at a structural and conceptual level, which may not fully capture variations in implementation across video game genres, platforms, and player populations. Finally, while the framework identifies psychological mechanisms associated with monetization systems, it does not establish causal relationships with specific behavioral or clinical outcomes, which are likely shaped by multiple moderating factors, including individual differences and contextual influences.

Future research may further examine how monetization systems interact with individual differences to influence spending behavior, well-being, impulse control, and perceptions of fairness. In particular, empirical studies may clarify how different configurations of design features contribute to distinct outcome patterns and under which conditions these systems may lead to maladaptive or harmful use. Such work may also inform the development of more precise regulatory approaches and prevention strategies grounded in system-level analysis.

By systematizing these mechanisms, the present framework contributes to identifying vulnerability markers associated with problematic engagement. Rather than attributing risk solely to individual differences, this approach emphasizes the interaction between player characteristics and structured monetization environments. This perspective may inform clinical interpretation, prevention strategies, and digital literacy initiatives, supporting more nuanced understandings of how monetization design shapes behavior, well-being, and decision-making.

CONCLUSION

The increasing integration of monetization systems into gameplay has reshaped how players engage with digital environments, embedding commercial logics within

structures that guide behavior and decision-making. While research has largely focused on loot boxes, similar psychological mechanisms operate across a wider range of monetization strategies, including battle passes, cosmetic economies, and in-game advertising.

By organizing these strategies into a structured typology, the present framework provides a basis for examining monetization systems as design features shaped by interacting psychological mechanisms. This perspective highlights the importance of understanding how combinations of design elements structure engagement and spending, rather than focusing on isolated features.

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APPENDIX

Glossary of Psychological Mechanisms in Monetization Systems

- **Anchoring:** A cognitive bias in which initial price or value information disproportionately influences subsequent judgments and decisions.
- **Arousal conditioning:** The process by which repeated pairing of stimuli (e.g., audiovisual cues) with rewards elicits conditioned physiological and emotional responses.
- **Behavioral profiling:** The collection and analysis of user data to infer preferences, traits, or likely behaviors for targeted interventions.
- **Cognitive fatigue:** A state of reduced attentional capacity resulting from sustained or forced cognitive effort.
- **Endowment effect:** A cognitive bias whereby ownership, or perceived ownership, increases the subjective value of an item.
- **Fear of missing out (FoMO):** A motivational state characterized by concern about missing time-limited opportunities, often driving urgency and continued engagement.
- **Illusion of control:** A cognitive bias involving the overestimation of one's ability to influence outcomes determined largely by chance.
- **Intermittent reinforcement:** A reinforcement schedule in which rewards are delivered inconsistently, increasing behavioral persistence.
- **Loss aversion:** A cognitive bias in which potential losses are weighted more heavily than equivalent gains.
- **Mental accounting:** A cognitive bias affecting how individuals evaluate and track financial resources based on contextual factors rather than objective value.
- **Mere exposure effect:** A psychological phenomenon in which repeated exposure to a stimulus increases familiarity and preference.
- **Monetary incentive salience:** The heightened motivational value attributed to rewards perceived as having real-world financial significance.
- **Near-miss effects:** Outcomes that closely resemble a win but result in failure, increasing persistence despite losses.
- **Operant conditioning:** A learning process in which behavior is shaped by reinforcement or punishment.

- *Price obfuscation*: A design strategy that reduces the transparency of real-world costs, often through virtual currencies or complex pricing structures.
- *Sunk-cost bias*: The tendency to continue investing in a behavior or decision due to prior investments of time, effort, or money.
- *Time-gating*: A design strategy that imposes delays or waiting periods on progression, often monetized through paid acceleration.
- *Variable-ratio reinforcement*: A subtype of intermittent reinforcement in which rewards are provided after an unpredictable number of responses, typically producing high and persistent response rates.