

review

An Examination of the Relationship Between Social Casino Gaming and Gambling: The Bad, The Ugly, and The Good

Michael J.A. Wohl,¹ Melissa M. Salmon,¹ Samantha J. Hollingshead,¹ & Hyoun S. Kim²

¹ Department of Psychology, Carleton University, Ottawa, Ontario, Canada

² Department of Psychology, University of Calgary, Calgary, Alberta, Canada

Abstract

Social casino games (i.e., free-to-play online gambling-themed games) are now ubiquitous on social network platforms such as Facebook. Their popularity and similarity to gambling games has raised concern that, among other things, social casino games will normalize gambling behaviour, which may contribute to gambling participation and to a rise in the rate of disordered gambling. Herein, we review theory and research that address potentially bad (migration to gambling) and ugly (increased rate of problem gambling) consequences of social casino gaming. We also outline the limits and boundaries of this presupposition. Specifically, we outline contexts in which social casino games may yield positive consequences when played, including the use of such games as a proxy for gambling among disordered gamblers. Drawing on these discussions, we offer a path model for gambling behaviour that places social casino gaming at its core. Although we, like others, present some pessimism regarding the outcome of social casino game play, this paper points to situations and motivations that may yield positive effects.

Keywords: social casino gaming, gambling, micro-transactions, migration, disordered gambling, treatment, benefits

Résumé

Les jeux de casino sociaux (à savoir, les jeux de hasard gratuits en ligne) se retrouvent maintenant sur les plateformes de réseaux sociaux comme Facebook. Leur popularité et leur ressemblance avec les jeux d'argent soulèvent des inquiétudes que les jeux de casino sociaux aient entre autres pour effet de normaliser les comportements de jeu, lesquels peuvent contribuer à une participation aux jeux de hasard et à une augmentation du taux de jeu compulsif (voir Gainsbury, Hing, Delfabbro, et King, 2014; Kim, Wohl, Salmon, Gupta, et Derevensky, 2015; Parke, Wardle, Rigbye, et Parke, 2013).

Dans le présent article, nous analyserons la théorie et les travaux de recherche qui traitent des conséquences potentiellement néfastes (engouement pour les jeux d'argent) et horribles (augmentation du taux du jeu compulsif) des jeux de casino sociaux. Nous définissons également les limites de cette affirmation. Plus particulièrement, nous présentons une vue d'ensemble des contextes dans lesquels les jeux de casino sociaux peuvent avoir des conséquences positives lorsqu'on s'y adonne, notamment l'utilisation chez les joueurs pathologiques de ces jeux comme substitut pour les jeux de hasard. En nous inspirant de cette analyse, nous proposons un modèle de cheminement pour les comportements de jeu où les jeux de casino sociaux occupent la place centrale. Bien que nous soyons un peu pessimistes, et nous ne sommes pas les seuls, en ce qui a trait aux répercussions des jeux de casino sociaux, cet article cite des situations et des motivations qui peuvent amener des effets positifs.

Introduction

Imagine that David logs into his Facebook account to check his newsfeed and notifications. In doing so, he is reminded that today is the birthday of a friend he made while backpacking through Europe. He reads the headline of a news story about the retreating Amazon rainforest, and sees a viral video of a cat falling off a table. Finally, David clicks on the notification icon and finds that he has been invited to join a free-to-play Texas Hold'em game on Facebook by the guy who lives down the hall in his residence building at university. He contemplates whether to accept the invitation. He decides it is best to try out the game—he had been invited to a poker game the previous week, but declined because he did not know how to play. David thinks that accepting the invite will not only help him build a friendship with the guy in his residence, but will also help build his poker knowledge and skill, which will enable him to join a real poker game in the future.

At face value, David's experience is benign. Researchers in the field of gambling studies, however, have expressed concern that engaging with social casino games—free-to-play casino-themed games on social media platforms—may pave the way for problematic gambling behaviours (see Derevensky & Gainsbury, 2016; Gainsbury, Russell, & Hing, 2014; Kim, Wohl, Salmon, Gupta, & Derevensky, 2015; King & Delfabbro, 2016; Parke, Wardle, Rigbye, & Parke, 2013). That is, social casino gaming has, in large part, been framed as a risky activity in need of attention by the research community and policy makers. Although we do not argue with the contention that some social casino gamers may migrate to gambling and experience the associated negative consequences, we believe that this contention is in need of qualification. Specifically, we argue that some social casino gamers may benefit from engaging in play, as it may reduce future gambling behaviour (and thus the negative consequences that stem from such behaviour).

To be clear, the current paper serves a dual function. The first function is to discuss the current state of theory and empirical research on the link between social casino gaming and gambling. As this area of research is in its infancy, we have done our best to search both the academic and grey literature for relevant information. Nonetheless, this area of investigation is growing at a rapid pace; although we conducted a comprehensive review of the existing literature, we cannot claim that this review is exhaustive. From the review conducted, we question the generally accepted presupposition that social casino gaming will exacerbate the rate of (disordered) gambling. Instead, we argue the social casino gaming picture is nuanced. Whereas regulation and restriction of social casino games may be wise for some people, others may benefit from exposure. To provide clarity on the social casino gaming issue, we first outline what constitutes a social casino game. We then describe theory and research that highlights when and why social casino games may be a gateway to gambling, a discussion that also details contexts in which social casino games may facilitate the development of disordered gambling. We then provide arguments and evidence for limit and boundary conditions that may help some people reduce their desire to gamble. From these arguments, we offer a path model of social casino gaming to delineate the varied effects it may have on gambling, which constitutes the second function of the present paper. Our hope is that this model will be generative. That is, we present this model to provide potential avenues for future research.

Social Casino Games: A Primer

The expansion of social media platforms (e.g., Facebook) has led to an explosion of social gaming applications (i.e., free-to-play gambling-themed games). Moreover, these applications (e.g., Slotomania, Zynga Poker) are among the top-rated apps on social networking sites, yielding significant revenue (Takahashi, 2013). For example, Facebook profited \$213 million from social casino games in Q1 of 2013 alone—an amount that comprises the majority of Facebook’s revenue (see Martin, 2014). One reason that social casino games are able to generate such considerable profits is, in part, due to the *freemium* model by which such games operate. In freemium models, no money is required to download the game or to initiate play. Although gaming operators provide players with free credits that are reloaded periodically, players are given the opportunity (and actively encouraged) to purchase additional credits to continue play or engage in higher stakes bets. These micro-transactions are a significant contributor to the estimated \$3.5 billion in revenue generated by social casino games in 2015, revenues that are expected to jump to \$4.4 billion in 2017 (Eilers & Krejcik Gaming, 2016).

Because of the lucrative nature of social casino games, it is not surprising that there is significant interest in social casino games from the gambling industry. Indeed, gambling operators have purchased, merged, and partnered with social casino gaming companies (Sapsted, 2013; Schneider, 2012). For example, International Game Technology (a Nevada-based company that designs and manufactures slot machines) purchased Double Down Casino (a social casino gaming company) for

\$500 million in 2012 (PR Newswire, 2012). Furthermore, Zynga (a popular supplier of social casino games) merged with Bwin Interactive (an online gambling operator). As a result of these partnerships, the social casino version and their casino counterparts look identical. In other words, the line between social casino gaming and online gambling has become blurred. Indeed, some players have commented that it is becoming increasingly difficult to differentiate social casino games from gambling games (Parke et al., 2013).

Due to the continued convergence of social casino games and gambling, some researchers have expressed concern about a possible link between social casino gaming and gambling. Specifically, there is concern that social casino games are a training ground for gambling games and contribute to the incidence, prevalence, and maintenance of disordered gambling (Gainsbury, Hing, Delfabbro, Dewar, & King, 2015; Griffiths, King, & Delfabbro, 2012; Kim et al., 2015; King, Delfabbro, Kaptsis, & Zwaans, 2014; Parke et al., 2013). Conversely, other research suggests that social casino game play may have prophylactic features that reduce the incidence, prevalence, and maintenance of disordered gambling (see Hollingshead, Kim, Wohl, & Derevensky, 2016; LaPlante & Shaffer, 2007; Oman et al., 2004). Thus, the effects of social casino games on future gambling behaviours are more nuanced than currently conceived. In the following sections, we detail the potential negative and positive effects of social casino game play for gambling behaviour.

The Bad: Migration From Social Casino Gaming to Gambling

Does social casino gaming lead to gambling? Although the current paucity of research on the influence of social casino gaming on gambling does not provide a definitive answer, some recent research supports the notion that social casino game play can lead to gambling behaviour. Kim and colleagues (2015), for example, conducted a longitudinal study of social casino gamers who never gambled online and found that 6 months after the initial session, over 26% of social casino gamers reported transitioning to online gambling. This migration can yield consequences, among which are financial, psychological, and familial harms (Fong, 2005; Kim, Salmon, Wohl, & Young, 2016a; Matheson, Wohl, & Anisman, 2009; Petry, Stinson, & Grant, 2005). Given the risks associated with gambling, why would a player move from the free social casino gaming version of the game to the gambling version where real money is wagered? Herein, we provide a non-exhaustive discussion of possible explanations for the migration from social casino games to gambling.

Exposure to Gambling via In-Game Advertisements

A 2012 Morgan Stanley report noted that the vast population of social casino gamers represent a potential pool of gamblers who could be recruited to increase gambling revenues. The gambling industry took note and began partnering with and purchasing social casino operators (see Girvan, 2015). Gambling operators hope that having their stake in the social casino game market will help them to, among other things, acquire new customers and strengthen their brand to increase their market

share (Gutierrez, 2012). One outcome of this partnership is an increase in advertisements for online and land-based casinos within social casino games specifically and social media platforms more generally (Kushnir, 2014). Indeed, a recent study found that more than half of the most popular Facebook games contained some sort of gambling content (e.g., Jacques et al., 2016). Importantly for the gambling operators, these advertisements are expected to generate significant revenue for both the social casino gaming and the gambling industries (Morgan Stanley, 2012).

Today, social media users are exposed to an unparalleled amount of gambling-related advertisements, a fact not lost on social casino gamers (see Kim, Wohl, Gupta, & Derevensky, 2016b). The majority of advertisements on social media platforms advocate for social casino games and one third of advertisements are for online gambling games (Gainsbury, King, Abarbanel, Delfabbro, & Hing, 2015). Moreover, over half of social casino gamers hear about the games they are playing from social media advertisements (SuperData, 2015). For example, a social casino game may post the number of credits won by players on the newsfeeds of their friends (or encourage players to post positive outcomes on their social media page or invite friends to play in exchange for additional credits). Embedding the advertisements of a game into the social features of a social media platform is particularly enticing (i.e., the advertisement entices people to download and use the game; see Askelöf, 2013).

Additionally, advertisements on social casino games primarily contain positive messages about gambling. Gainsbury and colleagues (2015b), for example, found that the messages tended to convey gambling as a glamorous opportunity to win money. Moreover, they found that there was a lack of responsible gambling messaging in the advertisements or words of caution that excessive play may cause problems. As a result, social casino gamers may feel that the gambling version of the game is worth a try. Typically, the advertisements are hyperlinked to an online gambling site. The opportunity to gamble is a simple click away—an opportunity the gambling industry wants social casino gamers to seize.

Overlap of Structural Characteristics

Once players are exposed to and engage in social casino game play, the structural characteristics of social casino games may lay the groundwork for migration to gambling. This is because the structural characteristics of social casino games closely mimic those of traditional casino gambling games (Gainsbury, Hing, Delfabbro, & King, 2014). Bramley and Gainsbury (2015), for example, analyzed the auditory features of gambling games and social casino games and found that the use of auditory cues is similar. Both games use audio to, among other things, communicate achievements to players, provide reinforcement, and heighten player emotions to enhance the gaming experience. Such auditory features may also contribute to players' reduced ability to distinguish between social casino gaming and gambling.

In addition, the highly addictive variable ratio reinforcement schedule of reward is present in both social casino games and gambling games. Specifically, in both types

of games, a player is reinforced after an unpredictable number of games (e.g., spins, hands) played. This type of reinforcement schedule creates a steady, high rate of responding. Moreover, activities that use this schedule of reinforcement, such as social casino and gambling games, are highly resistant to extinction and encourage continuation and acceleration of engagement (Ferster & Skinner, 1957).

As a result of these structural similarities, people have difficulty differentiating between free-play games and gambling games (Parke et al., 2013). The majority of Australian social casino game players reported that social casino games looked somewhat (67%) or very (24%) similar to gambling sites (Gainsbury et al., 2015b). In an effort to distinguish between these types of games, King, Gainsbury, Delfabbro, Hing, and Abarbanel (2015) argued that gaming is principally defined by its interactivity, skill-based play, and contextual indicators of success. On the other hand, betting/wagers, predominantly chance-determined outcomes, and monetary features that involve risk and payout define gambling. However, as skill-based bonus modes are being incorporated into current chance-based gambling games (e.g., slot machines), this line becomes increasingly blurred (see Nevada Senate Bill 443, 2015). Indeed, there are growing concerns that structural boundaries between gambling and gaming may become indistinguishable, such that “hybrid” gambling activities will adopt features of gaming and vice versa (King & Delfabbro, 2016). Perhaps even more nefarious is the recent introduction of slot machines, which are based on games of skill, on social networking sites such as Candy Crush. Gamers who engage in these skill-type games might be lured to their slot machine counterparts, mistakenly believing they have the skills to win money on a game that is based purely on randomness and chance.

Furthermore, there is concern that the structural similarities between social casino games and gambling games will facilitate the cross-pollination of players, which would increase the rate of gambling participation. As noted by Snow (1981), there is the potential for activity substitution when two activities provide an individual with similar satisfaction. Because social casino games and gambling games are similar in so many facets (see King et al., 2015), they will likely yield similar levels of satisfaction for a portion of players, thus facilitating the migration from social casino game play to gambling (and back again).

A Winning Algorithm: Misunderstandings About How Social Casino Games Work

Gamblers have a tendency to misunderstand their odds of winning (Bandura 1977; Toneatto, Blitz-Miller, Calderwood, Dragonetti, & Tsanos, 1997; Walker 1992; Wohl, Christie, Matheson, & Anisman, 2010). People tend to believe that slot machines randomly select outcomes without replacing them in the full set of outcomes (i.e., with every spin, the odds of winning get better). Contrary to this perspective, however, slot machines select outcomes and then replace them—each spin is independent. In practice, this means that the outcome of one spin does not affect what occurs on the next spin; no matter how many times the slot player spins the wheel, the odds of a win on each play remain constant. This misunderstanding can heighten gamblers’

perceived probabilities of future success, which can lead to problematic gambling practices (e.g., persistence in the face of loss, exceeding monetary limits; Sharpe & Tarrier, 1993). Given our discussion about the structural similarities between social casino and gambling games, it would be natural for people to think that, akin to gambling games, social casino games randomly select their outcomes without replacing them, leading to persistent and excessive social casino game play. However, as noted by Gainsbury et al. (2015c), the outcomes of most social casino games are based on algorithms that inflate the odds of success to enhance player enjoyment, otherwise known as dynamic game balancing (see also Rose, 2014).

The dynamic game balancing of social casino games is likely to promote false beliefs about the odds of winning. Specifically, players are led to believe that they are better (i.e., skilled or lucky) at the game than would occur if the outcomes were truly random. Such misperceptions about their winning ability is particularly problematic in light of advertisements promoting the illusion that the odds of winning on the social casino game are equivalent to the odds of winning on the paid gambling game (Bednarz, Delfabbro, & King, 2013). Together, these misperceptions about many social casino games may lead players to believe that they will experience similar positive outcomes when playing gambling games with real money, which may influence a social casino gamer's decision to try gambling with real money. Providing circumstantial support for this contention, Bednarz and colleagues (2013) found that social casino gamers who migrate to online gambling sites from free-play modes hold greater illusions of control over the outcome of the game, which contributes to gambling behaviour (Langer, 1975; Wohl & Enzle, 2002; Wohl, Stewart, & Young, 2011). In other words, winning that is experienced in social casino games may facilitate migration to gambling under the false sense that similar outcomes will be experienced while gambling.

As Micro-Transactions Go, So Too Does Migration

Micro-transactions—the purchase of additional credits or virtual items from the gaming operator to continue play or engage in higher stake bets—are a key component of many social casino games. Although social casino games are free to download and play, players are actively encouraged to make micro-transactions via in-game special promotions, pop-up messages, and limited-time offers. Even though only 3 to 4% of all social casino gamers make in-game purchases (SuperData, 2015), they account for a significant portion of this industry's revenue (Casual Games Association, 2012). For example, micro-transactions produced a profit of \$2.8 billion in 2014 (Wells, 2015).

Kim and colleagues (2015) found that the use of micro-transactions was a strong predictor of migration to online gambling. Specifically, they tracked social casino gamers who had never previously gambled over a 6-month period. They found that people who indicated having made micro-transactions during the first survey session were approximately 7 times more likely to try gambling for real money in the intervening 6 months. They argued that social casino gamers who make micro-transactions (a) are willing to share their credit card information with gaming

operators (which makes sharing this information with gambling operators easier) and (b) want to attempt to win real money with their financial investment in a game. When coupled with social gamers' beliefs about their chance of success (because of inflated positive outcomes about social casino games), migration to gambling games becomes understandable, albeit under false presuppositions. Thus, it is not surprising that social casino gamers who engage in micro-transactions are more likely to report involvement in gambling and problematic gambling behaviours than are social casino gamers who have not purchased virtual credits (Gainsbury, King, Russell, & Delfabbro, 2016; Kim, Hollingshead, & Wohl, in press).

In a similar vein, Bunnell and colleagues (2015) found that youth in the United States who had never smoked cigarettes before were twice as likely to have intentions to smoke if they used e-cigarettes (i.e., a nicotine-free alternative to cigarette smoking) than were non-users of e-cigarettes. Because the act of smoking e-cigarettes is similar to smoking real cigarettes, learning principles are at play that increase the likelihood of migration to the full version of the harmful alternative (e.g., smoking cigarettes). A similar argument was made by Griffiths (2013) in the context of the potential link between social casino gambling and gambling. Specifically, he claimed that allowing for the purchase of virtual credits was a masterstroke by the social casino gaming industry. This is because there is a financial cost to the social casino gamers when making micro-transactions, which makes the games more psychologically similar to gambling than they are to gaming. Put another way, because social casino gaming is functionally similar to gambling, the incentive to escalate to gambling is high based on basic learning principles.

The Ugly: Social Casino Gambling as a Gateway to Disordered Gambling

In the previous section, we delineated some of the potential negative (*bad*) effects of engaging in social casino games, specifically, the possibility of migration to gambling games. We now turn our attention to the potential *ugly* side of social casino gaming, that is, the potential for social casino games to lead to disordered gambling behaviours. In our opinion, the conversion of social casino gamers to gamblers should not be synonymous with harms. In other words, the migration to online gambling does not inevitably harm the social casino gamer. Indeed, the clear majority of people who engage in gambling activities do so at safe and recreational levels, with only 1% of the population becoming disordered gamblers (see Hodgins, Stea, & Grant, 2011). That said, the small but significant number of people who develop disordered gambling behaviours face immense negative consequences because of their addiction.

While the current literature is sparse regarding the migration of social casino gamers to gambling, the empirical literature suggests that there is considerable overlap between social casino gamers and gamblers. Many people who play social casino games also play gambling games and vice versa (Gainsbury et al., 2015c). Furthermore, profiles of individuals who engage in micro-transactions (a risk factor for the migration to online gambling) look similar to disordered gamblers; akin to

disordered gamblers, social casino gamers who make micro-transactions are impulsive and sensitive to rewards (Kim et al., in press). In this light, a portion of social casino gamers who make micro-transactions and migrate to gambling will likely develop disordered gambling behaviors. More empirical study is needed to delineate the factors that put social casino gamers who migrate to gambling at risk for disordered gambling.

According to King and Delfabbro (2016), social casino games can act both as a protective and as a risk factor when it comes to priming future online gambling behaviours. Specifically, they proposed a two-pathway model of early exposure to social casino games. The catalyst pathway describes risk factors associated with early exposure to social casino games in the development of disordered gambling. Conversely, the containment pathway delineates protective factors that may dissuade interest in gambling activities. Furthermore, both the containment and the catalyst pathway models contain social, cognitive, behavioural, and emotional domains. Risk factors, for example, may include peer pressure (social domain), greater confidence in winning (cognitive), early big wins (behavioural), and desensitization to losses (emotional). Protective factors may include the removal of the mystery of gambling (social), awareness of risks (cognitive), early losses (behavioural), and sensitivity to losses (emotional). This framework provides an opportunity to assess not only risk factors for developing disordered gambling, but also protective factors that are unique to social casino games.

Social Casino Games and Video Game Addiction

In addition to being a risk factor for disordered gambling, social casino games may also lead to the development of a video game addiction independent of gambling or financial harms. This supposition is based on the increased conversion of gambling and gaming, most notably seen in social casino games (King et al., 2015). This is because, as previously mentioned, the algorithms behind social casino games are intended to maximize player enjoyment and engagement. In other words, the goal is to keep players engaged in the game. The net result may be excessive involvement in social casino gaming play. That is, players may become addicted to social casino games specifically or online video games more generally (see Owens, 2010).

In an attempt to provide preliminary support for the link between social casino and video game addiction, Gainsbury, King, Russell, Delfabbro, and Hing (2017) assessed whether social casino gamers endorsed symptoms for an Internet gaming disorder as a result of their play. Using the criteria for Internet gaming disorder from the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; American Psychiatric Association, 2013), they found that more than half of the participants endorsed at least one symptom of the disorder. Other negative effects of social casino gaming were also reported. For example, some participants noted withdrawal symptoms when they could not use social casino games. There were also reports of relationship problems and impairments at work as a result their social casino game play. Thus, at least for some people, social casino gaming appears to impede

real-world functioning, impediments that are similar to those observed among disordered gamblers. To the best of our knowledge, no research has directly compared the harms that result from social casino gaming and gambling-related harms. However, as a result of micro-transactions, social casino gaming may lead to significant financial harms akin to those experienced by gamblers. In fact, one user of Big Fish Casino spent over \$22,000 on virtual credits in a span of 6 months (Wells, 2015).

The point here is that the potential harms of social casino games, namely, the potential for these games to develop into an addiction and thus undermine the player's well-being, should not be understated. Indeed, both video game and gambling addiction can result in significant harms to the individual (Griffiths, Kuss, & King, 2012). While empirical investigation into social casino games is in its infancy, we, like others (Derevensky & Gainsbury, 2016), feel that a proactive stance toward regulation and policy are needed to prevent the potential harm of these immensely popular free-play gambling-like games.

The Potentially Good: Social Casino Gaming as a Gambling Replacement

Thus far, we have argued that social casino game play is a risk factor for the progression and maintenance of gambling behaviour in general and disordered gambling in particular. This contention is substantiated by the growing body of empirical literature on the correlates and consequences of social casino gaming. The dark cloud over the social casino skies may nonetheless have a significant silver lining. We believe that social casino gaming may act as a harm reduction strategy for those engaging in disordered gambling behaviour, as social casino gaming may be a viable proxy for gambling. In other words, some good may be found in social casino game play.

We first turn attention to the possible prophylactic effects of social casino gaming. Like King and Delfabbro (2016), we argue that social casino games may be particularly beneficial for people with minimal exposure to gambling. Specifically, exposure to gambling games via social casino gaming may reduce their allure, which may minimize excessive play once social casino gamers begin to gamble with real money. This contention is based on research from the domain of alcohol addiction, which has found that alcohol consumption has a curvilinear relationship with mortality, moderate drinkers living longer than both non-drinkers and heavy drinkers (Di Castelnuovo et al., 2006; Gmel, Gutjahr, & Rehm, 2003). Moreover, groups that include moderate alcohol as part of their cultural or religious practices show reduced heavy alcohol consumption (e.g., Jews; see McCullough & Willoughby, 2009). This relationship may have multiple causes. Most straightforwardly, members learn self-control, which reduces their alcohol consumption (Desmond, Ulmer, & Bader, 2013; McCullough & Willoughby, 2009). Additionally, moderate drinking behaviour may be facilitated by the informal social norms of moderation that exist in such groups (see Chawla, Neighbors, Lewis, Lee, & Larimer, 2007). We contend that, in a like fashion, if members of a social casino

gamer's social network or offline network of family and friends allow for positive and moderate social casino game play, this approach may yield controlled play that extends to gambling behaviour.

In this regard, our contention is not dissimilar to that of King and Delfabbro (2016), who suggest that a healthy relationship toward gambling may be developed among youth via social casino gaming if there is parental supervision during game play. They also suggest that pauses in the game that allow for education about how simulated gambling works would yield benefits, as this relates to responsible gambling behaviour. In addition to other educational information, they suggest using social casino games to educate players with accurate ratios of wins to losses that mimic real-world casino odds without allowing the purchase of virtual credits (i.e., micro-transactions). At present, however, no empirical research has been conducted on the possible prophylactic effects of social casino games on responsible gambling attitudes, beliefs, or behaviours.

An important finding in recent research by Hollingshead et al. (2016) is that social casino games may serve as proxy for gambling among disordered gamblers. They recruited a community sample of disordered gamblers who indicated that they engaged in social casino game play and asked them about their motivation to play such games. Results showed that those who were motivated to play social casino games for the social connection it provides or to build skill reported an increase in gambling. Conversely, playing to cope with negative life events or for excitement was not predictive of gambling. Of importance to the current discussion, disordered gamblers who reported playing social casino games to reduce cravings to gamble reported an overall decrease in gambling. These findings are in line with anecdotal evidence from Gainsbury and colleagues (2015a), who reported that some disordered gamblers use social casino games to decrease their gambling. Taken together, these findings show that social casino games may be a useful tool in the arsenal of disordered gamblers to help them cut down or quit gambling.

It may also be advisable for clinicians to suggest social casino games to some clients who struggle with disordered gambling as a replacement activity to subside their cravings to gamble. However, we offer a word of caution here. One interpretation of Hollingshead and colleagues' (in press) findings is that only gamblers who were *actively* seeking to reduce their gambling (i.e., reduce their cravings) via social casino games reported subsequent decreased gambling behaviour. Social casino games may therefore be beneficial only to disordered gamblers who are in the action stage of behavioural change (see Prochaska & Norcross, 2001). Furthermore, research is needed to delineate moderators that may inadvertently increase craving when someone is engaging in social casino games as a proxy for gambling. This is because heightened craving results in increased gambling behaviours (see Young & Wohl, 2011) rather than the desired outcome of decreasing future gambling behaviours.

A Path Model of Social Casino Gaming’s Impact on Gambling

In this section, we provide a path model that outlines the consequences of social casino game play for gambling behaviour (see Figure 1). As traditionally conceptualized, a path is a contingent variable and a route that a person takes to a specific outcome. This model starts with exposure to social casino games and paths continue to one of three ends: (a) increased gambling behaviour, (b) decreased gambling behaviour, or (c) no impact on gambling behaviour. Each stop on the path provides the opportunity to appraise the current situation (e.g., whether to engage in social casino game play) and to decide on the next course of action. Here, we argue that a significant determining factor of how social casino gaming impacts on gambling is the player’s motivation to engage in social casino game play. We contend that the model works regardless of one’s prior experience with gambling. However, the speed with which one traverses the paths and the intensity with which gambling behaviour is influenced may be moderated by disordered gambling severity. Specifically, we contend that disordered gamblers will traverse the paths with relatively greater speed and intensity. However, this presupposition needs empirical verification. Furthermore, paths may need to be added or modified as empirical evidence becomes available.

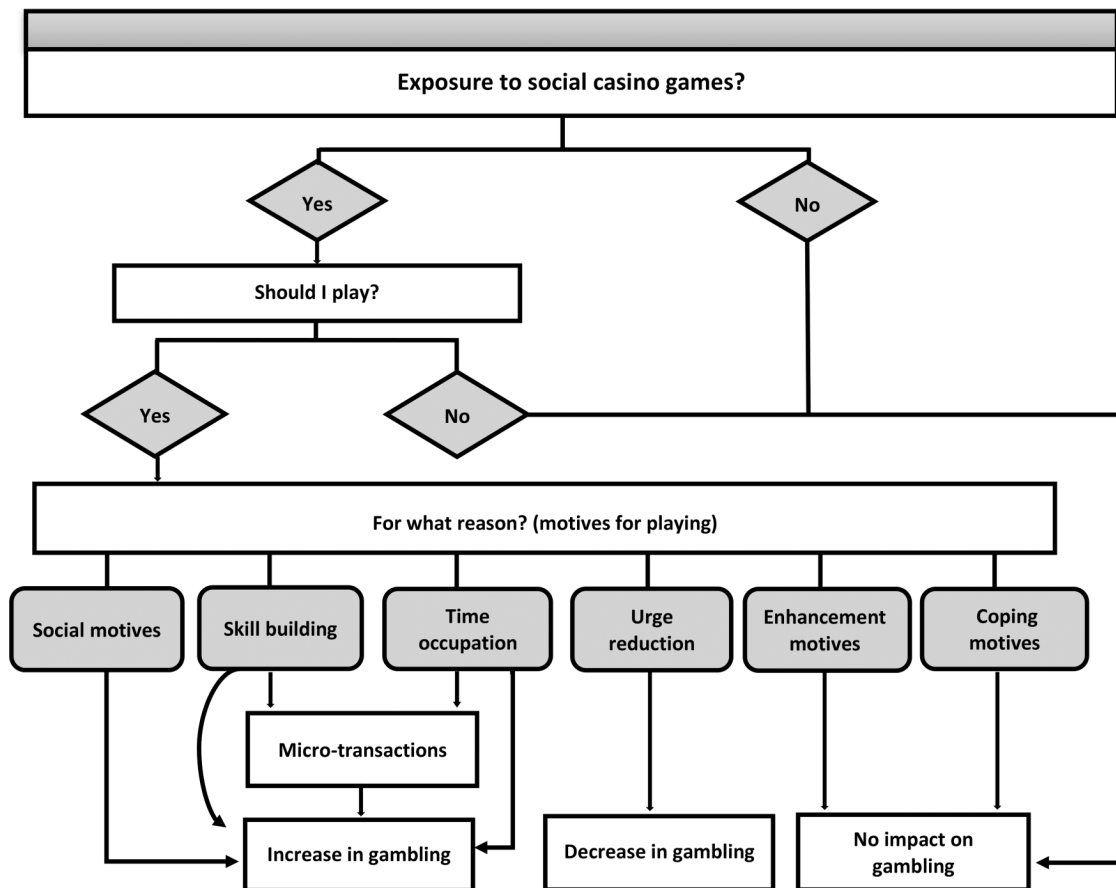


Figure 1. A path model of social casino gaming’s impact on gambling.

The path metaphor is not a formal model for others to be tested against, but rather a framework to (a) help better understand the possible link between social casino gaming and gambling and (b) generate testable hypotheses.

Start Vertex: Exposure to Social Casino Games

Every path model, like every path, needs a start, a point of departure for the person traversing its routes. In this model, social casino game play will only be engaged in after a person is aware of its existence. The obvious start is exposure to social casino games. Exposure may have occurred because of, among other things, direct advertising from the social casino game operator (e.g., on their social media page) or an invitation to play from a friend who is part of the person's social media network. Although there may be different pressures to engage in social casino game play that stem from the source (e.g., pressure to play a social casino game is likely to be greater when a person is exposed to it from a friend as opposed to an advertisement), these pressures and their consequences are outside the scope of the current model. Instead, this start vertex is solely concerned with whether or not the social media user is exposed to the existence of social casino games.

Social media users are inundated with information at login. Facebook users, for example, are provided with a list of posts from their friends and groups they have decided to follow, trending news stories, and event invites, among other things. The social media user's attention must be drawn to and recognize an opportunity to play a social casino game. Should the user fail to recognize that opportunity, there will be no engagement with social casino games and thus gambling behaviour will be unaffected. Only when an opportunity to play a social casino game catches the user's attention will he or she start traversing the path toward game play.

Although speculative, it is likely that at-risk and disordered gamblers are more often exposed to social casino advertisements than non-gamblers or recreational gamblers are. This may be particularly true for online gamblers, as targeted advertisements and newsfeed algorithms consider the user's online search history and activity. Moreover, gamblers may also be more apt than non-gamblers to receive invitations to play social casino games, in part because their friends, family, and acquaintances may think they will enjoy such games. The net result would be greater exposure to social casino games.

Motivational Vertices: Should I Play or Should I Go?

Once the social media user recognizes that there is a possibility to play casino-themed games for free with a social media account, he or she must decide whether or not to engage in social casino game play. If there is no motivation to engage in game play, then exposure to social casino games will not result in play and thus will have no influence on subsequent gambling behaviours. However, users will be more likely to engage in social casino game play if they are motivated to do so. In other words, play

is a function of motivation. An important consideration for the model is that motivations vary.

Clues for possible motivations for playing social casino games may be found in the motivations of gamblers (see Stewart & Zack, 2008). For example, akin to gamblers, some social casino gamers may use play as a coping mechanism. That is, they escape into play to avoid negative life circumstances. Some social casino gamers may be motivated to play for the social connections that playing provides. Players post their scores, see how their score compares to others on leaderboards, and converse with other players, all of which can be rewarding. Other social casino gamers may engage in play for enhancement. Specifically, play makes them feel good.

Although there is likely symmetry in the motivations to play social casino games and in those to gamble, there are also important points of departure. First, some social casino gamers are motivated to play to build their skills in the hope that they will transfer to the gambling game equivalent. Indeed, Kim et al. (2016b) conducted focus groups with social casino gamers and many spontaneously mentioned that social casino games were used to build gambling skills before playing for real money. Some expressed that they feel uncomfortable gambling in online (or land-based) casinos with real money without experience, which is offered free of charge on social casino gaming websites or applications. This result was echoed in a study by Hollingshead and colleagues (in press) in which participants' endorsement of this motive for social casino game play was well over the midpoint of the scale (2.64 on a 4-point scale). Additionally, some social casino gamers play to reduce their desire or craving to gamble (Hollingshead et al., in press; Gainsbury et al., 2015a; Parke et al., 2013). In this way, social casino gamers may believe that gaming will quench their thirst or motivation to gamble.

Motivational Outcome Vertices: Social Casino Game Play and Gambling

Social casino game play is functional: People engage in play to satisfy a desire or motivation. The outcome of the decision to play varies as a function of the motivation, especially as it pertains to possible subsequent gambling behaviour. Specifically, motivations to engage in social casino game play may result in (a) an increase in gambling behaviour, (b) a decrease in gambling behaviour, or (c) no change in gambling behaviour. We argue that each motivation to play social casino games has an associated behavioural tendency as it relates to gambling.

Motivations associated with increased gambling.

Skill building. Accumulating evidence (e.g., Kim et al., 2015, 2016b) suggests that people who are motivated to play social casino games to build their skill at the game are particularly likely to gamble. When people are so motivated, social casino games are perceived to be a venue for practice that will pave the way to success while gambling. In this way, skill-building motivations also place the social casino gamer at risk for progression to disordered gambling. As demonstrated by Wohl and

colleagues (Wohl & Enzle, 2002, 2003; Wohl et al., 2011; Wohl, Young & Hart, 2005, 2007), some people come to believe that they are personally lucky. That is, some people feel they possess a personal quality of luck that allows them to maximize chance-related outcomes. This belief likely stems from early success at games of chance that leads players to believe that they have gambling-related skills. The result is a blurred line between the chance and the skill elements of gambling games, which is associated not only with disordered gambling, but also with a reluctance to seek treatment (see Wohl et al., 2005, 2007, 2011). Additionally, people who want to build their skill may be apt to make micro-transactions to purchase credits when they have been depleted. Making a micro-transaction may be viewed as a means to quicken the skill-building pace. However, the purchase of virtual credits is a significant predictor of subsequent gambling (Kim et al., 2015).

Social motives. Social casino games played on social network platforms have an embedded social component. Many social casino games allow the user to communicate with other users during game play. Members of these social networks may invite the user to migrate to an online gambling site or to gamble offline. Anecdotally, the lead author of this paper was invited to a “house game” as a result of a “revelation” that he played poker, a revelation that stemmed from a post made by a Texas Hold’em app that informed members of his social network of the outcome of his play. People who are motivated to make social connections may be particularly keen to advance such connections by accepting the offer to gamble. Additionally, online and offline casino establishments advertise their presence on social casino games. These advertisements often contain messages that suggest a social atmosphere awaits, which may be particularly enticing for people who are socially motivated.

Time occupation motives. Some people simply want to play games to occupy their time. However, social casino games provide players with only a limited amount of credits. When those credits are used, the player needs to either wait a specified period of time for the game to reload their free credits, or purchase virtual credits (i.e., micro-transactions). People who are motivated to continue to play to occupy their time may be particularly apt to make micro-transactions. Indeed, Kim and colleagues (2016b) showed that the most cited reason for making micro-transactions was to extend play when initial seed credits were exhausted. In this light, people who are motivated to play social casino games to fill time-related voids are likely at particular risk for increased gambling (see Kim et al., 2015).

Motivations unrelated to subsequent gambling.

Enhancement motives. People who are enhancement motivated play social casino games to feel good about themselves as well as for the excitement. The advertising model used by social casino game operators likely stratifies this motivation. Indeed, it is normative for social casino games to announce especially positive outcomes (e.g., achievements) to members of the user’s social network. Leaderboards are also

posted so that members of a particular social network who use the social casino gaming app can see where they rank relative to their network compatriots. In this way, the need for self-enhancement is satisfied by the social casino game itself (and thus, there is no need to transition to gambling).

Coping motives. Given that social casino games are designed to look and feel like their gambling game equivalent, people who are motivated to play social casino games to cope or escape negative life situations (for example, via dissociation that may occur during play) should find gambling games equally satisfying. On the surface, it may be expected that people who play social casino games as a coping mechanism may subsequently migrate to gambling. However, we argue that people who find their coping needs satisfied by social casino games are likely to see no need to gamble. In fact, it may be the case that social casino games are helpful to gamblers who are gambling to cope. That is, disordered gamblers may be able to use social casino games as a free proxy for gambling. However, there is an absence of empirical work on the matter. Our contentions are therefore purely speculative.

Motivations that decrease gambling.

Urge reduction motives. Some people explicitly play social casino games to fulfill their need to gamble. Although Hollingshead and colleagues (in press), as well as others (Gainsbury et al., 2015a; Parke et al., 2013), have argued that in such a context, social casino games may be particularly helpful for disordered gamblers, it may help to reduce gambling among recreational and at-risk gamblers alike. Moreover, as noted by King and Delfabbro (2016), early exposure to social casino games may undermine the desire to gamble entirely (or at least at a moderate level). Taken together, these findings suggest that social casino games may quench people's thirst for gambling.

Conclusion

The field of social casino gaming is still in its infancy, but growing rapidly. In the current paper, we conducted a non-exhaustive review of the literature, with the express purpose of understanding the consequences (good and bad) of engagement with social casino games. From this review, we conclude that the transition from social casino gaming to gambling is neither inevitable nor unidirectional. We also outlined a path model of social casino gaming to help delineate the varied effects that it may have on gambling. However, the model will likely require amendments (or wholesale changes) as the literature on social casino gaming continues to grow. We look forward to both confirmations and challenges of the ideas presented herein.

In the meantime, it is imperative that researchers and policy makers do not sidetrack the discussion about social casino games with single-minded concerns about whether these games contribute to disordered gambling. Indeed, there may be good in these games being offered and in playing them. Put another way, intuitive assumptions about the power of social casino games to create gamblers may not be viable in

reality. That said, there is no doubt that some people will migrate from social casino gaming to gambling and that a small portion of those people may develop gambling problems. Moreover, it is increasingly the case that social casino game operators have, at their core, the purpose of enticing players to migrate to gambling (see Morgan Stanley, 2012). What is unknown, however, is whether people who start their journey toward disordered gambling from social casino gaming would have found themselves in the same predicament without exposure to social casino games. It is entirely possible that, for some, social casino games are a gateway. However, more research is needed before strong claims on the good, the bad, or the ugly effects of social casino gaming can be made. The likelihood is that social casino gaming yields all of the above. It is the duty of researchers to empirically determine the predictors, mediators, and moderators of a social casino gaming-gambling link. Once determined, this information needs to be translated to policy makers so that educated decisions about possible regulation can be made. Clearly, this is just the beginning of a long empirical road of discovery.

References

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.

Askelöf, P. (2013). *Monetization of social network games in Japan and the West* (Unpublished dissertation). Lund University, Lund, Sweden.

Bandura, A. (1977). *Social learning theory*. Oxford, England: Prentice-Hall.

Bednarz, J., Delfabbro, P., & King, D. (2013). Practice makes poorer: Practice gambling modes and their effects on real-play in simulated roulette. *International Journal of Mental Health and Addiction*, *11*, 381–395.

Bramley, S., & Gainsbury, S. M. (2015). The role of auditory features within slot-themed social casino games and online slot machine games. *Journal of Gambling Studies*, *31*, 1735–1751.

Bunnell, R. E., Agaku, I. T., Arrazola, R., Apelberg, B. J., Caraballo, R. S., Corey, C. G., ... King, B. A. (2015). Intentions to smoke cigarettes among never-smoking US middle and high school electronic cigarette users, National Youth Tobacco Survey, 2011–2013. *Nicotine & Tobacco Research*, *17*, 228–235.

Casual Games Association. (2012). *Social network games 2012: Casual games sector report*. Retrieved from [http:// docplayer.net/12856927-Social-network-games-2012-casual-games-sector-report.html](http://docplayer.net/12856927-Social-network-games-2012-casual-games-sector-report.html)

Chawla, N., Neighbors, C., Lewis, M. A., Lee, C. M., & Larimer, M. E. (2007). Attitudes and perceived approval of drinking as mediators of the relationship

between the importance of religion and alcohol use. *Journal of Studies on Alcohol and Drugs*, 68, 410–418.

Derevensky, J. L., & Gainsbury, S. M. (2016). Social casino gaming and adolescents: Should we be concerned and is regulation in sight? *International Journal of Law and Psychiatry*, 44, 1–6.

Desmond, S. A., Ulmer, J. T., & Bader, C. D. (2013). Religion, self control, and substance use. *Deviant Behavior*, 34, 384–406.

Di Castelnuovo, A., Costanzo, S., Bagnardi, V., Donati, M. B., Iacoviello, L., & de Gaetano, G. (2006). Alcohol dosing and total mortality in men and women: An updated meta-analysis of 34 prospective studies. *Archives of Internal Medicine*, 166, 2437–2445.

Eilers & Krejck Gaming. (2016). *Social casino tracker—4Q & 2015*. Santa Ana, CA: Author.

Ferster, C. B., & Skinner, B. F. (1957). *Schedules of reinforcement*. New York, NY: Appleton-Century-Crofts.

Fong, T. W. (2005). The biopsychosocial consequences of pathological gambling. *Psychiatry (Edgmont)*, 2, 22–30.

Gainsbury, S. M., Hing, N., Delfabbro, P., Dewar, G., & King, D. L. (2015a). An exploratory study of interrelationships between social casino gaming, gambling, and problem gambling. *International Journal of Mental Health and Addiction*, 13, 136–153. doi:10.1007/s11469-014-9526-x

Gainsbury, S., Hing, N., Delfabbro, P. H., & King, D. L. (2014). A taxonomy of gambling and casino games via social media and online technologies. *International Gambling Studies*, 14, 196–213. doi:10.1080/14459795.2014.890634

Gainsbury, S. M., King, D. L., Abarbanel, B., Delfabbro, P., & Hing, N. (2015b). *Convergence of gambling and gaming in digital media*. Retrieved from http://www.responsiblegambling.vic.gov.au/__data/assets/pdf_file/0003/25572/Gainsbury_convergence_of_gambling_and_gaming_2015.pdf

Gainsbury, S., King, D., Delfabbro, P., Hing, N., Russell, A., Blaszczynski, A., & Derevensky, J. (2015c). *The use of social media in gambling*. Gambling Research Australia. Retrieved from <http://www.rgtinfohub.org.uk/wp-content/uploads/2016/03/grasocialmediareport.pdf>

Gainsbury, S. M., King, D. L., Russell, A. M., & Delfabbro, P. (2016). Who pays to play freemium games? The profiles and motivations of players who make purchases within social casino games. *Journal of Behavioral Addictions*, 5, 221–230.

Gainsbury, S. M., King, D. L., Russell, A. M., Delfabbro, P., & Hing, N. (2017). Virtual addictions: An examination of problematic social casino game use among at-risk gamblers. *Addictive Behaviors, 64*, 334–339.

Gainsbury, S., Russell, A., & Hing, N. (2014). An investigation of social casino gaming among land-based and Internet gamblers: A comparison of socio-demographic characteristics, gambling and co-morbidities. *Computers in Human Behaviours, 33*, 126–135.

Girvan, P. (2015, March). Making the connection. *Global Gaming Business Magazine, 14*(3). Retrieved from <https://ggbmagazine.com/article/making-the-connection/>

Gmel G., Gutjahr, E., & Rehm, J. (2003). How stable is the risk curve between alcohol and all-cause mortality and what factors influence the shape? A precision-weighted hierarchical meta-analysis. *European Journal of Epidemiology, 18*, 631–642.

Griffiths, M. (2013). Social gambling via Facebook: Further observations and concerns. *Gambling Law Review and Economics, 17*, 104–106.

Griffiths, M. D., King, D. L., & Delfabbro, P. H. (2012). Simulated gambling in video gaming: What are the implications for adolescents? *Education and Health, 30*, 68–70.

Griffiths, M. D, Kuss, D. J., & King, D. L. (2012). Video game addiction: Past, present and future. *Current Psychiatry Reviews, 8*, 308–318.

Gutierrez, D. (2012). *Social gaming and gambling convergence: Threat, opportunity, or just a hype?* Presented at the 11th European iGaming Congress, Barcelona, Spain. Retrieved from <http://www.slideshare.net/kontagent/ei-g-webinar-9-17-12final>

Hodgins, D. C., Stea, J. N., & Grant, J. E. (2011). Gambling disorders. *The Lancet, 378*, 1874–1884.

Hollingshead, S., Kim, H. S., Wohl, M. J. A., & Derevensky, J. (2016). The social casino gaming-gambling link: Motivation for playing social casino games determine whether gambling increases or decreases. *Journal of Gambling Issues, 33*, 52-67.

Jacques, C., Fortin-Guichard, D., Bergeron, P. Y., Boudreault, C., Lévesque, D., & Giroux, I. (2016). Gambling content in Facebook games: A common phenomenon? *Computers in Human Behavior, 57*, 48–53.

Kim, H. S., Hollingshead, S., & Wohl, M. J. A. (in press). Who spends money to play for free? Identifying who makes micro-transactions on social casino games (and why). *Journal of Gambling Studies*. Advance online publication. doi: 10.1007/s10899-016-9626-6

- Kim, H. S., Salmon, M., Wohl, M. J., & Young, M. (2016a). A dangerous cocktail: Alcohol consumption increases suicidal ideations among problem gamblers in the general population. *Addictive Behaviors*, *55*, 50–55.
- Kim, H. S., Wohl, M. J., Gupta, R., & Derevensky, J. (2016b). From the mouths of social media users: A focus group study exploring the social casino gaming–online gambling link. *Journal of Behavioural Addictions* *5*, 115–121.
- Kim, H. S., Wohl, M. J., Salmon, M. M., Gupta, R., & Derevensky, J. (2015). Do social casino gamers migrate to online gambling? An assessment of migration rate and potential predictors. *Journal of Gambling Studies*, *31*, 1819–1831.
- King, D. L., & Delfabbro, P. H. (2016). Early exposure to digital simulated gambling: A review and conceptual model. *Computers in Human Behavior*, *55*, 198–206.
- King, D. L., Delfabbro, P. H., Kaptsis, D., & Zwaans, T. (2014). Adolescent simulated gambling via digital and social media: An emerging problem. *Computers in Human Behaviours*, *31*, 305–313.
- King, D. L., Gainsbury, S. M., Delfabbro, P. H., Hing, N., & Abarbanel, B. (2015). Distinguishing between gaming and gambling activities in addiction research. *Journal of Behavioral Addictions*, *4*, 215–220.
- Kushnir, E. (2014). *State of the social casino industry, Q4, 2014*. Retrieved from <http://www.slideshare.net/eladkushnir/final-ccsf-elad-kushnir>
- Langer, E. (1975). The illusion of control. *Journal of Personality and Social Psychology*, *32*, 311–328.
- LaPlante, D. A., & Shaffer, H. J. (2007). Understanding the influence of gambling opportunities: Expanding exposure models to include adaptation. *American Journal of Orthopsychiatry*, *77*, 616–623.
- Martin, C. (2014, Summer). Big data and social casino gaming. *Canadian Gaming Lawyer Magazine*. Retrieved from https://imgl.org/sites/default/files/media/bigdataandsocialcasinogaming_christinemartinjd_cgl_summer2014.pdf
- Matheson, K., Wohl, M. J., & Anisman, H. (2009). The interplay of appraisals, specific coping styles, and depressive symptoms among young male and female gamblers. *Social Psychology*, *40*, 212–221.
- McCullough, M. E., & Willoughby, B. L. B. (2009). Religion, self-regulation, and self-control: Associations, explanations, and implications. *Psychological Bulletin*, *135*, 69–93.

Morgan Stanley. (2012). *Social gambling: Click here to play*. Morgan Stanley Research. Retrieved from <http://docplayer.net/17454249-Social-gambling-click-here-to-play.html> the

Nevada Senate Bill 443, NV SB443 (USA). (2015). *Revises provisions governing the acceptance of race book and sports pool wagers*. Retrieved from <https://legiscan.com/NV/bill/SB443/2015>

Oman, R. F., Vesely, S., Aspy, C. B., McLeroy, K. R., Rodine, S., & Marshall, L. (2004). The potential protective effect of youth assets on adolescent alcohol and drug use. *American Journal of Public Health, 8*, 1425–1430.

Owens M. D. (2010). If you can't tweet'em, join'em: The new media, hybrid games, and gambling law. *Gaming Law Review and Economics, 14*, 669–672.

Parke, J., Wardle, H., Rigbye, J., & Parke, A. (2013). *Exploring social gambling: Scoping, classification and evidence review*. UK Gambling Commission. Retrieved from <http://eprints.lincoln.ac.uk/16412/1/Social%20Gambling.pdf>

Petry, N. M., Stinson, F. S., & Grant, B. F. (2005). Comorbidity of DSM-IV pathological gambling and other psychiatric disorders: Results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Journal of Clinical Psychiatry, 66*, 564–574.

PR Newswire. (2012, January 12). *International game technology to acquire social gaming company Double Down Interactive*. Retrieved from <http://www.prnewswire.com/news-releases/international-game-technology-to-acquire-social-gaming-company-double-down-interactive-137209833.html>

Prochaska, J. O., & Norcross, J. C. (2001). Stages of change. *Psychotherapy: Theory, Research, Practice, Training, 38*, 443–448.

Rose, I. N. (2014). Should social casino games be regulated? *Gaming Law Review and Economics, 18*, 134–137.

Sapsted, T. (2013). *Social casino gaming: Opportunities for 2013 and beyond*. London, United Kingdom: FC Business Intelligence.

Schneider, S. (2012). Social gaming and online gambling. *Gambling Law and Review, 16*, 711–712.

Sharpe, L., & Tarrier, N. (1993). Towards a cognitive-behavioural theory of problem gambling. *British Journal of Psychiatry, 162*, 407–412.

Snow, R. G. (1981). A structural analysis of recreation activity substitution. (Unpublished doctoral dissertation). Texas A&M University, College Station, Texas.

Stewart, S. H., & Zack, M. (2008). Development and psychometric evaluation of a three-dimensional Gambling Motives Questionnaire. *Addiction, 103*, 1110–1117. doi:10.1111/j.1360-0443.2008.02235.x

SuperData. (2015). Social casino market – US player insights 2015. New York, NY: Author.

Takahashi, D. (2013, December 9). Facebook names its top games of 2013. *Venture Beat*. Retrieved from <http://venturebeat.com/2013/12/09/facebook-names-its-top-games-of-2013>

Toneatto, T., Blitz-Miller, T., Calderwood, K., Dragonetti, R., & Tsanos, A. (1997). Cognitive distortions in heavy gambling. *Journal of Gambling Studies, 13*, 253–266.

Walker, M. (1992). *The psychology of gambling*. New York, NY: Pergamon.

Wells, N. (2015). The shocking truth about mobile gaming. *CNBC*. Retrieved from: <http://www.cnbc.com/2015/08/03/the-shocking-truth-about-mobile-gaming.html>

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*, 469–486.

Wohl, M. J. A., & Enzle, M. E. (2002). The deployment of personal luck: Sympathetic magic and illusory control in games of pure chance. *Personality and Social Psychology Bulletin, 28*, 1388–1397.

Wohl, M. J. A., & Enzle, M. E. (2003). The effects of near wins and losses on self-perceived personal luck and subsequent gambling behaviours. *Journal of Experimental Social Psychology, 39*, 184–191.

Wohl, M. J. A., Stewart, M. J., & Young, M. M. (2011). Personal luck usage scale (PLUS): Psychometric validation of a measure of gambling-related belief in luck as a personal possession. *International Gambling Studies, 11*, 7–21.

Wohl, M. J. A., Young, M. M., & Hart, K. E. (2005). Untreated young gamblers with game-specific problems: Self-concept involving luck, gambling ecology and delay in seeking professional treatment. *Addiction Research and Theory, 13*, 445–459. doi:10.1080/16066350500168444

Wohl, M. J. A., Young, M. M., & Hart, K. E. (2007). Self-perceptions of dispositional luck: Relationship to DSM gambling symptoms, subjective enjoyment of gambling and treatment readiness. *Substance Use & Misuse, 42*, 43–63. doi:10.1080/10826080601094223

Young, M. M., & Wohl, M. J. A. (2011). Canadian Problem Gambling Index: An evaluation of the scale and its accompanying profiler software in a clinical setting. *Journal of Gambling Studies*, 27, 467–485.

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For correspondence: Michael J. A. Wohl, Ph.D., Department of Psychology, Carleton University, 1125 Colonel By Drive, Ottawa, ON, K1S 5B6. E-mail: michael.wohl@carleton.ca

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