

STUDY

Requested by the IMCO committee



Loot boxes in online games and their effect on consumers, in particular young consumers



Policy Department for Economic, Scientific and Quality of Life Policies
Directorate-General for Internal Policies
Authors: Annette CERULLI-HARMS et al.
PE 652.727 - July 2020

EN

Loot boxes in online games and their effect on consumers, in particular young consumers

Abstract

This paper defines loot boxes and describes their behavioural effects, including problematic behaviour. It examines the regulatory framework at EU and national level within which loot boxes operate, provides an overview of public and industry practices, and derives recommendations.

Framing the debate around loot boxes, away from gambling and towards consumer protection, would provide the EU with an array of tools to address problematic practices and minimise potential harm, especially for minors.

This document was provided by the Policy Department for Economic, Scientific and Quality of Life Policies at the request of the committee on Internal Market and Consumer Protection (IMCO).

This document was requested by the European Parliament's committee on Internal Market and Consumer Protection.

AUTHORS

Dr. Annette CERULLI-HARMS (ConPolicy GmbH)
Marlene MÜNSCH (ConPolicy GmbH)
Prof. Dr. Christian THORUN (ConPolicy GmbH)
Frithjof MICHAELSEN (VVA Brussels SPRL)
Dr. Pierre HAUSEMER (VVA Brussels SPRL)

ADMINISTRATORS RESPONSIBLE

Christina RATCLIFF
Mariusz MACIEJEWSKI

EDITORIAL ASSISTANT

Roberto BIANCHINI

LINGUISTIC VERSIONS

Original: EN

ABOUT THE EDITOR

Policy departments provide in-house and external expertise to support EP committees and other parliamentary bodies in shaping legislation and exercising democratic scrutiny over EU internal policies.

To contact the Policy Department or to subscribe for email alert updates, please write to:

Policy Department for Economic, Scientific and Quality of Life Policies

European Parliament

L-2929 - Luxembourg

Email: Poldep-Economy-Science@ep.europa.eu

Manuscript completed: July 2020

Date of publication: July 2020

© European Union, 2020

This document is available on the internet at:

<http://www.europarl.europa.eu/supporting-analyses>

DISCLAIMER AND COPYRIGHT

The opinions expressed in this document are the sole responsibility of the authors and do not necessarily represent the official position of the European Parliament.

Reproduction and translation for non-commercial purposes are authorised, provided the source is acknowledged and the European Parliament is given prior notice and sent a copy.

For citation purposes, the publication should be referenced as: Cerulli-Harms, A. et al., *Loot boxes in online games and their effect on consumers, in particular young consumers*, Publication for the committee on the Internal Market and Consumer Protection (IMCO), Policy Department for Economic, Scientific and Quality of Life Policies, European Parliament, Luxembourg, 2020.

© Cover image provided by Stefan Coders from Pixabay

CONTENTS

LIST OF ABBREVIATIONS	5
LIST OF BOXES	6
LIST OF FIGURES	6
LIST OF TABLES	6
EXECUTIVE SUMMARY	7
1. INTRODUCTION	10
1.1. Background of the study	10
1.2. Scope of the study	11
1.3. Methodology	11
2. DEFINITION AND CLASSIFICATION OF LOOT BOXES AND IN-GAME PURCHASE SYSTEMS	13
2.1. Definition of loot boxes	13
2.2. Classification of loot boxes	14
2.2.1. Eligibility condition: Access to and cost of loot boxes	14
2.2.2. Selection procedure: Transparency and probabilities of obtaining different items from a loot box	15
2.2.3. Rewards: Loot box contents	16
2.2.4. Value conversion	17
2.3. Other in-game purchase systems	20
3. BEHAVIOURAL EFFECTS OF LOOT BOXES AND IN-GAME PURCHASE SYSTEMS	21
3.1. Problematic game designs and their consequences	21
3.1.1. Pricing and offer strategies	23
3.1.2. Reward structures and presentation features	25
3.2. Specific issues for children and underage players	27
4. THE EU POLICY AND REGULATORY FRAMEWORK FOR LOOT BOXES	31
4.1. European Union policies have not specifically addressed loot boxes	31
4.2. Different ways for dealing with loot boxes at national level	32
4.2.1. The capacity of players to enter into a loot box contract	33
4.2.2. National gambling authorities collaborate to address the issue of loot boxes	33
4.2.3. Loot boxes are not legally considered gambling in most EU Member States	34
4.2.4. In Belgium and the Netherlands, loot boxes are considered gambling	36
5. PRACTICES FROM AUTHORITIES AND THE INDUSTRY	37
5.1. Banning loot boxes that are considered gambling	37
5.2. Providing information about the content of video games	38

5.3. Restricting advertisements targeting minors	39
5.4. Disclosing the probabilities of obtaining different items	39
5.5. Implementing parental and player control mechanisms	40
5.6. Raising awareness of risks among players and parents	40
5.7. Using other in-game purchase systems	41
6. CONCLUSIONS AND RECOMMENDATIONS FOR FURTHER ACTION	42
REFERENCES	44

LIST OF ABBREVIATIONS

AVMSD	Audiovisual Media Services Directive
BEUC	Bureau Européen des Unions de Consommateurs (The European Consumer Organisation)
CPC	Consumer Protection Cooperation
EA	Electronic Arts (game developer and publisher)
EEA	European Economic Area
EGDF	European Games Developer Federation
ESRB	Entertainment Software Rating Board
EU	European Union
GRAF	Gaming Regulators European Forum
ISFE	Interactive Software Federation of Europe
KJM	Kommission für Jugendmedienschutz (Commission for Youth Protection in the Media)
Ofcom	United Kingdom's regulator for communications services
PEGI	Pan European Game Information
UK	United Kingdom
US	United States
USK	Unterhaltungssoftware Selbstkontrolle (Entertainment Software Self-Regulation)

LIST OF BOXES

Box 1:	Different types of games and platforms	10
Box 2:	A brief history of loot boxes	19
Box 3:	Addictive cycle in gaming	23
Box 4:	Classification of underage players and developmental issues	29

LIST OF FIGURES

Figure 1:	Schematic functioning of loot boxes	14
Figure 2:	Pathways to accessing loot boxes	15
Figure 3:	Example of PEGI labels	38

LIST OF TABLES

Table 1:	Classification of loot boxes	17
Table 2:	Different kinds of value conversion in loot boxes	18

EXECUTIVE SUMMARY

Background

Loot boxes are features in video games which are usually **accessed through gameplay, or which may be optionally paid for** with real-world money. They are '**mystery boxes**' which contain **randomised items**, so players do not know what they will get before opening. Players can access diverse types of in-game content through loot boxes such as **cosmetic items** for game customisation (e.g. skins and new looks for the player's avatar) or **items affecting gameplay** (e.g. tools, weapons, levels, maps, in-game currency etc.) which could, for example, help players compete better or advance more quickly.

Their original purpose is to **keep games interesting** through variety and novelty. They are also an important way for the industry to **monetise** their games, especially free-to-play games, but also traditional formats including console games. The money made through 'microtransactions' (including for purchasing loot boxes) is significant. For instance, in 2018, the European video game market was worth 21 billion Euro, with a 15% year-on-year growth rate. The Interactive Software Federation of Europe (ISFE) **estimates 34% of turnover resulting from in-app purchases and paid apps, including loot boxes**¹.

While in-game purchases are an important source of income for game developers, loot boxes raise potential concerns from a consumer protection perspective. Due to their random reward mechanisms, loot boxes bear a close resemblance to games of chance. Some are thus concerned that they could serve as a '**gateway**' from **gaming to gambling**. This would pose a particular challenge for **children and adolescent protection** as many games containing loot boxes are also played by children.

Findings

Some gambling researchers say loot boxes are 'virtual games of chance' (Griffiths, 2018) or a systematic attempt to turn gamers into gamblers². Others, such as academics in IT and industry representatives suggest that they resemble 'mystery boxes' found in other consumer markets such as collectors' card packs (e.g. sports, Pokémon etc.), or traditional whack-a-mole games at popular fairs. At a general level, **loot boxes are random reward mechanisms accessed through play or optionally through pay**.

Many different types of loot boxes exist. They vary in:

- **access and cost:** Loot boxes are accessed through gameplay, waiting time, ad-viewing, or they can be paid for. Their cost can vary substantially both in terms of real-world money as well as in hours of gameplay required to access them. Some loot boxes can be accessed repeatedly if the desired item was not yet obtained;
- **transparency and probabilities of obtaining different items from a loot box:** Some loot boxes return different content with similar probabilities – meaning that all possible items are equally common – while in others specific items are rare (low probability to appear) and common (high probability to appear). The probabilities of obtaining different items can be known or unknown to the player before opening a loot box, although major industry players have committed to increasing transparency in this regard;

¹ See ISFE (2019b) Key Facts on 2018 trends and data citing sources from Newzoo 2018 Global Games Market and own data.

² This was said by Prof Tilman Becker, a gambling researcher interviewed for this study.

- **content:** Loot boxes contain items which are either purely cosmetic or which affect gameplay. The content can be useful and valuable for the player, or worthless; and
- **value conversion:** Contents can sometimes be converted to in-game currency or even real money. This appears to be a niche phenomenon which is unwanted by game publishers and forbidden according to their terms and conditions. Nevertheless, this practice exists and it is the one that is most closely linked to gambling.

The main **difference between loot boxes and other in-game purchase systems is the element of chance**. With loot boxes players do not know the precise items they are purchasing before making the transaction. Other in-game purchase systems include the direct purchase of items, ad-viewing, the purchasing of add-ons and extensions, game passes or battle passes and such like.

Some research on the behavioural effects of loot boxes exists but **more research is needed to provide robust and conclusive findings**. Some research has found that problem gambling and paying for loot boxes are related. However, there is no consensus on a causal link between loot boxes and harmful behaviour. Indeed, those who liken loot boxes to 'mystery boxes' prevalent in other consumer markets, also argue that they are no more nor less harmful than these other random reward practices.

While various interviewed experts and some authorities agree that **not all loot boxes carry risks**, some loot boxes are surrounded by **problematic game designs** which could have adverse **psychological and financial consequences**. Some game designs resemble **addictive designs** of conditioning, known, for example, from slot machines. Opaque offer and **pricing techniques** could cause **unwanted or uncontrolled spending**. However, such designs are **not limited to loot boxes but found in games more broadly** and some are well-known from other consumer markets.

Even though many games with loot boxes are **not specifically targeted at children**, they still play and pay. Research on the effects of loot boxes on children's behaviour in online games is even more limited than the research on adults. Drawing from general research on developmental psychology, it appears however that children **could potentially be more vulnerable to problematic game designs**. This is because children have a reduced ability to exert self-control and more difficulties in understanding valuation and probabilities in games.

There are stories of massive overspending by children in games, however, these seem to be anecdotes rather than the norm. Surveys of children and parents suggest that many children regularly spend money in games, including for loot boxes, but that the average monthly spending of most children is contained.

Loot boxes are subject to general national legislation on contracts and consumer protection. In addition, several national authorities have **investigated under what conditions loot boxes may qualify as gambling**. With the exception of Belgium, the Netherlands and Slovakia, no European Union (EU) country has come to the conclusion that loot boxes fulfil their national gambling criteria. As a result, only these countries have so far taken or are considering taking regulatory steps to ban loot boxes. In those countries that have already banned them, this has led to the withdrawal of the loot box feature from games in these markets. In other countries, less invasive action has been taken including awareness raising and developing guidelines for parents and players.

In addition, the video game industry has taken some steps to address concerns about loot boxes. For example, boxed games and games in most online stores that include in-game purchases are **labelled accordingly**. Moreover, many platforms such as Google Play and Apple's App Store require that games containing loot boxes **display the probabilities of winning** different items. Awareness raising campaigns and **player and parental control tools** have been rolled out or improved to help manage

undesirable behaviours such as excessive screen times and (over) spending. Many game publishers are also **moving away from loot boxes** and towards a wider use of other in-game purchasing systems which do not rely on random rewards.

Recommendations for further action and conclusions

As a result, it appears that consumer protection should be focused on problematic game designs more broadly, rather than focussing too narrowly on loot boxes. **Since gambling is a national competence of the Member States, approaching the issue from this angle may lead to a fragmented market for video games within the EU.** For example, consumers in Belgium and the Netherlands currently do not have access to the same game versions as consumers in other Member States, and video game publishers cannot offer the same game across the whole Single Market.

It is therefore recommended to tackle problematic game designs from a wider consumer protection perspective. In this domain, the European Union has the discretion to act through a broad range of means, ranging from non-binding recommendations to mandatory legislation. The effectiveness of existing initiatives, for example the provision of information about video game content and purchase systems to consumers, making parental control tools available and accessible, and raising awareness among players about problematic game design, should be verified. This could be done, for example, through consumer testing. Based on such an assessment, the European Union could take steps to complement and strengthen the protection of (young) players.

1. INTRODUCTION

1.1. Background of the study

Video gaming represents a significant market with a global annual turnover of 83 billion Euro in the year 2019³. The turnover of the European video game industry in 2018 was 21 billion Euro, with 54% of the EU's population (about 240 million people) playing video games⁴.

Within the wide range of game designs and innovations that have emerged, one particular feature has become increasingly popular, while also causing controversy among some players, consumer advocates, policymakers and regulators: loot boxes. When loot boxes are paid for, they are accessed through 'in-game purchases' or 'microtransactions'. The money exchanged through such microtransactions is significant. **ISFE estimates that 34% of turnover comes from in-app purchases and paid apps, including loot boxes**⁵. While more precise data on loot box spending is difficult to find, estimates from the UK Gambling Commission (2019) survey of almost 3 000 children aged 11 to 16 suggest that around 23%⁶ have paid money to open loot boxes. More recently, the UK's regulator for communications services, Ofcom (2020), published results from a nationally representative survey and found that 4% of UK adult gamers and 3 to 6% of children aged 8 to 15 have spent real money on loot boxes.

Box 1: Different types of games and platforms

The gaming industry can be categorised in different ways. This study uses the following terms:

- **video games** are the widest category of games comprising mobile and other platform games, such as PC and console games;
- **mobile games** are (video) games which are played via mobile devices such as (smart) phones and tablets. In the last years, mobile games had the largest market share over other platforms⁷; and
- **online games** represent an additional layer for all types of games. They relate to games that have elements which are played online. Online games can have elements in which players interact with each other, so called multi-player games.

Source: Authors' own elaboration.

From a consumer protection perspective, loot boxes raise potential concerns. Due to their random reward mechanisms, loot boxes bear a close resemblance to games of chance. Some are thus concerned that they could serve as a **'gateway' from gaming to gambling** (Drummond & Sauer, 2018). This would pose a particular challenge for **children and adolescent protection** as many games containing loot boxes are also played by children. Moreover, loot boxes could lead to excessive screen times, and trigger broader **psychological and financial consequences** if players and parents do not control their own or their children's play habits and spending.

³ These figures compare to revenues of respectively 37 and 49 billion Euro for the global film and music industries (Statista 2019, 2020).

⁴ See ISFE (2019b) and ISFE's Official Website, <https://www.isfe.eu/games-in-society/>.

⁵ See ISFE (2019b) Key Facts on 2018 trends and data citing sources from Newzoo 2018 Global Games Market and own data.

⁶ The report found that 52% of surveyed children have heard of in-game items and 44% of those who were aware of in-game items declared having paid to open loot boxes. This results in approx. 23% of all interviewed children having paid for loot boxes.

⁷ Wijman, T. (2019), The Global Games Market Will Generate \$152.1 Billion in 2019 as the U.S. Overtakes China as the Biggest Market.

These concerns motivated authorities across the globe to look into the effects of loot boxes and also led to the commissioning of this study, the objective of which is to analyse loot boxes in online games and their effect on consumers, in particular young consumers.

1.2. Scope of the study

Within this context, the study:

- reviews recent behavioural studies on loot boxes and addictive designs;
- explores in-game purchasing systems and other monetisation strategies and their potential behavioural effects, in particular on young consumers;
- takes into account any recent developments from the European Commission;
- compares the different regulatory approaches and the relevant legal (national law) frameworks;
- identifies examples of best practices (within the EU or at international level); and
- puts forward recommendations on how to improve the regulation of loot boxes, particularly with regards to young and vulnerable users.

In the analysis, the European Union's freedom to provide services, the Member States' autonomy to organise their gambling services, the varying legal classifications of loot boxes across jurisdictions, and the relation between gaming and gambling, are considered.

1.3. Methodology

This study was conducted between 6 April and 3 July 2020. It used the following data collection and analysis tools:

A **literature review** on loot boxes, video gaming and gambling, addictive designs with a particular focus on the behavioural effects of loot boxes, and studies looking at their effects on young and potentially vulnerable consumers. To this end, the research team reviewed academic articles, conference papers, grey literature including literature by regulators and consumer bodies, industry reports, newspaper articles, and blog posts.

Seven **semi-structured expert interviews** with representatives from academia, the gaming industry, regulatory bodies and a consumer organisation were conducted. Each interview lasted roughly one hour and was based on a number of questions around loot boxes and other in-game purchases systems, their purposes and behavioural effects, best practices, and (self-)regulatory actions taken so far. Those individuals interviewed were:

- **academia:** Prof Tilman Becker, Managing Director of the Gambling Research Centre at the University of Hohenheim;
- **regulation:** A former regulator who took part in the Gaming Regulators European Forum (GREF) working group;
- Representatives from the **consumer advocacy group** Consumer Choice Center which was founded 3 years ago and supports lifestyle freedom, innovation, privacy, science, and consumer choice⁸; and

⁸ The European Consumer Organisation BEUC (Bureau Européen des Unions de Consommateurs) was also contacted for a consultation. They declined to participate as the topic is outside of BEUC's current priorities and in-house staff knowledge.

- **gaming industry:**
 - Dirk Bosmans – Operational Director at Pan European Game Information (PEGI).
 - Two experts working for and with game developers and publishers for over 20 years.
 - Two representatives from industry bodies: namely one from ISFE and one from the European Games Developer Federation (EGDF).

A **desk-based review of EU and national policies and regulation** around loot boxes, including European Commission communications, national gambling legislation, position papers, and decisions of national gambling authorities.

A **survey of European national gambling authorities** which focused on how loot boxes are qualified under national law and whether the authorities have taken regulatory action. The survey questionnaire was shared with 29 gambling authorities (from the EU Member States as well as the United Kingdom (UK) and Norway), and 28 of the 29 authorities replied.

A **cross-analysis** of the collected evidence to identify **current practices** regarding how the industry and regulators deal with loot boxes and **recommendations** for further action.

The remainder of this study is structured as follows:

- section 2 defines loot boxes (2.1) and shows a classification of different types of loot boxes (2.2), it also gives a brief history of loot boxes and finishes by describing other in-game purchase systems (2.3);
- section 3 explains the behavioural effects of loot boxes and other in-game purchase systems, including different types of problematic game designs which can be found in loot boxes and in games more broadly (3.1) and discusses specific issues for children (3.2);
- section 4 presents recent legal and policy developments including those taken by the European Commission (4.1) and those taken at the national level (4.2);
- section 5 identifies practices from authorities and the industry for dealing with loot boxes; and
- section 6 shows recommendations for further actions and concludes the study.

2. DEFINITION AND CLASSIFICATION OF LOOT BOXES AND IN-GAME PURCHASE SYSTEMS

KEY FINDINGS

Loot boxes are features in video games which are usually accessed through gameplay, or which may optionally be paid for with real-world money. They are 'mystery boxes' which contain randomised items, so players do not know what they will get before opening them.

Loot boxes vary in the way they are accessed, their cost, how the random reward is selected and in the content they return. These differences impact players' gaming experience, spending in terms of time and money, transparency and predictability of the loot boxes' contents.

Other in-game purchase systems exist. Their main difference compared to loot boxes is the absence of a random draw. Players therefore know what they will receive prior to purchasing. In some cases, in-game purchases can give access to the same content as can be acquired through loot boxes.

This section defines (section 2.1) and classifies loot boxes according to their main characteristics (section 2.2). It describes where loot boxes originate and the challenges they pose. Section 2.3 then describes other in-game purchase systems.

2.1. Definition of loot boxes

Various studies have looked at and defined loot boxes. Some noteworthy definitions from different backgrounds are:

The Belgian FPS Justice Gaming Commission defines loot boxes as '*...the umbrella term for one or more game elements that are integrated into a video game whereby the **player acquires game items either for payment or for free in an apparently random manner***' (Kansspelcommissie, 2018).

The Netherlands Gambling Authority writes: '*Loot boxes are a type of **treasure chest** that are built into a growing number of games. Loot boxes in games create a **mixing of games of chance and games of skill**. Although the outcome of games is determined by skill, the outcome of loot boxes is determined by chance.*' Kansspelautoriteit (2018).

Academics in the field of computer science Zendle et al. (2020b) describe loot boxes as '*... items in video games that **may be bought for real-world money**, but which provide players with a **randomised reward of uncertain value***⁹.

According to interviewed industry representatives loot boxes are 'rewards' for players which are accessed usually through gameplay and may **optionally** be purchased for money. Some voices however are more critical, especially those of academics who conduct research on gambling. Griffiths (2018) says paid-for loot boxes '*are (in essence) **virtual games of chance***' and Prof. Becker (interviewed for this study) suggests that loot boxes are a systematic attempt to turn gamers into gamblers.

⁹ This definition was also cited by the UK Parliament (House of Commons, 2019).

Others again argue that loot boxes are the video-game counterpart to 'mystery boxes' seen in other consumer markets, such as Kinder surprise eggs, collectors' card packs (e.g. sports cards, Pokémon cards etc.), claw machines and whack-a-mole games found at popular fairs and game arcades¹⁰. All of these are purchased by the consumer without any certainty of what they will receive.

Taking the above definitions together, the **working definition** of loot boxes for this study is: Loot boxes are features in video games which are usually **accessed through gameplay**, or which **may optionally be paid for with real-world money**. They are 'mystery boxes' which **contain randomised items**, so players do not know what they will get before opening.

2.2. Classification of loot boxes

The following classification describes loot box characteristics that were uncovered in the literature review or mentioned by interviewed experts. The classification is a list of features without an assessment of how common the various features are in practice.

Loot boxes exist in several gaming genres including card, shooting, sports or role-play games and exist on all platforms and distribution channels, namely consoles (e.g. Xbox, Play Station), PC and mobile (e.g. phone and tablet) games. Loot boxes are often given game-specific names or are labelled as 'mystery boxes', 'crates', 'chests' etc.

All loot boxes are characterised by the following structure described in Figure 1.

Figure 1: Schematic functioning of loot boxes



Source: Based on Nielsen & Grabarczyk, 2019.

Despite these commonalities, there are **important variations in how loot boxes are designed and used**. These variations influence the different steps of the above schema. Following Figure 1, the subsequent paragraphs describe loot box characteristics for each part of the schema and are summarised thereafter in Table 1.

2.2.1. Eligibility condition: Access to and cost of loot boxes

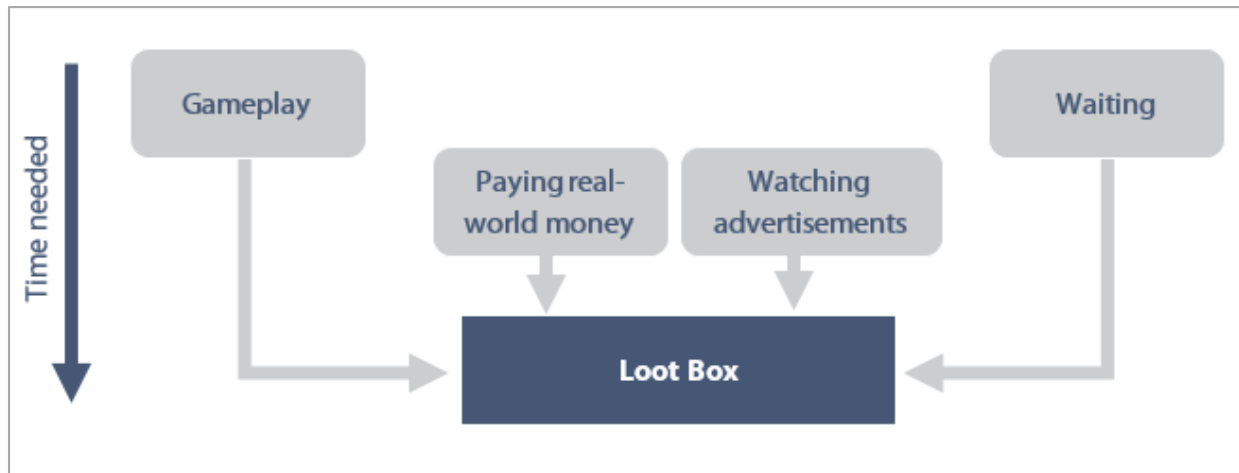
Shown below, Figure 2, players become eligible in various ways. Most commonly, players access loot boxes through **gameplay**. Some game developers also insert **waiting times** as a way of accessing loot boxes. For instance, players may need to wait for a certain time period, until the next play session, or until a specific moment (e.g. the next day) to access a loot box. In some cases, gameplay or waiting times **can be skipped** if the loot box is instead **paid for with real-world money**, or by **watching advertisements**. **Payment is usually an option in addition to the other pathways**. Payment happens through real-world money or in-game currency (which needs to be earned through gameplay

¹⁰ Similar and other examples are listed, for example, in BBC, 2019b and Nielsen & Grabarczyk, 2019.

or paid for with real-world money).

The same loot box may often be accessed repeatedly in case the desired item was not yet obtained. Repeat access is often gained through payment to speed up the process.

Figure 2: Pathways to accessing loot boxes



Source: Authors' own elaboration.

The cost of loot boxes can vary substantially – both in terms of gameplay¹¹ required to access them and also the real-world monetary value attached to them. According to interviewed experts from different backgrounds, if access to loot boxes has to be paid for, it is common to find prices from a few Euro to a hundred Euro or more for in-game currency which can be used to open loot boxes. For example, in the game *Overwatch*, loot boxes can be purchased in bundles with two boxes costing 1,99 Euro and 50 boxes costing 39,99 Euro (Fandom Overwatch Wiki, n.d.). The game *Apex Legends* is said to contain a series of loot boxes which cost 7 US dollars (approx. 6 Euro) each. However, if a player wants to obtain the rare 'heirloom axe', they need to have opened a number of loot boxes to obtain all other available items first and then pay an additional 35 US dollars (approx. 30 Euro) for the final box. This could require them to spend up to 170 US dollars (approx. 150 Euro) on this item (CNN Business, 2019; Forbes.com, 2019).

2.2.2. Selection procedure: Transparency and probabilities of obtaining different items from a loot box

Regarding the selection procedure, these are usually random or rather algorithmic draws. The selection procedure might return different items with **equal probabilities**. This would mean that all items which could be contained from a loot box are equally common. Otherwise, the selection procedure might be programmed so that **some items are rare and others much more common**. For example, in *Overwatch*, the probability to obtain specific items from loot boxes ranges from around 2% to around 50% (Fandom Overwatch Wiki, 2019). The relative rarity of items usually reflects also the worth they represent for players with some being rare and valuable and others being common and sometimes worthless instead (Griffiths, 2018). For example, in a golf game a player might value a special club which is a rarity in a loot box while golf balls are common and usually owned in abundance already.

In terms of **transparency**, the probabilities of obtaining different items from a loot box used to be

¹¹ Intense and sometimes repetitive gameplay to earn points or in-game currency is also called 'grinding'. Grinding can therefore represent a high cost for accessing a loot box.

widely unknown to players. However, the mobile game distributors Apple and Google now **require game publishers to display probabilities**¹². According to industry organisations ISFE and EGDF, many game developers beyond mobile games have also **increased transparency** by displaying the probabilities of obtaining different items (ISFE, 2019c). However, there still exist games and platforms which do not adhere to this practice and they continue to offer loot boxes whose **probabilities remain unknown** to the player.

Whether or not probabilities of obtaining different items are displayed, the underlying selection mechanism is usually unknown to the player and controlled by the game developer. According to EGDF, game developers incorporate so-called 'pity timers' into loot box mechanisms. This means, that in case a user has opened the same loot box repeatedly to obtain a specific (rare) item – say which occurs only with a 1% chance – the player would obtain the item with certainty at the 100th opening, if it was not obtained earlier.

2.2.3. Rewards: Loot box contents

Players can access diverse types of **in-game content** through loot boxes such as **cosmetic items** for game customisation (e.g. skins and new looks for the player's avatar) or **items affecting gameplay** (e.g. tools, weapons, levels, maps, in-game currency etc.). Cosmetic items can be online status symbols (Kansspelcommissie, 2018) but do not affect the competitiveness of players. Instead, items in the latter category can help players gain strength or advance more quickly. The practice of paying for this type of loot boxes is often coined as **'pay-to-win'** (Zendle et al., 2020a)¹³.

Table 1 summarises the different possible characteristics of loot boxes described above.

¹² See respectively Apple's App Store Review Guidelines for Developers and Google Play's Developer Policy Center, available at: <https://developer.apple.com/app-store/review/guidelines/#in-app-purchase>; <https://play.google.com/intl/en-gb/about/monetization-ads/>, both accessed 24 May 2020.

¹³ Pay-to-win is frowned upon in the European gamer community. According to EDGF, it is instead a common and widely accepted practice in Asia.

Table 1: Classification of loot boxes

Eligibility condition	
Access to loot boxes	
Gameplay, waiting time	Payment of real-world money, watching advertisements (both are usually options alongside gameplay)
Cost of loot boxes	
Low: e.g. some gameplay (finishing a level), a few Euro (1 to 2 Euro)	High: e.g. heavy (several hours) and often repetitive gameplay (so-called grinding), costs of up to 100 Euro and more have been observed
Selection procedure	
Transparency ¹⁾	
Probabilities of obtaining different items are known to the player.	Probabilities of obtaining different items are not known to the player.
Probabilities of obtaining different items	
Different item have a similar likelihood to appear in a loot box.	Some items might be rare (e.g. appear in only 2% of cases) and others common (appear in 50% of cases).
Reward	
Content of loot boxes	
Purely cosmetic (customisation) e.g. looks of the player's character, etc	Affect gameplay e.g. tools, weapons, maps, 'super powers'

Source: Authors' own elaboration based on reviewed literature and expert interviews.

Note: 1) Major industry players have committed to increasing transparency in this regard.

2.2.4. Value conversion

Last but not least, there is one more consideration which lies beyond the characteristics shown in Figure 1 and Table 1, namely that in some games players can convert the content of their loot box (Macey & Hamari, 2018; Zendle et al., 2020a; Drummond & Sauer, 2018). Value conversion can let users **gain outside-game value from loot box contents**. Usually, content gained through loot boxes is linked to the player's account and cannot be traded outside the game. However, sometimes in-game items can be exchanged between players, or converted into in-game currency which, in turn, can be converted into 'platform' money and spent on other games or elsewhere¹⁴. It is this practice which links loot boxes potentially to gambling as digital rewards might be converted into something of (speculative) real-world value.

Nielsen & Grabarczyk (2019) introduce a classification of games containing loot boxes that helps understand under which circumstances loot boxes can be considered gambling according to legal definitions in various Member States (for more detail, see section 4.2). **The classification is based on the link of the eligibility criterion and the reward (see Figure 1) to real-world money (i.e. value**

¹⁴ This practice is further described for example in: Zendle et al. 2020a and Drummond & Sauer, 2018.

conversion). When value conversion to real-world money is possible, according to the authors, the items are '*embedded*' in the everyday economy. On the other hand, virtual items or currency that have no link to real-world money are '*isolated*' from the everyday economy (Nielsen & Grabarczyk, 2019: 192-193).

In a game that contains loot boxes, the eligibility criterion to obtain a loot box, the reward obtained from a loot box, or both, can be either embedded or isolated. This leads to **four different types of games containing loot boxes** (Table 2).

Table 2: Different kinds of value conversion in loot boxes

Type	Eligibility condition	Reward	Examples
I-I	Isolated (non-purchasable)	Isolated (non-sellable)	Horizon Zero Dawn, Diablo 1, Diablo 2
I-E	Isolated (non-purchasable)	Embedded (virtual sellable object)	Diablo 3 (with auction house)
E-I	Embedded (real money purchase)	Isolated (virtual unsellable object)	Overwatch, FIFA 17 Ultimate Team
E-E	Embedded (real money purchase)	Embedded (virtual sellable object)	PlayerUnknown's Battlegrounds (PUBG), Team Fortress 2, Counter-Strike: Global Offensive

Source: Nielsen & Grabarczyk, 2019: 196.

As elaborated further in the legal analysis in section 4.2.3, only games in the E-E category could fall within most Member States' legal definition of gambling. According to industry representatives and ISFE (2019d), this **practice is unwanted and forbidden in game publishers' terms and conditions** and only facilitated through **unauthorised third-party websites** (for further detail, see section 4.2.3).

Box 2: A brief history of loot boxes

There are different opinions on the origin of loot boxes. Some industry experts claim they **always existed in video games**, e.g. as boxes with random content holding for example coins, invincibility or extra lives. These tools – just like loot boxes today – allowed developers to **introduce elements of surprise and keep games interesting** even if played repeatedly (Nielsen & Grabarczyk, 2019). However, such content simply appeared throughout the game and **could not be purchased**.

Others claim that loot boxes have their origins in **Japanese vending machines called 'gachapon'**. Using a gachapon machine means making a **'blind purchase'** – the user inserts a coin and obtains an item by chance, or purchases a blind-packaged item without knowing its content. Gachapons distribute figurines and items which can carry collectible value. But users can also obtain items which they already own, or which carry little value for them. At present, loot boxes are sometimes referred to as **'gacha'**, acknowledging this origin.

Loot boxes spread across the globe for many years have generated **significant revenues** for the industry, facilitated **innovative game designs** and created **entertainment value** as many players seem to specifically enjoy accessing and collecting loot boxes. They became especially widespread in mobile games as the **'free-to-play'** business model continued to gain traction. Since thousands of games are downloadable for free, or for a small price like 0.99 Euro, mobile game players are not **willing to pay more up front**. Free-to-play games allow players to start playing and **either never pay, or choose to continue or enhance the gaming experience through in-game purchases such as loot boxes**.

However, since at least 2012, loot boxes have caused controversies as they have been increasingly linked to online gambling. In fact, Japan was the first country to issue legislation against some forms of 'gacha' because of the problematic nature of random rewards¹⁵.

At a global level, loot boxes were widely unnoticed outside the gaming community until 2017. That year, the game *Star Wars Battlefront 2* was released with loot boxes in a preview version for a limited set of players. It was a **PC/console game** with a standard retail price tag. However, in this game, **major content** (such as popular characters like Luke Skywalker and Princess Leia) was locked and **'hidden' in loot boxes**. These loot boxes were accessible after many hours of gameplay, or they could be accessed more quickly if paid for.

This resulted in an immediate and wide-reaching **backlash from players** who felt that the use of loot boxes was **unbalanced and unfair** (Gilbert, 2017). Players were frustrated that many of the most popular characters were not accessible right away. They also did not expect to see paid-for loot boxes in a premium-priced console game. Due to the magnitude of the backlash in the preview version, the game publishers (*Electronic Arts (EA)*) changed the game prior to the official launch to remove paid-for loot boxes. Nevertheless, this episode increased **awareness** about loot boxes in the gaming community and it also caught the **attention of regulators**.

Source: Authors' own elaboration.

¹⁵ The Fine Line between Gambling and Gaming: The Short International History of Loot Box/Gacha and Regulations for all Game Devs. Available at: <https://cs-agents.com/blog/history-loot-box-gacha/> and Bloomberg (2018) The Good Times are Over for Japan's Loot-Box-Style Gaming Bonanza. Available at: <https://www.bloomberg.com/news/articles/2018-11-05/the-good-times-are-over-for-japan-s-loot-box-style-gaming-bonanza>, accessed 25 May 2020.

2.3. Other in-game purchase systems

The main difference between paid-for loot boxes and other in-game purchase systems is the element of chance. With loot boxes, gamers do not know what they will get, whereas in other types of in-game purchases they do¹⁶.

Some games offer the same contents found in loot boxes through **non-random in-game purchases**. Others offer different content through different outlets, or they only use one or another monetisation strategy. As mentioned by industry experts (including the organisations ISFE and EGDF), these are business decisions of the game developers/publishers.

Given the issues around loot boxes, according to interviewed experts from industry, regulation and a consumer organisation, many game developers and publishers are **increasingly moving away from loot boxes** and they are using other forms of in-game purchases and other business models – such as subscriptions – to monetise their games.

There are at least the following four other kinds of in-game purchase systems¹⁷:

- **direct purchase of items:** Players can pay for cosmetic items and items affecting gameplay directly;
- **ad-viewing:** Players can watch advertisements in order to unlock in-game items. Ad-viewing is therefore another 'currency' alongside real-world money and gameplay. Industry experts stated that ad-viewing is sometimes offered to players who have never spent real money in a game to allow game publishers to nevertheless monetise the player¹⁸;
- **add-ons and extensions:** Video games, especially on console and PC, can be distributed in various versions from basic to premium and carry different price tags. In a basic version, players might receive offers to **unlock further content** through in-game purchases. Moreover, game publishers might release newly developed contents (extensions) at a later stage. These contents can be downloaded following payments; and
- **game passes, battle passes etc.:** Similar to add-ons and extensions, game passes or battle passes give **access to specific content, levels or worlds**. For example, players of a car racing game might wish to meet up with others to compete on a specific racetrack. To do so, access to this track might need to be bought through a pass. Such passes are sometimes available in (monthly) subscriptions¹⁹.

¹⁶ The interviewed experts unanimously mentioned this key difference.

¹⁷ These have been named and described by the various interviewed experts and verified by the research team to the extent possible through various sources.

¹⁸ Google Play lists ad-based models in their guidelines about monetisation options for developers: <https://play.google.com/intl/en-gb/about/monetization-ads/>, accessed 05.06.2020.

¹⁹ Examples of such subscriptions are discussed here: <https://www.gamerefinery.com/battle-pass-trend-mobile-games/#:~:text=One%20interesting%20difference%20from%20the.want%20access%20to%20premium%20content.>

3. BEHAVIOURAL EFFECTS OF LOOT BOXES AND IN-GAME PURCHASE SYSTEMS

KEY FINDINGS

More research into the behavioural effects of loot boxes on players is needed. Some research has found a link between problem gambling and spending on loot boxes, but the direction of causality is unknown.

Not all loot boxes carry risks. Still, some games use problematic designs which are linked, but not restricted, to loot boxes. Some problematic designs relate to opaque pricing and offer techniques, others relate to rewards and presentational features, some of which could be addictive.

Games with loot boxes might not be specifically targeted at children but they still play and pay. Due to their cognitive development, children could potentially be more vulnerable to problematic design practices compared to adults.

Since loot boxes have raised concerns among some players, experts and regulators, this section describes the behavioural effects of loot boxes and in-game purchase systems on the players themselves. Section 3.1 presents the existing research on the behavioural effects of loot boxes as well as examples and consequences of problematic game designs. Section 3.2 looks at specific implications for children.

3.1. Problematic game designs and their consequences

According to experts from regulation authorities and industry bodies, many video games and certain types of loot boxes are unproblematic with regards to their form of monetisation and design mechanisms. Similarly, some authorities acknowledge that **not all loot boxes carry risks** (The Senate: Commonwealth of Australia, 2018) and only a small number of loot boxes seem to constitute a legal form of gambling²⁰.

There are a number of research papers available on loot boxes and the behavioural effects of game designs more generally. Nevertheless, the analysis of loot boxes' behavioural effects is particularly challenging, as **more systematic research is needed** to establish clear links between loot boxes and behavioural outcomes for players, in terms of both the gameplay and spending patterns they elicit. Some of the existing evidence can be summarised as follows:

Research from the field of psychology has found a link between game design mechanisms (e.g. reward and punishment features) and problematic gameplay behaviours (King et al., 2011). Many of these design mechanisms increase players' **screen times**. Although longer screen times are widely seen as a problem, scientifically it is not entirely established whether longer screen times have negative impacts on users (Przybylski & Weinstein, 2017). Hence, long screen times might be a by-product rather than the main problem. However, King et al. (2011) do find that **certain game mechanisms may contribute to problematic gaming practices**, defined as an '*irresistible urge to play, and experiencing a growing tension that could only be relieved by playing*' (Desai et al., 2010).

²⁰ See for example Swedish Consumer Agency (2019) and further discussions and evidence discussed in sections 4 and 5.

Hamari (2011) uncovered that the behavioural effects of some game designs, including but not limited to loot boxes, can be explained using known techniques from behavioural economics such as **loss aversion**.

A number of researchers, mostly from IT and psychology backgrounds, are looking into the links between loot boxes and gambling:

Psychologists Drummond and Sauer (2018) as well as Griffiths (2018) argue that **some loot boxes share characteristics with gambling and could thus be a gateway to more serious problem gambling**. Without attempting a legal classification, the authors list criteria under which loot boxes could be considered gambling. They also classify and discuss that selected games fulfil their gambling criteria.

Another strand of research, led by psychologists, gambling, IT and gamification researchers, seeks to establish an empirical link between loot boxes and gambling (e.g. Brooks & Clark, 2019; Zendle & Cairns, 2018 & 2019; Zendle et al., 2020a). These studies share a similar approach: they all used surveys of online gamers drawn from various platforms and social media or university students. They then asked participants to self-declare their spending practices *vis a vis* loot boxes (and other gaming or gambling activities), and whether they associate loot boxes with gambling, and assess their degree of problem gambling behaviour.

The various authors **find a link between paying for loot boxes and problem gambling behaviour**. All mentioned authors however recognise that they are **unable to conclude that loot box spending causes problematic gambling behaviour**. They observe a correlation between loot box spending and gambling-related measures. For example, in the Zendle and Cairns (2019) analysis, the average spending on loot boxes was 11.14 US dollars (approx. 10 Euro) for non-problem gamblers while it was 38.24 US dollars (approx. 34 Euro) for problem gamblers. However, the researchers are unable to establish whether loot box spending leads to problem gambling, or whether online game players with pre-existing gambling problems are especially attracted to spending money on loot boxes. They also acknowledge that their results have **limited generalisability** due to the nature of the used samples and call for more research to reach robust conclusions. Nevertheless, Zendle and the co-authors believe their results present a justification for regulating loot boxes, for example by restricting children's access to them.

Despite a lack of further evidence in the scientific literature, it appears that **some loot boxes use problematic design features**. This view was confirmed by interviewed experts from all backgrounds. These features could influence the motivation of players in a way that could lead to problematic outcomes for users, including **psychological and financial consequences** such as addictive behaviours or problematic spending.

As an illustration, Box 3 describes a typical addictive cycle in gaming and/or gambling and relevant psychological factors promoting addictive behaviour. Patterns described in the box can help to understand how the mechanisms described later in this section might give rise to problematic behaviours such as addictions.

Box 3: Addictive cycle in gaming

Addiction is a learned compulsive engagement to an addictive stimulus which remains in the face of adverse consequences (APA, 2013). Operant learning theory argues that certain behavioural patterns can be strengthened by using the **principle of reinforcement**, which consists of using rewarding stimuli to strengthen and punishing stimuli to decrease a behaviour (Skinner, 1965; Mook, 1995). **A certain behaviour can become addictive if it is rewarding, associated with immediate pleasure and repeated.**

The use of a slot machine is a typical example for an addiction cycle, which is like a feedback loop or also termed 'ludic loop' in gambling research (Schüll, 2014).

Rewards are stimuli or goods that are **associated with winning** and elicit pleasure for the player. In the example of slot machines, there can be different kinds of rewards, reinforcing the gaming behaviour. Extrinsic rewards include **accumulating points, hitting the jackpot and receiving real money**, visual or auditory rewards in the form of **flashing lights, ringing noises** as well as receiving **social approval** by others. At the same time, there are potential intrinsic rewards, such as **performing well or outperforming** other players (Fisher & Griffiths, 1995).

In the Diagnostic and Statistical Manual of Mental Disorders, **problem gambling or gambling disorder** is defined as the '*persistent and recurrent problematic gambling behaviour leading to clinically significant impairment or distress*' (APA, 2013) that leads to severe difficulties in personal and professional life (Zendle et al., 2019) and is associated with depression and suicide (Newman & Thompson, 2003; Lorains et al., 2011), as well as with bankruptcy (Grant et al. 2010).

Source: Authors' own elaboration.

Potentially problematic game designs identified in the literature and by experts consulted for this study included the pricing and offer strategies of a game (section 3.1.1), the structure of rewards as well as the visual appearance of the game (section 3.1.2). **Many design techniques listed below are not specific to loot boxes but found in games more broadly and are well-known from other consumer markets.**

3.1.1. Pricing and offer strategies

Many online games no longer monetise their contents by using a 'pay once'-model, but instead 'drip feed' content through microtransactions to extend the game and keep it entertaining. Academic research has shown how some mechanisms in loot boxes **use well-documented behavioural biases** – systematic pitfalls in behaviour compared to how rational and well-informed consumers should behave – to sell content (King & Delfabbro, 2018; Søraker, 2016). The following pricing and offer strategies can cause financial consequences. For example, they could become problematic if pricing becomes less transparent (Kimppa et al., 2016) and if players feel compelled to spend more money than they planned to or can afford, or if they enter into an unwanted subscription. Some of the following practices, such as using artificial currencies, are also used by casino gambling providers. Other pricing techniques, such as bundling, baiting and time-limited offers are well known from other consumer markets and depending on their exact nature, they could be considered aggressive or misleading for consumers.

The following pricing and offer strategies have been identified in the literature or were named by interviewed experts.

- **baiting offers:** Some games have **introductory offers** or **time-limited free play experiences** with premium content, thereafter, also known as **lure-to-pay games** (Kimppa et al., 2016). Sometimes, players need to sign-up to a game when they start playing. Premium content is later **unlocked automatically**, unless the subscription is cancelled. In this strategy, player engagement is maintained by the so-called 'sunk-cost-fallacy'. This bias describes the tendency to continue a certain behaviour after having invested resources, because of the aversion for these resources to appear wasteful (Arkes & Blumer, 1985); Gambling research observed that players feel pressure to continue, even after high losses, which has become known as 'entrapment' (Rogers, 1998). In the case of loot box offers, players have invested time and effort, and will thus likely continue playing and paying, because they find it difficult to evaluate the game's real value (Kimppa et al., 2016);
- **time-limited offers:** Players are sometimes offered loot boxes, or other content, for a limited time only (Kimppa et al., 2016; King & Delfabbro, 2018). Offers can last several days or weeks or can be immediate and last only for a single play session or a few hours or minutes. Such offers are sometimes connected to some sort of event or theme within the game (Shibuya et al., 2015). Time-limited offers **suggest items to be rare, limited in quantity, almost sold out or especially valuable** (Shibuya et al., 2015) and thus create a sense of **urgency** and **scarcity** (fear of missing out) in players (Cialdini, 2008; Mullainathan & Sharif, 2013). (Artificial) scarcity is a known attempt in marketing to make items appear more exclusive and thereby sustaining high prices (Kotler & Keller, 2006). Activating this mechanism of enhanced valuation (Cialdini, 2008) motivates players to purchase content to avoid feeling regret (Loomes & Sugden, 1982). This technique can lead players to purchase more content than they had planned to;
- **virtual currencies:** As seen in section 2.1, loot boxes can be bought with real-world money, or sometimes through virtual, in-game currencies. These currencies are typically paid with real-world money. Different forms of virtual currencies exist, such as gold coins, points, credits, chips, or berries. The detachment of real and actual value may be problematic for players if the conversion rate is difficult to understand and players hold a **valuation bias** (Zendle et al., 2020a). This may cause confusion and can consequently lead to overspending (Zendle et al., 2020a). Research on '**pain of paying**', shows that people experience pain because they are averse to spending money (Ariely & Kreisler, 2018). This experience is lessened when the transaction is less tangible and delayed, such as in in-game purchases or through card payment. Virtual currencies also facilitate **odd-pricing techniques**. For example, game publishers offer packages in which available currency packages do not exactly match the values of items that can be bought (Hamari & Lehdonvirta, 2010). This means players end up with an unsuitable sum and are lured into purchasing more currency. Previous research has shown that using virtual currencies, such as chips in gambling, in contrast to using real-world money, is **associated to overspending** (Lapuz & Griffiths, 2010; Raghuram & Srivastava, 2008) and **problem gambling** (Zendle et al., 2020a);
- **bundles:** Another pricing technique used in loot boxes is bundling, i.e. offering characters, in-game currencies, and other features as a package, so that players pay a fixed amount for a whole combination of virtual items. Bundling makes it **difficult for players to understand or identify the value of individual items**. Bundles might also give an **illusion of worth** when in fact some of the obtained items are worthless. Players are often drawn to choose bundles over single-priced options, because this cuts down on effort and search costs (Harris & Blair, 2006). However, this '**bundling bias**' was shown to alter people's behaviour, so that they are less likely

to experience full value from all purchased items (Soman & Gourville, 2001) and might buy more than they had initially planned to;

- **loot box openings and trades:** Interactions in video games are increasingly **streamed** on third-party sites (Macey & Hamari, 2018), such as Twitch. This can mean that a player who has gained access to a loot box, for example through gameplay, might stream the opening of the box and therefore grant the right to the (possibly exciting) revealing of its content to other users. It is possible that such rights to view, or third-party openings, are **traded (illegally)**²¹ **with real-world money on online marketplaces**. Furthermore, some sites have been shown to offer players loot boxes at a lower price (Lewis, 2017) than original outlets. Such practices could open possibilities to **gambling-like activities** and otherwise could also result in problems if **websites are unregulated and providers dishonest** (Lewis, 2017; Macey & Hamari, 2018); and
- **key mechanism:** Key mechanisms are a specific feature used in loot boxes where players acquire the box through gameplay but need a specific key to open the box. Keys might have to be purchased (Zendle et al., 2020a). Key mechanisms can be misleading, as the additional price for the key is unknown to the player beforehand. This characteristic is again linked to the **'sunk-cost-fallacy'** (Arkes & Blumer, 1985) which can increase players' willingness to spend additional money to open a loot box.

In conclusion, due to problematic pricing mechanisms players might be unaware of the overall costs and their total spend on games. This issue could potentially be alleviated by **increasing the transparency** of virtual currencies and price composition, as well as improving the way in which users are informed about subscriptions and cancellation procedures up front and avoiding automatic enrolments. Moreover, **financial control tools** provided by game developers, platforms and devices could help users control their spending and time spent playing.

3.1.2. Reward structures and presentation features

Other game design mechanisms used in loot boxes, such as certain reward structures and their visual presentation, have been found to play an important role in activating and sustaining players' motivation (Griffiths & Nuyen, 2017; Schlinger et al., 2008; King & Delfabbro, 2018). Some features can become problematic for players because they tend to prolong gaming times, could motivate players to repeatedly access loot boxes, or are associated with addictive behaviours and techniques used in casino gambling.

The following reward structures and presentation features were identified in the literature or named by interviewed experts:

- **intermittent reinforcement:** An **intermittent and unpredictable** reinforcement (i.e. reward) schedule, also known as 'variable ratio schedule of reinforcement', is most effective in continuously engaging players (Eysenck, 2004). The probability of winning is defined beforehand by an **algorithm** or the operator of the game, but its frequency and interval are unknown to the player (Chance, 2013). Slot machines use this technique as they are designed to deliver **wins of different magnitude at random, unpredictable time intervals**. Similarly, players who open loot boxes are provided with random content at an unpredictable pattern. Players might be shown the items which could be inside a loot box, including valuable and rare

²¹ Game developers and publishers forbid such practices in their terms and conditions. Trade is facilitated via unauthorised third-party websites.

ones. Players stake money on the (sometimes uncertain) probability of winning the valuable item – they pay for loot boxes in advance, receive small wins frequently, but large rewards only after several tries (Zendle, 2019). This reinforcement schedule of 'pure luck' has been found to elicit the strongest responses in people, as they stay highly active and focused as a win might turn up on the very next try (Schlinger et al., 2008). This is therefore suggested to be a driver in developing a **gambling problem** (Blaszczynski & Nower, 2002; Blanco et al., 2001; Haw, 2008);

- **near-miss experiences:** Near-miss experiences signal players to have **almost received a big win** or valuable item. It is typical for slot machines or fortune wheels, where players are shown that their outcome was very close to a big win (Schüll, 2014). Near-misses **deceive players** in believing that winning the next time has become more likely (Reid, 1986). Furthermore, it has been found that players who have experienced a near-miss engage in **more risk-taking behaviour** subsequently and tend to prolong their gaming time (Côté et al., 2003). Near-miss experiences are present similarly in loot boxes, as players might be shown especially scarce items that they could have received instead of an item they got (Zendle et al., 2020a). For example, players are shown a spinning wheel of various rewards that might be inside the specific loot box, until the wheel stops at the value-less item the player receives. The very rare and valuable item is then shown right next to the item received on the wheel (Zendle et al., 2020a);
- **visual and acoustic effects:** Sound and visual elements associated with the opening of loot boxes, revealing of characters or winning and losing features are other important structural characteristics to consider (Wood et al., 2004). Some closely resemble gambling features (Griffiths, 2018), such as winning **sounds of slot machines** or wheels of fortune with **flashing lights**. According to classical conditioning theory, these characteristics can function as cues that become strongly associated with the rewards experienced in gaming. A cue automatically reminds players of the pleasure even in absence of the reward (King et al., 2010a), for example the typical music of a game might elicit excitement even in the absence of the game. Such reactions are also reflected in bodily reactions like increased arousal, indicated by pupil dilation, faster heart rate and sweaty palms (Brown, 1986). Furthermore, sounds can contribute to the pleasure of playing a particular game and even distort players' perception in that they **overestimate their wins** (Dixon et al., 2014) and **disregard previous losses** (Griffiths & Parke, 2005). Thus, these elements play an important role in players' arousal and confidence in winning;
- **lottery- and casino-like features:** In some games, loot boxes are designed to resemble lottery- or casino-like components, such as **animated slot machines, blackjack, wheels of fortune** or **roulette** tables (Zendle, 2019). Sometimes, not necessarily restricted to loot boxes, such features are embedded into the game as '**mini games**', i.e. players have the possibility to spin a wheel or play a slot machine to win something or to advance to a new level (Swedish Consumer Agency, 2019). Another variation of casino-like features are **social casino games**, in which the whole environment of the game resembles a casino with the additional possibility to compete against other players. Some argue that microtransactions in environments with casino-like elements make players develop a distorted picture about the probability of winning and make them **less sensitive to costs or losses** in the game (King et al., 2010b). There is also evidence showing that making purchases in social casinos increases the **likelihood to commence with gambling** (Kim et al., 2015); and

- **social components:** On top of social casinos, there are forms of embedding social elements into loot boxes, such as showing a **ranking** of how many boxes other users or friends have opened (Hamari & Lehdonvirta, 2010) or even giving the top-ranked player access to very valuable or rare items in the game (Shibuya et al., 2015). These social features make use of **'social proofing'**, which is the tendency of people to be strongly affected by descriptive normative influences (Aronson et al., 2005). That occurs because people have an innate desire to conform and to be liked and accepted by others (Aronson et al., 2005). In extreme cases, this tendency leads to **'herding'**, a phenomenon where people follow the crowd instead of making individual decisions (Banerjee, 1992). Social interaction was found to be a **key motivator for playing video games** (Yee, 2006). Furthermore, the presence of **competitive elements**, such as rankings (Rockloff & Dyer, 2007), as well as the obligation exerted by social interaction in games, are thought to impact the duration of video game playing, with some players spending more time than planned (King et al., 2011).

To sum up, some reward structures and presentation features **might mislead players** regarding the likelihood of receiving valuable items and could **promote addiction**. These issues could be alleviated through **responsible game design** which refrains from using proven addictive features. Moreover, players should be clearly informed about the presence of loot boxes in games prior to downloading/purchasing them and about the probabilities of receiving certain items from a loot box at the moment of access.

3.2. Specific issues for children and underage players

Video games are extremely popular among children and adolescents. ISFE's (2019a) showed that 76% of children aged 6 to 15 in Europe play video games on any device. Access to video games is fostered by their **easy accessibility** via tablets or mobile devices, which are used intensively by young consumers (IZI, 2019).

Children's access to video games is mainly regulated through age ratings, such as the PEGI labels, which are based on games' content. The PEGI ratings²² consider the presence of a number of indicators, for example bad language, violence, drugs, fear etc. However less attention is given to the underlying (psychological) design mechanisms of games (Søraker, 2016), such as those discussed above. Also, the mere presence of loot boxes does not trigger specific age ratings. Games containing loot boxes carry a content descriptor for 'in-game purchases' and games released from April 2020 onwards will additionally carry the description 'paid for random items' (PEGI, 2020).

That being said, loot boxes are **not necessarily targeted at children**. There are, however, games which are targeted at children that contain loot boxes and there are **games that contain loot boxes which are targeted at adults and also played by children**²³. The Swedish Consumer Agency (2019) has presented evidence that many parents consciously let children play games which are rated for older age groups.

According to Zendle et al. (2020b), about 60% of the top mobile games on Google Play and Apple's App Store contained loot boxes. Of these, **over 90% were rated as suitable for children aged 12+**. PC and console games were rated more conservatively and less frequently contained loot boxes.

The presence of loot boxes in games is a point of controversy with regard to children and adolescents.

²² PEGI gives age labels to games to inform parents whether or not there is any inappropriate content for children of a certain age. Available at: <https://pegi.info/page/pegi-age-ratings>.

²³ See Box 4 – underage players are children who play games which are rated for older age groups.

On the one hand, it is questionable whether introducing microtransactions with random content (i.e. loot boxes) to games that children might play is acceptable (BBC, 2019a). On the other hand, some argue that loot boxes are very similar to surprise boxes that exist in analogue markets for children, such as in Kinder surprise eggs, whack-a-mole, sports or other collector cards (Nielsen & Grabarczyk, 2019; BBC, 2019b).

Most research about video gaming and loot boxes has been done on an adult population. Studies on children and underage players often rely on reports from parents or on correlational evidence (Lobel et al., 2017). However, there are several developmental reasons why loot box mechanisms and in-game purchases in general could be problematic for young players (see Box 4).

Box 4: Classification of underage players and developmental issues

Children can be classified according to their age group. The World Health Organization generally differentiates the following phases: The phase of **early childhood** ranges from ages 0 to 8; **childhood** from 8 to 10 and the phase of **adolescence** from 10 to 19²⁴.

In this report, children who play games which are **rated for older age** groups are considered **underage players**²⁵. The respective age categories for labels for interactive software products set by the PEGI are 3, 7, 12, 16 and 18²⁶.

Certain developmental phases may make children particularly vulnerable for mechanisms used in loot boxes. Some possible risk factors, respectively for children and adolescents, are:

Developmental risk factors for children:

- research suggests that children are **less able to disentangle costs** (King & Delfabbro, 2020) and were found to be more at risk of problem gambling behaviour compared to adults when presented with **virtual currencies** (Zendle et al., 2019);
- children were found to have problems understanding and **taking probabilities into account** (Sunstein, 2002). This could make it particularly difficult for them to understand the probabilities of obtaining different items from a loot box and predict their outcomes and value; and
- with regard to psychosocial effects, children are more at risk to develop habits in response to certain stimuli. Research claims that video games containing frequent (or repeated) reward mechanisms, such as in loot boxes, get children used to a constant input of new and exciting stimuli and thereby contribute to **hyperactivity** and **symptoms of inattention** in children (Gentile et al., 2012; Lobel et al., 2017).

Developmental risk factors for adolescents:

- another developmental issue to take into account for both children and adolescents is **impulse control**. The ability to exert control over decisions is not yet fully developed in minors and is associated with higher vulnerability to problem gambling (Lussier et al., 2014). This goes back to research about 'delayed gratification'. It has been found that preschool children have major difficulties resisting immediate rewards compared with potential future rewards (Mischel et al., 1989). The full ability to exercise impulse control and delay rewards is only developed in adolescence (Mischel et al., 1989) and '**ego depletion**', a state in which the energy for self-control is impaired, is mainly found in people below the age of 25 (Dahm et al., 2011). In the face of a potential reward in a loot box, children and adolescents are less likely to be able to delay gratification and wait for obtaining the loot box through gameplay, they are more likely to experience a state of ego depletion in which they cannot exert willpower and thus are more prone to spending; and
- lastly, the association between spending money on loot boxes and displaying signs of **problem gambling** was found to be more pronounced in adolescents. Whereas Zendle and Cairns (2019) found a small-to-medium-sized effect in adults, a survey on adolescents revealed a relationship of medium-to-large effect size for adolescents aged 16 to 18 (Zendle et al., 2019).

Source: Authors' own elaboration.

Some are concerned that children might spend money in online games in an uncontrolled manner. While there are reports of excessive spending (see examples in BBC 2019c and 2019d), these seem to be anecdotes of extreme cases rather than a common phenomenon. ISFE's (2019a) study on how parents supervise children's in-game spending showed that **36% of children aged 6 to 15 spend money within games**. Compared to the 2018 results of the same study, it seems that fewer children spend money in games. At the same time, more parents, namely 85% (up from 79% in 2018), **supervise the in-game spending of their child**. The same study showed that **62% of children have a fairly small average monthly spend ranging between 1 and 20 Euro** across all types of platforms and in-game transactions. Smaller shares of children spend intermediate to high amounts in-game, respectively: 11% spend between 21 to 40 Euro, 5% between 41 to 60 Euro, 1% between 61 to 80 Euro, and 4% more than 80 Euro. Yet, a **significant proportion of parents, 16%, did not know how much their child spends in-game** in an average month.

These findings are to some extent corroborated by studies from the UK Gambling Commission (2019) and the UK's regulator for communication services Ofcom (2020). In a large-scale survey of adults and children who play games in the UK, Ofcom (2020) found that 33% of children paid for additional in-game items in purchased games and 47% in free-to-play games. According to the Ofcom data, it appears that loot boxes make up a very small share of the spending. Only 4 to 6% of children stated having ever spent real money on loot boxes. In a previous survey on almost 3 000 children aged 11 to 16, the UK Gambling Commission (2019) instead found that around 23%²⁷ had paid real money for loot boxes.

To conclude, **more research is needed** to show the effects of various video game features such as loot boxes on children. Due to an insufficient ability to understand costs and probabilities and a lower control over their impulses, **children and adolescents are potentially more vulnerable to problematic game designs**, including loot boxes. Any taken measures should consider the special needs of young players.

²⁴ World Health Organization about childhood and adolescence. Available at: <https://www.who.int/topics/early-child-development/en/>; https://www.who.int/health-topics/adolescent-health/#tab=tab_1.

²⁵ This research has found no definition of underage players.

²⁶ Though they do not strictly represent age categories, as for example the PEGI 3 label means that games are rated as suitable for all age groups. More information is available at: <https://pegi.info/what-do-the-labels-mean>

²⁷ The report found that 52% of surveyed children have heard of in-game items and 44% of those who were aware of in-game items declared having paid to open loot boxes. This results in approx. 23% of all interviewed children having paid for loot boxes.

4. THE EU POLICY AND REGULATORY FRAMEWORK FOR LOOT BOXES

KEY FINDINGS

The European Union has no competence in the area of gambling. The European Commission has therefore not tackled the issue of loot boxes directly but has adopted several communications and recommendations about the protection of minors in the gaming and gambling context more broadly.

At national level, although the legal definitions of gambling vary between Member States, loot boxes are not considered gambling in the legal sense in most jurisdictions. The exceptions are Belgium and the Netherlands where the national authorities have banned loot boxes from video games, and Slovakia where the national authority is investigating the issue of loot boxes.

The public debate about loot boxes and concerns that they have similarities with gambling (and therefore might have potentially harmful effects on players) have **triggered reactions from policymakers, legislators and gambling regulators in many jurisdictions**.

This section presents the policies adopted by the European Union (section 4.1), as well as the relevant regulatory framework in the Member States and actions taken by national gambling authorities (section 4.2).

4.1. European Union policies have not specifically addressed loot boxes

In principle, the European Union's general rules on consumer protection also apply to loot boxes. This legislation includes, among others, the Consumer Rights Directive 2011, the Unfair Commercial Practices Directive 2005 and the Unfair Terms in Consumer Contracts Directive 1993; which regulate, for example, the consumers' rights regarding pre-purchase information and contract cancellation or the restriction of misleading and aggressive commercial practices. The European Union has, however, limited legislative powers in the area of gambling policy. Although gambling services *per se* are covered by the provisions on services laid down in the Treaties, the European Court of Justice²⁸ has recognised that the particular features of gambling justify a sufficient degree of national discretion in regulating the sectors involved. Therefore, there exists no sector-specific EU legislation in the area of gambling.

The European Commission has nevertheless issued **several recommendations and communications on the topic of online gambling** (including the aspect of protecting young players). In 2011, the Commission adopted a Green Paper on online gambling (European Commission, 2011). The purpose of the Green Paper was to start a debate about challenges caused by the developments in, and increase of, the online gambling market. The Green Paper was soon followed by the communication 'Towards a comprehensive European framework for online gambling' (European Commission, 2012) which made suggestions for policy actions at EU and national level to ensure coherence of the national regulatory frameworks with EU law and the principles of the Internal Market. Eventually, in 2014, the Commission adopted recommendations for the protection of players of online gambling services and for the prevention of minors from gambling online (European Commission, 2014a).

²⁸ See for example the Schindler decision (Case C-275/92). Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:61992CJ0275>.

All of these policy documents look at classical gambling services such as sport betting, casino games or lotteries offered via electronic means. **Online video games and loot boxes as defined in this study are not explicitly mentioned.** Since these documents were adopted several years before the public debate on loot boxes started in 2017, it is unlikely that the European Commission intended to directly tackle the issue of loot boxes with these recommendations.

In addition to these legislative interventions, in 2013/2014, **the European Commission engaged in a joint enforcement action together with the Consumer Protection Cooperation (CPC)** to improve the protection of children regarding in-app purchases in online games. The joint action was directed at Apple, Google and ISFE and encouraged them to adopt consumer protection measures, such as not using the word *free* for games that include in-app purchases (European Commission, 2014b). Furthermore, **the Commission launched a similar initiative specifically targeting loot boxes in 2018.** The CPC collected and analysed complaints about loot boxes and related mechanisms filed with national consumer organisations. The analysis showed that gambling authorities in two Member States (Belgium and the Netherlands) have subjected loot boxes to national gambling regulation (the main determining element being the question whether the reward from loot boxes can be considered having monetary value outside the game), whereas in other Member States consumer legislation applies (see also section 4.2 below)²⁹.

Finally, **a European Commission Expert Group on Gambling Services was active from 2012 to 2018.** The expert group dealt with a large variety of gambling-related issues, ranging from topics like IT governance through the integrity of sport to anti-money laundering. Loot boxes were on the agenda of one expert group meeting in March 2018. The group members discussed different national views on the topic and concluded that it was necessary to further assess the regulatory context in the different Member States (European Commission, 2018a). However, the expert group's mandate ended at the end of 2018 and was not renewed (possibly because the EU has no legislative power in the domain) so **the group was not able to further investigate the topic.**

The European Parliament has also discussed online gambling and adopted three resolutions on the topic (in 2009, 2011 and 2013) in which it stressed the need for strong consumer protection measures to accompany online gambling services. More recently, **several Members of the European Parliament addressed parliamentary questions to the European Commission** in which they enquired about the Commission's activities and plans to tackle the issue of loot boxes (European Parliament, 2019a, 2019b, 2018). The Commission replied to these questions by referring to the abovementioned research carried out by the CPC and to general EU consumer legislation and by pointing out the lack of sector-specific EU gambling legislation.

As this discussion has shown, while there have been some interventions in the field of online gambling and protection of minors, **the European Union has not yet taken any significant targeted action to address the topic of loot boxes** specifically. As mentioned in the introductory paragraph to this section, the European Union has little competence in the area of gambling, as this competence mainly lies with the Member States.

4.2. Different ways for dealing with loot boxes at national level

There exists no legislation at national level that specifically addresses loot boxes. Instead, more general national legislation on contracts and consumer protection applies. In addition, many national

²⁹ Information provided by the European Commission in response to an email request made for this study. The European Commission is not planning to publish the results of the CPC analysis.

gambling authorities have investigated the issue of loot boxes. However, the legal and regulatory framework is not sufficiently harmonised across Member States and each Member State has its own definition of gambling.

4.2.1. The capacity of players to enter into a loot box contract

Purchasing a loot box is effectively a contract like any other: players agree to pay a fee in return for a digital service provided by the video game publisher. In order for such a contract to be valid, **the players must have the legal capacity in their jurisdiction** to enter independently and of their own will into a valid contract. General legal capacity is obtained by reaching the majority age, which is 18 years in all EU Member States (Fundamental Rights Agency, n.d.). This is based on the assumption that a person reaching the majority age is intellectually capable of fully understanding the content of a contract and its consequences. **Adult players are therefore able to enter into a loot box contract**, provided that the contract complies with rules against unfair commercial practices. These rules are part of general national common law or civil law, often enshrined in civil codes or consumer acts.

Minors, (players under the age of 18) consequently have limited legal capacity and can generally not enter into a valid contract on their own. Exceptions exist for purchases of basic needs (like buying food in the supermarket) or for purchases made with a minor's own money (like pocket money), for which minors are considered emancipated to make their own contractual decision (UNICEF Youth Policy Labs, 2016). The basic price for a single loot box is typically in the range of a few Euro, so **as long as a minor does not exceed a reasonable price limit by purchasing a high number of loot boxes such contracts would be considered valid**. For other contracts, minors require the approval of a parent for the contract to be valid. This approval can also be given by implication, for example by providing credit card details for the child's online account.

In addition to these general contract rules, certain types of contracts are subject to more specific rules, notably contracts concerning gambling services. The age of licence to enter a gambling contract in the EU is between 16 and 21 years (depending on the Member State and the type of gambling service), and minors below this age cannot enter into a gambling contract even with the approval of a parent (Gambling Compliance, n.d.). However, **these strict rules only apply to a loot box contract if the loot box meets the legal requirements to be considered gambling**. These requirements are defined at national level because gambling services are the competence of the Member States.

4.2.2. National gambling authorities collaborate to address the issue of loot boxes

In 2015, **the national gambling authorities of the European Economic Area (EEA) Member States signed a cooperation agreement** concerning online gambling (European Commission, 2019). The agreement takes account of the fact that gambling services offered online are not restricted by national borders and thus require coordination between national regulators. It establishes procedures for sharing information and best practices collaboration between the authorities. This agreement was made following the suggestions published by the European Commission in its 2012 communication 'Towards a comprehensive European framework for online gambling' (European Commission, 2012) but **it does not specifically target loot boxes**.

A more concrete coordination effort was started in the context of the Gaming Regulators European Forum (GREF). GREF is an informal discussion forum where gambling authorities from European countries (including non-EU countries like Norway, Switzerland, Gibraltar or the Isle of Man)

exchange views on matters related to gambling. In September 2018, several³⁰ **members of GREF signed a declaration on their concerns related to the blurring of lines between gambling and gaming** (Gambling Commission, 2018). The declaration identifies skin gambling, loot boxes, social casino gaming and the use of gambling themed content as main areas for concern.

Following the declaration, the signatories started a **cooperative process to assess whether such elements of video games would constitute gambling**. The assessment included an economic review and consultations with videogame industry representatives and consumer organisations (GREF, 2019). As a conclusion of this assessment, the participating authorities recognised that chance, which is a key element in all national definitions of gambling, is also a defining element of loot boxes because players do not know in advance which reward they will receive from the loot box. The authorities also identified lack of transparency for consumers as an issue because the players do not know the underlying probabilities of obtaining the different rewards from a loot box. However, **the participating authorities also concluded that the answer to the question whether loot boxes are gambling ultimately depends on national legislation** (GREF, 2019).

Following the publication of the results of the assessment, GREF undertook no further coordinated investigation into loot boxes. **The main driver behind the cooperation had in fact been the issue of skin gambling**³¹. When national authorities and, as a consequence, the video game industry (in particular *Valve*, the operator of the video game distribution platform *Steam*) started taking action against skin gambling by forcing third-party platforms to cease operation, **the need for members of GREF to cooperate in this area reduced**.

4.2.3. Loot boxes are not legally considered gambling in most EU Member States

As mentioned above, despite EU level action and pan-European coordination efforts, **gambling regulation remains a matter of national competence**. National authorities in the EU and in third countries have chosen different ways to deal with loot boxes.

The replies of the national gambling authorities to the survey conducted for this study³² showed that, in most countries, loot boxes have not triggered any regulatory action by the national authorities. **The central issue is the question whether loot boxes fall under the applicable legal definitions of gambling**. These definitions, laid down in national gambling acts, determine the scope of action of the gambling authorities, meaning that the authorities cannot act in the area of loot boxes if loot boxes are not covered by the national gambling definition.

While every Member State has its own legal definition of gambling and there are differences in the details, the authorities' responses to the survey showed that **there are nevertheless three key elements that are prevalent in most jurisdictions**. Gambling is thus commonly defined as an activity during which:

- a **consideration** (money or an item of monetary value) is made to participate in the activity;

³⁰ The declaration was initially signed by 15 of the 39 members of GREF. By 2019, four more members had joined for a total of 19 signatories: these are the gambling authorities from Austria, Cyprus, Czechia, Denmark, Finland, France, Gibraltar, Ireland, Isle of Man, Jersey, Latvia, Malta, the Netherlands, Norway, Poland, Portugal, Spain, the State of Washington (US), the United Kingdom.

³¹ Skin gambling is an activity where players bet on the outcome of an event (usually a professional e-sports match) using video game skins (cosmetic items) as virtual currency. Due to the apparent similarities with sports betting, the national gambling authorities focussed their efforts on skin gambling.

³² Twenty-nine national gambling authorities (from the EU Member States as well as the UK and Norway) were contacted with a survey about how loot boxes are qualified under national law and whether the authorities have taken regulatory action. Twenty-eight of the contacted authorities replied to the survey.

- the outcome of the activity is determined fully or partly **by chance**;
- the participant can win a **prize** (money or an item of monetary value).

A loot box **needs to meet all three requirements** before national gambling legislation applies and the national authority can investigate and, if necessary, intervene. Analysing the three requirements with the help of the four different types (I-I, I-E, E-I and EE) of games containing loot boxes introduced by Nielsen & Grabarczyk (2019) (see Table 2 in section 2.2) sheds light on the types of loot boxes that could be considered gambling in the legal sense.

For the first legal requirement, it is important that the player acquires the loot box with money or something of monetary value. The requirement is obviously met in games where loot boxes can be bought directly using real-world money. In games where loot boxes can be bought with a virtual in-game currency, the virtual in-game currency needs to be linked to real-world money, i.e. players need to be able to buy the virtual currency with real-world money. This applies to loot boxes of the E-I and E-E type. On the other hand, loot boxes of the I-I and I-E type where the virtual currency can only be earned through in-game achievements (for example gaining experience points by progressing in the game) do not meet this requirement.

The second legal requirement, the element of chance, is not linked to money or an item of monetary value and is generally fulfilled by all loot boxes. The prize from the loot box is not determined in advance but by the algorithm of the game. The players cannot know which prize they will receive, and they also cannot influence the outcome in any way (for example through skill).

For the third legal requirement to be met, the reward obtained from the loot box must have value that can be translated into real-life currency by selling the virtual item or currency. This applies to I-E and E-E type loot boxes. This requirement is however not met by loot boxes in games where the virtual items cannot be traded or can only be traded within the game, i.e. loot boxes of the I-I and E-I type.

Since all three requirements need to be fulfilled for the legal definition to apply, only loot boxes of the E-E type can potentially be considered gambling in the legal sense. Looking at the examples in Table 1 (that is the games *PlayerUnknown's Battlegrounds*, *Team Fortress 2* and *Counter-Strike: Global Offensive*) reveals that the games containing E-E type loot boxes are typically associated with skin gambling, an issue that has already been tackled and largely resolved by regulators and the industry.

On the other hand, the games that are most commonly mentioned in the debate on loot boxes (*Overwatch*, *Star Wars Battlefront 2* and *FIFA Team Ultimate*) belong to the E-I type and thus do not meet the legal definition of gambling. These games do not allow that virtual items won from loot boxes could be sold or traded for real-life currency. Grey markets for such virtual items do exist (by selling the items on third-party platforms), but such transactions are typically a violation of the video game publisher's terms and conditions. And while simple terms and conditions do not necessarily release a video game publisher of their liability³³, most publishers do in practice assume their responsibility by actively enforcing these terms and taking actions against illegal marketplaces³⁴.

The survey conducted for this study among national authorities has confirmed that **the monetary value of the prize is indeed part of the gambling definitions of most countries and is the decisive**

³³ Several national gambling authorities have stated explicitly that video game publishers can be held accountable for illegal trading of virtual items, for example the Finnish National Police Board (NPB, 2018) or the UK Gambling Commission (Gambling Commission, 2017).

³⁴ Interview with a representative from a national gambling authority who also took part in the GREF working group.

factor why loot boxes are not legally considered gambling. In a few Member States, the gambling definition is slightly different, but the outcome is nevertheless the same³⁵. Several authorities have also publicly expressed this view by adopting opinions or position papers, notably the gambling authorities of Denmark (Spillemyndigheden, 2017), Finland (NPB, 2018), France (ARJEL, 2017), Sweden (Spelinspektionen, 2018) and the UK (Gambling Commission, 2017). **In all these countries where gambling regulations do not apply to loot boxes, loot boxes are regulated by general legislation on contracts and consumer protection.**

Three of the national gambling authorities that replied to the survey have taken a different path and consider loot boxes to be gambling under their national legal definitions: the authorities from Belgium, the Netherlands and Slovakia. The Belgian and Dutch authorities have already taken regulatory action, while the Slovak authority is, as of May 2020, still investigating.

4.2.4. In Belgium and the Netherlands, loot boxes are considered gambling

The national legal definitions of gambling in Belgium and the Netherlands are not substantially different from those in other EU Member States. They notably also include the elements of chance and the possibility to win a prize (a reward) as defining criteria. **The key difference that has led the two authorities to follow a different path lies in the interpretation of the prize requirement.**

According to the assessment of the Belgian Gaming Commission (Kansspelcommissie, 2018), **the reward that can be obtained from a gambling activity does not necessarily have to be of monetary value.** It is sufficient if it has value for the player, which can for example result from the scarcity of a virtual item. It is therefore not required that a reward from a loot box can be transferred into real-world money. Under this interpretation, E-I type loot boxes (see Table 2 in section 2.2) are considered gambling under the national legal definition. The Gaming Commission thus came to the conclusion that loot boxes in games such as *Overwatch*, *FIFA 18* and *Counter-Strike: Global Offensive* are illegal in Belgium.

In the Netherlands, the fact that the reward has individual value to the player is not sufficient for a loot box to meet the national definition of gambling (Kansspelautoriteit, 2018). Instead, **the reward must have a market value which is the case when it can be traded (e.g. it is transferable to other players).** It is not relevant whether the virtual items can be legally traded or whether such trade is prohibited by the terms and conditions of the game publisher. Though the legal interpretation differs from that in Belgium, loot boxes of the E-I type are therefore also considered gambling under the Dutch legislation.

Following their decisions, **both authorities requested video game publishers to remove loot boxes** from their games offered in Belgium and the Netherlands, with the risk of receiving a fine of up to 830 000 Euro and criminal prosecution in case of non-compliance.

³⁵ In Germany for example, a defining element of gambling is the fact that you can completely lose the consideration made to enter the game. Since players always win something from a loot box (even if it might not be what they wanted), the requirement is not met. In Portugal, there is no general definition of gambling but an exhaustive list of activities that require a licence. Since loot boxes are not included in that list, they cannot be considered gambling by the gambling authority.

5. PRACTICES FROM AUTHORITIES AND THE INDUSTRY

KEY FINDINGS

Initiatives to tackle loot boxes have been taken by different stakeholder groups, ranging from national gambling authorities to the video game industry, consumer protection organisations and the European Union.

There are a variety of mandatory and voluntary interventions. Some regulators have banned loot boxes completely, making them unavailable in games published in the respective territories. Other measures focus on providing transparency and information about loot boxes so that the player can take an informed purchase decision.

Some national authorities have taken regulatory action against loot boxes, but other stakeholder groups like the video game industry or consumer groups have also taken initiatives. **This section presents practices that try to tackle the issue of loot boxes through different types of interventions:** banning loot boxes (section 5.1), providing game content information to consumers (section 5.2), advertisement restrictions (section 5.3), disclosing the probabilities of obtaining different items (section 5.4), parental control mechanisms (section 5.5), raising awareness campaigns (section 5.6), or using other in-game monetisation methods (section 5.7). Most of these practices have been put into place fairly recently, and there exists no systematic analysis of their effectiveness or general impact. Therefore, within the limitations of this study, it is not possible to conclude whether these practices constitute best practices.

5.1. Banning loot boxes that are considered gambling

It has already been explained in section 4 that in two EU Member States, Belgium and the Netherlands, **loot boxes have effectively been banned from video games**. The national gambling authorities in these two countries considered that loot boxes meet all the necessary requirements to be considered gambling under the national legal definition and could therefore not be offered on the market without a permit from the national authority.

These decisions showed immediate effect (Valentine, 2019), as **publishers reacted by changing the loot box mechanism** (for example by making the loot box transparent so that its content can be seen before purchase), removing the loot box feature or even completely pulling games from the Belgian and Dutch markets. Although the publisher *EA* initially refused to comply with the rulings of the Belgian and Dutch regulators, they eventually removed disputed content from their *FIFA* games after a criminal investigation was started in Belgium. As a consequence, **consumers in Belgium and the Netherlands do not have access to the full content of games** compared with all other national EU markets where loot boxes were not banned.

A comparable approach has been suggested in the US in the form of a **legislative proposal for a Protecting Children from Abusive Games Act**³⁶ that was introduced in May 2019. Under this act, publishing a game that is oriented at minors and contains loot boxes would become unlawful. As of July 2020, the bill has not yet been adopted nor further discussed in the US Congress.

³⁶ A bill to regulate certain pay-to-win microtransactions and sales of loot boxes in interactive digital entertainment products, and for other purposes. Available at: <https://www.congress.gov/bill/116th-congress/senate-bill/1629/text>.

5.2. Providing information about the content of video games

The video game industry provides game ratings that inform consumers about the recommended minimum age to play a game as well as about certain content elements and other features of the game.

The European rating system **PEGI contains three types of labels**. The age labels indicate the minimum age of the player for whom the game is considered suitable.

Content descriptors illustrate certain elements that are part of the game and are potentially not suitable for every player group (such as violence, sexual content, gambling or in-game purchases). However, **the interpretation of gambling within this content rating system is fairly narrow**. Only games that are actual gambling in the traditional sense (for example a roulette game where players play with real money) or games that include a simulation of such gambling (for example a casino within the game world where players can make the game character play in-game casino games) will be assigned the gambling content descriptor. **Loot boxes, according to the interpretation of the PEGI, do not fall into this category**³⁷.

In order to nonetheless be able to address loot boxes and similar mechanisms more precisely, PEGI introduced a third type of label, the so-called feature notice, in April 2020. **The feature notice informs consumers if a game includes paid random items** (PEGI, 2020). The terminology was chosen by PEGI based on an assessment that the term loot boxes might not be well understood by many consumers, in particular parents³⁸. Other national content rating system, like the Entertainment Software Rating Board (ESRB) classification used in the US or the USK (Unterhaltungssoftware Selbstkontrolle) system used in Germany, also apply or are in the process of developing similar labels (in Germany for digital-only products). The style of the labels assigned by PEGI looks like this (complemented by a more comprehensive text that repeats the presence of in-game purchases):

Figure 3: Example of PEGI labels



Source: PEGI, 2020.

Although the scope of the PEGI and similar labels is fairly large, **national regulators**³⁹ **have expressed doubts about the effectiveness of these labels**. Take-up and compliance with such industry self-regulation measures is not enforced by an independent regulator. Moreover, these systems have only regional scope and may therefore not apply to all territories, and the industry associations which have signed up to such self-regulatory measures do not cover the entire market.

³⁷ Interview with a representative from PEGI.

³⁸ Interview with a representative from PEGI.

³⁹ Notably the GREF in their summary report on loot boxes (GREF, 2019) but also individually the UK Gambling Commission (2017) and the Malta Gaming Authority (in its reply to the survey conducted for this study).

5.3. Restricting advertisements targeting minors

Advertisement can play a double role in loot boxes. Firstly, the purchase of loot boxes can be advertised (typically within the game). Secondly, some games offer the possibility to open a loot box by watching an advertisement first. **Both types of advertisement have been restricted in Germany** as they were deemed to target minors.

Advertisements targeting minors are subject to certain limitations according to Section 6 of the Interstate Treaty on the Protection of Minors in the Media⁴⁰, which states that **advertisements must not harm the interests of minors and, more specifically, must not contain direct appeals to buy goods or services and at the same time exploit the inexperience and credulity of minors**. In-game advertisements in the style of 'Buy 20 loot boxes for 5 Euro!' could be considered a direct appeal, but they would also have to be clearly directed at minors and exploit their inexperience in order to fall under the restriction of this provision (Schwiddessen, 2019).

The provision has been specified further by the Youth Protection Guidelines⁴¹ adopted by the Commission for Youth Protection in the Media (Kommission für Jugendmedienschutz – KJM) in 2019. The Guidelines clarify in Section 4.3 that the **business model** (which would cover the functioning of loot boxes and other in-game monetisation mechanisms) is taken into account when assessing whether the inexperience or credulity of minors is exploited. In addition, Section 4.6 of the guidelines states that an advertisement targeting children under 14 years is **not allowed if a reward is granted for watching the advertisement**. This restricts loot boxes that can be opened by watching an advertisement.

These limitations apply to advertisements targeting minors. **Whether or not an advertisement targets minors must be assessed on a case by case basis**. The fact that a game has a fantasy setting or that the advertisement uses informal language are for example (according to a court decision concerning the game *World of Warcraft*) not sufficient to establish that an advertisement targets minors (Schwiddessen, 2019).

5.4. Disclosing the probabilities of obtaining different items

Another practice which aims at providing information to consumers is the **disclosure of the probabilities of obtaining different rewards from a loot box**. This type of information provision has been implemented through legislation (i.e. as a requirement) and through industry self-regulation measures (i.e. as a voluntary measure).

The People's Republic of China introduced legislation in 2016 that requires publishers of online video games to provide players with information on the probabilities of obtaining virtual items or services (McAloon, 2016). Similar legislation was proposed in South Korea's national parliament but was not adopted. However, **the Korea Association of Game Industry picked up the initiative** and started a self-regulation measure that requires winning probabilities to be displayed for all games including loot boxes or similar mechanisms (Byung-yeul, 2018). Similarly, **the world's two largest app stores (Apple's App Store and Google Play) both require game developers to display the**

⁴⁰ Staatsvertrag über den Schutz der Menschenwürde und den Jugendschutz in Rundfunk und Telemedien. Available at: <http://www.landesrecht-bw.de/jportal/?quelle=jlink&query=JMedienSchStVtrG+BW&psml=bsbawueprod.psml&max=true&aiz=true#ilr-JMedienSchStVtrGBWW6StVtr-P6>.

⁴¹ Gemeinsame Richtlinien der Landesmedienanstalten zur Gewährleistung des Schutzes der Menschenwürde und des Jugendschutzes. Available at: https://www.kjm-online.de/fileadmin/user_upload/Rechtsgrundlagen/Richtlinien_Leitfaeden/JuschRILi_der_Landesmedienanstalten_ab_15.10.2019.pdf

probabilities of obtaining different items if loot boxes are used in games (Apple's App Store Review Guidelines for Developers; Google Play's Developer Policy Center). Major console manufacturers and their platforms are following with similar commitments (ISFE, 2019c).

While these initiatives cover a significant share of the market, **some of the experts consulted for this study doubt the usefulness and enforceability of such self-regulatory measures**. At the same time, some industry experts insist that non-compliant developers risk a backlash from users and investigation from Apple/Google potentially leading to deletion of the game from these app stores, which would effectively foreclose them from the market. It is unclear how complaints are handled by Apple and Google⁴².

5.5. Implementing parental and player control mechanisms

Many distribution platforms and video game publishers have implemented **mechanisms for parents to control the play behaviour of their children**, notably their screen time and spending.

All the major video game distribution platforms (such as the stores from Microsoft/Xbox, PlayStation, Nintendo as well as Steam, Google Play and Apple's App Store) offer such control mechanisms. Typical features include: limiting the time that games can be played, setting filters to prevent games with a certain content (like violence or gambling) from being played, setting total spending limits or setting their child's account so that an approval by a parent is required before a child can make a purchase in the store (Dealessandri, 2020; Perez, 2019).

Google Play and Apple's App Store have also improved their refund practices for unwanted spending. These practices promise users refunds if unwanted spending is claimed, for example in cases in which friends or family members unintentionally or accidentally purchased items. These improved refund practices seem to have reduced the number of complaints about in-game purchases and remedied spending issues linked to loot boxes to some extent⁴³.

Although parental control tools are available on most platforms and operating systems (PEGI, n.d.), offering them and using them remains voluntary. Research conducted in 2019 by the UK-based child protection organisation NSPCC showed that **only one in five parents use such mechanisms to limit the screen time and spending of their children** (Thornhill, 2020). A recent study commissioned by ISFE finds similar figures (ISFE, 2019a).

Also, these tools are usually presented as parental control tools, which might prevent adult players from using them to control their own play behaviour.

5.6. Raising awareness of risks among players and parents

The GREF has noted that the dialogue between children and parents/adults on gaming may be difficult due to imbalances in their levels of knowledge in the digital and gaming field (GREF, 2019). To close this generational gap and make adults, educators and children themselves more aware of the risks in the digital gaming field, **educational tools and awareness raising campaigns have been put in place** at international and national level.

At national level, the initiatives often include handbooks or websites dedicated to best practices applied in gaming and in the online sphere. In Finland, for example, a consortium composed of a library,

⁴² Here is an example of a discussion on Google Play Help of users doubting the displayed probabilities and asking for an enquiry. There was no statement from Google on this particular thread. Available at: <https://support.google.com/googleplay/thread/11275099?hl=en>.

⁴³ Interview with an industry expert.

a University and the Finnish audio-visual institute developed and published, with support from the European Union, a 'Game Educator's Handbook' (targeting parents, schools, libraries, youth organisations, and anyone with connections with children, adolescents or adults that play digital games). **The book explains the relationship between games and money** and discusses game features involving real money, such as the sale or purchase of virtual goods from other players in exchange of actual money (Harviainen et al., 2015).

In France, a website named 'PédaGoJeux' has been set up to **inform parents about how gaming works and to present good practices** linked to this activity. The website contains advice on how to choose a game that is appropriate for the age of the child, how to avoid 'toxic' behaviours online, or how to define time spent on a game. A section of the website presents the phenomenon of 'skin gambling' and explains that real money can be exchanged or won in online games (PédaGoJeux, n.d.). Also in France, the association 'e-Enfance' was created (and co-funded by the European Union) to raise awareness about risks linked to digital technology. **The association works in schools with pupils, their parents and professionals** and it organises debates specifically with parents to help them understand and supervise the digital and gaming behaviours of their children (e-Enfance, n.d.).

In parallel to co-funding national initiatives, **the EU has also put in place several pan-European measures** to raise awareness about risks in the digital and gaming field, such as the Better Internet for Kids policy that includes the #SaferInternet4EU campaign (Better Internet for Kids, n.d.) or the Safer Internet Centres (European Commission, 2018b).

5.7. Using other in-game purchase systems

Lastly, **some video game developers and publishers have removed loot boxes** from their games and opted for different in-game purchase systems. The publisher *Epic Games* has, for example, replaced the loot box mechanisms in their popular games *Fortnite* (Epic Games, 2019) and *Rocket League* (Rocket League, 2019) with systems where consumers are able to see which items they will receive before making a purchase. The element of chance that defines loot boxes is therefore removed. Another example is the game *Heroes of the Storm* (published by *Blizzard Entertainment*) where the option to buy loot boxes with real-life currency was removed, leaving the use of virtual in-game currency as the only option to obtain a loot box (Castello, 2019).

6. CONCLUSIONS AND RECOMMENDATIONS FOR FURTHER ACTION

The public debate about loot boxes has so far mainly circled around actual or perceived similarities between loot boxes and gambling. Consequently, many gambling authorities have started to look into the issue and to cooperate with each other, and some authorities have adopted opinions or even taken action against loot boxes. The key issues here are around loot boxes where the reward can be converted to real-world money. While this not possible for most types of loot boxes, grey markets exist on third-party platforms where virtual items are traded. **It is thus recommended that national gambling authorities intensify their cooperation** to ensure that video game publishers take action against illegal marketplaces that violate their terms and conditions.

Banning loot boxes under gambling regulation (as in Belgium and the Netherlands) effectively removes loot boxes that are considered gambling from video games, but it also impacts the Single Market for video games. In the Member States where loot boxes are banned, video game publishers cannot market the same games as in the other Member States, and players cannot buy and play the same games. Since gambling legislation is the competence of the EU Member States, all Member States would need to develop a common approach to avoid that the EU market for video games becomes fragmented. The fact that the national gambling authorities have come to different conclusions about the nature of loot boxes, despite similarities in their national legal definitions of gambling and despite their cooperation in the framework of GREF, shows the limitations of such a national approach.

Moreover, loot boxes are a specific (albeit prominent) example of more general issues related to problematic game design and in-game monetisation methods which can also appear in video games independently of loot boxes. As business models and design elements in the video game industry develop rapidly, focusing in particular on the regulation of loot boxes carries the risk that they will simply be replaced by other potentially problematic game designs and monetisation methods in the future and that regulation will lag behind technological development.

It is therefore recommended to broaden the perspective beyond gambling aspects and approach the issue of loot boxes and other problematic game designs from a wider consumer protection angle. The European Union has wide-ranging competences in the field of consumer protection and a well-established consumer *acquis*. Furthermore, the EU has already taken significant initiatives in markets that have similarities with the concerns created by loot boxes. For instance, the European Commission carried out a joint enforcement action together with the CPC of national consumer protection authorities to improve protection of children regarding in-app purchases in online games. Another example is the revision of the Audiovisual Media Services Directive (AVMSD), adopted in 2018, which reinforced the protection of minors against harmful online content.

Measures to protect video game players, in particular minors, from potentially harmful effects of loot boxes and similar in-game purchase systems can be put in place at different points of the consumer journey. Many of the existing practices and initiatives identified in this study, such as raising awareness about the risks of loot boxes, restricting advertisements targeting minors, informing the consumer that a game includes loot boxes or disclosing the probabilities of winning, inform the consumer during the pre-purchase phase. Other practices, such as the refund policies of Google Play and Apple's App Store, take effect during the purchase or post-purchase phase.

Like in other consumer markets, providing players (or parents in the case of minors) with information and being transparent about spending mechanisms or unwanted content are the starting point for

balancing out the asymmetry in information between players and publishers. **For many initiatives however, there is a lack of evidence with regards to the extent to which they achieve their goal of protecting players from harmful effects**, and experts have doubted the effectiveness of some transparency and information measures.

The GREF (2019) has for example expressed concerns that labels on video games (as issued by PEGI) might in fact have adverse effects by inducing children and minors to play games not deemed suitable for their age. Regarding the disclosure of probabilities of receiving certain contents, it has been shown that consumers tend to overestimate small probabilities but underestimate large probabilities (Rabin, 2000; Kahneman & Tversky, 1974). **The channels through which information is provided are also crucial**. The information needs to be provided at the right time, in the right format and to the right audience. For example, the effects of disclosing the probabilities of winning can be expected to be marginal if they are provided on the publisher's website instead of being shown in-game immediately before a loot box is purchased.

Similarly, parental control measures cannot be expected to be effective if they are not activated by default and if parents are not aware of their existence or do not use them correctly. These settings need to be accessible and intuitive and provide the consumers with a range of options regarding payment history, spending limits, alerts, transcripts or refund policies to protect all types of consumers and empower parents to protect their children. Moreover, parental control measures should be reframed to motivate adoption by adult players to protect themselves from harmful practices.

Thus, while consumer information, transparency and player control measures are certainly welcome initiatives, it is recommended that their effectiveness is systematically verified, for example through consumer testing. It also needs to be made sure that such measures are supervised and enforced by independent bodies.

The European Union has the competence to harmonise rules on consumer protection in the Single Market. **The European Commission is therefore in a position to take a holistic approach on design and monetisation elements in video games which include, but are not limited to, certain types of loot boxes that may have harmful effects on players, in particular minors**. Measures taken at EU level should be based on evidence for the effectiveness of existing initiatives and can range from non-binding recommendations to binding legislation in the form of Directives.

Inspiration for potential actions can be taken from consumer protection measures previously adopted by the EU in other sectors. With the Consumer Rights Directive, the EU implemented a 14-day period for withdrawal from distance contracts. The Tobacco Products Directive sets precise requirements for consumer warning labels and information messages to be put on the packaging of tobacco products. The recently amended Audiovisual Media Services Directive restricts audiovisual advertisements directed at minors and obliges video-on-demand services and video-sharing platforms to implement appropriate measures to protect minors from harmful online content. It lists a set of measures that providers must put in place on a gradual scale, depending on the level of control the viewer has and the potential harmfulness of the content. Among the items on the list are, for example, parental control or age verification systems.

These measures are in many ways comparable to the existing practices tackling loot boxes that were identified in this study. **Should these existing practices (which are mostly voluntary) be found insufficient to protect players from potentially harmful effects of loot boxes, they could be regulated at EU level in a similar manner**.

REFERENCES

Publications and Working Papers

- American Psychiatric Association (APA) (2013), *Diagnostic and Statistical Manual of Mental Disorders (5th ed.)*. Arlington, VA: American Psychiatric Publishing.
- Arkes, H. R., & Blumer, C. (1985), *The psychology of sunk costs*. *Organizational Behavior and Human Decision Processes*, 35, pp. 124-140.
- Ariely, D., & Kreisler, J. (2018), *Small change: Money mishaps and how to avoid them*, Pan Macmillan.
- Aronson, E., Wilson, T., & Akert, A. (2005), *Social Psychology (5th ed.)*. Upper Saddle River, NJ: Prentice Hall.
- Banerjee, A. (1992), *A simple model of herd behavior*. *Quarterly Journal of Economics*, 107, pp. 797-817.
- Blanco, C., Moreyra, P., Nunes, E. V., Saiz-Ruiz, J., & Ibanez, A. (2001), *Pathological gambling: addiction or compulsion?*, in *Seminars in Clinical Neuropsychiatry*, 6(3), pp. 167-176.
- Blaszczynski, A., & Nower, L. (2002), *A pathways model of problem and pathological gambling*. *Addiction*, 97(5), pp. 487-499.
- Brockner, J., Shaw, M. C., & Rubin, J. Z. (1979), *Factors affecting withdrawal from an escalating conflict: Quitting before it's too late*. *Journal of Experimental Social Psychology*, 15(5), pp. 492-503.
- Brooks, G. A., & Clark, L. (2019), *Associations between loot box use, problematic gaming and gambling, and gambling-related cognitions*. *Addictive behaviors*, 96, pp. 26-34.
- Brown, R. I. F. (1986), *Arousal and sensation-seeking components in the general explanation of gambling and gambling addictions*. *International Journal of the Addictions*, 21(9-10), pp. 1001-1016.
- Cialdini, R.B. (2008), *Influence: Science and Practice (5th ed.)*. Boston: Pearson.
- Chance, P. (2013), *Learning and behavior*. Nelson Education.
- Côté, D., Caron, A., Aubert, J., Desrochers, V., & Ladouceur, R. (2003), *Near wins prolong gambling on a video lottery terminal*. *Journal of Gambling Studies*, 19(4), pp. 433-438.
- Dahm, T., Neshat-Doost, H. T., Golden, A. M., Horn, E., Hagger, M., & Dalgleish, T. (2011), *Age shall not weary us: Deleterious effects of self-regulation depletion are specific to younger adults*. *PloS one*, 6(10).
- Desai, R. A., Krishnan-Sarin, S., Cavallo, D., & Potenza, M. N. (2010), *Video-gaming among high school students: health correlates, gender differences, and problematic gaming*. *Pediatrics*, 126(6).
- Dixon, M. J., Harrigan, K. A., Santesso, D. L., Graydon, C., Fugelsang, J. A., & Collins, K. (2014), *The impact of sound in modern multiline video slot machine play*. *Journal of Gambling Studies*, 30(4).
- Drummond, A., & Sauer, A. D. (2018), *Video game loot boxes are psychologically akin to gambling*. *Comment in Nature Human Behavior*.
- European Commission (2019), *Cooperation Arrangement between the gambling regulatory authorities of the EEA Member States concerning online gambling services* (updated March 2019). Available at: <https://ec.europa.eu/docsroom/documents/34701>.

- European Commission (2018a), *Minutes of the meeting of the Expert Group on Gambling Services (E02868) of 2 March 2018 in Brussels*. Available at: <https://ec.europa.eu/transparency/regexpert/index.cfm?do=groupDetail.groupDetailDoc&id=38509&no=2>.
- European Commission (2014a), *Recommendations of 14 July 2014 on principles for the protection of consumers and players of online gambling services and for the prevention of minors from gambling online*, 2014/478/EU. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32014H0478>.
- European Commission (2014b), *In-app purchases: Joint action by the European Commission and Member States is leading to better protection for consumers in online games*. Press release. Available at: https://ec.europa.eu/commission/presscorner/detail/en/IP_14_847.
- European Commission (2012), *Towards a comprehensive European framework for online gambling*, COM/2012/0596 final. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52012DC0596>.
- European Commission (2011), *Green paper on on-line gambling in the Internal Market*, COM/2011/0128 final. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:52011DC0128>.
- European Parliament (2013), *Resolution of 10 September 2013 on online gambling in the internal market*, 2012/2322 (INI). Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52013IP0348>.
- European Parliament (2011), *Resolution of 15 November 2011 on online gambling in the Internal Market*, 2011/2084(INI). Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52011IP0492>.
- European Parliament (2009), *Resolution of 10 March 2009 on the integrity of online gambling*, 2008/2215(INI). Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52009IP0097>.
- Eysenck, M. W. (2004), *Psychology: An international perspective*. Taylor & Francis.
- Fisher, S., & Griffiths, M. (1995), *Current trends in slot machine gambling: Research and policy issues*. *Journal of Gambling Studies*, 11(3), pp. 239-247.
- Gambling Commission (2019), *Young people and gambling survey 2019 - A research study among 11-16 year olds in Great Britain*. Available at: <https://www.gamblingcommission.gov.uk/PDF/Young-People-Gambling-Report-2019.pdf>.
- Gambling Commission (2018), *Declaration of gambling regulators on their concerns related to the blurring of lines between gambling and gaming*. Available at: <https://www.gamblingcommission.gov.uk/PDF/International-gaming-and-gambling-declaration-2018.pdf>.
- Gambling Commission (2017), *Virtual currencies, eSports and social casino gaming – position paper*. Available at: <http://www.gamblingcommission.gov.uk/PDF/Virtual-currencies-eSports-and-social-casino-gaming.pdf>.
- Grant, J. E., Schreiber, L., Odlaug, B. L., & Kim, S. W. (2010), *Pathologic gambling and bankruptcy*. *Comprehensive Psychiatry*, 51(2), pp. 115-120.

- GREF (2019), Synthesis of the works carried on by GREF eGambling Working Group with regard to the implementation of the *Declaration of gambling regulators on their concerns related to the blurring of lines between gambling and gaming*. Available at: https://www.gref.net/wp-content/uploads/2019/10/Synthesis_final-draft_v4_clean.pdf.
- Griffiths, M.D. (2018), *Is the buying of loot boxes in video games a form of gambling or gaming?* Gaming Law Review: Regulation, Compliance, and Policy.
- Griffiths, M. D., & Nuyens, F. (2017), *An overview of structural characteristics in problematic video game playing*. Current Addiction Reports, 4(3), pp. 272-283.
- Griffiths, M. D., & Parke, J. (2005), *The psychology of music in gambling environments: An observational research note*. Journal of Gambling Issues (JGI), (13).
- Hamari J. (2011), *Perspectives from behavioral economics to analyzing game design patterns: loss aversion in social games*. Conference: CHI 2011 Social Games Workshop.
- Hamari, J., & Lehdonvirta, V. (2010), *Game design as marketing: How game mechanics create demand for virtual goods*. International Journal of Business Science & Applied Management, 5(1), pp. 14-29.
- Harris, J., & Blair, E. A. (2006), *Consumer preference for product bundles: the role of reduced search costs*. Journal of the Academy of Marketing Science, 34 (4), 506-513.
- Harviainen, J. T., Meriläinen, M., Tossavainen, T. (2015), *The Game Educator's Handbook Revised International Edition*. Available at: <https://pelikasvatus.fi/gameeducatorshandbook.pdf>.
- Haw, J. (2008), *Random-ratio schedules of reinforcement: the role of early wins and unreinforced trials*, Journal of Gambling Issues 21, pp. 56–67.
- House of Commons - Digital, Culture, Media and Sport Committee (2019), *Immersive and addictive technologies*. Fifteenth Report of Session 2017–19.
- Interactive Software Federation of Europe (ISFE) (2019a). In-Game Spending Study GameTrack.
- Interactive Software Federation of Europe (ISFE) (2019b). Key Facts – 2018 trends and data.
- International Central Institute for Youth and Educational Television (IZI) (2019). International Data on Youth and Media 2019. Available at: <https://www.br-online.de/jugend/izi/english/International%20Data%20on%20Youth%20and%20Media.pdf>.
- Kahneman, D. & Tversky, A. (1974), *Judgment under uncertainty: heuristics and biases*. Science, Vol. 185, Issue 4157.
- Kansspelautoriteit (2018), *Onderzoek naar loot boxes – Een buit of een last?* Available at: <https://kansspelautoriteit.nl/publicaties/onderzoek/>.
- Kansspelcommissie (2018). *Onderzoeksrapport loot boxen*. Available at: https://www.gamingcommission.be/opencms/export/sites/default/jhksweb_nl/documents/onderzoeksrapport-loot-boxen-final-publicatie.pdf.
English translation available at: https://www.gamingcommission.be/opencms/export/sites/default/jhksweb_nl/documents/onderzoeksrapport-loot-boxen-Engels-publicatie.pdf.
- Kaptsis, D., King, D. L., Delfabbro, P. H., & Gradisar, M. (2016), *Withdrawal symptoms in Internet gaming disorder: A systematic review*. Clinical Psychology Review, 43, pp. 58-66.

- Kim, H. S., Wohl, M. J., Salmon, M. M., Gupta, R., & Derevensky, J. (2015), *Do social casino gamers migrate to online gambling? An assessment of migration rate and potential predictors*. *Journal of Gambling Studies*, 31(4), pp. 1819-1831.
- Kimppa, K. K., Heimo, O. I., & Harviainen, J. T. (2016), *First dose is always freemium*. *ACM SIGCAS Computers and Society*, 45(3), pp. 132-137.
- King, D. L., & Delfabbro, P. H. (2018), *Predatory monetization schemes in video games (eg 'loot boxes') and internet gaming disorder*. *Addiction*, 113(11), pp. 1967-1969.
- King, D. L., & Delfabbro, P. H. (2020), *The convergence of gambling and monetised gaming activities*. *Current Opinion in Behavioral Sciences* 2020, 31, pp. 32-36.
- King, D. L., Delfabbro, P.H., Gainsbury, S.M., Dreier, M., Greer, & N., Billieux, J. (2019), *Unfair play? Video games as exploitative monetized services: An examination of game patents from a consumer protection perspective*. *Computers in Human Behavior*, 101, pp. 131-143.
- King, D., Delfabbro, P., & Griffiths, M. (2010a), *Video game structural characteristics: A new psychological taxonomy*. *International Journal of Mental Health and Addiction*, 8(1), pp. 90-106.
- King, D., Delfabbro, P., & Griffiths, M. (2010b), *The convergence of gambling and digital media: Implications for gambling in young people*. *Journal of Gambling Studies*, 26(2), pp. 175-187.
- King, D.L., Delfabbro, P. H., & Griffiths, M. D. (2011), *The role of structural characteristics in problematic video game play: an empirical study*. *International Journal of Mental Health and Addiction*, 9(3), pp. 320-333.
- Kotler, P., & Keller, K. (2006). *Marketing Management (12th ed.)*. NJ: Prentice Hall.
- Lapuz, J., & Griffiths, M. D. (2010), *The role of chips in poker gambling: an empirical pilot study*. *Gambling Research: Journal of the National Association for Gambling Studies (Australia)*, 22(1), p. 34.
- Loomes, G., & Sugden, R. (1982), *Regret theory: an alternative theory of rational choice under uncertainty*. *The Economic Journal*, 92(368), pp. 805-824.
- Lorains, F. K., Cowlshaw, S., & Thomas, S. A. (2011), *Prevalence of comorbid disorders in problem and pathological gambling: systematic review and meta-analysis of population surveys*. *Addiction*, 106(3), pp. 490-498.
- Lussier, I. D., Derevensky, J., Gupta, R., & Vitaro, F. (2014), *Risk, compensatory, protective, and vulnerability factors related to youth gambling problems*. *Psychology of Addictive Behaviors*, 28(2).
- Macey, J., & Hamari, J. (2018), *eSports, skins and loot boxes: participants, practices and problematic behaviour associated with emergent forms of gambling*. *New Media & Society*.
- Newman, S. C., & Thompson, A. H. (2003), *A population-based study of the association between pathological gambling and attempted suicide*. *Suicide and Life-Threatening Behavior*, 33(1), pp. 80-87.
- Mischel, W., Shoda, Y., & Rodriguez, M. I. (1989), *Delay of gratification in children*. *Science*, 244(4907), pp. 933-938.
- Mook, D. (1995). *Motivation: the organization of action*. Norton (London).
- Mullainathan, S., & Sharif, E. (2013), *Scarcity: why having too little means so much*. London. Allen Lane.

- Nielsen, R. K. L., & Grabarczyk, P. (2019), *Are Loot Boxes Gambling? Random Reward Mechanisms in Video Games*. Transactions of the Digital Games Research Association, June 2019, Vol 4 No 3.
- Ofcom (2020). Online Nation - 2020 Report. Available at: https://www.ofcom.org.uk/data/assets/pdf_file/0027/196407/online-nation-2020-report.pdf.
- Przybylski, A. K., & Weinstein, N. (2017), *A large-scale test of the goldilocks hypothesis: quantifying the relations between digital-screen use and the mental well-being of adolescents*. Psychological Science, 28(2), pp. 204-215.
- Rabin, M. (2000), *Risk aversion and expected utility theory: a calibration theorem*. Econometrica, Volume 68, Issue 5.
- Raghubir, P., & Srivastava, J. (2008), *Monopoly money: the effect of payment coupling and form on spending behavior*. Journal of experimental psychology: Applied, 14(3), p. 213.
- Reid, R. L. (1986), *The psychology of the near miss*. Journal of gambling behavior, 2(1), pp. 32-39.
- Rockloff, M. J., & Dyer, V. (2007), *An experiment on the social facilitation of gambling behavior*. Journal of Gambling Studies, 23, pp. 1–12.
- Rogers, P. (1998), *The cognitive psychology of lottery gambling: a theoretical review*. Journal of Gambling Studies, 14(2), pp. 111–134.
- Schlinger, H. D., Derenne, A., & Baron, A. (2008), *What 50 years of research tell us about pausing under ratio schedules of reinforcement*. The Behavior Analyst, 31(1), pp. 39-60.
- Schüll, N. D. (2014), *Addiction by design: machine gambling in Las Vegas*. Princeton University Press.
- Shibuya, A., Teramoto, M., & Shoun, A. (2015), *Systematic analysis of in-game purchases and social features of mobile social games in Japan*. In DiGRA Conference.
- Skinner, B. F. (1965), *Science and human behavior (No. 92904)*. Simon and Schuster.
- Soman, D., & Gourville, J. T. (2001), *Transaction decoupling: how price bundling affects the decision to consume*. Journal of marketing research, 38(1), pp. 30-44.
- Søraker, J. H. (2016), *Gaming the gamer? The ethics of exploiting psychological research in video games*. Journal of Information, Communication and Ethics in Society.
- Sunstein, C. R. (2002), *Probability neglect: emotions, worst cases, and law*. The Yale Law Journal, 112(1), pp. 61-107.
- Swedish Consumer Agency (Konsumentverket) (2019), *A survey of consumer protection relating to lottery or casino-like elements in video games (original title in Swedish: Kartläggning av konsumentskyddet vid lotteri- eller kasinoliknande inslag i datorspel)*. Available in Swedish at: <https://www.konsumentverket.se/contentassets/83509d8dffff48559d44de6546ecc362/kartlaggning-av-konsumentskyddet-vid-lotteri-eller-kasinoliknande-inslag-i-datorspel-fi-2019-01630-ko.pdf>, English translation was shared with the research team by ISFE.
- The Senate: Commonwealth of Australia (2018). Gaming micro-transactions for chance-based items. Environment and Communications References Committee.
- Thompson, R. F., & Spencer, W. A. (1966), *Habituation: a model phenomenon for the study of neuronal substrates of behavior*. Psychological review, 73(1), p. 16.

- UNICEF Youth Policy Labs (2016), *Age Matters! Age-related barriers to service access and the realisation of rights for children, adolescents and youth*. Available at: https://agemattersnow.org/downloads/YPL_Age_Matters_Final_Report_Oct2016.pdf.
- Wood, R. T., Griffiths, M. D., Chappell, D., & Davies, M. N. (2004), *The structural characteristics of video games: A psycho-structural analysis*. *CyberPsychology & Behavior*, 7(1), pp. 1-10
- Yee, N. (2006), *Motivations for Play in Online Games*. *CyberPsychology & Behavior*, 9(6), pp. 772–775.
- Zendle, D. (2019), *Problem gamblers spend less money when loot boxes are removed from a game: a before and after study of Heroes of the Storm*. *PeerJ*, 7, e7700.
- Zendle, D., & Cairns, P. (2018), *Video game loot boxes are linked to problem gambling: Results of a large-scale survey*. *PLoS ONE* 13(11).
- Zendle D., & Cairns P. (2019). *Loot boxes are again linked to problem gambling: Results of a replication study*. *PLoS ONE* 14(3).
- 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.
- Zendle, D., Cairns, P., Barnett, H., & McCall, C. (2020a). *Paying for loot boxes is linked to problem gambling, regardless of specific features like cash-out and pay-to-win*. *Computers in Human Behavior*, 102, 181-191.
- Zendle, D., Meyer, R., Cairns, P. Waters, S. & Balloucd N., (2020b), *The prevalence of loot boxes in mobile and desktop games*. Short Report in Addiction.

Newspaper Articles, Websites, Blog Posts and Other Sources

All web sources have been accessed between 6 April and 3 July 2020.

- Android Developers Blog. Available at: <https://android-developers.googleblog.com/2019/05/building-safer-google-play-for-kids.html>.
- Apple App Store Review Guidelines for Developers. Available at: <https://developer.apple.com/app-store/review/guidelines/#in-app-purchase>.
- Apple Support to request refunds. Available at: <https://support.apple.com/en-us/HT204084>.
- ARJEL (2017), *Letter to the Senate*. Available at: <http://www.arjel.fr/IMG/pdf/20171120courrier.pdf>.
- BBC (2019a), *Loot boxes should be banned, says US senator*. Available at: <https://www.bbc.co.uk/news/technology-48214293>.
- BBC (2019b), *EA Games: Loot boxes aren't gambling, they're just like kinder egg*. Available at: <https://www.bbc.co.uk/news/newsbeat-48701962/>.
- BBC (2019c), *The kids emptied our bank account playing Fifa*. Available at: <https://www.bbc.com/news/technology-48908766>.
- BBC (2019d), *My son spent £3,160 in one game*. Available at: <https://www.bbc.com/news/technology-48925623>.
- Better Internet for Kids (n.d.), *SaferInternet4EU campaign*. Available at: <https://www.betterinternetforkids.eu/web/portal/saferinternet4eu>.

- Bloomberg (2018), *The Good Times are Over for Japan's Loot-Box-Style Gaming Bonanza*. Available at: <https://www.bloomberg.com/news/articles/2018-11-05/the-good-times-are-over-for-japan-s-loot-box-style-gaming-bonanza>.
- Byung-yeul, B. (2018), *Korea's heavily-regulated game industry to lose its edge*. Available at: https://www.koreatimes.co.kr/www/tech/2018/12/134_252776.html.
- CA Agents (2018), *The Fine Line between Gambling and Gaming: the Short International History of Loot Box/Gacha and Regulations for all Game Devs*. Available at: <https://cs-agents.com/blog/history-loot-box-gacha/>.
- Castello, J. (2019), *Heroes Of The Storm will remove the ability to buy loot boxes with real money*. Available at: <https://www.rockpapershotgun.com/2019/03/24/heroes-of-the-storm-will-remove-the-ability-to-buy-loot-boxes-with-real-money/>.
- CNN Business (2019), *Apex Legends developer apologizes for controversial loot boxes*. Available at: <https://edition.cnn.com/2019/08/17/business/apex-legends-electronic-arts-loot-boxes/index.html>.
- Dealessandri, M. (2020), *Xbox boosts responsible gaming strategy with Family Settings app*. Available at: <https://www.gamesindustry.biz/articles/2020-05-27-xbox-boosts-responsible-gaming-strategy-with-family-settings-app>.
- e-Enfance (n.d.), *Jeux Vidéo Info Parents*. Available at: <https://www.e-enfance.org/jeux-video-info-parents>.
- Epic Games (2019). *Loot Unboxing*. Available at: <https://www.epicgames.com/fortnite/en-US/news/loot-unboxing>.
- European Commission (2018b), *Safer Internet Centres*. Available at: <https://ec.europa.eu/digital-single-market/en/safer-internet-centres>.
- European Commission, *Coordinated Actions*. Available at: https://ec.europa.eu/info/live-work-travel-eu/consumers/enforcement-consumer-protection/coordinated-actions_en.
- European Parliament (2020), *Parliamentary question E-003254/2019*, Answer given by Mr Reynders on behalf of the European Commission. Available at: https://www.europarl.europa.eu/doceo/document/E-9-2019-003254-ASW_EN.html.
- European Parliament (2019a), *Parliamentary question E-004184/2019*, Regulation of loot boxes and gambling in computer games. Available at: https://www.europarl.europa.eu/doceo/document/E-9-2019-004184_EN.html.
- European Parliament (2019b), *Parliamentary question E-003254/2019*, Impact on children and vulnerable adults of gambling features in videogames. Available at: https://www.europarl.europa.eu/doceo/document/E-9-2019-003254_EN.html.
- European Parliament (2018), *Parliamentary question E-000212/2018*, Impact of gambling features in video games on children and vulnerable adults. Available at: https://www.europarl.europa.eu/doceo/document/E-8-2018-000212_EN.html.
- Fandom Overwatch Wiki (n.d.). Available at: https://overwatch.fandom.com/wiki/Loot_Box.
- Forbes.com (2019), *'Apex Legends' iron crown loot box pricing is hilariously out of touch*. Available at: <https://www.forbes.com/sites/paultassi/2019/08/14/apex-legends-iron-crown-loot-box-pricing-is-hilariously-out-of-touch/>.

- Fundamental Rights Agency (n.d.), *Age of majority*. Available at: <https://fra.europa.eu/en/publication/2017/mapping-minimum-age-requirements/age-majority>.
- Gambling Compliance (n.d.), *Analysing age requirements in Europe*. Available at: <https://gamblingcompliance.com/infographic/analysing-age-requirement-europe>.
- Gentile, D., Swing, E., Lim, C., & Khoo, A. (2012), *Video game playing, attention problems, and impulsiveness: Evidence of bidirectional causality*. *Psychology of Popular Media and Culture*, 1.
- Gilbert, B. (2017), *The new 'Star Wars' game is embroiled in controversy, and fans are furious - here's what's going on*. Available at: <https://www.businessinsider.com/star-wars-battlefront-2-mess-explained-2017-11?r=DE&IR=T>.
- Google Play's Developer Policy Center. Available at: <https://play.google.com/intl/en-gb/about/monetization-ads/>.
- Google Play Help with user discussions on loot box probabilities. Available at: <https://support.google.com/googleplay/thread/11275099?hl=en>.
- Google Support to request refunds. Available at: <https://support.google.com/googleplay/answer/2479637?hl=en>.
- Halbfinger, D. M. for the New York Times (1999), *Suit Claims Pokemon is Lottery, Not Just Fad*. Available at: <https://www.nytimes.com/1999/09/24/nyregion/suit-claims-pokemon-is-lottery-not-just-fad.html>.
- Interactive Software Federation of Europe (ISFE) (n.d.). Available at: <https://www.isfe.eu/games-in-society/>.
- Interactive Software Federation of Europe (ISFE) (2019c), *Video Game Industry Commitments to Further Inform Consumer Purchase*. Available at: <https://www.isfe.eu/news/video-game-industry-commitments-to-further-inform-consumer-purchase/>.
- Interactive Software Federation of Europe (ISFE) (2019d), *Europe's video games industry welcomes Danish Gambling Authority decision to block illegal skin-betting websites*. Available at: <https://www.isfe.eu/news/europes-video-games-industry-welcomes-danish-gambling-authority-decision-to-block-illegal-skin-betting-websites/>.
- Kiiski, E. on GameRefinery (n.d.), *Battle Pass is a hot trend in mobile games – like it or not*. Available at: <https://www.gamerefinery.com/battle-pass-trend-mobile-games/#:~:text=One%20interesting%20difference%20from%20the.want%20access%20to%20premium%20content>.
- Lewis R. (2017), *How case opening sites scam their customers*. Available at: <https://rlewisreports.com/case-opening-sites-scam-customers/>.
- Lobel, A., Engels, R. C., Stone, L. L., Burk, W. J., & Granic, I. (2017), *Video gaming and children's psychosocial wellbeing: A longitudinal study*. *Journal of youth and adolescence*, 46(4), pp. 884-897.
- McAloon, A. (2016), *Online games will be required to disclose random loot box odds in China*. Available at: https://www.gamasutra.com/view/news/287258/Online_games_will_be_required_to_disclose_random_loot_box_odds_in_China.php.
- NPB (2018). *Statement of the National Police Board on loot boxes*, 19 November 2018. Available at: <https://www.arpajaishallinto.fi/news>.

- PédaGoJeux (n.d.), *Le skin gambling expliqué aux parents*. Available at: <http://www.pedagojeux.fr/comprendre-le-jeu-video/le-skin-gambling/>.
- PEGI (n.d.), *What do the labels mean?* Available at: <https://pegi.info/what-do-the-labels-mean>.
- PEGI (2020), *PEGI Introduces Notice To Inform About Presence of Paid Random Items*. Available at: <https://pegi.info/news/pegi-introduces-feature-notice>.
- PEGI (n.d.), *Parental Control Tools*. Available at: <https://pegi.info/parental-controls>.
- Perez, S. (2019), *Microsoft adds per-app time limits to its parental controls*. Available at: <https://techcrunch.com/2019/10/08/microsoft-adds-per-app-time-limits-to-its-parental-controls/?guccounter=1>.
- Rocket League (2019), *Crates leave Rocket League later this year*. Available at: <https://www.rocketleague.com/news/crates-leaving-rocket-league-later-this-year/>.
- Schwidessen, S. (2019), *Germany: Rewarded in-app advertisement, profile linking and in-game monetization models targeted by a new draft guideline*. Available at: <https://www.linkedin.com/pulse/germany-rewarded-in-app-advertisement-profile-linking-sebastian/>.
- Spelinspektionen (2018), *Random prizes in computer games*. Available at: <https://www.spelinspektionen.se/en/press-contact/notes-archive/random-prizes-in-computer-games/>.
- Spillemyndigheden (2017), *Statement about loot boxes/loot crates*. Available at: <https://www.spillemyndigheden.dk/en/news/statement-about-loot-boxes-loot-crates>.
- Statista (2019), *Music industry revenue worldwide from 2012 to 2023*. Available at: <https://www.statista.com/statistics/259979/global-music-industry-revenue/>.
- Statista (2020), *Global box office revenue from 2005 to 2019*. Available at: <https://www.statista.com/statistics/271856/global-box-office-revenue/>.
- Steamspy (2020). Overview. Available at: <https://steamspy.com/year/>.
- Taylor, H. (2017), *Developers must disclose loot box odds following update to App Store guidelines*. Available at: <https://www.gamesindustry.biz/articles/2017-12-21-apple-updates-guideline-to-require-disclosure-of-loot-box-odds>.
- Thornhill, J. (2020). *With children off school and gaming online, parents face shock bills*. Available at: <https://www.theguardian.com/money/2020/apr/05/with-children-off-school-and-gaming-online-parents-face-shock-bills>.
- Valentine, R. (2019), *Rocket League nixes loot boxes in Belgium, the Netherlands*. Available at: <https://www.gamesindustry.biz/articles/2019-04-16-rocket-league-nixes-loot-boxes-in-belgium-the-netherlands>.
- Wijman, T. (2019), *The Global Games Market Will Generate \$152.1 Billion in 2019 as the U.S. Overtakes China as the Biggest Market*. Available at: <https://newzoo.com/insights/articles/the-global-games-market-will-generate-152-1-billion-in-2019-as-the-u-s-overtakes-china-as-the-biggest-market/>.
- World Health Organization (n.d.) *Early child development*. Available at: <https://www.who.int/topics/early-child-development/en/>.

- World Health Organization (n.d.) Adolescent health.
Available at: https://www.who.int/health-topics/adolescent-health/#tab=tab_1.

This paper defines loot boxes and describes their behavioural effects, including problematic behaviour. It examines the regulatory framework at EU and national level within which loot boxes operate, provides an overview of public and industry practices, and derives recommendations. Framing the debate around loot boxes, away from gambling and towards consumer protection, would provide the EU with an array of tools to address problematic practices and minimise potential harm, especially for minors.

This document was provided by the Policy Department for Economic, Scientific and Quality of Life Policies at the request of the committee on Internal Market and Consumer Protection (IMCO).

PE 652.727
IP/A/IMCO/2019-11

Print ISBN 978-92-846-6905-9 | doi:10.2861/019767 | QA-02-20-533-EN-C
PDF ISBN 978-92-846-6904-2 | doi:10.2861/72151 | QA-02-20-533-EN-N