

Video Game Loot Boxes and Gambling

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Abstract

Recent research has found strong links between certain reward mechanisms found in many of the most popular video games and indications of problem gambling. These reward mechanisms, colloquially referred to as loot boxes, vary in specific details but all typically share the same principle of being a virtual item containing randomized items. While these items have existed in some form as loot systems in games released early as 2004, recent presentation of loot boxes in popular games has sparked many to bring into question the ethics and legality of these items. Arguments have been made that loot boxes can be interpreted as a form of gambling, especially in the case where the rewards can be cashed out for real world currency. This paper aims to evaluate the relevancy of loot boxes by giving a formal definition to loot boxes, reviewing previous studies linking loot boxes to gambling, and exploring legislation pertaining to the regulation of loot boxes.

1 Introduction

The phenomenon of loot boxes swept across the gaming community in late 2017, eventually finding its way into the mainstream media and national news [10]. The news coverage showcased this prominent mechanic of many video games that as whole generated an estimated \$30 billion in 2018, and is projected to surpass \$50 billion by 2022 [12]. Despite the vigorous growth of the video game industry due to loot boxes, most of the news coverage consisted of comparing loot boxes to gambling. Many referenced to the lack of regulation pertaining to loot boxes as well as the numerous studies concluding that loot boxes psychologically emulated gambling [2] as showed significant links with problem gambling [15]. Studies began to link loot boxes to motivations for adolescents to gamble [17], and eventually the issue of loot boxes made its way to the debate of nations globally. Some countries like Belgium and Nether-

lands outright banned the sale of loot boxes in gaming, while in the US multiple pieces of legislation have been proposed in efforts to regulate loot boxes [14] .

2 Loot Box Definition, Background, and Relevancy

To better understand the dynamic between loot boxes and gambling, we will first try to define what a loot box is. The term *loot box* is a general term and has been likened to the notion of opening trading card packs, or baseball cards. For the purposes of this paper we will restrict the definition of the loot box to the definition provided by Schwidessen and Karius:

Definition 1 "The term 'loot box', also known as 'loot crate' or 'prize crate' and other names, typically refers to a consumable virtual item which can be redeemed to receive a randomized selection of further virtual items, ranging from simple customization options for a player's game character, to game-changing equipment such as weapons, armor, virtual currency, additional skills and even completely new or exclusive characters... Loot boxes can be differentiated in two categories: Those dropping cosmetic items (the latter... often referred to as 'skins') and those generating items relevant for gameplay progress." [11]

We will also be referring to video game *micro-transactions* through the following definition:

Definition 2 "[A microtransaction] commonly refers to a business model... where users can purchase virtual goods via micropayments... Microtransactions (i.e. premium content) may include downloadable content such as story extensions (so called 'DLCs'), additional play time, levels, new maps, virtual currency, weapons, armor, characters or cosmetic items to customize the player's character or items. The player pays... either directly with real world currency or with some form of fantasy virtual currency (e.g. gold). The latter is typically earned during gameplay or can (often alternatively) be purchased with real world money." [11]

2.1 Loot Box Design

Loot boxes vary in design over many different video games, but most share a few key features:

- Presentation of a digital box, container, or pack with randomized contents.

- The chances of getting any certain item among the randomized content is fixed, leading to low chance rate item to be highly desired.
- Opening of the loot box is dramatized, i.e. an animation is played to delay the opening of the box to build anticipation similar to the spinning of a slot machine. This is to motivate future purchases, explained in Section 3.1.

Loot boxes can be obtained in different ways over different games, being obtainable through game progression (e.g. leveling-up), direct purchase, or sometimes both. Consumers typically pay real-life currency in exchange for loot boxes (or for virtual currency which is then traded for loot boxes) which are then opened. The contents are randomized, though the odds of getting any particular item in the box are often fixed. This makes room for categorization of the loot box contents in tier lists based on drop rate, typically amongst some structure of basic, rare, and unique tiered loot. Loot boxes also vary in the amount of items given in each opening, with some games like *Counter-Strike: Global Offensive* only giving one item per box opening, while other games like *Overwatch* give three. Games with loot boxes that offer multiple items typically have the caveat of containing at least one item of better quality to incentivize consumers to buy them [8]. Some games have options to recycle items for virtual currency to either buy more loot boxes, or directly purchase the desired item. This feature is intentionally not accessible in most games to make obtaining items more difficult and therefore encourage loot box purchases.

2.2 Loot Box History

The origins of Loot Boxes can be traced back to the early 2000's, with the emergence of a new genre of gaming known as **free-to-play** (F2P). These games were to available on the internet at no cost, but had provisions in-game which strongly motivated users to spend real-life currency to purchase in-game content [17]. This format of releasing games proved to be effective in raising profits, with the Chinese game *ZT Online* reporting in 2007 monthly revenues of over \$15 million USD [7]. Game developers realized that it was more profitable to release a free game riddled with micro-transactions (see **Def. 1**) and optional premium content rather than with releasing a full game set at a fixed price. Mobile developers followed shortly after, with Japanese based company GungHo releasing free mobile game *Puzzle & Dragons*, which in 2014 became the first mobile game to earn more than \$1 billion USD [4]. Non-F2P game developers soon joined in on adding additional purchasable content to their games, realizing they

could release paid title games that also include micro-transactions. One of the first notable instances of this is in 2016 when US-based company Blizzard released *Overwatch* at a base price of \$60 USD, but also included the option of purchasing loot boxes containing purely cosmetic items. This multi-layer payment system found major success globally, with Blizzard reporting \$1 billion USD in *Overwatch's* first year [12]. Eager to match *Overwatch's* success, other game developers began releasing paid titles with loot boxes. Some even added new loot box systems in their already existing games, such as with Riot Games's *League of Legends*, released in 2009 but offering loot boxes in 2016 [12]. To better understand why loot boxes so prevalent in gaming and appeal to consumers, we will discuss the psychology of loot boxes in Section 3.

2.3 Loot Box Controversy

Loot boxes have been adapted by different video game developers to best fit their own business models. However in 2017, EA Games would be known for releasing the title with the most controversial usage of loot boxes in the history of the video game industry. *Star Wars Battlefront 2* was released in late 2017, including a return of the popular feature of *star cards*, items that give players new abilities and skills. The controversy arose when these items were restricted to being exclusive loot box rewards, meaning you could no longer pay for these bonus items but rather pay for a chance at them [17]. Further complications with multiple in-game currencies would lead to the startling conclusion that you could pay for multiplayer advantages [17]. This essentially made the game "pay to win", meaning gameplay would cater to the portion of consumers willing to pay more. After public backlash and a hit to overall market value, EA games was resorted to temporarily disabling all microtransactions from the game all together [8]. Similar microtransaction strategies were utilized in 2K Sports' *NBA 2K18* and Monolith Production's *Middle-Earth: Shadow of War*, but both equally met with consumer backlash [8]. The infamy of loot boxes would lead to many to claim that loot boxes emulated gambling, and question the purpose of loot boxes in video games. We will explore some studies conducted on loot boxes in Section 4.

3 Psychology of Loot Boxes

The psychology behind loot boxes is designed to the appeal consumers. Marketing strategies used by video game publishers have the same goal: to sell as many loot boxes to consumers as possible. Fogg's

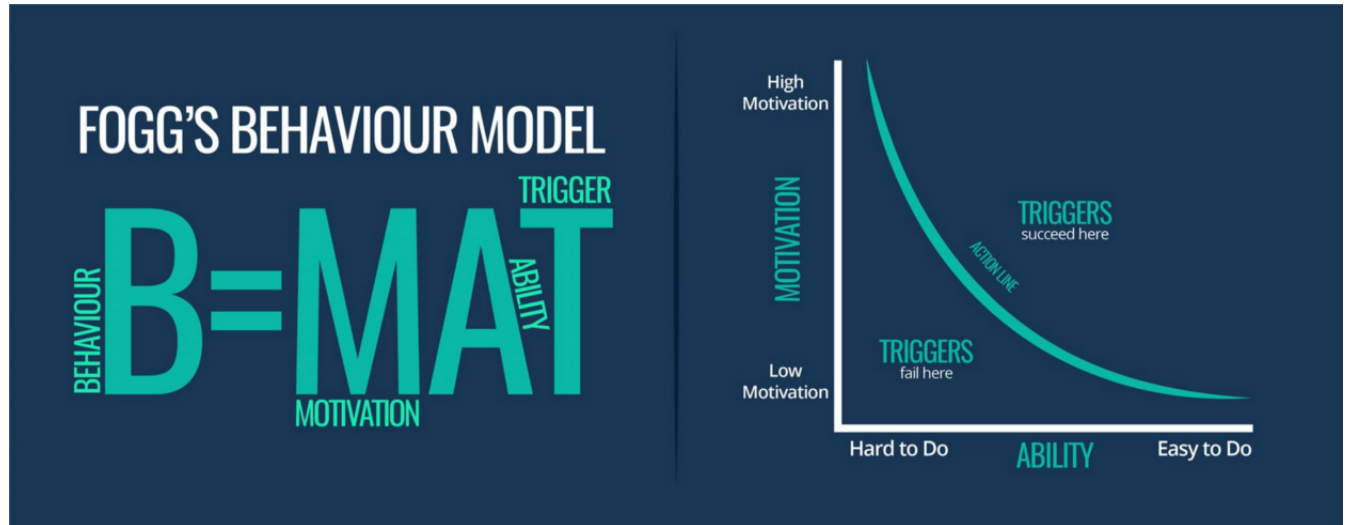


Figure 1: Fogg's behavior model as illustrated by Growth Engineering.

Behavior Model explains how consumers are typically motivated, while Eyal's Hooked Model and the *gamblers' fallacy* provide insight on why consumers return for more in the future.

3.1 Behavioral Design of Loot Boxes

The appeal of buying loot boxes lies in the marketing strategies of game publishers. To make the boxes enticing to consumers, various methods are employed to motivate purchases. These motivations are referred to as triggers [9], taking various forms such as advertisements on the internet or messages that show up on game loading screens. With these triggers, the transaction model for loot boxes are typically set up to be as simple and user-friendly as possible. This makes it easy for consumers to enter in payment information and receive their loot boxes in a promptly. This is described in Fogg's Behavior model, shown in Fig. 1. The equation states that a consumer's behavior B is a function of that consumer's motivation M , their ability in performing that behavior A , and whether a trigger is present T . If one of the variables is missing or lacking, users will fall below the theoretical action line, thus not performing the action [9]. In addition to this, Eyal's Hooked model shown in Fig. 2 describes how consumers end up returning to make future purchases. It is described in four steps:

1. Trigger: An internal/external trigger is exposed to consumers which grabs the interest or curiosity of consumers, e.g. advertisements.

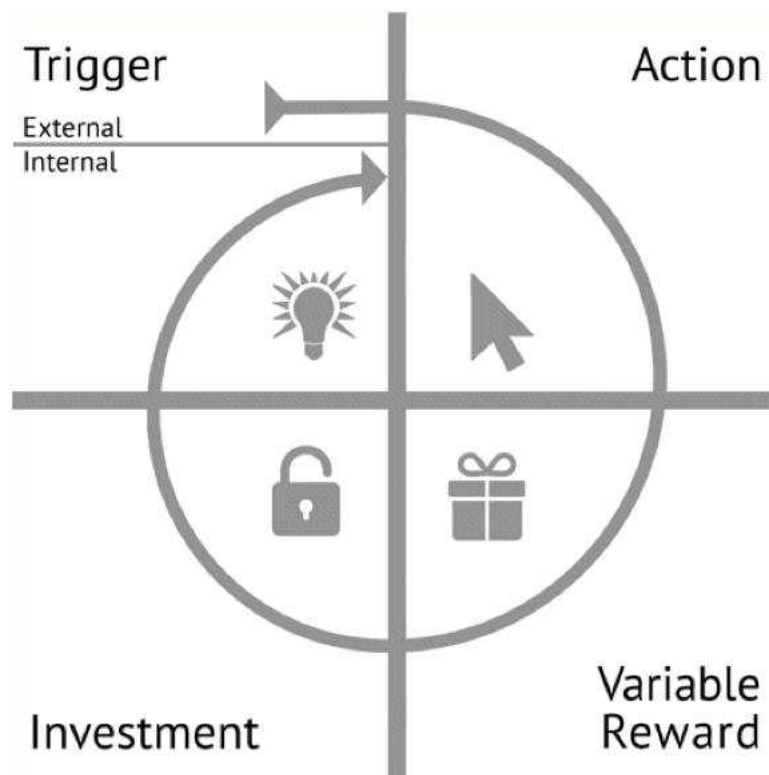


Figure 2: The Four Steps of the Hooked Model by Nir Eyal. [3]

2. Action: A means of action is offered to consumers to respond to the trigger, in this case purchasing loot boxes.
3. Variable Reward: Varying rewards are given out to the consumer, usually appealing the consumer's excitement by adding a delay before giving the reward, e.g. building anticipation with the spinning on a slot machine. This feeling of anticipation builds the foundation for the next stage.
4. Investment: Manipulation of the product to motivate consumers to use the product again.

Eyal's hooked model visualizes business design with the purpose of enticing consumers to buy into a product they typically would not necessarily feel the need to purchase, as well as motivate them to make repeat purchases in the future. In this sense, the ideal scenario for game developers is to have consumers fall into the hooked model and continue to purchase loot boxes. The repeated purchases of loot boxes can lead to addiction as a direct result of excessive spending in order to get a desired outcome, a condition akin to gambling addiction [15].

3.2 Gambler's Fallacy

In some instances, gamers that open loot boxes with the intent of getting specific desired items (i.e. *star cards* in Section 2.3) but fail to get them may feel inclined to continue to spend until that item is achieved. These gamers may be motivated by the fact that since the first few boxes don't have their desired item, surely the next few should contain it. This mistaken belief that if things happen more frequently than usual in a certain time period then it will happen less often in the future (or vice versa) is known as the Gambler's Fallacy (or Monte Carlo Fallacy) [6]. To better visualize this, we will use the example of consecutive coin tosses. The outcome of different tosses are independent, and the odds of getting heads is $\frac{1}{2}$. Getting two heads in two tosses would be $\frac{1}{4}$, three in three tosses would be $\frac{1}{8}$, and so on. In general, if A_i is the event where toss i of a fair coin results in heads, then :

$$Pr\left(\bigcap_{i=1}^n A_i\right) = \prod_{i=1}^n Pr(A_i) = \frac{1}{2^n}. \quad (1)$$

If after three tosses with all landing heads, another toss resulting in heads would be a run of four successive head tosses. The probability of flipping four heads in a row is $\frac{1}{16}$, which could form the mistaken belief that the next toss would end in tails instead of heads. The event of four successive head tosses has the exact same probability of the event of three successive head tosses followed by tails ($\frac{1}{16}$). A run of four successive head tosses is improbable at about 6%, but it is crucial to recognize that probability only applies before the first coin is tossed. The probabilities of three successive tosses are equal to 1, thus the outcome of the next toss is independent. The idea that the fourth toss is more likely to be tails due to an improbable run of heads epitomizes the gambler's fallacy, and perhaps explains how so many individuals end up spending so much money on loot boxes. When the spending parallels that of addiction, concerns of loot boxes being too similar to gambling are raised. We will discuss this in Section 4.

4 Loot Boxes and Gambling

With the excessive usage of loot boxes in video games along with instances of questionable designs, claims were made that the practice of using loot boxes was too similar to gambling [10]. As a result, many reviews and studies were done to study the ethics behind loot boxes. This section will compare loot boxes and gambling as defined by Griffiths' five characteristics of gambling [2], as well explore the findings of multiple surveys that linked loot boxes to problem gambling.

Table 1: Loot Boxes in video game titles, defined by Griffiths’ five gambling principles [2]

Title	ESRB Rating ¹	Purchasable	Chance Involved	Advantage	Cash-out
Apex Legends	13+	✓	✓		
Assassins Creed Origin	17+	✓	✓	✓	
Battlefield 1	17+	✓	✓		
Call of Duty: WWII	17+	✓	✓	✓	
Counter-Strike: Global Offensive	17+	✓	✓		✓
Destiny 2	13+	✓	✓		
FIFA 17	E	✓	✓	✓	✓
FIFA 18	E	✓	✓	✓	✓
For Honor	17+	✓	✓	✓	
Fortnite	13+	✓	✓	✓	
Forza Motorsport 7	E	✓	✓	✓	
Gears of War 4	17+	✓	✓		
Hearthstone	13+	✓	✓	✓	
Halo Wars 2	13+	✓	✓	✓	
Injustice 2	13+	✓	✓	✓	
Lawbreakers	17+	✓	✓		
League of Legends	13+	✓	✓		
Madden NFL 17	E	✓	✓	✓	
Madden NFL 18	E	✓	✓	✓	✓
Mass Effect 3	17+	✓	✓	✓	✓
NBA 2K18	E	✓			
Need for Speed Payback	13+	✓	✓	✓	
Overwatch	13+	✓	✓		
PlayerUnknown’s Battlegrounds	13+	✓	✓		✓
Puzzle & Dragons	E	✓	✓	✓	
Rainbow Six: Siege	17+	✓	✓		
Rocket League	E	✓	✓		
Star Wars Battlefront II	13+		✓	✓	
ZT Online	13+	✓	✓	✓	

4.1 Gambling Specifics

To see the similarities between loot boxes and gambling, we can refer to Griffiths' five principles [2] to distinguish gambling activities:

1. The exchange of money or valuable goods.
2. An unknown future event determines the exchange.
3. Chance plays partly in the outcome of the exchange.
4. Opting out of the exchange avoids losses.
5. One party clearly wins at the cost of the other party losing.

Drummond includes a sixth principle [2]: an ability to exchange winnings into real-world currency, or an option to cash-out. With these characteristics we can assess the validity behind the claim that loot boxes emulate gambling. Drummond observed the 22 games from 2016-2017 which included loot boxes, which is supplemented by individual research for 2018 games in Table 1. The criteria of the table reflects the six characteristics with the exclusion of the ability to opt out to avoid losses (since this would obviously apply to each game), in order to better compare gambling and loot boxes. Seventeen out of the listed 29 games (58%) cover all 5 of Griffiths' gambling characteristics, with 6 of these 17 games having an option to convert winnings into real-world currency. While it is important to note that these 6 games have provisions in their terms of service that explicitly prohibit the sale or trade of in-game currencies [2], the actual items received are easily sold/exchanged through online marketplaces, such as with *Counter Strike: Global Offensive*, which was worth a reported \$10 billion USD through the sale/exchange of in-game cosmetic items earned in loot boxes [12]. With such prevalence in the video game industry, the loot box can be manipulated in many ways by video game developers, and as seen many of these instances are akin to gambling.

4.2 Loot Boxes and Problem Gambling

Zendle and Cairns [15] and later Zendle, Cairns, McCall, and Barnett [16] conducted studies on whether or not loot boxes could be correlated with instances of problem gambling. In the first study, Zendle and Cairns interviewed 7,422 adult gamers to assess the link between the amount of money spent on loot boxes

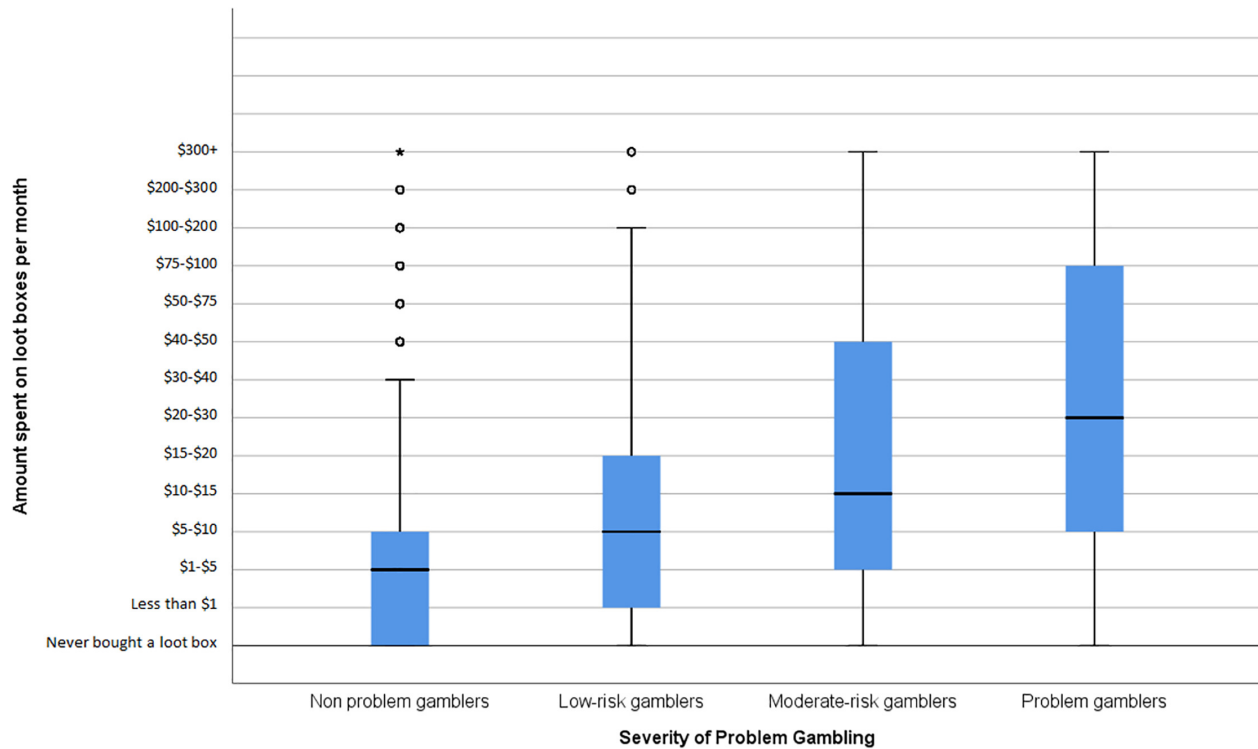


Figure 3: Amount of money put into loot boxes monthly versus problem gambling severity. [15]

to the degree of their gambling addiction, seen in Fig. 3. The study noted that the link was stronger between money spent on loot boxes than when compared to the link with buying other in-game items with real-world money. This finding suggests that the gambling-like features of loot boxes can be responsible for the observed trend between loot boxes and problem spending. While it is unclear whether this is an implication that loot boxes are a gateway to problem gambling or if loot boxes simply appeal to problem gamblers, it does clearly highlight a strong link between problem gambling and the purchase of loot boxes. A follow up survey done on 1,200 adult individuals determined that when judging gamers who engage in unpaid openings of loot boxes (free boxes) against those who do paid openings, those who pay to open boxes were much more likely to have a higher problem gambling severity [16]. As seen in Fig. 4, those who paid for loot boxes had on average double the severity in problem gambling to those who only opened free boxes. The survey continues to note that while some loot box features may mitigate some of the risk of higher problem gambling severity, the main conclusion is that the exchange of real-life currency for virtual content is the main driving force for problem gambling.

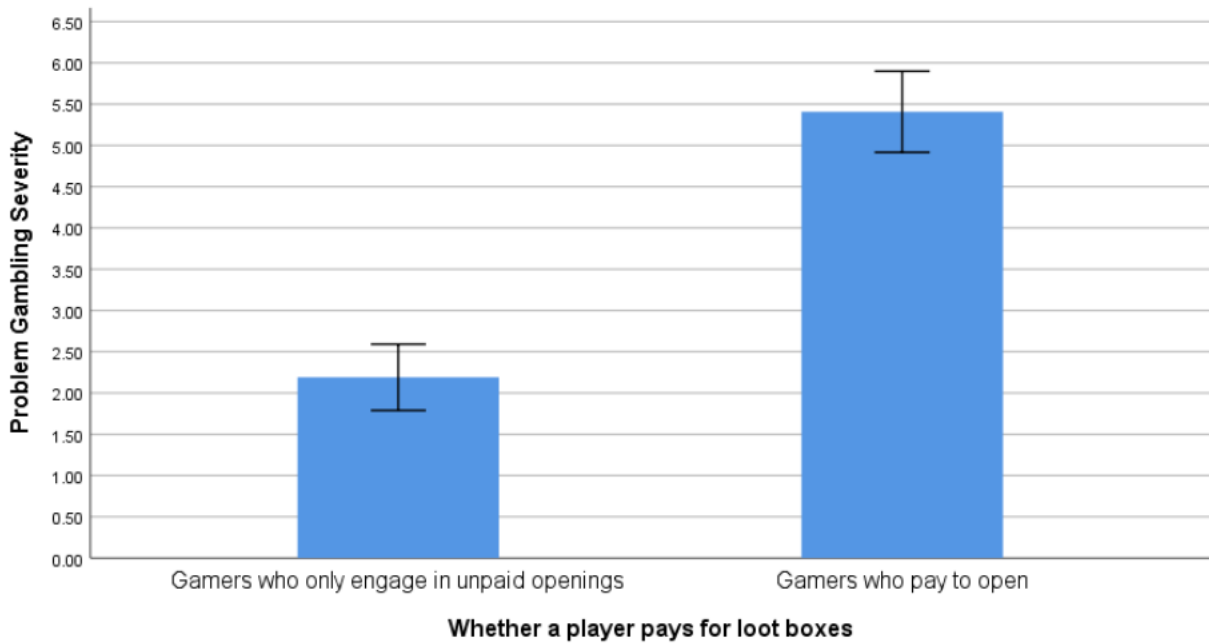


Figure 4: Problem Gambling severity versus opting in or out of paying for loot boxes in adults. [16]

4.3 Adolescent Gambling

Zendle, Meyer, and Over [17] surveyed 1155 adolescents within the age of 16-18 to gauge the relationship between loot box spending and problem gambling. This survey was done after the surveys reviewed in Section 4.2 in order to compare the severity in adults versus in adolescents. The results in Fig. 5 showed that the link between loot box spending and problem gambling was more than twice of that observed in adults [17]. Furthermore the results found direct correlation between higher loot box spending with more serious problem gambling classification, observable in Fig. 6. These findings not only suggest that adolescents are at higher risk than adults to establish problem gambling habits when spending more money on loot boxes, but also show implications that video game companies are profiting from developing problem gambling in adolescents. The stronger link between problem gambling and loot boxes in adolescents can also be attributed as a byproduct of peer pressure, with young gamers giving their best efforts to match the monetary spending of their peers [13]. Because of easy accessibility of gambling-like activities, such as buying loot boxes, gambling can seem more leisurely. This generalizes gambling to be more widely accepted, even when done by adolescents [1]. This overall has serious implications on the morals of the video game industry, and also puts weight on the political sector to oversee much needed regulation and policies on gambling-like loot boxes. These policies will be discussed in Section 4.4.

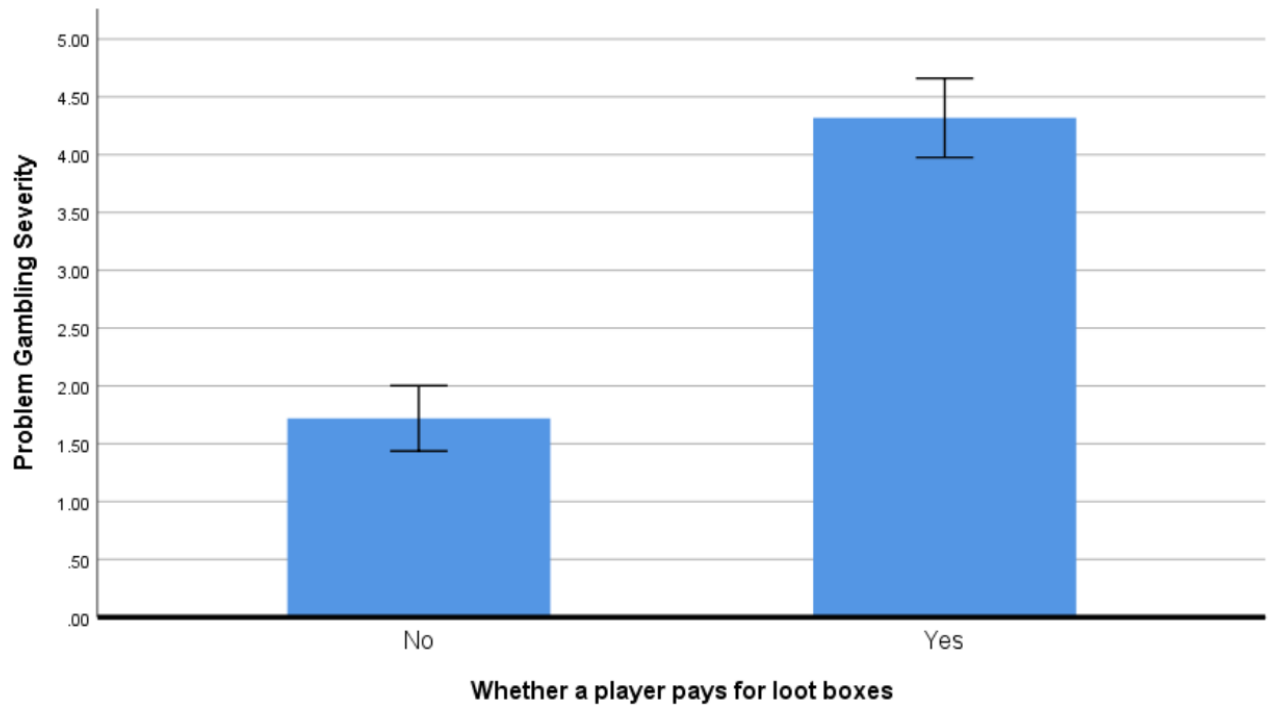


Figure 5: Trends between buying loot boxes and problem gambling in adolescents. [17]

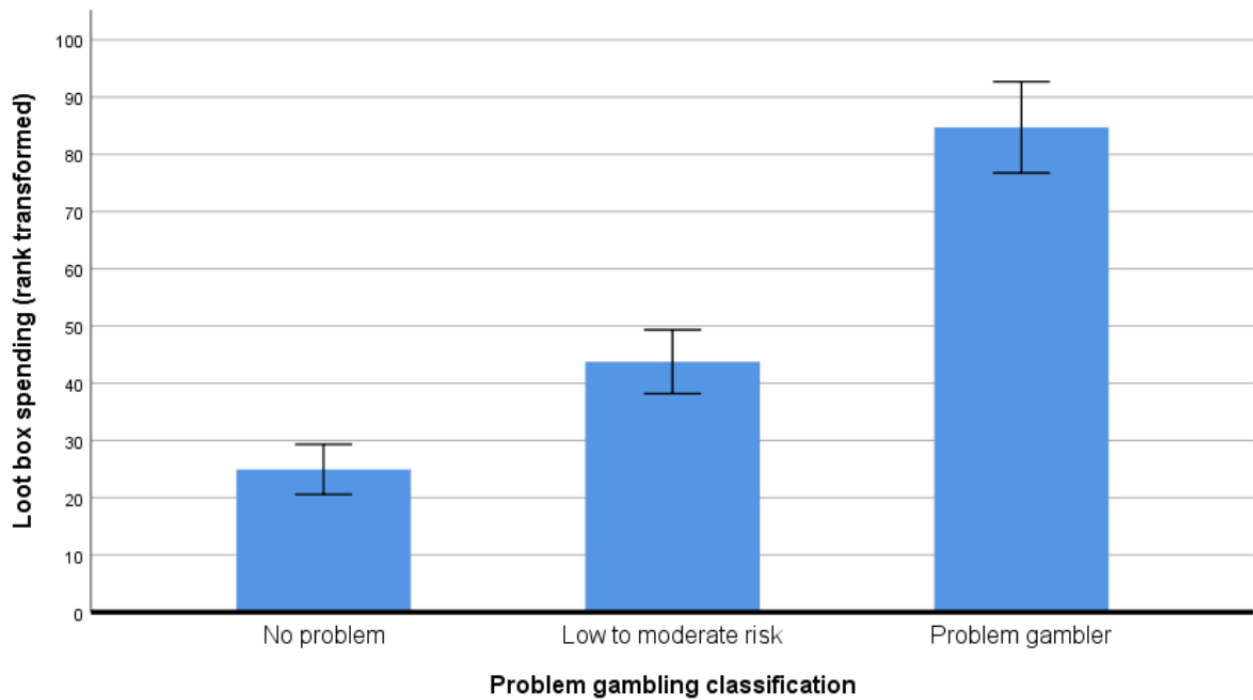


Figure 6: Trends between loot box spending and problem gambling classification in adolescents. [17]

4.4 Regulation

Given the infamy of loot boxes, discussions on possible regulation made their way into political circles around the world. Through independent review, as well as consideration of funded case studies [8], countries have already started to take action in determining the extent of loot box influence. Global discussions focused on two different issues pertaining to loot boxes: gambling and transparency. If loot boxes were found to be gambling, then they would be regulated as such. In terms of transparency, concerns on consumer exploitations were made given instances of deceptive or predatory marketing practices, especially when in consideration of presentation towards children [8]. These two issues have elicited different responses from different countries, as presented in Table 2. The most extreme responses were by Belgium, Netherlands, and Japan who all determined loot boxes to be forms of gambling and banned the sale of gambling-based loot boxes in video games entirely. In countries with larger populations of gamers, U.S., U.K., and China, loot boxes were found to *not necessarily* be gambling, though more investigation would be needed to make a formal decision [8], leaving room open for possible legislation to pass. In September 2018, gambling commissions from 15 European nations of Austria, the Czech Republic, France, Gibraltar, Ireland, Isle of Man, Jersey, Latvia, Malta, the Netherlands, Norway, Poland, Portugal, Spain, UK, as well as the state of Washington from the United States announced a collaborative effort to form legislation to better define the lines between gambling and gaming [5]. There have been efforts for the video game industry to self-regulate through means of updating guidelines and terms of services, though many of these efforts have proven to be ineffective [8].

Table 2: Loot Box legal opinion and regulation by country [8]

Region	Legal Opinion or Action	Current Policy
Australia	Loot Boxes might be gambling	Pursing future investigation
Belgium	Loot Boxes are gambling	Banned loot boxes
China	Loot Boxes might be gambling	(1) Draw rates must be accessible (2) Ban purchase of loot boxes with money (3) Ban the trading of virtual currency
Denmark	Loot Boxes might be gambling	Cautioned parents
France	Loot Boxes might be gambling	Pursing future investigation
Germany	Loot Boxes might be gambling, can be harmful to children	Reviewing case-by-case
Isle of Man	Loot Boxes might be gambling, virtual currencies have value	Revising Gambling law
Japan	Loot Boxes are gambling	Banned loot boxes
Netherlands	Loot Boxes are gambling	Banned loot boxes
New Zealand	Loot Boxes aren't gambling	No action
Singapore	Loot Boxes might be gambling	Pursing future investigation.
South Korea	Loot Boxes might be gambling, false advertising is dangerous	Threaten developers with fines
Sweden	Loot Boxes aren't not gambling	Pursing future investigation.
United Kingdom	Loot Boxes aren't gambling, 3rd party markets for loot boxes might be gambling	(1) Cautioned parents (2) Pursing future investigation
United States (California)	Loot Boxes might be gambling, Bill proposed to mandate clear packaging on games with microtransactions.	Bill allowed to die
United States (Hawaii)	Loot Boxes might be gambling, Bills proposed to: (1) Restrict sale of games with cash-out features to 21+ age limit. (2) Demand draw rates for loot boxes (3) Games with gambling-like features have to marked packaging.	Bills allowed to die
United States (Minnesota)	Loot Boxes might be gambling Bill proposed to: (1) Games with gambling-like features to have marked packaging. (2) Restrict sale of games with microtransactions to 18+ age limit.	Bill passed to a committee
United States (Washington)	Loot Boxes might be gambling Bill proposed to charge Gambling Commission to investigate loot boxes.	Bill failed to advance through committee

5 Recommendations

Given the studies presented and reviewed in this paper, it is within reason to believe that loot boxes in some forms can constitute as gambling. To prevent the exploitation of consumers, as well as suppress gambling in adolescents and children, more resources should be placed on defining a clear line between gaming and gambling. I would like to present two options to explore:

1. Remove the option to buy loot boxes in video games with real-world currency.
2. Task the Gambling Commission to thoroughly investigate the link between gambling and loot boxes and advise action.

Drummond [2], Zendle and Cairns [15], and Barnett and McCall [16], have all built connections linking gambling and loot boxes. With the recent failures to pass legislation in the U.S. pertaining to loot boxes, video game developers should not be given the chance to push the limits of what is to be considered acceptable in terms of loot boxes. Video game loot boxes can still exist, but the problem lies in the option to purchase them with money. In-game items can still be given monetary value since this is akin to online shopping, but the process of opening loot boxes is too similar to gambling to allow the flow of real-world money to be involved. The Gambling Commission should also be involved with the joint effort from the 15 European countries, as well as the state of Washington, USA, to establish guidelines for video game developers to follow and abide by.

6 Conclusion

This paper has reviewed several studies conducted on both adult and adolescent gamers to verify the link between loot boxes and problem gambling. We have evaluated the psychological design of loot boxes and how easily it can be manipulated to maximize profits, sometimes at the cost of predatory marketing practices at adolescents. With the current regulation, especially in the U.S., video game developers have taken the concept of loot boxes and manipulated them to best match their business models. The mechanic of loot boxes is a random reward system and harmless on its own, but becomes dangerous when made available for exchange with real-world currency. In its modern day form, the loot box has led to a need for a global discussion between video game developers and gambling commissions on where the line is between gaming and gambling.

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