



Regulating Gambling-Like Video Game Loot Boxes: a Public Health Framework Comparing Industry Self-Regulation, Existing National Legal Approaches, and Other Potential Approaches

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Abstract

Purpose of Review Loot boxes are gambling-like monetisation mechanics in video games that are purchased for opportunities to obtain randomised in-game rewards. Gambling regulation is increasingly being informed by insights from public health. Despite conceptual similarities between loot boxes and gambling, there is much less international consensus on loot box regulation. Various approaches to regulating loot boxes are reviewed via a public health framework that highlights various trade-offs between individual liberties and harm prevention.

Recent Findings Many countries have considered regulation, but as yet only a few countries have taken tangible actions. Existing regulatory approaches vary greatly. More restrictively, Belgium has effectively ‘banned’ paid loot boxes and prohibits their sale to both children and adults. In contrast, more liberally, China only requires disclosure of the probabilities of obtaining potential rewards to provide transparency and perhaps help players to make more informed purchasing decisions. Most other countries (e.g., the UK) have adopted a ‘wait-and-watch’ approach by neither regulating loot box sales nor providing any dedicated consumer protection response. Industry self-regulation has also been adopted, although this appears to elicit lower rates of compliance than comparable national legal regulation.

Summary Many potential public health approaches to loot box regulation, such as expenditure limits or harm-reducing modifications to loot box design (e.g., fairer reward structures), deserve further attention. The compliance and clinical benefits of existing interventions (including varying degrees of regulation, as adopted by different countries, and industry self-regulation) should be further assessed. The current international variation in loot box regulation presents opportunities to compare the merits of different approaches over time.

Keywords Loot boxes · Video gaming regulation · Online gambling · Consumer protection · Interactive entertainment law · Video games · Public health

Introduction

‘Loot boxes’ are gambling-like monetisation mechanics in video games that players can engage with to obtain randomised rewards, which can provide cosmetic changes or gameplay advantages [1••, 2•]. All loot boxes involve ‘randomisation’ when deciding which rewards to provide to players. However, depending on (i) whether or not the player pays real-world money to become eligible to engage with the loot boxes and (ii) whether or not the rewards that the players receive can be transferred to other players in exchange for real-world money [3] (the latter being a particularly important distinction for regulatory purposes at present), loot boxes have been divided into four categories by Nielsen and Grabarczyk [4••], as summarised in

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Table 1. The existing academic literature and regulatory scrutiny have focused on so-called paid loot boxes (i.e., the shaded third and fourth categories described in Table 1) that the player spends fiat currency to purchase because these might lead to the player overspending real-world money and thereby suffering potential financial harms [5•]. The first and

second categories of loot boxes that do not require purchase appear less obviously harmful, although they might in contrast lead to the player overspending *time* (in order to ‘grind’ or repeatedly complete largely identical in-game tasks to achieve or receive something with only a small chance of happening [6, 7]), rather than overspending *money*, and

Table 1 Nielsen and Grabarczyk [4••]’s loot box categorization framework [4••] (adapted from Xiao [5•] and Xiao et al. [11])

Perceived level of potential harm in the authors’ view (ascending, with 1 being lowest risk)	Costs real-world money to engage?	Provides rewards possessing real-world monetary value?	Example implementations in video games	Regulatory position in selected jurisdictions
1	No	No	Loot drop system in <i>Path of Exile</i> (Grinding Gear Games, 2013) [as intended by the developer]; Gachapon machines dispensing costumes for the player avatar in <i>Yoshi’s Crafted World</i> (Good-Feel, 2019)	Unregulated in most countries
2	No	Yes	Loot drop system in <i>Path of Exile</i> (Grinding Gear Games, 2013) [in practice contrary to the developer’s intentions]	Unregulated in most countries
3	Yes	No	Booster packs in <i>Magic: The Gathering Arena</i> (Wizards of the Coast, 2019); FIFA Ultimate Team packs in <i>FIFA 2019</i> (Electronic Arts, 2018) [as intended by the developer]; Card packs in <i>Hearthstone</i> (Blizzard Entertainment, 2014)	Deemed as gambling in Belgium [13] Unregulated in most other countries
4	Yes	Yes	Booster packs in <i>Magic: The Gathering Online</i> (Wizards of the Coast, 2002); FIFA Ultimate Team packs in <i>FIFA 2019</i> (Electronic Arts, 2018) [in practice contrary to the developer’s intentions]	Deemed as gambling in Belgium [13], Denmark [14], the UK [15] and many other countries Previously <i>incorrectly</i> deemed as gambling in the Netherlands [16-18]; presentl confirmed <i>not</i> to constitute gambling generally under Dutch law as of 9 March 2022 [19, 20] Only the Netherlands is known to have enforced the law (albeit erroneously [19, 20] [17, 18, 21] cf. the UK which has not actively enforced the law [22])

potentially lead to or exacerbate the World Health Organization's (WHO's) so-called gaming disorder or problematic engagement with video gaming as a form of behavioural addiction.¹ The degree of the 'problematic-ness' and level of potential harm for each category of loot boxes, as perceived by the authors and generally understood by the literature, are outlined in ascending order in Table 1. Hereinafter, this article discusses paid loot boxes only and refers to them as loot boxes, unless otherwise specified, following colloquial norms and the existing literature [11].

This article introduces loot boxes' current prevalence in video games and discusses why loot box regulation could be, and should be, conceptualised as a public health issue that can be approached in many different ways. Then, existing self-regulatory approaches from the video game industry, and the legal regulatory frameworks for loot boxes in various example jurisdictions, are summarised. Finally, both existing and potential loot box harm minimisation measures are considered in the context of the Nuffield public health intervention ladder [12(pp. 41–42, paras 3.37–3.38)], with respect to how they balance inherent trade-offs between individual liberties and harm prevention.

Prevalence and Deemed Suitability to Children

Loot boxes are presently frequently implemented in video games, particularly on mobile phone platforms: in 2019, amongst the highest-grossing video games, 59% on the Apple iPhone platform contained loot boxes in the UK, as did 36% on the PC Steam platform [23•]. Loot boxes remain an evolving issue as the prevalence rate was found to have increased to 77% for UK iPhone games when it was re-assessed in 2021 using a comparable sample [24]: this appears to be due to multiple reasons including (i) a greater number of popular games starting to implement loot boxes; (ii) difficulties with identifying well-hidden loot box implementations with complex purchasing procedures; and (iii) semantic and definitional ambiguities with what game mechanic exactly constitutes a loot box [25•]. The prevalence rate also differs across countries: 91% of the 100 highest-grossing iPhone games contained loot boxes in China in 2020 [26], suggesting that the loot box situation might be different across countries and cultures and that future research should include the perspectives of non-Western countries and players [see 27].

Although some members of the public, e.g., some parents [see 28], consider loot boxes to be unsuitable for children, game companies and self-regulatory video game age rating systems, which are financially supported by the industry and therefore arguably conflicted from acting against the

industry's commercial interests, generally deem loot boxes to be suitable for implementation in children's games and, by implication, suitable for children to purchase (e.g., the Entertainment Software Rating Board (ESRB) in North America and Pan European Game Information (PEGI) in Europe, neither of which requires a minimum age rating for games containing loot boxes as of May 2022, although imposing this would be within their self-regulatory powers [29]; this should be contrasted with how mere *depiction* of tobacco, alcohol and illegal drug use would generally render the game to be deemed as suitable only for older adolescents, e.g., 'PEGI 16' or suitable for players aged 16 and above [30]). Indeed, 58% of the highest-grossing UK iPhone games deemed suitable for children aged 12+ contained loot boxes in 2019 [23•], meaning that children are regularly exposed to loot boxes and can readily purchase them. The UK Gambling Commission found that 23% of young people aged between 11 and 16 have paid real-world money to purchase loot boxes [31(p. 39)]; in contrast, only 7% have ever participated in traditional online gambling [31(p. 33)].

Conceptual Similarities with Gambling

Purchasing loot boxes is conceptually similar to gambling both structurally and psychologically because the player voluntarily spends real-world money to engage in a randomised process whose results could be desirable or, more often, undesirable, given that most potential loot box rewards are often contextually worthless to the player (either because they already have a duplicate copy or because they are already in possession of some other superior or effectively equivalent in-game item) [2•, 32]. Through purchasing loot boxes, players potentially either 'gain' by obtaining a valuable and wanted item or 'lose' by obtaining a non-valuable and unwanted item [32]. This is even more evident in relation to loot boxes that provide rewards possessing real-world monetary value that the player can subsequently sell on the secondary market, because many non-valuable rewards are worth far less than the cost of purchasing the loot box, compared to the potential large 'jackpot' wins from valuable rewards [3], similar to the incentive structure of lottery tickets [24]. Certain particularly rare and highly sought-after loot box content is worth hundreds, and potentially over one thousand, euros on the secondary market [33]. Indeed, opening 'rare' rewards from loot boxes elicits physiological responses similar to participating in certain traditional gambling activities [34]. One adult player reportedly spent over US\$10,000 on loot boxes in one game over a 2-year period [35], and four children spent 'nearly £550 in 3 weeks' of their father's money without permission and still failed to obtain the rare item that they were hoping for [36].

¹ The debate on that issue is not addressed herein [8, 9] and has been addressed in other articles in *Current Addiction Reports* [e.g., 10].

Differing Interpretations of the Loot Box ‘Harm’ Evidence Base: Allusions to Longstanding Debates on the Evidence Base of Gambling Harms

Importantly, loot box expenditure has been found to be positively correlated with self-reported problem gambling severity in many cross-sectional studies across various Western countries, including the USA [37], Spain [38], Denmark [39] and Australia [40], amongst both adult and adolescent player samples [41]. Reviews and meta-analyses of these studies have been conducted elsewhere [42••]; [43–45]. However, the causal direction (if any) of this positive correlation is not known [46], and there is debate as to how the current evidence base should be interpreted. McCaffrey has argued that, presently, there is insufficient evidence to demonstrate that loot boxes cause widespread harm and that regulatory intervention is therefore not yet justified [47, 48]. In contrast, Drummond et al. have argued that there is already sufficient evidence demonstrating the potential harms of loot boxes (particularly, similarities with traditional gambling and the involvement of real-world money) and that loot boxes should therefore immediately be regulated more stringently [2•, 3].

These diverging perspectives have similarly been present in the longer-standing debate in gambling. Collins et al. have argued that existing harm reduction methods have been successful (as evidenced by stable or flat prevalence rates of problem gambling), and that further regulation would unnecessarily reduce the (safe) enjoyment of gambling as a leisure activity by many people [49(p. 994)]. The gambling industry also echoes this interpretation [e.g., 50], perhaps unsurprisingly given its commercial interests. In contrast, other researchers have argued that the problem gambling prevalence rate fails to reflect the full extent of the potential harms of gambling and that non- ‘problem gamblers’ would also potentially suffer harms, which is why a population-based public health harm minimisation approach might be required to reduce the risk of harm amongst all gamblers [51–56].

The conflicting interpretations, in both the loot box and the gambling contexts, arguably arise partially from the methodological weaknesses of a majority of the evidence base, which relied on retrospective self-reported data. Such data, derived either from a representative panel (such as a prevalence survey [57]) or from online convenience samples [58], might lack reliability due to the participants’ responses being intentionally dishonest (due to a desire to hide one’s participation in gambling due to perceived stigma [59]) or unintentionally inaccurate (due to memory recall issues [60]; inconsistent interpretation of questions [61]; or incorrect estimations and calculations of expenditures [62]). To illustrate, in the UK, gambling prevalence studies have, in the 12 months prior to May 2022, recorded rates of problem gambling as varied as 0.2% (by

the UK Gambling Commission [63]) and 2.8% (by YouGov on behalf of GambleAware) [64(p. 2)]. This suggests that ‘harm prevalence’ data may be subject to a range of methodological issues affecting their accuracy and validity that researchers are not fully aware of and cannot account for. More recently, Muggleton et al., relying instead on more objective transaction data from a high street bank, suggested that even the higher, previously identified problem gambling prevalence rates (i.e., ~3.0%) have underestimated the extent of gambling-related harms and, importantly, failed to reflect the widespread associations between gambling and various harms even amongst less engaged (supposedly, non-problem) gambling participants [65]. For loot boxes, this suggests that the prevalence of loot box ‘harms’ might have been underestimated by prior studies and that research collaborations with the industry using players’ *actual* (and, therefore, more objective) loot box spending data could provide important insights [66]. However, in yet another striking parallel with gambling research, the video game industry has hitherto been unwilling to share their data, similarly to how the gambling industry has been unwilling to share data with independent researchers [67].

Loot Boxes and Gambling Both Show a Trend Toward Pre-emptive Industry ‘Self-Regulation’

The video game industry has adopted certain pre-emptive self-regulation purportedly to enhance transparency and reduce harms ahead of potential impending legal regulation. For example, some companies have committed to making probability disclosures detailing the player’s likelihood of obtaining different randomised rewards voluntarily *outside* of Mainland China (where, uniquely, disclosures are required by law [26])[68]. Major app stores, such as the Google Play Store and the Apple App Store, also require probability disclosures globally [69, 70]. In addition, the two major self-regulatory age rating systems of North America and Europe, the ESRB and PEGI, have introduced an ‘in-game purchases (includes random items)’ content descriptor to label and signify the inclusion of loot boxes in a video game [71, 72]. However, this self-regulatory measure has been criticised as being insufficiently detailed to truly inform potential customers about the risks involved with loot boxes [29], and there is no evidence of these labels providing any tangible benefit.

Loot box-related industry self-regulation mirrors many attempts by the traditional gambling industry to self-regulate (seemingly in conflict with its own financial interests) arguably in order to fend off stronger (and likely more effective) interventions from regulators and policymakers [73]. For example, the gambling industry has, for a long time, directed funds towards non-restrictive interventions, such as warning messages or education programmes about the risks of gambling, which do nothing to alter the properties

and availability of potentially harmful products [74]. In the UK, the industry has agreed to partial restrictions around advertising in professional sports (e.g., ‘whistle-to-whistle’ ban): however, this has not effectively reduced sports watchers’ frequent exposure to gambling marketing via logos and website addresses shown on, for example, shirts and pitch-side billboards in soccer [75]. Research has additionally critiqued the inadequacies of the main gambling warning message used by the UK industry from 2014 to 2021 (‘When the Fun Stops, Stop’) [76, 77], and also its lack of effect on influencing gambling behaviour [78]. Many gambling researchers have therefore advocated for stronger interventions, akin to the graphic health warnings or restrictions on availability adopted in tobacco contexts [79], but uptake of these approaches has been slow.

What Does Taking a Public Health Approach Mean?

Within the discourse surrounding loot box regulation, there is substantial support for banning the mechanic entirely [80]: for example, as advocated for by academics [e.g., 81(p. 40)], gambling-related charities and other NGOs (non-governmental organisations) [e.g., 82], and, indeed, members of the legislature [e.g., 83(p. 115, para. 446)]. However, banning the product is only one potential approach amongst a spectrum of different approaches of varying degrees of restrictiveness. An indiscriminate ban is one of the most extreme approaches and is not strongly supported by the evidence from, and the experience of, other public health domains given significant potential negative consequences thereof. For example, the US ban on alcohol during the Prohibition era (1920–1933) was not successful: consumption and alcohol-related harm was likely reduced, but demand remained and caused the industry to shift towards a higher risk illegal industry supplied by organised crime, thus incurring ‘unacceptable social and economic [costs]’ that led to support for the eventual repeal of the ban [84].

To ban or heavily regulate loot boxes as gambling is but one potential regulatory approach that has dominated the discourse. Notably, in contrast, most countries have seemingly decided not to regulate collectible card packs and other similarly gambling-like products (e.g., blind boxes) [85], even though these products likely contravene existing gambling laws [86] and would constitute the most seemingly harmful fourth category of loot boxes (per Table 1) had these been virtual, rather than physical, products [87]. Many video game players have identified this uncomfortable incongruence between many countries’ strong desire to regulate and ban loot boxes and regulatory *inaction* in relation to other gambling-like products as deserving of some further consideration [88]. Indeed, a wider range of other

options that interfere less with the players’ ability and choice to purchase loot boxes and the companies’ commercial interests are available. The Nuffield public health intervention ladder [12(pp. 41–42, paras 3.37–3.38)] is a tool that helps to illustrate the acceptability of various measures on each ‘rung’ by identifying, comparatively, how intrusive on personal liberty each measure may be; how much justification may be required before they are adopted; and whether they are proportionate responses for achieving regulatory aims (as shown in the first column of Table 2).

The lowest rung of ‘do nothing’ or simply ‘monitor the situation’ is technically a public health approach. This has the advantage of not restricting choice and does not remove any of the potential (e.g., economic) benefits of the product. Such an approach is likely appropriate when the potential for harm is deemed to be low or little information is available as to whether the product is, on balance, more harmful or beneficial to society. However, generally, the second lowest rung of ‘provide information’ is likely a superior approach when compared to ‘do nothing’, because ‘provide information’ can guide choice towards better alternatives and provides the same freedom of choice as ‘do nothing’. Many intermediary approaches rest between the lower, non-restrictive rungs and the highest, most restrictive rung of ‘eliminate choice’. Several different approaches might also be used in relation to one subject matter simultaneously: for example, the UK public health approach to obesity works at multiple levels, e.g., by providing information on nutrition (in supermarkets) and calories (in restaurants), whilst also restricting choice via new policies on the marketing and promotion of unhealthy foods (especially to children). Similarly, many approaches have been implemented in relation to tobacco: in addition to what has already been done in many Western countries (e.g., age limits on purchasing the product (‘eliminate choice’); restrictions on advertising (‘guide choice’); and warning messages on packaging (‘provide information’)), many tobacco researchers have been advocating for greater uptake of e-cigarettes and other generally less harmful combustion-less tobacco alternatives [89, 90]. More sustainable improvements to health may arise not from simply banning the existing product (without providing alternatives and ignoring potential negative consequences thereof), but by inventing, promoting and disseminating healthier alternatives to the original product.

These examples from other public health domains have been highlighted because, although loot boxes share strong similarities with gambling (which itself is now seen as a public health issue [51–56]), there are also major differences between loot boxes and gambling. Importantly, there are potential public health interventions for loot boxes that are not possible in traditional gambling contexts. Commercial gambling relies on individuals losing money to be profitable, and since a majority of gamblers spend very little money on

Table 2 Mapping loot box harm minimisation measures (non-exhaustive) onto the Nuffield public health intervention ladder [12(pp. 41–42, paras 3.37–3.38)]

Range of intervention options	Examples of specific measures	As adopted by or as recommended by...
Eliminate choice Regulate in such a way as to entirely eliminate choice, for example, through compulsory isolation of patients with infectious diseases	Prohibit the sale and, by extension, the purchase of loot boxes to all players Or less restrictively, prohibit the sale and, by extension, the purchase of loot boxes to <i>underage</i> players	Belgium, which has effectively ‘banned’ the sale and purchase of both the third and fourth categories of loot boxes through applying existing gambling law [13] Technically, Denmark [14], the UK [15] and many other countries through applying existing gambling law in relation to the fourth category of type loot boxes, although this regulatory position has seemingly not been enforced in practice
Restrict choice Regulate in such a way as to restrict the options available to people with the aim of protecting them, for example, removing unhealthy ingredients from foods, or unhealthy foods from shops or restaurants	Maximum spending limits on loot boxes: i.e., that a player is only allowed to spend up to a predetermined sum during a specified period [115, 116•] Less directly, maximum gameplay time limits: i.e., that a player is only allowed to spend up to a predetermined length of time on video games during a specified period, which might dissuade purchase of loot boxes given that less time can be spent on enjoying their content Prohibit the implementation of specific types of loot boxes deemed to be particularly problematic	China, which only permits underage players to spend a certain amount of money in online video games per month [120] China, which also only permits underage players to play online video games on specific days during specific time periods [120, 121] Japan, which prohibits the implementation of <i>kompu gacha</i> , which is a type of loot boxes that provide a particularly valuable extra reward only after the player collects all other ‘regular’ potential rewards from the loot box (i.e., after the player spends a substantial sum of money) [98(pp. 314–315)]
Guide choice through disincentives Fiscal and other disincentives can be put in place to influence people not to pursue certain activities, for example through taxes on cigarettes, or by discouraging the use of cars in inner cities through charging schemes or limitations of parking spaces	Institute an extra tax that is payable by players when purchasing loot boxes, above and beyond usual sales taxes (if any) Require video game companies to obtain and pay for a specific (non-gambling) licence in order to sell loot boxes, which represents a cost that is likely to be shifted onto the player-consumers	None
Guide choices through incentives Regulations can be offered that guide choices by fiscal and other [positive] incentives, for example, offering tax-breaks for the purchase of bicycles that are used as a means of travelling to work	Require video game companies to provide players with the choice to obtain all potential loot box rewards through direct purchase or some other form of non-randomised monetisation method at a price that would, on average, be <i>lower</i> than had the player attempted to obtain those rewards through purchasing loot boxes. (That it is generally cheaper to obtain the rewards through direct purchase should also be required to be prominently disclosed because ‘incentive’ in this context is difficult to control given that the randomisation could mean that some players might still be tempted to purchase loot boxes for a chance at obtaining all potential rewards even more cheaply.) Provide discretionary grants and tax relief to video game companies based on their implementation of more ethical loot boxes or their decision not to implement loot boxes at all. These financial benefits may also be shifted onto the player-consumers and make more ethically designed video games more widely available	None Not yet, but governmental funding is already available for the video game industry in many countries: these could be redirected, withheld and awarded on a basis that focuses on social responsibility in relation to loot boxes, rather than on, e.g., the employment of citizens belonging to certain countries [119]
Guide choices through changing the default policy For example, in a restaurant, instead of providing chips as a standard side dish (with healthier options available), menus could be changed to provide a more healthy option as standard (with chips as an option available)	Require video game companies to offer potential loot box rewards through direct purchase or some other form of non-randomised monetisation method at a reasonable and comparable price <i>by default</i> , such that the player must undertake extra effort in order to find the alternative option of attempting to obtain the rewards through purchasing loot boxes	None

Table 2 (continued)

Range of intervention options	Examples of specific measures	As adopted by or as recommended by...
Enable choice Enable individuals to change their behaviours, for example, by offering participation in an NHS 'stop smoking' programme, building cycle lanes, or providing free fruit in schools	Require video game companies to provide players with the choice of either (a) purchasing loot boxes or (b) obtaining all potential loot box rewards through direct purchase or some other form of non-randomised monetisation method at a reasonable and comparable price	Some video games (e.g., <i>Brawl Stars</i> (Supercell, 2017)) currently offer the option to purchase <i>some</i> potential loot box rewards directly, but this is often confined to opportunities that are time-limited and do not include all possible rewards [22(p. 43)]. This option should be provided for <i>all</i> items on demand
	Promote ethical game design measures that are likely to minimise potential loot box harms: (i) encourage video game companies to adopt them and (ii) encourage players to play and only spend money on games adopting them	A variety of measures are available, some of which have been partially implemented by certain video game companies [93••, 118, 119]. Promotion programmes directed at companies and players have not been forthcoming
Provide information Inform and educate the public, for example as part of campaigns to encourage people to walk more or eat five portions of fruit and vegetables per day	Require the expected, average real-world monetary cost of obtaining potential rewards to be calculated and published by companies for the player's benefit	The UK advertising regulator attempted to require this [122], but has since decided <i>not</i> to do so following consultation citing difficulties that companies would face in calculating this value given the complexity of in-game economies [123(pp. 9–10)] (which were arguably intentionally designed by companies to be that way and so the companies should be liable for any costs-related consequences thereof)
	Require probability disclosures as to the likelihood of obtaining potential rewards to be published	China by law [26] Nearly all other countries by industry self-regulation [24]
Do nothing or simply monitor the current situation	Continue to allow loot boxes to be sold without intervening	In practice, the current position in Denmark, the UK and many other countries, given that existing gambling laws have not been enforced as interpreted and therefore no actions has been taken against the fourth category of type loot boxes

the activity, gambling profits are driven by a small percentage of high-spending gamblers incurring high losses (so-called whales in land-based gambling environments) [91(p. 21)]. The term ‘whales’ has also been used as a term for high-spending loot box purchasers, and this small minority of players have been identified as effectively financing the video game containing the loot boxes (for the benefits of not only the operating company but also many non-paying players) [92]. However, other loot box business models that rely on more players paying a reasonable amount of money (and no players spending extreme amounts) may also be commercially viable [93••].

Finally, public health has a ‘precautionary principle’ stating that the lack of scientific certainty cannot justify regulatory inactivity when potential harms are significant. This principle has already been cited by the loot box literature [26] and by policymakers [94(p. 29)] to argue in favour of regulating loot boxes, despite the absence of a strong evidence base. Given that this principle has already been invoked in relation to loot boxes, it is important that stakeholders are aware of the full spectrum of approaches that could be used in a public health approach to regulating loot boxes. In particular, the negative consequences of both an overly lenient and an overly restrictive approach should be recognised. Indeed, a non-restrictive or less restrictive approach might be more appropriate at present when regulation is imposed based on the precautionary principle.

A Public Health Framework Comparing Industry Self-Regulation, Existing National Approaches, and Other Potential Approaches

The perceived urgency of the loot box regulation issue and the divergent interpretations of the emerging evidence base on potential loot box harms have meant that various countries (including those that are otherwise ideologically quite aligned, e.g., Western European countries) have taken very different policy approaches, as previously comprehensively collated by the legal literature [95–98]. Players, including children, in different countries are therefore provided with varying degrees of consumer protection: players in Belgium (where all paid loot boxes have effectively been ‘banned’ [13]) are provided with the highest degree of protection, whilst players in the UK are provided with no dedicated loot box consumer protection measures (because, although paid loot boxes that contain rewards that can be transferred to other players and therefore possess real-world monetary value technically contravene gambling law according to the national gambling regulator [15], no enforcement actions have been taken against known illegal implementations [5•, 85]). Players from different countries are therefore

not provided with the highest level of consumer protection uniformly, meaning that some players are more frequently exposed to potential harms than others, which does not appear to be ideal [22]. Cerulli-Harms et al.’s report commissioned by the Committee on the Internal Market and Consumer Protection of the European Parliament has argued that divergent regulation would also lead to increased compliance costs for companies (which might more unfairly affect smaller, newer companies, thus making it harder for them to compete with more established companies [48]) and is contrary to the principles of the European Single Market [100].

However, it should also be noted that, conversely, companies’ economic interests and players’ freedoms are less restricted in the UK than in Belgium. In addition, there are also benefits to this divergent regulatory environment: specifically, data can be collected from multiple countries as to the pros and cons of different public health-based approaches, which can then be compared with each other and with data on industry self-regulation and also with perspectives on other potential regulatory approaches that have been suggested but not as yet trialled. Multiple national policy experiments are effectively being conducted across the world: taking advantage of this opportunity would facilitate the improvement of existing policies and the adoption of better policies in all countries. To assist in visualising and comparing the array of harm minimisation measures that have either been adopted or proposed in relation to loot boxes (either as (i) industry self-regulation or (ii) national legal regulation), these are non-exhaustively mapped onto the Nuffield public health intervention ladder [12(pp. 41–42, paras 3.37–3.38)], as shown in Table 2; some (iii) additional approaches that have not previously been suggested are also summarised therein.

Industry Self-Regulation

As mentioned under “[Loot Boxes and Gambling Both Show a Trend Toward Pre-emptive Industry ‘Self-Regulation’](#)” section, the video game industry self-regulates loot boxes through mandating probability disclosures. However, importantly, the motivations for the industry to self-regulate should be viewed with an appropriate degree of scepticism because established research from traditional addictive domains, such as gambling, alcohol and tobacco, have all suggested that, when their industries have purported to act in socially responsible ways, those self-regulatory efforts have in fact been self-interested and suboptimal and have therefore failed to maximally advance the public interest [101–103]. Indeed, industry self-regulation might not have been adopted by companies for purely altruistic purposes (e.g., improve public welfare at the cost of its own commercial profits) and may instead have been adopted to placate

public concern, dissuade stricter legal regulation, and maintain control over whether and how much the product is regulated [104].

This cynical view is justified in relation to the self-regulation of loot boxes. The Apple App Store requires loot box probability disclosures for all video games on the platform. However, when the 100 highest-grossing UK iPhone games were examined in 2021, only 64.0% of those games containing loot boxes actually complied with industry self-regulation and disclosed probabilities [24]. Additionally, many UK probability disclosures were found to have been implemented using methods that were difficult for players to access (e.g., requiring multiple buttons to be pressed before the disclosure is shown) [24]. Despite this unsatisfactory level of compliance (which is likely reflected also in other countries adopting industry self-regulation), the industry's adoption of probability disclosure self-regulation has been widely promoted: however, this measure's effectiveness (particularly in relation to children) is not even known, and research from other risk communication domains and self-reported evidence would suggest that it is unlikely to reduce loot box spending on a broad scale [93••, 105]. This perfunctory and unsatisfactory state of affairs is reminiscent of similarly suboptimal information disclosure-based industry self-regulation in gambling [78] and other addictive domains, e.g., tobacco [101].

Existing National Approaches

In contrast to how probability disclosures have been required in other countries through industry self-regulation, China has imposed this measure by law [26]. A direct comparison of the loot box probability disclosure rates amongst the 100 highest-grossing iPhone games in China and in the UK has been conducted: the compliance rate with Chinese law was 95.6% in 2020 [26], which was significantly higher than the compliance rate with UK industry self-regulation at 64.0% in 2021 [24]. This demonstrates that legal regulation appears to have been more effective at ensuring compliance than industry self-regulation (cultural differences between the two countries as to companies' willingness to comply with law and regulation notwithstanding) [24]. However, Chinese law gave discretion to companies as to how they can comply: any disclosure, however difficult for the player to access, is deemed compliant [106]. For this reason, many disclosures in China were also found to have been published by video game companies using methods that were not prominent and difficult for players to access: even though companies could have displayed the probability disclosure on the in-game page where loot boxes could be purchased, so that players can easily view them and perhaps make more informed purchasing decisions, only 5.5% of games containing loot boxes did so [26]. In one extreme example, the player had

to enter the Chinese game's settings menu and chat with the customer support bot in English in order to access the disclosure [26]. Further, the effectiveness of probability disclosures at reducing overspending and harm is unproven and doubtful, even when they are easily accessible and have been seen by the player: only a small minority of Chinese players (16.4%) self-reported spending less money after seeing loot box probability disclosures [93••, 105]. Thus, it is important not to treat the adoption of only one consumer protection measure as a 'solution,' given that the measure might not be complied with fully and that the measure itself might not effectively reduce harm even if it has been effectively adopted [93••].

In other countries, although a consumer protection law approach to loot box regulation (e.g., using the Unfair Commercial Practices Directive 2005 and national implementations thereof in the European Union and the UK [106, 107•, 108, 109]) and other approaches might be tenable, the focus has been to apply gambling law to regulate loot boxes in light of the apparent similarity and relationship between loot boxes and gambling, and the ease and promptness with which existing gambling law could be applied to immediately address the issue [22]. This assessment has already been completed by the national gambling regulators of many countries, *inter alia*, the UK [15], the Netherlands [16] (which has since been found to be incorrect [19, 20]), Belgium [13], France [110], and Denmark [14]. The national gambling regulators would attempt to fit various implementations of loot boxes within the pre-existing national gambling law framework, meaning that the legal definitions of 'gambling' differ from the common sense understanding of gambling. National gambling laws also differ across countries: specifically, the various legal elements that must be satisfied for a product to constitute gambling are not the same [5•, 22]. This means that different national regulators may easily arrive at different conclusions as to whether a specific type of loot box legally constitutes gambling under the national laws of any particular country. This also means that the conclusion reached by any one national regulator (one way or the other) is not necessarily reflective of, or relevant to, the decision that a different country's regulator might arrive at [20]. The decision-making processes are separate and based solely on how that country's gambling law was originally drafted. Finally, national gambling regulators generally cannot change the law (from how it was originally drafted by the legislature) or make new laws: they merely pronounce an interpretation; express a desire to enforce that interpretation; and potentially take enforcement actions against products that are deemed to be contravening the law (with the proviso that the regulators' interpretation of the law might be legally wrong and therefore remains challengeable in court by video game companies, as has been successfully

done by Electronic Arts against the Dutch gambling regulator's previously published interpretation [19, 20]).

Briefly put, Belgium, due to the distinctiveness of its national gambling law, has deemed the third and fourth categories of loot boxes (as described in Table 1; both of which require payment of real-world money to engage in a process that provides randomised rewards) to legally constitute gambling [13] and therefore effectively 'banned' all implementations of the product from the country [22, 100]. In contrast, most other countries (e.g., the UK [15], France [110], and Denmark [14]) concluded that only loot boxes that both require payment of real-world money to purchase and provide players with rewards that can be transferred to other players in exchange for real-world money (i.e., only the fourth category of loot boxes per Table 1) legally constitute gambling. Notably, although the countries adopting this latter position agreed as to which category of loot boxes legally constitute gambling under their laws, the national regulators' enforcement actions have differed in relation to the same games that arguably contravene the gambling laws of multiple countries. Indeed, only the Dutch gambling regulator was known to have enforced the law [16–18], whilst the regulators of many other countries have chosen not to act despite having issued compliance advice suggesting that such loot boxes would be illegal [e.g., 15]. However, a recent Dutch judicial decision overruled the Dutch gambling regulator's interpretation of the law [19] and instead effectively affirmed the legality of the fourth category of loot boxes in the Netherlands [20].

Accordingly, no country, besides Belgium, is actively regulating loot boxes using gambling law at present. Some companies quickly sought to comply with Belgian law by changing the design of the national version of the game, specifically removing the possibility of purchasing loot boxes with real-world money [111, 112]. Doing so allowed these games to continue to be available to Belgian players: importantly, the games were not banned, and only the loot box monetisation method was. These corporate actions also suggest that (i) it is possible to rapidly remove the loot box functionality if required to do so and (ii) these games were still deemed to be commercially sound even without the loot box revenue stream. This might be due to these games being able to generate revenue through the sale of the software or other non-randomised in-game product offerings, or because maintaining strong brand awareness amongst the player base in Belgium was deemed as being worth the loss in revenue and operating costs. However, in contrast, other companies instead removed their games from the Belgian market entirely [113], rather than to only remove the loot box feature, likely because it was no longer commercially viable to operate those games. This shows that some genres of video games (so-called gacha games [114]) whose monetisation models rely heavily on loot boxes were likely more severely

affected by the Belgian ban. The effectiveness of Belgium's blanket 'ban' of loot boxes remains to be assessed, although this measure appears to have not perfectly achieved the elimination of paid loot boxes from that market [99].

Other Potential Approaches

Many regulatory measures that may be taken in relation to loot boxes are presented on Table 2. Notably, many are phrased as an intervention that can be imposed on players. This framing seemingly places the burden on individuals to change their loot box purchasing behaviour, which perhaps is inequitable because it is the video game companies that are providing a potentially harmful product, so it is their behaviour that policy should aim to influence. A public health approach to gambling regulation has recognised the importance of moving past the 'blame-the-victim' framing that is inappropriately preoccupied with the gamblers' individual responsibility [54]. Therefore, the loot box regulatory measures could also be rephrased as interventions against video game companies, e.g., prohibiting the 'sale' of loot boxes by companies, instead of prohibiting the 'purchase' of loot boxes by players, or restricting the amount of money that 'companies are allowed to receive' from each player, rather than limiting the amount of money 'players are allowed to spend.' This would more accurately reflect that the policies are aimed at targeting the product availability that companies provide, rather than restricting players' ability to purchase, although practically the two might be identical. The responsibility should rest with the companies to do less harm, rather than for players to protect themselves, and the framing of any regulation should more accurately reflect with whom that onus lies.

In addition, there are other potential ways of minimising loot box harms that emulate examples from public health issues other than gambling. For example, promoting the use of e-cigarettes in smoking is a way of reformulating the delivery of nicotine in a way that is fundamentally less harmful than combustible tobacco [89, 90]. Similarly, less harmful and fairer loot boxes could be implemented by increasing the likelihood of obtaining the rarest rewards; limiting how many different loot boxes may be offered within a single game and how many different potential rewards may be obtainable from a single type of loot box; and not providing players with useless (or significantly devalued) duplicate rewards [93••]. Importantly, such design changes are plausible because of one fundamental difference between loot boxes and traditional gambling: gambling providers profit only when gamblers lose money and so harm to gambling participants is inherent to the profitability of that industry; however, loot box providers profit from each loot box sale regardless of whether the video game player has 'won' a valuable reward or not [93••] and so profitability

is *not* dependent on the player ‘losing’ money and harm is *not* inherent to the loot box monetisation model. Video game companies’ commercial interests might be negatively affected by the adoption of the aforementioned measures, as players would now only need to buy fewer loot boxes before becoming satisfied with their rewards. However, the business model would still in theory be potentially profitable (and previously non-spending players may now be more willing to spend small amounts of money on the game as the chance of obtaining a valuable item would be higher, thereby unlocking a new source of revenue for video game companies). Similar design changes would be impossible for traditional gambling as the industry would be rendered unprofitable (the house edge would be lost) [93••]. Such design-based approaches are, in the authors’ opinion, the best regulatory proposal at present because it balances the interests of all stakeholders: the potential harms of loot boxes would be effectively curtailed, but players and companies would still gain from the economic benefits of the loot box monetisation model.

The video game industry and individual companies should be encouraged to self-regulate and adopt so-called ethical game design measures (even potentially through granting tax incentives for making more ‘ethical’ games or placing tax disincentives on loot box purchases) [119]. However, any one particular measure on its own should not be deemed as sufficient consumer protection. The effectiveness of self-regulation should be continually monitored, and some legal intervention (e.g., banning certain problematic aspects of loot boxes) might be appropriate, if voluntary measures are shown to be merely performative and ineffective. Similarly, any legal regulatory measures that have been adopted (e.g., Belgium’s ban on paid loot boxes and China’s probability disclosure requirements) should also not be assumed to be an ultimate and effective ‘solution’ that other jurisdictions should immediately emulate without question: the differing cultural contexts should be considered. Which approach a certain jurisdiction decides to take is a policy decision for the people of that jurisdiction to make (national loot box research would allow for evidence-informed regulation) [80]. Consumer protection regulation can always be improved upon and must continue to adapt, as loot boxes continue to be designed and implemented in newer ways by video game companies.

Conclusions

Conceptual similarities between loot boxes and gambling and the potential harms of loot boxes have been highlighted. A public health approach to gambling regulation can inform a similar approach for loot box regulation. However, attempting to regulate loot boxes as gambling is only

one of many different potential approaches. A whole range of harm minimisation measures of varying levels of restrictiveness are available to both policymakers and video game companies. A broader public health perspective allows the loot box issue to be viewed more holistically: specifically, by comparing the pros and cons of different approaches and by balancing the interests of different groups of players (e.g., on one hand, those who benefit from having continued access to cheaper entertainment due to loot boxes and who appreciate this more flexible monetisation model [88•] and, on the other hand, those who may be in need of consumer protection from potential financial harms) and the commercial interests of video game companies. Intrusive measures might be more immediately effective at reducing harm but may lead to negative consequences, whilst less intrusive measure better respect all stakeholders’ interests but might not provide sufficient consumer protection to the most vulnerable players. Existing legal and self-regulatory responses to loot boxes (whose effectiveness should be subject to empirical assessment) must be viewed critically and *not* seen as ultimate ‘solutions’ that have successfully and effectively removed all potential harms from those countries. Consideration should be given as to which measure would be the most appropriate for different types of players (e.g., young children, as compared to adults) in different countries.

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Declarations

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