

## The cost of virtual wins: An examination of gambling-related risks in youth who spend money on social casino games

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**Background and aims:** Social casino games (SCGs) are not technically considered a form of gambling but they do enable players to spend money in a game that is gambling themed or structurally approximate to gambling. It has been theorized that SCGs could be a gateway to gambling activities or otherwise normalize the experience of gambling for young people, particularly when money becomes involved. The aim of this study was to investigate whether adolescents' financial expenditure in SCGs was associated with broader gambling activity, including level of participation, expenditure, and problem gambling symptoms. **Methods:** An online survey was administered to 555 adolescents, including 130 SCG players (78 non-paying and 52 paying users). **Results:** Paying SCG users tended to be employed males who play more frequently and engage in more SCG activities, who report more symptoms of problem gambling and higher psychological distress than non-paying SCG users. Paying SCG users reported more frequent engagement and spending in monetary gambling activities, and two-thirds of SCG payers recalled that their SCG use had preceded involvement in financial gambling. **Discussion and conclusions:** Spending in simulated gambling activities by adolescents may be a risk factor for problem gambling. Although SCGs may currently defy classification as a form of gambling, these activities will likely continue to be scrutinized by regulators for the use of dubious or exploitative payment features offered in a gambling-themed format that is available to persons of all ages.

**Keywords:** adolescent, social casino games, gambling disorder, Internet, financial

### INTRODUCTION

Social casino games (SCGs) occupy a unique place in the digital entertainment marketplace. SCGs are close structural approximations to gambling, featuring comparable and sometimes identical audio-visual and game play design, and enable players to invest real money in exchange for virtual credits that can be won or lost. These activities, therefore, blur the line between gaming and gambling, but fundamentally evade legal definition as a gambling activity due to the absence of monetary return to the player (Dayanim, 2014; Gainsbury, Hing, Delfabbro, & King, 2014; Rose, 2014). However, social casino gaming is becoming more recognized in academic literature for its link to gambling activities (Abarbanel & Rahman, 2015). For example, recent studies have reported on migration rates from SCGs to gambling (Kim, Wohl, Salmon, Gupta, & Derevensky, 2015) and the positive association between SCG play with gambling problems (Gainsbury et al., *in press*). Research evidence suggests that social games are popular among young adults (i.e., worldwide prevalence of 6% in the 18–21 age range; Parke, Wardle, Rigbye, & Parke, 2013) and youth are actively involved in or otherwise exposed to advertising for SCGs (Wood & Griffiths, 2007; Ipsos MORI, 2009; King,

Delfabbro, Kaptosis, & Zwaans, 2014). However, the influence of SCG use on financial gambling and gambling problems is currently unclear.

A prevalent feature of social casino gaming, like other social games, is the option for players to spend real money on virtual credits. By design, the player is not required to stake real money in order to play the game as distinct from a gambling activity. Instead, players are provided with a starting pot of credits that may then be depleted, and will be prompted to spend money on additional currency to continue play. An alternative option may be for the player to wait for a specified period of time (e.g., 4 hr) for in-game credit to be added or replenished. The ability to pay money for additional credit is therefore intended to enable players to avoid waiting and immediately relieve any frustration or discomfort due to interrupted play, or make much more rapid progress than would be possible without spending money. As the time and effort required to earn sufficient credits to make steady progress increases, there may be

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stronger temptation among players to purchase credit to achieve previous levels of reward payout or progress in the game (King & Delfabbro, 2016a). This is borne out in data that show a small number of young people aged 13–17 who spend money on SCGs spend, on average, US\$3.96 per day on credits (Harvest Strategy, 2014). Another important aspect of SCGs is players are not able to cash out or otherwise redeem their in-game credits for real money. However, in some games, it may be possible for players to earn loyalty points through playing that can then be redeemed for hotel rooms or other gifts or items, including special discounts and casino promotions (e.g., a coupon that is brought to the casino cashier and exchanged for \$10 in chips that can be used to gamble for real money rewards) (King, Gainsbury, Delfabbro, Hing, & Abarbanel, 2015). SCGs may be attractive to adolescent populations due to their aesthetic properties and licensing (e.g., designs, graphics, characters, and brands of interest to younger people), integration within online social networks where young people frequently socialize and earn peer recognition (Gainsbury et al., 2014), and their similarity to gambling products which may be perceived as a desirable adult activity (Allen, Madden, Brooks, & Najman, 2008; Bramley & Gainsbury, 2015; King, Delfabbro, & Griffiths, 2010). However, there is only preliminary evidence on whether SCG activity may contribute to changes in the incidence and prevalence of gambling and potential problems associated with gambling (Gainsbury, Hing, Delfabbro, Dewar, & King, 2015; Griffiths, King, & Delfabbro, 2012; Kim et al., 2015; King et al., 2014). A study of 409 SCG users by Kim et al. (2015) reported that spending in SCGs was a unique predictor of migration from SCGs to online gambling. Another study of 521 adult SCG users found that 10% reported that their gambling involvement had increased as a result of SCGs and 19% reported that they had gambled as a direct result of these games (Gainsbury, Russell, King, Delfabbro, & Hing, 2016). A recent study by Kim, Hollingshead, and Wohl (2016) surveyed 302 social casino gamers and reported that participants who made micro-transactions reported higher problem gambling severity and increased impulsivity and reward sensitivity, suggesting that spending in these activities may be associated with additional risks. Qualitative studies with SCG users have reported that some users migrate to gambling, motivated by a desire to achieve monetary rewards (Gainsbury et al., 2015; Kim, Wohl, Gupta, & Derevensky, 2016).

There are several conceptual reasons to expect that financial expenditure in SCGs may increase the likelihood of future gambling and associated risks for adolescents (King & Delfabbro, 2016b). First, the involvement of money may alter the structural nature of the game, including its win/loss payout (e.g., access to special jackpots or big wins), enable certain player advantages, increase the frequency of promotions and incentives to play, and facilitate larger bets and access to advanced levels (Kim, Wohl, et al., 2016), thereby making gambling seem more enjoyable and/or profitable. Spending money in an SCG may strengthen a player's justification for continued gambling to minimize cognitive dissonance related to spending money that cannot be returned to the player (McCusker, 2001). Also, purchasing SCG currency may give a sense of ownership of virtual

goods that may make it more difficult for the player to discontinue playing (Watkins & Molesworth, 2012). SCG spending may also have a normalizing effect (Korn, Hurson, & Reynolds, 2005), whereby the experience of spending money on SCGs generalizes to similar digital activities including online gambling.

### *The present study*

Optional financial expenditure in SCGs has not been investigated thoroughly in the academic gambling literature, with previous studies tending to focus on time investment or psychological variables (e.g., addiction, attitudes, and interest in gambling). The first aim of this study was to investigate the nature and extent of spending in SCGs among adolescents, and identify whether financial expenditure in SCG was associated with differences in playing activity, including frequency and motivations for playing SCGs. The second aim of the study was to explore whether financial expenditure in SCGs was related to gambling, including whether it may be a behavioral indicator of problem gambling symptoms and psychological distress. Psychological distress was included to provide additional perspective on psychological difficulties experienced by participants, given that gambling-related problem symptoms may be underreported.

## METHODS

### *Participants and recruitment*

A total of 561 complete responses from respondents aged 12–17 years were obtained through an online survey conducted between May and June 2014. The survey instrument was hosted on the Qualtrics platform and respondents were recruited through Survey Sampling International. The respondents were recruited through their parents and their parents were asked to give their consent at the start of the survey. Inclusion criteria were being aged 12–17 years and living in Australia. Initial examination of the data identified six spurious responses to the demographic questions, leaving a total sample of 555 adolescents. For the purpose of this study, a subsample of respondents who indicated that they had played SCGs in the last 12 months was targeted. Of the 555 adolescents in the sample, 130 (23.4%, 75 males, mean age = 15.38 years,  $SD = 1.47$ ) indicated that they had played SCGs and were thus retained for further analysis. There were 52 paying SCG users and 78 non-paying SCG users.

### *Measures*

The questionnaire was a part of a larger project on social media and gambling that has been reported elsewhere (Gainsbury, King, et al., 2016; Gainsbury et al., in press). A comprehensive survey of social casino gaming was conducted for this project, with additional sections of relevance to this study detailed further below.

*Demographics.* Gender, age, and employment status (part-time, casual work) were assessed.

*Social casino game activity.* Participants were asked whether they had played each of six types of SCGs

(lottery-type, electronic gaming machines (EGMs), sports betting, horse/dog race betting, poker, and casino games); how frequently they have played each form (never, annually, monthly, weekly, daily); number of separate game sessions within a typical day of SCG play (response options: 1, 2–3, 4–6, 7–10, 11+); and duration of SCG play in a typical day of SCG play (0–15 min, 16–30 min, 31–59 min, 1–2 hr, more than 2 hr).

**Expenditure on SCGs.** These questions assessed frequency of expenditure on SCGs in the last 12 months (at least once per day, week, month, year, or never in the last 12 months); usual expenditure each time they make a purchase (<\$1, \$1–\$5, \$6–\$10, \$11–\$20, \$21–\$50, \$51–\$100, \$101+, all in AUD\$); forms on which they spent money (the same six forms as above); motivations for spending money for SCGs [to decorate or personalize the game; to get ahead in the game; to avoid waiting for or earning credits; to purchase gifts for friends; the game is not fun otherwise; to take advantage of a special offer; to increase my level of enjoyment; as an impulse decision to continue play; other (specify): each rated from not important, somewhat important, very important]; number of SCGs on which they spend money in a typical month, and whether the cost of purchases was understood clearly before they paid (5-point Likert scale from strongly disagree to strongly agree). Frequency of expenditure and usual expenditure were combined to form an estimate of weekly expenditure. Further details about this variable are given in the Results section.

**Reasons for playing SCGs.** Participants were provided with a list of seven possible reasons for playing SCGs (social interaction, to relieve stress/escape from my worries, to pass the time/avoid boredom, to improve my gambling skills, to make money, for excitement/fun, and for the competition/challenge). The response format was “yes/no” and multiple responses were permitted.

**Relationship between SCGs and gambling.** These questions assessed the interest in gambling with real money on their favorite SCG (not at all, somewhat, very); interest in gambling with real money online on forms that are currently illegal in Australia (not at all likely, somewhat likely, very likely); whether being able to gamble online on their favorite SCG form would increase or decrease the existing SCG play; and whether being able to gamble in this way would increase, decrease, or leave their SCG play unchanged. Respondents were asked if they had ever gambled as a result of playing an SCG (yes/no); whether they had gambled on any form of gambling within the last 12 months (yes/no for each of 10 forms); whether they had gambled online within the last 12 months (yes/no); and estimated monthly gambling expenditure (open-ended question).

**Kessler 6 (K6; Kessler et al., 2002).** The K6 was administered to assess broad psychological distress. A sum of the scores on all six items (each item with response options of “0: none of the time,” “1: a little of the time,” “2: some of the time,” “3: most of the time,” and “4: all of the time”) was calculated to yield an index of psychological distress (Kessler et al., 2010). The cut-off scores employed in this study were “0–12: no distress” and “13+: at least mild distress.”

**Problem Gambling Severity Index (PGSI; Ferris & Wynne, 2001).** The 9-item PGSI assessed the extent of

gambling-related problems experienced over the last 12 months with response options of “never,” “sometimes,” “most of the time,” and “almost always.” These questions were only asked to those who reported gambling in the last 12 months on anything other than lottery-type games. Total scores ranged from 0 to 27. The PGSI has been independently validated and shown to have excellent reliability, dimensionality, external/criterion validation, item variability, practicality, applicability, and comparability (McMillen & Wenzel, 2006). The internal consistency was high (Cronbach’s  $\alpha = 0.94$ ).

### Statistical analysis

The presented analyses involved the comparison of paying SCG users ( $n = 52$ ) and non-paying SCG users ( $n = 78$ ). The two groups were compared using Welch  $t$ -tests or Mann–Whitney  $U$  tests for continuous-dependent variables and  $\chi^2$  tests of independence for categorical-dependent variables with post-hoc tests of proportions where required. An  $\alpha$  of 0.05 was employed with Bonferroni corrections where indicated. Effect sizes are reported for Mann–Whitney  $U$  ( $r$ ) and  $\chi^2$  ( $\Phi$ ) tests with both interpreted the same way: small effects = 0.1, medium effects = 0.3, and large effects = 0.5. As described below, paying and non-paying SCG users differed in terms of gender and age. Additional analyses controlling for these variables were conducted and found that the results did not change. Analyses indicated tolerance between the age, gender, and SCG pay/non-pay variables of 0.94–0.97 indicating that they were independent of each other. Thus, we opted to report uncontrolled analyses for ease of reading. Multivariate logistic regression to examine the overlap between variables was considered, but the analysis was underpowered.

### Ethics

The study procedures were carried out in accordance with the Declaration of Helsinki. The Human Research Ethics Committee at Southern Cross University approved the study. All subjects were informed about the study and all provided informed consent.

## RESULTS

### Demographics

Of the 75 male SCG users, 48% were paying users, which was a significantly higher proportion than the 29.1% of 55 female SCG users who were paying users,  $\chi^2(1, N = 130) = 4.73$ ,  $p = .030$ ,  $\Phi = 0.19$ . Paying SCG users were significantly older ( $M = 15.69$ ,  $SD = 1.21$ ) than non-paying SCG users ( $M = 15.18$ ,  $SD = 1.59$ ), Welch  $t(125.5) = 2.08$ ,  $p = .039$ ; however, this difference would not be developmentally significant. Of the 45 adolescents who were employed in some capacity, 62.2% had spent money on SCGs, which was significantly more than the 28.2% of the 85 unemployed students in the sample,  $\chi^2(1, N = 130) = 14.16$ ,  $p < .001$ ,  $\Phi = 0.33$ .

*SCG activity*

Table 1 summarizes the frequency of engagement in each of the six forms of SCGs in the last 12 months. Of the paying SCG users ( $N = 52$ ), the rates of participation across the six types of SCGs ranged from 77% to 90%, as compared to 24% to 60% of the non-paying SCG users, indicating that

Table 1. Past-year engagement in each of the six forms of SCGs

Form and frequency	Non-paying SCG users (n = 78)		Paying SCG users (n = 52)	
	n	%	n	%
<b>Lottery-type games<sup>a</sup></b>				
At least once per day	2	2.6	10	19.2*
At least once per week	13	16.7	15	28.8
At least once per month	11	14.1	15	28.8*
At least once per year	21	26.9	7	13.5
Never	31	39.7*	5	9.6
$\chi^2(4, N = 130) = 27.78, p < .001, \Phi = 0.46$				
<b>Slot machines/pokies/gaming machines</b>				
At least once per day	1	1.3	8	15.4*
At least once per week	7	9.0	17	32.7*
At least once per month	15	19.2	12	23.1
At least once per year	16	20.5	9	17.3
Never	39	50.0*	6	11.5
$\chi^2(4, N = 130) = 32.19, p < .001, \Phi = 0.50$				
<b>Sports betting</b>				
At least once per day	2	2.6	8	15.4*
At least once per week	7	9.0	11	21.2*
At least once per month	8	10.3	14	26.9*
At least once per year	6	7.7	10	19.2*
Never	55	70.5*	9	17.3
$\chi^2(4, N = 130) = 15.98, p = .001, \Phi = 0.53$				
<b>Race wagering</b>				
At least once per day	7	1.3	7	13.5*
At least once per week	5	6.4	10	19.2*
At least once per month	7	9.0	12	23.1*
At least once per year	6	7.7	12	23.1*
Never	59	75.6*	11	21.2
$\chi^2(4, N = 130) = 38.75, p < .001, \Phi = 0.55$				
<b>Poker</b>				
At least once per day	1	1.3	9	17.3*
At least once per week	9	11.5	9	17.3
At least once per month	7	9.0	14	26.9*
At least once per year	15	19.2	9	17.3
Never	46	59.0*	11	21.2
$\chi^2(4, N = 130) = 27.63, p < .001, \Phi = 0.46$				
<b>Other casino-style card or table games</b>				
At least once per day	2	2.6	8	15.4*
At least once per week	8	10.3	9	17.3
At least once per month	10	12.8	10	19.2
At least once per year	10	12.8	13	25.0
Never	48	61.5*	12	23.1
$\chi^2(4, N = 130) = 21.30, p < .001, \Phi = 0.41$				

Note. Omnibus  $\chi^2$  tests followed by post-hoc pairwise tests of proportions.

<sup>a</sup>Lottery-type games were specified as lotteries, scratchies, lotto, pools, bingo, or keno.

\*Significantly higher proportion in each row where a significant Bonferroni-corrected test of proportions was observed.

paying SCG users were more strongly represented across the six activities compared to non-paying SCG users. Furthermore, paying SCG users participated in each form significantly more often than non-paying SCG users with the weakest statistically significant difference observed for SCGs, Mann–Whitney  $U = 118.5, Z = 4.25, p < .001, r = .37$ . Table 2 presents a summary of the number of SCG sessions played and their duration in a typical day according to paying status. Paying SCG users were more likely to report playing more than one game session in a typical day of SCG play (77%) compared to non-paying SCG users (23%). Paying SCG users were also significantly more likely to report a higher number of sessions during a typical day of play,  $\chi^2(4, N = 130) = 18.06, p = .001, \Phi = 0.37$ . Furthermore, SCG playing sessions were typically longer for paying SCG users with only 13.5% of this group playing 0–15 min compared to 51.3% of non-paying SCG users. A higher proportion of paying SCG users reported longer durations of play than non-payers,  $\chi^2(4, N = 130) = 21.41, p < .001, \Phi = 0.41$ .

*Description of expenditure among those who had paid for SCGs*

Table 3 summarizes the types and frequency of financial expenditure on SCGs as well as the reasons for spending money on SCGs. Paying SCG users tended to pay money on a weekly (46.2%) or monthly (34.6%) basis over the last 12 months with each purchase typically \$10 or less (50% of respondents). Respondents reported financial expenditure on the following SCG activities: lottery-type games (51.9%), sports betting (44.2%), and EGMs (42.3%). The most frequently reported reasons for spending money on SCGs were: to avoid waiting for free credits or having to earn credits (42.3%), to make progress in the game (36.5%), to take

Table 2. Social casino game sessions in a typical day of social casino game play

SCG play	Non-paying SCG users (n = 78)		Paying SCG users (n = 52)	
	n	%	n	%
<b>Number of sessions</b>				
1	47	60.3*	14	26.9
2–3	22	28.2	19	36.5
4–6	5	6.4	14	26.9*
7–10	2	2.6	3	5.8
11+	2	2.6	2	3.8
$\chi^2(4, N = 130) = 18.06, p = .001, \Phi = 0.37$				
<b>Session duration</b>				
0–15 min	40	51.3*	7	13.5
16–30 min	26	33.3	24	46.2
31–59 min	9	11.5	15	28.8*
1–2 hr	1	1.3	2	3.8
2+ hr	2	2.6	4	7.7
$\chi^2(4, N = 130) = 21.41, p < .001, \Phi = 0.41$				

Note. Omnibus  $\chi^2$  tests followed by post-hoc pairwise tests of proportions.

\*Significantly higher proportion in each row where a significant Bonferroni-corrected test of proportions was observed.

Table 3. Financial expenditure among paying SCG users ( $n = 52$ )

	<i>n</i>	%
<b>Frequency of expenditure</b>		
At least once per day	4	7.7
At least once per week	20	38.5
At least once per month	18	34.6
At least once per year	6	11.5
Never	4	7.7
<b>Usual spend per purchase</b>		
<\$1	4	7.7
\$1–\$5	10	19.2
\$6–\$10	12	23.1
\$11–\$20	10	19.2
\$21–\$50	11	21.2
\$51–\$100	2	3.8
\$101+	3	5.8
<b>Forms on which they have spent money</b>		
Lottery-type games	27	51.9
Slot machines/pokies/gaming machines	22	42.3
Sports betting	23	44.2
Race wagering	13	25.0
Poker	11	21.2
Other casino-style card or table games	2	3.8
<b>Expenditure on how many different SCGs per month</b>		
0	6	11.5
1	11	21.2
2	21	40.4
3	10	19.2
4	0	0.0
5+	4	7.7
<b>Reasons for spending money on SCGs</b>		
To avoid waiting for or earning credits	22	42.3
To get ahead in the game	19	36.5
To take advantage of a special offer	19	36.5
To purchase gifts for friends	15	28.8
To increase my level of enjoyment	12	23.1
The game is not fun otherwise	10	19.2
An impulse decision to continue play	8	15.4
To decorate or personalize the game	5	9.6
Other	1	1.9

advantage of a special offer (36.5%), and to increase enjoyment of the game (23.1%). Most respondents (61.6%) reported spending money on one or two SCG games per month, and the majority (75%) indicated that they were aware of the cost of their SCG purchases prior to making payment.

#### Estimated weekly SCG expenditure

Estimated weekly SCG expenditure was calculated by taking participants' estimates of days of SCG use per year that involved spending money and then multiplying that value by their usual expenditure, using the central value of the relevant range of expenditure. For example, an individual who reported "daily" SCG spending was assumed to spend money 365 days per year with a corresponding expenditure of "\$11–\$20" converted to a value of \$15.50. These two values were then multiplied to yield an estimate of annual expenditure. Finally, this value was converted to a more conservative weekly estimate, as extrapolating expenditure to a 12-month period

would assume persistent spending which may be unlikely. Three of these respondents reported daily spending of \$101+ and one reported daily spending of \$51–\$100. As these responses were considered unlikely to be true, these four outliers were excluded from the subsequent analyses. Of the retained 49 respondents, four (8.3%) indicated that they had not spent money on SCGs within the last 12 months. Nine (18.8%) respondents were estimated to spend <\$1 per week on average, and 22 (45.8%) were estimated to spend between \$1 and \$10 per week. In total, 72.9% ( $N = 35$ ) of respondents were estimated to spend up to \$10 on SCGs per week. Eight respondents were estimated to spend between \$10 and \$20, and four were estimated to spend \$35.50 weekly and one at \$75.50. Median weekly SCG expenditure was \$3.58.

#### Reasons for playing SCGs

Table 4 summarizes the perceived importance of reasons for playing SCGs according to paying status. Paying SCG users were significantly more likely than non-paying SCG users to endorse six out of the seven reasons as "important," with the weakest significant difference occurring for "to pass the time/avoid boredom,"  $\chi^2(2, N = 130) = 7.69, p = .021, \Phi = 0.24$ . If a Bonferroni correction is applied, then this latter difference is not statistically significant, but the other five comparisons remain statistically significant. The two groups did not differ significantly in their appraisal of "excitement/fun" as a reason for SCG play.

#### Relationship between SCGs and gambling

In the paying SCG user group, 86.5% were "somewhat" or "very" interested in gambling with real money on their favorite SCG, compared to 28.2% of the non-paying group,  $\chi^2(2, N = 130) = 43.00, p < .001, \Phi = 0.58$ . The majority of the paying SCG users (84.6%) reported that they would gamble online with real money on forms that are currently illegal if it became legal, as compared to 32.1% of non-paying SCG users,  $\chi^2(2, N = 130) = 40.81, p < .001, \Phi = 0.56$ . However, 71.2% of paying SCG users and 71.8% of non-paying SCG users said their SCG play would likely stay the same if gambling options became available, with no significant differences in the proportion who said their SCG play would increase (17.3% and 12.8%, respectively), or decrease (11.5% and 15.4%, respectively),  $\chi^2(2, N = 130) = 0.77, p = .682$ .

About two-thirds of paying SCG users (65.4%) stated that they had gambled for real money as a result of playing an SCG, compared to only 1.3% of non-paying SCG users,  $\chi^2(1, N = 130) = 65.16, p < .001, \Phi = 0.71$ . Paying SCG users were significantly more likely to have engaged in financial gambling within the last 12 months [90.4% vs. 37.2%,  $\chi^2(1, N = 130) = 36.37, p < .001, \Phi = 0.53\chi^2(1, N = 130) = 27.86, p < .001, \Phi = 0.46$ ].

Participants classified as land-based gamblers were asked if they had gambled online. Within this subgroup, paying SCG users who gambled (87.2%) were significantly more

**Table 4.** Perceived importance of reasons for playing SCGs

Reason and importance	Non-paying SCG users (n = 78)		Paying SCG users (n = 52)	
	n	%	n	%
<b>Social interaction</b>				
Not important	41	52.6*	9	17.3
Somewhat important	31	39.7	30	57.7*
Very important	6	7.7	13	25.0*
$\chi^2(2, N = 130) = 18.62, p < .001, \Phi = 0.38$				
<b>To relieve stress/escape from my worries</b>				
Not important	41	52.6*	8	15.4
Somewhat important	33	42.3	28	53.8
Very important	4	5.1	16	30.8*
$\chi^2(2, N = 130) = 25.66, p < .001, \Phi = 0.44$				
<b>To pass the time/avoid boredom</b>				
Not important	22	28.2	10	19.2
Somewhat important	45	57.7	24	46.2
Very important	11	14.1	18	34.6*
$\chi^2(2, N = 130) = 7.69, p = .021, \Phi = 0.24$				
<b>To improve my gambling skills</b>				
Not important	56	71.8*	14	26.9
Somewhat important	19	24.4	24	46.2*
Very important	3	3.8	14	26.9*
$\chi^2(2, N = 130) = 28.85, p < .001, \Phi = 0.47$				
<b>To make money</b>				
Not important	52	66.7*	10	19.2
Somewhat important	23	29.5	29	55.8*
Very important	3	3.8	13	25.0*
$\chi^2(2, N = 130) = 31.45, p < .001, \Phi = 0.49$				
<b>For excitement/fun</b>				
Not important	17	21.8	10	19.2
Somewhat important	42	53.8	24	46.2
Very important	19	24.4	18	34.6
$\chi^2(2, N = 130) = 1.62, p = .446$				
<b>For the competition/challenge</b>				
Not important	30	38.5*	8	15.4
Somewhat important	37	47.4	26	50.0
Very important	11	14.1	18	34.6*
$\chi^2(2, N = 130) = 11.61, p = .003, \Phi = 0.30$				

Note. Omnibus  $\chi^2$  tests followed by post-hoc pairwise tests of proportions.

\*Significantly higher proportion in each row where a significant Bonferroni-corrected test of proportions was observed.

likely to gamble online than non-paying SCG users who gambled (41.4%),  $\chi^2(1, N = 76) = 17.87, p < .001, \Phi = 0.49$ . Paying SCG users reported spending more on gambling (median = \$40 per month) compared to non-paying SCG users (median = \$5 per month), Mann-Whitney  $U = 344.5, Z = 3.63, p < .001, r = .42$ .

#### Problems and consequences

Paying SCG users were significantly more likely to report psychological distress based on K6 scores (38.5%) as compared to non-paying SCG users (7.7%),  $\chi^2(1, N = 130) = 18.46, p < .001, \Phi = 0.38$ . Table 5 presents a summary of problem gambling symptoms according to SCG paying status. Paying SCG users had significantly higher

**Table 5.** Problem gambling symptoms among paying and non-paying SCG users

Problem gambling symptom	Non-paying SCG users (n = 26)		Paying SCG users (n = 46)	
	n	%	n	%
<b>Preoccupation/planning</b>				
Never	12	46.2*	6	13.0
Once or twice	10	38.5	13	28.3
Sometimes	4	15.4	18	39.1*
Often	0	0.0	9	19.6*
$\chi^2(3, N = 72) = 15.98, p = .001, \Phi = 0.47$				
<b>Tolerance</b>				
Never	19	73.1*	9	19.6
Once or twice	3	11.5	13	28.3
Sometimes	4	15.4	17	37.0
Often	0	0.0	7	15.2*
$\chi^2(3, N = 72) = 20.93, p < .001, \Phi = 0.54$				
<b>Overspending</b>				
Never	17	65.4*	8	17.4
Once or twice	6	23.1	14	30.4
Sometimes	3	11.5	20	43.5*
Often	0	0.0	4	8.7
$\chi^2(3, N = 72) = 18.91, p < .001, \Phi = 0.51$				
<b>Withdrawal</b>				
Never	18	69.2*	12	26.1
Once or twice	6	23.1	9	19.6
Sometimes	2	7.7	16	34.8*
Often	0	0.0	9	19.6*
$\chi^2(3, N = 72) = 17.48, p = .001, \Phi = 0.49$				
<b>Gambling to escape</b>				
Never	17	65.4*	9	19.6
Once or twice	4	15.4	13	28.3
Sometimes	4	15.4	15	32.6
Often	1	3.8	9	19.6
$\chi^2(3, N = 72) = 15.65, p = .001, \Phi = 0.47$				
<b>Chasing</b>				
Never	20	76.9*	13	28.3
Once or twice	3	11.5	13	28.3
Sometimes	0	0.0	16	34.8*
Often	3	11.5	4	8.7
$\chi^2(3, N = 72) = 19.85, p < .001, \Phi = 0.53$				
<b>Lies/deception</b>				
Never	20	76.9*	10	21.7
Once or twice	5	19.2	12	26.1
Sometimes	1	3.8	17	37.0*
Often	0	0.0	7	15.2*
$\chi^2(3, N = 72) = 23.71, p < .001, \Phi = 0.57$				
<b>Arguments/conflict</b>				
Never	19	73.1*	11	23.9
Once or twice	2	7.7	14	30.4*
Sometimes	5	19.2	12	26.1
Often	0	0.0	9	19.6*
$\chi^2(3, N = 72) = 18.92, p < .001, \Phi = 0.51$				
<b>Theft</b>				
Never	19	73.1*	12	26.1
Once or twice	4	15.4	12	26.1
Sometimes	3	11.5	13	28.3
Often	0	0.0	9	19.6*
$\chi^2(3, N = 72) = 16.55, p < .001, \Phi = 0.48$				

Note. Omnibus  $\chi^2$  tests followed by post-hoc pairwise tests of proportions. These questions were only asked to those who reported gambling in anything other than lottery-type games in the last 12 months.

\*Significantly higher proportion in each row where a significant Bonferroni-corrected test of proportions was observed.

overall scores (median = 14/36) compared to non-paying SCG users (median = 1/36), Mann-Whitney  $U = 203.5$ ,  $Z = 4.65$ ,  $p < .001$ ,  $r = .41$ . Furthermore, paying SCG users were significantly more likely to endorse each of the individual PGSI items than non-paying SCG users with the least significant difference for the “gambling to escape” item  $\chi^2(3, N = 72) = 15.65$ ,  $p = .001$ ,  $\Phi = 0.47$ . The relationship between K6 scores and gambling expenditure was non-significant but this comparison was also underpowered ( $N = 29$ ).

## DISCUSSION

The present study was the first to investigate adolescents' financial expenditure in SCGs and examine whether in-game spending varies in relation to gambling and other risk factors. Paying SCG users tended to be employed males who play more frequently and engage in more SCG activities and who report more symptoms of problem gambling and greater psychological distress than non-paying SCG users. Paying SCG users reported more frequent engagement and spending in monetary gambling activities, and two-thirds of SCG payers recalled that their SCG use had preceded the involvement in financial gambling. These findings suggest that adolescents who invest money in SCGs may differ systematically from non-payers in terms of their level of interest, involvement, and expenditure in gambling, which is consistent with the differences between paying and non-paying adult SCG users (Gainsbury, Russell, et al., 2016). Underlying factors (e.g., impulsivity, poor financial literacy, and familial influences) may account for spending in SCGs; however, such variables may be complex and more difficult to observe, quantify, and monitor over time. Spending in simulated gambling activities warrants examination in larger follow-up studies to inform regulatory or other protective measures for young and vulnerable users.

About a quarter (23.4%) of the overall sample of adolescents ( $N = 555$ ) had played SCGs with 40% of this subsample of SCG players spending money on the activity. This suggests that, despite SCGs having no financial obligation, a large proportion of young people who play SCGs are likely to spend money on them. The median weekly expenditure on SCGs was AUD\$3.58. This figure was lower than reported by a recent industry-led behavior tracking study which reported an average spend of US\$25.20 per week on SCGs (Harvest Strategy, 2014). This may indicate that adolescents underestimate expenditure, possibly due to memory or recall bias, denial or other defensive reactions to questioning, and/or the automaticity (i.e., lack of awareness) of spending behavior in SCGs. Industry-academic collaborative projects that use self-report and behavioral measures in combination may assist in reconciling these discrepant observations.

Adolescents who reported spending money on SCGs tended to play more frequently, play more SCGs, and play a greater number of sessions than non-spenders. More frequent, prolonged, and/or intense play in an activity that is designed to simulate gambling (i.e., a payout rate below 100%) will logically result in larger net losses to the player and therefore require more credits than provided freely by games. The present study found that the most commonly reported reason for spending money (as endorsed by 42% of

payers) was to avoid waiting for free credits. By comparison, only 23% of payers reporting that spending increased their level of enjoyment. SCG spending may therefore be more frequently motivated by an urge to relieve tension associated with discontinued play (i.e., gaming withdrawal; see Kaptis, King, Delfabbro, & Gradišar, 2016), rather than the desire to heighten or enhance the experience of playing. The structural emphasis in SCGs on spending money to sustain or advance play (e.g., overcoming “paywalls”), rather than purchasing for enjoyment or for unique items, may be risky for vulnerable players.

The notion that engagement in simulated gambling may precede or increase the likelihood of financial gambling has been the subject of conjecture for years, despite a relative lack of empirical evidence (King & Delfabbro, 2016b). Compared to non-paying SCG users, the paying SCG users were more than twice as likely as non-paying SCG users to report gambling in the last 12 months (90% vs. 37%); more than twice as likely to report gambling online (87% vs. 41%); and spent considerably more on gambling per month (median values of \$40 vs. \$5). Although the correlational nature of this study precludes the statements of causality, the majority (65.4%) of paying SCG users responded to a direct question that they had gambled as a result of playing an SCG, as compared to only 1.3% of the non-paying SCG users. This information should be treated cautiously, given that youth gambling etiology is known to be complex (Abbott et al., 2013; Shead, Derevensky, & Gupta, 2010). Those who spent money on SCGs were also more likely to endorse PGSI items and report greater psychological distress, suggesting these adolescents may be a more vulnerable group.

The present study has several limitations to take into account. First, the study design employed self-report measures and data were collected from a single time-point only. This study asked participants to indicate their SCG use over the course of 12 months (along with other information) as a means of calculating weekly mean expenditure, which may increase error, and therefore these figures may be best viewed as a relative rather than absolute measure. It is also not possible to determine whether the adolescents who spent money on SCGs first had experience in gambling, or whether SCG spending led these young adults to gamble. Another limitation was the lack of social status and income data for adolescents, which may have been helpful to contextualize the levels of expenditure in SCGs. However, the average income of adolescents in this study would be unlikely to exceed \$5,000 per annum (Muir et al., 2009). Similarly, it was not clear how adolescents were spending money on SCGs and gambling activities; it would be helpful to know if payment was being facilitated by a parent or other adult in these cases, as some recent data suggest that parents are often facilitators of financial gambling activities (King & Delfabbro, 2016c). Finally, the respondents were recruited through their parents who formed a panel of Internet users willing to complete the surveys, so these results may not generalize to all adolescents who play and spend money in SCGs.

## CONCLUSIONS

Adolescents who spend money in SCGs demonstrated greater interest, involvement, and expenditure in gambling

compared to non-spenders. Two-thirds of paying participants identified a progression from spending on SCGs to gambling. These findings may indicate that spending in simulated gambling is a key mechanism that normalizes spending on broader gambling activities. Adolescents' spending on SCGs was primarily motivated by the desire to continue playing SCGs, in line with observations that these activities have predetermined paywalls to prevent continuous play. Game mechanics may affect younger populations differently and appeal to a less mature ability to delay ongoing game play. SCGs will likely continue to be scrutinized by regulators for the use of dubious or exploitative payment features offered in a gambling-themed format that is available to persons of all ages.

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