

Griffiths, M.D. (2021). A brief overview of loot boxes in video gaming. In: Kowert, R. & Quandt, T. (Eds.), *The Video Game Debate 2: Revisiting the Physical, Social, and Psychological Effects of Video Games* (pp. 7-18). London: Routledge.

Abstract

The buying of loot boxes has received a lot of national and international media publicity. Loot box buying takes place within online gaming and have been described as virtual games of chance. Players use real money to buy keys to open the boxes where they receive a chance selection of virtual items. Many researchers have questioned whether loot box buying are a form of gambling. Depending upon the definition of gambling, the buying of some loot boxes (or equivalents) would arguably be classed as a form of gambling. To date, there has been little research examining loot box buying. Based on the few studies carried out to date, the findings are very consistent that there is an association between problem gambling and loot box buying among both adolescents and adults. However, it is not known whether being a problem gambler increases the likelihood of engaging in loot box buying or whether being a loot box buyer increases the likelihood of problem gambling

Keywords: loot boxes; loot box buying; gambling; gaming; gaming micro-transactions

Introduction

Over the past few years, the buying of loot boxes has received a lot of national and international media publicity (e.g., Avard, 2017; BBC, 2019a, 2019b; Griffin, 2019; Griffiths, 2018a; Hood, 2017; Lawrence, 2017). In May 2019, the US Republican senator Josh Hawley said that loot boxes exploit children and should be banned when attempting to pass the ‘Protecting Children from Abusive Games Bill’. He was quoted as saying: *“When a game is designed for kids, game developers shouldn't be allowed to monetise addiction. And when kids play games designed for adults, they should be walled off from compulsive micro-transactions”* (BBC 2019b).

What are loot boxes?

Loot box buying primarily takes place within online gaming and depends on both the presence of tradeable loot boxes and related winnings within games, plus a market place (which can be provided in-game or via dedicated trading platforms). Loot box buying been described as a virtual game of chance (Griffiths, 2018b). Players use real money to buy keys to open the boxes where they receive a chance selection of virtual items. Other types of equivalent in-game virtual assets that can be bought include chests, bundles, crates, card packs, and cases. The virtual in-game items that can be ‘won’ can comprise basic customization (i.e., cosmetic) options for a player’s online avatar to in-game assets that can help players progress more effectively in the game (e.g., gameplay improvement items such as armor and weapons) (Drummond & Saur, 2018; Griffiths, 2018b). Loot box buying is a subset of ‘microtransactions’, an umbrella term comprising in-game purchases (McCaffrey, 2019). According to Schwidessen and Karius (2018):

“[Microtransactions refer] 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” (p.18).

King and Delfabbro (2019) raised concerns concerning in-game micro-transactions such as loot

box buying, in particular the predatory monetization and the utilization of individual player data by gaming operators. They claimed that gaming companies “*manipulate the nature and presentation of purchasing offers in ways that maximize the likelihood of the player spending money. Some schemes may exploit an information asymmetry (i.e. the game system knows more about the player than the player can know about the game) to adjust the prices of virtual items for players depending on their playing and spending habits in the game*” (p.1967). Other tactics to incentivize the purchasing of in-game items is the use of ‘limited time’ offers which attempt to put pressure on gamers to buy such items. Furthermore, most (if not all) gamers are unaware or not informed concerning the odds when buying such in-game items. King and Delfabbro claim that such ploys may exploit gamers (particularly younger individuals) to spend more than they can afford to lose.

In relation to loot box buying, all players hope that they can win ‘rare’ items and are often encouraged to spend more money to do so because the chances of winning such items are minimal (King & Delfabbro, 2018). Many popular videogames now feature the chance to buy loot boxes (or equivalents) including *Star Wars Battlefront 2*, *FIFA Ultimate Team*, *Overwatch*, *Middle-earth: Shadow of War*, and *Lambreakers* (to name just a few). In short, all of these require the paying of real money in exchange for a completely random in-game item. Psychologist Jamie Madigan (cf. Hood, 2017) asserted that:

“Whenever you open [a loot box], you may get something awesome (or you may get trash). This randomness taps into some of the very fundamental ways our brains work when trying to predict whether or not a good thing will happen. We are particularly excited by unexpected pleasures like a patch of wild berries or an epic skin for our character. This is because our brains are trying to pay attention to and trying to figure out such awesome rewards. But unlike in the real world, these rewards can be completely random (or close enough not to matter) and we can't predict randomness. But the reward system in your brain doesn't know that. Buying [loot boxes] puts them into the same category of packs of Pokémon cards or baseball cards. Unlike gambling in a casino, you're going to get something out of that pack. Maybe just not the thing you wanted” (p.1).

It should also be noted that loot box buying can have different mechanisms and characteristics. Zendle, Cairns, Barnett, and McCall (2019) which may have different consequences and psychosocial impacts. The differences include (i) paid and unpaid openings (i.e., in some games players have to pay to open loot boxes and in others they are free to open and are ‘earned’ based upon progressing within the game), (ii) opportunities for cashing out (i.e., the winning content of some loot boxes are not linked to a gamer’s account and can be sold on third party sites), (iii) paying to win (i.e., buying loot boxes to help in-game progression), (iv) using in-game currency (i.e., buying loot boxes with in-game currency rather than real money), (v) crate and key mechanics (i.e., earning loot boxes as a result of skillful playing), (vi) showing near-misses (i.e., showing the contents of loot boxes that the player did not choose), and (vii) containing exclusive items (i.e., gaining items that cannot be gained in any other part of the game) (Zendle et al., 2019a). The presence or absence of some of these features may also help determine whether the buying of loot boxes is a form of gambling (and will be revisited later in this chapter).

Is loot box buying a form of gambling?

For over 25 years, many scholars have observed that there are behavioral and psychological similarities between gambling and video game playing (e.g., Fisher, 1994; Griffiths, 1991: 2005; Griffiths, King & Delfabbro, 2014; King, Delfabbro & Griffiths, 2010a; 2010b). One reason for this is that video games share many of the same structural characteristics as recognized forms of gambling, most notably gaming machines. The term ‘structural characteristics’ refers to those elements of an activity that either induce the person to play or are inducements to continue playing (i.e., characteristics that are responsible for reinforcement, may satisfy a player's needs and may actually facilitate playing) (Griffiths, 1993). It has also been observed gambling and gaming

technologies have begun to converge with video games featuring gambling-like elements, and gambling games featuring video gaming-like elements (Griffiths et al., 2014). King, Delfabbro, Derevensky and Griffiths (2012) noted that simulated gambling activities and gambling themes have a substantial presence in many modern videogames. According to King, et al (2012), gambling content in video games may be categorized according to the following three categories:

- *Standard gambling simulation*, a digitally simulated interactive gambling activity that is structurally identical to the standard format of an established gambling activity, such as blackjack or roulette;
- *Non-standard gambling simulation*, an interactive gambling activity that involves the intentional wagering of in-game credits or other items on an uncertain outcome, in an activity that may be partially modelled on a standard gambling activity but which contains distinct player rules or other structural components that differ from established gambling games;
- *Gambling references*, the appearance of non-interactive gambling material or gambling-related paraphernalia/materials within the context of the video game.

In regard to the second of these categories, it could be argued that the buying of loot boxes are non-standard gambling simulations. In fact, many researchers have questioned whether loot box buying are a form of gambling (e.g., Brooks & Clark, 2019; Griffiths, 2018b; King & Delfabbro, 2019; Li, Mills & Nower, 2019; Zendle & Cairns, 2018). Although there are many definitions in many disciplines defining gambling, there are a number of common elements that occur in the majority of gambling instances that distinguish ‘true’ gambling from mere risk-taking. These include: (i) the exchange is determined by a future event, which at the time of staking money (or something of financial value), the outcome is unknown, (ii) the result is determined (at least partly or wholly) by chance, (iii) the re-allocation of wealth (i.e., the exchange of money [or something of financial value] usually without the introduction of productive work on either side, (iv) losses incurred can be avoided by simply not taking part in the activity in the first place, and (v) winners gain at the sole expense of losers (Griffiths, 1995, 2015). In addition to the five aforementioned defining features of gambling, Drummond and Sauer note:

“A sixth characteristic that is important to consider is whether the winnings can be converted in some way into real-world money – that is, ‘cashed out’. The ability to cash out winnings is often considered a criterion for gambling by regulatory bodies...Although not all games with loot boxes contain this functionality, some games include the ability to cash out via third party websites (that is, not run by a game company), others via the platform on which the game is distributed.”

Added to this, it could be argued that the money or prize to be won should be of greater financial value than the money staked in the first place (Griffiths, 2018b). Based on these elements, the buying of some loot boxes (or equivalents) would arguably be classed as a form of gambling. The UK Gambling Commission’s most recent position paper on virtual currencies and social casino gambling (Gambling Commission, 2017) noted:

“One commonly used method for players to acquire in-game items is through the purchase of keys from the games publisher to unlock ‘crates’, ‘cases’ or ‘bundles’ which contain an unknown quantity and value of in-game items as a prize. The payment of a stake (key) for the opportunity to win a prize (in-game items) determined (or presented as determined) at random bears a close resemblance, for instance, to the playing of a gaming machine. Where there are readily accessible opportunities to cash in or exchange those awarded in-game items for money or money’s worth those elements of the game are likely to be considered licensable gambling activities [Section 3.17]...Additional consumer protection in the form of gambling regulation, is required in circumstances where players are being incentivised to participate in gambling style activities through the provision of prizes of money or money’s worth. Where prizes are successfully restricted for use solely within the game, such in-game features would not be licensable

gambling, notwithstanding the elements of expenditure and chance [Section 3.18]”.

Consequently, the UK Gambling Commission does not consider loot box buying as a form of gambling because (they claim) the in-game items have no real-life value outside of the game. However, this is not the case because there are many websites that allow players to trade in-game items and/or virtual currency for real money. The Gambling Commission appears to acknowledge this point and claim that the buying of in-game loot boxes (and their equivalents) are not gambling but, if third party sites become involved (by allowing the buying and selling of in-game items), the activity does become a form of gambling. As Hood (2017) rightly notes, this appears to be a case of the law struggling to keep pace with technology. There are also issues surrounding age limits and whether games that offer the buying of loot boxes (or equivalents) should be restricted to those over the age of 18 years.

At present, there are a few countries (e.g., Belgium, Holland, and Japan) who do view the buying of loot boxes as a form of gambling (see Table 1) and have incorporated such activities into their gambling regulations (Chansky & Okerberg, 2019). To date, only a few jurisdictions have examined whether loot box buying is a form of gambling (see Table 1). However, it was reported that gambling regulators from 16 countries were teaming up to examine loot box buying and how to regulate the buying of them (Austria, Czech Republic, France, Gibraltar, Ireland, Isle of Man, Jersey, Latvia, Malta, The Netherlands, Norway, Poland, Portugal, Spain, the United Kingdom, and the US’s Washington State Gambling Commission) (Lanier, 2018). In the main, most countries have either not considered regulating the buying of loot boxes at all, or (like the UK and New Zealand), have ruled that buying loot boxes does not currently meet their regulatory definition of gambling (Adams, 2018; Chalk, 2018; Chansky & Okerberg, 2019; Kelly, 2019; McCaffrey, 2019).

Table 1: Countries that have considered loot boxes in relation to their gambling regulation

Country	Legal view of buying loot boxes
Australia	The Australian Office of eSafety assert that loot box buying may be a gateway to addictive gambling behavior. However, only the state of Victoria has deemed loot box buying to be a form of gambling.
Belgium	Belgian Gaming Commission has ruled that loot boxes are ‘games of chance’ and come under gambling laws.
China	The Chinese government has said that gaming companies must disclose the odds of winning for loot boxes that are paid for.
Denmark	Danish government have said loot box buying may involve gambling
Finland	Finland’s Lotteries Administration are investigating whether to include loot box buying within its gambling regulation
France	Autorité de Régulation des Jeux en Ligne (ARJEL) does not view buying loot boxes as gambling under their current regulation
Germany	Loot boxes may violate laws regarding harm and advertising to children
Holland	The Dutch Gaming Authority has ruled that games where individuals can buy loot boxes with the ability to transfer items are illegal under gambling laws.
Japan	The National Consumer Affairs Agency views virtual items gained from loot box buying are ‘prizes’ even if they have no demonstrable real-world monetary value.
New Zealand	The New Zealand Gambling Commissions does not view buying loot boxes as gambling under their current regulation
South Korea	The South Korean Fair Trade Commission fined gaming companies in 2018 for misleading odds related to loot box buying. It has requested information from video game developers regarding in-game purchases, particularly related to underage users (April 2019).
Sweden	Swedish government have said loot box buying may involve gambling
United Kingdom	The UK Gambling Commission does not view buying loot boxes as gambling under their current regulation
United States of	The US Federal Trade Commission is planning to hold a public workshop to examine the

America	video game industry's sale of loot boxes. Proposed bills in California (failed), Hawaii (failed), Washington (failed), and Minnesota (referred)
---------	---

Sources: Adams (2018); Chalk (2018), Chansky and Okerberg (2019) Kelly (2019); McCaffrey (2019)

Predictably, the gaming industry does not view loot box buying as gambling. For instance, Dirk Bosmans from the European videogame rating organization *Pan European Game Information* (PEGI) stated in an interview (cf. Hood, 2017) that:

“Loot crates are currently not considered gambling: you always get something when you purchase them, even if it's not what you hoped for. For that reason, a loot crate system does not trigger the gambling content descriptor. If something is considered gambling, it needs to follow a very specific set of legislation, which has all kinds of practical consequences for the company that runs it. Therefore, the games that get a PEGI gambling content descriptor either contain content that simulates what is considered gambling or they contain actual gambling with cash payouts. If PEGI would label something as gambling while it is not considered as such from a legal point of view, it would mostly create confusion. We are always monitoring such developments and mapping consumer complaints. We see a growing need for information about specific features in games and apps (social interaction, data sharing, digital purchases), but the challenge is that such features are rapidly becoming ubiquitous in the market, yet they still come in very different shapes and sizes” (p.1).

Griffiths (2018b) argued that this was somewhat hardline given that PEGI's own descriptor of gambling content is used whenever any videogame “*teaches or encourages*” gambling. Griffiths claimed that such a descriptor arguably covers gambling-like games or activities and that loot box buying is (at the very least) gambling-like. A spokesman for the North American Entertainment Software Rating Board (ESRB) (cf. Hood, 2017) asserted that the:

“ESRB does not consider [the buying of loot boxes] to be gambling because the player uses real money to pay for and obtain in-game content. The player is always guaranteed to receive something - even if the player doesn't want what is received. Think of it like opening a pack of collectible cards: sometimes you'll get a brand new, rare card, but other times you'll get a pack full of cards you already have. That said, ESRB does disclose gambling content should it be present in a game via one of two content descriptors: Simulated Gambling (player can gamble without betting or wagering real cash or currency) and Real Gambling (player can gamble, including betting or wagering real cash or currency). Neither of these apply to loot boxes and similar mechanics” (p.1).

Empirical studies on loot box buying

To date, there has been little research examining loot box buying. Drummond and Sauer (2018) examined 22 games containing loot boxes from the *Giant Bomb* game review site in 2016 and 2017. Using Griffiths' (1995) five aforementioned criteria for gambling, ten of the 22 games met all five criteria. Of these ten games, four also gave players the opportunity to cash out winnings (via third-party websites that were not affiliated to the gaming company that developed the videogame but allowed gamers to trade, buy and/or sell in-game rewards for real money). Drummond and Sauer also noted that the ‘terms of use’ for playing these four games explicitly stated that re-selling or trading virtual currencies was prohibited but that does not mean that players are unable to do so.

Drummond and Sauer concluded that loot box buying shared both structural and psychological similarities with gambling and that loot box buying sustained player engagement in the game. They also asserted that “*of those games containing loot boxes, 100% allow for (if not actively encourage) underage players to engage with these systems*” (p. 532). They also noted that although game developers do not appear to be legally responsible for third party websites that allow the trading or re-selling of virtual items, such websites facilitate the conversion of in-game items into real currency. Like Griffiths (2018), they therefore argued that loot box buying appears to meet both the legal and psychological definitions of gambling.

A large-scale survey of 7,422 adult gamers by Zendle and Cairns (2018) was the first to examine the relationship between loot box buying and problem gambling (assessed using the Problem Gambling Severity Index [PGSI]). They reported a significant association between problem gambling and the amount of money that gamers spent on buying loot boxes. Based on their findings, the authors went as far as saying that *“the gambling-like features of loot boxes are specifically responsible for the observed relationship between problem gambling and spending on loot boxes”* (p.1). However, given the cross-sectional nature of the study they could not determine whether loot box buying appeals more to problem gamblers than non-problem gamblers or whether loot box buying acts as a ‘gateway’ to problem gambling.

Brooks and Clark (2019) examined the relationships between gaming involvement, loot box buying, and gambling disorder in two small survey studies published in the same paper (144 adults in the first study and 113 university students in the second). Participants completed the Internet Gaming Disorder Scale and the PGSI, as well as answering questions relating to time spent gaming, monthly expenditure, and perceptions concerning the buying of loot boxes. In both studies, the majority of the samples viewed loot box buying as a form of gambling (68.1% in the first study and 86.2% in the second). More than a half had bought loot boxes and approximately one-third had sold a loot box item. They also created a new measure (the ‘Risky Loot-box Index’ [RLI]) and found that scores on the RLI were significantly associated with problem gambling in both studies.

In an online survey, Li, Mills and Nower (2019) examined the relationships between problematic gaming (using the American Psychiatric Association’s criteria for internet gaming disorder from the *Diagnostic and Statistical Manual for Mental Disorders*), problem gambling (using the PGSI), and loot box buying among a sample of 618 adult videogame players. Just under half of the gamers had bought loot boxes (44.2%) and they found that compared to those who had never bought loot boxes, that loot box buyers engaged in more online gaming and online gambling more frequently, and had higher levels of problem gambling and gaming (as well greater levels of mental distress). Using path analyses, they also demonstrated that loot box buying was directly related to the severity of both problem gambling and problem gaming.

Zendle, Meyer and Over (2019b) examined the relationship between loot box buying and problem gambling (using the Canadian Adolescent Gambling Inventory) in a survey of 1,115 adolescents aged 16-18 years. They reported that the association between loot box buying and problem gambling was stronger than that found among previous studies examining adults. They also reported some qualitative data showing that the reasons for loot box buying were similar to reasons for gambling (e.g., fun and excitement). They concluded by claiming that their *“results suggest that loot boxes either cause problem gambling among older adolescents, allow game companies to profit from adolescents with gambling problems for massive monetary rewards, or both”* (p.1).

Zendle et al. (2019a) carried out a study on 1200 participants (61% male, aged 18-40+ years) to determine whether the seven different characteristics and mechanisms of loot box buying (outlined earlier in the chapter) had any associations with problem gambling (again assessed using the PGSI). The results showed a significant positive correlation between (i) loot box spending and problem gambling, (ii) paying for loot boxes and problem gambling, and (iii) loot box spending and problem gambling. The study also found that two loot box characteristics significantly strengthened the relationship between loot box spending and problem gambling (i.e., near-misses, and being able to use in-game currency). The study also found that the more money players made from loot boxes, the more severe their gambling problems were.

In November 2018, the UK Gambling Commission published its annual statistics showing that based on a self-report survey of 2,865 children and adolescents aged 11-16 year-olds, that the

prevalence of problem gambling had risen to 1.7% (2% for boys and 1.3% for girls) compared to 0.4% in 2016 and 0.9% in 2017 (Gambling Commission, 2018). It was speculated that one of the factors behind the increase may have been the playing of simulated gambling games (or gambling-like activities such as the buying of loot boxes) in video games. The Gambling Commission's (2018) report noted that 13% had played gambling-style games online, and that 31% had accessed loot boxes in a videogame or app, to try to acquire in-game items.

Macey and Hamari (2019) surveyed the characteristics of 582 esports spectators who gambled via an international online survey (with 27% of the sample being under the age of 18 years). Participation in gambling and gambling-like activities was found to be 67%, with 4.5% being classed as problem gamblers in the sample using the PGSI. Approximately two-fifths of those who participated in gambling or gambling-like experiences reported that they had bought loot boxes. The study also reported that loot box buying was significantly associated with problem gambling.

Conclusions

Based on the few studies carried out to date, the findings are very consistent that there is an association between problem gambling and loot box buying among both adolescents and adults (and that the association may be even stronger among adolescents). However, it is not known whether being a problem gambler increases the likelihood of engaging in loot box buying or whether being a loot box buyer increases the likelihood of problem gambling because none of the research carried out to date has been longitudinal in nature. Furthermore, all of the empirical research to date has collected self-report data which are subject to well-known methodological biases (e.g., social desirability, memory recall). Theoretical and conceptual analyses suggest that loot box buying is a form of gambling (or at the very least gambling-like) and that gambling regulators should at least consider whether loot box buying should be examined within a regulatory gambling framework. Governments and regulatory bodies should also consider whether individuals aged under the age of 18 years should be legally allowed to buy loot boxes given the large similarities with more traditional forms of gambling.

References

Adams, R.N. (2018). Finland begins investigating loot box practices. Retrieved August 15, 2019, from: <https://techraptor.net/content/finland-investigating-loot-box>

Avard, A. (2017). Video games have a loot box fetish, and it's starting to harm the way we play. Games Radar, October 10. Retrieved August 15, 2019, from: <http://www.gamesradar.com/loot-boxes-shadow-of-war/>

Brooks, G. A., & Clark, L. (2019). Associations between loot box use, problematic gaming and gambling, and gambling-related cognitions. *Addictive Behaviors*, *96*, 26-34.

Batchelor, J. (2018). Loot boxes expected to drive games market to \$160 billion by 2020. Games Industry, May 1. Located at: <https://www.gamesindustry.biz/articles/2018-05-01-loot-boxes-expected-to-drive-games-market-to-usd160-billion-by-2022>

BBC (2019a). EA Games: Loot boxes aren't gambling, they're just like kinder egg. June 20. Located at: <https://www.bbc.co.uk/news/newsbeat-48701962/>

BBC (2019b). Loot boxes should be banned, says US senator. May 9. Located at: <https://www.bbc.co.uk/news/technology-48214293>

Chalk, A. (2019). CS:GO players in Belgium and the Netherlands can no longer open loot cases. *PC Gamer*, July 12. Retrieved August 15, 2019, from: <https://www.pcgamer.com/uk/csgo-players-in-belgium-and-the-netherlands-can-no-longer-open-loot-cases/>

Chansky, E. & Okerberg, E. (2019). Loot box or Pandora's box? Regulation of treasure chests in video games. *National Law Review*, July 22. Located at: <https://www.natlawreview.com/article/loot-box-or-pandora-s-box-regulation-treasure-chests-video-games>

Drummond, A., & Sauer, J. D. (2018). Video game loot boxes are psychologically akin to gambling. *Nature Human Behaviour*, 2, 530-532.

Fisher, S.E. (1994). Identifying video game addiction in children and adolescents. *Addictive Behaviors*, 19, 545–553.

Gambling Commission (2017). *Virtual currencies, esports and social casino gaming – Position paper*. Birmingham: Gambling Commission

Gambling Commission (2018). *Young people and gambling*. Birmingham: Gambling Commission.

Griffin, A. (2019). Loot boxes found in Fortnite, Fifa and other games to undergo overhaul. *The Independent*, August 10. Retrieved August 15, 2019, from: <https://www.independent.co.uk/life-style/gadgets-and-tech/gaming/loot-boxes-fortnite-fifa-odds-chances-rules-uk-a9050176.html>

Griffiths, M.D. (1991). Amusement machine playing in childhood and adolescence: A comparative analysis of video games and fruit machines. *Journal of Adolescence*, 14, 53-73.

Griffiths, M.D. (1993). Fruit machine gambling: The importance of structural characteristics. *Journal of Gambling Studies*, 9, 101-120.

Griffiths, M.D. (1995). *Adolescent Gambling*. London: Routledge.

Griffiths, M. D. (2018). Is the buying of loot boxes in video games a form of gambling or gaming? *Gaming Law Review*, 22(1), 52-54.

Griffiths, M.D. (2018). Gambling loot boxes in video games could be conditioning children. *Metro*, December 6. Retrieved August 15, 2019, from: <https://www.metro.news/gambling-loot-boxes-in-video-games-could-be-conditioning-children/1337389/>

Griffiths, M.D., King, D.L. & Delfabbro, P.H. (2014). The technological convergence of gambling and gaming practices. In Richard, D.C.S., Blaszczynski, A. & Nower, L. (Eds.). *The Wiley-Blackwell Handbook of Disordered Gambling* (pp. 327-346). Chichester: Wiley.

Griffiths, M. D. & King, R. (2015). Are mini-games within *RuneScape* gambling or gaming? *Gaming Law Review and Economics*, 19, 64-643.

Hood, V. (2017). Are loot boxes gambling? *Eurogamer*, November 3. Retrieved August 15, 2019, from: <http://www.eurogamer.net/articles/2017-10-11-are-loot-boxes-gambling>

Kelly, M. (2019). FTC to hold a public workshop on loot box concerns this year. *The Verge*, February 22. Retrieved August 15, 2019, from:

<https://www.theverge.com/2019/2/22/18236352/loot-box-video-game-ftc-workshop-hassan-congress>

King, D.L., Delfabbro, P.H., Derevensky, J. & Griffiths, M.D. (2012). A review of Australian classification practices for commercial video games featuring simulated gambling. *International Gambling Studies*, 12, 231-242.

King, D. L., & Delfabbro, P. H. (2018). Predatory monetization schemes in video games (eg 'loot boxes') and internet gaming disorder. *Addiction*, 113(11), 1967-1969.

King, D.L., Delfabbro, P.H. & Griffiths, M.D. (2010a). Video game structural characteristics: A new psychological taxonomy. *International Journal of Mental Health and Addiction*, 8, 90-106.

King, D.L., Delfabbro, P.H. & Griffiths, M.D. (2010b). The convergence of gambling and digital media: Implications for gambling in young people. *Journal of Gambling Studies*, 26, 175-187.

Lanier, L. (2018). Sixteen European, US gambling regulators teaming up to tackle loot boxes, skin gambling. *Variety*, September 17. Retrieved August 15, 2019, from: <https://variety.com/2018/gaming/news/european-us-gambling-regulators-against-loot-boxes-1202943991/>

Lawrence, N (2017). The troubling psychology of pay-to-loot systems. IGN, April 23. Retrieved August 15, 2019, from: <http://uk.ign.com/articles/2017/04/24/the-troubling-psychology-of-pay-to-loot-systems>

Li, W., Mills, D., & Nower, L. (2019). The relationship of loot box purchases to problem video gaming and problem gambling. *Addictive Behaviors*, 97, 27-34.

Macey, J., & Hamari, J. (2018). eSports, skins and loot boxes: Participants, practices and problematic behaviour associated with emergent forms on gambling. *New Media & Society*. Epub ahead of print, <https://doi.org/10.1177/1461444818786216>.

McCaffrey, M. (2019). The macro problem of microtransactions: The self-regulatory challenges of video game loot boxes. *Business Horizons*, 62, 483-495.

Schwiddessen, S., & Karius, P. (2018). Watch your loot boxes! – Recent developments and legal assessment in selected key jurisdictions from a gambling law perspective. *Interactive Entertainment Law Review*, 1(1), 17-43.

Zendle, D., & Cairns, P. (2018). Video game loot boxes are linked to problem gambling: Results of a large-scale survey. *PLoS One*. 13(11). e6655

Zendle, D., Cairns, P., Barnett, H., & McCall, C. (2019). Paying for loot boxes is linked to problem gambling, regardless of specific features like cash-out and pay-to-win. *Computers in Human Behavior*, in press.

Zendle, D., Meyer, R., & Over, H. (2019). Adolescents and loot boxes: Links with problem gambling and motivations for purchase. *Royal Society Open Science*, 6(6), 190049.