

Online gaming and gambling in children and adolescents – Normalising gambling in cyber places

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Our vision: A Victoria free from gambling-related harm



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Online gaming and gambling in children and adolescents – Normalising gambling in cyber places

A review of the literature

September 2018

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Executive summary

Overview

This review aimed to address the following six research questions provided by the Victorian Responsible Gambling Foundation:

- What is gaming? What is gambling? How are the two converging?
- In what ways and to what extent are children and adolescents being exposed to gambling-like content through online games?
- In what ways and to what extent are children and adolescents being exposed to online gambling products through online games?
- What influence do gambling-like elements and simulated gambling in games have on children and adolescents' gambling behaviour? What are the likely long-term consequences for children and adolescents exposed to gambling-like experiences through gaming?
- How are gambling-like games marketed and promoted to children and adolescents, and what impact does this marketing have?
- Are there any protective factors associated with exposure to gambling-like experiences through gaming?

Methodology

- The writer was commissioned by the Foundation to undertake a review of the literature on the broad topic of gaming and gambling crossover and identify whether these activities may contribute to the normalisation of gambling among young people.
- The review was designed to summarise relevant documentation and other source material on the broad topic of the convergence of gaming and gambling and its known and potential impacts on young people.
- The review was intended to focus primarily on the Australian jurisdiction, however, some information from international jurisdictions was included where there may be more available research that has relevance to the Australian context.
- The review employed a 'wide net' in its search protocol, to include academic material (i.e., peer-reviewed scholarly papers) sourced from bibliographic databases and major Internet search engines. Recent news stories and media releases on gaming-gambling cross-over topics were evaluated for inclusion in this review.
- The review is based on published academic papers (i.e., empirical studies, systematic reviews), as well as information gathered from government websites and State gambling regulatory bodies; industry reports, and media news articles, including coverage of presentations by industry experts, and reports on policy and industry developments relevant to gambling and gambling-themed gaming.

This review is presented in six main sections that correspond to the Foundation's research questions. The main findings and a brief summary of each section is presented below.

What is gaming? What is gambling? How are the two converging?

- A 'video game' refers broadly to an interactive playable form of digital entertainment that typically requires strategic and skilful play. Video games differ by genre, platforms, modes, online connectivity, and in-game objectives.
- Video games are constantly changing because of industry innovations in product design, gaming hardware, and online infrastructure.
- The video gaming market has changed significantly since 2007 due to expanded online connectivity options and online service elements; social media platform integration; the monetisation of virtual goods and use of player data to drive microtransactions; the introduction of gambling-like elements in game design; and hardware portability and greater uptake of smartphone as a gaming platform.
- A 'gambling activity' is defined by legislation which varies across jurisdictions but tends to refer principally to the concepts of the consideration, prize, and chance. Specifically, gambling involves the act of staking something of value, usually a monetary sum, upon the outcome of a contest of chance or a future contingent event not under the person's control or influence, with an agreement or understanding that the person or someone else will receive a monetary sum or something of value in the event of a certain outcome.
- The proportionate influence of skill and chance elements in determining outcomes are often considered when deciding whether certain activities should be considered a form of gambling. The ability to 'cash out' wins has been an important determining factor.
- Many popular video games are becoming financially involved due to 'loot boxes' or in-game purchasing systems involving random virtual goods. These systems are attracting regulatory attention as a potential form of gambling. Loots boxes in 'closed' game economies are not currently considered gambling in Australia.
- Video games and gambling are converging in multiple ways, including: video games that simulate gambling without money being directly involved; video games becoming monetised in such ways that enable unregulated gambling on external platforms; gambling operators promoting gambling using video games on social media; and the presence of gambling within competitive gaming events and online broadcasts.
- Many gaming and gambling activities and their promotions are shared and accessible from the same devices and online channels.
- In summary, gaming and gambling are defined as separate activities but they share aspects of interactivity, presentational qualities, and elements of skill and chance. Recent innovations have enabled video games to provide monetised goods which has facilitated unregulated gambling activities by third parties. Simulated (non-financial)

gambling and gambling promotions can be found in online games and social media and there are gambling products associated with eSports or competitive gaming.

In what ways and to what extent are children and adolescents being exposed to gambling-like content through online games?

- Digital media and associated technologies have become integrated into young people's lives, and used regularly across home, school, and social life domains.
- Most children and adolescents in Australia use and/or have their own electronic device.
- Mobile phone ownership increases significantly with age. One in ten Australian children aged 8-9 years and 9 in 10 adolescents aged 14-17 years own a mobile phone.
- ABS data indicate that 97% of Australian households with children aged under 15 years have Internet access. The mean number of online devices at home per household has increased from 5.8 in 2014-15 to 6.2 in 2016-17.
- Only 1.1% of young people aged 13-17 years do not use the Internet at all on any device.
- 2013 Australian data reports that 95% of children aged 8-11 years and 100% of adolescents aged 16-17 years have accessed the Internet in the past week.
- Social media use increases with age. 2013 Australian data shows that 23% of 8-9 year old children and 45% of 10-11 year old children used social media in the past month. Most adolescents aged 12-13 years (67%), 14-15 years (85%), and 16-17 years (92%) had used social media in the past month.
- 2017 Australian data shows that, among adolescents aged 13-17 years, 86% use *YouTube*, 75% used *Facebook*, and 70% *Instagram*.
- 2017 Australian data show that 67% of the population play video games; 54% of video game players are male, and 23% of video game players are aged under 18 years. The data show that 97% of homes with children have video games; 60% of households have five or more screens; and 80% of game households have more than one game device.
- There has been a general increase in male video gaming involvement in Australia. While gaming among Australian female youth remained stable at an average of 23-24 min per day between the years of 1995 and 2007, males' gaming had almost doubled in this time, increasing from 29 min to 55 min per day.
- 2017 data show that 81% of Australian young people aged 8–17 years have played an online game and 64% played with others in the 12 months prior to June 2017.

- Excessive video gaming is a growing societal and public health concern. ‘Gaming disorder’ and ‘Hazardous gaming’ are now officially listed in the International Classification of Diseases (11th Edition) (ICD-11).
- Male adolescents tend to play games more than their female counterparts. 2015 data on 2967 Australian adolescents show that 4.1% of males play video games for an average of 9 hours or more on an average weekday, and 7.8% play games for an average of 9 hours or more on weekends, compared with 0.9% and 1.4% of females.
- Australian studies of problematic video-gaming over the last decade have estimated that between 1 to 8% of adolescents experience symptoms of problematic gaming.
- Spending money on virtual goods in video games, including on gambling-like content, is becoming commonplace. 2017 data show that 34% of Australian young people made in-game purchases in the past 12-month period while playing online games.
- Popular online games and franchises have adopted a service model that presents players with (typically small) purchase options known as ‘microtransactions’.
- ‘Loot boxes’ are a recent innovation in microtransactions. A loot box refers to an in-game reward system that can be purchased with real money, usually repeatedly, to obtain a random selection of virtual items. There is no possibility of direct financial return in these transactions. Some jurisdictions, such as Belgium and the Netherlands, regard loot boxes as an illegal form of gambling.
- Loot boxes differ across video games. A 2018 review of 22 popular video games available in Australia found that 6 games met the criteria for gambling and players could cash out winnings for real money.
- Social casino games are a popular form of gaming-gambling crossover that are widely accessible in Australia. These games are online gambling-themed games that do not require payment to play or provide a direct payout or monetary prizes. A 2016 review identified 54% of games on *Facebook* include gambling themes.
- Industry data show that very few young people are involved in playing social casino games (i.e., less than 1% of the total player population is aged under 18 years) and only a minority spend money on social casino games. However, these figures assume that young people are not accessing these games on an adult’s account.
- Video games with gambling themes tend to be rated as all-ages entertainment by the Office of Film and Literature Classification in Australia.
- A 2013 study of Australian youth reported that 13% engaged in simulated gambling in the last 12 months, and 32% had engaged in simulated gambling in their life. A 2016 study reported that the most prevalent simulated gambling activities were unsupervised video gaming (7.9%) and mobile apps (5.7%).
- Studies in the UK, Germany and Canada have reported higher past year youth engagement in simulated gambling rates, including rates between 5 and 38%, depending on the activity. A 2016 Canadian study reported that free play Internet poker was prevalent among male adolescents (14.6%). A 2017 Canadian study reported that 9% of youth had played a simulated version of poker, and 5.3% had

played a non-poker gambling simulation. A 2017 German study reported that 38% of youth had engaged in simulated gambling in the past year. A 2017 UK study reported that 11% of youth aged 11-16 years had played online gambling-style games, including 4% in the past week.

- In summary, the review identified that available gambling-like experiences in online games can vary greatly. A noteworthy innovation has been the 'loot box' in online games which is a monetised chance-determined activity that is considered a form of gambling in some jurisdictions. Exposure to gambling-like content on social media and popular online video games is quite common among Australian youth.

In what ways and to what extent are children and adolescents being exposed to online gambling products through online games?

- Many online games involve elements of chance and randomness but otherwise do not feature or resemble gambling.
- Three online gambling products have links to online games, including *skin gambling*; *fantasy sports*; and *free play modes on gambling websites*.
- Some popular online video games feature cosmetic virtual items ('skins') which enable in-game customisation. Skin gambling refers to the use of skins as a virtual currency for betting purposes, such as using skins to bet on games of chance.
- There are no age restrictions for purchasing skins. Purchases may be facilitated by a range of payment options available to young people, including gift cards or vouchers.
- 2017 UK data based on youth aged 11-16 years reports that 45% were aware that it was possible to bet with in-game items. Almost six in ten boys (59%) knew about this activity compared to less than a third of girls (31%). About one in ten (11%) claimed to have personally ever bet with in-game items. More than a third (36%) had done so in the past seven days, 23% within the past month, and 41% more than one month ago.
- A 2018 UK study of youth skin betting reported that 27% of children aged 13-18 years were familiar with the term 'skin gambling'; 10% had reportedly gambled using skins at least once, and 29% believed it was a "fairly big" or "very big" problem.
- Fantasy sports refer to an online competition involving chance and skill where participants compete by assembling a virtual team of professional sports players. There is a 'cost of entry' fee that creates a prize pool.
- There is limited research on adolescent involvement in fantasy sports. A US 2017 study reported 28% of regular players aged 13-15 years were at-risk of problem gambling.
- Practice modes refer to the free-play mode on an online gambling site. They are presented as an opportunity to 'practice' before having to spend money, however the practice mode may not be an accurate representation of the financial counterpart.

- A 2013 Australian study reported that 4.7% of 1287 adolescents aged 12 to 17 years had tried free play gambling modes on online casinos.
- Studies in the UK and Canada have reported higher levels of engagement in practice modes. In the UK, 17% of 2881 young people aged 11-16 years had used free demo modes in the seven-day period prior to the survey. In Canada, 14% of 10,035 students in grades 9 to 12 had played practice modes in the previous 3-month period.
- In summary, the review indicated that Australian data is limited in this area but international evidence suggests that some young people have become involved in three main gambling products, including (1) 'skin gambling', an online gambling activity that is facilitated by transferable monetised virtual content obtained in online games; (2) 'fantasy sports', an online sports-based tournament that involves prize pools; and (3) 'online casino practice modes', the free play versions of online gambling products.

What influence do gambling-like elements and simulated gambling in games have on children and adolescents' gambling behaviour? What are the likely long-term consequences for children exposed to gambling-like experiences through gaming?

- Young people can access a range of simulated gambling activities via online digital media, such as video games, social media sites and smartphone apps.
- Public health approaches to gambling have advocated for delayed or older age of first use, and for early experiences to involve controlled use under parental supervision.
- Academic commentary on youth simulated gambling has highlighted multiple concerns. A commonly proposed risk of simulated gambling has been the so-called 'gateway effect' or the potential to entice young people to gamble that increases the risk of problem gambling or results in gambling-related harm.
- Simulated gambling is thought to 'normalise' gambling for young people, referring to gambling being more readily perceived as positive, safe, normal or socially accepted, legitimate, and an inextricable part of daily life and other activities (e.g., sports).
- Researchers have proposed that simulated gambling may increase young people's confidence in gambling due to the relative ease of winning in these activities.
- A 2016 conceptual paper proposed that simulated gambling may: (1) facilitate entry into a gambling subculture with avenues for progression to financial gambling; (2) enable interaction with a social network of peers and experienced gamblers that provide incentives to gamble, and; (3) enable covert and excessive use of these activities.

- Another proposed risk is gambling features in video games may make video gaming more problematic or addictive for some users, and increase the rate of problematic involvement in video gaming irrespective of gambling participation.
- The evidence base on simulated gambling risks among children and adolescents is still developing, and most research has been conducted outside of Australia.
- Australian survey studies have identified small but significant associations between simulated gambling, gambling involvement, and problematic gambling. A 2013 study reported that simulated gambling activities were at least 3 times more popular among adolescents who endorsed some problem gambling criteria.
- Three longitudinal studies of youth simulated gambling have examined the 'gateway effect' (i.e., migration from any simulated gambling to monetary gambling). A Canadian study reported that simulated gambling predicted gambling with real money but only in the case of adolescents who transitioned from simulated poker to poker with real money. A 2017 Norwegian study reported that problematic gaming predicted problematic gambling 12 months later. A 2018 German study found that migration from simulated gambling to financial gaming was predicted by participation in simulated gambling on social media at home, and exposure to gambling advertising.
- Young people who make in-game purchases may be at greater risk of problematic gaming. A 2017 German study reported that the prevalence of youth problem gaming symptoms was higher among those who had spent money on free to play games.
- Studies suggest that some players migrate from social casino games to monetary gambling. A 2015 Canadian study reported that 26% of participants had migrated to online gambling from social casino games and that spending money in-game was the only significant predictor of migration. A 2016 study by this team reported that microtransaction spending was positively associated with problem gambling severity.
- A 2016 Australian study reported that 9.6% of adults reported that their gambling overall had increased, and that 19.4% reported that they had gambled for money, as a direct result of playing social casino games.
- Australian experimental studies on simulated gambling show that players who have opportunities for free-play sessions and are exposed to profit during free play tend to bet significantly more than players without these opportunities and exposure.
- In summary, the review found that there is academic commentary on, and some preliminary research support for, the notion that simulated gambling in adolescence increases the risk of monetary gambling in adulthood. This tentative relationship has been observed in studies of simulated gambling in the home environment and in cases where there is a clear path for progression from the simulated activity to the monetary version. There are no Australian data on young people's involvement in emerging forms of unregulated gambling (e.g., 'skin gambling').

How are gambling-like games marketed and promoted to children and adolescents, and what impact does this marketing have?

- Simulated gambling activities are promoted online through digital communication channels, including online broadcasts (e.g., live gameplay streaming on *Twitch*) and via sponsored advertising on social media (e.g., *Facebook*). Some products are advertised through email lists, online advertisements such as ‘pop-ups’, banners, or sidebars embedded in websites and downloaded software, in addition to traditional media such as advertising in print journalism and television media.
- Online social networking sites are increasingly recognised as the host platforms and content publishers for simulated gambling activities. Advertisements for social casino games are common on sites such as *Facebook*, as well as being displayed on social media app-linked marketplaces (e.g., *Apple Store*, *Google Play*).
- A 2016 Australian study of social casino gaming advertisements reported that advertisement imagery featured images likely to appeal to younger users, such as bright colours, character images of young adults, cartoon animal characters, gambling and sporting activities, and references to popular culture and Las Vegas. There were incentives for playing, visual cues that others were playing, and messages related to winning. About 90% contained no references to responsible gambling.
- Simulated and monetary gambling activities have been promoted through online broadcasting services, such as *Twitch* and *YouTube*. So-called ‘youtubers’ or ‘streamers’ (often aged in their early 20s and therefore marketable to a youth audience) promote simulated gambling and online gambling products.
- Some streamers have made sponsored content for third party sites that offer gambling services including ‘skin gambling’. An Australian example is the popular streamer *LachlanPlayz*, who has over 6 million followers and a 2017 skin gambling video sponsored by *Skinhub* that has been viewed over 350,000 times on *YouTube*.
- Streamers that promote skin gambling sites are typically shown to consistently win large monetary sums (e.g., thousands of dollars in profit from low probability outcomes in rapid succession). This may occur due to outcomes being manipulated by the service provider to ensure profitable outcomes.
- A 2018 UK report identified highly viewed *YouTube* video content that portrayed skin content as profitable, with video titles referring to thousand-dollar wins.
- Competitive gaming or eSports is a major cultural phenomenon in many countries. Following its rapid global uptake, there has been an increase in the provision of eSports-related gambling services. It is estimated that eSports gambling reached \$1.5 billion in global revenue in 2017 and will reach \$1.9 billion by 2020.
- There is limited research on youth exposure to online gambling advertising and its behavioural effects. Some studies report that youth are familiar with digital gambling advertising. A 2010 Canadian study reported that 96% of adolescents aged 12-19 years had viewed gambling advertisements on television and 61% had received

promotional emails. Some agreed with the notions that winning is easy (63%), the chance of winning is high (60%), and that gambling is an easy way to become wealthy (80%).

- A 2017 UK study of youth aged 11-16 years reported that 80% had seen gambling advertising on TV, 70% on social media, and 66% on other websites. In relation to online advertising, 27% of the sample saw gambling advertising more often than weekly on social media and 21% saw them more often than weekly on websites. In addition, 10% of the sample 'followed' gambling companies on social media. Among those following gambling companies on social media, 30% had spent their own money on gambling in the last seven days, compared to 9% of non-followers.
- A 2018 German study reported that gambling onset was influenced by exposure to advertising. The study concluded that unregulated product marketing of simulated gambling on social media increased adolescent demand for gambling products.
- In summary, this review has found that advertising for gambling and gambling-like products appears to be quite prevalent and visible on social media and entertainment streaming, including so-called 'social influencers' or individuals who broadcast informational and/or entertainment gambling-related videos on an online streaming service (e.g., *YouTube*). The rise of eSports' popularity has facilitated the crossover of gaming and gambling products, such as new and existing gambling operators promoting betting through eSports broadcasts and related content (e.g., social media, websites). Research in these areas is quite limited in Australia, but overseas data suggest that some adolescents are quite familiar with and interact with these promotions and may subsequently develop positive gambling attitudes.

Are there any protective factors associated with exposure to gambling-like experiences through gaming?

- Youth gambling and problem gambling develops from the greater presence of risk factors and the absence of protective factors.
- Risk factors for youth problem gambling in general include alcohol use, antisocial behaviours, depression, being male, tobacco, cannabis and illicit drug use, impulsivity, involvement in multiple gambling activities, sensation seeking, violence, under-controlled temperament, antisocial behaviours, and poor academic performance.
- Protective factors for youth problematic gaming and/or gambling include: high self-esteem; conscientiousness; the absence of depression and anxiety; no substance use; lower risk-taking; ability to delay gratification; future-oriented thinking; emotion regulation skills; being less accepting toward gambling; and low impulsivity.
- Deficient self-regulation is a strong long-term predictor of problem video gaming.
- Parental monitoring is protective against problematic behaviours, including gambling and gaming. Studies show that increased paternal care and higher parental supervision in childhood predict lower rates of problem gaming in adolescence.

- Adolescents who perceive more parental caring and monitoring report lower likelihood in probable problem gambling.
- Peer gambling involvement is a strong predictor of at-risk and problem gambling.
- Peer influences affect online gaming behaviours. In online games, players often want to maintain their game progression in line with peers. Adolescents who regularly play social online games tend to have much smaller and lower quality offline social circles.
- Greater access to gambling products and earlier age of onset of gambling are risk factors for problem gambling. Accessibility is relevant to youth online gaming and gambling activities given the common presence of devices in the home, including in bedrooms.
- On a national level, expenditure on public health reduces probable problem gambling.
- In relation to simulated gambling, factors such as not spending money on micro-transactions, more parental supervision, having less access to gambling activities at home, and less exposure to promotions (e.g., eSports) may be protective against problematic use and future engagement in online gambling activities.
- Gambling at an early age is not necessarily predictive of future gambling or gambling problems. Similarly, video gaming is not inherently problematic, and many people report that their lives are enhanced in various domains by playing games.
- In summary, the review identified that many individual-level protective factors as well as additional factors, such as not spending money on micro-transactions, being supervised by a parent, having less access to gambling activities at home, and less exposure to promotions, that may prevent engagement in online gambling activities.

This review provides the basis for further discussion of the implications of gaming and gambling crossover in several key areas, including parent and youth awareness and education, classification and consumer protection, and future research directions.

Areas for consideration

- Gambling and gambling-like products are highly visible, accessible, and promoted to young audiences across a range of digital media channels.
- The heterogeneity and high quantity of online gaming and gambling products and their interactions across media platforms poses various challenges to classification and regulation.
- Gambling content in retail games in Australia is classified within the category of 'themes'. Consumer advice describes gambling content as 'simulated gambling' or as 'gambling references'. Some jurisdictions are implementing consumer advice on in-game purchases in online games and introducing age-restrictions on sale of games with in-game purchases to young people.
- The implementation of design standards and consumer protections in video games with loot boxes is an ongoing discussion at the international level. Some potential

areas to improve transparency have included the introduction of a requirement to display the odds of winning in games when money is involved; the disclosure of the systems for random number generators in loot boxes, including whether other variables affect payout; and the provision of data on player actions and payments in-game.

- Many online gambling products are offered from overseas providers and these activities may be difficult to regulate from within Australia. International collaboration and information-sharing among various stakeholders may be necessary as a first step.
- Some young people are familiar with gambling promotions on social media sites, and some young people actively follow gambling companies on social media. While specific gambling products (e.g., actual odds/offers and incentives) may not be advertised on social pages, these pages nevertheless facilitate brand awareness and enable the prominent display of a gambling operator's logo. Internationally, gambling regulatory authorities are continuing to monitor these developments. Some promotional strategies may warrant independent review to ensure that they are not configured to make them appealing to underage users.
- In summary, there are multiple areas of gaming-gambling crossover that are being monitored closely by gambling commissions and other stakeholders. In the meantime, further research is needed to describe the rates of youth participation in these activities and their potential impact in relation to gambling-related harms and other mental health-related consequences.

Implications for parent education

- Young people's engagement across a range of digital online activities, including online gaming and gambling activities, is often autonomous, private, and independent of parental oversight. Despite these considerations, parents play an important protective role in the prevention of gambling involvement among young people.
- Many parents may be unfamiliar with new and emerging areas of convergence of gaming and gambling. It is recommended that parents are aware of and learn about the range of online activities available to young people and how these activities may be accessed and financed, including the basic types and functions of social media, online games, payment options, and related activities.
- Specialised workshops and other educational resources on gaming-gambling crossover may help raise awareness among Australian parents.
- Total restriction of electronic media is not generally considered a practical or feasible parenting strategy. In line with cyber-safety recommendations, monitoring and setting or negotiating limits may be more effective, particularly when parents are aware of the types and age-appropriateness of gaming and related online products.
- Monitoring and limiting access to financial options in online games may prevent unwanted in-game purchasing.

- Modelling healthy media use, promoting alternative interests, and building a positive parent-child relationship are identified protective factors against excessive video gaming and underage involvement in gambling.
- Young people may benefit from information about online activities and their associated risks. Assisting young people to understand that gaming and gambling industries are primarily a business designed to make profits, and that some online operators are unregulated and have few or no player protections, may encourage critical thinking.

Conclusions

- Electronic media has become integral to young people's lives. However, the constant accessibility on smartphones and other electronic devices has facilitated new entry points to gambling activities and exposure to gambling promotions.
- The expansion and sophistication of online gambling products and the emergence of new forms of unregulated gambling with virtual currencies, in addition to 'non-gambling' online content such as social casino games and gambling promotions on social media, has contributed to the 'normalisation' of gambling among young people.
- While some gaming and gambling products appear to overlap, many of the commercial relationships and corporate strategies at play appear to exist and operate independently of each other. For example, the companies that develop and publish online games with monetised goods (skins) are independent of the operators that offer gambling products involving skins. These relationships may be considered a 'corporate synergy', where the popularity and success of one party affects the popularity and success of another party but where these parties are, by legal definition, otherwise distinct and separate.
- Australian research on simulated gambling is still developing and there are multiple gaps in our current understanding of the ways in which gaming-gambling crossover activities and promotions influence Australian young people.
- Available research from Australia, Europe, and Canada suggest that some young people between the ages of 13 and 17 years are familiar with and exposed to gambling-like activities and promotions, particularly via video gaming activities, online gaming channels (i.e., streaming), and social media. There is emerging evidence that some young people participate in and spend money on unregulated online gambling activities, including skin gambling on third party sites.
- Further research is needed to examine the impacts of digital technologies and gaming-gambling hybrid products, including the identification of young people who are more vulnerable to these products, and to develop useful regulatory and other responses to reduce gaming and gambling-related harm.
- As gaming and gambling continue to converge, it is important to identify the effective approaches to reduce the risk of gambling-related harm among young people.

Literature review: Overview

This review sought to address each of the following research questions:

- What is gaming? What is gambling? How are the two converging?
- In what ways and to what extent are children and adolescents being exposed to gambling-like content through online games?
- In what ways and to what extent are children and adolescents being exposed to online gambling products through online games?
- What influence do gambling-like elements and simulated gambling in games have on children and adolescents' gambling behaviour? What are the likely long term consequences for children and adolescents exposed to gambling-like experiences through gaming?
- How are gambling-like games marketed and promoted to children and adolescents, and what impact does this marketing have?
- Are there any protective factors associated with exposure to gambling-like experiences through gaming?

The purpose of this review was three-fold. First, the review aimed to expand the Victorian Responsible Gambling Foundation's (VRGF, or 'Foundation') knowledge about children and adolescents' exposure to, and participation in, online gambling-related activities. Second, this work aimed to assist the Foundation in developing strategies to address issues around youth exposure to and participation in these activities. Finally, this work aimed to inform gambling harm prevention initiatives such as parent education resources and workshops.

This literature review will be presented in six main sections, with each section addressing each of the above research questions. It will be evident that some high-quality research has been conducted in some areas, whereas in other areas there has been much less research despite the strong academic, regulatory, and wider public interest. Technological innovations affect the nature of gambling and gaming products and the comparability of research on these products. Some products change because of new regulation and corporate strategies that affect the availability, access, and functionality of certain activities (e.g., the implementation of 7-day player-to-player skin trade bans that affected 'skin gambling' in June 2018). Such developments may affect the comparability and relevance of studies within even a short period of time. This review should therefore be considered as a 'snap shot' only.

Methodology

This review was designed to gather relevant documentation and other source material on the broad topic of the convergence of gaming and gambling and its known and potential impacts on young people. The review was intended to focus primarily on the Australian jurisdiction, including local research studies and other developments (e.g., market changes, technological innovations, policies) that are applicable to the Australian context; however, some information from international jurisdictions has been included where there may be more available research that has some direct or potential relevance to the Australian context.

Research on gaming and gambling technologies and products is only relatively new, and therefore the literature in this area is quite limited in scope and relevance. Research on new technologies can become outdated relatively quickly (i.e., within a few years) due to the introduction of new products and services that supersede activities or disrupt the market. In recognition of these issues, this review employed a 'wide net' in its search protocol, to include academic material (i.e., peer-reviewed scholarly papers), sourced from bibliographic databases including *Academic Search Premier*, *PubMed*, *PsychINFO*, *ScienceDirect*, *Web of Science*, as well as major Internet search engines, such as *Google Scholar* and *Google Patents*.

Searches were conducted using a range of keywords and logic, including "Social casino games; Internet OR online gambling; Internet OR online gaming; social media AND games; social media AND gambling; skin AND gambling; gambling-like AND gaming; simulated gambling AND game; gambling AND social media promotions OR advertising; social gaming AND gambling problems; gambling AND virtual good; gambling AND gaming consoles; responsible gambling AND social media". Reference lists of identified publications were also searched to identify further relevant publications. The citation lists of highly cited and relevant papers were evaluated for additional results. This search process identified the key authors and teams who were then sought using searches conducted in Scopus. Reference lists of reviews of gaming, simulated gambling, and gambling were also examined.

To supplement this protocol, the review searched the websites of university-based research centres to identify any relevant research publications or projects either completed or in progress, both in Australia and internationally. Additional search methods were employed to identify literature outside traditional academic sources, including: (1) government websites and State gambling regulatory bodies; (2) industry reports, such as reports published by *SuperData* and *Newzoo* and other companies that specialise in gaming-related market research, and (3) review of media articles, including coverage of presentations by industry experts, and reports on policy and industry developments relevant to gambling and gambling-themed gaming.

Section 1: Definitions of gaming and gambling, and ‘convergence’

Research question

What is gaming? What is gambling? How are the two converging?

Summary

This section presents some conceptual definitions of gaming and gambling activities. This discussion highlights that video gaming is a complex digital entertainment activity that, besides offering story elements and social experiences, typically involves predominantly skill-based play and outcomes. Gambling refers to a class of activities primarily defined by jurisdictional legal definitions that refer to and interpret the basic elements of consideration, chance, and prize. Gaming and gambling are converging in several ways. Some gaming products enable players to spend money in-game under conditions involving randomness or on features that visually resemble gambling machines or other activities, but these games tend not to meet the legal definition of gambling. Some recent technological innovations have enabled video games to become monetised products which has facilitated unregulated gambling activities by third parties. Gambling operators can promote their brand and/or products through online games and social media and there are gambling products associated with eSports competitive gaming.

1.1 Defining video gaming

The term ‘video game’ refers broadly to an interactive playable form of digital entertainment (Esposito, 2005). Gaming activities are designed to be ‘played’ by the user, and therefore generally require active user participation at all times during play. The player of a video game uses the game’s control scheme (e.g., keyboard, touchpad, controller, or motion sensors) to manipulate images on a visual display (e.g., computer monitor, television, tablet or smartphone) to reach an outcome usually defined as success or failure (Salen & Zimmerman, 2004). While some randomness and chance-based elements are commonly found in video games, the majority of video gaming activities have a considerable skill-based or a strategic component that largely determines the outcomes of play. Unless the video game is designed to subvert player expectation, a highly skilled player typically develops an advantage over the machine in most games. In this way, the common design philosophy applied in most video games is players improve with practice and develop a mastery over the game’s challenges.

Modern gaming activities are a form of digital entertainment media designed to provide a range of psychological experiences (Hamari & Keronen, 2017). They are designed to present players with unlimited or recurring opportunities for winning and losing. In some games, the player’s mistakes and losses can be reversed by reloading or restarting the game situation. Gaming opportunities to win are often contextualised within complex and time-consuming narratives and non-player character interactions, large open virtual worlds, and options to socialize with other players (King et al., 2010). Games can enable players to experience psychological states of engrossment or immersion (sometimes referred to as ‘flow’, or the state of optimal engagement in an activity; Csikszentmihalyi, 2014) and can elicit a range of emotional states (e.g., excitement, frustration, boredom, fear and anxiety). Media psychology research has recognised that video games can satisfy certain psychological needs of users, including identity expression, a sense of mastery and achievement, and the desire to escape from reality (Ryan et al., 2006). Many online games support social functionalities,

such the ability to communicate with text-only, voice-only, or video-based chat, in dyads and groups (Steinkuehler & Williams, 2006).

The boundaries that define video games are constantly changing and are driven by the underlying hardware and software capabilities. Gaming technologies are highly varied and support various gaming experiences. Video games can differ according to *genre* (e.g., shooting, role-playing, and strategy), *platforms* (e.g., personal computer, home console, smartphone), *modes* (e.g., single-player, competing against other players), *online connectivity* (i.e., playing online or offline), and *objectives* (e.g., commit violence, solve puzzles, navigate in 3D space). Despite this heterogeneity, many games are similar in their aim to provide the player with a sense of progression using visual and auditory feedback. A typical indicator of progress is the onscreen 'score' (e.g., points), but many video games also include unlockable and collectible content, including virtual items and goods, in-game ranks, and other aesthetic and competitive options. In some games, the player's acquired virtual goods and currency may be shared or traded with other players either in-game or externally using linked online applications.

Four innovations in gaming design, availability, and service implementation are of relevance to understanding modern games and gaming-gambling convergence.

1.1.1 Games as a 'service'

Prior to the widespread uptake of the Internet and online services, most video games were purchased on a stand-alone basis. The user purchased a cartridge, disk, or piece of software, and would be able to use it in perpetuity. In contrast to this arrangement, many online gaming services (e.g., *Xbox Live*, *PlayStation Plus*) and digital distribution services (e.g., *Steam*, *GOG*) offer game products that operate as a service. This refers to video games where: (1) the player must have an online connection in order to play due to the requirement of connecting to an external server that processes the game's operations; and (2) the game may be updated or otherwise modified via online updates (e.g., patches, 'hotfixes') resulting in new game-related parameters (e.g., adjustments to game difficulty, reward frequency, pace of action, or responsiveness of controls). The terms of service for these products typically state that the user has entered into an irrevocable service agreement where the game may be altered at any time, and there is no recognised ownership of the gaming data or related assets. In addition, these agreements specify that parents of underage users grant permission to these users to use the product and make in-game purchases, and parents assume responsibility for their actions.

1.1.2 Monetisation schemes

A development related to 'games as a service' has been the advent and sophistication of monetisation features in video games (Hamari & Keronen, 2017). A monetisation scheme refers broadly to in-game purchasing options, which can take different forms across different types of games. These purchasing options include additional game content or premiums (e.g., virtual items, textures/skins, currency, levels, or power-ups). These schemes contrast with traditional game revenue models where the player pays a fixed upfront price (i.e., the 'cost of entry') to own or play the game for a set period (e.g., 1-month subscription). Monetisation schemes became prevalent first in games on mobile platforms and other games that are usually referred to as '*free-to-play*', meaning these games do not require the player to spend any money upfront to play initially but small purchases may be made optionally to expedite progress or become required to progress further in the game at a later stage (i.e., bypass an in-game 'paywall') (Hamari et al., 2017). Small in-game purchases are also commonly referred to as 'microtransactions'. Such purchases provide varied offerings and may include cosmetic differences (e.g., new textures, graphics or animations) or items that confer certain competitive advantages to gameplay (i.e., '*pay-to-win*' features) (Hamari et al., 2017). Monetisation schemes have enabled companies to monetise video game products in ways that enable players to purchase smaller units of game content during the act of playing the game.

It is difficult to isolate the precise amount or proportion of money spent by players on monetisation schemes from the total amount that is spent on video game products and hardware more generally. Some popular online video games have disclosed data on player spending. For example, SuperData Research market data from July 2018 reported that the video game *Fortnite* has generated over \$1 billion dollars (USD) in revenue from micro-transactions since its inception, but the demographic and user distribution of spending activity is not known. Spending on 'free-to-play' games offers some insight because all or most of the reported profits from these game types may be assumedly derived from microtransactions. Recent data suggests that 1 in 3 people globally play free-to-play games and that these games generated more than \$82 billion dollars in revenue in 2017 (SuperData Research, 2017). In addition, consumers spent \$14 billion more on mobile games in 2017 than in 2016. As an example, the popular game *Candy Crush* was estimated to have a daily revenue of more than \$2 million in 2017, which is about four times higher than its recorded daily revenue in 2013 (Thinkgaming, 2017).

A recent development in the area of microtransactions that has attracted international consumer and regulatory attention is the 'loot box'. Drummond and Sauer (2018) define a loot box as a "*catch-all term for a digital container of randomized rewards. Essentially, a loot box contains one or more random rewards that alter the game in some way. Rewards may allow players to personalize aspects of the in-game aesthetic (for example, alter their avatar's appearance) or improve their in-game performance (for example, via powerful weapons)*" (p.1). A 'loot box' is thus an in-game purchasable reward delivery system (i.e., visually represented as a chest or crate that is opened) that gives the player a random selection of items, which may include cosmetic items or items that confer a competitive advantage. While there is currently debate on the legality of loot boxes with reference to online gambling laws, loot boxes may be considered psychologically similar to gambling slot machines or scratch-cards in that they require no skill and they deliver a randomly determined outcome (i.e., prize). All loot boxes are considered an illegal form of gambling in Belgium and the Netherlands, however loot boxes in closed game economies (i.e., where players cannot cash out) are not considered gambling in Australia, according to Victorian and NSW gambling regulators.

An inspection of registered design patents for microtransactions in the last five years shows that some gaming companies (i.e., publishers/developers) have invested in research and development on in-game systems that may encourage players to make greater financial investments in video games. The US patent US9808708B1, for example, registered by *Kabam Inc.* (a gaming company that specialises in mobile games) is designed to adjust prices to ensure that users are continually presented with offers that match their specific cost sensitivity level (i.e., the specific amount of money the player may be willing to spend, based on shared attributes with other players who spend money on these offerings). Another patent, US2016005270A1, registered by Activision (i.e., a top 10 most profitable gaming company in 2017), refers to a targeted advertising system that selectively matches the user with other players in the game who already possess items known to be desired by the user, to encourage the player to spend money on microtransactions to acquire these items.

Major gaming companies' terms of service agreements for virtual goods specify that virtual goods are not actually owned by users and they have no monetary value (e.g., see Activision, 2017). Moreover, there is no possibility of direct financial return in these transactions, meaning that the player is unable to recover what has been spent in the activity. These characteristics distinguish virtual assets from comparable features (e.g., chips) in traditional gambling products despite any visual and functional similarities.

1.1.2.1 'Predatory' monetisation in video games

There has been some academic discussion on whether certain monetisation schemes, including certain loot box systems, are designed using tactics to elicit player spending. Some academics view such systems as a form of gambling, whereas others have disputed the 1:1 comparison of these

products and services to online gambling. Adopting the view of gaming and gambling as a simple dichotomy may be too inflexible for some monetised gaming products. King and Delfabbro (2018) proposed the term ‘predatory monetization’ to refer to microtransactions that involve some elements of gambling and/or have specific properties that tend to encourage financial behaviours.

King and Delfabbro (2018) define predatory monetization schemes as in-game purchasing systems that disguise or withhold the true long-term cost of the activity until players are already financially and psychologically committed. They state that some schemes are designed to encourage repeated player spending using tactics or elements that may involve, either singularly or in combination, limited or misleading disclosure of the product; intrusive and unavoidable solicitations; systems that manipulate reward outcomes to reinforce purchasing behaviors over skilful or strategic play. Such strategies may exploit inequalities in information between purchaser and provider such as when the industry uses knowledge of the player’s game-related preferences, available funds, and/or playing and spending habits, to present offers predetermined to maximize the likelihood of eliciting player spending. While some gaming activities involve gambling-like mechanics, these activities may be conceptualised and regulated according to consumer protection frameworks (e.g., principles of fair trade) rather than according to gambling law.

1.1.3 Social media and smartphone integration

Games on smartphones and social media constitute the most popular type of game globally (SuperData, 2017, see Figure 1 in the Appendices). Online connectivity has also enabled many types of online video games to integrate or link with social media platforms (e.g., *Facebook*, *Instagram*) to record player progress and achievements, upload in-game video recording or other media, or invite other people to play. Social media integration enables players to share their game activities with others beyond their social network of friends who play games. Data sharing capabilities may also enable developers to track the activities of the player and their interests in other activities, including preferences for other brands and products. Companies, such as game developers, can then tailor their game-related advertising and messages to different segments of the player base. Developers may inspect player data to then adjust or modify their in-game content offerings.

1.1.4 Hardware portability

Video gaming products are available across a range of physical media platforms. The smartphone gaming market in particular is growing and is forecast to incrementally increase its global market share over the next five years. This has enabled game developers to reach consumers who would not typically purchase a gaming-only device. Highly popular games, such as *Fortnite*, which has a global player base of 125 million players as of June 2018, have been ported to smartphone hardware given that these devices have reached a sufficiently capable level of graphical processing to achieve parity with dedicated gaming machines. The user base for smartphones far exceeds any gaming-specific platform, has in-built online connectivity through 4G networks, and has a high proportion of young users with an interest in gaming, thereby making this platform a desirable platform on which to release online games. In addition to smartphone platforms, there are compact gaming machines, often referred to as ‘handhelds’. A noteworthy example at the time of writing is the Nintendo Switch console, which has sold more than 17 million units worldwide (www.statista.com). These developments have led to online gaming becoming more accessible, allowing convenient access to gaming anywhere (e.g., home, public transport, workplace).

1.2 Defining gambling

The definition of gambling is primarily guided by legislation which varies across jurisdictions. There tends to be three basic components of gambling: (1) “the consideration” or the act of staking something of value, usually a monetary sum, (2) upon the outcome of a contest of chance or a future

contingent event not under the person's control or influence, and (3) with an agreement or understanding that the person or someone else will receive a monetary sum or something of value in the event of a certain outcome. These three components may be summarised concisely as the consideration, chance, and prize.

1.2.1 Gambling in Australia

The above core legal components are evident in Australian legislation. According to the *Interactive Gambling Act 2001*, a gambling service means: (a) a service for the placing, making, receiving or acceptance of bets; or (b) a service the sole or dominant purpose of which is to introduce individuals who wish to make or place bets to individuals who are willing to receive or accept those bets; or (c) a service for the conduct of a lottery; or (d) a service for the supply of lottery tickets; or (e) a service for the conduct of a game, where: (i) the game is played for money or anything else of value; and (ii) the game is a game of chance or of mixed chance and skill; and (iii) a customer of the service gives or agrees to give consideration to play or enter the game; or (f) a gambling service (within the ordinary meaning of that expression) that is not covered by any of the above paragraphs.

1.2.2 Academic perspectives on gambling

Another definition of gambling, put forward by Griffiths (1995), specifies five characteristics common to most gambling activities and that distinguish gambling from other forms of risk-taking. These characteristics include: (1) the exchange of money or valuable goods; (2) an unknown future event determines the exchange; (3) chance at least partly determines the outcome; (4) non-participation can avoid incurring losses; and (5) winners gain at the sole expense of losers. These components are not necessarily exclusive to gambling.

Other academic perspectives on gambling and video games have highlighted the role of skill and chance elements as an important consideration for determining whether activities are gambling. Some gambling activities, such as poker, have attracted considerable debate in terms of the influence of player skill in determining the winning outcome. Some activities may be difficult to judge in terms of whether skill or chance is the greater factor in determining outcomes. Nevertheless, it is often understood that players who are more familiar with or practiced in certain activities that involve at least some skill-based component (e.g., poker) will tend to have greater success over time (i.e., repeated engagements), even if 'success' in this context refers only to losing money more slowly than other participants.

From a psychological perspective, gambling involves not only monetary transactions and the experience of winning and losing something of value, but also the player's psychological motivations associated with the activity (Walker, Shellink, & Anjou, 2008). This view of gambling includes the user experience of reward that occurs at the physiological and neurobiological level. Whether or not some activities are legally recognised as a form of gambling, they may still be considered psychologically akin to gambling. This view often supports the claim that video games that simulate gambling with virtual currencies (King et al., 2014) are 'gambling-like' because they employ similar variable ratio reinforcement and elicit many of the same psychological effects of play (e.g., excitement, frustration, boredom).

However, some academics have challenged the view that gaming and electronic gambling activities may be considered alike in terms of their basic reinforcement schedules (i.e., the ways in which both activities reward players intermittently). James and Tunney (2017) argued that both activities may feature randomness and intermittent rewards, but that video games are highly heterogeneous and that only some types of video games (e.g., mobile games) appear similar in nature to gambling machines. They suggested that one must assess where the positive and negative reinforcement in gaming activities actually comes from (e.g., whether it comes from the activity itself or from general contextual

cues). For example, some games that are known to be played excessively, such as some strategy games (e.g., *Starcraft* in South Korea), do not have the same types of schedules of reinforcement as electronic gambling machines, and that these games are much more strategic and goal-oriented.

Simulated gambling activities (including video games with gambling-like elements) can have a high degree of visual and structural parity to their real life gambling counterparts. For this reason, laboratory studies of gambling have often employed simulated gambling tasks to examine human factors that underlie gambling (e.g., cognitive bias, physiological arousal). These studies operate on the assumption that it is ecologically valid to study gambling and its effects on players without having to give participants money to play with (Clark et al., 2012; Dixon & Schreiber, 2002; Kushner et al., 2007).

1.2.3 Legal tests and rulings

Courts and other legal authorities often refer to one or more tests to determine whether an activity constitutes gambling. These tests include: (1) the '*Dominant Factor*' test: this test refers to whether an activity is predominantly skill-based or chance-based; (2) the '*Material Element*' test, which looks to whether chance is present in any material degree; (3) the '*Any Chance*' test: this test refers to whether any chance is evident in the activity; and/or (4) the '*English rule*' test: this test refers to whether any skill is evident in the activity. Courts will thus assess activities in terms of the degree of skill or chance involved, but without necessarily considering context, and/or will apply different legally applicable standards.

One challenge that arises in appraising video games according to these tests is the consideration of the game as a whole entity as opposed to the sum of its parts. Some video games, for example, may feature some stand-alone predominantly chance-based components (e.g., a virtual slot machine) that are positioned within the broader context of a skill-based activity (e.g., an action video game requiring fast reflexes and decision-making). If the slot machine in this example requires currency that is only obtainable by executing skilful play, then this may have some relevance to appraising whether this activity is primarily skill-determined. The size and complexity of modern game design can make it difficult to evaluate the extent to which chance and skill predominate outcomes in moment-to-moment play.

Considerations of skill and chance in competitive play have led to what investment strategist Michael Mauboussin has termed the "paradox of skill" (Mindell, 2018). As the difference in skill lessens between competing participants, the outcome of a contest is necessarily determined more by the difference in chance between them. If two participants are equally skilled, the outcome will be wholly determined by factors outside their skill. This principle may be particularly applicable to gambling activities, such as poker, but this principle also applies to many competitive video gaming activities (e.g., eSports).

1.2.4 Money and losses

The monetary component of gambling is routinely cited in legal discussions of certain monetised gaming activities to determine whether they fulfil the criteria for gambling (Griffiths, 2018; McLeod, 2018; Nettleton, 2013). In Australia, for commercial video games that present simulations of gambling (e.g., casino card games) where no money is involved in the game itself, the Office of Film and Literature Classification has typically determined that these activities should be classified as a product featuring 'gambling themes' and not a legally recognised form of gambling (King et al., 2012). However, money can also be spent in a video game that simulates gambling without meeting the definition of gambling (Gatto, 2012).

In recent legal proceedings in the United States, some plaintiffs have claimed that they had lost considerable amounts of money on gaming activities due to the conversion of money to virtual credits that were then spent on activities with chance elements within the game. Such claims have generally been rejected in the courts on the basis that spending money in these situations was not a form of gambling, because the conversion of money to in-game credits was not gambling per se but comparable to spending money on a movie ticket or similar entertainment (Martinelli, 2017). The 'loss' was deemed to have occurred at the moment at which money was converted to virtual currency, and not at the point at which the virtual currency was used to play a game of chance within the video game. A recent exception to this standard ruling, however, was a Washington court ruling that the social casino game series *Big Fish Casino* was providing a form of illegal gambling (Solana, 2018).

Determining whether any particular activity may be considered a form of gambling will ultimately be resolved by a legal process of decision-making that is usually bound by the specific legislation of the region. It is evident from recent court proceedings that there are various video gaming activities that involve the expenditure of money and chance-determined outcomes to earn virtual items or other rewards without monetary value. Many such activities are considered to not involve staking monetary sums or receiving monetary prizes, and thus have not meet the applicable standard of gambling. However, some gambling researchers, as well as some advisory and regulatory bodies, have appraised a range of gaming activities and concluded that these activities appear to meet some of the definition of gambling (Drummond & Sauer, 2018). Accordingly, one may view gaming and gambling along a spectrum accounting for factors including monetary investment and payout, structural similarities, and the composition of skill and chance elements (e.g., Gainsbury et al., 2014; King et al., 2015).

The terms 'gambling-like' or 'akin to gambling' may be applied in such cases to refer to activities that appear to blend features of gaming and gambling. For example, researchers have highlighted that some video games have 'near miss' events that are similar to slot machines (Larche, Musielak, & Dixon, 2017). Some regulatory bodies may apply a precautionary principle in judging certain 'hybrid' activities, such as monetised gaming activities like loot boxes, by referring to their close (or perhaps, 'close enough') approximation to gambling as sufficient in classifying these activities as a form of gambling (Schwiddessen & Karius, 2018).

1.3 The concept of 'convergence'

Convergence refers to a number of related technological processes and trends, but relates in general terms to the growing inter-dependence between the channels through which media and its content are provided (Griffiths et al., 2013). Media convergence typically takes one of four common forms: (1) when a single media channel (e.g., the Internet) becomes capable of delivering media (e.g., radio, television) that was previously accessible only through separate channels and/or devices; (2) the co-location of activities or content that previously could not be provided together. For example, this might occur when media becomes capable of providing both the ability to view a sporting match, send email, or play a video game all on the same device; (3) when one type of digital activity is embedded within another. For example, a gambling activity that can be played within a video gaming activity or vice versa; (4) when a single activity is designed so as to fulfil a common purpose. For example, this may occur when a video game shares some of the interactive elements of gambling. Some common ways in which gaming and gambling converge as activities and promotions include the following types:

1.3.1. Access via shared platforms, devices, and streaming

This type of convergence refers to the ability to access both video game products and gambling services via the same device. For example, using an online-enabled personal computer, laptop, or smartphone (or similar device) to access a video game and a gambling application or website on this same device. The user can switch between each activity with minimal input required (e.g., single

command 'one-button' entry) and without having to exit or close the application to access the other activity. This functionality enables a seamless transition and/or concurrent involvement in multiple activities (i.e., both the video game and the gambling activity may be 'running' or operating as a background process). The user's information (e.g., account or user credentials) is stored on the device so the user can stay logged in for extended periods. For gambling activities, the user's financial details are linked to a personal credit card or other electronic payment system. In relation to streaming, gambling promotions on social media platforms may include video content that provides a direct link to access the gambling product (e.g., a sports betting app).

1.3.2 Video games with gambling themes and elements

Some video games include gambling themes and elements, which can take a range of different forms. In some games, this may be a non-monetary simulation of traditional land-based gambling activities, such as casino card games and slot machines. Some video games adapt these gambling activities and redesign them with new elements to match the aesthetic and design of the video game (e.g., a futuristic sci-fi theme). These elements, while interactive and structurally similar, are not generally considered 'gambling' but a gambling 'theme'. In Australia, video games with gambling themes are classified as suitable for 'all ages' or appropriate for children 'under parental guidance'.

Some software companies offer 'gamblification' services to incorporate gambling mechanics in video games (typically mobile games). For example, the US company zGames (www.zgames.com) provides a range of design solutions to introduce and blend gambling mechanics (e.g., features present in slot machines and card games) with the design of the video game. The zGames website states that gambling mechanics are intended to "extend the gameplay, facilitate player engagement and retention" and they tailor their product to the most popular gambling activity of the video game's home region.

1.3.3 Virtual goods as currency for betting

With the advent of shared player worlds in online games that involve tradeable virtual goods and currency, in-game items have become a form of monetised currency. The stable, persistent, and open economy of the game platform enables players and/or the game developer to assign an enduring monetary value to virtual items. Some games have historically only enabled players to trade or gift items and currency in the virtual location of the game (i.e., two avatars must be logged in together and interact on the same server), however recent games have enabled players to access and manipulate in-game inventories from external online platforms (i.e., access via an open application programming interface (API) design architecture that enables others to programmatically access the proprietary software or service).

This design innovation has led to linked software platforms, sometimes developed by a third party developer who is not affiliated with the game or developer, that enable players to access and use their virtual goods from their accounts across games (i.e., a type of access akin to logging into an online banking platform with access to multiple accounts). On this unified platform, players can buy, trade, or sell their virtual goods with other players or to the platform operator (who will receive a fee for handling these transactions) (see Figure 6 in the Appendices). In effect, these various technologies enable players to obtain monetised currency from within a video game and then use these currencies on external platforms, including third-party gambling sites. Notable examples of this include 'skins' obtainable in games including *Counterstrike: Global Offensive* (CS: GO), *PlayerUnknown Battlegrounds* (PUBG), and *Defence of the Ancients* (DOTA) 2.

1.3.4 Social casino games and gambling operators

Social casino games refer to a type of online video game that has prominent gambling mechanics and is usually free-to-play on a mobile device. These games are designed to replicate the experience of

playing the real-world counterpart (e.g., roulette). These games often incorporate features of video games (e.g., levelling systems, player rank, unlockable features) and social media (e.g., integration with social media, such as *Facebook*, provide incentives to invite friends, and automatic posts to social media). Social casino games are more popular and have a larger audience reach than online gambling services (e.g., online casinos). Some of these games are developed and owned by gambling operators as an adjunct business, or to promote the real-world counterpart to the activities depicted in the social casino game. While social casino games tend to operate in a closed-loop economy where the player can purchase virtual credits with real money but cannot receive cash prizes for participation, some games use hybrid reward systems that reward loyalty points or discounts redeemable at a casino venue.

1.3.5 Presence of gambling in competitive gaming events (eSports)

The mass popularity of eSports leagues around the world, particularly in East Asia but increasingly within Australia with its advent of a national eSports league, has led to online gambling operators offering betting on these matches. This includes existing online gambling operators adding eSports betting options, as well as new dedicated eSports betting sites (Schneider, 2015). Currently in Australia, eSports betting is approved only in the Northern Territory, under state gambling law.

The global eSports audience is predominantly aged between 25 and 35 years, with some figures that indicate an underage viewership, including 10% of viewers in the United States (www.statista.com). The eSports competitors themselves tend to be slightly younger than the average eSports viewer, with some data that suggest that the average age across different games ranges from 21 to 25 years. The standard age requirement across leagues is 18 years or over. This means that eSports primarily involves and appeals to adults. However, there are viewers and competitors who, in some jurisdictions (e.g., United States), are not legally able to gamble but who are exposed to, or are the subject of, gambling promotions. This situation is comparable to some other professional sports leagues, including the AFL and NRL.

1.3.6 Gambling promotions and advertising on social media

Gambling promotions and advertising are present on social media (Abarbanel et al., 2017) and are known to be viewed and interacted with by underage users. This includes the official social media pages of betting operators, who produce material and engage with users (e.g., respond to messages) to advertise their brand. Social media content is propagated by paid or sponsored content, and then shared by individuals on the social network (i.e., viral distribution). Promotions and advertising for gambling products are promoted on sites with video-streaming and social functionalities that do not feature age-restrictions.

1.4 Types of gaming-gambling cross-over

Researchers have attempted to classify gaming and gambling activities according to their distinctive and overlapping structural properties (Gainsbury et al., 2014; King et al., 2015). The main challenge in developing a taxonomy of these activities is ensuring that the framework is flexible to include all available activities and accommodate new developments in the market. Gaming and gambling activities are evolving due to developments in technological platforms, payment and monetisation systems, and cross-media promotion. At the same time, it has become difficult for some consumers to perceive the differences between some gaming and gambling products when certain structural characteristics and play motivations are shared across the two activities (Teichert, Gainsbury, & Mühlback, 2017)

Gaming and gambling activities may be distinguished according to the following characteristics: (1) the type of monetisation involved in the activity, including whether money is involved as a cost of entry, or

for the purchase of currency or related means of participation, and whether money can be won as a consequence of play; (2) whether the activity involves betting or wagering mechanics, including interactivity and the presence of chance-based outcomes; (3) whether the activity has visual and structural resemblance or parity with established gambling activities; and (4) the context and positioning of the activity, including the centrality of the gambling experience. Acknowledging that there can be great variations in activities within each type, the following activities may be delineated:

1. Simulated non-financial gambling:

These are gambling simulations that may closely resemble or otherwise appear similar to gambling activities (e.g., blackjack, or slot machines) but no money is involved in the state of play. The player does not lose or win money while playing. An example would be a video game version of Texas Hold'em Poker on a video game console or other device.

2. Monetised simulated gambling:

These are gambling simulations that have monetisation features to enable players to spend money on virtual currency. However, this currency is positioned within a closed-loop economy where it cannot be redeemed for money or traded among players (Balakrishnan & Griffiths, 2018). Therefore, money is spent by the player but not won or lost. An example would be a social casino game such as Slotomania.

3. Monetised video gaming:

These are video games with payment options, including in-game purchasing. These games may include options to use the currency earned or purchased on activities within the video game, which may be entirely optional. Money is spent but not won or lost. Some of these monetisation schemes may look very similar to gambling mechanics, given the presence of chance-based elements. Some games may provide the option to spend money to obtain virtual goods that have financial value among players (e.g., 'skins') and can be traded among players. Virtual goods that are purchased with a random chance of 'dropping' (e.g., loot box) are considered a form of gambling in some jurisdictions (Abarbanel, 2018).

4. Unregulated online gambling using virtual goods:

These are online gambling activities that essentially use virtual goods obtained from video games as the stake in gambling activities, which often include roulette-style draws. Skin gambling is the most popular example of this type. Video game 'skins' are first either purchased in certain games by buying keys to open random virtual reward containers (e.g., crates or boxes) or skins may be purchased from other players. The game developer will take a small percentage of the sale in these transactions. The virtual good ('skin') may be used as a currency on a third-party website that provides gambling activities with the option to win additional skins or convert these to money (Martinelli, 2017).

5. Fantasy sports and daily fantasy sports:

These may be considered a separate class of online game where participants compete by assembling a virtual team of players of a professional sport. Each player's team competes in imagined or theoretical rounds of play where the outcomes are determined by the statistical performance of each player's team members that corresponds to their real world individual performances. Fantasy sports may involve money by requiring players to deposit money into a pot that is awarded to the winner of the competition. The main aspect of interactivity involves making decisions on which players to select, trade, or delist from a player's team, where players who are more familiar or knowledgeable of the

scoring systems at play and/or the status of the professional competition and its players will have a competitive advantage over other participants in the Fantasy sports league.

6. eSports gambling:

This refers to gambling activities that involve betting on the outcomes of professional video gaming matches. This is delineated from other online gambling in this discussion because it involves video games and may be more appealing to individuals with a strong interest in the competitive gaming scene.

7. Online gambling activities:

This refers to other gambling activities that are provided on a digital device with an internet connection. A wide range of betting activities fall into this category, including online sports betting and online casinos. These products are distinct from online video gaming activities.

Section 2: Youth exposure to gambling-like content through online games

Research question

In what ways and to what extent are children and adolescents being exposed to gambling-like content through online games?

Summary

This section presents an overview of youth exposure to gambling-like content through online games. The first part of this section provides some background on Australian youth ownership of digital devices and involvement in online gaming and other online activities. Over the last decade, video gaming and online activities have become increasingly accessible and popular among Australian youth. Available data indicate that participation rates in video gaming have increased among boys, which may be partly explained by the worldwide growth in smartphone ownership and mobile gaming. The next part provides an introduction to some specific gambling-like features in online games, including monetised gaming elements such as 'loot boxes'. This provides the background for the final part on Australian and international academic and industry research on youth involvement across a range of simulated gambling activities. These studies suggest that youth involvement in gambling-like experiences varies greatly by type but that exposure to gambling-like content on social media and popular online video games is quite commonly experienced among Australian youth. The available research evidence has some caveats but suggests that only a small proportion of youth may be regularly involved and spending money on these activities.

2.1 Youth and digital technology use in Australia

Digital media and technologies have become an integral part of many young people's lives. Young people use and have come to rely on these technologies not only for leisure and peer socialisation, but also for educational purposes (e.g., classwork, research, homework). Survey studies have consistently shown over the last decade that adolescents, particularly in urbanised areas, report rates of digital media *exposure* (i.e., the digital content or technology is visible, or passively consumed or observed by the individual) and/or *use* (i.e., participation or active use of digital media) in excess of three or more hours per day (ACMA, 2017). Such estimates tend to be based on youth self-report and may vary according to whether the study is measuring singular or concurrent use of multiple electronic devices. Some studies may consider so-called 'second-screen' use (e.g., simultaneously using a smartphone while watching a movie) as additive digital media use, whereas other studies may report this as a single activity.

This section will present some recent data on youth digital technology use in Australia, with a focus on types of digital device ownership and online access, the frequency of media use across age groups, and some current estimates of excessive digital media use (i.e., digital media use that interferes with well-being and other activities). This information is intended as background for considering specific use of gaming activities and exposure to gambling-like content in games in Section 2.2. It should be noted that Australian data is less current in some areas in comparison to other English-speaking countries (e.g., United States, United Kingdom).

2.1.1 Youth access to and ownership of digital devices

The majority of children and adolescents in Australia use and/or own an electronic device. A report by the Australian Communications and Media Authority (2013) presents the findings of an Australian population survey of 1511 children and adolescents aged 8-17 years. Mobile phone ownership was generally high and found to increase significantly with age: 11 per cent of 8-9 year olds have their own mobile phone, 35% of 10-11 year olds, 67% of 12-13 year olds, 87% of 14-15 year olds and 94% of 16-17 year olds have a mobile phone. Data collected in December 2013 by Ray Morgan Research for the ACMA (2014) reported that, among young people aged 14-17 years: 89% have a mobile phone; 69% of mobile phone users have a smartphone; 56% use their mobile phone to go online; and 72% go online more than once a day. More recent data collected by Ray Morgan research (2016) states that 91% of Australian youth aged 14-17 years own a mobile phone, of which the majority (94%) own a smartphone and 75% are using an upgraded or replacement handset (i.e., not their first mobile phone).

According to data from the Australian Bureau of Statistics, the proportion of households with access to the Internet at home has been steadily increasing since 2004-05 but remained constant between 2014-15 and 2016-17 at 86%. For households with children aged under 15 years, 97% had access to the Internet compared with 82% of households without children under 15 years. Desktop or laptop computers are used by 91% of online-connected households. Similarly, mobile or smartphones are used by 91% of connected households. The mean number of devices used to access the Internet at home per household has increased from 5.8 devices in 2014-15 to 6.2 devices in 2016-17. For households with children aged under 15 years, the mean number of devices used was 7.8, compared with 5.4 devices for households without children under 15. Nearly all (99%) households with children under 15 years used a mobile or smartphone to access the internet in 2016-17. People aged 15-17 years were the highest proportion of Internet users (98%) compared with the older age group (65 years and over) which had the lowest proportion of internet users (55%).

2.1.2 Frequency of use of electronic media

A major shift in digital entertainment options for youth and their families occurred in the period between 2007 and 2010. It was at this time that mobile phone technology became more widespread and social media platforms became more prominent and popular across the population. In 2007, the MCAF study reported that young Australians were still maintaining their use of traditional media, such as broadcast television, but they were increasing their use of emerging or increasingly popular media platforms, including the Internet for browsing, mobile phones, and social media. At the same time, there was an increase in the number of different activities being reported by users of all ages, as individuals added more online activities to their routine of digital media consumption.

In another ACMA report comparing 2009 and 2014 Australia data, the majority of teenagers (aged 14-17 years) were considered 'intensive' users of the Internet. During December 2013, 55% were considered 'intensive' users (i.e., they engaged in four or more different activities) compared to 37% in 2009. Accounting for population size differences, this was a 51% increase in intensive media use from 345,000 to 522,000 teenagers from 2009 to 2014. The number of teenagers performing only one activity online had decreased by 31 per cent from 131,000 to 90,000. This increase in online activity participation was consistent with the upward trend in digital media consumption patterns of adults, however Australia adolescents in 2013 did not use the Internet as intensively as adults aged 18 to 54 years.

A report by the Australian Communications and Media Authority (2013) presents the findings of an Australia-wide population survey of 1511 children and adolescents aged 8-17 years. This online study investigated gaming behaviours and online risks but did not examine exposure to gambling or gambling-like experiences. It should be noted that the study considered 'gaming' and 'gaming device'

primarily as a method or means of accessing the Internet, rather than as an activity (that could occur online or offline) in its own right. The study reported that the majority of 8-17 year olds surveyed had accessed the Internet in the last four weeks, including 95% of 8-11 year olds to 100% of the 16-17 year olds. Home computer access was very common (93 to 97%), and the majority of adolescents reported accessing the Internet at school (64 to 75%). The most common mode of accessing the Internet for children aged 8-11 years was the home personal computer (97%). Accessing the Internet using a mobile device (e.g., smartphone or portable gaming device) was found to increase with age. Mobile phone Internet access increased with age, with half of the 14-17 year olds using this platform (49% of 14-15 year olds and 54% of 16-17 year olds). Other mobile device (e.g., gaming device) access was higher among 8-11 year olds and peaked at 43% for 10-11 year olds.

The 2013 ACMA report also referred to different types of electronic media use according to age groups. In relation to video gaming, younger children (8-11 years) reported playing games online in the last four weeks (85% of 8-9 year olds; 87% of 10-11 year olds). Social media use was less prevalent but emerging among younger users, with 23% of 8-9 year olds and 45% of 10-11 year olds who reported having used social networking sites in the last four weeks. The majority of 12-13 year olds (67%), 14-15 year olds (85%), and 16-17 year olds (92%) had used a social networking service (SNS) in the last four weeks on a computer. Frequency of SNS use was reported to increase with age. The survey found that 36% of 12-13 year olds reported daily SNS use on a computer, with this figure increasing to 71% for 16-17 year olds. *Facebook* was the most popular social network service for 12-17 year olds. The majority of *Facebook* users used the site at least daily and in some cases, more regularly. For example, the majority of *Facebook* users aged 14 years and over were more likely to use *Facebook* more than once a day (47 to 50%) than daily (32%). Nielsen Online data (April, 2015) reported that 1.49 million Australian young people (i.e., those aged up to 17 years) were online in 2015 and 70% accessed social networking sites or online games.

The 2017 *Youth Digital Participation Survey* prepared by the Office of the eSafety Commissioner (2018) provides the most recent 'snapshot' of young people's use of social media. This survey comprised a random sample of more than 3,000 young people in Australia aged 8–17 years and included information on young people's online safety experiences and behaviours in the 12 months prior to June 2017. The survey did not screen online gambling or gambling-like content but the survey did include measures of social media use. It bears noting that Australian government research into youth online activities has often focused on risk issues such as cyberbullying, privacy concerns, and online sexual activities and risks ('sexting' and online predators), with less attention to media overuse and exposure to gambling content and advertising – this seems to reflect the national priorities outlined in the *2013 Coalition's Policy to Enhance Online Safety for Children*.

The 2017 eSafety Commissioner report states that, among teenagers (i.e., defined as those aged 13-17 years), 86% used *YouTube*, 75% used *Facebook*, and 70% *Instagram*, with numerous other social networking applications also listed at lower frequencies of preference. The report does not, however, provide the complete details of time spent on these websites and applications. Some 2013 data from Nielsen Online Ratings indicates that adolescents spent the most time on *YouTube*, followed by *Facebook*, *Skype*, *Tumblr*, and '*Microsoft*' (i.e., Xbox Live, PC internet browsing), however the time-frame for these statistics was not reported.

2.1.3 Online gaming accessibility among Australian youth

The *Digital Australia Report 2018* commissioned by the Interactive Games and Entertainment Association (IGEA) and prepared by Brand, Todhunter, and Jervis (2018) presents the findings from one of the largest and most regularly conducted studies of gaming-related activities in Australia. Since 2012, the IGEA have published annual statistics on Australian gaming behaviors based on commissioned research. The 2018 report was based on 2017 data that involved 1234 households and 3135 individuals of various ages in those households. The report stated that: 67% of Australians play

video games; 54% of video game players are male, and 23% of players are aged under 18 years. Further, the report states that 97% of Australian homes with children have video games; 60% of households have five or more screens; 80% of game households have more than one game device (e.g., personal computer, home console device); and that 16% of game households have a virtual reality headset. Young people often access video gaming by playing with their parents, with 60% of parents reporting to play with their children in the same room and 44% of parents who play online games with their children.

2.1.4 Online gaming participation among Australian youth

Youth gaming participation in Australia has been relatively consistent with other Western countries. There has generally been an upward trend in male video gaming over the past decade. For example, the Generation M2 study in the United States reported that, in 2009, youth aged 8-18 years spent an average of 73 min per day engaged in gaming activities. This was an increase from the average figure of 24 min in 2004. The report accounted for this difference by referring to the increase in mobile game and handheld games participation. Console gaming and gaming on a personal computer remained relatively unchanged over this period. In 2009, it was reported that US youth spend half of their total gaming time on mobile devices. Australian comparison data indicates that there was a significant increase in gaming among Australian boys during this same period (2000s to 2010s). While gaming among female youth remained stable at an average of 23-24 min per day between the years of 1995 and 2007, boys' gaming had almost doubled in this time period, increasing from 29 min to 55 min per day.

The *Australian Child and Adolescent Survey of Mental Health and Wellbeing 2015* surveyed 2967 young people aged 11-17 years in 2014. The study reported that, on average, males spent more time playing video games than females, even though males and females spend similar amounts of time using the Internet. Only 5.3% of males did not play video games compared with 24.8% of females. In terms of other age and gender differences, 96.3% of 11-15 year old males and 81% of same-aged females played video games. Relatively fewer 16-17 year-olds played video games (90.6% of males and 62.4% of females played games). Notably, only 1.1% of young people did not use the Internet at all on any device.

The *Digital Australia Report 2018* by Brand, Todhunter, and Jervis (2018) provides the most recent data on gaming participation across different age categories. The report presents a study that involved a 2017 survey of 1234 households in Australia and reported that: the average daily total of all gaming (i.e., among adolescents and adults) was 89 min; the average daily total play for males was 98 min; and the average daily total play for females was 78 min (see Figure 2 in the Appendices). The report does not specify a "youth" subgroup; instead, the most relevant age category is 15-24 years. The average daily playing time among males for this age group is 155 min per day, and about 85 min per day for females in this group. It is not clear what proportion of young people under 18 years are playing games on a daily basis.

The most recent and informative Australian data on youth gaming comes from the Office of the eSafety Commissioner (2018). Their report presents the results of the Office's *2017 Youth Digital Participation* survey, which included questions related to online gaming. The survey comprised a nationally representative random sample of 3017 young people aged 8–17 years (Office of the eSafety Commissioner, 2018). A benefit of these data compared to the IGEA data, for example, is its delineation of adolescents from adults aged 18 years and over. The report states that 81% of Australian young people aged 8–17 years have played an online game and 64% played with others (i.e., friends and strangers) in the 12 months prior to June 2017. Playing online games with others was more popular with 14-17 year olds (67%) than 8-13 year olds (62%), and gaming was more popular among boys than girls (71% vs 51%).

The eSafety Commissioner (2018) report also investigated monetised gaming activities, which is a relatively new development in gaming and generally only limited data are available. About a third (34%) of all Australian young people made in-game purchases in the previous 12-month period while playing online games, with 14-17 year olds slightly more likely to make purchases than 8-13 year olds (38% vs 32%). Around 34% of 17 year olds made in-game purchases compared with around 25% of 8 year olds. The 14–16 year age group were the most likely to report in-game purchases, with around 40% reporting a purchase. Like playing online games in general, making in-game purchases and upgrades was particularly common among males, including 51% of boys who played games online compared to 34% for girls. About half of the sample played eSports game titles like *League of Legends* and *Counter Strike: Global Offensive*. However, the proportion of young people participating in eSports tournaments (i.e., amateur and/or professional level) was only 4%.

According to Holden, Kaburakis, and Rodenburg (2017), the professional status of eSports has 'legitimised' the excessive consumption of an activity that was previously thought to be best consumed in moderation. These researchers highlighted:

The burnout associated with competitive video gaming is associated not only with the playing of games but also with the streaming of games, as some Twitch streamers have been reported to occasionally stream for periods of 24 h or longer to satisfy the appetites of the site's subscribers who follow and, in some instances, pay for content from streamers.

2.1.5 Excessive gaming among Australian youth

Although there is no academic agreement on how much time spent in any given activity should be considered 'excessive', researchers are often guided by normative data (i.e., what is statistically abnormal) and accompanying behavioural indicators that the activity generates negative personal consequences, such as displacement of important activities including education or work responsibilities and the occurrence of family or other relational conflicts. Researchers in public health and other health disciplines may agree that any digital media activity that exceeds 8 hours per day (i.e., greater duration than any other waking activity) is likely to be indicative of excessive use, particularly if this level of use is sustained consistently over time (e.g., over a 6-month period). With the recognition of 'gaming disorder' in the DSM and ICD health and diagnostic classification systems, more studies are using the criteria based on problem gambling to screen for excessive or problematic video gaming behaviours.

There are relatively few sources of quality data on Australian youth excessive gaming. Porter et al. (2010) employed an online survey that recruited 1945 participants. The overall sample was 92.6% male and drawn mainly from the USA, Canada, Europe, Australia, and New Zealand. The majority reported playing video games every day (62.1%), playing longer than planned (59.8%), and playing despite believing that they should not do it (52.0%). The overall prevalence of problem video-gaming was 8.0%. The adolescent subsample included 1042 people in total, and about 9% of this subsample met criteria for problem video gaming. However, sub-analyses of adolescent users were not conducted. Thomas and Martin (2010) surveyed 1326 Australian school students (51% male) on video gaming and Internet use and associated problematic use. They reported prevalence rates of problem use for arcade machine games (4.2%), video games (5.0%), and the Internet (4.6%). King, Delfabbro, Zwaans, and Kaptsis (2013) surveyed a total of 1287 South Australian secondary school students aged 12–18 years. The rates of problematic Internet use and gaming were 6.4% and 1.8%, respectively. A subgroup with co-occurring problematic gaming and Internet use was identified (3.3%). These figures were mostly comparable with international statistics on problematic gaming among adolescent males, although East Asian countries tend to report higher rates (e.g., around 10%). However, some researchers have questioned the validity of self-report questions for screening problematic gaming and harm, particularly for young people.

The largest and most robust Australian study of youth excessive media use is the *2015 Australian Child and Adolescent Survey of Mental Health and Wellbeing*, which sampled and surveyed 2967 young people aged 11-17 years in 2014. The Australian Government Department of Health funded *Young Minds Matter* and commissioned The University of Western Australia to undertake the survey through the Telethon Kids Institute in partnership with Roy Morgan Research. The study reported that 4.1% of males played video games for an average of 9 hours or more on an average weekday, and 7.8% played games for an average of 9 hours or more on weekends, compared with 0.9% and 1.4% of females.

The 2015 Australian Child and Adolescent Survey of Mental Health and Wellbeing also screened 'problematic' gaming and Internet use, which was defined according to meeting the following indicators: (1) going without eating or sleeping in order to be on the internet or play games; (2) feeling bothered or upset if they are unable to be on the internet or gaming; catching themselves using the Internet or playing games even when they are not interested; (3) spending less time than they should with family or friends or doing school work or work because of the time they spend on the Internet or gaming; and (4) having tried unsuccessfully to reduce the time spent in these activities. These indicators are comparable to those used in youth problem gambling research (e.g., Raisamo, Halme, Murto, & Lintonen, 2013). The report stated that 3.5% of males aged 11-15 years, 3.0% of females aged 11-15 years, 4.4% of males aged 16-17 years, and 6.5% of females aged 16-17 years met all four of the criteria. In addition, problem Internet or gaming was more common among youth with mental disorders, particularly major depressive disorder (MDD). Some 13.0% of youth with MDD identified reported problem gaming or Internet use compared with 3.1% of young people with no identified mental disorder.

2.2 Types of gambling-like content in online games

Video games are constantly changing and updating as a result of industry innovations in product design and advancements in gaming hardware and online infrastructure. As explained in Section 1, video games have changed significantly since around 2007 due to increasing uptake of service-based business models, online connection requirements, hardware mobility and increase in smartphone games, and new monetisation features. Over the last five years, highly popular online competitive games and game franchises (e.g., *FIFA*, *Counterstrike*, *Overwatch*, *Destiny*) have adopted a service model that presents players with (typically small) purchase options known as 'microtransactions'. Microtransactions enable players to obtain additional game content or premiums (e.g., virtual items, textures/skins, currency, levels, or power-ups). The gaming industry has taken different steps to capitalize on players' interests to acquire and use various virtual currencies and goods within online games. This has led to many such games including monetised gambling-like features. This section will provide a brief overview of some of these gambling-like features in video games.

2.2.1 Loot box features in games

A loot box refers to an in-game reward system that can be purchased with real money, usually repeatedly, to obtain a random selection of virtual items (see Figures 3 and 4 in the Appendices). Essentially, a loot box contains one or more random rewards that alter the game in some way (Drummond & Sauer, 2018). The low probability of obtaining certain items means that the player will have to purchase an indeterminate number of loot boxes to obtain the item. There is no possibility of direct financial return in these transactions, meaning that the player is unable to recover what has been spent in the activity. Such characteristics distinguish these features from traditional gambling products despite some similarities in their structure. However, it should be noted that some online video games (e.g., *CS:GO*) enable players to spend money on loot boxes to acquire items that have a fixed monetary value outside of the game. This means that, in effect, players can spend some amount of real world money on the random possibility of acquiring a virtual currency that takes the form of a

virtual good that can then be traded and sold to other players for money, or used as a monetised currency for gambling activities.

Loot boxes differ in terms of their mechanics and implementation across video games. Drummond and Sauer (2018) examined 22 online video games containing loot boxes that were released in 2016-17 (see Figure 5 in the Appendices). They assessed each game according to a five-component definition of gambling by Griffiths (1995), which included: (1) the exchange of money or valuable goods; (2) an unknown future event determines the exchange; (3) chance at least partly determines the outcome; (4) non-participation can avoid incurring losses; (5) winners gain at the sole expense of losers. They reported that 10 (45%) of the 22 games met all five of the criteria for gambling. In the case of 4 of these 10 games, players could cash out winnings, albeit via websites unaffiliated with the company that published the game (i.e., independent websites exploiting features within these games that allow players to trade with each other, to buy and sell in-game rewards for real-world money). Six of the ten games that met all of Griffiths' criteria, as well as all of the games that allowed players to cash out for real money, were rated appropriate for audiences 13 years old or younger. The age ratings for these games was not influenced by gambling-related or loot box-related content, but more by the depiction of violence in the game.

A recent interview with Reggie Fils-Aime, the President and Chief Operating Officer of Nintendo of America, acknowledged that some Nintendo games popular among children, such as the mobile game *Animal Crossing: Pocket Camp*, use loot boxes (Hewa, June 2018). The article based on this interview claimed that Fils-Aime stated that some loot box types are “bad gameplay design”. Fils-Aime was quoted: *“I think you have to be really careful when you talk about a particular gameplay mechanic and try to characterize how it could be used and what’s its role. The core concept of spending money in an experience and not knowing exactly what you’re going to get is as old as baseball cards.”* Similarly, a statement by the IGEA referred to loot boxes as “surprise and delight” mechanics that should not be regulated (IGEA, 2018).

2.2.2 Social casino games

Social casino games are some of the most popular gambling-themed games that are widely accessible in Australia (Gainsbury et al., 2015). Social casino games refer to online gambling-themed games that do not require payment to play or provide a direct payout or monetary prizes (Gainsbury, Hing et al., 2014). They are hosted on or interact with a social media site (e.g., *Facebook*), including through mobile apps. Their central theme is a simulation of an established gambling activity (e.g., poker, slots, roulette, bingo, keno, betting). A recent analysis by Jacques et al. (2016) reported that, among the 100 most popular games on *Facebook*, 54% included gambling content or references, which included 22% that simulated slot machines and of which many were owned by gambling developers. Social casino games monetise using a ‘freemium’ model. The basic game is free (i.e., no ‘cost of entry’), but the game provides options to pay for upgrades and increase game time by purchasing in-game virtual currency. This currency can then be spent for ongoing game play, to unlock additional levels or features, to personalise or decorate game assets, and to give virtual gifts to online friends. A social media platform enables users to share their achievements and progress, view other users’ achievements on leaderboards, invite other users to play with them or support their play, share virtual goods and credits between users, discuss the game through supported synchronous and/or asynchronous exchanges, and compete with other users in challenges (Parke et al., 2013). Despite these opportunities, some social games can be played with no or very limited social interaction, depending on the user’s preferences and game settings.

2.2.3 Video games with gambling themes and optional gambling content

Aside from social casino games, there are some gambling-themed video games that are offered across a range of digital devices, such as personal computers and games consoles, that are not

necessarily linked to social media and which do not offer the option to spend money on virtual currency. Similarly, there are some video games that may feature a gambling-themed game as an optional feature (i.e., not the primary game), such as an optional casino level within a large city environment or an incidental gambling element in gameplay. Gambling-themed video games are a niche genre in the market and are much less popular in general than social casino games and other online video games. However, many popular video game franchises (e.g., *Grand Theft Auto*, *Red Dead Redemption*, *Borderlands*, and *Mafia*) have included optional gambling-themed activities and therefore these activities may be commonly reported by young people in surveys of their experiences of exposure to gambling-like content in games.

2.3 Youth exposure to gambling-like content through online games

It is evident from the research presented in Section 2.1 that the majority of children and adolescents in Australia have access to and frequently use online-enabled devices at home and elsewhere, and that online gaming is a highly popular pastime for males in this age group. However, much less is known on the extent to which young people may be exposed to gambling-like content through gaming, despite the consistently high observed rates of participation in gaming activities. This section will present the available data on exposure to gambling-like content through online games. Drawing on the conceptual definitions presented in Section 1, and the activities described in Section 2.2, this section will refer primarily to ‘simulated’ gambling, or digital media that has the appearance and mechanics of gambling activities (e.g., slot machines) but that does not involve betting money or something of value.

This section will also include some information on monetised features in video games (e.g., ‘microtransactions’) that are not widely recognised as a form of gambling but are often considered to be ‘gambling-like’ based on elements of financial expenditure and randomness. Some studies refer to spending in ‘social casino’ games, which involves a situation where money can be spent but never won. Some studies refer to ‘online gambling-style’ or ‘online simulated gambling’ games, which may include social casino games but may also include video games where gambling mechanics are present and there is an option to spend money. Other studies refer to ‘free poker’ which appears to indicate the practice mode on a gambling site. It bears noting that the lack of consistent terminology and blurring of features across activities creates some challenges in both organising and comparing findings across different studies.

2.3.1 Australian research on youth participation in simulated gambling

While there have been a number of academic studies of gambling and video gaming (i.e., individually or in combination) among adolescents over the past two decades (e.g., Delfabbro et al., 2009; Forrest et al., 2016; Gupta & Derevensky, 1996; Molde et al., 2018; Parker et al., 2008), this research has often considered each activity as a homogenous activity and has not considered specific types of gaming activities that may resemble gambling. Some studies have focussed on the relationship between gaming and gambling, where the guiding framework has been the so-called ‘gateway effect’ (Hayer, Kalke, Meyer, & Brosowski, 2018; Molde et al., 2018; UK Gambling Commission, 2015; Wohl, Salmon, Hollingshead, & Kim, 2017) or the pathway between gaming and gambling where certain individuals with a video gaming history may demonstrate a greater likelihood of engaging in gambling at adult age. Some scholarly research has more recently considered the degree to which young people may become more familiar with gambling due to involvement in video gaming activities that simulate gambling or may be considered ‘gambling-like’. The main limitation of some available Australian studies of youth simulated gambling has been the recruitment and sampling approach. Some studies have relied on non-random and non-representative youth samples and therefore these data should not be considered true prevalence rates among Australian youth.

King, Delfabbro, Kaptsis, and Zwaans (2013) surveyed 1287 adolescents aged 12 to 17 years in secondary schools in South Australia. They reported that 13% of the sample had been involved in

simulated gambling in the last 12 months, and 32% reporting engaging in at least one simulated gambling activity in their life. The most popular types were casino card games, electronic gaming machines, and sports betting activities. The most common experience of exposure to simulated gambling occurred via gambling mechanics (e.g., 'mini-games') in video games, including popular video-games such as *Grand Theft Auto* and *Pokémon*. About 1 in 10 reported to have tried social casino apps on *Facebook* (e.g., *Zynga Poker*), and 1 in 20 adolescents had tried gambling smartphone apps (e.g., *Slotomania*).

A 2014-2015 national project on adolescent and adult simulated gambling led by Sally Gainsbury examined social casino game play among adolescents (Gainsbury et al., 2015). As a part of this project, a survey of 555 adolescents was administered. The survey was hosted on *Qualtrics* and respondents were recruited through Survey Sampling International. The respondents were recruited through their parents and their parents were asked to give their consent at the start of the survey. The study identified that 130 adolescents were social casino game players, including 52 adolescents who reported spending money on these games. Those who spent money to play these 'free-play' activities tended to be male and played these games more frequently. The self-reported median weekly expenditure on these games among spending adolescents was \$3.58 (King et al., 2016).

King and Delfabbro (2016) surveyed 824 adolescents from secondary schools to examine simulated and financial gambling. The survey examined rates of participation across activities and whether parents facilitated this involvement. The most prevalent simulated gambling activities were unsupervised video gaming (7.9%) and mobile apps (5.7%). In terms of lifetime involvement, the most common simulated gambling was video gaming with gambling features (9.7%). Males were significantly more likely than females to report involvement in both simulated gambling and financial gambling. Older participants were more likely to report financial gambling but there were no significant age differences in simulated gambling. For most simulated gambling activities, adolescents reported to play, on average, about once per month (i.e., 10 to 15 times per year), with comparable frequencies irrespective of whether parents supervised the activity. Financial gambling was usually facilitated by a parent, particularly for scratch tickets and sports betting, which was consistent with the requirement of money to play and associated age restrictions. Simulated gambling activities, such as social casino games, tended to be reported as being unsupervised.

2.3.2 International research on youth participation in simulated gambling

Empirical studies on youth simulated gambling, specifically referring to involvement in social casino games and online gambling-like video games, have been conducted in the United Kingdom, Germany, and Canada. While there are similarities across regions with respect to how young people use and access online activities, including high rates of youth ownership of gaming devices and smartphones, it should not be assumed that participation rates in gambling and simulated gambling are broadly comparable across these regions. For example, some regions may facilitate greater visibility and access to online poker sites or social casino games due to region-specific factors such as the online marketplace and its promotional strategies and the popularity of these activities among adult users.

Elton-Marshall, Leatherdale, and Turner (2016) reported the findings of the 2012–2013 *Youth Gambling Survey* (YGS) supplement, a questionnaire administered as part of the *Canadian Youth Smoking Survey* (YSS, 2012) in 3 provinces: Newfoundland and Labrador (n=2,588), Ontario (n=3,892), and Saskatchewan (n=3,555). The sample included 10,035 students in grades 9 to 12. The survey questions on participation in simulated gambling referred to: (1) free Internet poker; (2) free Internet slots; and (3) gambling games on *Facebook*. Overall, the study found that adolescents reported to have engaged in online simulated gambling including free online poker (9.1%), free online slots (4.9%), and simulated gambling on *Facebook* (9.0%). Males were significantly more likely than females to report involvement in all three types of simulated gambling. The most prevalent form of simulated gambling was free play online poker among male adolescents (14.6%).

Dussault et al. (2017) reported the findings of a longitudinal study on gambling among young people in Canada. The study involved data collected over three waves from 2012 to 2014. After applying exclusion criteria to meet the study's aims, the final sample at baseline included 1220 adolescents aged 14-18 years (37.9% male). The survey examined participation in simulated versions of online gambling websites using a questionnaire with yes/no type questions (e.g. 'Have you ever engaged in online gambling using free demo versions?'). The meaning of a free version online gambling website was defined in the questionnaire as participation in any gambling activities on the Internet, such as video lottery games (VLT), poker or blackjack via websites or on *Facebook*, but without betting real money. For those who answered 'Yes', participation in simulated version of online gambling was also assessed over the past year for poker, slot machines, table games and bingo. Among the initial sample of 1220 participants, 9% (n = 110) had played a simulated version of poker, and 5.3% (n = 65) had played a simulated version of at least one other (non-poker) game.

Wijesingha, Leatherdale, Turner, and Elton-Marshall (2017) presented findings from the 2012–2013 *Youth Gambling Survey* conducted in three Canadian provinces. The sample included 10035 students in Grades 9 to 12. They reported that adolescents who played free games on gambling websites and *Facebook* were significantly more likely to gamble online.

Hayer et al. (2018) conducted a representative longitudinal (i.e., 12-month) survey with a total of 1178 school pupils (M = 13.6 years; 47.5% male) in Northern Germany. These data were collected between 2015 and 2016. The study questionnaire examined four different types of simulated internet gambling (on social networks, via apps, through video games, and as 'demo' games) and two different access routes per type (from home, and elsewhere). The study divided its results according to two subgroups: (1) 'consistent abstainers', those who had no experience of gambling at both time-points (n = 391), and (2) 'onset gamblers', those who had no experience of real gambling at baseline but who reported gambling at follow up. The rates of participation in simulated gambling were 33% and 50% for each subgroup. Considering the total sample, there were 202 (38%) adolescents who reported involvement in simulated gambling on the first survey. Unfortunately, the authors did not provide a descriptive breakdown of involvement across simulated gambling activities. The study concluded:

In the context of the broad definition selected, with four different forms of simulated internet gambling and two different access routes, it must first be noted that in Germany, one in every two school pupils aged 11–19 years has had experience of such gaming opportunities. Simulated internet gambling is currently a reality of life for many adolescents, above all due to its widespread presence within video games. (p. 14)

Another study by Hayer and colleagues (Hayer, Rosenkranz, Meyer, Brosowski, 2018b) involved a cross-sectional survey of 1905 students in grades 6 to 10 in Northern Germany. The mean age of the sample was 13.8 years (SD=1.5), and 49.1 % were male. The results indicated that about half of all respondents had engaged in simulated gambling activities within the past 12 months. Simulated gambling embedded in video games represented the most prevalent activity (40%), followed by simulated gambling activities via apps (almost 20%).

The *Young People and Gambling 2017* report by the UK Gambling Commission (December, 2017) provides the most recent snapshot of youth exposure to and participation in gambling-like content via video games. The 2017 report presents the findings of the latest in a series of annual surveys by the UK Gambling Commission on the subject of youth gambling in Great Britain. The findings are based on a sample of 2881 young people aged 11-16 year old who were surveyed between February and May 2017. The research was conducted using Ipsos MORI's *Young People Omnibus*, a representative survey of school students in England, Wales, and Scotland. The 2017 survey included questions to examine 'online gambling-style' games. These were defined as games which:

...look and play like gambling games such as roulette or poker but are free to play, do not offer any prizes and do not have any age restrictions. Such games are not considered as gambling by law but can have many similar characteristics to games that involve real money being lost/won, and are of interest as they represent a possible route into gambling for money, particularly for young people. (p.20)

The 2017 report stated that the proportion of 11-16 year olds who have ever played online gambling-style games was 11% (compared to 9% in 2016). Boys (12%) were slightly more likely to have played online gambling-style games than girls (10%). Of those 11-16 year olds who had ever played online gambling-style games, the most popular type of gambling-style game played in the last seven days was bingo, played by 16%, followed by casino games (15%), slot/fruit machine games (14%), and poker (13%). Overall, this equated to 4% of all 11-16 year olds having played a gambling-style game in the week prior to the survey. Girls (24%) were more likely to have played a bingo-style game within the last seven days, compared to 8% among boys. The most popular type of online gambling-style game among boys was casino games (20%), compared to 8% among girls.

The most common way of playing an online gambling-style game was using an app on a smartphone or tablet, with 73% of those who have played an online gambling-style game (and who mentioned the game they played) having used this mode of play. Social networking sites such as *Facebook* were the second most common method of play (28%), followed by free demo games on gambling websites (17%) and other websites (20%). Based on these data, it might be assumed that the respondents were often reporting to have played 'social casino' games (i.e., the 73% figure seems to include these activities), and relatively fewer young people were accessing free-play gambling activities hosted by online gambling operators. This distinction is important for considering the way in which young people may be exposed to solicitations to engage in certain activities. Social casino games have a much stronger presence on social casino sites and app stores, where young people are known to have access and spend time.

Macey and Hamari (2018a) provided by request some additional figures on youth simulated gambling activities. In their sample of 157 adolescents, there were 49 (31%) who reportedly had purchased a loot box in an online game. The majority of this subgroup (n=28) reported that they purchased loot boxes no more frequently than once per month. There were 6 adolescents (about 4%) who reported purchasing loot boxes between 2-6 times per week. Most loot box purchasers (73%) spent between \$2 and \$10 per month on loot boxes.

2.3.3 Industry data on youth participation in social casino games

Kowert and Quinn (2017) present the *2017 ISGA Player Demographics Report*, which provides a summary of global data on players of social casino games. The report constitutes one of the largest industry-based analyses of social casino games. Four companies represented by the ISGA provided aggregated data to the ISGA from their player pool. The data provided to the ISGA is drawn from players who are active in 2015. Overall, this report suggests that only a small minority of the player base are adolescents and that adolescents who spend money only spend quite small sums. Specifically, the *ISGA* results indicate that the vast majority of players globally are 18 years old and

older (99.41%). In Australia, 99.20% of players are over the age of 18 years. Players aged 13-17 years reported played for an average of 15.6 min per week. Only 0.18% of the spending players in the sample fell in the 13–17 age category (n = 499). Adolescent spenders reportedly spent only 23 cents per day on social casino games.

There is currently no available industry data on youth participation in other gambling-like gaming activities highlighted in Section 2. This includes a current lack of industry data on adolescents who make in-game purchases of loot boxes and/or purchasing gaming 'skins' directly. One caveat of player account data that should be highlighted is that such data assumes that the player account is used only by the individual named on the account. Some parents may allow their children to use the parent's personal device (e.g., smartphone, tablet) to access a social casino game, or an account may be created in an older person's name. Similarly, some gaming accounts may be co-used by a parent and child (e.g., father and son) and this dyad may purchase in-game items together. Such arrangements may not be detected by player behavioral data, despite its many other accurate insights into these activities.

Section 3: Youth exposure to online gambling content through online games

Research question

In what ways and to what extent are children and adolescents being exposed to online gambling products through online games?

Summary

This section examines some ways in which young people may be exposed to online gambling content and products through their association with online games. Three main activities are described and examined, each with a distinct relationship to gaming or some resemblance to online gaming. These activities include: (1) 'skin gambling', an online gambling activity that is facilitated by transferable monetised virtual content, online networking infrastructure, and community interactions and support within online games; (2) 'fantasy sports', an online tournament where participants compete by assembling a virtual sports team derived from data on real world players to beat other teams and win a share of a prize pool; and (3) 'online casino practice modes', the non-monetised versions of online gambling products (i.e., slots and casino card games) presented as a free 'game' to entice progression to the monetary equivalent. Research data on Australian youth participation in these activities is currently limited. However, available data from studies in the UK, Germany, US, and Canada indicate that between 10-15% of young people have engaged in these activities. Skin gambling is notably popular among adolescent males, partly due to its strong association with popular competitive online games and eSports.

3.1 Types of online gambling content associated with online gaming

While many online games do not feature or resemble gambling (Forrest, King, & Delfabbro, 2016), there are some online gaming activities which have inadvertently facilitated new forms of gambling. These developments have occurred irrespective of whether this was the stated intention of the game developer. Conversely, other online games and game-like activities have been developed with the intention of facilitating gambling activities or for promoting a gambling product. This section will highlight three different types of online gambling products that have (direct or indirect) links with online games, including *skin gambling* (i.e., a form of online gambling that involves virtual currencies that can be obtained from some online games); *fantasy sports* (i.e., a type of online competition that involves a simulated game-like or rule-governed competition using sports data with the opportunity to win money); and *free play modes on gambling websites* (i.e., a non-monetary version of gambling activities hosted in an online casino that includes the option to progress from this mode to playing with real money).

3.1.1 Skin gambling

Some popular online video games feature cosmetic virtual items (or 'skins') which enable the customisation of the player's character or an in-game item (e.g., a weapon, such as a gun or knife) (see also Section 1.1.3). The term 'cosmetic' indicates that the item does not affect gameplay functions (i.e., it does not affect the likelihood of the player progressing or winning in the game). Cosmetic items serve to make the game seem more unique or visually appealing for the player. Some items are extremely rare and therefore very desirable among players as a form of status symbol or collector's item. As noted by the UK Gambling Commission (2017), the monetary value of skins can

fluctuate but they typically range from under AUD \$10 to \$500, but with particularly rare items being valued at over \$2000.

In some games, skins can be acquired by ‘random drops’ by playing and investing time in the game or they can be purchased by spending money to access or open crates containing a random assortment of skins in the game (i.e., the purchase of an opportunity to win a prize). It is thought to be unlikely that the player will acquire a rare or expensive skin without spending money. Skins can also be purchased from other players and third parties on online marketplaces. There are no age restrictions for purchasing skins and these purchases may be facilitated by a range of payment options available to young people, including the use of gift cards or vouchers acquired from retailers using cash or direct debit. They can also be purchased using a credit card or online payment options (e.g., *PayPal*) linked to an online account (e.g., a parent’s stored credit card details). Players can trade and purchase their skins on online marketplaces. Skin gambling refers to the use of skins as a virtual currency for betting purposes, such as using skins to bet on the outcome of professional gaming matches (e.g., eSports matches) or on other games of chance. Skin gambling activities are provided by third parties who are not affiliated with the game developer, however gaming companies may be considered passive beneficiaries of these activities (e.g., players who lose all their skins from gambling may wish to purchase more) (UK Gambling Commission, 2017).

Skins tend to be used for gambling purposes in two main ways. The first way involves the use of skins as a currency for betting on the outcomes of eSports matches (i.e., professional video game tournaments). This involves the player depositing skins from their online inventory (e.g., *Steam* account) to the skin repository of a third party who then facilitates betting on matches. The second type of skin gambling activity involves betting on games of chance such as customisable roulette-style games where the player stakes skins on the chance of winning additional skins of greater number or value. Such games may include options to adjust the odds of winning by selecting preferred prizes and stake size. Given skins have monetary value, these activities have attracted legal and regulatory attention. There is debate as to whether the skin creators themselves should take some responsibility for how skins are used outside their intended or expressed purpose (i.e., as outlined in the terms of use) and should impose measures that may restrict gambling activities, such as restrictions on freedoms to trade or transfer ‘ownership’ (i.e., user control) of skins among players.

3.1.2 Fantasy sports

Fantasy sports (including its faster-paced subtype ‘daily fantasy sports’) refers to an online-facilitated structured competition involving both chance and skill where participants compete by assembling a virtual team of players of a professional sports league. Each player’s team competes in imagined or theoretical rounds of play where the outcomes are determined by the statistical performance of each player’s team members that corresponds to their real world individual performances. In contrast to traditional fantasy sports leagues, which are generally played in real-time over the corresponding sports season, daily fantasy sports (DFS) is more fast-paced, being conducted over a single game or round of competition.

Fantasy sports involves money usually expressed in the form of a ‘cost of entry’ fee by requiring players to deposit money into a pot or pool that is subsequently awarded to the winner. DFS players are required to pay entry fees that can range from 25c to \$5000, depending on the league’s rules and requirements (Pickering, Blaszczyński, Hartmann, & Keen, 2016). The main aspect of interactivity involves making decisions in relation to which virtual players to select, trade, or delist from a player’s team, and this is where players more familiar or knowledgeable of the scoring systems at play and/or the status of the professional competition and its players will have a marked competitive advantage over other participants in the fantasy sports league. Although fantasy sports has a considerable chance element (e.g., real world players may get injured or unfit), a large proportion of the winnings tends to be awarded to the more highly skilled or knowledgeable players.

According to Pickering et al. (2016), fantasy sports have not been classified consistently across jurisdictions, such as the United States where there have been many legal deliberations on their status as a potential form of gambling, due to “*differences in the degree to which legislators believe the activity is a game of skill or luck. In the absence of clear guidelines differentiating the importance of skill and luck, operators have been free in some States to operate without regulatory consumer protection guidelines*” (p. 307). In Australia, where in 2016 there were reportedly 1.65 million DFS players (Swinson, 2016), DFS have generally been classified as gambling when money became involved. The DFS market in Australia is projected to continue to grow with *DraftKings*, a major DFS operator popular in the US and Europe, joining several other large operators in this region.

3.1.3 Practice, free play, or demo games on online gambling websites

Practice modes on gambling websites may be technically considered simulated gambling however they differ significantly from other simulated gambling activities, such as gambling-like games (e.g., apps and video games) and social casino games, because they provide the player with a clear avenue and incentive to gamble with real money. Practice modes refer to the free-play mode positioned within a financial gambling website. They are presented to the user as an opportunity to ‘practice’ the gambling activity before having to spend money (i.e., the option to gamble without money), however the practice mode may not be an accurate representation of the financial counterpart (e.g., the demo may have an inflated or >100% payout rate). Practice modes are intended to promote a gambling activity and thus may be viewed as akin to an interactive promotion. Many online gambling operators offer free-play versions of their own games, which are marketed as ‘practice’, ‘demo’, or ‘instructional’ sites, allowing users to become familiar with the rules of the game before risking actual money.

Practice gambling games are often offered on .net sites to differentiate these from .com sites that provide gambling (Gainsbury et al., 2015). This distinction usually enables operators to avoid requiring customers to identify themselves and provide proof of their age, and .net sites can also be advertised with fewer restrictions than sites offering real money gambling (Monaghan & Derevensky, 2008; Monaghan, Derevensky, & Sklar, 2008). Sevigny, Cloutier, Pelletier, and Ladouceur (2005) reported that the demo modes on 45 (39%) out of 117 sites they assessed provided inflated payout rates (over 100%). These unrealistic high rates were not maintained when playing for real money. Therefore, these activities are designed to simulate and misrepresent gambling to entice the player to spend money on the real money version. Unlike loot boxes and social casino games where the player has the option to spend money to play, online casino practice modes do not directly generate revenue for the operator.

3.2 Research on youth online gambling associated with online gaming

3.1.1 Youth engagement in ‘skins betting’

The 2017 *Young People and Gambling* study by UK Gambling Commission stated that the proportion of 11-16 year olds who have ever played online gambling-style games was 11% (compared to 9% in 2016), and 4% of all 11-16 year olds had played a gambling-style game in the week prior to the survey. While the study was cross-sectional and thus could not establish causality, it was reported that among young people who have ever played online gambling-style games, a quarter (25%) had spent their own money on any gambling activity in the past week, which was significantly higher than the average of 12% among all 11-16 year olds. This finding suggested that there was an association between simulated and monetary gambling, which may be influenced by other underlying factors.

The 2017 UK Gambling Commission study included a section in its questionnaire on an emerging video game-related gambling activity known as ‘skins betting’, which has grown in popularity since about late 2016. The Gambling Commission adopted the view that the ability to convert in-game items to cash, or to trade them (for other items of value) means that these items attain a real-world value

and become articles of money or money's worth. The survey investigated young people's awareness of and participation in 'skins betting' among young people. Questions on 'skins betting' in the survey were introduced and described as follows: *'When playing computer games/apps it is sometimes possible to collect in-game items (e.g., weapons, power-ups and tokens). For some games, it is possible to bet these in-game items for the chance to win more of them.'*

The youth respondents were first asked if they had ever played computer games or apps. Those who answered 'yes' were then asked if they were aware of betting with in-game items and if they had personally done so (and if so, how recently). Overall, based on the description provided within the questionnaire, 45% of 11-16 year olds were aware that it is possible to bet with in-game items when playing computer games or app-based games. Almost six in ten boys (59%) knew about this activity compared to less than a third of girls (31%). In terms of actual participation, the report states that 11% of 11-16 year olds claimed to have personally ever bet with in-game items. The activity was more prevalent among boys (20%) than girls (3%). Older respondents were more likely to have bet with in-game items: only 3% of 11 year olds had done so compared to 14% of 14-16 year olds. The incidence of betting with in-game items was higher than average among young people who had spent their own money on gambling in the past week (24%) and those who had played online gambling-style games (30%). Of the 11% of 11-16 year olds who had ever bet with in-game items, more than a third (36%) had done so in the past seven days, 23% within the past month, and 41% more than one month ago.

Macey and Hamari (2018a) provided by request some additional figures on youth skin gambling that were not included in their published report. Of the 157 adolescents in their sample, 69 (43%) reportedly had gambled using skins in the past month. It should be noted that the sample was recruited online by self-selection and therefore should not be considered representative. Skin gambling was reportedly facilitated using skins mainly from *CS:GO* (n=49) and *Team Fortress 2* (n=38), but also *DOTA2* (n=4), and 'other' (n=4).

Another recent study of youth engagement in skins betting, also conducted in the UK, was presented by the organisation Parent Zone (June, 2018). Parent Zone commissioned an Ipsos MORI survey of 1,001 children aged 13 to 18 years to investigate underage skin gambling. The survey involved a nationally representative quota sample of children in the United Kingdom and was conducted between 25 May and 4 June 2018. In addition, Parent Zone representatives visited six UK secondary schools between March 2018 and June 2018, and spoke confidentially to mixed groups of boys and girls, aged 12 to 16 years, about skin gambling experiences. Interview questions included skin gambling, digital distribution services in relation to skins (e.g., Steam), and third-party gambling sites that accept skins as currency. The 2018 report stated that 27% of children aged 13-18 years were familiar with the term 'skin gambling'; 10% had reportedly gambled using skins at least once, and 29% believed it was a "fairly big" or "very big" problem. A greater proportion of males than females (about 6:1 ratio) were involved in skins gambling. Young people reported using pocket money or gift money to purchase skins, or paying for skins using a direct debit from their personal bank account.

3.2.2 Youth engagement in fantasy sports

An emerging research base considers young people's involvement in daily fantasy sports and its potential links to problematic gambling behaviour (Marchica, Zhao, Derevensky, & Ivoska, 2017; Marchica & Derevensky, 2017; Martin, Nelson, & Gallucci, 2017). However, there is a dearth of published research specifically focused on adolescent involvement in fantasy sports, and those relevant studies that have investigated fantasy sports among adolescents have often not provided complete information on rates and correlates of involvement. One recent study by Richard, Potenza, Ivoska, and Derevensky (2018), for example, surveyed 6542 adolescents about their gambling and stimulant use. The study employed a survey measure of gambling participation that included fantasy sports among many other gambling activities, but the study report did not provide further details on DFS and/or specific findings concerning DFS and gambling-related harms or other impacts.

One of the largest studies of adolescent fantasy sports was conducted by Marchica et al. (2017) who surveyed 6818 students in the US aged 10 to 19 years. The survey measure included the NORC DSM-IV Screening for Gambling Problems: Loss of Control, Lying and Preoccupation (NODS-CLiP), a three-item measure of problem gambling, and questions about gambling participation across 11 different activities. The researchers did not provide a detailed breakdown on gambling participation, but they reported that 7.4% of males and 1% of females participated in 'seasonal' (i.e., long-form) fantasy sports more often than once a month, and 6.5% of males and about 1% of females participated in daily fantasy sports more than once a month. Hierarchical regression analyses identified that being in the early adolescence age category (i.e., 13–15 years old) and playing daily fantasy sports more than once a month was associated with being 8 times more likely to be considered at-risk for a gambling problem. The results indicated that 28% of the 13–15 year old participants who participated in regular fantasy leagues more often than once a month were considered at-risk for a gambling problem.

3.2.3 Practice, free play, or demo games on online gambling websites

There are limited available data on youth involvement in practice modes in online gambling websites. While it is understood that some youth become involved in this activity, it is recognised that online casino practice modes may not be accurately reported on for various reasons. Some youth reporting to have participated in this online activity may mistake practice modes with other activities such as social casino games, particularly those games that are provided by gambling operators (e.g., a social casino game with similarities to, or the same brand as, a real world casino) (King & Delfabbro, 2016). Another possibility is that some respondents may misreport various gaming and/or gambling activities to create 'mischief', a phenomenon that has been documented in studies of problematic gaming (Przybylski, 2016).

King, Delfabbro, Kaptsis, and Zwaans (2013) surveyed 1287 adolescents aged 12 to 17 years in secondary schools in South Australia. Their results stated that 4.7% (n=55) of the sample had tried free play gambling modes on online casinos. Young people who endorsed problem gambling indicators (n=39) being significantly more likely than normal adolescents (n=16) to report involvement in this activity. In a later study of 824 adolescents recruited from some of the same schools, King and Delfabbro (2016) found that less than 2% (n=15) had tried online casino practice modes in the past 12 months, and these participants reported that their online activities were not supervised by parents or guardians. The lower rate (4.7% vs 2%) may have been attributable to having more survey options related to gambling, which helped to differentiate online casino practice modes from other gambling-related activities.

Considerably higher rates of youth participation in online practice modes have been reported in the UK and Canada. The *Young People and Gambling 2017* report by the UK Gambling Commission (December, 2017) reported that 17% of its sample of 2881 young people aged 11-16 years had used free demo modes on gambling sites in the 7-day period prior to the survey. Similarly, in Canada, Elton-Marshall, Leatherdale, and Turner (2016) surveyed 10,035 students in grades 9 to 12 and reported that 14% of the sample had tried either free play poker or slots in the previous 3-month period.

Section 4: Influence of gambling technologies on young people's behaviours

Research question

What influence do gambling-like elements and simulated gambling in games have on children and adolescents' gambling behaviour? What are the likely long term consequences for children exposed to gambling-like experiences through gaming?

Summary

This section presents a summary of recent scholarly commentary and research on the topic of simulated gambling and its potential effects on children and adolescents. Researchers have proposed that exposure to, and participation in, simulated gambling may normalise monetary gambling activities, with some activities being more likely than others to have this effect. This basic assertion has generated arguments that simulated gambling may foster positive gambling attitudes, encourage misperceptions about the profitability of gambling, and increase the likelihood of engaging in monetary gambling in the future (i.e., when reaching the legal age to gamble). This section includes summaries of research studies conducted in Australia and abroad, highlighting that many adolescents are quite familiar with and have some past-year experience with simulated gambling activities on social media and/or within video games. Recent longitudinal studies provide some preliminary support for the notion that simulated gambling in adolescence increases the risk of monetary gambling in adulthood. This relationship has been observed in cases where simulated gambling occurs in the home environment and there is a clear path for progression from the simulated activity to the monetary form (e.g., a free play version offered on a gambling website). Recent UK research suggests that young people are involved in some emerging forms of unregulated gambling (e.g., 'skin gambling') but these activities have not yet been examined among Australian youth.

4.1 The potential influence of simulated gambling on youth

Young people can access a range of simulated gambling activities via online digital media, such as social media sites and smartphone apps (Gainsbury et al., 2015; Griffiths, 2015). Current research on the potential risks associated with these activities is still developing, and many of the concerns about youth simulated gambling have not yet been examined empirically (King & Delfabbro, 2016; UK Gambling Commission, 2015). There is a substantial body of academic commentary on the potential risks associated with simulated gambling, including multiple viewpoints that have involved extrapolation of research data gathered on other activities (e.g., underage drinking) to gambling. Some academics apply the 'precautionary principle' based on the findings that early exposure to other addictive substances or activities (e.g., tobacco, alcohol) increases lifetime risk and severity of addiction (Eissenberg & Balster, 2000; Johnson, Cloninger, Roache, Bordnick, & Ruiz, 2000; Shaffer, LaBrie, & LaPlante, 2004). Public health approaches to gambling have therefore advocated for delayed or older age of first use or exposure, and/or for early experiences to involve controlled use under responsible supervision (Messerlian, Derevensky & Gupta, 2005; Rahman et al., 2012). At the same time, it has been recognised that many individuals are resilient to early exposure to gambling activities (LaPlante & Shaffer, 2007) and that underage gambling tends to be episodic and not necessarily predictive of adult gambling (Delfabbro, King, & Griffiths, 2014).

While research in this area is particularly limited in Australia, there have been several quality studies undertaken in other regions (Dussault et al., 2017; Hayer et al., 2018). These studies have not

examined all types of simulated gambling identified in this review, but they provide some insight into how certain experiences may have some long term consequences for some young people. Studies into young adults' (i.e., typically those aged between 18-25 years) experiences with simulated gambling provide some further insights (Gainsbury et al., 2017; Kim et al., 2017). This work has included observational studies of young adults engaged in simulated gambling (e.g., Bednarz et al., 2013; Frahn et al., 2015) that may be considered by some university research ethics committees to be too high-risk (i.e., unethical) to replicate using underage participants.

4.1.1 Academic commentary on youth simulated gambling

Academics serve an important role in forecasting important social and environmental changes and developments that may pose risks to society. This task may sometimes proceed or draw from only limited available case examples or research evidence. This has been evident in the field of gambling and simulated gambling, where the rapid pace with which new gambling and gaming technologies have emerged has meant that gambling researchers have advanced preliminary views or commentary prior to the collection of data and/or publication of peer-reviewed research studies. This approach may be seen as necessary in relation to simulated gambling given that strictly data-driven views may be unavailable to respond to emerging products and technological developments that involve young people.

Academic commentary on youth simulated gambling has highlighted multiple concerns about the short- and long-term consequences of exposure and involvement (Derevensky, 2016; Dickins & Thomas, 2016; King, Delfabbro, & Griffiths, 2010). The most commonly proposed risk of simulated gambling has been the so-called 'gateway effect' (Hayer et al., 2018) or the potential to entice young people to gamble (i.e., with money) that may then develop into an enduring involvement in gambling that increases the risk of problem gambling or results in gambling-related harm (Allen, Madden, Brooks, & Najman, 2008; Derevensky & Gupta, 2007; Molde et al., 2018). It has been argued that, despite money not being involved, the gameplay mechanics and schedules of reinforcement within simulated gambling activities may foster an interest in and understanding of other gambling activities that involve money (Griffiths & Wood, 2000; McBride & Derevensky, 2016).

It has been reasoned that players who are exposed to or win in simulated activities may subsequently desire financial wins. Volberg et al. (2008), for example, highlights this progression by reporting that problem gambling careers may progress from gambling on the Internet for free to playing card games for money with friends and family and so on. Some authors have referred to the early 'big win' experience in gambling as having an instrumental influence on the desire to continue gambling – in relation to simulated gambling activities, it has been commented that many such games will employ algorithms designed to ensure that the novice player will experience big wins (e.g., jackpots) in the early stages of play.

Another process that is raised in these discussions is the concept of 'normalisation' (Hing & Breen, 2008; Thomas, 2014). While this concept does not appear to have been defined explicitly, the so-called 'normalising' effect of simulated gambling on young people appears to refer to a type of 'mere exposure' effect (see Zajonc, 2001) that follows the ubiquitous presence of gambling cues, and the pairing or integration of gambling with other popular activities (e.g., sports, video games) (see Pitt et al., 2015), that fosters favourable perceptions of gambling as positive, safe, normal or socially accepted, legitimate, and an inextricable part of daily life and other activities. In relation to simulated gambling, the presence of gambling and gambling-like features in online games, and the promotion of video games through smartphones and online channels such as websites, social media, messaging services, and apps (Abarbanel et al., 2017), has been proposed to normalise gambling for game users.

A conceptual paper by King and Delfabbro (2016) included a review of potential risks of simulated gambling. The paper included a framework of risk and protective factors, which outlined some of the social risks associated with simulated gambling, including: (1) facilitating entry into a gambling subculture with avenues for progression to financial gambling (e.g., online forums on casino websites); (2) enable interaction with a social network of peers and experienced gamblers that provide incentives to gamble (e.g. recognition of status or prowess), and; (3) covert and excessive use of these activities. The paper also identified some potential cognitive effects of simulated gambling, including: (1) the development of false beliefs about gambling (or 'positive' gambling attitudes) or misunderstanding of how gambling works due to misleading information about gambling (e.g., the odds of winning in gambling activities are inflated such that the player consistently wins and/or wins in the long term); (2) fostering overconfidence in the player's ability to win from gambling, due to scenarios highlighted above or due to the combination of skill elements in gambling-like games, and; (3) fostering the perception of gambling as entertainment and becoming desensitised to losses as 'part of the experience' or the 'cost of entry'. The authors acknowledged there may be some protective factors that limit or 'contain' the individual's interest in gambling activities.

Other researchers have highlighted the potential role of simulated gambling activities as a way of increasing young people's confidence in gambling to win money (Derevensky, Gainsbury, Gupta & Ellery, 2013). This includes the argument that these activities that develop and/or strengthen certain decision-making biases that are common among problem gamblers, such as the illusion of control (i.e., the mistaken belief that outcomes are determined by player skill to a greater extent that is the case) and the gambler's fallacy (i.e., s mistaken belief about the frequency of outcomes in a sequence of randomly determined outcomes). A common theme among these arguments is that simulated gambling activities, irrespective of whether they provide an accurate representation of gambling (e.g., a win/loss ratio that matches real-world gambling activities), may foster a greater sense of familiarity and confidence in gambling and increase the desire to gamble with real money (Armstrong, Rockloff, Browne, & Li, 2018; Derevensky & Gainsbury, 2016; Derevensky, Sklar, Gupta, & Messerlian, 2010).

Another proposed concern related to simulated gambling is that the presence of gambling-like features may not necessarily encourage or lead to financial gambling but that gambling-like features may foster a deeper involvement in gaming that becomes problematic in its own right (Elliot et al., 2012; Gainsbury et al., 2017; Groves, Skues, & Wise, 2014; Macey & Hamari, 2018a). This argument notes the growing recognition of problem gaming and gaming disorder (e.g., the disorder recognised in the DSM-5 and ICD-11 classification systems), making the connection that problematic simulated gambling could be considered a subtype of problematic gaming. Problematic simulated gambling may include cases of excessive or harmful levels of spending of microtransactions (without the possibility of financial reward). Purchasing virtual currency may give a sense of 'ownership' of virtual goods that may make it more difficult for the player to discontinue playing (Watkins & Molesworth, 2012).

4.1.2 Australian research on youth simulated gambling and problem gambling

There is limited research in Australia on the topic of youth involvement in simulated gambling activities, including no longitudinal studies of the 'gateway effect' (i.e., studies of potential migration from simulated gambling to land-based financial gambling). Current knowledge in this area is drawn primarily from interviews and cross-sectional surveys.

A focus group study of adolescents by Allen, Madden, Brooks, and Najman (2008) reported mixed findings in relation to simulated gambling. Their report stated that practice play in gambling-like games via the Internet, computer games or mobile phones was regarded quite positively by most young people and was particularly popular amongst male school students. The authors stated that, for some young people, the use of practice play was one of the factors that influenced their future intention to gamble. For others, however, involvement with online practice play or computer based gambling games resulted in "*a decreased desire to participate in future monetary gambling as they tire easily of*

the games, and develop a sense of how quickly money can be lost" (p.9). These findings show that the potential influence of simulated gambling on young people should take into consideration the 'player-product interaction', or the notion that not all young people will have the same experience of these activities or experience the same consequences due to varying personal characteristics, and social and environmental factors (Goldstein et al., 2013).

King, Delfabbro, Kaptsis, and Zwaans (2013) surveyed 1,287 adolescents aged 12 to 17 years in secondary schools in South Australia. About 1 in 4 'at-risk' adolescents (i.e., those endorsing up to 4 items on a problem gambling measure) had engaged in simulated casino card games, and 1 in 10 reported playing simulated electronic slot machine games. Adolescents reported engaging in simulated gambling games via Facebook, with the most commonly identified applications being *Zynga Poker* and *Texas Hold'Em Poker*. Fewer adolescents reported to have engaged in simulated gambling via smartphone apps (6.3%) and free-play or 'demo' modes of casino websites (4.7%). The most frequently reported smartphone app was *Slotomania*, however several participants reported "iPhone games" which may have included this app. Adolescents tended to report accessing free-play casino activities via the website *Pokerstars* (www.pokerstars.com).

King et al. (2013) examined the relationship between simulated gambling and monetary gambling participation, as well as co-occurrence of simulated gambling and problem gambling indicators (i.e., measured by DSM-IV-MR-J screening measure). Small but significant relationships were identified using between-group analyses. Simulated gambling activities were at least 3 times more popular among adolescents who endorsed items on a measure of problem gambling. A logistic regression analysis showed that adolescents with a history of engagement in simulated gambling activities were more likely to endorse indicators of problem gambling. Rates of simulated gambling via smartphone apps were over 6 times more prevalent among at-risk gamblers than non-problem gamblers. Rates of monetary gambling via card games and scratch tickets were 3 times more prevalent than predicted among simulated gamblers, whereas wagering on races was 5 times more prevalent, as compared to adolescents who did not engage in simulated gambling.

As a single component of a larger national gambling project (see Gainsbury et al. 2015), King et al. (2016) presented the results of an online survey of 555 adolescents, including 130 social casino game (SCG) players (78 non-paying, 52 paying users). About a quarter (23.4%) of the overall sample of adolescents (N=555) had played SCGs, with 40% of this subsample of SCG players spending money on the activity. Paying SCG users tended to be employed males who played more frequently and engaged in more SCG activities, and who reported more symptoms of problem gambling and higher psychological distress than non-paying SCG users. Paying SCG users reported more frequent engagement and spending in monetary gambling activities, and two-thirds of SCG payers recalled that their SCG use had preceded involvement in financial gambling. The median weekly expenditure on SCGs was AUD\$3.58. While this level of expenditure was seemingly low, the authors concluded that spending in simulated gambling activities may normalise spending in other gambling activities.

4.1.3 Youth migration from simulated gambling to financial gambling

In the last two years, there have been four published research reports on the topic of youth migration from simulated gambling to financial gambling. These studies have typically involved a survey of young people at the age of 16 or 17 years and then a follow up once they had reached adulthood. The aim of these studies has been to assess whether initial measures of simulated gambling during adolescence may be predictive of gambling behaviors in adulthood.

Dussault et al. (2017) reported the findings of a longitudinal study on gambling among young people in Canada. The study included 1220 young people who had never gambled with real money whose data was assessed over three waves from 2012 to 2014. The study examined a range of simulated gambling activities, including free play versions on online gambling websites, including free video

lottery games (VLT), poker or black jack via websites, and simulated gambling on Facebook. The analysis distinguished between free play poker and all other activities. The survey also examined financial gambling, including lottery, scratch games, video lottery games (VLT), poker, sports betting, casino table games, bingo. The study found that, at the 12 month follow up, 29% of the participants had gambled for the first time with real money. Logistic regression analysis indicated that the predictive association between simulated gambling and gambling with real money was only significant for adolescents who transitioned from simulated poker to poker with real money. The authors stated that free play poker on online gambling sites may offer the necessary 'training ground' (i.e., social context, opportunity for progression) that other simulated gambling activities do not provide. In this way, differential patterns of risk associated with simulated gambling may exist according to gender, age and the utilisation of simulated versions.

Molde et al. (2018) conducted a longitudinal study of 4601 people aged 16-74 years to assess the transition from gaming to gambling activities. While the study rationale referred to the convergence of gaming and gambling, including simulated gambling, the study did not assess participation rates in these activities. Rather, the focus of the study was on problematic gaming and problematic gambling, as measured by the Game Addiction Scale and Canadian Problem Gambling Index. Unfortunately, the presented results did not include a summary of age-related differences. It is therefore not possible to draw conclusions specifically about youth exposure to simulated gambling. Using a cross-lagged structural equation model, there was a significant positive relationship between scores on problematic gaming and later scores on problematic gambling, but there was no evidence of a reverse relationship.

Hayer et al. (2018) conducted a representative longitudinal (i.e., 12-month) survey of 1178 school students. This study may be the most comprehensive research ever conducted on young people's exposure to and participation in simulated gambling and gambling advertising and its longer term consequences in relation to financial gambling. The study questionnaire examined four different types of simulated internet gambling (on social networks, via apps, through video games, and as 'demo' games) occurring at home or elsewhere, and six types of financial gambling, including lotteries, scratch cards, sports betting (including betting on sports for money among friends), gaming machines, poker (including poker for money among friends), and card or dice games other than poker (including card or dice games for money among friends). The study also examined exposure to gambling-related advertising through a range of channels, including by email or *WhatsApp*, on web pages or game content, on Facebook, via inserts within games, on TV or radio, in newspapers or magazines, and on posters or billboards.

Hayer et al. (2018) found, using logistic regression analysis, that migration from simulated gambling to financial gaming was fostered by: (1) participation in simulated gambling on social networks (e.g., Facebook) at home, and; (2) significant exposure to advertising (relating to both simulated and monetary gambling). The authors concluded: "...the almost unrestricted marketing opportunities offered by the internet may in the future provide a further impulse to this (e.g. through optimized exploitation of viral or individually tailored marketing strategies)." However, among the subgroup of online simulated gamblers, variables including patterns of use (including the breadth and depth of involvement within simulated gambling, certain psychological motives for participation, and spending on microtransactions) were not significant predictors of financial gambling. Therefore, there were no distinctive behavioral patterns of simulated gambling that appeared to predict monetary gambling.

Finally, while this study was not technically a prospective study, the *Young People and Gambling* report by the UK Gambling Commission (2017) presented figures on monetary gambling among young people who were engaged in simulated gambling. The report stated that the proportion of 11-16 year olds who have ever played online gambling-style games was 11% (compared to 9% in 2016), and 4% of all 11-16 year olds reportedly had played a gambling-style game in the week prior to the survey. Among young people who had ever played online gambling-style games, a quarter (25%) had spent

their own money on any gambling activity in the past week, which was significantly higher than the average of 12% among all 11-16 year olds. This finding suggested that there was an association between simulated and monetary gambling, which may be influenced by other underlying factors.

4.1.4 Monetised gaming activities and adolescent problem gaming

Some limited research has examined the relationship between monetisation features in video games, irrespective of the presence of gambling-like features and design, and problematic gaming symptoms (see Section 2.1.5). King and Delfabbro (2018) and Griffiths (2018) have proposed that monetisation features may contribute to some video games becoming more appealing and potentially problematic for some users. These monetisation features may contribute to problematic gaming becoming a more financially involved activity that therefore resembles features of problem gambling (e.g., spending more than one can afford, borrowing or stealing money). Spending money on gaming activities may increase the psychological commitment to the activity, due to processes such as the *sunk cost effect* (i.e., the justification to maintain one's investment based on previous investment in the activity) (Garland, 1990) and the *endowment effect* (i.e., the notion that people ascribe more value to things they have bought) (Kahneman, Knetsch, & Thaler, 1990).

Dreier et al. (2017) conducted a nationally representative study of 3967 schoolchildren aged 12 to 18 years. The survey examined rates of problematic gaming and participation in free-to-play video games including average financial expenditure in these activities. Additional survey questions assessed psychological problems. While the researchers did not compare problematic gaming according to exposure to monetised games, they reported that, among free-to-play gamers, the prevalence of IGD was 5.2%, which was higher than typical prevalence rates for problematic gaming (i.e., between 1 and 3% for young people). There was a significant positive association between spending money on free-to-play games and endorsing symptoms of problematic gaming. However, it should be cautioned that these results do not indicate a causal relationship and may be accounted for by other variables.

4.1.5 Research on adult social casino game play and migration to gambling

Several studies have examined whether adults who play social casino games (SCG) on social media and/or smartphones may be at greater risk of gambling involvement. This research has been primarily undertaken by two research teams: Australian research led by Sally Gainsbury and colleagues, and Canadian research by Andrew Kim and colleagues.

Kim, Wohl, Salmon, Gupta, and Derevensky (2015) conducted the first study of adult migration from social casino games to financial gambling. They surveyed 409 social casino gamers recruited from Amazon's Mechanical Turk system who had never gambled previously, including a 6-month follow up survey. The questionnaire examined time spent involved in SCGs, motives for using SCGs, and financial spending (i.e., microtransactions) on SCGs. Kim et al. reported that 26% of participants had migrated to online gambling and that spending in SCGs was the only significant unique predictor of this migration. There were no significant relationships between the amount of time spent playing SCGs or motives for playing SCGs (i.e., skill building, play enhancement) and engagement in monetary gambling. Similar findings were reported in a follow up survey study by the same research group. Kim, Hollingshead, and Wohl (2016) surveyed 302 social casino gamers and reported that participants who made microtransactions in SCGs reported higher problem gambling severity and increased impulsivity and reward sensitivity. The authors noted that participants who reported higher reward sensitivity were more likely to buy virtual currency to chase losses.

A focus group study by Kim, Wohl, Gupta, and Derevensky (2016) examined the potential link between social casino gaming and gambling. Three focus groups of Canadian university students who were experienced SCG users were conducted. The researchers reported that participants highlighted that SCGs were a great opportunity to build gambling skills before playing for real money. Some

participants stated that there was a direct progression from social casino gaming to online gambling, whereas others believed the transition to online gambling depended largely on personal characteristics of the user, rather than mere exposure to social casino games. There was reportedly a consensus that SCGs may facilitate the transition to online gambling among younger teenagers (i.e., 12–14 year old). These findings were supported by another study by Hollingshead, Kim, Wohl, and Derevensky (2016). The researchers surveyed 140 disordered gamblers about their SCG use. They found that gamblers who were motivated to play social casino games for social connection and/or skill building reported an increase in their financial gambling. However, some problem gamblers reported playing social casino games to reduce their cravings to gamble with real money.

Gainsbury, Russell, King, Delfabbro, and Hing (2016) presented the first Australian study of adult migration from SCGs to online gambling. The study involved a survey of 521 adult SCG users recruited through Survey Sampling International. The survey included questions on SCG use and monetary gambling involvement. In addition, the SCG users were asked how similar they considered SCGs and gambling to be in terms of appearance, playing experience, and excitement of winning. Respondents were asked if they had any interest in gambling with real money on their favourite SCGs if they could, whether they had gambled as a result of their SCG use, and, if they had, which aspects of SCGs had encouraged them to gamble. Respondents were also asked to what extent their experiences with SCGs had increased or decreased how much they would like to and actually gamble for money, and the extent to which they agreed or disagreed that SCG operators encouraged them to gamble.

Gainsbury et al. (2016) reported that most participants (71.2%) reported that SCGs had no impact on how much they gambled. However, 9.6% reported that their gambling overall had increased and 19.4% reported that they had gambled for money as a direct result of these games. Gambling as a direct result of social casino games was more common among males, younger users, those with higher levels of problem gambling severity and more involved social casino game users in terms of game play frequency and in-game payments. The most commonly reported reason for gambling after playing social casino games was to win real money.

4.1.6 Experimental research on adult simulated gambling

Some experimental studies have examined the playing conditions of simulated gambling activities in relation to gambling behavior. These studies have been conducted using young adults due to the ethical restrictions on studying simulated gambling among adolescents. The purpose of these studies has been to assess whether free-play gambling activities (e.g., the 'demo' version on online gambling casinos) may have psychological effects on players that influences subsequent play with real money.

Bednarz, Delfabbro, and King (2013) conducted an experiment that examined the role of free-play modes on gambling behaviour in computer-based roulette. A sample of 80 adult participants were recruited and randomly allocated to one of four pre-exposure conditions: no exposure (control group), a loss condition, a break-even and a profit condition in which the return to player was greater than 100 %. Behavioural persistence (i.e., choosing to continue to play) and betting behaviour was subsequently monitored in a period of regular (i.e., monetary) roulette play. The results showed that players given opportunities for free-play sessions bet significantly more per spin and wagered more credits in total than the control group, although no significant group differences in behavioural persistence were observed.

Frahn, Delfabbro, and King (2015) conducted an experiment that examined the behavioral effects of practice modes in simulated slot machine gambling. A sample of 128 adult participants predominantly aged 18–24 years were randomly allocated to 1 of 4 pre-exposure conditions: control (no practice), standard 90% return to player, inflated return to player and inflated return with pop-up messages. Participants in all conditions engaged in monetary gambling using a realistic online simulation of a slot

machine. The results showed that players who were exposed to inflated or 'profit' demonstration modes placed significantly higher bets in the real-play mode as compared to the other players. However, the groups did not differ in relation to how long they persisted in the real-play mode. Pop-up messages had no significant effect on monetary gambling behavior. The results suggested that exposure to inflated practice or "demo" modes may lead to short-term increases in risk-taking.

Section 5: Marketing and promotion of gambling-like games

Research question

How are gambling-like games marketed and promoted to children and adolescents, and what impact does this marketing have?

Summary

This section presents an overview of advertising for gambling and gambling-like products, with a focus on online technological products. The first part introduces social media-based promotions, including advertising for social casino games, and then explains the role of so-called ‘social influencers’ or individuals who broadcast informational and/or entertainment gambling-related videos on an online streaming service (e.g., *YouTube*). This content may involve sponsored content by an unregulated third-party betting website. The rise of eSports’ popularity has led to a crossover of gaming and gambling that may be comparable to professional sports and sports betting advertising. New and existing gambling operators promote betting services through eSports broadcasts and related content (e.g., social media, websites). Research in these areas is quite limited, particularly in Australia, but some survey-based studies suggest that some adolescents are exposed to these gambling promotions. There is some limited evidence that simulated and monetary gambling promotions may affect future gambling behaviours among young people, and that advertising may affect gambling brand awareness and recall of positive gambling messages (e.g., profitability, excitement, glamour).

5.1 Types of promotions and marketing

Simulated gambling and gambling-like games are promoted online through digital communication channels, including online broadcasts (e.g., live streaming on *Twitch* and pre-recorded video presentations on *YouTube*) and sponsored or targeted advertising on social media (e.g., *Facebook* and *Twitter*). In addition, some of these products and services may be advertised through email lists, online advertisements such as ‘pop-ups’, banners, or sidebars embedded in websites and downloaded software, in addition to traditional media such as advertising in print journalism and television media. The purpose and delivery of each type of promotion varies across different media platforms. This section will provide an overview of some typical promotion and marketing strategies for various simulated gambling activities.

5.1.1 Social media promotions

Online social networking sites are increasingly recognised as host platforms and content publishers for simulated gambling activities. Advertisements for social casino games are quite common on sites such as *Facebook*, as well as being prominently displayed on social media app-linked marketplaces (e.g., *Apple Store*, *Google Play*). According to recent market research, over half of social casino game players first became familiar with the games they played from social media advertisements (SuperData, 2015). These games are often promoted to others by sharing information about the game and the player’s progress on that user’s profile or newsfeed. For example, a social casino game may post the number of credits won by players on the newsfeeds of their friends (and/or encourage players to share game data on their profile or invite their contacts to play to receive credits or bonuses). While it is difficult to determine the long term psychological influence of these promotions on users, including children and adolescents, some research has examined the extent to which young users are exposed to and can recall experiences of this content online.

According to Wohl, Salmon, Hollingshead, and Kim (2017), the gambling industry has become more aware that players of social casino and other gambling-like games may be a potential source of monetary gamblers. As a result, gambling operators have developed their own social casino games as a way of promoting their brand as well as the products and services they offer in real world venues. The authors referred to the study by Jacques et al. (2016) that reported that 54% of popular *Facebook* games featured gambling themes. Further, Wohl et al. (2017) noted that the portrayal of gambling in these advertisements may be generally considered to be entirely positive and/or glamorous.

Similar observations were reported by Abarbanel, Gainsbury, King, Hing, and Delfabbro (2016), who evaluated the content of 115 social casino gaming advertisements captured by young adults during their regular Internet use. The study involved instructing participants (N=22) to screen-capture any advertisements related to gambling and/or gambling-like games that appeared during their regular use of the Internet and social media over a one-week period in May 2015. The results showed that the advertisement imagery typically featured images likely to appeal to younger users, such as bright colours, character images of young adults, cartoon animal characters, gambling and sporting activities, references to popular culture, and references to Las Vegas. The advertisements included incentives for playing, visual cues that others were playing, and messages related to winning. The researchers stated that about 90% of the advertisements contained no references to responsible gambling or problem gambling.

5.1.2 Streaming services and social influencers

Simulated and monetary gambling activities are promoted through online broadcasting services, such as *Twitch* and *YouTube*. Gaming products and gaming industry developments (e.g., news about gaming hardware, upcoming software updates, and sales data) have long been reported on (and indirectly promoted) by video games journalists in print and online media. With the advent of accessible user content creation tools (e.g., recording/editing software, webcam, and microphone), the players of video games themselves have created their own videos about games and their experiences. Some of this user content and broadcasting may include a live feed of the player commentating while playing a video game in a bedroom recording studio, for example, whereas other video content may be pre-recorded and edited like a conventional TV program (e.g., a studio-based '*Let's Play*' video).

Popular streamers, such as Felix Kjellberg (or '*PewDiePie*'), have made lucrative full-time careers by providing personalised online content centred around their gaming experiences and interacting with their viewership. Many other 'youtubers' or 'streamers' (many of whom are aged in their early 20s and are therefore marketable to a youth audience) have attempted to emulate his level of success. Individuals who manage to develop a large online following of subscribers or viewers are commonly referred to as 'social influencers'. Gaming companies have recognised the potential of social influencers to promote their products. This may be achieved by simply providing complementary copies of their games prior to release, on the understanding that the social influencer will share the game with their viewership. Similarly, third party sites that offer gambling services such as 'skin gambling' have employed similar promotional tactics. In regard to unregulated betting using virtual items (e.g., 'skins'), game companies and third-party sites may provide social influencers with free access or credit to use their product to promote the game to their audience.

This promotional strategy can be observed, for example, in the broadcasting of a popular Australian gaming streamer or 'social influencer' named Lachlan Power (online name: *LachlanPlayz*), aged 22 years, who resides in Brisbane, Queensland. Mr Power has nearly 3,000 videos online (produced at a rate of 1-2 videos daily), and over 6 million subscribers on *YouTube* (Source: <http://youtube.wikia.com/wiki/Lachlan>). His gaming channel includes some sponsored videos on loot box opening and skin gambling. One of his September 2017 skin gambling videos sponsored by *Skinhub* has been viewed over 350,000 times. This type of promotion usually takes the format of a

short video (e.g., 10-min duration) in which a streamer narrates a demonstration of the steps required to place bets or purchase loot boxes to win money. In these videos, the streamer is typically shown to consistently win large monetary sums (e.g., thousands of dollars in profit from low probability outcomes in rapid succession). This may occur due to the outcomes being manipulated to ensure profitable outcomes.

While some YouTube promotions for skin gambling acknowledge that this content is ‘sponsored’ (see Figure 7 in the Appendices), the commercial relationships between social influencers and game service providers have not always been clearly indicated to viewers or otherwise publicly disclosed. This has been legally problematic with respect to social influencers promoting gambling services (e.g., skin gambling). Some recently documented cases of social influencers have involved the failure to disclose that the streamer was in fact the proprietary owner of the gambling service associated with the game. In some cases, it has been revealed that the social influencer was misrepresenting his identity as an independent user of a third-party skin gambling site, in addition to misrepresenting the product or service itself by manipulating the odds of winning when broadcasting the website to viewers.

Some online promotions and related activities have led to prosecution in some jurisdictions due to violation of local gambling laws. The UK Gambling Commission (2017) highlighted the case of *FutGalaxy.com*, where two online streamers were found to be the Directors of *Game Gold Tradings Limited*, a company which operated and advertised *FutGalaxy.com* – an unlicensed gambling website. The District Judge described the offending as “very grave” and noted children as young as 12 years old had been gambling on the site but that it was unclear how many young people had been involved. The website *FutGalaxy.com* had no official association with the FIFA series of games or EA Sports. The site had allowed customers to buy virtual currency called FUT coins. Customers could then use those FUT coins to gamble. They could convert these into FIFA coins, which could in turn be sold for real money on an unauthorised secondary market in which one of the directors also had an interest. Similar relevant cases of unregulated gambling, wire fraud, and conflicts of interest have been documented in relation to CS:GO skin gambling on third party websites (Hardenstein, 2017; Holden, 2017), and have typically resulted in courts issuing fines and conditions related to online conduct and transparency in future commercial activities.

In response to legal proceedings and public pressure to impose restrictions to prevent users from using skins for gambling on third-party sites, the gaming company *Valve Inc.*, the owner of CS:GO and the digital distribution network *Steam*, has implemented technical measures to restrict the trading of skins among CS:GO players. A recent (i.e., June, 2018) 7-day trade-ban measure was intended to potentially restrict skin gambling activities; however, some users and service providers appear to have developed workarounds to circumvent these restrictions.

5.1.3 Gambling presence in eSports

Competitive gaming is a major cultural phenomenon in many countries. This is highlighted by the rising popularity of eSports, or professional leagues and tournaments where players compete against each other, individually or in teams, for prize money. These events are popular in countries such as South Korea and China. In 2017, eSports generated \$756 million in revenue and was projected to become a billion-dollar business in 2018 (SuperData Research, 2018). Popular online games including *League of Legends* and *Overwatch* attract audiences that fill large stadiums and theatres and such events have had over 250 million online viewers in 2017. Many of the top players and teams are regarded as celebrities and have large online followings on social media channels and online broadcast services.

There are large monetary incentives for eSports teams. The largest overall prize pool in eSports was ‘*The International 2017*’ for the game *DOTA 2* with a US\$24 million-dollar total prize pool for teams.

The winning team also received a physical trophy forged out of bronze and silver, called the *Aegis of Champions*, crafted by Weta Workshop, the special effects company behind the *Lord of the Rings* films. *DOTA 2* is also the top-ranked game for total prize money, having awarded over \$133 million across 880 tournaments and 2335 players (Source: <https://www.esportsearnings.com/games>). The strong consumer interest in eSports gambling, much like sports betting on traditional sports, has led to gambling becoming more integrated and promoted within and around major eSports events.

Following the rapid global uptake and consumer attention on eSports, there has been an increase in the provision of various eSports-related gambling services (Macey & Hamari, 2018; Schneider, 2015). This includes existing major gambling operators, including land-based casinos, expanding their services to accommodate eSports betting, as well as new online operators, including unregulated overseas operators, that claim to specialise in this area. Some operators have also enabled users to gamble on eSports events using monetised virtual goods ('skins') and other digital currencies (e.g., cryptocurrency), thereby raising some concerns that these activities are more accessible to younger users than cash or credit-based gambling.

The growth of eSports gambling has exceeded recent market projections. For example, a report by Grove (2016) reported that an estimated \$649 million was spent on cash-based eSports gambling in 2016 and was projected to increase to over \$1.2 billion by 2020. A report by SuperData Research (December, 2017) reported that eSports gambling had already reached \$1.5 billion in global revenue in 2017 and that it would reach \$1.9 billion by 2020.

5.2 The impact of marketing and promotions on young people

Over the last decade, studies have examined the potential influence of gambling advertising and promotions on young people, given the strong presence of gambling in media and domains that young people have a known interest, such as sport (Pitt et al., 2016), television (Derevensky, Sklar, Gupta, & Messerlian, 2010), and social media (Gainsbury et al., 2015). As Hayer et al. (2018) note, advertising is one of the 'central pillars' of the gambling industry's business model. Of recent concern has been the array of unregulated gambling brand and product marketing on online social networking sites, which has prompted some arguments that unrestricted exposure to advertising among young people may increase their demand for gambling products. However, a challenge for research in this area has been the ability to investigate the actual influence, if any, of gambling advertising on youth people. Given the ethical constraints of testing this relationship, studies have often relied on retrospective self-report survey methods, including measures involving the recall of gambling advertising materials (e.g., familiarity with brands, recent experiences of gambling advertising), however there is some emerging prospective research in this area (Hayer et al., 2018).

5.2.1 Studies of online gambling advertising exposure among young people

Derevensky, Sklar, Gupta, and Messerlian (2010) surveyed 1147 young people aged 12 to 19 years about their experiences and perceptions of gambling advertising across a range of media. The survey included a self-made questionnaire to examine the types and frequency of gambling advertisements, as well as youth perceptions of the underlying messages of advertisements and their behavioral reactions to advertisements. The survey referred to advertising via television, radio, billboard, print media, online popup, and email solicitation. The researchers reported that most participants (96%) had viewed gambling advertisements on television and many (61%) had received emails about gambling promotions. Some participants reportedly agreed with the notions that that winning is easy (i.e., around 63%), the chance of winning is high (i.e., around 60%), and that gambling is an easy way to become wealthy (i.e., around 80%). While most participants were reportedly dismissive of the advertisements and were aware of the risks associated with gambling, some young people with a pre-existing interest in gambling reported that these messages had prompted them to gamble.

Gainsbury et al. (2015) conducted a survey of 561 Australian adolescents as one component of a large national project on social media and gambling. The survey included questions that referred to experiences that involved the direct links between engagement in one form of gambling (e.g., social casino games) and another subsequent activity (e.g., monetary gambling). The survey also examined the potential influence of gambling advertising on gambling intentions. The survey indicated that 9% of adolescents who played social casino games and then subsequently engaged in monetary gambling reported that they had been influenced by the advertisements for gambling received through social casino games.

The *Young People and Gambling* 2017 report by the UK Gambling Commission (December, 2017), presenting the findings of a survey of 2881 young people aged 11-16 years, reported that 80% of the sample had seen gambling advertising on TV, 70% on social media and 66% on other websites at least once. In relation to the Internet and social media, 27% of the sample reportedly saw gambling advertising more often than weekly on social media and 21% saw them more often than weekly on websites. In addition, 10% of the sample 'followed' (i.e., signed up to receive updates) gambling companies on social media, including *Facebook*, *YouTube* and *Instagram*. Among those who followed gambling companies on social media, 30% had spent their own money on gambling in the last seven days, making them more than three times as likely to have done so as those who do not follow any gambling companies on social media (9%). It bears noting that young people who followed gambling companies on social media tended to be more aware of gambling 'help' organisations. The survey also revealed that 22% of those who have ever played online gambling-style games followed gambling companies on social media, whilst this figure was 8% amongst those who have never played online gambling-style games. Overall, awareness of gambling advertising was more common among males and increased with age.

The 2017 survey by the UK Gambling Commission included additional questions concerning the behavioural impact of gambling advertisement exposure via gambling companies and posts on social media by gambling companies. Although many young people reported familiarity and/or active engagement with gambling promotions, there was little evidence of a self-reported influence of advertising on gambling activity. When presented with a set of statements describing the impact on their gambling activity, in relation to both gambling adverts and social media posts, only 1% of the sample endorsed the statements '*It prompted me to start gambling for the first time*' and '*It made me increase the amount that I gamble*'. The study did not assess advertising exposure in relation to problem gambling indicators.

A study by Macey and Hamari (2018a) examined gambling activities connected to eSports events and broadcasting. Their study assessed participation rates and demographic characteristics of eSports spectators who gamble via an international online survey (N = 582). The sample highlighted the prevalence of young, often under-age, males in eSports-related gambling activities. Participation in gambling, and gambling-like activities, was found to be 67%, with rates of problematic and potentially problematic gambling in the sample being 50.34%. Another study by the same authors (Macey & Hamari, 2018b) investigated the relationships between video gaming and viewing eSports and a range of gambling activities. The study involved a survey of 613 online participants recruited from forums and discussion boards related to gaming and eSports. The sample included a subgroup of 152 persons aged between 13 and 17 years; however, there were no separate analyses conducted across age groups. The researchers reported that viewing eSports had a small to moderate association with measures of video game-related gambling, online gambling, and problem gambling.

The only available prospective study of technological gambling advertising (including advertising for gambling-like games) and its influence on young people was recently conducted in Germany. Hayer et al. (2018) conducted a representative longitudinal (i.e., 12-month) survey with a total of 1178 school pupils (M=13.6 years; 47.5% male). The study involved a comprehensive gambling questionnaire,

which included multiple questions on gambling advertising. Questions examined experiences with gambling advertising across different media including personal email, *WhatsApp*, websites, video game content, *Facebook*, television, radio, newspapers, magazines, and on posters or billboards. In addition, participants were asked about the intrusiveness of each type of advertising. As reported in Section 4.1.3, Hayer et al.'s (2018) regression analysis identified that the onset of financial gambling was significantly predicted by two gambling-related factors: (1) participation from home in simulated gambling on social networks (e.g., *Facebook*), and; (2) significant exposure to advertising (relating to both simulated and monetary gambling). Hayer et al. (2018) concluded that: *“there is a clear suggestion that particularly the unregulated product marketing of simulated internet gambling, for example on social networking sites, is affecting adolescent demand”*.

A 2018 study of skin gambling in the UK conducted by Parent Zone and Ipsos MORI involved focus groups with young people. These discussions highlighted that young people who were involved in skin gambling were familiar with promotions for these products due to their presence on broadcasting services on *YouTube* and other channels, where social influencers (see Section 5.1.2) demonstrated how to gamble using skins. The report noted online video content with provocative titles referring to unlikely winning scenarios, including ‘*CRAZY 1% CHANCE \$4,000 WIN!!*’ (1.5m views), ‘*MOE WINS \$84,000! CS:GO SKIN GAMBLING!*’ (349k views) and ‘*CS:GO Gambling - ACCIDENTAL 56,000\$ WIN!*’ (259k views). The Parent Zone report noted that some participants in the focus group had lost money on skin gambling sites or knew someone who had lost money. Figure 7 in the Appendices shows an uploaded video of underage users engaged in skin gambling activities.

Section 6: Protective factors associated with gambling-like experiences

Research question

Are there any protective factors associated with exposure to gambling-like experiences through gaming?

Summary

This section will summarise some of the protective factors associated with youth gambling and gambling-like experiences. These protective factors belong to the following categories: (1) *personal characteristics*, or characteristics of the individual, such as personality and mental well-being; (2) *parental factors*, including the parent-child relationship, parenting strategies, and supervision of youth digital media use; (3) *peer influences*, including real-world social connections and social interactions; and (4) *environmental factors*, including lower accessibility and access restrictions on gambling activities. While the research literature has tended to examine risk-related variables rather than protective factors, some relevant research on protective factors is presented. It is generally accepted that the greater presence of risk factors and the absence of protective factors increases the likelihood of youth engagement in risky online activities. Emerging evidence suggests that, in relation to simulated gambling, factors such as not spending money on micro-transactions, being supervised by a parent, having less access to gambling activities at home, and less exposure to promotions (e.g., eSports) may be protective against problematic use and subsequent engagement in online gambling activities. However, it should be noted that online gaming and other online activities (e.g., social media) are typical among young people, and therefore not all types of use should be considered inherently risky or potentially related to gambling-related harm. An effective public health approach should recognise the benefits of online activities in addition to the risks.

6.1 Protective factors associated with youth gambling and problematic gaming

Youth gambling behaviours develop with the greater presence of risk factors and the absence of protective factors (Shead, Derevensky, & Gupta, 2010). Over the last three decades, numerous studies have investigated these factors, including variables at the level of the individual, family and peer network, and wider environmental and socio-economic level. While youth gambling generally receives less research attention than other risky activities in adolescence, such as illicit substance use, gambling is still recognised as a serious problem, given the potential problems for the user (e.g., interference with school and home life, decreased psychological well-being, and its links to psychopathology, antisocial behavior and other risk-taking) and its association with an increased likelihood of gambling in adulthood.

Researchers acknowledge that gambling at an early age is not necessarily predictive of future gambling or gambling problems. Rather, gambling during adolescence can be episodic or experimentation with limited further engagement. A study by Delfabbro, King, and Griffiths (2013), for example, involved a 4-wave longitudinal investigation of gambling behaviour in a probability sample of 256 young people (50% male) interviewed at the age of 16–18 years and then followed through to the age of 20–21 years. Relatively few participants reported gambling on the same individual activities consistently over time. Gambling participation rates increased rapidly as young people made the transition from adolescence to adulthood and then were generally more stable. Gambling at 15–16 years was generally not associated with gambling at age 20–21 years. Such findings support the

notion that early exposure to gambling may have minimal influence on future gambling and gambling-related harm without accompanying personal vulnerabilities and/or significant life stressors that co-occur with gambling exposure. For example, Welte, Barnes, Tidwell, and Hoffman's (2008) study reported that young people's difficulties with navigating the transition from adolescence to adulthood (e.g., finding employment, living independently of parents, losing student status, support, and lifestyle) were significantly associated with greater gambling involvement and problem gambling severity.

The research literature has recognised that individual factors in isolation do not exert a strong influence on individuals and populations; rather it is the confluence of multiple factors that tends to have a significant influence on individuals. A meta-analysis by Dowling et al. (2017) examined the literature on youth gambling from 1990 to 2015 which included 15 studies. Meta-analyses quantified the effect size of 13 individual risk factors (alcohol use frequency, antisocial behaviours, depression, being male, cannabis use, illicit drug use, impulsivity, number of gambling activities, problem gambling severity, sensation seeking, tobacco use, violence, under-controlled temperament), in addition to peer antisocial behaviours and poor academic performance. The analysis examined protective factors including higher socio-economic status and parent supervision, but there was much less work generally on protective factors. Effect sizes were, on average, small to medium across these studies.

Another important paper on this topic is a report by Molinaro et al. (2014) which presented the findings from one of the largest studies of predictors of youth gambling. Their data were derived from the *2011 European School Survey Project on Alcohol and Other Drugs (ESPAD) Study*, which included questions on gambling as well as family and socioeconomic indicators. The sample was composed of a representative sample of 31236 students aged 16 years living in nine European countries. Cross-sectional analyses indicated that adolescents who perceived more parental caring and monitoring were less likely to report probable problem gambling. Adolescents who perceived stronger parental regulation (i.e., having strict parental rules at home and elsewhere) were more likely to be problematic gamblers. At the country level, expenditure on public health reduced probable problem gambling. These findings suggested that efforts to monitor youth gambling and promote health messages have a protective effect, even if the mechanisms of change may differ across individuals.

Some research on other protective factors related to youth gambling and problematic gaming will be briefly summarised below, within the categories of *personal*, *family*, *peer* and *environmental factors*. The proceeding section will then highlight some of the limited available research focussing specifically on variables that reportedly reduce the likelihood of participation within online gambling and gambling-like activities.

6.1.1 Personal characteristics

Children and adolescents vary in their natural interest in gaming and gambling-like activities. Similarly, individual differences affect the development of problematic behaviors associated with electronic media activities, including video gaming and online activities involving gambling opportunities. Some adolescents are more at risk of gambling due to the aspects of their personality profile, decision-making tendencies, and general psychological well-being. These factors can influence how an adolescent tends to perceive and respond in gaming and gambling situations, including their perception of the costs and benefits of the activity. In addition, many of the known risk and protective variables have been shown to be inter-related (see, for example, Dussault et al., 2017). For example, young people with greater emotion regulation skills (i.e., the capacity to handle or reduce uncomfortable emotions) will be less at risk of mood symptoms such as anxiety, and will in turn have higher self-esteem.

The inability to self-regulate tends to make adolescents' early experimentation with addictive activities a riskier prospect. For example, individuals who cannot self-regulate will be more inclined to place large bets when gambling (Kim, Poole, Hodgins, McGrath, & Dobson, 2018) or will tend to play games

for longer (Bailey, West, & Kuffel, 2013). A prospective study of 2790 online gamers by Seay and Kraut (2007) examined the variables of video gaming activity, motivations, personality, social and emotional environment, and negative impacts. Deficient self-regulation was the strongest predictor of problem gaming over a 14-month period. They concluded that, while “*a player's reasons for playing do influence the development of problematic usage, these effects are overshadowed by the central importance of self-regulation in managing both the timing and amount of play*” (p. 829).

Psychological protective factors identified in relation to youth problematic gaming and/or gambling behavior include: *having high self-esteem* (Jeong & Kim, 2011); *the absence of mental health issues, such as depression and anxiety* (Dussault et al., 2017; Laconi, Pirès, & Chabrol, 2017) and *substance use* (Blinn-Pike, Worthy, & Jonkman, 2010); *lower risk-taking tendencies* (Jackson et al., 2008); *the ability to delay gratification* (Seay & Kraut, 2007; Schiebener & Brand, 2017) and *future-oriented thinking* (Cosenza & Nigro, 2015); *emotion regulation skills* (Liau et al., 2015); *a less accepting attitude toward gambling* (Rossen et al., 2016); and personality traits including *lower impulsivity* and *higher conscientiousness* (Müller, Beutel, Egloff, & Wölfling, 2014; Walther, Morgenstern, & Hanewinkel, 2012).

6.1.2 Parental and family factors

Although adolescence is considered a transitional time when individuals tend to seek out and strengthen their relationships outside of the family unit, parents and guardians nevertheless play an important role in supporting adolescents. Parents can have a major influence on young people's opportunities for exposure to and participation in gaming and gambling activities. The nature of the parent-adolescent relationship can affect the adolescents' capacities to cope with stressful life events and influence their level of interest and participation in risky activities. Children of parents who are problem gamblers are known to be more at risk of problem gambling due to the influence of genes, parent modelling, and having more opportunities to gamble themselves (Jacobs et al., 1989; McComb & Sabiston, 2010; Vitaro et al., 2014). Adolescents who have an older sibling who gambles (Canale et al., 2017) or another relative who gambles or has a gambling problem (Gonzalez-Roz et al., 2017) tend to be more at risk of becoming a gambler and developing gambling problems. Several other important parent-related variables, such as parental restriction and monitoring, and parents' marital and socioeconomic status, are known to affect youth gambling rates.

Studies have found that parental monitoring is protective against problematic behaviours. In relation to problem gaming, a five-year longitudinal study by Rehbein and Baier (2013) reported that increased paternal 'devotion' and higher parental supervision in childhood predicted lower rates of problem gaming in adolescence. Similarly, in relation to gambling, a longitudinal study of 514 individuals in the United States by Lee, Stuart, Ialongo, and Martins (2014) reported that low and/or declining parental monitoring between the ages of 11-14 years was significantly associated with problem gambling between the ages of 16-22 years.

Parental protective factors identified in relation to youth problematic gaming and/or gambling behavior include: *greater parent-child bonding* (Floros, Siomos, Fisoun, & Geroukalis, 2013; Floros et al., 2015; Magoon & Ingersoll, 2006); *greater parental supervision and monitoring* (Dowling et al., 2017; Goldstein et al., 2013; Smith, Gradisar, & King, 2015); *greater parental knowledge of the adolescent's whereabouts and friendship group* (Canale et al., 2016); *lower parental permissiveness* (Leeman et al., 2014); and *the provision of rewards (i.e., encouragement, praise and positive feedback) for prosocial involvement* (Scholes-Balog, Hemphill, Dowling, & Toumbourou, 2014).

6.1.3 Peer influences

Peer relationships and a sense of peer group belonging are centrally important to adolescents. Peers are an important influence on an adolescent's interest and decision-making in activities such as

gaming and gambling. Online gaming with friends (i.e., including real world or online-only relationships), for example, can give rise to social obligations to play regularly in teams (e.g., 'clans' and 'guilds'). Gaming can be a significant and unpredictable time commitment, where players may feel under pressure to continue playing until there is a group consensus to quit. It may be difficult to stop the action or to take breaks. Estimating when group-based activities will conclude may be difficult, given that success may be determined by random factors, and much time can be spent waiting for other players to prepare themselves for gaming events. Similar situations and peer influences may arise in adolescent gambling activities, such as private poker matches and online play. However, some adolescents may engage in many of these activities alone (Potenza et al., 2011) given the lack of real world friendships, which may lead to forming an association with online strangers of varying ages and backgrounds in similar socially isolated circumstances.

Many types of online social gaming and gambling situations can result in playing longer and/or spending more money than intended due to peer influences. This may become rationalized by adolescents as 'normal' given that their friends are playing in the same (potentially unintended) way. Success (e.g., winning in the form of greater status, virtual items, or money) may galvanize the adolescent's view that the investment of time or money was 'worth it'. Playing in groups may reframe the negative outcomes of playing (e.g., parental conflict, missing school) as a 'badge of honor'. Conversely, adolescents who leave social activities early or before others may feel guilty due to social pressure or repercussions, or experience 'fear of missing out' (see Przybylski et al., 2013). In online games, players may become worried about not maintaining their game level or progression in line with their peers, as this may determine whether they are able to continue playing with the group. Maintaining a gaming and/or gambling schedule may eventually impact on real-world friendships outside of the peer network associated with the activity. A study by Kowert et al. (2014), for example, found that adolescent players who regularly played social online games tended to have much smaller and lower quality offline social circles.

Peers are a particularly strong influence on gambling behaviour among young people. Being a member of a social group that provides social incentives to gamble (e.g., recognition of wins and group status) may be just as appealing for young people as the perceived financial incentives to gamble. For example, Castren, Grainger, Lahti, Alho, and Salonen's (2015) study of 988 adolescents (mean age of 13.4 years) reported that peer gambling was a stronger predictor of at-risk or problematic gambling status than all other variables in the analysis, including male gender, family gambling, level of gambling involvement, and substance use. Thus, the main peer-related protective factor for gambling may be simply having friends who do not have any interest in gambling or participate in gambling activities (Dowling et al., 2017; King & Delfabbro, 2016; Potenza et al., 2011; Zhai et al., 2017).

6.1.4 Environmental factors

Gaming and gambling participation cannot occur without access to these activities. Researchers recognise that greater accessibility is often associated with higher levels of use (Shead et al., 2010). Accessibility is particularly relevant to youth online gaming and gambling activities given the presence of devices in the family home, including bedrooms (King, Delfabbro, Zwaans, & Kaptsis, 2014), as well as portable devices (e.g., smartphones) that enable access anywhere and anytime. Research has recognised that environments that enable earlier age of gambling may be a risk factor for problem gambling (Reith & Dobbie, 2011). A study by Rahmen et al. (2012) surveyed 1624 high school students and reported that earlier age of onset of gambling was associated with problem gambling severity, particularly for non-strategic forms of gambling including lottery and slot-machine gambling. Thus, limiting early exposure and participation in gambling may be protective against youth gambling. The relationship between early use and problematic video gaming is less straight-forward than for gambling, given that moderate engagement in gaming is not inherently problematic and gaming has become a commonplace leisure activity. A study of three longitudinal datasets by Gentile, Berch,

Choo, Khoo, and Walsh (2017) reported that children with bedroom media were more likely to use devices than read books, and were at greater risk of developing problematic gaming behaviors. Similarly, King, Delfabbro, Zwaans, and Kaptsis, (2014) found that pre-sleep use of electronic media in bedrooms was more prevalent and occurred at later times in the evening among adolescent problematic gamers.

6.2 Protective factors associated with gambling-like activities

There is only limited available research on the protective factors specific to involvement in digital and online technological forms of gambling and gambling-like activities. Consistent with the approaches taken to investigating traditional (i.e., land-based and online) forms of gambling among young people, the focus of studies of free play poker and eSports betting, for example, has been on risk factors and correlates of problematic use. However, some studies on simulated gambling activities have included some protective factors in the analysis. It may be cautiously inferred from some significant correlational relationships (e.g., ↑depression: ↑problematic gaming) that the reducing the former may also reduce the latter (e.g., ↓depression: ↓problematic gaming), which informs the selection of some protective factors.

Studies of adolescents or young adults engaged in simulated gambling activities (e.g., social casino games) suggest that the following variables may be potentially protective against gambling with real money: *low impulsivity* (Dussault et al., 2017); *not spending money on micro-transactions* (Kim et al., 2015); *lack of access to simulated gambling at home* (Hayer et al., 2018); *less access to simulated gambling in general* (Kim et al., 2016; Marchica et al., 2017); *not having peers who gamble and not receiving incentives to gamble (e.g., sign-up bonuses) from peers* (Kim, 2017); *not spectating eSports matches* (Macey 2018a); *lower scores on symptom checklists for problematic Internet use* (Tsitsika, Critselis, Janikian, Kormas, & Kafetzis, 2011) *and problematic video gaming* (Molde et al., 2018; Vadlin 2018), and; *non-use of substances (alcohol, tobacco)* (Dussault et al., 2017; Walther et al., 2012).

Areas for consideration

This section will outline areas of consideration that arise from the previous review sections. It is clear from this review that the convergence of gaming and gambling activities occurs in multiple ways and it may not always be clear whether certain activities meet the legal definition of gambling. This is an area that warrants further monitoring. At the same time, many gambling and gambling-like products are highly visible, accessible, and promoted to young audiences across a range of digital media channels. The heterogeneity and high quantity of online gaming and gambling products, and their interactions across media platforms, presents challenges to classification and regulation. Many products are offered from overseas providers and thus may be difficult to regulate from within Australia. International collaboration and information-sharing among various stakeholders may be necessary as a first step.

Acknowledging the above limitations, this review of the literature raises the following issues for consideration. Note that this information is not intended to be prescriptive, given the limited available research evidence, but should generate further critical discussion on the relative merits (e.g., cost-benefit) of responses to protect young people and reduce gaming and/or gambling-related harms.

Video game classification

All video games intended for commercial sale in Australia must be reviewed and approved by the Australian Office of Film and Literature Classification (OFLC). Gambling content in Australia is classified within the category of 'themes'. Consumer advice describes gambling content as 'simulated gambling' or as 'gambling references'. The current National Classification Code (amended May, 2005) does not refer to interactive gambling or gambling experiences or to the ability to make in-game purchases (e.g., loot boxes). Higher impact content, such as violence and drug use, will supersede gambling themes and therefore games that feature, for example, both violence and gambling will not include references to gambling on the rating description. The introduction of relevant advice and age restrictions for video games with gambling-like content and monetised virtual currency should be considered. The classification of video games should distinguish basic chance elements from gambling elements. The repeatability of in-game purchasing may be salient to these considerations.

Age restrictions for in-game monetised content

Monetised features in video games are accessible to users of all ages via gift cards or vouchers purchasable with cash from game retailers and supermarkets without restriction. Some regions, such as Belgium, have recommended age verification measures (e.g., 18+ years) on the purchase of gift cards for purchasing in-game content (e.g., *Steam* gift cards to purchase skins). Similarly, an age verification measure could be required on the client side (i.e., by the game service provider) to redeem gift cards on an account.

Transparency and ethical design in monetised activities

With the growing international attention on skins and loot boxes, regulators are considering ways to define and clearly represent these online activities. This includes introducing measures to increase the transparency of the functionality of loot boxes and ensure these systems adhere to principles of ethical game design and consumer protection frameworks. Areas for greater transparency to consider include the requirement of the chances of winning to be displayed when money is involved; the disclosure of the systems for random number generators in loot boxes, including whether other variables affect payout; the provision of data on player actions and payments in-game (e.g., located in a menu option in the game) and elsewhere (e.g., a player account statement on an external website); introduction of

a financial cap for the monetary amount that can be spent on loot boxes (e.g., a cap that does not exceed the total cost of a standard retail game); the lack of duplicate items from loot boxes (i.e., each purchase increases the likelihood of getting the desired item), and; the presence of paid loot boxes does not impede or disadvantage those playing the game without paid loot boxes.

Consumer protection standards in video games

The consumer protections for online products, including virtual goods and currencies, warrant further consideration in relation to online games and virtual currencies. Online game service agreements often deny users a refund entitlement for purchases of virtual currency. Some games may provide a refund within 48 hours of the purchase, whereas others claim that the player is not entitled to a refund. Given that virtual goods do not typically 'perish' or diminish in value, a protective measure would apply a forgiving window of opportunity for players to change their mind and seek a refund. Parents of young people who make unauthorised purchases using a parent's credit card may benefit from this protection.

Social media promotions

Young people are familiar with gambling promotions on social media sites, and some young people actively follow these companies on *Facebook*, for example. While specific gambling products (e.g., actual odds/offers and incentives) may not be advertised on social pages, these pages facilitate brand awareness and the prominent display of a gambling operator's logo. There are no age restrictions on young people 'liking' and 'sharing' this content with others. Thus, regulations on gambling operators (and other adult age products, such as alcohol) to prevent underage followers may warrant consideration among relevant stakeholders, including the social media platform provider. Similar considerations of potential age restrictions may be advanced for social casino games given they are interactive and some promote real-world gambling venues and activities (e.g., slot machines). Some gambling operators appear to offer loyalty schemes (e.g., for real-world rewards, such as discounts, other services) through social casino games. These schemes warrant further independent review and scrutiny to ensure that they are not configured in ways that make them appealing to underage users and do not resemble online gambling.

Online broadcasts and streamers

Independent online video content providers (e.g., 'streamers' or 'social influencers') promote gambling activities offered by third party sites (e.g., 'skin gambling'). Popular Australian and overseas streamers with large youth audiences are known to promote skin betting on social media channels such as *YouTube* and *Twitter*. These types of promotions are arguably more appealing and effective than other types of advertisements given the digital media habits of young people. Such promotions (i.e., live gaming streams, *YouTube* videos, *Twitter* posts) are tailored to a younger audience (i.e., adolescents and young adults). These promotions warrant independent evaluation and discussions with the platform providers (e.g., *YouTube*) to develop social responsibility measures (e.g., age restriction) for underage audiences. The gaming broadcast service, *Twitch*, for example, has introduced restrictions on broadcasting skin betting, on the rationale that this content is not technically 'gaming'. Similar considerations of exposure to gambling promotions via eSports deserve further attention from regulators. While there exist many countermeasures to circumvent online restrictions on media content, this is not necessarily an argument against introducing measures to reduce youth exposure to online gambling products and promotions.

Free play games in online casinos

Practice modes in online casinos offer one of the most direct paths of progression from simulated gambling to financial gambling. Some young people report involvement in these activities, although research suggests that it may be less popular in Australia than in regions such as the UK and Germany. These activities warrant further monitoring to identify the extent to which young people may be involved, the ease of access to these activities, and whether practice modes are legitimate representations of the financial version of the activity.

Unregulated third party skin gambling websites

Skin gambling websites are not regulated. These third party operators offer and promote skin gambling products to young people in Australia and other regions. Skin gambling operators are using virtual currencies that are purportedly not intended for this purpose by the gaming company responsible for creating them. Game companies that create skins have a direct and indirect commercial interest in the skin gambling market (i.e., these companies earn revenue from consumers purchasing skins and skin gambling creates demand for skins) that may influence their decision-making in relation to social responsibility.

Over the last two years, the game company and digital distribution provider, *Valve*, for example, has requested via direct correspondence to some skin gambling operators that they cease their activities or *Valve* will ban the player accounts involved in these activities. However, it is unclear whether these bans have been routinely implemented and whether players are broadly affected or deterred. Such cases demonstrate that game companies appear to have the capacity to take firm actions (e.g., apply bans, block trading) against those involved in skin gambling. Some technical measures have been introduced to reduce the viability of skins as a form of tradable gambling currency. However, these measures appear to have been circumvented by providers diversifying their payment options. International collaboration with law enforcement and regulators, payment providers (e.g., PayPal), and advertisers may help to reduce unregulated and illegal skin betting. Age verification measures to buy and own skins may be another option for consideration.

Industry data for research on problem users

Academic research into youth problem gaming and gambling may likely benefit from independent access to player data from companies that offer gambling-like experiences (e.g., loot box spending, social casino game play). As a recent example, a Norwegian researcher (Dr Rune Mentzoni from the University of Bergen) spent many thousands of dollars of research funding on loot boxes in the game *FIFA* to determine the payout rates for these products – this approach (i.e., spending money) to access data on how gaming products operate would not have been necessary if this information was disclosed by the company. Third party sites may be unlikely to cooperate with researchers, particularly those researchers investigating potential harms. There is no evidence that major gaming publishers or other industry bodies are open to discussion and support for investigations of problematic gaming. The IGEA (i.e., Australia's gaming industry representative association) would perhaps be the most relevant industry contact to initiate such discussion in Australia. The IGEA recently made a submission to the 2018 Australian Senate inquiry into loot boxes, stating “*the video game industry takes its responsibility to its players, parents and guardians very seriously*” (Walker, 2018). The IGEA's official stance on support for research on problematic gaming is not currently known, but they have expressed opposition to the ICD-11 gaming disorder classification.

At a global level, industry-academia collaboration to study problematic video gaming does not appear to be evident in the literature, despite the strong potential and capacity for the industry to assist efforts such as the identification of potentially problematic users of games (e.g., abnormally high time

commitment and/or spending behaviors). The global gaming industry has tended to characterise gaming as an activity that solely has benefits and is predominantly enjoyed safely and sensibly (King & Gaming Industry Response Consortium, 2018). While millions enjoy gaming in moderation, there are also players who experience gaming-related harms, including those generated by gaming-gambling cross-over activities.

Support for research on youth gaming and gambling convergence

Australian academic research on gaming-gambling crossover is quite limited relative to other countries. Most of the limited research available has focussed on social casino games which do not offer direct avenues of progression to online gambling. There is a need for further investigation into monetised video game products (e.g., skins) and the promotion of gambling across online channels. Popular games featured in eSports activities (i.e., CS:GO) include monetised virtual goods that can be used for betting; therefore, the relationships between eSports, gambling activities and promotions, and youth problem gaming and gambling warrant further examination. The popularity of amateur broadcasting and rise of celebrity streamers, in combination with integrated social media platforms to share content, has led to video gaming becoming more socially connected than ever before, which has in turn enabled gambling advertising and sponsored content for gambling products to reach young audiences more effectively than traditional media channels. Further research is needed on these new technological developments and how they are used and perceived by young people.

Implications for parent education

This section will outline some areas of parental education in relation to gaming-gambling crossover. This review has highlighted areas of convergence of gaming and gambling that may be unfamiliar to parents and non-participants. Many young people own at least one personal online-enabled device and have regular unsupervised access to online activities that converge with gambling. Many young people in Australia report familiarity with online gambling promotions and past-year exposure to and involvement in simulated gambling and gambling activities. Parents may not be generally aware of the nature and scope of these activities, including recent developments such as 'skins' and 'loot boxes'.

This review has highlighted that parental and environmental factors affect youth gambling involvement, which include modifiable factors that influence gambling risk. As noted by Gentile (2018), governmental and legislative approaches *"are potentially beneficial, [but] they require a great deal of political will and may have effects that are broader than desired or be difficult to implement at a national scale"*. Parental education may be more feasible while also being complementary to some broader regulatory responses. The following areas may be useful for parents to consider to protect young people from problematic use of gaming-gambling crossover activities and reduce their level of exposure to gambling promotions.

Parent understanding of new media and its risks

It is recommended that parents are aware of and learn about the types of online activities engaged in by their children and friends, and the range of online activities available to young people. This awareness may include coverage of the basic types and functions of social media, online games, and related activities. In addition, parents with adolescents who play online competitive games may benefit from learning about microtransactions, loot boxes, and skins, as well as online game streaming and eSports. Young people themselves may help provide this content knowledge based on their experiences and active demonstration. Independent websites (e.g., www.commonssensemedia.org) may provide objective descriptive information on the content and play experiences of new release and popular games.

Specialised workshops and other educational resources on gaming-gambling crossover may help raise awareness among Australian parents. While there are some resources on online risks, including privacy concerns and risky sexual activities (e.g., 'sexting'), few resources have been published on online gambling and gaming activities. At the same time, some online resources may be difficult to parse given the references to the popularity ('everyone does it') and mostly innocuous nature ('gaming is harmless fun') of gaming. There is a need for resources that offer clear and simple delineation of gaming and gambling activities, including straight-forward terms with diagrams and pictures, to assist parents to understand how these activities work and where the specific risks to users may lie.

Monitoring and setting limits

Monitoring online activities is known to be more effective than restricting young people's access completely, which is not generally considered practical or feasible for parents. Monitoring and setting or negotiating limits may be more effective if parents are aware of the types and age-appropriateness of gaming and related products. Co-participation in digital media activities may help parents to understand these activities. Cyber-safety considerations are complementary to these efforts, such as the recommendation that personal information is not shared with strangers including within online games. It may be valuable for parents to possess the skills to instruct or negotiate assertively how gaming devices are used by adolescents. While restriction may not be the best first option because it may not support self-regulation in children, some boundaries on use and access can avoid risks such

as overspending and accessing inappropriate content. Some gaming devices have parental controls on gaming consoles (e.g., content restriction and time limits), which lock the option to spend money on games using credit cards and similar options. Screen time is not the sole consideration; the type of content and activities, including interaction with others online, are important in evaluating the benefits and downsides of media use.

Financial access

Access to payment options in online games and other sites influences youth participation. Some researchers have recommended the approach termed 'active mediation' (Buijzen & Valkenburg, 2005), referring to critical conversation between parent and child about media (e.g., discussing its intended messages and effects) as opposed to 'media restriction', where the parent restricts or removes media access from a child. However, some types of restriction may be useful as a preventative measure. Griffiths (2015, p.36), for example, makes the following recommendations to prevent unwanted in-game purchasing: (i) not giving children access to online store passwords; (ii) personally overseeing any app or game that they download; (iii) using parental controls on phones and tablets; (iv) unlinking debit/credit card cards from online store accounts (i.e., do not store payment details with online stores); and (v) actually talking with children themselves about the games they play and the buying of in-game extras.

Parent modelling

It is recommended that parents are conscious of their own media use and how it may influence their children's media habits. Modelling healthy and moderate use, including avoiding devices during family activities (e.g., meals and an outside activity, such as sport) and having media-free days or times of day. It is important to consider how important others, including a child's siblings, relatives, friends, and peers, model media use to their children.

Preventing early access to online activities

Digital media use that tends to be irregular (e.g., not daily) and begins later in life may reduce the risk of becoming a problematic behavioral pattern. The type of gaming activity may also be an important factor. Studies have shown that some online games (e.g., Massively Multiplayer Online [MMO] games, and games that include MMO elements) are more difficult for young people to regulate their usage and can have more negative impacts than other games on school performance and sleep. Competitive online games that feature skins may generate interest in collecting and trading these virtual items with others. Limiting the availability of 'riskier' games may be considered, such as scheduling play during school holidays or similar periods. Greater engagement tends to increase rather than reduce the desire to play (Kaptsis et al., 2016a, 2016b). Similar considerations apply to social media use and other online activities.

Identifying problems early

Parents concerned by a child's gaming may consider a screening test. Such tests are available online from regional organizations, such as the Network for Internet Investigation and Research Australia (NIIRA) in Australia, and from online service providers (e.g., www.netaddiction.com). A screening test is not diagnostic and will not account for other factors, but it can be a useful starting point. Parents may consult their doctor to discuss concerns and seek referral to a mental health service or practitioner, as required, if there are any emotional difficulties or other mental health concerns.

Promoting alternative non-digital interests

Youth gambling is not only facilitated by greater access but also by the lack of other structured or rewarding activities. Youth engagement in a range of hobbies and interests may reduce the appeal and opportunities to engage in digital leisure activities. Many competitive video games are more appealing when users have more time to invest in these activities, given the structure of these games reinforces frequent play and regularly logging in for new rewards. The endlessness of electronic media activities makes these activities more difficult to self-regulate. Such activities may readily displace other activities and/or reduce one's interest in other activities by fostering the view that there is only enough time to engage in online activities. Supporting activities that are incompatible with concurrent media use due to their scheduling and physical demands may be protective for young people.

Parent-child relationship

An important protective factor against youth gambling is the parent-child relationship. Studies show that a healthy parent-child relationship is associated with lower risk of youth problematic gambling and gaming. A 2017 systematic review reported that healthy maternal and paternal relationships are negatively associated with problem gaming, and longitudinal evidence suggests that the paternal bond in particular is a protective factor against problem gaming (Schneider et al., 2017). Interventions to reduce problematic gaming often involve strengthening the parent-child relationship by facilitating bonding activities and teaching parents the practical skills to communicate with adolescents in ways that avoid personal criticism and deal with conflict more effectively (Liu et al., 2016).

Accessibility in the home

Digital media activities are greatly influenced by the degree of accessibility of these activities. Constant and convenient accessibility is more likely to facilitate regular media use. Young people who use digital devices in their bedroom have been found to engage in online activities for longer periods, displace their sleep or wake up at night to use the device, and be more at risk of problematic use. Keeping electronic devices out of bedrooms and making living areas less device-centric (e.g., furniture orientated away from screens) may reduce overall use and reliance on devices among young people.

Supporting positive mental health

An important protective factor is psychological resilience and the absence of mental health issues, such as depression and anxiety. Mental health conditions and stressful life events can increase young people's vulnerability to seeking out solitary activities that provide a sense of calm or excitement and an escape from reality. Some parents may incorrectly assume that online activities are an effective form of coping with stress or problems, given the appearance that young people are 'calm' when engaged in online activities. However, positive mental health is supported by managing symptoms (e.g., fatigue, irritability, low mood), addressing the maintaining causes (e.g., low self-esteem, inactivity, negative self-perception, lack of social support), and building personal competencies (e.g., developing and strengthening mental, creative, and physical abilities).

Engaging in recreational digital media activities is unlikely to be effective in addressing academic concerns (e.g., falling behind in school), social concerns (e.g., bullying), family concerns (e.g., parental conflict, divorce), or general worries about the future (e.g., life after school). Some gaming and other online activities, under the right conditions, can be productive, supporting learning and personal growth, and improve well-being. It is important to identify the electronic media activities that support a child or adolescent's mental health (e.g., social play, fun with friends, support creativity, and/or relax after school/homework) and notice the signs that digital media activities is reducing general

psychological well-being (e.g., socially isolated activities, irritated when not online, purposeless browsing, angry while gaming). Not all digital media activities affect all users in the same way.

Other areas for consideration

Education for young people

Not only parents may benefit from understanding online activities and their associated risks. Young people may be naïve of the risks of these activities, including longer term consequences of online actions. Young people may benefit from education and self-reflective learning (e.g., group discussions, workshops, and school assignments) on gaming-gambling crossover and gambling promotions. Young people have a natural interest in online activities and may be open to critical discussion of the risks associated with some of these activities, including those relating to online gambling and gambling-like experiences.

Helping young people understand that gaming and gambling industries are primarily a business designed to make profits, and that some online operators are unregulated and therefore there may be very few or no player protections, may encourage critical thinking. The psychology of problematic use and how habits develop may be useful psycho-education topics. Identifying the reasons that underlie the appeal of gaming in connection with the demands of adolescence (e.g., identity, social belonging, desire to stand out or achieve more than others) may generate insights into why some people overuse these activities. In addition, young people may be guided to reflect on the nature of social media promotions and online celebrity as vehicles that promote and normalise products such as gambling.

Conclusions

Digital devices and online media have become integral to young people's lives, enabling many new opportunities for socialisation, creativity, and learning. However, the constant online accessibility on smartphones and other electronic devices has also facilitated new entry points to gambling activities and exposure to gambling promotions. This review has examined the available research on children and adolescents' exposure to and participation in online gaming and gambling activities. The research literature in this diverse area is growing rapidly in response to the academic, parental, social, and regulatory concerns about youth access and involvement in these activities, even as these activities appear to be evolving at a rate that outpaces the research. Australian research on simulated gambling is still developing and there are multiple gaps in our current understanding of the ways in which gaming-gambling crossover activities and promotions influence Australian young people. Available research from Australia, Europe, and Canada suggest that many young people between the ages of 13 and 17 years are familiar with and exposed to gambling-like activities and promotions, particularly via video gaming activities, online gaming channels (i.e., streaming), and social media. There is emerging evidence that some young people are active participants in unregulated online gambling activities, including skin gambling on third party sites.

The expansion and sophistication of gambling products on the Internet and the emergence of new forms of unregulated gambling with virtual currencies, in addition to 'non-gambling' online content such as social casino games and gambling promotions on social media, has contributed to the 'normalisation' of gambling in Australian society. There appears to be growing youth interest in and aspiration for 'digital careers' that is influenced by the 'prestige', glamour, and perceived profitability of eSports, entertainment streaming, and online social influencers, which are not unlike professional sports and Hollywood celebrity. Some of these activities, particularly streaming and eSports, appear to have indirect commercial relationships with gambling promotions and services tailored to competitive gaming audiences. Many of these online activities appear to have popularised and/or legitimised the act of personal commitment to continuous engagement in electronic media activities among some young people. These influences are important to consider with the recent recognition of gaming disorder alongside gambling disorder in the ICD-11. Further research is needed to examine the impacts of digital technologies and gaming-gambling hybrid products, including the identification of young people who are more vulnerable to these products, and to develop useful regulatory and other responses to reduce gaming and gambling-related harm.

The final conclusion of this review is that online gambling products and promotions are changing due to developments in online games, streaming and eSports, and the monetisation of virtual goods. However, it should be noted that many of the commercial relationships and corporate strategies at play appear to exist and operate independently of each other. For example, the companies that develop and publish online games with monetised goods (skins) are understood to be independent of the operators that offer gambling products involving skins. Similarly, the online social influencer that promotes an online game that enables avenues to gamble does not usually directly benefit from the commercial success of that game or gambling activity. Thus, it may be appropriate to conceptualise the relationships between these various companies and stakeholders as a 'corporate synergy', where the popularity and success of one party influences the popularity and success of another party but where these parties are, by legal definition, otherwise distinct and separate. As an 'always online' population that tends to own personal portable online devices, young people engaged in popular digital activities such as online gaming and social media are regularly entering an online ecosystem that is structured in ways that support various entry points and exposure to gambling products and promotions. The complementary commercial relationships and seamless integration of these various gaming and gambling technologies, aided by factors such as the portability of online devices, options for concurrent or 'second screen' multi-device use, and sharing of user data between operators, has

facilitated the normalisation of gambling products and advertising among young people. As gaming and gambling continue to converge, it will be increasingly important to identify effective measures and approaches to reduce the risk of gaming and gambling-related harms among young people.

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Appendices

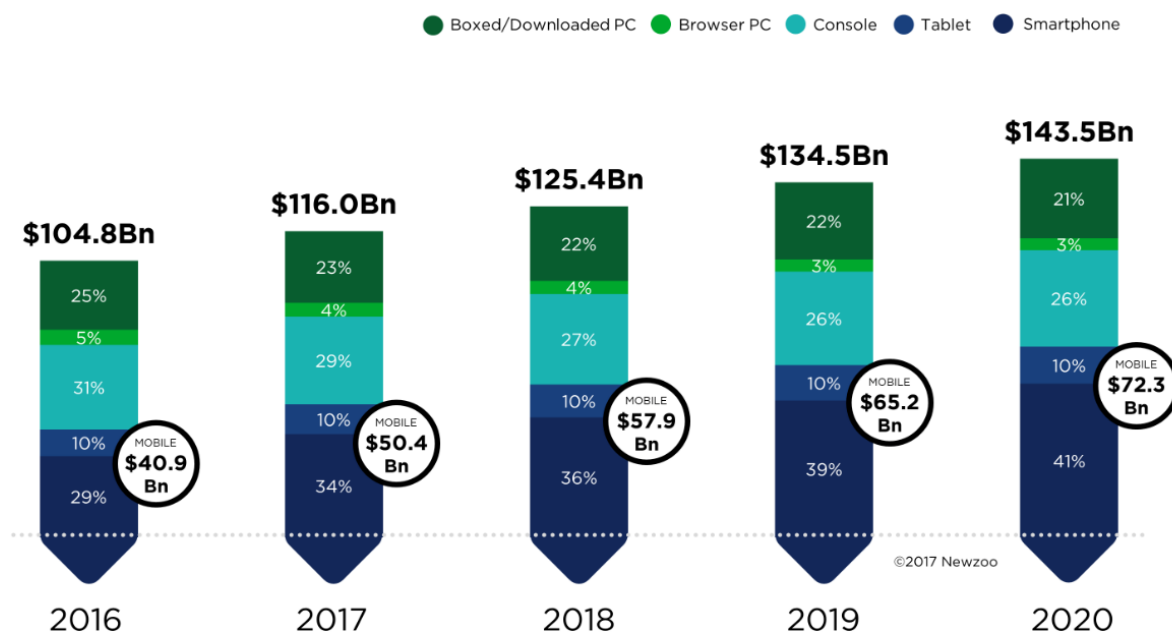


Fig 1. Sales projections for the global gaming industry (Source: Newzoo Research, 2017)

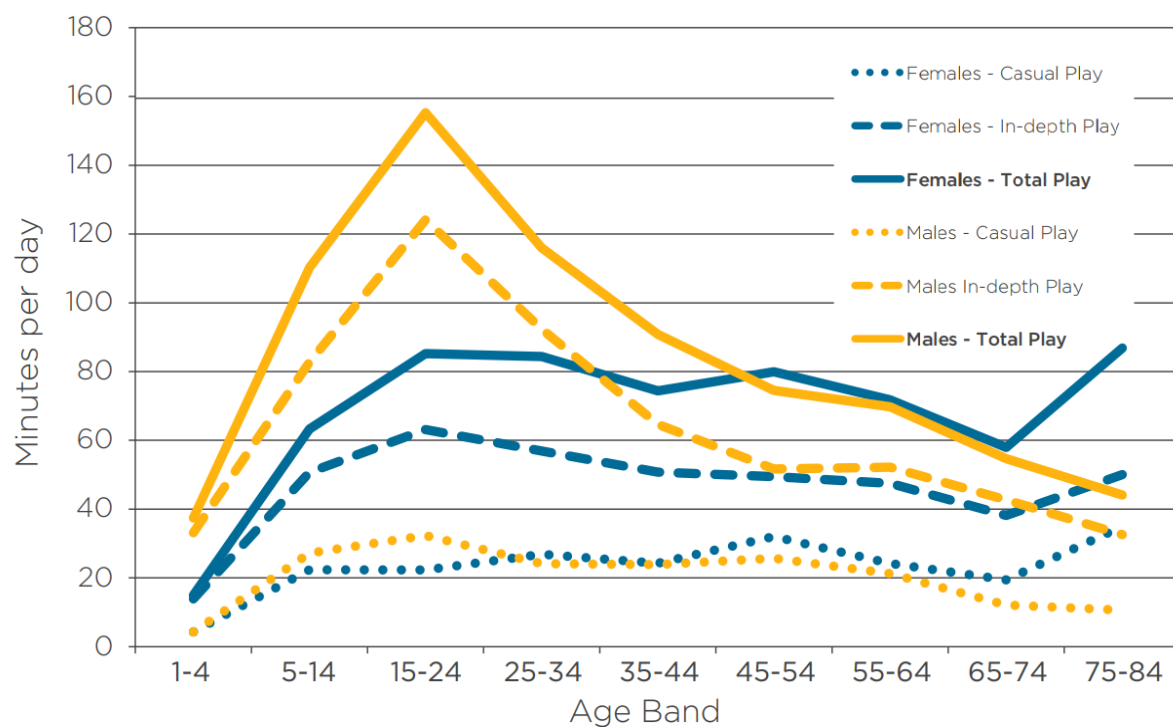


Fig 2. Daily video gaming participation in Australia (Source: IGEA, 2018)

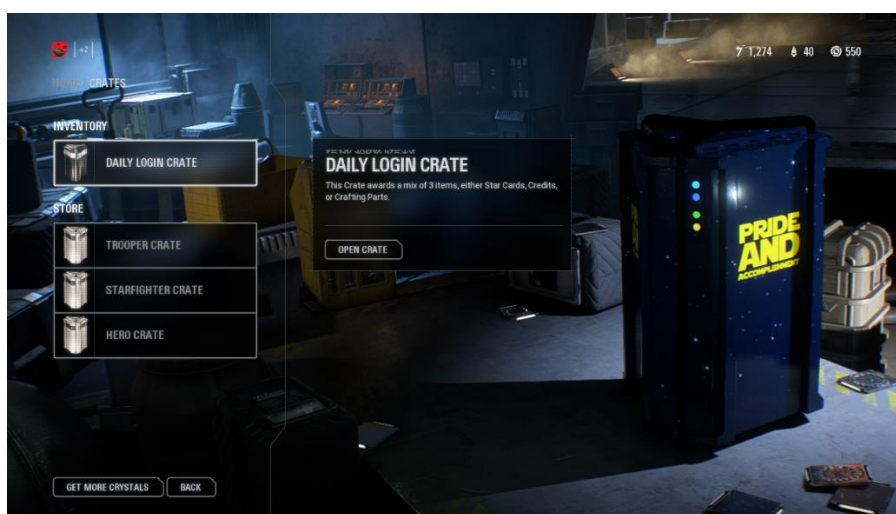


Fig 3. Examples of loot boxes from online games, Overwatch, Battlefront 2, and CS:GO

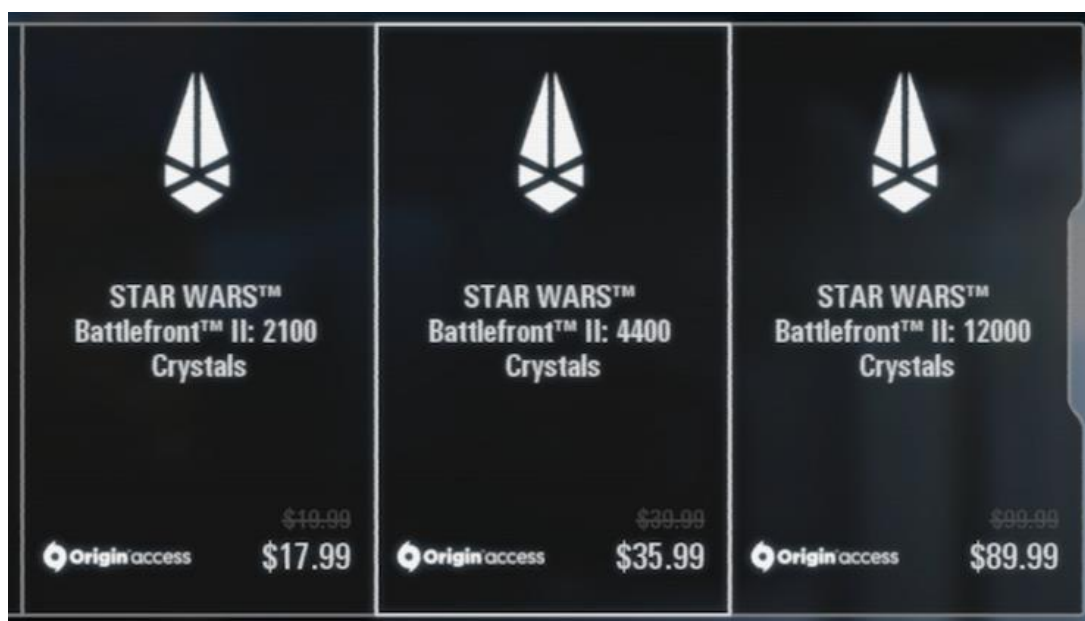


Fig 4. The menu options to purchase loot boxes in Star Wars: Battlefront II

Table 1 | Gambling features in the 22 video games containing loot boxes in 2016–2017

Game	ESRB rating	Exchange of money	Unknown future event	Chance involved	Avoid losses if opt out	Competitive advantage	Can cash out
<i>Assassins Creed Origins</i>	17+	✓	✓	✓	✓	✓ ^a	X
<i>Battlefield 1</i>	17+	✓	✓	✓	✓	X	X
<i>Call of Duty: Infinite Warfare</i>	17+	✓	✓	✓	✓	✓	X
<i>Call of Duty: WWII</i>	17+	✓	✓	✓	✓	X	X
<i>Destiny 2</i>	13+	✓	✓	✓	✓	X	X
<i>FIFA 17</i>	E	✓	✓	✓	✓	✓	✓
<i>FIFA 18</i>	E	✓	✓	✓	✓	✓	✓
<i>For Honor</i>	17+	✓	✓	✓	✓	✓	X
<i>Forza Motorsport 7</i>	E	X ^b	✓	✓	✓	✓	X
<i>Gears of War 4</i>	17+	✓	✓	✓	✓	X	X
<i>Halo Wars 2</i>	13+	✓	✓	✓	✓	✓	X
<i>Injustice 2</i>	13+	X	✓	✓	✓	✓	X
<i>Lawbreakers</i>	17+	✓	✓	✓	✓	X	X
<i>Madden NFL 17</i>	E	✓	✓	✓	✓	✓	✓
<i>Madden NFL 18</i>	E	✓	✓	✓	✓	✓	✓
<i>Mass Effect Andromeda</i>	17+	✓	✓	✓	✓	✓ ^a	X
<i>Middle Earth: Shadow of War</i>	17+	X ^c	✓	✓	✓	✓ ^a	X
<i>NBA 2K18</i>	10+	✓	X	X	✓	X	X
<i>Need for Speed Payback</i>	13+	✓	✓	✓	✓	✓	X
<i>Overwatch</i>	13+	✓	✓	✓	✓	X	X
<i>PlayerUnknown's Battlegrounds</i>	13+	✓	✓	✓	✓	X	✓
<i>Star Wars Battlefront II</i>	13+	X ^c	✓	✓	✓	✓	X

E, everyone. ^aThese games are single player or cooperative, but loot boxes can provide competitive advantage against the game and make players more powerful than friends or team mates. ^bTurn 10 Studios (the publisher of *Forza Motorsport 7*) have announced they will be adding the ability to purchase loot boxes with money soon. ^cOriginally included, but shut down at time of writing due to consumer backlash.

Fig 5. An analysis of loot boxes in relation to gambling elements (Drummond & Sauer, 2018)

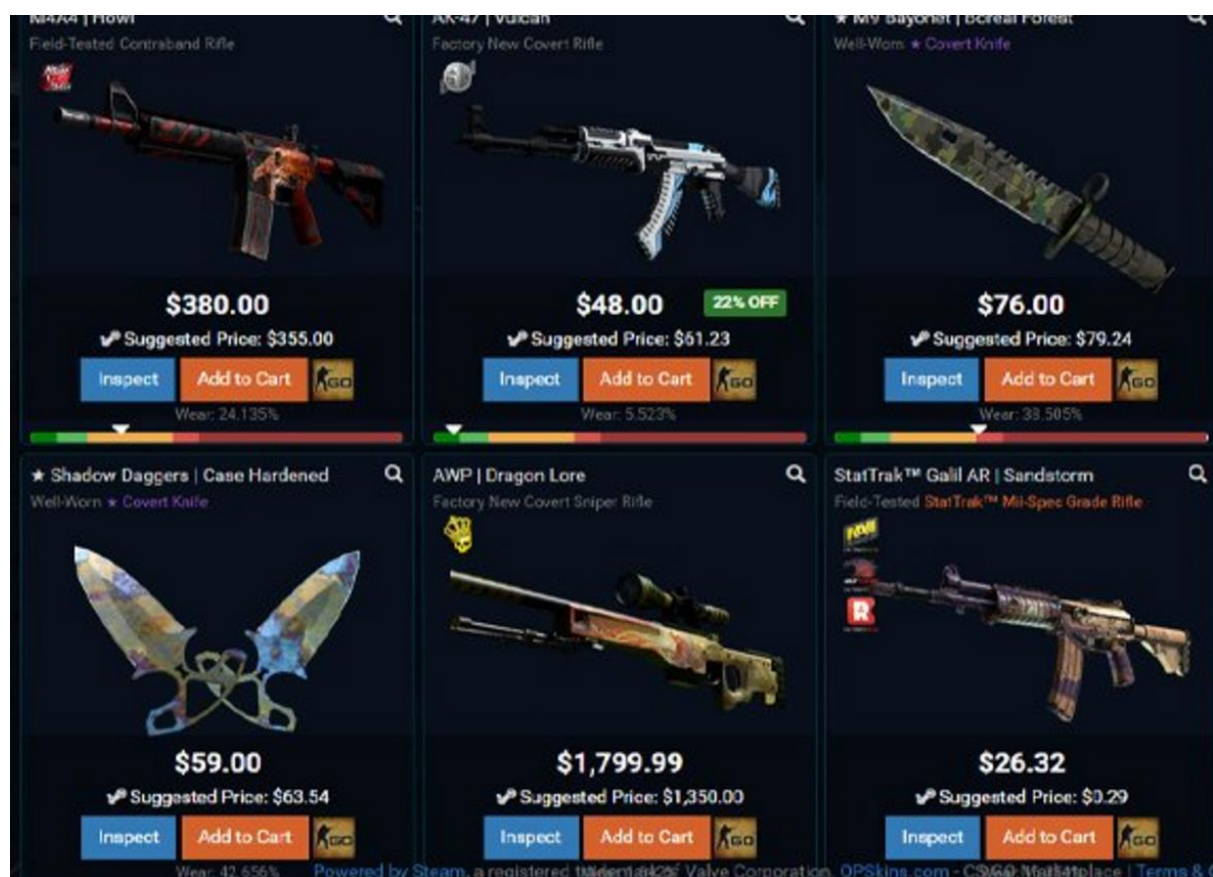


Fig 6. An online marketplace to purchase skins for CS:GO

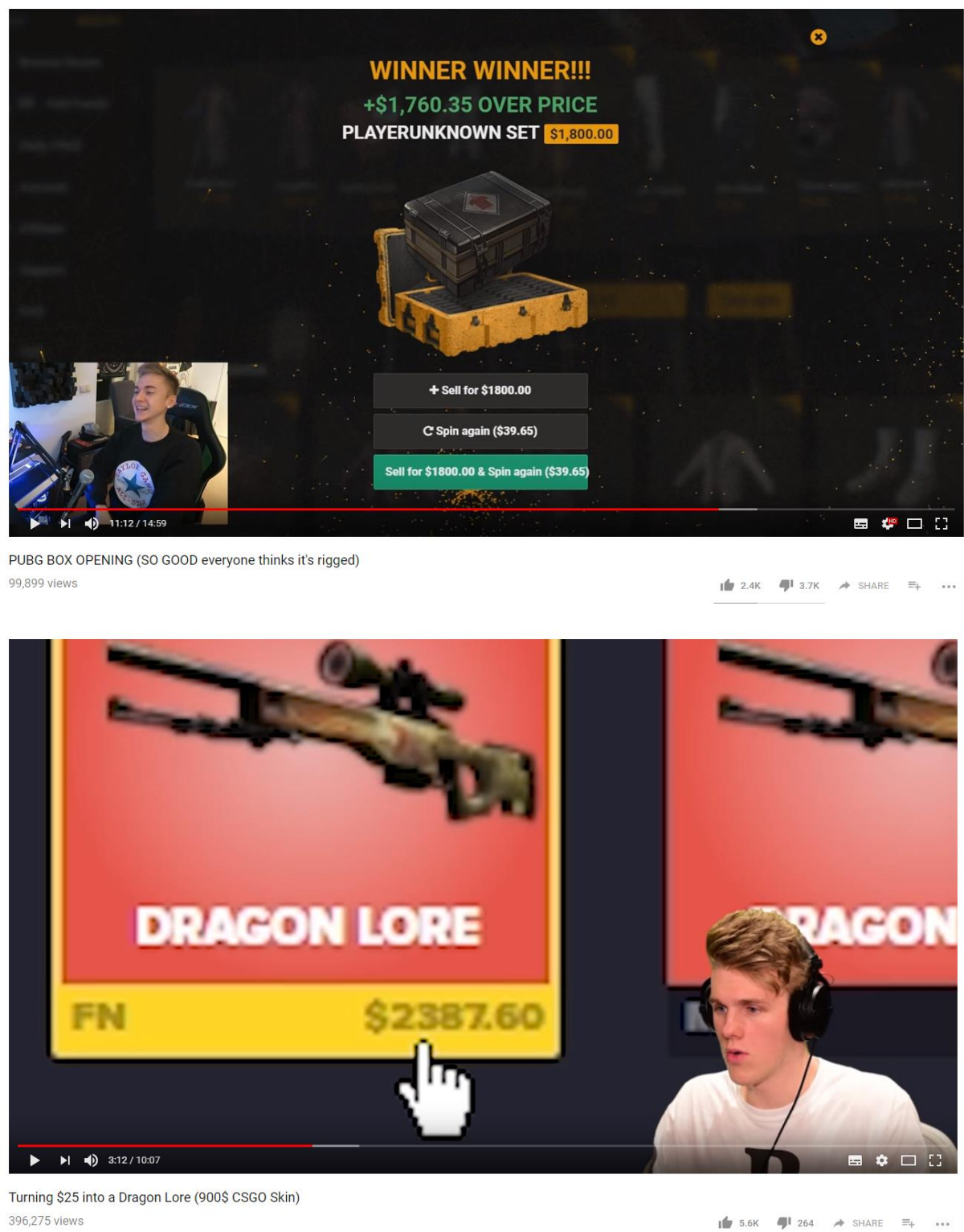
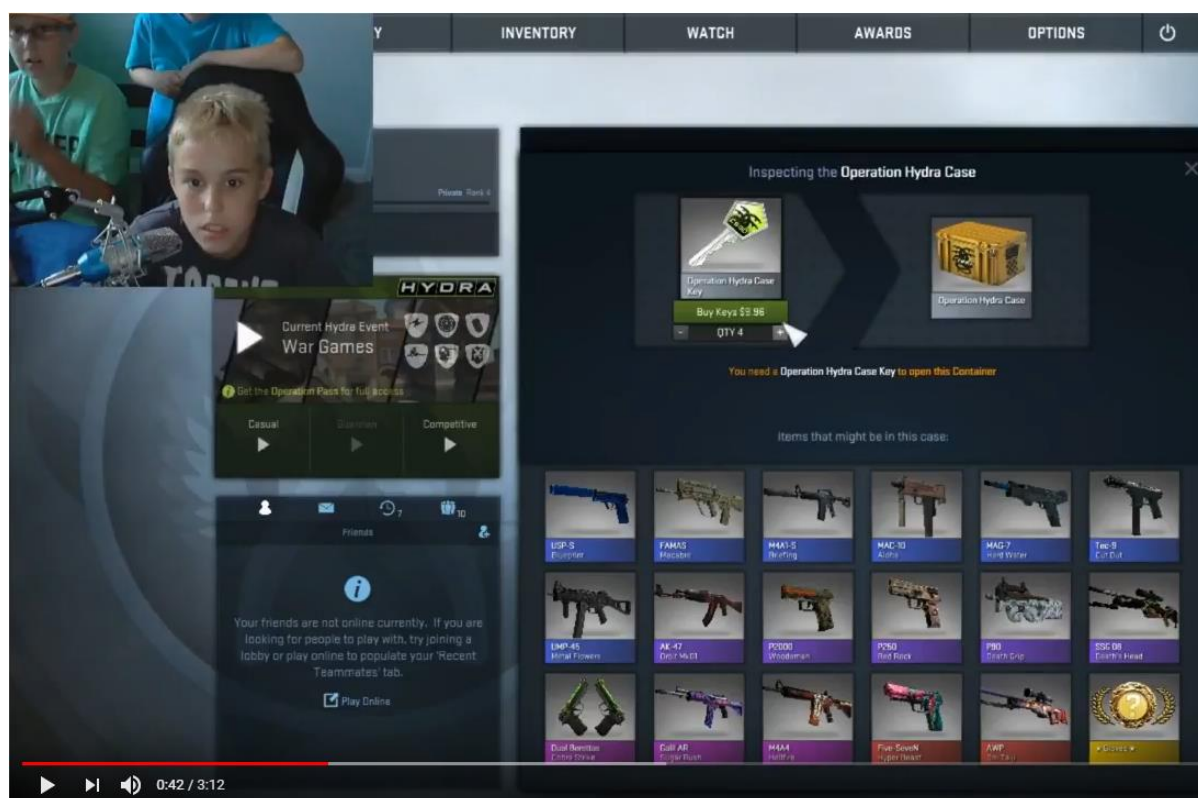


Fig 7. Sponsored skin betting promotions by online streamers



CS:GO Loot Crate Opening | INSANE KNIFE PULL (\$10 Dollar Budget Pull) 2 Purples, 1 GOLD

Fig 8. Underage participation in and streaming of CS:GO loot box and skin activities

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