

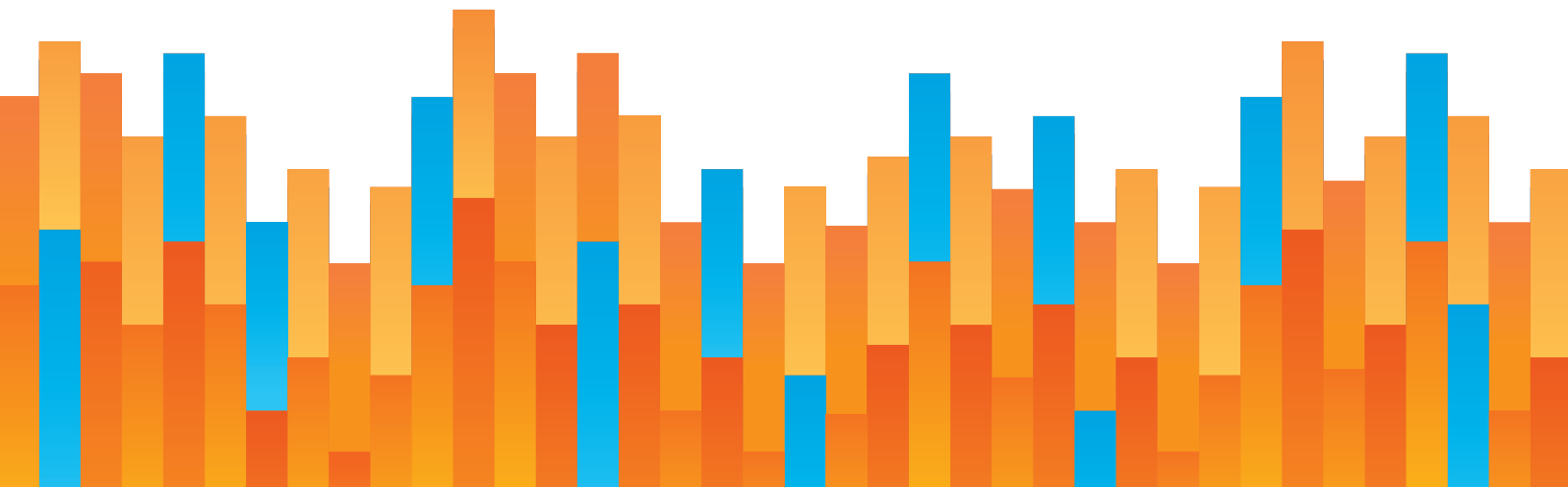


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VIDEO GAME LOOT BOXES: ANATOMY OF A MORAL PANIC

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EXECUTIVE SUMMARY

It is almost a law of public policy that technological innovations cause moral panics. It is unsurprising then that one of the more recent innovations in the video game industry, “loot boxes,” have become targets of similar criticism. Since 2017 especially, loot boxes have been the subject of controversy involving claims of addiction and gambling, accompanied by calls for government regulation that bear all the trappings of a moral panic.

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Not all video games contain loot box mechanics, and not all loot boxes are controversial; they become controversial when they can be purchased with real-world money.

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Loot boxes exist in many different forms and under a variety of names, but in general a loot box is “a consumable virtual item which can be redeemed to receive a randomized selection of further virtual items [loot], ranging from simple customization options for a player’s game character, to ... weapons, armor, virtual currency, additional skills and even

completely new or exclusive characters.”¹ Not all video games contain loot box mechanics, and not all loot boxes are controversial; they become controversial when they can be purchased with real-world money.

The source of controversy here is that buying a loot box means paying for a randomized reward of variable value. This in turn results in loot boxes being likened to gambling, and to related claims, such as that loot boxes are addictive and, in a sense, similar to slot machines. Therefore, loot boxes might cause or encourage behavioral problems like those sometimes found among problem gamblers. These concerns are even more pressing because loot boxes are sometimes available for purchase in games played by children.

Given the severity of the risks, it is unsurprising that there have been many calls from academics, advocacy groups, and governments for loot boxes to be banned outright, or at the very least, strongly regulated.

This paper reviews the existing evidence relating to concerns that loot boxes create serious social harm. My discussion draws heavily on a recent systematic review of the literature in which I show that existing research suffers from many serious problems and fails to support the claim that loot boxes are currently a source of serious harm.



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Based on that systematic, critical review of the literature, I conclude that there is no reason to believe at this point that loot boxes are harmful. Despite the lack of evidence, however, loot boxes have been a persistent topic of debate in the media and in policy circles for the past five years. This divergence between public outcry and scientific evidence is a good

¹ S. Schwiddessen and P. Karius, “Watch Your Loot Boxes!—Recent Developments and Legal Assessment in Selected Key Jurisdictions from a Gambling Law Perspective,” *Interactive Entertainment Law Review* 1, 1 (2018), 17-43; emphasis added.

indication that the loot box controversy is only merely a recent example of moral panic in video games.

Dozens of studies have appeared over the past five years, yet our knowledge of how players interact with loot boxes has grown very little. Again and again, we reach the same conclusion—the low quality of available research means that we lack concrete, reliable answers across virtually every question of interest: how prevalent loot box engagement is; how much players spend; the practical significance of their spending; the costs and benefits involved; how loot box engagement changes over time, etc. In fact, the closer we look at the results of literature, the more we find evidence hinting that loot boxes are not responsible for a widespread epidemic of problem behavior. Specifically:



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- Research on gaming is mostly on adults, not adolescents, and its study populations are not very representative of gamers.
- We don't know how many gamers pay for loot boxes, but it may not be a lot: surveys find from 1.8% to 25% of adolescent gamers and from 8 to 11% among adults. Those surveys are not comprehensive, but they indicate the percentage of gamers who buy loot boxes may not be very large.
- Overall, there appear to be a wide range of motivations for gamers buying loot boxes, many of which are unconnected to alleged similarities between opening loot boxes and engaging in traditional gambling.
- The tools used to identify problem gaming were created to identify problem gambling and haven't been adapted to gaming and so create false positives. Even then, some of the studies on problem gaming find no link with loot boxes.
- The biggest fear is of loot boxes fueling addiction and overspending. But there is at present no evidence to suggest that loot box spending is excessive among either adults or adolescents, much less that it is responsible for any widespread harm.

This lack of evidence of harm from loot boxes is troubling because the literature on loot boxes is already having an impact on policy discussions despite its faults and is regularly cited in the popular press to highlight the alleged dangers of loot boxes. Moreover, the loot box controversy is different from earlier outrages in one crucial respect: Whereas in earlier video game moral panics, players and developers united against policymakers and parent advocacy groups, loot boxes have caused many gamers to take the side of regulators against the industry.



... there is at present no evidence to suggest that loot box spending is excessive among either adults or adolescents...



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PART 1

INTRODUCTION

It is almost a law of public policy that technological innovation causes moral panic.² This trend is most obvious for art and media targeted to the consuming public, and especially to children, but it has a long and varied history. Novels, radio programs, movies, comic books, television shows, trading cards, role-playing games, breakdancing, anime, the internet, virtually every genre of popular music, and, of course, video games have all been subjects of moral panic (to list only a few). It is unsurprising then that one of the more recent innovations in the video game industry, “loot boxes,” have become targets of similar criticism.

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² “A moral panic is a widespread feeling of fear, often an irrational one, that some evil person or thing threatens the values, interests, or well-being of a community or society. It is “the process of arousing social concern over an issue”, usually perpetuated by moral entrepreneurs and mass media coverage, and exacerbated by politicians and lawmakers. Moral panic can give rise to new laws aimed at controlling the community.” “Moral Panic,” Wikipedia, https://en.wikipedia.org/wiki/Moral_panic (Accessed April 20, 2023).

Since 2017 especially, loot boxes have been the subject of controversy involving claims of addiction and gambling accompanied by calls for government regulation that bear all the trappings of a moral panic. In the typical case, legislators and parental advocacy groups stoke fears of a social crisis that can only be avoided through quick legal action to ban products or to regulate their production and consumption—all with little or no serious evidence that a genuine problem exists to begin with. Panic requires energy though, and typically moral panics burn out due to a combination of lack of interest, lack of evidence, the rise of a new controversy, or the end of an election cycle.



... at the time, lawmakers and parents were convinced that violent games were eroding morals and causing children to become more violent.



A now-classic case is the moral panic over video game violence that reached its peak in the 1990s. The rapid expansion of the game industry, combined with a lack of formal regulation, led many developers to experiment with controversial content, and as graphics improved, depictions of violence became more explicit. Of course, in retrospect, the violence depicted in games like *Doom* (1993) is quaint compared to the content of contemporary titles (including the more recent entries in the *Doom* franchise!). Nevertheless, at the time, lawmakers and parents were convinced that violent games were eroding morals and causing children to become more violent. And at first it seemed these allegations had merit: Several early studies claimed to show a clear relationship between playing games and aggressive behavior.³ These results were seized upon by pundits as compelling evidence for the need for government to regulate content.⁴ Attempts to regulate violent games even went to the U.S. Supreme Court, which ruled that the First

³ See Karen E. Dill and Jody C. Dill, "Video Game Violence: A Review of the Empirical Literature," *Aggression and Violent Behavior* 3, 4 (1998), 407-428; M. Griffiths, "Violent Video Games and Aggression: A Review of the Literature," *Aggression and Violent Behavior* 4, 2 (1999), 203-212.

⁴ E.g., Washington Post, "Senator Calls For Warnings On Video Games," *The Washington Post*, 2 December, 1993. Available at: <https://www.washingtonpost.com/archive/lifestyle/1993/12/02/senator-calls-for-warnings-on-video-games/74450503-ed9a-4084-9910-b8e65ac6f0cb/>; Carey Goldberg, "Children and Violent Video Games: A Warning," *New York Times*, 15 December, 1998. A16.

Amendment protects video games.⁵ Moreover, it turned out that the early research on games suffered from major problems. Research design was often poor or relied on faulty methods, many of the key variables were hard to define or measure, and results were sometimes valid but temporary, any relationship between gaming and violence disappearing over time.⁶ A wide range of scholarship has since shown these early results to be without serious scientific value.⁷ Nevertheless, politicians continue to repeat myths about video game violence (President Donald Trump is a relatively recent example).

It is against this backdrop that the present paper discusses the recent controversy in video gaming over “loot boxes,” the generic term for randomized digital rewards in video games. Loot boxes exist in many different forms and under a variety of names, but in general a loot box is:

a consumable virtual item *which can be redeemed to receive a randomized selection of further virtual items [loot], ranging from simple customization options for a player’s game character, to ... 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 ... and those generating items relevant for gameplay progress.*⁸

Not all video games contain loot box mechanics, and not all loot boxes are controversial; they become controversial when they can be purchased with real-world money. This paper discusses only these paid loot boxes, as they are the focus of debate, but it is important to note that these are only a subset of all loot boxes.

Paid loot boxes pose some unique challenges that have captured the attention of players, psychologists, social scientists, and policymakers alike.⁹ The key issue is that buying a loot box means paying for a randomized reward. This in turn results in loot boxes being likened

⁵ Brown v. Entertainment Merchants Association, 564 U.S. 768 (2011).

⁶ See, e.g., Griffiths, “Violent Video Games and Aggression”; S. Egenfeldt-Nielsen, J.H. Smith, and S.P. Tosca, *Understanding Video Games: The Essential Introduction*, 4th ed. (London: Routledge, 2020), pp. 283-315.

⁷ C.J. Ferguson, “Do Angry Birds Make for Angry Children? A Meta-Analysis of Video Game Influences on Children’s and Adolescents’ Aggression, Mental Health, Prosocial Behavior, and Academic Performance,” *Perspectives on Psychological Science* 10, 5 (2015), 646-666; A.K. Przybylski and N. Weinstein, “Violent Video Game Engagement is Not Associated with Adolescents’ Aggressive Behaviour: Evidence from a Registered Report,” *Royal Society Open Science* 6, 2 (2019), 171474.

⁸ S. Schwidessen and P. Karius, “Watch Your Loot Boxes!—Recent Developments and Legal Assessment in Selected Key Jurisdictions from a Gambling Law Perspective,” *Interactive Entertainment Law Review* 1, 1 (2018), 17-43; emphasis added.

⁹ M. McCaffrey, “The Macro Problem of Microtransactions: The Self-Regulatory Challenges of Video Game Loot Boxes,” *Business Horizons* 64, 2 (2019), 483-495.

to gambling and to related claims, that loot boxes are addictive and in a sense similar to slot machines. Therefore, loot boxes might cause or encourage behavioral problems like those that are often found among problem gamblers. These concerns are even more pressing because loot boxes are sometimes available for purchase in games that are commonly played by children.



The key issue is that buying a loot box means paying for a randomized reward. This in turn results in loot boxes being likened to gambling and to related claims, that loot boxes are addictive and in a sense similar to slot machines.



Given the severity of the risks, it is unsurprising that there have been many calls from academics, advocacy groups, and governments for loot boxes to be banned outright, or at the very least, strongly regulated. Proposals include outlawing loot boxes, restricting the sale of games with loot boxes to those over 18 or 21 years of age, mandating special packaging or labelling for games containing loot boxes, and imposing spending limits on players.¹⁰

Several countries, as well as smaller regional authorities, have already taken steps in this direction (see Table 1). In addition, a large literature of academic research on loot boxes has appeared that, at first glance, appears to confirm the worst fears of loot box critics.¹¹ It remains to be seen, however, whether these fears are justified, and whether there is sufficient evidence to justify regulation. To provide that justification, proponents of regulation must prove three things:¹²

1. Loot boxes create serious social harm

¹⁰ McCaffrey, “The Problem of Microtransactions: The Self-Regulatory Challenges of Video Game Loot Boxes.”

¹¹ S.S. Garea, A. Drummond, J.D. Sauer, L.C. Hall, and M.N. Williams, “Meta-Analysis of the Relationship between Problem Gambling, Excessive Gaming and Loot Box Spending,” *International Gambling Studies* 21, 3 (2021), 460-479.

¹² M. McCaffrey, “A Cautious Approach to Public Policy and Loot Box Regulation,” *Addictive Behaviors* 102, 106136 (2020).

2. The video game industry is incapable of voluntarily mitigating this harm in a satisfactory way
3. The benefits of government intervention to mitigate the harm outweigh the costs, even when considering the unintended consequences of regulation

In this paper I review the existing evidence relating to the first claim, which is the most crucial, and, so far, the most frequently investigated. My discussion draws heavily on a recent systematic review of the literature in which I show that existing research suffers from many serious problems and fails to support the claim that loot boxes are currently a source of serious harm.¹³ That paper should be consulted for fuller descriptions of each of the problems explained below. However, throughout this discussion it is vital not to lose sight of claims 2 and 3, which involve most of the key economic and policy questions relating to loot boxes, and which are, moreover, almost completely ignored in the current literature. For example, relating to claim 2, regulation is unnecessary if game developers and publishers are willing to put safety measures in place to protect players from potential harms due to loot boxes. Likewise, relating to claim 3, attempts by government to impose safety measures will almost certainly create unseen costs and unintended consequences for developers and players alike. For instance, regulations that increase the cost to developers of including loot boxes in their games tend to privilege the largest developers at the expense of their smaller, independent competitors. On the player side, restricting loot boxes may push them into grey or black markets where any harms are likely to be exacerbated. These results may drastically change the perceived benefits of regulation.

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¹³ M. McCaffrey, “Loot Boxes, Problem Gambling, and Problem Gaming: A Critical Review of the Emerging Literature,” *Communications of the Association for Information Systems* (2022). Available at: <https://aisel.aisnet.org/cais/vol52/iss1/2/>.

PART 2

A BRIEF HISTORY OF THE LOOT BOX CONTROVERSY

Before examining the empirical evidence, it is important to explain the economic context of the modern gaming industry and how loot boxes came to exist. From the 1970s to the early 2000s, video games were mainly sold through a standard product-based business model. That is, games were manufactured as physical media and purchased for a one-time sticker price. Because game content was limited to cartridges, disks, CDs, etc., it was fixed, and any additional content had to be sold separately through “add-on” packs that were also available as stand-alone physical products. However, starting in the late 1990s, the spread of cheap internet access made it possible to alter games at any time through downloadable content (DLC). Online access was initially used by developers to deliver updates, fix bugs, and make other small improvements to published games (“patches”), but these services quickly expanded to include offering original content: new story chapters, multiplayer modes, special items for use in-game, and many others. Although some games offer free DLC, typically it (and other supplementary content like loot boxes) must be purchased separately through “microtransactions,” an umbrella term that describes small payments that players make for pieces of in-game content. In cases when loot boxes can be purchased for real money, they represent one kind of microtransaction—one with randomized rewards.

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... the cost of developing major game titles (“AAA” games) has surged over the past few decades, often around \$100 million, comparable to the cost of creating a blockbuster movie.

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Since the mid-2000s microtransactions have become a crucial component of the business models of many game developers and publishers. This trend is enabled by technological innovations like online sales platforms, but is mainly driven by economic concerns. Most importantly, the cost of developing major game titles (“AAA” games) has surged over the past few decades, often around \$100 million, comparable to the cost of creating a blockbuster movie.¹⁴ Technological development means that games are constantly growing larger and more complex, which requires larger development teams, more licensing of costly technologies like game engines, and longer development periods. These kinds of issues add layers of uncertainty to an already costly and unstable industry and leave producers searching for new revenue streams to supplement core sales.

Loot boxes are a relatively recent innovation, but the basic principle behind them is the same one used in long-established analog media, such as collector’s cards. For example, a loot box and a pack of baseball cards are both purchased using real money, and both are guaranteed to contain a reward, although the exact value of this reward is not known to the buyer until the box or pack is opened. The most valuable rewards are often the rarest, and cannot be bought directly, but only won through a sufficient number of random draws. Consequently, they carry enormous financial potential for developers if players believe that rare loot is valuable enough to pay for.

There is little publicly available data about loot box revenue, but estimates suggest total sales exceeded \$15 billion in 2020.¹⁵ SEC filings from Electronic Arts indicate that its

¹⁴ Mansoor Mithaiwala, “Video Games That Cost More To Make Than Hollywood Blockbuster Films,” SVG, March 30, 2018, <https://www.svg.com/35410/video-games-cost-make-hollywood-blockbuster-films/>

¹⁵ This estimate is misleading though, as it appears to combine loot box spending with spending on gambling cosmetic loot. J. Clement, “Global Video Game Loot Box Market Value 2020–2025,” *Statista* 7 September (2021). Available at: <https://www.statista.com/statistics/829395/consumer-spending-loot-boxes-skins/>.

Ultimate Team modes for its sports franchises—which depend largely on loot boxes—generated nearly \$4.5 billion in net revenue from 2019-2021.¹⁶ This is clearly significant for EA as a business, but by itself it tells us nothing about the behavior or welfare of individual players. Furthermore, EA is an outlier in terms of financial success, as there are few if any companies that can boast the same loot box revenue, but its experience hints at the potential monetary value of the most successful loot box mechanics.



Loot boxes started to appear in various forms in the mid-2000s and were especially prominent in Japanese gacha games, essentially an early form of loot boxes.



Loot boxes started to appear in various forms in the mid-2000s and were especially prominent in Japanese *gacha* games, essentially an early form of loot boxes. They then spread gradually to Western audiences through games like *FIFA* in 2009 and *Team Fortress 2* in 2010, and have since become a common mechanic across game platforms and genres.

From the beginning, players have been skeptical about microtransactions and loot boxes on the grounds that they allow unfair competition. For example, if loot boxes give rewards that influence competitive gameplay, such as special weapons or armor, it may be possible to “pay to win” by spending money on loot boxes rather than working to improve one’s skills. Players who declined to buy loot boxes could suffer competitive disadvantages. At the same time, one business model is a “free-to-play” game that players can download for free. The game makes revenue by selling loot boxes or selling advertising that gamers must watch to play or to get loot boxes.

These kinds of criticisms dominated the early discussions of loot boxes. Crucially though, they are complaints about product quality, not legality or psychology: Players were concerned that loot boxes give unfair advantages to competitors with deeper pockets.

¹⁶ Electronic Arts, “Electronic Arts Inc. 2021 Form 10-K Annual Report for the Fiscal Year Ended March 31, 2021,” *Electronic Arts* (2021). Retrieved March 3, 2022, from: <https://ir.ea.com/financial-information/sec-filings/sec-filings-details/default.aspx?FilingId=14988756>.

Developers were offering a product that was not always received well by customers, but there was no serious suggestion of legal action or regulation of the industry.



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Things changed in October 2017, when publisher EA and its developer, EA Digital Illusions CE AB (DICE), began beta-testing *Star Wars: Battlefront II*. This was a pre-release version of the game that prominently featured loot boxes that randomly gave out cards that increase your power in the game. It outraged players, who argued that the game used a pay-to-win system. The stand-out moment in the saga occurred when an EA employee posted on Reddit in an attempt to placate fans who were upset at having paid \$80 for the game only to discover that its most desirable features still had to be unlocked, either through many hours of patient play, or more quickly through buying loot boxes. "The intent," the employee wrote, "is to provide players a sense of pride and accomplishment for unlocking different heroes."¹⁷

This was a first hint that the loot box controversy was potentially far larger than one game or one company, reflecting a broader dissatisfaction with this approach to gaming rewards. Again though, this initial dispute was a conflict between a business and its consumers, one that played out in the market. Following the wave of bad publicity from the beta test, EA's stock price plummeted by 8.5%, wiping as much as \$3.1 billion from its market value.¹⁸ DICE removed the loot box system before the game was published, but the controversy soon spread to the overall concept of buyable loot boxes.

The true turning point came when loot boxes became a political and a regulatory issue. In November 2017, Hawaii state Rep. Chris Lee held a press conference in which he described

¹⁷ Reddit, https://www.reddit.com/r/PS4/comments/7chguv/ea_replies_to_battlefronts_40_hour_hero_unlock/

¹⁸ CNBC, "EA's Day of Reckoning is here after 'Star Wars' Game Uproar, \$3 Billion in Stock Value Wiped Out," *CNBC* (2017). Available at: https://www.cnbc.com/2017/11/28/eas-day-of-reckoning-is-here-after-star-wars-game-uproar.html?_source=twitter%7Cmain.

loot boxes as a predatory practice targeting children and likened them to gambling. The conference proved to be a touchpoint and received widespread media attention. It also helped shift the focus of debate to the legality and psychological effects of purchasing loot boxes, though there was no evidence of any kind to support claims of serious harm associated with loot boxes. The conference thus bore all the earmarks of a traditional moral panic, even including remarks by religious leaders with a dubious knowledge of loot boxes about their moral impact on young people.

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Nevertheless, proposals for legislation to regulate loot boxes have quickly sprung up in different regions. Some of these initial proposals and decisions are summarized in Table 1. These proposals have been followed by numerous other inquiries by governments around the world, including in the United Kingdom and Australia. A top issue for regulators is whether loot boxes are legally equivalent to gambling, and therefore whether they will be regulated under existing gambling law. This question is under consideration by courts in different countries, as different regions have different definitions of gambling and different ways of interpreting existing restrictions. Analysis of gambling regulations is beyond the scope of this paper.

TABLE 1: INITIAL REGULATORY OPINIONS, ACTIONS, AND POLICIES REGARDING LOOT BOXES.

| Region | Legal Opinion or Regulatory Action | Initial Response |
|-----------|------------------------------------|---|
| Australia | Loot boxes can be gambling | Recommend further investigation |
| Belgium | Loot boxes can be gambling | Ban loot boxes |
| China | Loot boxes can involve gambling | 1) Developers must publish all reward lists and drop rates for loot boxes 2) Purchase of loot boxes with cash is prohibited 3) Transfer of virtual currency is prohibited |

| Region | Legal Opinion or Regulatory Action | Initial Response |
|----------------------------|--|--|
| Denmark | Loot boxes may involve gambling | Recommend caution from parents |
| Germany | Loot boxes can violate laws regarding advertising to children, or harming them | Decisions made on a case-by-case basis |
| Isle of Man | 1) Convertible and non-convertible currencies are considered “money’s worth” 2) Loot boxes can involve gambling | 1) Revision and clarification of gambling laws is ongoing 2) Limited jurisdiction to regulate foreign companies if/when loot boxes are gambling |
| Japan | “Kompu gacha” loot boxes are exploitative | Ban “kompu gacha” loot boxes |
| Netherlands | Loot boxes can be gambling | Ban loot boxes (decision later reversed) |
| New Zealand | Loot boxes are not gambling | N/A |
| South Korea | Loot boxes can involve false advertising | Fines for developers |
| Sweden | Loot boxes are not gambling | Open to further investigation |
| United Kingdom | 1) Loot boxes are not necessarily gambling 2) Third-party markets for loot boxes can be gambling | 1) Recommend caution from parents 2) Prosecute unlicensed gambling 3) Parliamentary investigation |
| United States (California) | Bill proposed to require packaging to clearly state whether a game includes microtransactions | Bill allowed to die |
| United States (Hawaii) | Bills proposed to regulate loot boxes by: 1) Restricting sale of games with direct or indirect convertibility of items into cash to persons of 21 years of age or older 2) Requiring publishers to disclose draw rates for loot boxes 3) Requiring that games with “gambling-like” mechanisms have clearly marked packaging | Bills allowed to die |
| United States (Minnesota) | Bill proposed to 1) require packaging to clearly state if a game contains potentially addictive mechanisms or could encourage large financial risks 2) Restrict all games with purchases of randomized rewards to persons of 18 years of age or older | Bill referred to committee |
| United States (Washington) | Bill proposed to charge the Gambling Commission to investigate loot boxes and recommend possible policy responses | Bill failed to advance through committee stage |

Source: adapted and updated from M. McCaffrey, “The Macro Problem of Microtransactions: The Self-Regulatory Challenges of Video Game Loot Boxes,” *Communications of the Association for Information Systems* (2022). Available at: <https://aisel.aisnet.org/cais/vol52/iss1/2/>

PART 3

A CLOSER LOOK AT THE EVIDENCE ON LOOT BOXES AND PROBLEM BEHAVIOR

These early efforts to regulate loot boxes were based on little more than public outcry, as there was no published research on loot boxes when the major controversy began in 2017.¹⁹ Following the surge in regulatory interest, however, academics quickly moved to investigate the legal and psychological implications of loot boxes. In the ensuing five years, dozens of papers have appeared that study these issues from a variety of disciplinary angles, and this literature is now being cited by policymakers and major media outlets to justify new regulatory proposals. The main issues under investigation involve the relationship between loot boxes and problem behaviors. Almost all extant studies show some type of correlation between engaging with loot boxes and symptoms of problem gambling or problem gaming. This has given rise to claims that loot boxes are addictive, that they are a gateway to traditional gambling, that they cause overspending and financial difficulties, and so on. On the surface, therefore, this body of work seems to show that loot

¹⁹ W. DeCamp, "Loot Boxes and Gambling: Similarities and Dissimilarities in Risk and Protective Factors," *Journal of Gambling Studies* 37 (2021), 189-201, p. 190.

boxes are a cause of serious harm, and that therefore they should be regulated by public authorities.



The peer-reviewed literature on loot boxes suffers from a variety of methodological and interpretive problems that undermine its most important conclusions.



However, a systematic critical review of the literature reveals these claims to be unfounded. The peer-reviewed literature on loot boxes suffers from a variety of methodological and interpretive problems that undermine its most important conclusions. These problems mainly relate to (1) the availability of relevant and useful data, choice of research subjects, and difficulties of reliable and representative sampling; (2) the use of research tools and methods that fail to take account of the unique characteristics of loot boxes; and (3) neglect of the underlying economic significance of loot box engagement. This last is a necessity for considering the true social impact and the policy implications of loot boxes. When taking all these issues into account, it becomes clear that we still know very little about the psychological implications of loot boxes, and furthermore, that the rationale for regulation is extremely weak. This section will survey some of the main problems in the literature and discuss their implications for public policy. The discussion relies heavily on a recent critical review of the literature on loot boxes and problem behaviors.²⁰

As mentioned above, many papers have appeared that study some aspect of loot box engagement. In fact, there is now enough published literature that several reviews and meta-analyses have appeared as well to summarize progress so far.²¹ These reviews tend to conclude that loot box research provides a reliable basis for policymaking. Unfortunately, none of them takes a critical approach to the literature or looks in any depth at particular

²⁰ McCaffrey, "Loot Boxes, Problem Gambling, and Problem Gaming." See especially Table 1 there, summarizing the limitations of specific studies.

²¹ Garea et al., "Meta-Analysis of the Relationship between Problem Gambling, Excessive Gaming and Loot Box Spending"; S.G. Spicer, L.L. Nicklin, M. Uther, J. Lloyd, H. Lloyd, and J. Close, "Loot Boxes, Problem Gambling, and Problem Video Gaming: a Systematic Review and Meta-Synthesis," *New Media & Society* 24, 4 (2021), 1001-1022; K. Yokomitsu, T. Irie, H. Shinkawa, and M. Tanaka, "Characteristics of Gamers who Purchase Loot Box: a Systematic Literature Review," *Current Addiction Reports* 8 (2021), 481-493.

studies; instead, they apply one-size-fits-all checklists to evaluate research quality, checklists that specifically avoid many of the most difficult questions about the value and reliability of the underlying work. These reviews, for example, simply pool the data or results of previous studies without questioning the underlying data or the methods used to evaluate and interpret it. This is helping to turn the literature into an echo chamber in which the only acceptable conclusion is that government oversight of loot boxes is needed.



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It is therefore necessary to survey the literature more deeply and critically and to look closely at individual pieces of research before aggregating them. In a recent paper, I reviewed existing literature on the relationship between loot box engagement and problem behaviors, especially problem gambling and problem gaming.²² The purpose of that review was to determine whether there are grounds for believing that loot boxes are causing a serious social harm to adults and/or to children. This is a necessary first step in making the case for regulation.

3.1

RESEARCH DESIGN PROBLEMS

An underlying problem with loot box research is that it lacks a clear conceptual foundation. Players can understand different things by the term “loot box,” and it is often unclear how and why they are valued. For example, loot boxes are sometimes bought with real currency, sometimes with virtual currency, and sometimes with both, or neither; some loot boxes offer rewards that change competitive gameplay, while other are purely cosmetic; some loot boxes can be exchanged in real-world markets; and so on. All of these factors can have an influence on player behavior. Yet there is a lack of theories or models of players’

²² McCaffrey, “Loot Boxes, Problem Gambling, and Problem Gaming.”

decision processes when buying loot boxes and their motivations for repeat purchases. This kind of underlying qualitative work is urgently needed: Without a sound theory, we cannot know what and how to investigate empirically.

Several experimental studies of loot box engagement have been conducted, but none involved players spending real money or examined player behavior much beyond measuring some indicators of physical excitement and arousal while watching loot boxes being opened. These studies add no information that could be used to draw wider conclusions about loot boxes, much less inform policy. As a result, the remainder of the results surveyed in this section relate to empirical work.



... there is to date no research that observes players purchasing loot boxes with real money. Instead, empirical research is based on data collected through self-selected convenience samples gathered via anonymous online surveys, meaning that essentially none of the data can be verified.



To begin, there is to date no research that observes players purchasing loot boxes with real money. Instead, empirical research is based on data collected through self-selected convenience samples gathered via anonymous online surveys, meaning that essentially none of the data can be verified. Given the highly negative public reaction to loot boxes (see the Reddit example above, for instance), the possibility of results biased against loot boxes is also strong. There is also currently no longitudinal research on loot box engagement.²³ Data are cross-sectional and cannot address crucial questions about how loot box engagement changes over time, or whether there is merit to the claim that loot boxes are a gateway to conventional gambling.

²³ During the preparation of this paper a study was published purporting to examine loot box engagement over time and especially its role as a potential gateway to traditional gambling. This paper suffers from several of the problems discussed in this section, such as non-representative sampling, in addition to other issues such as a short time frame over which the research was conducted (six months). See G.A. Brooks and L. Clark, "The Gamblers of the Future? Migration from Loot Boxes to Gambling in a Longitudinal Study of Young Adults," *Computers in Human Behavior* 141 (2023), 107605.

The venues used to gather data are also open to criticism. For example, several papers posted survey links on Reddit, the same social media platform that helped ignite the backlash against loot boxes. Other papers tried to improve on this method by using Amazon' Mechanical Turk to collect survey responses.²⁴ However, that platform has been shown to produce non-representative samples that tend to over-represent people in relatively poor mental and physical health, as well as gamblers, thus hinting again at likely bias.²⁵



The majority of loot box research examines adult behavior, with adolescents appearing in less than half of current studies, and no work at all studying pre-adolescent children.



The majority of loot box research examines adult behavior, with adolescents appearing in less than half of current studies, and no work at all studying pre-adolescent children. This is understandable due to the difficulties of conducting research with very young and potentially vulnerable participants, but it nevertheless highlights an inconsistency in public discussion: loot box regulation is almost always justified with respect to dangers to young children, but they are not studied anywhere in the literature.

There are issues of representativeness even among the adult population, however. For example, the majority of respondents in most research are men. Women are an increasing proportion of gamers, roughly half according to some measures,²⁶ and are also more heavily involved in mobile gaming, where loot boxes are more common. Moreover, studies that do

²⁴ D. Zendle and P. Cairns, "Loot Boxes are Again Linked to Problem Gambling: Results of a Replication Study," *PloS ONE* 14, 3 (2019), e0213194; G.A. Brooks and L. Clark, "Associations between Loot Box Use, Problematic Gaming and Gambling, and Gambling-Related Cognitions," *Addictive Behaviors* 96 (2019), 26-34.

²⁵ K. Walters, D.A. Christakis, and D.R. Wright, "Are Mechanical Turk Worker Samples Representative of Health Status and Health Behaviors in the US?" *PloS ONE* 13, 6 (2018), e0198835; S. Mishra and R.N. Carleton, "Use of Online Crowdsourcing Platforms for Gambling Research," *International Gambling Studies* 17, 1 (2017), 125-143.

²⁶ Entertainment Software Association, "2022 Essential Facts about the Video Game Industry," *Entertainment Software Association* (2022). Retrieved March 30th, 2023, from: <https://www.theesa.com/resource/2022-essential-facts-about-the-video-game-industry/>.

include women have returned ambiguous results, making representation all the more important. Yet various papers have dismissed the importance of obtaining larger proportions of responses from women. For example, the large sample ($n=7422$) in one study was strongly biased in terms of gender (89% male and 9% female respondents).²⁷ The authors justified their unbalanced gender response on the grounds that it accurately represented the proportion of women gamers. Yet when they replicated their study, they received a female response more than three times larger, but did not consider this to be a problem.²⁸ Both figures cannot be accurate, though. This is only one example of many where an inconsistency in the literature has been overlooked in current research.

As a result of these issues, loot box research struggles to produce generalizable results. Most studies openly acknowledge that they failed to obtain representative samples that could be used to draw wider conclusions: This is a natural consequence of the methods and data used. Yet these warnings are mostly forgotten when it comes time to discuss policy implications.



Most studies openly acknowledge that they failed to obtain representative samples that could be used to draw wider conclusions: This is a natural consequence of the methods and data used. Yet these warnings are mostly forgotten when it comes time to discuss policy implications.



²⁷ D. Zendle and P. Cairns, "Video Game Loot Boxes are Linked to Problem Gambling: Results of a Large-Scale Survey," *PloS ONE* 13, 11 (2018), e0206767. A similar study by some of the same authors also received a 9% female response. See D. Zendle, R. Meyer, and H. Over, "Adolescents and Loot Boxes: Links with Problem Gambling and Motivations for Purchase," *Royal Society Open Science* 6 (2019), 190049.

²⁸ Zendle and Cairns, "Loot Boxes are Again Linked to Problem Gambling," pp. 10-11.

3.2 HOW COMMON IS LOOT BOX ENGAGEMENT?

It is important to ask how prevalent loot box purchasing is among the general gaming population, especially among younger players, as widespread engagement might signal deeper behavioral problems for policymakers to address.

Younger children are not studied in loot box research, but several studies measure engagement among adolescents and/or adults. Their findings vary widely, however. For example, one study of Japanese adolescents found that that 1.8% opened loot boxes,²⁹ while another Japanese study put the figure at 3.5%.³⁰ In one survey, 12% of 16-24-year-olds in the United Kingdom reported having purchased a loot box in the previous year,³¹ while 19.8% of Danish adolescents reported the same.³² In a large-scale survey of 8th- and 11th-grade students in Delaware, 24.9% of the former and 17% of the latter reported buying loot boxes in the previous year.³³

The range of results is narrower for adults, whose engagement tends to fall between the extremes found for younger players. In some cases, 7.8% of respondents claimed to have spent money,³⁴ but in studies of committed players who played at least three times a week, the figure grew to only 10.8%.³⁵ A representative sample of German internet users similarly

²⁹ H. Shinkawa, T. Irie, M. Tanaka, and K. Yokomitsu, "Psychosocial Adjustment and Mental Distress Associated With In-Game Purchases Among Japanese Junior High School Students," *Frontiers in Psychology* 12 (2021), 708801.

³⁰ S. Ide, M. Nakanishi, S. Yamasaki, K. Ikeda, S. Ando, M. Hiraiwa-Hasegawa, K. Kasai, and A. Nishida, "Adolescent Problem Gaming and Loot Box Purchasing in Video Games: Cross-sectional Observational Study Using Population-Based Cohort Data," *JMIR Serious Games* 9, 1 (2021), e23886.

³¹ H. Wardle, and D. Zendle, "Loot Boxes, Gambling, and Problem Gambling among Young People: Results from a Cross-Sectional Online Survey," *Cyberpsychology, Behavior, and Social Networking* 24, 4 (2021), 267-274.

³² S. Kristiansen, and M.C. Severin, "Loot Box Engagement and Problem Gambling among Adolescent Gamers: Findings from a National Survey," *Addictive Behaviors* 103 (2020), 106254.

³³ DeCamp, "Loot Boxes and Gambling."

³⁴ D. Zendle, "Beyond Loot Boxes: A Variety of Gambling-Like Practices in Video Games are Linked to both Problem Gambling and Disordered Gaming," *PeerJ* 8 (2020), e9466.

³⁵ P.A.K. Carey, P. Delfabbro, and D. King, "An Evaluation of Gaming-Related Harms in Relation to Gaming Disorder and Loot Box Involvement," *International Journal of Mental Health and Addiction* 20 (2022), 2906-2921.

found that 9.8% were loot box purchasers.³⁶ In other words, there is as yet no agreement on exactly how widespread loot box engagement is among adolescents or adults, especially given that the samples mentioned above are mostly unrepresentative. Nevertheless, for now we will assume that loot box mechanics are popular enough to warrant a closer look.



... there is as yet no agreement on exactly how widespread loot box engagement is among adolescents or adults, especially given that the samples mentioned above are mostly unrepresentative.



3.3

WHY DO PLAYERS ENGAGE WITH LOOT BOXES?

It is similarly open to debate why players engage with loot boxes. Of course, players' perceptions of their own motivations might not reflect their deepest preferences. For example, players who feel addicted might rationalize their purchases for other reasons, especially to avoid social stigmas associated with addiction and problem spending. Nevertheless, player opinions can also enrich our understanding of loot boxes' popularity, which is particularly important given the lack of conceptual foundations mentioned above. Furthermore, if loot boxes do indeed have addictive properties, we would expect at least some convergence between their stated motivations and actual behavior. It would be strange, for instance, if loot boxes carried addictive properties that players refused systematically and overwhelmingly to acknowledge. Motivation data are also quite mixed though.

In one survey of gamers who were familiar with loot boxes, 48.3% claimed that they enhanced their gaming experience, compared to 17.6% who claimed the opposite.³⁷ This hints that there is a divergence between public opinion about loot boxes, which is often overwhelmingly negative, and players' demonstrated preferences when buying them.

³⁶ M. Von Meduna, F. Steinmetz, L. Ante, J. Reynolds, and I. Fiedler, "Loot Boxes are Gambling-Like Elements in Video Games with Harmful Potential: Results from a Large-Scale Population Survey," *Technology in Society* 63 (2020), 101395.

³⁷ W. Li, D. Mills, and L. Nower, "The Relationship of Loot Box Purchases to Problem Video Gaming and Problem Gambling," *Addictive Behaviors* 97 (2019), 27-34.

Interestingly, when loot boxes are associated with some kind of benefit to players, this is sometimes treated as an aberration to be explained away. For instance, one study found an association between loot box engagement and positive mood: the straightforward explanation was that loot boxes provided value to players. Yet the study dismissed and downplayed this possibility, proposing instead that positive mood was related to higher disposable income, even though there was no evidence for this.³⁸



In one survey of gamers who were familiar with loot boxes, 48.3% claimed that they enhanced their gaming experience, compared to 17.6% who claimed the opposite.



There has been some quantitative work to date to investigate more complex motivations for loot box engagement. In one survey that allowed for open-ended answers, only 16% of purchasers reported opening loot boxes for “the fun, excitement and thrills of opening the box itself.”³⁹ In the study, this was the category used to describe motivations connected to gambling or addiction, as for example in one player’s confession that opening loot boxes “scratches my gambling itch.” However, even combined with the answers that were not related to gambling as such, this category of motivations was only the third most common one in this sample. Out of the other seven motivation categories reported, most involved personal or practical reasons like wanting to gain competitive advantages from loot (21.9%) or wanting to collect all of the prizes (19.2%). Ranked fourth were “cosmetic reasons,” at 15.3%. These results are exactly what we should expect given that these goals can often only be accomplished by finding unique loot in a loot box. At the same time, 10.7% of respondents reported buying loot boxes as a way to support the developers of free-to-play

³⁸ See, for instance, A. Drummond, J.D. Sauer, C.J. Ferguson, and L.C. Hall, “The Relationship between Problem Gambling, Excessive Gaming, Psychological Distress and Spending on Loot Boxes in Aotearoa New Zealand, Australia, and the United States—A Cross-National Survey,” *PLoS ONE* 15, 3 (2020), e0230378, pp. 11-12.

³⁹ Zendle, Meyer, and Over, “Adolescents and Loot Boxes,” p. 13.

games.⁴⁰ And around 9.8% believed loot box rewards provided good value for their money.⁴¹ These results cut against the idea that gambling-like features of loot boxes are consciously the main reason for their popularity. In fact, similar studies suggest that problem gamblers are bigger spenders on a variety of content, not necessarily on loot boxes specifically.⁴²

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There is only limited qualitative research into loot box purchase motivations.

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There is only limited qualitative research into loot box purchase motivations. Semi-structured interviews with U.K. respondents suggest 20 specific triggers or motivators.⁴³ In practice, these motivations are often intermingled. The most commonly reported were the positive experience of opening boxes and the functional or cosmetic value of loot box rewards. Importantly, most participants (19 out of 28) reported buying loot boxes due to emotive or impulsive influences such as problems with urges, temptations, or control—this was the sixth most common motivation. However, these results were not consistently present alongside symptoms of problem behavior, thus “challenging the idea that ‘compulsive’ loot box purchasers would typically be those reporting problematic gaming.”⁴⁴ Overall, there appear to be a wide range of motivations for loot box engagement, many of which are unconnected to alleged similarities between opening loot boxes and engaging in traditional gambling.

⁴⁰ See also J. Macey and M. Bujić, “The Talk of the Town: Community Perspectives on Loot Boxes,” In *Modes of Esports Engagement in Overwatch*, eds. Maria Ruotsalainen, Maria Törhönen, and Veli-Matti Karhulahti. Cham, Switzerland: Palgrave Macmillan, 2022), 199-223, pp. 205-207.

⁴¹ Zendle, Meyer, and Over, “Adolescents and Loot Boxes,” pp. 13-14.

⁴² Drummond et al., “The Relationship between Problem Gambling, Excessive Gaming, Psychological Distress and Spending on Loot Boxes in Aotearoa New Zealand, Australia, and the United States.”

⁴³ L.L. Nicklin, S.G. Spicer, J. Close, J. Parke, O. Smith, T. Raymen, H. Lloyd, and J. Lloyd, “It’s the Attraction of Winning that Draws You in”—A Qualitative Investigation of Reasons and Facilitators for Videogame Loot Box Engagement in UK Gamers,” *Journal of Clinical Medicine* 10, 10 (2021), 2103.

⁴⁴ *Ibid*, p. 16.

3.4

SCREENING AND MEASUREMENT TOOLS FOR PROBLEM GAMBLING AND PROBLEM GAMING

As mentioned above, the major finding of the loot box literature is a correlation between loot box engagement and symptoms of problem gambling or problem gaming. This result is a crucial first step in proving that loot boxes represent serious harm, and it is beginning to have a significant impact on public policy and opinion. Naturally though, this result depends heavily on how problem behavior is defined and measured; yet in this area, too, there has been almost no criticism to date of the methods used in published studies. A closer look reveals important problems here as well.

Much of the academic controversy around loot boxes relates to the question of whether they are behaviorally similar to gambling. This can only be proven through careful study using methods that account for the unique features of loot boxes. However, most existing research simply takes it for granted that loot box engagement can be analyzed using methods that were originally designed, sometimes decades ago, to study traditional gambling (such as casino games). The danger is that screening tools for problem behavior are not fit for purpose and can produce false positives by classifying players as problem gamblers even though they exhibit few or no symptoms.



... most existing research simply takes it for granted that loot box engagement can be analyzed using methods that were originally designed, sometimes decades ago, to study traditional gambling (such as casino games).



The clearest example is the Problem Gambling Severity Index (PGSI). The PGSI is a multi-item survey used to classify participants as non-problem gamblers, low-risk gamblers, moderate-risk gamblers, or problem gamblers.⁴⁵ It is used as a screening tool in most loot box studies to show that players who spend more on loot boxes are also more likely to exhibit symptoms of problem gambling. There are at least two problems with this tool in the context of loot boxes though.

⁴⁵ See, e.g., Zendle and Cairns, “Video Game Loot Boxes are Linked to Problem Gambling,” p. 3.

First, it can classify players as moderate-risk gamblers based purely on the misconceptions of other people. For instance, if a friend or family member is critical of behavior that they consider to be gambling, a player's gambling score automatically increases, even if no gambling is occurring. As an example, imagine a parent who is concerned about the amount of time a child spends on a free mobile poker game, mistakenly believing it is a form of gambling, even though no money is being won and lost. If the parent is worried about this behavior, then the child's score changes regardless of the reality of the game. Likewise, a player feeling guilty about gambling produces a higher score even if there is no justification for this feeling. This makes a mess of the measurement process. In fact, some research shows that it can be easy to confuse addiction with separate problems like poor time management or playing as a coping mechanism to deal with personal issues. Players can even become convinced they are addicts based on inaccurate impressions of friends or family members.⁴⁶

Second, PGSI questions ask about gambling without clarifying whether gambling includes buying loot boxes. This creates a problem because some players do consider buying loot boxes equivalent to gambling. Yet the purpose of using the PGSI is to examine the relationship between loot box engagement and symptoms of traditional gambling. If these are the same thing in the eyes of the player, then greater loot box spending can be correlated with gambling entirely because gambling is defined as loot box spending. The PGSI can thus assume exactly what it is supposed to investigate.

In any case, the majority of current research is based on the PGSI and other tools that have not been developed for or adapted to the study of loot boxes. The value of their results is therefore unclear. It is worth noting though that the built-in assumptions of these screening tools make it more likely to generate false positives rather than false negatives.

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... a sample of adult Fortnite players found no link between loot box spending and symptoms of gaming disorder.
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⁴⁶ R.T. Wood, “Problems with the Concept of Video Game “Addiction”: Some Case Study Examples,” *International Journal of Mental Health and Addiction* 6, 2 (2008), 169-178.

Not all studies find an association between loot box spending and problem gambling or gaming. For example, a sample of adult *Fortnite* players found no link between loot box spending and symptoms of gaming disorder.⁴⁷ Similarly, among 8th- and 11th-grade students in Delaware, risk factors like “parental bond, depression/anxiety, victimization, bullying, substance use, school grades, gender, and race/ethnicity” poorly predicted loot box and other microtransaction purchases.⁴⁸ This hints that—in this respect at least—loot boxes and traditional gambling are dissimilar. Another study asked respondents retrospective questions about loot box use as a way to track their choices over time.⁴⁹ For adults, after controlling for age, there was no relationship between the length of time since first exposure to loot boxes and any key outcome reported in the paper. For adolescent girls there was some association between recent first openings of loot boxes and potential problem gambling. Yet longer past engagement with loot boxes did not predict gambling outcomes in adults or adolescents. Again, in general, the literature so far has failed to establish clearly that loot box spending is associated with problem behavior.

3.5

THE ECONOMIC (IN)SIGNIFICANCE OF LOOT BOX ENGAGEMENT

The previous sections explained a few problems that occur in the design and execution of loot box research. The most damning fault of this literature though is its neglect of the practical and economic significance of loot box engagement. Any attempt to show that loot boxes pose a social problem justifying government intervention must provide evidence of such practical harm to players or others. Such evidence is missing from the literature.

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One adult sample put median monthly spending on loot boxes at \$10, with only 6.2% of respondents reporting more than \$40.
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⁴⁷ D.L. King, A.M. Russell, P.H. Delfabbro, and D. Polisen, “Fortnite Microtransaction Spending was Associated with Peers’ Purchasing Behaviors but Not Gaming Disorder Symptoms,” *Addictive Behaviors* 104 (2020), 106311.

⁴⁸ DeCamp, “Loot Boxes and Gambling,” p. 193.

⁴⁹ M. Rockloff, A.M. Russell, N. Greer, L. Lole, N. Hing, and M. Browne, “Young People Who Purchase Loot Boxes are More Likely to Have Gambling Problems: An Online Survey of Adolescents and Young Adults Living in NSW Australia,” *Journal of Behavioral Addictions* 10, 1 (2021), 35-41.

The most commonly discussed harm related to loot boxes is overspending, which is naturally connected to problem gambling. Despite its importance though, there is no definition of overspending in the literature. Setting that problem aside, only about half of loot box studies ask for any information about how much players spent, their disposable income, or other relevant information that could be used to analyze the effects of spending in practical terms. Instead, statistical significance and effect sizes are used to interpret all data and relationships without context or reference to any economic welfare concerns and are assumed to be relevant.

Studies that do record spending data do not indicate that overspending, even broadly conceived, is a widespread problem. One adult sample put median monthly spending on loot boxes at \$10, with only 6.2% of respondents reporting more than \$40. In a parallel sample of students, median spend was \$17.50, with 10.3% reporting more than \$50.⁵⁰ Early research showed that there is an average difference of roughly \$10-\$15 per month in loot box spending between problem and non-problem gamblers.⁵¹ In another case, alleged problem gamblers spend on average \$12.92 more per month than non-problem gamblers (or about \$21 when including outliers), with these amounts being driven by a small number of relatively extreme cases.⁵²

“

... there is a strong negative relationship between unemployment and loot box purchasing.

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Another telling example comes from a study of loot boxes conducted during the early days of the COVID-19 lockdowns.⁵³ Intuitively, this was a period of great risk for potential problem gamblers. Yet even in this extreme case, mean spending on loot boxes was \$6.08.

⁵⁰ Brooks and Clark, “Associations between Loot Box Use, Problematic Gaming and Gambling, and Gambling-Related Cognitions,” p. 28.

⁵¹ D. Zendle, quoted in Environment and Communications References Committee, “Gaming Micro-Transactions for Chance-Based Items,” Environment and Communications References Committee (Canberra, ACT: Parliament of Australia, 2018), p. 42.

⁵² Drummond et al., “The Relationship between Problem Gambling, Excessive Gaming, Psychological Distress and Spending on Loot Boxes in Aotearoa New Zealand, Australia, and the United States.”

⁵³ L.C. Hall, A. Drummond, J.D. Sauer, and C.J. Ferguson, “Effects of Self-Isolation and Quarantine on Loot Box Spending and Excessive Gaming—Results of a Natural Experiment,” *PeerJ* 9 (2021), e10705.

In a similar timeframe, players in a different study reported engaging with loot boxes 2.1 times in the preceding three months, with an average spend of \$16.49 on each occasion.⁵⁴ When extrapolated, this translated to \$25.97 spent on loot boxes over the period.

Data about broader financial health tell a similar story. A more representative sample shows that loot box buyers tend to live in households of average income, and that only 3.1% are unemployed, with 83.8% employed and the remaining 13.1% outside the labor force (retired, students, stay-at-home parents, etc.).⁵⁵ In fact, in this sample there is a strong negative relationship between unemployment and loot box purchasing.⁵⁶ This is intuitive, as fully-employed people will tend to be more interested in taking shortcuts in games in order to economize their time. This also hints at the more practical motivations behind loot box engagement, as opposed to behavioral motivations related to lack of control. Overall, a cumulative average spend of €1000 (\$1,090 U.S.) per month across all forms of traditional gambling “increases the likelihood of purchasing a loot box by 4% and increases the frequency of purchases by 12-16 times in a given year.”⁵⁷ These are small results compared to the size of the initial spend required.

A survey of published loot box research, as well as publicly available data used in these works, shows that cases of extreme spending (say, more than a few hundred dollars per month) are rare, and documented cases of extreme spending from players with low or no income are rarer still. The evidence indicates that the bulk of spending comes from “whales,” a small number of spenders who contribute disproportionately to loot box revenue.⁵⁸

In summary, there is at present no evidence to suggest that loot box spending is excessive among either adults or adolescents, much less that it is responsible for any widespread harm. For the vast majority of gamers, loot box spending is less than the price of a Netflix subscription. It is also far cheaper than a night out at a bar, and would represent a small

⁵⁴ Carey, Delfabbro, and King, “An Evaluation of Gaming-Related Harms in Relation to Gaming Disorder and Loot Box Involvement.”

⁵⁵ Von Meduna et al., “Loot Boxes are Gambling-Like Elements in Video Games with Harmful Potential.”

⁵⁶ Ibid.

⁵⁷ Ibid., pp. 7-8.

⁵⁸ See also J. Close, S.G. Spicer, L.L. Nicklin, M. Uther, J. Lloyd, and H. Lloyd, “Secondary Analysis of Loot Box Data: Are High-Spending “Whales” Wealthy Gamers or Problem Gamblers?” *Addictive Behaviors* 117 (2021), 106851.

portion of average monthly spending on all media and entertainment services in developed nations.

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For the vast majority of gamers, loot box spending is less than the price of a Netflix subscription. It is also far cheaper than a night out at a bar, and would represent a small portion of average monthly spending on all media and entertainment services in developed nations.

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3.6

LOOT BOXES: JUST ANOTHER MORAL PANIC?

From the outset, the research literature has made strong claims about the actual and potential harms of buying loot boxes. These assertions often include exaggerations, innuendos, and other rhetoric unsupported by the evidence that stack the deck against loot boxes and in favor of regulation. For example, in the first empirical study showing an association between loot box spending and problem gambling, the authors warned that,

[Problem gambling is] a pattern of gambling activity which is so extreme that it causes an individual to have problems in their personal, family, and vocational life... These issues range from domestic abuse... and intimate partner violence... to involvement in illegal activities... increased medical costs... and suicidality.⁵⁹

This summary is presented as evidence of the likely harms caused by loot boxes: problem gambling causes harm, and the people who buy loot boxes are sometimes problem gamblers, therefore loot boxes are harmful as well. This is pure speculation, however. Not only is no evidence provided to support this claim, but the study did not even investigate the problems listed here—and neither has the vast majority of other research.

⁵⁹ Zendle and Cairns, “Video Game Loot Boxes are Linked to Problem Gambling,” p. 2; see also Zendle, Meyer, and Over, “Adolescents and Loot Boxes,” p. 2.

This kind of rhetoric and guilt by (statistical) association are not unique to the earliest research. Another paper describes microtransactions as a “virtual epidemic” (Brady and Prentice, 2021),⁶⁰ and loot boxes have been called a matter of “life or death” for problem gamblers, with the potential to generate an “epidemic of problem gambling the scale of which the world has never seen.”⁶¹ The data simply do not fit this extreme picture.



... loot boxes have been called a matter of “life or death” for problem gamblers, with the potential to generate an “epidemic of problem gambling the scale of which the world has never seen.” The data simply do not fit this extreme picture.



In fact, motivating academic research with this kind of rhetoric is likely to stoke moral panic at the expense of scientific understanding.⁶² As researchers have explained, in the midst of moral panic,

moral beliefs [e.g., about the evils of gambling] can substantially influence scientific research, [whose] results are readily used as confirmation for what has been suspected. ... [R]esearch projects launched in the midst of a moral panic bear the risk of introducing bias and distracting from more important issues.⁶³

In the case of loot boxes, the single-minded focus on the alleged harms of loot boxes has crowded out discussions about the underlying causes and consequences of problem behavior, as well as difficult conversations about issues like parental responsibility for children’s relationship to technology. It has also resulted in an almost complete neglect of

⁶⁰ A. Brady, and G. Prentice, “Are Loot Boxes Addictive? Analyzing Participant’s Physiological Arousal While Opening a Loot Box,” *Games and Culture* 16, 4 (2021): 419-433.

⁶¹ D. Zendle, quoted in B. Sinclair, “Loot Boxes a Matter of “Life or Death,” Says Researcher,” *Gamesindustry.biz* (2019), Retrieved 5 April, 2023, from: <https://www.gamesindustry.biz/articles/2019-08-08-loot-boxes-a-matter-of-life-or-death>.

⁶² See, e.g., N.D. Bowman, “The Rise (and Refinement) of Moral Panic,” In *The Video Game Debate: Unravelling the Physical, Social, and Psychological Effects of Digital Games*, eds. R. Kowert and T. Quandt (New York: Routledge, 2015), 22-38.

⁶³ M. Elson and C.J. Ferguson, “Gun Violence and Media Effects: Challenges for Science and Public Policy,” *British Journal of Psychiatry* 203, 5 (2013), 322-324, p. 322.

the costs and unintended consequences of government regulation of video games. These include discouraging developers from experimenting with innovative revenue models; privileging larger developers such as EA at the expense of smaller companies; pushing loot boxes into grey or black markets where they are harder to monitor and in which any negative effects from them will be worsened; undermining the consumer rights and agency of adult players; and creating additional layers of bureaucracy in order to administer any regulations. Rather than consider these issues, however, the literature is permeated by the non sequitur that as long as there is an allegation of harm, regulation is necessary and desirable.

“

... the literature is permeated by the non sequitur that as long as there is an allegation of harm, regulation is necessary and desirable.

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CONCLUSION

This paper surveyed some major problems in loot box research that undermine its credibility and reliability. Based on a systematic, critical review of the literature, there is no reason to believe at this point that loot boxes are the cause of serious harm. Despite the lack of evidence, however, loot boxes have been a persistent topic of debate in the media and in policy circles for the past five years. This divergence between public outcry and scientific evidence is a good indication that the loot box controversy is merely a recent example of moral panic in video games.

Dozens of studies have appeared over the past five years, yet our knowledge of how players interact with loot boxes has grown very little. Again and again, we reach the same conclusion. The low quality of available research means that we lack concrete, reliable answers across virtually every margin of interest: how prevalent loot box engagement is; how much players spend; the practical significance of their spending; the costs and benefits involved; how loot box engagement changes over time, etc. In fact, the closer we look at the results of the literature, the more we find evidence hinting that loot boxes are not responsible for a widespread epidemic of problem behavior. Specifically:

- Research on gaming is mostly on adults, not adolescents, and its study populations are not very representative of gamers.
- We don't know how many gamers pay for loot boxes, but it may not be a lot; surveys find from 1.8% to 25% of adolescent gamers, and from 8 to 11% among adults.

Those surveys are not comprehensive, but they indicate the percentage of gamers who buy loot boxes may not be very large.



Overall, there appear to be a wide range of motivations for gamers buying loot boxes, many of which are unconnected to alleged similarities between opening loot boxes and engaging in traditional gambling.



- Overall, there appear to be a wide range of motivations for gamers buying loot boxes, many of which are unconnected to alleged similarities between opening loot boxes and engaging in traditional gambling.
- The tools used to identify problem gaming were created to identify problem gambling and haven't been adapted to gaming and so very easily create false positives. Even then, some of the studies on problem gaming find no link with loot boxes.
- The biggest fear is of loot boxes fueling addiction and overspending. But there is at present no evidence to suggest that loot box spending is excessive among either adults or adolescents, much less that it is responsible for any widespread harm.

This lack of evidence of harm from loot boxes is troubling because the literature on loot boxes is already having an impact on policy discussions despite its faults and is regularly cited in the popular press to highlight the alleged dangers of loot boxes. Moreover, the loot box controversy is different from earlier outrages in one crucial respect: Whereas in earlier debates players and developers united against policymakers and parent advocacy groups, loot boxes have caused many gamers to take the side of regulators against the industry.

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He is the author or editor of six books and dozens of peer-reviewed articles. He is also the author of a wide range of works on video games and on the gaming industry, including the edited volume *The Invisible Hand in Virtual Worlds: The Economic Order of Video Games* (Cambridge University Press, 2021), as well as numerous peer-reviewed articles, reviews, and commentaries. This research covers the theory and practice of gaming across several disciplines, including economics, business, psychology, and public policy.

