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Loot Boxes: Gambling-Like Mechanics in Video Games



structural and psychological similarities with gambling.

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Synonyms

[Blind bags](#); [Blind boxes](#); [Booster packs](#); [Gachas](#); [Gatchas](#); [Loot crates](#); [Prize crates](#); [Random reward mechanisms](#); [Randomized monetization methods](#); [Surprise mechanics](#); [Virtual Gashapons](#)

Definition

Loot boxes are mechanics often found in video games that provide the player with randomized virtual rewards. Some loot boxes can be paid for with real-world money and therefore share

Introduction

“Loot boxes” is a colloquial catch-all terminology used to describe software features, typically found in video games, that provide the player with randomized virtual rewards (Drummond and Sauer 2018). The player must satisfy an “eligibility condition” to engage with (or “open”) the loot box: This could be by defeating a certain in-game enemy, by obtaining a certain virtual item, by watching embedded commercials, or (more importantly) through purchasing using fiat currency (or real-world money) (Nielsen and Grabarczyk 2019). Once the player engages with the loot box, a “random procedure,” of potentially varying degrees of complexity (Ballou et al. 2020), is used to determine what virtual rewards the player will obtain. The virtual “rewards” that the player obtains may be merely cosmetic items that, e.g., change the color of the player’s armor, or may, alternatively, influence gameplay more significantly by, e.g., unlocking additional game content or increasing the player’s in-game power (Xiao 2021). These “rewards” may be transferable (or “sold”) to other players, in exchange for real-world money (Drummond et al. 2020b), or may be restricted by the video game company for use only inside the in-game economy by the original player who engaged with the loot box (Xiao 2020a). The

Loot Boxes: Gambling-Like Mechanics in Video Games, Table 1 Four categories of loot boxes proposed by Nielsen and Grabarczyk (2019)

Category	Description	Regulatory positions
Embedded-Embedded	Costs real-world money to engage, and its reward does have real-world value	Regulated as gambling in Belgium (Belgische Kansspelcommissie [Belgian Gaming Commission] 2018), the Netherlands (Kansspelautoriteit [The Netherlands Gambling Authority] 2018), the UK (UK Gambling Commission 2017), and most other countries that regulate gambling as a licensable activity Banned as gambling in most countries that more heavily prohibit gambling
Embedded-Isolated	Costs real-world money to engage, but its reward does not have real-world value	Regulated as gambling in Belgium (Belgische Kansspelcommissie [Belgian Gaming Commission] 2018) Unregulated in most other countries
Isolated-Embedded	Does not cost real-world money to engage, but its reward does have real-world value	Unregulated in most countries
Isolated-Isolated	Does not cost real-world money to engage, and its reward does not have real-world value	Unregulated in most countries

act of engaging with a loot box may be represented in-game as the player literally opening a box containing loot; however, the loot box mechanic can also be visually represented in other forms, e.g., as tearing open a card pack, spinning a prize wheel, or receiving a capsule from a “gacha” vending machine. Regardless of their visual representation, all loot boxes share the structural characteristics of being triggered by satisfying an “eligibility condition,” involve a “random procedure,” and provide “rewards,” as described above.

Nielsen and Grabarczyk (2019) proposed a framework for classifying various implementations of loot boxes into four categories which focuses on whether the “eligibility condition” requires spending real-world money to satisfy, and whether the “rewards” can be transferred to other players in exchange for legal tender, and therefore possesses real-world value, as shown in Table 1.

Paid Loot Boxes in Context

Loot boxes that players have to purchase with real-world money to engage with are implemented by companies as monetization methods in video games, known as

“microtransactions,” which represent an alternative, or complementary, business model to selling copies of the software or providing subscription-based services (Petrovskaya and Zendle 2020). Analysis of loot box-spending data has revealed that the loot boxes of one single game (*Counter-Strike: Global Offensive*) generated US\$528,000 in 1 day in one country alone, thus hinting at the immense size of the global loot box market (Zendle et al. 2020b).

In terms of the historical context and development of loot boxes, it has been suggested that using loot boxes to monetize video games was inspired by how collectible sports cards and fantasy trading cards (e.g., *Magic: The Gathering*) are sold in blind, randomized packs in order to encourage players to buy more packs and increase revenue (Nielsen and Grabarczyk 2019; Švelch 2020; Xiao 2021). These randomized packs were designed to contain rare cards, known as “chase cards,” that were less likely to be included in packs than other cards and were therefore more sought-after and monetarily valuable. The consumer was thereby encouraged to purchase more packs in order to obtain such rare “chase cards,” but they would more often only obtain less valuable, duplicate cards that they already possessed when they try to “chase” rare cards.

Loot boxes are implemented in highly popular home console games, e.g., the Ultimate Team Packs in Electronic Art's *FIFA* games (Electronic Arts 2019). Presently, loot boxes are prevalent in video games, particularly on mobile platforms, e.g., Android and iOS: In 2019, 59% of the highest-grossing iPhone games in the UK contained loot boxes, while 36% of the 50 Highest grossing PC games on Steam contained loot boxes (Zendle et al. 2020a). Compared to in the UK, which represents the Western video game market, loot boxes are significantly more prevalent in China: In 2020, 91% of the 100 highest-grossing iPhone games contained loot boxes (Xiao et al. 2021b). This reflects that video game markets in different countries may implement loot boxes to different degrees. Video games containing loot boxes are also generally given low age ratings: 95% of the highest-grossing iPhone games containing loot boxes were deemed suitable for children aged 12+ (Zendle et al. 2020a). This suggests that children are regularly exposed to loot boxes and can readily purchase them. The UK Gambling Commission's survey (2019) found that 23% of 11- to 16-year-olds reported paying real-world money for loot boxes.

Potential Harms: Links with Problem Gambling

Paid loot boxes, because of the fact that players spend real-world money to engage with them and because of their randomized nature, are structurally and psychologically similar to gambling (Drummond and Sauer 2018). This encompasses Embedded-Embedded and Embedded-Isolated loot boxes under Nielsen and Grabarczyk's categorization (2019). Further, loot box purchasing has been found to be positively correlated with problem gambling severity in more than a dozen empirical studies in Western countries (Garea et al. 2021), e.g., the USA (Zendle and Cairns 2019), Australasia (Drummond et al. 2020a), Denmark (Kristiansen and Severin 2019), and Germany (von Meduna et al. 2020). Players with higher problem gambling severity tend to spend more money purchasing loot boxes (Zendle and

Cairns 2018). In Western countries, loot box spending appears to be more strongly correlated with relatively "gamified" gambling games, e.g., online slot machines, and not correlated with more traditional gambling formats, e.g., playing bingo or the lottery in person (Zendle 2020). The relationship between loot boxes and gambling may be weaker in non-Western countries where gambling is more heavily prohibited, rather than regulated as a licensable activity, e.g., China, where lottery products represent the only legally available commercial gambling opportunity (Xiao et al. 2021a). Cultural differences and legal differences in gambling product availability may affect the relationship between loot boxes and gambling and remain a direction for future research.

Further, as in gambling contexts (Deng et al. 2021; Muggleton et al. 2021), the vast majority of loot box revenue is generated by a small minority of players spending significant amounts of money (Zendle et al. 2020b). This small minority of players have been identified as generally being players with problem gambling issues, rather than players with high personal incomes, thus suggesting that video game companies may be disproportionately profiting from potentially vulnerable consumers (Close et al. 2021). Researchers have also suggested that cognitive biases that are present in gambling contexts, e.g., the gambler's fallacy and loss chasing, which lead to maladaptive gambling, may also apply to loot box purchasing behavior and lead to maladaptive loot box overspending (King and Delfabbro 2018; Nielsen and Grabarczyk 2019; Xiao 2021). Finally, it has yet to be determined whether engagement with loot boxes in childhood affects a person's risk of developing gambling problems later in life.

Regulation by Law and Industry Self-Regulation

Paid loot boxes have been the subject of regulatory scrutiny by gambling regulators and policymakers in many countries because of their similarities with gambling and because of the link between loot box purchasing and problem

gambling severity (Cerulli-Harms et al. 2020). In particular, concerns about children engaging with loot boxes have been raised because they may be more susceptible to overspending money and more in need of consumer protection measures (Wardle and Zendle 2021; Zendle et al. 2019). Different jurisdictions are regulating the various categories of loot boxes to varying extents (Xiao 2021), as shown in Table 1. Applying existing gambling law has been how loot boxes have become regulated in nearly all countries: Various countries diverge as to which of the two categories of paid loot boxes (i.e., Embedded-Embedded and Embedded-Isolated loot boxes as defined by Nielsen and Grabarczyk) constitutes gambling and is therefore regulated: Nearly all countries agree that Embedded-Embedded loot boxes constitute gambling, but only a small minority of countries (e.g., Belgium) have taken the position that Embedded-Isolated loot boxes also constitute gambling. It is rather paradoxical that randomized physical sports and trading card packs, which arguably inspired loot boxes, are generally not considered to be a form of gambling and have thereby evaded regulatory scrutiny. Such physical packs legally constitute gambling in most countries because: They are bought with real-world money; their content is randomized; and the content has real-world monetary value because it can be sold to other people. Future research should consider why such physical Embedded-Embedded loot boxes are not considered to be gambling (Zendle et al. 2021).

The simplest regulatory solution is to ban the sale of loot boxes. This has effectively been done in Belgium where all paid loot boxes have been determined to be gambling and where no gambling licenses have been granted to video game companies for the sale of loot boxes (Belgische Kansspelcommissie [Belgian Gaming Commission] 2018). This prevents Belgian players from purchasing loot boxes and thus shields them from potential harms. However, this ban in Belgium has led to the removal of many video games that rely on loot boxes to generate revenue and which can no longer be profitably operated in that country (Xiao 2021). A blanket ban does not offer players freedom to play the video games they

want or to engage with loot boxes and negatively affects video game companies' commercial interests. Conversely, nonregulation would continue to expose players, including vulnerable consumers, to potential loot box harms, and is arguably inadequate and unsatisfactory because of the precautionary principle of public health (Digital, Culture, Media and Sport Committee of the House of Commons (UK) 2019), which states that the lack of scientific certainty cannot justify regulatory inaction in a situation of high potential risk. Middle ground approaches that lie between a blanket ban and nonregulation have also been proposed and adopted in certain countries, e.g., restricting loot box purchasing only when a player attempts to go above a certain maximum spending limit (Drummond et al. 2019; Xiao 2020b, 2021).

Other consumer protection measures, which have been applied in gambling contexts (Livingstone et al. 2019), have also been identified as being potentially applicable to loot boxes (King and Delfabbro 2019; Xiao and Henderson 2021). The most prominent nonrestrictive regulatory measure is the disclosure of "winning" probabilities, which reveals how likely a player is to obtain a particular reward, as implemented in *Mario Kart Tour* (2019). This would require video game companies to reveal and publish the exact probabilities of obtaining each randomized loot box reward. The video game industry has increasingly imposed this requirement as self-regulation, e.g., by Apple (Kuchera 2017), Google (Gach 2019), and the major hardware providers and game publishers (Entertainment Software Association (ESA) 2019). This measure has also been adopted as law in China (presently the only country to do so), which has led to widespread compliance; however, the prominence and accessibility of disclosure have been identified as being suboptimal (Xiao et al. 2021b). A survey of Chinese video game players found that 85% of loot box purchasers reported seeing probability disclosures (meaning that they have been reasonably widely seen by players); however, only 19% of this group reported spending less money on loot boxes as a result of seeing the disclosures (Xiao et al. 2021a). This suggests that loot box probability disclosures may be of limited

effectiveness at reducing loot box spending even if they are accessibly and prominently displayed such that all players can see them (Xiao and Newall 2021). The video game industry has been widely supportive of loot box probability disclosure as an industry self-regulatory measure aimed at ensuring consumer protection (Entertainment Software Association (ESA) 2019), but whether self-regulation is effective remains to be assessed by future research.

Loot boxes and gambling may share many structural similarities; however, they are dissimilar in at least one regard: how the company makes money. Gambling operators lose money when the player wins money, which is why gambling operators must ensure that the gambling games are designed such that the operator is more likely than the player to win. In contrast, a video game company does not directly lose money when the player wins a reward, valuable or otherwise, as it does not directly cost money to give players these virtual rewards. However, it should also be noted that a video game company would face an indirect loss when a player wins a valuable reward (Xiao 2020c): A player may stop purchasing a loot box after receiving their desired reward, meaning that the video game company may stop making money from that player after the valuable reward is given out. In order to be sustainable, many loot box systems rely on frequent updates with new rewards, but each new reward costs money for the video game company to develop, meaning that companies would have to expend more costs to develop more new content if players are able to more easily obtain desirable rewards. Further, the value and desirability of a reward would decrease if all players managed to obtain it: It would no longer be a “rare” reward with which players could impress others. However, despite the potential for indirect loss, video game companies are still financially able to give out their most valuable rewards more frequently than traditional gambling operators. This means that loot box consumer protection methods do not have to be limited to what has been done in gambling contexts, and that loot box consumers could be additionally protected by novel features of ethical game design, e.g., allowing players to win

valuable rewards more often (King and Delfabbro 2019; Xiao and Henderson 2021; Xiao and Newall 2021).

Conclusion: Directions for Future Research

Loot boxes, and paid loot boxes in particular, represent a relatively novel mechanic in video games. Despite increasing research attention being paid to the issue, further research is required to fill in the existing knowledge gaps. Future correlational research between loot boxes and gambling should examine whether loot box purchasing is more strongly correlated with engagement with specific gambling products, rather than engagement with gambling in general. Existing research has largely utilized self-reported data: Transparent collaboration with the video game industry may provide more reliable data. Indeed, qualitative methods may assist in better understanding individual players’ experiences with loot boxes (Nicklin et al. 2021), and gauging players’ views as to the implementation and regulation of loot boxes (Petrovskaya and Zendle 2021): This is especially relevant for Embedded-Isolated loot boxes because, although this category represents the vast majority of paid loot boxes implemented in video games, these mechanics have no obvious counterparts in nondigital contexts, and therefore there is no translatable literature from other fields. Further, cross-cultural perspectives would clarify whether players in various countries are experiencing loot boxes differently. Additionally, neuroscience perspectives may shed light on how player’s cognition is affected when engaging with loot boxes: Such perspectives are prominent in research on gambling disorder; however, as of yet, they are missing from the loot box literature. Finally, the prevalence of serious problems with loot box spending has never been assessed, and it is not known whether such problems are caused by exposure to loot boxes or are instead symptoms of preexisting underlying issues. In conclusion, despite recent advances made by the literature,

loot boxes remain an area deserving of further research.

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