J Gambl Stud (2011) 27:443–451
DOI 10.1007/s10899-010-9213-1

ORIGINAL PAPER

Audience Influence on EGM Gambling: The Protective Effects of Having Others Watch You Play

Matthew J. Rockloff · Nancy Greer

Published online: 17 August 2010

Abstract One component of social facilitation on gambling is the potential for an audience of people to observe the play of Electronic Gaming Machine (EGM) gamblers and influence their behaviour without participating directly in gambling themselves. An experiment was conducted with an audience of onlookers, purported to be students of research methods, taking notes while watching the participants play an EGM. Forty-three male and 82 female participants ($N = 125$), aged 18–79 ($M = 49.2$, SD = 15.6), played a laptop simulated 3-reel EGM using a $20 stake in three conditions: (1) alone, (2) watched by a simulated audience of six persons, or (3) watched by an audience of 26. Outcomes on the poker machine were rigged with a fixed sequence of five wins in the first 20 spins and indefinite losses thereafter. The results found smaller bet-sizes associated with larger audiences of onlookers, and this outcome is consistent with a hypothesized motivation to display more wins to the audience. Moreover, final payouts were greater in the audience conditions compared to the control, further suggesting that an audience may be a protective factor limiting player losses.

Keywords EGM · EGMs · Poker · Slot · Fruit · Gambling · Pathological gambling

Prior research suggests that the presence of other gamblers in a venue acts to magnify individual betting intensity on Electronic Gaming Machines (EGMs). In particular, Rockloff and Dyer (2007) found that other player who (falsely) believed that others were gambling along with them placed more bets and lost more money on a simulated EGM. Rockloff et al. (2010) furthermore demonstrated that large crowds of players contribute to placing more bets, gambling faster and larger consequent losses. These past studies did not, however, specifically test for what features or aspects of social influence created the change in behaviour—other than the presence of other gamblers performing the same activity. The influence of the other gamblers on betting, however, can be deconstructed into co-action

M. J. Rockloff (✉) · N. Greer
Institute for Health and Social Science Research, Central Queensland University, Bundaberg, QLD 4670, Australia
e-mail: m.rockloff@cqu.edu.au

effects, audience effects, and the effects of mere presence (cf., Cottrell et al. 1968). Co-action effects include the informational influence of other players. Large crowds may tend to give an impression of more frequent wins, and thus create the false impression that a win is "due" for the player. Audience effects, which are the focus of this present study, exclude this informational influence, and instead focus on the influence from others who observe rather than participate in the gambling. This influence of observation, or the "audience," may contribute uniquely to betting apart from the informational influence provided by co-action.

Zajonc's Drive Theory and Audience Effects

One prominent theory advanced for the Social Facilitation effect was based on the motivational drive hypothesis. Zajonc (1965) proposed that the presence of others raises an aversive state of autonomic arousal, and creates a drive to reduce that aversive state. Part of this arousal may be from the mere-presence of others in the environment, but it may also result from the fear of a negative evaluation of performance. Cottrell et al. (1968) argued that social facilitation occurs because an individual believes that an audience will evaluate his or her behaviour and therefore develops an apprehension about a potential negative evaluation that will tend to enhance performance of a dominant response. A dominant response may lead to either an increase or decrease in performance, depending on the learning history of the target actor. A professional basketball player, for instance, is likely to have his or her scoring performance enhanced by the presence of an audience of spectators, as successfully completing a scoring basket is a dominant (or more frequent) response for that player. In contrast, an amateur player is more likely have his or her performance impaired by the presence of an audience, as missing a scoring basket is likely to be a dominant response for this type of player. In a related line of reasoning, Baron et al. (1978) suggest that audiences are a source of distraction, and the competition that people experience between attending to the crowd and the needs of the task creates autonomic arousal. Unsurprisingly, this distraction can inhibit performance of complex or poorly learned tasks. Ironically, however, the distraction caused by an audience can enhance performance of easy or well-learned tasks, as people focus more intently on the task their attempts to regain control.

Control Theory and Audience Effects

Carver and Scheier (1981) introduced Control Theory, which suggests that social facilitation effects do not need a mediating "drive" state. Instead, the presence of an audience focuses the attention of individuals on their performance relative to a salient standard of correctness. It is this discrepancy between their actual performance and the salient standard that people act to reduce, rather than an emotional drive-state. This more cognitive explanation for behaviour requires knowledge about the salient standard to accurately predict audience effects, whereas Zajonc's drive theory more parsimoniously predicts enhanced performance of dominant responses in the presence of an audience.

Drive or Control Affects Betting Behaviour?

Rockloff et al. (2010) investigated the influence of co-action on gambling, and found the predicted increases in betting speed, persistence and consequent player losses. In contrast,

however, players generally bet smaller amounts in the presence of other gamblers than when playing alone (Rockloff et al. 2010). A post-hoc explanation for this unexpected result was that players sought to maximize "total wins" during play, rather than maximizing the amount won. In this case, the salient standard was winning rather than making money. Betting smaller amounts allows players to stay in the game longer, and maximize the number of "wins" for any fixed level of expenditure in a fair game. Displaying wins is most obviously relevant as a social motivation for players, who display these wins to an audience of onlookers. As the current study is investigating audience effects, this tends to suggest that we might also find similar reductions in bet size when players are simply observed by an audience. In fact, since the audience in this current study is not distracted by any other activity while observing the player, it is reasonable to expect that this reduction in bet size might be dramatic. This prediction is consistent with a control theory explanation for social facilitation, as the audience encourages players to examine their performances relative to a salient standard. In this case, the salient standard is "total wins," and the audience encourages adherence to this standard. A contrasting prediction, however, can be made from Drive Theory (Zajonc 1965), where the presence of an audience increases arousal and (potentially) also a fear of negative evaluation. This drive should increase production of a dominant response, which arguably would be to intensify all aspects of gambling behaviour, including larger bet sizes. Regardless of a Drive Theory or Control Theory orientation towards prediction, other measures of betting behaviour—apart from bet size—should be intensified by the presence of an audience through either the encouragement of dominant responses or adherence to style of play that displays rapid and persistent wins.

Hypotheses

Contrasting predictions for bet-size lead to the hypothesis that bet size will be either increased or decreased by the presence of an audience, as predicted by *Zajonc's Drive Theory* or *Control Theory*, respectively. Other measures of gambling intensity, including Speed of Betting, Gambling Persistence (Total Trials) and Losses (i.e., lower Final Payouts), are predicted to be intensified by the presence of an audience of onlookers.

Methods

Participants

Subjects were recruited via flyers distributed in a daily newspaper in Bundaberg, Australia. The flyers advertised for potential participants to play a "simulated poker machine" (EGM) and stated that they would be provided the initial gambling stake, and that they could keep any winnings. One-hundred and twenty-five subjects, 43 male and 82 female, completed the study. Participants were aged between 18 and 79 years with a mean age of 49.2 years (SD = 15.6). Based on the nine-item Problem Gambling Index of Severity (PGSI, Ferris and Wynne 2001), participants were categorised into the following groups: (a) 65 (53.7%) non-problem gambler, 29 (24%) low-risk, 18 (14.9%) moderate-risk, and nine (7.4%) problem-gamblers. Four participants (3.2%) had not gambled in the last 12 months and therefore were not categorised according to the PGSI. The cultural backgrounds of participants included: 104 (83.2%) Australian, ten (%) English, four (8.0%)

Aboriginal or Torres Straight Islander, two (1.6%) New Zealander, one (0.8%) Irish, one (0.8%) German, one (0.8%) Italian, one (0.8%) American, one (0.8%) Scottish, and one (0.8%) Croatian.

The Simulated EGM

The study used a laptop simulated EGM programmed by the principal researcher in Visual Basic as a 3-reel traditional machine (see Fig. 1). The EGM was programmed (rigged) to payoff on trials 4, 7, 13, 16, and 20. All bets placed past trial 20 were programmed as losses. Players could place bets of 25, 50 or 100 cents on each trial, and winning bets payed-off ten times the amount bet (i.e., $2.50, $5.00 or $10.00, respectively). The laptop was setup so that the image on the screen was split to a monitor placed directly behind it and facing outwards. A camera was set-up in a position before the laptop where it could capture the screen image of the EGM and the face of the player (participant) seated behind the monitor.

Pre-recorded videos of five and 25 persons watching and taking notes were recorded prior to commencement of the study (see Fig. 2). The recording took place at Central Queensland University, Bundaberg, in a lecture theatre with local students helping as actors. The video of the five person audience was composed of two males (40%) and three (60%) females, ages ranging from 21 to 59 years of age with a mean age of 34 years (SD = 15.23). The video of the 25 person audience was composed of ten males (40%) and 15 (60%) females, ages ranging from 19 to 59 years with a mean age of 33.2 years (SD = 16.04). All actors in the five-person recording were also included in the 25-person recording. The actors were given notepad and pens and were instructed to pretend they were students in class taking notes from a lecture they were watching. Prior to the commencement of the note taking a female actor, acting as the local experimenter, walked before the group and announced to the camera: "okay, we are ready." This was setup to give the impression to the subjects that the video-feed was live. The duration of the videos was 45 min, although all subjects completed play prior to the end of the video.

Fig. 1 Illustration of laptop simulated EGM

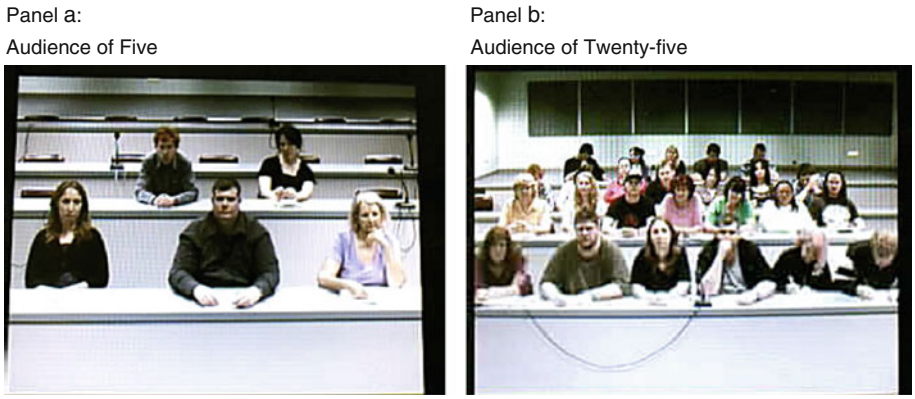

Fig. 2 Frame capture from pre-recorded videos of five and 25 audience members observing the gambling task

Design and Procedure

In the experiment, participants were randomly assigned prior to their arrival to one of three conditions, including: (a) six-person audience (a five person video-recording plus one live confederate, $n = 36$), (b) 26-person audience (a 25 person video-recording plus one live confederate, $n = 43$), or (c) an alone condition ($n = 44$). In the test conditions (a and b), participants were also informed that there would be a group of students from the Rockhampton University campus (290 km distant) viewing the session via a live video-feed, as well as one student on the local Bundaberg campus who would sit in on their session. They were told that these students were learning about experimental research methods. It was emphasised that the group would be able to see and hear the participant, and that they would be able to see and hear them. All participants gave permission to be watched with the exception of one, who was subsequently excluded from the data analysis for failure to follow study directions. The pre-recorded video tapes of five or 25 persons taking notes were used in the six and 26 person audience conditions, respectively (see Fig. 2). The participant was also observed by a "live" 42 year-old female confederate, who also acted as an additional student observing the experiment. The cover-story was concocted to give a reasonable explanation for why their gambling was being observed, without suggesting that their behaviour was being judged as either good or bad. In the control condition participants gambled alone on the simulated EGM in the same room, but *without* a confederate or faked video-conference.

Participants were given $20 as compensation for their arrival at the experimental session. After receiving their $20 compensation, subjects completed a questionnaire which included basic demographic questions and the Problem Gambling Severity Index (PGSI, Ferris and Wynne 2001). Participants were invited to gamble with their $20 compensation money, and no participant refused to gamble. The experimenter retrieved the $20 compensation money prior to the start of the task. This retrieval of the compensation money was intended to give the (correct) impression that subjects were gambling with their own money. Participants were told that they could decide when they would like to quit the game by signalling the experimenter via a remote buzzer fixed to the table next to them (i.e., a wireless doorbell alarm). The experimenter left the room, retrieved the live confederate,

and brought them into the room. The seat was placed in close proximity behind the participant in a position where the confederate could see his or her monitor. The experimenter then connected to the supposed "live-feed" of the additional students by playing the pre-recorded video of either five or 25 other audience members. The experimenter started the EGM for the subject, which was programmed with a 30 s count-down to allow the experimenter to leave the room. The confederate was instructed not to initiate conversation and that if the participant initiated conversation they were to keep their responses to a polite minimum. The confederate confirmed that attempts at conversation by the subjects were minimal.

Results

Data Analysis

The outcomes of Bet size, Speed of Betting, Trials Played and Final Payouts were analysed with ANCOVA models, each of which used Condition (Alone, Audience of Six, Audience of 26) as the independent variable, and Age and Gender as covariates.

Bet Size

There was a significant effect for Condition on Bet Size, $F(2,113) = 3.49$, $P = 0.03$ (see Fig. 3). Tests of simple effects revealed that the Alone condition had significantly higher bet-sizes than the 26 person audience condition, $P = 0.01$, although other differences between conditions were not significant. The covariate of Age, $F(1,113) = 9.19$, $P < 0.01$, was also significant, whereby younger gamblers on average bet larger amounts. There was no significant effect for Gender on bet size, $F(1,113) = 0.05$, $P = 0.82$, ns.

Speed of Betting

Bets-per-minute was calculated as the average number of bets each subjects made per 1 min of play, with higher mean scores indicating faster speeds. There was *no* significant effect for Condition on Speed of Betting, $F(2,113) = 0.38$, $P = 0.68$, ns. However, the covariate Age had a significant effect on Speed of Betting, $F(1,113) = 12.46$, $P < 0.01$,

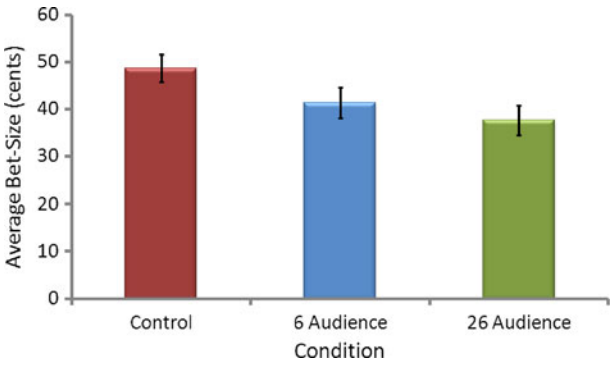

Fig. 3 Bet-size by condition

such that younger participants on average bet faster. There was *no* effect for Gender on Speed of Betting, $F(1,113) = 0.12$, $P = 0.73$, ns.

Trials Played

Persistence at the task was measured by the number of trials played during the entire session. There was *no* significant effect for Condition on the number of Trials Played, $F(2,113) = 2.69$, $P = 0.07$, ns. There was a significant effect for Age on trials played, $F(1,113) = 5.57$, $P = 0.02$, such that older participants on average placed more bets before quitting. There was *no* significant effect for Gender on the number of Trial Played, $F(1,113) = 0.87$, $P = 0.35$, ns.

Final Payouts

Approximately one-third ($n = 42$, 34.4%) of participants ended play on the EGM with no money remaining. As such, this variable was converted into rank-scores to make them amenable for analysis with the ANCOVA model. There was a significant effect for Condition on Final Payouts, $F(2,116) = 3.52$, $P = 0.03$ (see Fig. 4). Tests of simple effects showed that the six person audience condition had higher Final Payouts than the alone/control condition, $P = 0.01$. There was no significant difference in Final Payouts, however, between the six-person audience and the 26-person audience conditions.

Discussion

The two measures of gambling intensity that did illustrate audience-effects showed that the presence of an audience moderates bet sizes and improves final payouts. Similar social facilitation effects on bet size were found in a prior co-action study (Rockloff et al. 2010), where greater numbers of other players also moderated bet size. A post-hoc explanation given by Rockloff, Greer and Fay for their unexpected outcome was that players had a goal of maximizing "wins" during the session that could be observed by others. The results of the present audience-study are consistent with this explanation too. Moreover, the audience-study suggests the importance of understanding the salient features of performance to which players are responding (e.g., total number of wins versus dollar amounts won).

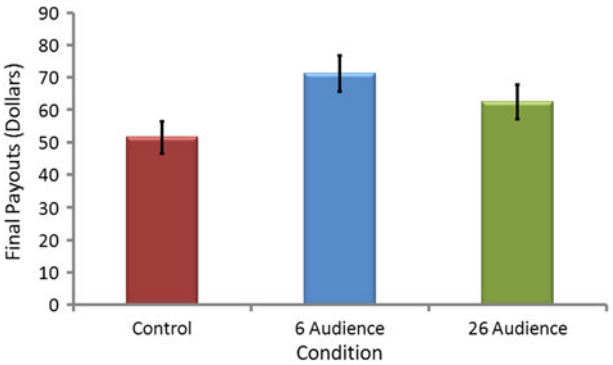

Fig. 4 Final payouts by condition

Zajonc's Drive Theory Versus Control Theory

The drive theory of social facilitation, as proposed by Zajonc (1965), suggests that the presence of others creates autonomic arousal, which enhances the performance of a dominant response. As gambling on EMGs is a simple task for most players, intensification of betting by all measures; including bet-size, speed of betting and trials played; was the predicted outcome based on Zajonc's drive theory. In contrast, Control Theory (Carver and Scheier 1981) suggests that the presence of an audience causes people to conform closely to a salient aspect of performance. If we can assume that the salient aspect of performance is to "display" the largest number of wins to an audience, then the present results are consistent with a control theory explanation for the social facilitation effect. The lack of any significant effects for speed of betting and total trials played in the audience study may simply be a consequence of a lack of salient standards for performance by the subject on these aspects of gambling. The players may not have considered faster gambling to be judged as more (or less) desirable in the presence of an audience. Likewise, quitting earlier or later in the session is ambiguous with respect to its social desirability, as quitting early admits defeat and quitting late shows intemperance. Higher final payouts in the audience conditions relative to the control condition in this study was a natural consequence of smaller bet sizes, as the other features of play—including speed and persistence—were relatively consistent among conditions.

Limitations

Like all experimental studies, the audience study replicated only some key features of the environment that are thought to be important in real gaming venues. As a consequence, the external validity of the study is only viable if these choices were made appropriately. In this study the audience was presented as "students interested in research methods." This cover-story was intended to give minimal guidance in terms of the expectations that the subjects might have for what constitutes appropriate gambling behaviour. An audience in a real gaming venue, in contrast, may tend to be more or less encouraging of risky or intense betting by their language or behaviour, and thus might produce different outcomes.

Another important distinction in considering the expectations for social facilitation on gambling is accurately defining the concepts of "dominant response" (in the case of Zajonc's drive theory) and "salient aspects of performance" (in the case of control theory). An assumption was made that more intense gambling; in terms of larger bet-sizes, faster betting and persistence at gambling; were dominant responses. If the definition of a dominant response is the "more probable" response given peoples' skills (Zajonc 1965, p. 149), it is not clear that betting larger amounts, gambling faster and being more persistent are necessarily dominant responses for all players. Instead, these are actions that suggest greater intensity and commitment to the task. Likewise, the "salient aspects of performance," as outlined in Carver and Scheier's (1981) Control Theory, lacks a clear means for identifying which aspects of performance become salient to the gambler. It is a reasonable that players would be concerned to maximize the "number of wins" that they can display to an audience, but this is only an assumption in the present study. Further research is needed to identify whether total wins, or some other aspect of performance, is what players are responding to by reducing bet sizes in the presence of an audience.

The present research was not devised to test all aspects of Zajonc's (1965) Drive Theory or Carver and Scheier's (1981) Control Theory. Furthermore, these theories are not

exhaustive for explaining the present results. However, the two theories provide a useful means of understanding the contrasting predictions made for bet size, and the results suggest that Control Theory is a better predictor.

Implications and Conclusions

The audience-study provides some preliminary evidence suggesting that non-participating patrons who only *observe* players in a gaming venue do not appear to constitute a hazard that intensifies betting behaviour. In fact, the study suggests that observability may even provide some protection against making large bets, which in isolation tends to limit long-run losses.

Acknowledgment This research was funded by a grant from the Department of Justice, Victoria, Australia.

Conflict of interest None.

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