



A qualitative study of participant experience with skill gaming machines in comparison to electronic gaming machines

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ABSTRACT

New variants of electronic gaming machines (EGMs) are being developed that incorporate gaming elements. Policies to govern the use of skill gaming machines (SGMs) must be predicated on evidence of their impact, which is currently lacking. Focus groups (N = 21) were conducted with university students, regular EGM players, and community members who played an EGM and SGM. Participants clearly perceived that SGMs involved a skill component, although most did not have a good understanding of how SGMs work. There was evidence of greater immersion in SGMs, but this was restricted to the feature in which money was not gambled and time was limited. Participants reported a mixture of both negative and positive emotions during play on both SGMs and EGMs reflecting some consumers enjoying the gaming-elements to a greater extent. The results indicate that SGMs would likely appeal to a subset of consumers and most consumers would not have a good initial understanding of these machines.

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Introduction

Electronic gaming machines (EGMs) are considered controversial gambling products given their reported association with gambling disorders (Delfabbro, King, Browne et al., 2020). In Australia, 8.1% of adults play electronic gaming machines monthly and expenditure on gaming machines accounts for one-fifth of total gambling expenditure (Armstrong & Carroll, 2017). The structural characteristics of EGMs (e.g. continuous, rapid rates of play, and random schedules of reinforcement) contribute to cognitive biases and interact with neurobiological variables to increase risk of impaired control and gambling-related harm among a proportion of participants (Binde et al., 2017; Delfabbro et al., 2020; Gainsbury, Angus et al., 2019; Harrigan et al., 2014). In most countries, EGMs are subjected to strict regulatory controls with the expansion of existing machines and/or introduction of newly

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configured games and machines subjected to detailed scrutiny by regulatory agencies.

Recent prevalence surveys have reported decreasing rates of participation in EGMs, increases in sports wagering and betting through online channels, and stable or decreasing reported rates of gambling disorders (Browne et al., 2019; Gambling Commission, 2020; *New Zealand National Gambling Study*, 2018). For example, the proportion of NSW adults participating in at least one gambling activity significantly decreased from 69% in 2006 to 53% in 2019 and EGM participation dropped from 31% in 2006 to 16% in 2019 (Browne et al., 2019). Whether the result of changing consumer preferences, social adaptation, effective harm minimization policies, or other factors, reduction in EGM participation has led industry operators to question the extent to which the next generation will engage with gambling, and EGMs specifically. In response to perceived threats to revenue and industry sustainability, several manufacturers are developing innovative products designed to appeal to a broader consumer cohort familiar with video gaming. These manufacturers have incorporated video game elements such as console-style controllers, progress, achievement, narrative and skill components into EGMs (Delfabbro, King, Gainsbury et al., 2020).

As there is no single accepted terminology, we use the term skill gaming machines (SGMs) to refer to EGMs which have a design element enabling individual players to influence the likelihood of winning. This is similar to other skill-based gambling activities, such as poker and blackjack where strategies are applied to optimize outcomes but where random components impact final outcomes (e.g. cards dealt randomly). There are many variants of products referred to as hybrid gaming machines and video-game gambling machines (see recent review by Pickering et al., 2020). Like EGMs, SGMs are based on random number generators set to provide minimum return to player percentages where wins and jackpots occur regardless of level of skill. Superimposed on this element, games are designed to incorporate skill components with randomly generated opportunities to maximize outcomes. These include the use of optimal play strategies, or separate random and skill-based components – for example, skill being confined to a feature in which bonuses of limited sizes can be won. Just as with regular EGMs, most players will typically lose, and some players will win. Unlike EGMs, in SGMs, a player's skill can enhance their chances of winning to an extent. Typically, greater skill can influence winning prizes up to a certain level but cannot lead to a positive expected return. Jackpots and large wins are still randomly determined and can be achieved by players regardless of skill level.

Most jurisdictions do not currently permit EGMs where outcomes can be influenced by player skill. Regulatory reforms were introduced in New Jersey and Nevada, allowing elements of skill to influence payouts (Horridge, 2017), but there is very limited academic research on the impact of SGMs making it difficult to formulate evidence-based policy with regards to such products. GameCo was the first manufacturer to introduce a first-person shooter SGM (although they refer to these as video game gaming machines), locating the machine at Harrah's Atlantic City casino in 2016 (Sieroty, 2019).

Questions that regulators should consider include the extent to which consumers can use SGMs in an informed manner and whether SGMs exacerbate gambling problems within a community. Informed choice is based on the principle of autonomy and the role of the individual in having sufficient information to guide life choices (Kapp, 2007).

Within the context of gambling, a public health perspective argues that governments and industry must ensure that individuals have sufficient accurate information on the operation of products to allow appropriate informed decisions (Blaszczynski et al., 2008). Illusions of control are a subjective over-estimation of control that is greater than the objective level of control (Langer, 1975). Studies have shown that gambling activities which incorporate aspects of skill may increase illusions of control, increasing potential for gambling problems (Källmén et al., 2008; Myrseth et al., 2010). If SGMs appeal to individuals with existing gambling problems this may exacerbate illusions of control resulting in increased or continued play (Brevers et al., 2013; Canale et al., 2019; Young & Wohl, 2009). Therefore, it is important that consumers understand SGMs and how outcomes are determined, so that they can make appropriate choices regarding participation and understand the relative role of skill vs. chance.

In a previous study examining consumer understanding of SGMs (Gainsbury & Philander, 2020), 184 participants from an online sample were shown examples of SGMs and completed an author-designed scale to assess their understanding of how outcomes were determined and the role of skill vs. chance. Responses between those who had previously played and had not played an SGM were compared. Individuals who had played SGMs were younger, more likely to be male, have higher gambling problems and cognitive distortions, and more likely to be involved in all gambling and gaming types as compared to individuals who had not played SGMs. This is consistent with evidence of a 'honeymoon effect' where existing gamblers gravitate toward new products (Gainsbury et al., 2017). There was no between-group differences for those reporting an awareness of involved skill but lacking an understanding of how outcomes are determined. In a similar study of a sample of 43 US casino patrons who had interacted with an SGM, these authors found that participants rated the role of skill vs. chance in SGMs to be similar to blackjack, but that skill was lower than in poker and higher than EGMs (Gainsbury & Philander, 2020). These preliminary results suggest that consumers do perceive skill to be involved with SGMs but retain a poor understanding of how short- and long-term outcomes are determined (Gainsbury & Philander, 2020).

To date, no academic studies have examined consumer perceptions of SGMs. The current study aimed to investigate consumer perspectives of SGM in contrast to traditional EGM immediately following a session of play in a simulated laboratory setting (i.e. without gambling money). Where appropriateness of research questions is not well suited to specific quantitative studies, qualitative research assists in framing future research perspectives (Flick, 2007). This study received ethics approval from the lead author's institution (protocol: 2019/738). The protocol, measures, and analysis plan were pre-registered: <https://osf.io/ba5n2/>

Methods

Participants

A total of 21 participants (11 female, 8 male, 2 unreported) participated in three focus groups. Each group comprised seven participants with $n = 7$ drawn from a population of university students (aged 18 to 39 years), $n = 7$ regular EGM players, and $n = 7$ community members.

University students were recruited through an online research participant recruitment platform where they received either course credit or payment for participation. Regular EGM players (played at least monthly) were recruited through the database of a market research firm and received payment for participation. Community members were recruited through locally targeted advertisements (e.g. social media, flyers) and received payment for their participation. Eligibility criteria included being over 18 years of age and an Australian resident. Individuals were informed that participation would require engagement with an electronic gaming machine and not to participate if they have experienced gambling problems.

Procedure

The study was conducted in a university research laboratory housing three traditional EGMs and three SGMs electronic gaming machines. Upon arrival, all participants were met by a research assistant and brought to a waiting area where they were given a tablet device containing the Participant Information Statement and Consent Form. Participants were taken to the laboratory and asked to select a machine to play. Given there were seven participants for six machines, two participants were paired on one machine, with one observing the other play for 5 minutes before swapping places. Machines were preloaded with credits; no money was bet or awarded as games were set in demo mode. Participants were told to start playing their machines without further instructions given. After 5 minutes, a research assistant triggered the SGM feature mode on those machines, and after a further 5 minutes, told to swap to the alternative machine (i.e. from SGM to EGM, or vice versa). Play resumed following the same procedure of 5 minutes play before triggering the SGM feature and a further 5 minutes play.

Participants were then brought to another room for the focus group discussion. The groups followed a semi-structured format, with questions asked followed by probing questions where necessary. Questions assessed participant's experience playing the machines and elicited thoughts about aspects of the machines and game play. On completion of the focus groups lasting approximately 1 hour, participants were provided with a debrief sheet, and given a verbal description during which time they could ask questions about the machines and/or study. Participants received payment for participation at completion of the study.

Stimuli

The typical EGM was a standard modern reel-based machine in which participants could vary their bet size and number of lines using buttons or a touch screen and would see the outcome after reels spinning. The machine had a traditional free game feature¹ in which participants can choose 'red' or 'black' on a card flip and standalone progressive jackpot with a minimum return to player percentage of 90.5%. As this study was conducted in Australia, the EGMs may be referred to as 'pokies' or 'poker' machines, even though the game is predominately reel-based.

The specific SGM used in this study, *Fortunes of the Brave*² by Wymac Gaming Solutions includes two play styles. Participants start in a standard reel-spin-style game and can vary bet size and number of lines using buttons or touch screen controls. In

addition to typical wins and loss credits, during the reel-spin participants randomly win non-monetary currencies which can be exchanged for cosmetic character upgrades and items that can be used within the features (e.g. weapons) to increase their ability. Once three or more symbols appear in any place on the reels, a feature is triggered. To commence, participants must click each button to ensure that it works and are shown a brief explanation of how to play the feature (e.g. how to move the character). Participants can then customize their avatar by selecting cosmetic items (e.g. armor). In the feature, participants use their character (e.g. a knight) in one of two battle arenas where they use a console-style hand-held controller to defeat enemy forces. The feature lasts 4 minutes. If the participants' character is eliminated with time remaining in the feature, they are 'respawn' and the battle continues. Participants accrue a point score for successfully battling and eliminating the enemies, the points score is displayed on the participants' screen as well as the top screen. Participants must achieve a minimum level of points to win the first level of monetary payout, with subsequent higher payouts requiring higher score to be achieved. The score required to achieve each payout level is set and participants achieve this based on their performance within the feature. The size of the payout varies depending on the jackpot parameters set, the amount of play on the machine, and the outcomes of previous players – when a player wins, the prizes reset to a lower level, but accrue over time if subsequent players are unsuccessful, similar to a standard mystery jackpot. The minimum return to player percentage was 90.5%.

Analysis

Focus group sessions were audio-recorded and transcribed by a professional transcription service. Data were subject to thematic analysis using a deductive, theoretical approach in which the research questions guided analysis of the data (Braun & Clark, 2006). Two research assistants independently coded the data and then collaboratively reviewed their assessments to determine final codes and themes. Any discrepancies were referred to the study's principal investigator who also reviewed the transcripts and analysis. Qualitative analysis was conducted using NVivo software, version 12. A project memo was kept detailing methodological and analytical issues as they arose, and decisions made. Node memos were kept to detail coders' understanding of nodes (codes) in the focus group data as they developed, and their relationship to each other and their overarching themes. Quotes have been edited to remove filler words (e.g. 'like', 'um') for clarity.

Results

The thematic analysis of the focus group data identified three key themes surrounding SGMs: an ambiguous gaming experience with confusion about how the SGM worked; varied attitudes toward SGMs; and perceptions of the role of skill.

Ambiguous gaming-gambling experience

At the conceptual level, many participants were confused by the premise underpinning the SGM, how the gambling and gaming elements related to each other, and who the target user was. Several participants said the SGM failed to provide sufficient context or

premise for why EGM reels were being blended with a video game, which led to a jarring experience for some.

“One minute you’re playing a poker machine, the next minute you’re thrown into . . . a War Craft style thing.” (EGM player)

Participants debated whether to conceptualize the SGM as either primarily an EGM with video game features or a new video game machine with subsidiary gambling elements. Participants in each group said they were unclear whether they were spending money (and in effect gambling) while they played the feature, how the feature affected how much they would win, and the relationship between reel play and the feature.

“I was a bit confused on the feature. How do I know how much money I’m winning when I hit the . . . insects? Does each insect have like 10 USD worth, or – it’s kind of confusing.” (Male EGM player)

“I still didn’t know how much I was winning, or is it . . . do I make money per wave, or is it per insect?” (Male EGM player)

“I also had no idea when I did pay for an upgrade and got it, whatever it was, whether that was real money or whether it was just credit or something else. Was it just using points that I earned, or was it using the real money that I put in or earned?” (Male community member)

Additionally, some participants questioned whether choosing different customized appearances for their character was a functional or purely esthetic consideration. Other participants said they perceived a connection between the reels and feature, correctly identifying that bonuses could be gained in reel spins that could be used to access additional features in the feature (e.g. power-ups which provided a game advantage). One described the feature as a welcome ‘time out’ from reel play, while another suggested that wins in reel play could be used to upgrade their character in the feature game and this made the reel-spin component more interesting.

“I liked the fact that when you are doing the more boring element of just the real spinning, you can see the different colour gems, and how to level up to your character, which will help later. So it gave – there was a purpose to it in that regard. Not just the luck chance bit, but you could see when the little green gems filled up the green bar, the red ones filled up the red bar, it made sense. So, I like that.” (Male community member)

On a practical level, there was a perceived lack of clarity around the rules of the game and instructions for how to play in the feature. Three participants commented on the need for a tutorial within the game to set out basic play functions, with one favoring a tutorial over written instructions.

I felt with the newer game, it probably would have been good to have some sort of explanation of how the skill element connects to the gambling element, because I wasn’t sure . . . (Student)

Difficulty in mastering the machine’s controls and/or the character’s movement in the game was noted by several participants.

In the fighting part there’s a complete lack of instruction on what’s actually happening, or how to do anything. Like the little upgrades . . . that you can buy the suit and armour and whatever else, they seem to be purely cosmetic. (EGM player)

Varied attitudes toward SGMs and EGMs

Across the three focus groups, participants reported a mixture of both negative (boredom, confusion) and positive (interest, enjoyment) emotions during play on both machines. Several reported feeling frustration or boredom, with numerous participants commenting that the EGM was ‘slow’ and/or ‘boring.’ Others said they found both the SGM and EGM to be monotonous and a further participant described the reels section of the SGM as boring.

I thought the newer one was much more fun, because you could actually ... control the game more, and I felt ... I didn't really notice the time ... but with the slots, I was kind of just repeatedly pressing the button, and it got quite ... monotonous in that way. (Student)

Several participants reported feeling confused while playing the SGM, with some attributing this confusion to their lack of understanding of the concept underpinning the game (as mentioned above) and the game's rules. Participants were not certain how often a feature would occur in relation to reel spins when playing SGMs. Conversely, one reported he found the EGM plays a confusing experience.

Numerous participants said they felt immersed or engrossed while playing the SGM, particularly the game's feature, with some of these commenting that they felt more engrossed in the SGM as compared to the EGM. Participants spoke generally of video gaming as being an immersive experience.

“[The SGM] is more engrossing and interactive ... when you play that game, you're actually playing a game, whereas [with] the poker machine you're kind of mindlessly just staring into a void.” (EGM player)

“You can include your personality in the – in the gaming one. You are actually involved in it directly, and you're doing something. But with the poker machine you're not really doing very much.” (Female EGM player)

Feelings of amusement, curiosity, and interest in relation to SGM play were reported by participants, with some commenting on a greater level of enjoyment during the game's feature. Participants described the SGM as being ‘fun’ and/or more fun than the EGM. In several instances, the greater enjoyment was related to ‘value for money’ or a greater focus than the gambling element.

“I feel like I'm getting more of my money's worth with the video game style”. (Male EGM player)

“I figured if I was paying money and I'm actually – even I didn't win anything, I've paid for the enjoyment of playing the game, like you would at one of the arcades or something.” (Male community member)

“And I also noticed that I was way less concentrated on the money aspect [chuckles] and the, you know, battle game.” (Female community member)

“When you're playing the game play and the fighting bits, you totally forget about money and then you forget you're gambling. You're just focussing on winning as much as possible.” (Male community member)

A few participants found aspects of the EGM enjoyable or interesting, such as being able to ‘gamble’ wins on card flips.

So, I was ... doing the gambles, because ... that's more interesting than just like pressing.
(Female community member)

Some participants commented on their dislike of the roving camera angle in the SGM feature and remarked on their difficulty in using the handheld controller. In contrast, others made positive remarks about the handheld controls. Several said they did not like the fighting aspect of the game's feature, with one describing it as 'stressful' and another as 'confusing'. Some participants remarked that the graphics in the game's feature were of a poor quality.

"I think the graphics could be improved. ... if you see other games which are in the market right now, they have much better graphics ..." (Student)

The role of skill

Most of the participants variously described the SGM as being 'skilled-based' and/or requiring or depending more on skill than the EGM. One participant said that young people would see the SGM as being skill-based and therefore affording them a better chance of winning. In terms of wins and losses, several participants referred to the element of greater user control and skill in the SGM as being linked to the amount of money that a player would win or 'earn', with a perception among some that a 'good gamer' would win greater amounts of money.

"I think if you put gambling aside, and if a person truly has skills, like good gaming skills, such kind of machines can prove to be an alternate source of revenue for the person." (Student)

"Oh, it's actually kind of nice, because ... you think you have more control of how much money you're winning. So if you actually got good at it, ... I'd probably play that machine rather than the other one, where you're just hoping something good ... will come down." (Male EGM player)

"As you increase you get better using it. If I play something new like that, I'll only bet low until I get the hang of it a bit, and then I'll increase my bid as I feel I'm getting more confident with it." (Male EGM player)

In relation to the role of skill, one participant specifically discussed the opportunity of features to enable players to win back losses in the chance-based reel-spin component:

"Your win or potential winnings is based on how well you do ... So even if I've been unlucky before, I can make up for it in this". (Male community member)

Some participants referred to EGMs as being a chance-based game and others described the reel section of the SGM as being chance-based.

Further discussions emerged about the likely impact of the skill component on wins and losses. Although one participant remarked that they would lose less playing the SGM as compared to the EGM due to time spent in the feature game, others argued a player would lose more given the amount they would have to spend learning how to play, and some participants said money would be spent getting to the next level. The cost of acquiring skill in the SGM feature was discussed by several participants some commented that users would have to spend money on repeated plays so as to practice and develop

abilities in the game's feature, and others argued regular gamers would acquire skill in the SGM relatively quickly.

"... when you're just at home playing regular video games, you have nothing to lose, so you can just kind of chill, learn the games as you go. But ... this ... you are actually putting money – you're gaining or losing money with it, and that's ... a very real thing." (Student)

Relating to the confusion described previously, there was confusion among participants about how outcomes within the skill feature component would impact monetary prizes.

"I felt with the newer game, it probably would have been good to have ... some sort of explanation of how the skill element connects to the gambling element, because I wasn't sure ... – okay, so you won ... – I don't know, ... a shield or something. I don't know what that was." (Female student)

"I didn't get evidence in my ... experience of playing [SGM] that the money went back into my kitty." (Female community member)

"is that just where it's going, ... to help me with the game in level – ... to get to level four, or is it helping me earn money in the real world." (Female community member)

Discussion

The purpose of this research was to gain an understanding of individuals' subjective perceptions of playing EGMs and SGMs. Overall, a range of sentiments were expressed toward SGMs, with some participants enjoying the gaming aspects and others finding it confusing, difficult, and even stressful. The difficulty and stress appeared mostly related to the lack of familiarity and comfort with the gaming genre and controls. Conversely, some participants felt that the SGM was more entertaining and thus represented better value for money than reel-spin-based products. Although participants did not speak about their previous gaming experience, our results suggest that SGMs are likely to appeal to a subset of consumers with greater comfort with this format and gaming-style and mechanics. Prior research on SGMs indicates that intent to play is predicted by more favorable attitudes (Gainsbury et al., 2019) and SGMs are more likely to be played by those with existing gaming preferences and experience (Gainsbury & Philander, 2020). Gaming is extremely popular across society, for example, over two-thirds of Australians play video games (Brand et al., 2019). If comfort with and enjoyment of gaming is related to positive perceptions of SGMs, this suggests that these may be relatively popular gambling activities. However, more research is required to determine how gamers would interact with SGMs given their gambling elements and cost of play.

There were no substantial differences in perceptions of and attitudes toward SGMs and EGMs between the three recruitment groups. None of the three groups appeared to exhibit more positive or negative appraisal of the SGMs, although a proportion of regular EGM and community participants thought that the SGMs would be more popular among young people. Nonetheless, the student group, which were a younger age cohort, did not report any greater positive sentiment than the other groups. Prior research suggests that SGMs are more popular with existing EGM customers and younger players (Gainsbury & Philander, 2020; Pickering et al., 2020). Of note, regular EGM players are more likely to be exposed to SGMs if these were legalized or trialed in venues, so they may be more

likely to engage with these than the average community member who would not be visiting venues to have the same access opportunities. As our sample was small and not representative of general gambling venue or community populations further research is required to understand who would be most likely to engage with SGMs. This could include an ecologically valid field trial, or a laboratory or other simulated environment including free choice for participants regarding their preferred type of machine with which to engage.

Most participants perceived that SGMs involved skill while EGMs were chance based. Our findings are consistent with previous research that consumers understand that SGMs involve skill to a greater extent than EGMs, but do not have a good understanding how outcomes are determined and the relative roles of skill and chance (Gainsbury & Philander, 2020). Participants discussed how it may be possible for some players to overestimate their skill, however there was no evidence amongst the group that any participants viewed themselves as being more skilled than any other consumer, or that they personally would engage in repetitive play to 'practice' and increase their skills.

The current research contributes new insight to literature by describing specific aspects of game design that contribute to player misunderstanding. There was confusion about the how reel play related to the skill features, and how much money was being wagered and won during the features. These findings are useful to inform the development of player information strategies which should focus on increasing understanding of how outcomes are determined and the role of chance in determining outcomes (Wohl et al., 2010). Future research should examine whether illusions of control, or overestimates of the chance of winning, vary based on prior experience with gaming or perceived gaming skill. Future studies should consider whether these cognitive distortions influence the likelihood of playing SGMs or how players engage with these products.

Some participants reported that the SGM feature was highly engaging and immersive to the extent that they were not focused on time or money spent. However, these experiences were related to the feature in which money is not actively wagered and it is automatically time limited. Immersion in this machine's feature would not result in greater gambling expenditure as has been observed in the immersion during reel-spin-style EGM play (Imperatori et al., 2017; Schluter & Hodgins, 2019; Stewart & Wohl, 2013). The feature ends automatically, which may create a natural break in play whereby players can decide whether they want to continue to engage with reel-spins. The impact may be more similar to the indirect impact of smoking bans within gambling venues, which resulted in a reduction in EGM revenue (Lal & Siahpush, 2008; Tanner et al., 2017). However, preliminary research has shown that forced breaks in gambling can increase urges to continue (Blaszczynski et al., 2016). Further research is required to investigate the impact of the break in continuous play created by the feature and whether engaging in a different activity during a break in play has a positive impact on increasing sustainable gambling.

The research design included participants engaging in non-monetary-simulated play in a laboratory setting that precludes any comment made on patterns of play, gambling behavior, or impact on problem gambling. A small number of non-representative participants were included so the results are not intended to be extrapolated to a broader population. Specifically, people with existing gambling problems or a history of gambling problems were instructed not to participate as part of the ethics approval requirements.

Given the nature of focus groups, the results are limited to verbalized personal cognitions. This trial included one type of SGM that is not representative of the broad array of these machines and caution is needed to generalize the results to other SGMs.

Conclusions

This is the first qualitative study of player experience following engagement with SGMs in comparison to traditional EGMs. It provides in-depth insight into whether consumers understand SGMs and EGMs and their related attitudes. Many participants expressed positive attitudes toward SGMs and the skill-based gaming-style feature as being more engaging and entertaining than reel play. However, some participants did not understand the skill feature and how it was related to the reel-spin component, and this made them uncomfortable. All participants perceived that skill was involved in the outcomes of SGMs. However, one session of play does not appear to be sufficient to understand the precise role of skill vs. chance in determining outcomes. Future research is needed to explore some of the longer term impacts of SGM play, including whether consumers would play SGMs repeatedly in an attempt to develop 'skill' and increase their chances of winning, and whether this could contribute to gambling problems. Many of the key questions around the potential impact of SGMs on gambling and gambling harms are difficult to answer without an independently run ecologically valid trial of SGMs in a gambling venue with a comparison to similar EGMs across a substantial time period to investigate immediate adoption and use of machines and ongoing use among consumers using exit surveys, loyalty/tracking metrics, and machine data.

Notes

1. A 'feature' in an EGM refers to an event involving special sound, music or lighting effects typically associated with the player receiving an opportunity to win bonus credits or other special bonuses.
2. https://www.youtube.com/watch?v=9ga7UC6zL_s.

Disclosure statements

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Constraints on publishing

The funding body placed no constraints on publishing and had no requirements to review this manuscript before submission or publication.

Competing Interest

Sally Gainsbury and Alex Blaszczynski are Editors of International Gambling Studies and were blinded from the review and editorial process. Their competing interests are declared on the IGS website. Since 2016, Kahlil Philander has received research funds from the Washington State Gaming Commission, Manitoba Gambling Research Program, UNLV International Centre for Gaming Regulation, U.S.-Japan Business Council, Board of Regents of the Nevada System of Higher Education. He has received consulting payments from British Columbia Lottery Corporation, Responsible Gambling Council of Canada, Intralot, the Commonwealth of The Bahamas, West Virginia Lottery, Indiana Gaming Commission, and iDevelopment and Economic Association. He has received reimbursement for travel from the National Conference of State Legislators, National Council for Problem Gambling, International Association of Gaming Advisors, National Centre for Responsible Gambling, Responsible Gambling Council of Canada, North American State and Provincial Lottery Association, Evergreen Council on Problem Gambling, Global Gaming Expo Asia, and Alberta Gambling Research Institute. He is a member of the National Council for Problem Gambling, and formerly was the Director of Social Responsibility at the British Columbia Lottery Corporation.

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Data availability statement

The qualitative data described in this article is not available due to ethical restrictions. However, the protocol was pre-registered and the measures used are available here: <https://osf.io/ba5n2/>.

Open scholarship

This article has earned the Center for Open Science badge for Open Materials and Preregistered. The materials are openly accessible at <https://osf.io/ba5n2/>.

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References

- Armstrong, A. R., & Carroll, M. (2017). *Gambling activity in Australia: Findings from wave 15 of the Household, Income and Labour Dynamics in Australia (HILDA) survey*. Australian Gambling Research Centre and the Australian Institute of Family Studies. <https://aifs.gov.au/agrc/publications/gambling-activity-australia>
- Binde, P., Romild, U., & Volberg, R. A. (2017). Forms of gambling, gambling involvement and problem gambling: Evidence from a Swedish population survey. *International Gambling Studies*, 17(3), 490–507. <https://doi.org/10.1080/14459795.2017.1360928>
- Blaszczyński, A., Cowley, E., Anthony, C., & Hinsley, K. (2016). Breaks in play: Do they achieve intended aims? *Journal of Gambling Studies*, 32(2), 789–800. <https://doi.org/10.1007/s10899-015-9565-7>
- Blaszczyński, A., Ladouceur, R., Nower, L., & Shaffer, H. (2008). Informed choice and gambling: Principles for consumer protection. *The Journal of Gambling Business and Economics*, 2(1), 103–118. <http://www.ubplj.org/index.php/jgbe/article/view/527>
- Brand, J., Jervis, J., Huggins, P., & Wilson, T. (2019). *Digital Australia 2020*. IGEA. <https://igea.net/wp-content/uploads/2019/08/DA20-Report-FINAL-Aug19.pdf>
- Braun, V & Clarke, V. (2006) Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101. <https://doi.org/10.1191/1478088706qp063oa>
- Brevers, D., Cleeremans, A., Bechara, A., Greisen, M., Kornreich, C., Verbanck, P., & Noël, X. (2013). Impaired self-awareness in pathological gamblers. *Journal of Gambling Studies*, 29(1), 119–129. <https://doi.org/10.1007/s10899-012-9292-2>
- Browne, M., Rockloff, M., Hing, N., Russell, A., Boyle, C., Rawat, V., Tran, K., Brook, K., & Sproston, K. (2019). *NSW gambling survey, 2019*. NSW Responsible Gambling Fund. <https://www.responsiblegambling.nsw.gov.au/research2/research/nsw-gambling-survey-2019>
- Canale, N., Cornil, A., Giroux, I., Bouchard, S., & Billieux, J. (2019). Probing gambling urge as a state construct: Evidence from a sample of community gamblers. *Psychology of Addictive Behaviors*, 33(2), 154–161. <https://doi.org/10.1037/adb0000438>
- Delfabbro, P., King, D., & Gainsbury, S. M. (2020). Understanding gambling and gaming skill and its implications for the convergence of gaming with electronic gaming machines. *International Gambling Studies*, 20(1), 171–183. <https://doi.org/10.1080/14459795.2019.1662824>
- Delfabbro, P., King, D. L., Browne, M., & Dowling, N. A. (2020). Do EGMs have a stronger association with problem gambling than racing and casino table games? Evidence from a decade of Australian prevalence studies. *Journal of Gambling Studies*, 36(2), 499–511. <https://doi.org/10.1007/s10899-020-09950-5>
- Flick, U. (2007). What is qualitative research?. In Flick, U. (Ed.), *Qualitative Research kit: Designing qualitative research* (pp. 2–15). London: SAGE Publications, Ltd. doi: 10.4135/9781849208826
- Gainsbury, S. M., Abarbanel, B., & Blaszczyński, A. (2017). Intensity and gambling harms: Exploring breadth of gambling involvement among esports bettors. *Gaming Law Review*, 21(8), 610–615. <https://doi.org/10.1089/glr2.2017.21812>
- Gainsbury, S. M., Angus, D. J., & Blaszczyński, A. (2019). Isolating the impact of specific gambling activities and modes on problem gambling and psychological distress in internet gamblers. *BMC Public Health*, 19(1), 1372. <https://doi.org/10.1186/s12889-019-7738-5>
- Gainsbury, S. M., & Philander, K. S. (2020). *Skill gambling machines and electronic gaming machines: Irrational cognitions and understanding of the role of skill* [Pre-print publication]. Open Science Framework. <https://osf.io/w5hm3/>
- Gainsbury, S. M., Philander, K. S., & Grattan, G. (2019). Predicting intention to play random and skill-based electronic gambling machines using the theory of reasoned action. *Journal of Gambling Studies*. <https://doi.org/10.1007/s10899-019-09915-3>

- Gambling Commission. (2020). *Gambling participation and problem gambling*. <https://www.gamblingcommission.gov.uk/news-action-and-statistics/Statistics-and-research/Levels-of-participation-and-problem-gambling/Gambling-participation-and-problem-gambling.aspx>
- Harrigan, K., MacLaren, V., Brown, D., Dixon, M. J., & Livingstone, C. (2014). Games of chance or masters of illusion: Multiline slots design may promote cognitive distortions. *International Gambling Studies*, 14(2), 301–317. <https://doi.org/10.1080/14459795.2014.918163>
- Horridge, K. (2017). *Skill-based gambling machine manufacturer Gameco targets Australia, but hurdles remain*. Casino.org <https://www.casino.org/news/skill-based-gambling-machine-manufacturer-targets-australia/>
- Imperatori, C., Innamorati, M., Bersani, F. S., Imbimbo, F., Pompili, M., Contardi, A., & Farina, B. (2017). The association among childhood trauma, pathological dissociation and gambling severity in casino gamblers. *Clinical Psychology & Psychotherapy*, 24(1), 203–211. <https://doi.org/10.1002/cpp.1997>
- Källmén, H., Andersson, P., & Andren, A. (2008). Are irrational beliefs and depressive mood more common among problem gamblers than non-gamblers? A survey study of Swedish problem gamblers and controls. *Journal of Gambling Studies*, 24(4), 441. <https://doi.org/10.1007/s10899-008-9101-0>
- Kapp, M. B. (2007). Patient autonomy in the age of consumer-driven health care: Informed consent and informed choice. *Journal of Legal Medicine*, 28(1), 91–117. <https://doi.org/10.1080/01947640601180398>
- Lal, A., & Siahpush, M. (2008). The effect of smoke-free policies on electronic gaming machine expenditure in Victoria, Australia. *Journal of Epidemiology & Community Health*, 62(1), 11–15. <https://doi.org/10.1136/jech.2006.051557>
- Langer, E. J. (1975). The illusion of control. *Journal of Personality*, 32(2), 311–328. <https://doi.org/10.1037/0022-3514.32.2.311>
- Myrseth, H., Brunborg, G. S., & Eidem, M. (2010). Differences in cognitive distortions between pathological and non-pathological gamblers with preferences for chance or skill games. *Journal of Gambling Studies*, 26(4), 561–569. <https://doi.org/10.1007/s10899-010-9180-6>
- New Zealand National Gambling Study: Wave 4* (2015). (2018). Ministry of Health NZ. <https://www.health.govt.nz/publication/new-zealand-national-gambling-study-wave-4-2015>
- Pickering, D., Philander, K. S., & Gainsbury, S. M. (2020). Skill-based electronic gaming machines: A review of product structures, risks of harm, and policy issues. *Current Addiction Reports*, 7(2), 229–236. <https://doi.org/10.1007/s40429-020-00309-9>
- Schluter, M. G., & Hodgins, D. C. (2019). Dissociative experiences in Gambling Disorder. *Current Addiction Reports*, 6(1), 34–40. <https://doi.org/10.1007/s40429-019-0238-y>
- Sieroty, C. (2019, April 25). *Skill-Based slots does not accurately describe video game gambling, GameCo CEO says*. Gambling Compliance. https://gamblingcompliance.com/premium-content/insights_analysis/skill-based-slots-does-not-accurately-describe-video-game-gambling
- Stewart, M. J., & Wohl, M. J. A. (2013). Pop-up messages, dissociation, and craving: How monetary limit reminders facilitate adherence in a session of slot machine gambling. *Psychology of Addictive Behaviors*, 27(1), 268–273. <https://doi.org/10.1037/a0029882>
- Tanner, J., Dawson, A. S., Mushquash, C. J., Mushquash, A. R., & Mazmanian, D. (2017). Harm reduction in gambling: A systematic review of industry strategies. *Addiction Research & Theory*, 25(6), 485–494. <https://doi.org/10.1080/16066359.2017.1310204>
- Wohl, M. J. A., Christie, K.-L., Matheson, K., & Anisman, H. (2010). Animation-based education as a gambling prevention tool: Correcting erroneous cognitions and reducing the frequency of exceeding limits among slots players. *Journal of Gambling Studies*, 26(3), 469–486. <https://doi.org/10.1007/s10899-009-9155-7>
- Young, M. M., & Wohl, M. J. A. (2009). The gambling craving scale: Psychometric validation and behavioral outcomes. *Psychology of Addictive Behaviors*, 23(3), 512–522. <https://doi.org/10.1037/a0015043>