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An Experiment on the Social Facilitation of Gambling
Behavior

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Abstract

Research and theory regarding the social facilitation effect generates the expectation that the presence of other gamblers (or co-actors) in a gaming venue is likely to intensify individual gambling behavior and magnify losses. Fifty male and 66 female participants (116 total) played a computer-simulated electronic gaming machine (EGM) with a fixed winning sequence, followed by an indefinite losing sequence. Measures of the intensity of gambling behavior included the final payout (a direct measure of losses), average bet-size, number of trials played, and the speed of play. Some participants received false feedback from the computer designed to suggest that other gamers in adjacent rooms were playing and sometimes winning at the same game. Persons who received both sight and sound information, including winning bells and instant messages regarding the wins of other (fake) players, placed more bets and lost more money compared to the other conditions with less information.

Key Words:

Slot

Fruit

Poker

Group Polarization

Group Effects

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Gambling

An Experiment on the Social Facilitation of Gambling Behavior

The performance of a wide range of behaviors can be facilitated or enhanced in the presence of co-actors or an audience. Triplett (1898) made early observations of this effect in an analysis of bicycle racing results. He observed that racers tended to perform better while racing in competition (with co-actors) than racing either alone, paced or in timed-trials. This effect, later named *social facilitation*, is robust with respect to many performance-related tasks. The current research explores the influence that the presence of co-actors has on gambling behavior using Electronic Gaming Machines (EGMs). In particular, based on theories and observations outlined below, the presence of co-actors should promote the intensification of gambling behavior under conditions of loss. Gambling intensity is operationally defined as any marker or trace of behavior that would tend to indicate or contribute to gambling losses over long-run play. Most forms of gambling, including play on EGMs, have an expected negative return for each dollar bet. As such, larger average bet-sizes, placing more bets and gambling more quickly all contribute to greater gambling losses in the long-run.

Social Facilitation of Gambling

The existence of a social facilitation effect for gambling behavior on EGMs is plausible for reasons that are specific to the gaming experience, but also in consideration of theoretical grounds. The principal specific factor is the broadcasting of wins within a gaming venue. Wins are often announced to nearby gamblers by way of lights and bells on each machine. This information may have an influence on gambling behavior either by generating perceptions about the frequency of wins, or by energizing the competitive instincts of the gambler (Triplett, 1898). Another specific factor is the desire to appear lucky or skillful at gambling in the sight of others. Of course, these specific factors may not be exhaustive, so it is also useful to consider theoretical reasons to support the hypothesized influence of social facilitation on gambling behavior.

Theoretical Explanations for Social Facilitation

The social facilitation effect is an empirical regularity found in many performance-related tasks, where individual behavior is energized or enhanced by the presence of co-actors or an audience. This study is constructed to explore whether social facilitation has an influence on EGM gambling behavior. In justifying the

expectations for greater gambling intensity in the presence of co-actors, it is instructive to outline some of the theoretical rationales that have been offered to explain the social facilitation effect. Geen (1991) reviewed the main theoretical explanations for the social facilitation effect, highlighting the arousal hypothesis and attentional effects.

The Arousal Hypothesis. In the context of social facilitation research, the arousal hypothesis suggests that the presence of other people creates an adverse affective state. Specifically, co-actors or an audience can create expectations for a possible negative evaluation of performance. The prospect of a public failure produces evaluation apprehension - a fear that can inspire greater effort and performance. In sporting events the arousal instilled in competitors by other athletes and spectators can contribute to achievement. Although EGM play is not a competitive sport, gambling behavior may be similarly stirred by the evaluation apprehension caused by the presence of others. The fear of appearing to be a loser - in a literal sense - may be a particularly potent motivation for problem gamblers to continue playing in spite of mounting losses.

Zajonc (1965) suggested that the mere presence of others - even if they cannot evaluate the performance of the actor - may still generate some arousal that facilitates behavior. In studies using animal models, Zajonc showed that the fear of an audience was not necessary to produce the effect of social facilitation. These studies were particularly persuasive as the lower animals used; cockroaches; do not have the cognitive ability to fear evaluation. Proof of this effect of *mere-presence* on the behavior of humans has proven somewhat more elusive (Griffin, 2001; Guerin, 1986). However, some experiments have removed many reasonable expectations of negative evaluation being placed on study participants; yet still find an effect for the social facilitation of behavior (Markus, 1978; Schmitt, Gilovich, Goore, & Joseph, 1985).

The motivation to promote a positive self-image may also contribute to the social facilitation of some behaviors. Self-presentation management refers to the need to appear positive in the eyes of others rather than simply a fear of being appraised negatively. One of the specific factors already postulated for the social facilitation of gambling behavior is the desire to use gambling as a means of demonstrating superior luck or skill. Enhancing self-

presentation is only a more general descriptor of this phenomenon described in the literature (Geen, 1991).

Although social facilitation is most often used to describe the enhancement of performance in the presence of others, there are also situations in which co-actors or an audience can interfere with the competent enactment of behavior. In particular, when a task is new or complex the arousal caused by the presence of others may interfere rather than enhance the ability of the actor to produce a proficient performance (Zajonc, 1965). Play on EGMs is a simple task for most people; particularly regular gamblers; and therefore our assumption is that the intensity of gambling behavior should be magnified by the presence of others.

Attentional Effects. The presence of others - apart from concerns about evaluation - can create uncertainty in the actor. As a source of distraction, co-actors or an audience can create conditions of cognitive-overload, and limit the ability to focus on a competent performance of behavior. The presence of others, including either co-actors or an audience, is therefore a likely culprit in decreasing performance on complex or novel tasks. However, the mere possibility of distraction can also produce a narrowing of attention to a few salient features of the

task in an effort to regain control. Ironically, this restriction of focus may increase performance on simple tasks since other possible distracters are eliminated. In a gaming venue, gamblers may actually strengthen their focus on the EGM to avoid the distractions introduced by other patrons or onlookers.

In summary, both the arousal hypothesis and attentional effects lead to the unambiguous proposition that the intensity of gambling behavior will be encouraged by the presence of co-actors.

Other Theories

Although research and theory addressing the social facilitation effect guides expectations regarding the current study, it is also prudent to examine the implications of other major theoretical approaches. Kahneman and Tversky (1979) have introduced Prospect Theory, which proposes that people are risk-averse in considering potential gains to their wealth, yet risk-seeking in relation to potential losses. It seeks to explain the empirical regularity that people will generally prefer to receive a small amount of money as a sure-bet rather than the uncertain possibility of gaining a much larger sum (i.e., risk-averse for gains). Conversely, people will often readily accept the uncertain possibility

of a very large loss simply to avoid a small definite loss of money (i.e., risk-seeking for losses). Most important for this discussion, however, Kahneman and Tversky also propose that people frame their above decisions based on salient cues, which may include both the gains and losses made by others. As such, prospect theory suggests that people should be relatively more willing to wager aggressively when experiencing losses, and should also view their potential for losses as more grave when other gamblers are perceived to be winning.

Banbura's (1977) Social Learning Theory provides another perspective suggesting that the presence of other gamblers should stimulate gambling behavior. In brief, the theory suggests that people learn new behaviors and increase the frequency of previously-learned behaviors when they are modeled profitably by others. The presence of co-actors, particularly if they are winning at their gambling, may therefore encourage the continuation of wagering - even in the face of mounting losses.

Gambling Research on the Effect of Co-actors

Only limited research has directly addressed the impact that co-actors have on gambling behavior. Le Floch, Martinz & Gaffi (2005) used a computer-simulated roulette game to explore the influence of information about the wins

and losses made by other players on wagering. The test conditions of the experiment falsely indicated to participants that a previous participant had either lost, won or made a small gain during play. Compared to the control condition where subjects were not informed of the performance of other players, the participants told about either gains or losses tended to make more risky wagers. This study did not specifically test the effects of the presence of co-actors on gambling behavior in real-time. However, it suggested that information about the performance of others is likely to intensify gambling behavior as measured by risk-taking.

Hardoon and Derevensky (2001) examined the influence of peers on a simple roulette game using children aged 9 to 13. The study was conducted as a within-subjects design. All children played the game in the order of 1) alone, 2) in groups (dyads or triads), and 3) alone again. The authors found an increase in the size of wagers by female children from the first "alone" trial to the second "group" trial, which was maintained thereafter. Unfortunately, the experimental design was hampered by the existence of possible order effects. Bet size may have simply increased due to a greater familiarity with the task across trials. In addition, the ANOVA statistics used to analyze the data

required that all observations be independent. The separate children in these real groups; however, did not constitute independent observations.

Purpose of the Current Study

Based on the theoretical considerations outlined above, gambling behavior should be intensified in the presence of co-actors. The current study aimed to investigate EGM gambling under experimental test conditions that replicate the information communicated between patrons in a real gaming venue. In particular, EGMs typically broadcast their wins to nearby gamblers using lights and bells. Gamblers are aware of the presence of other players, but may have few social interactions with them. To avoid the statistical problems and lack of experimental control introduced by studying real groups (cf., Hardoon & Derevensky, 2001), the current study employed fictitious computer-mediated interaction to imply the presence of other co-actors. A manipulation check was employed to verify that participants believed that other players were concurrently participating in the study in real-time. The study focused on players' behavior under conditions of loss, as the expected value of returns on EGMs is always negative with continued play. Therefore, the computer-simulated EGM was programmed to produce a short sequence of

wins followed by an indefinite string of losses. The intensity of gambling behavior was measured in several ways, including the final payout (a direct indicator of losses); average bet size; total number of trials played; and the speed of play.

Method

Participants

One-hundred and sixteen participants (50 male and 66 female, aged 18 to 67) were recruited from both newspaper advertisements and posters within gaming establishments in Rockhampton, Queensland. As measured by the Problem Gambling Severity Index¹ (PGSI, Ferris & Wynne, 2001), this recruitment method resulted in a relatively high proportion of participants with at least some gambling problems (47% or 55), which was in line with the experience of others using similar methods (Ladouceur, Arsenault, Dubé, Freeston, & Jacques, 1997). The sample included persons from the following risk categories of the PGSI: Low-risk (23% or 27), Moderate-risk (14% or 17) and Problem Gamblers (9% or 11).

Procedure

Participants played a computer simulation of a conventional 3-reel Electronic Gaming Machine (EGM) with a predefined winning sequence, followed by an indefinite losing sequence. A primary dependent measure was the amount cashed-out at the conclusion of gambling (the final payout), as the losing sequence would continue until all

¹ The Problem Gambling Severity Index is a subset of nine questions from the Canadian Problem Gambling Index (CPGI).

monies were lost or the player quit. Other measures of gambling intensity included average bet-size, total number of trials played, and the speed of play.

The study was conducted by a sole female experimenter. Each subject participated alone in a separate session. At the beginning of the session, participants were given \$5 as compensation for their arrival. Subjects were then offered the opportunity to gamble with this \$5. All of the 116 participants agreed to gamble with their original stake. To reinforce the perception that participants were gambling with their own money, the \$5 stake was retrieved by the experimenter prior to starting the task. The sessions began in a waiting room that led to three experimental rooms prominently labeled by numbers affixed to each door. The experimenter feigned confusion about which room was suitable for the participant. Participants were then led alone from the waiting room into the 2nd of the three experimental rooms. The experimenter did not make any other indication - either positive or negative - about whether any other participants were concurrently taking part in the study behind the closed doors of the other two rooms.

Five-hundred one-cent credits were displayed as the initial bankroll on the computer-simulated EGM. Players bet amounts of 1, 10 or 50 cents on each spin, with each spin

lasting 6 seconds. Wins returned 10 times the amount bet. The EGM machine was preset to payoff on the following trials (randomly determined before the start of the study): 6, 10, 12, 18, 25, 34, 38, 41, and 50. Losses were programmed for all subsequent spins after the 50th trial. Players were told that it was possible to win up to \$50 on the game (i.e., final payout including the initial \$5 stake but excluding any losses), and that the winning sequence had been randomly determined. Participants were not initially told, however, that the winning sequence was the same for each participant, and that wins would cease past the 50th trial. Lastly, participants were told that they could quit at any time during the session, and that the amount of credits left on the machine would determine their final payout.

In a completely randomized design, some of the participants received false feedback from the computer designed to suggest that other gamers in adjacent rooms were playing and sometimes winning at the same game. Two mock computer-generated players in the "adjacent rooms" experienced wins according to a random schedule that approximated a 90% long run return, and gambled at a rate of 1 spin every 10 seconds. The feedback participants received included two forms of information. First,

approximately half of participants had a banner at the top of the screen that would show "wins" made by the fake players presumably in the adjacent rooms (although not the amounts won). These banners would display "Room 1 wins!" or "Room 3 wins!" at the randomly determined intervals described above. The other half of participants had no visual cues to the performance of other (fake) players. In addition, approximately half of the participants also heard a winning bell when the (mock) players in adjacent rooms presumably had won, while the remaining half heard no such sounds. These two factors, named "Sight" and "Sound," respectively, were crossed conditions. As such, all participants were assigned at random by the computer (experimenter blind) to the combination of conditions illustrated in Table 1.

[INSERT TABLE 1 HERE]

Results

Data Analysis

For the purposes of this study, gambling intensity is defined as any marker or trace of behavior that would tend to indicate or contribute to gambling losses over long-run play. The dependent variables measuring gambling intensity in this study included the final payout (a direct indicator of losses); the number of trials played; the average bet-

size; and the speed of play. As outlined above, the sight and sound information was manipulated to create the impression that other players (co actors) were simultaneously participating in the study in adjoining rooms. As a manipulation check, at the conclusion of the session each participant was asked to estimate the number of people who gambled, "at the same time as you did, but not necessarily in the same room?" The average results of these estimates are shown in Figure 1. Independent samples t-tests showed that participants in the combined sight-and-sound condition had significantly higher estimates of the number of concurrent players than the sound-only condition, $t(37) = 1.79$, $p = .04$, and non-significantly higher than the sight-only condition, $t(35) = 1.46$, $p = .08$, ns, and the no-sight no-sound condition, $t(50) = 0.98$, $p = .17$, ns.

[INSERT FIGURE 1 HERE]

The manipulation check as illustrated in Figure 1 suggested that only the combined sight-and-sound condition was differentially effective in creating a false impression that more people were participating concurrently in the study. In addition, the sight-and-sound condition most closely approximates the information transmitted in real gambling venues. As such, the data analysis focused on comparing the sight-and-sound condition to participants in

the 3 other conditions grouped together as a control. These groupings were also necessary to improve the power of the comparisons. A Mann-Whitney U-test was conducted to test for differences in final-payouts between sight-and-sound condition and the other combined conditions, as this dependent variable was non-normally distributed (e.g., 63.6% of participants across all conditions quit with no money remaining). Independent t-tests were conducted for comparisons using the remaining dependent variables, including: average bet-sizes, the number of trials played, and seconds between spins (or speed of play).

Lastly, the data analysis includes an examination of two potentially important moderating variables for the effects of experimental condition on gambling intensity. Both Gender and Gambling Problems (as measured by dichotomized scores on the Canadian Problem Gambling Index of Severity (CPGI): 0 = no gambling problems, 1 = one or more problems) were included in this latter analysis. Factorial ANOVA models explored potential main effects and interactions of these variables and condition with each aforementioned indicator of gambling intensity.

Results: Gambling Intensity

Final Payouts. The final payouts of participants were reduced when participants were given the false sight-and-

sound information regarding wins in adjacent rooms. In the sight-and-sound condition, 71.4% of participants left the EGM with no money remaining, while only 65.6%, 53.1% and 63.2% of persons in the sight-only, sound-only, and no-sight/no-sound conditions, respectively, gambled away all their money. A Mann-Whitney U-test on final payouts confirmed that the sight-and-sound information together (Mean Rank = 52.67) produced greater losses when compared to the other conditions combined (Mean Rank = 62.38), $p = .05$ (one-tailed). However, Mann-Whitney U-tests showed no significant differences among any pair of the four conditions when analyzed separately, $p > .05$, ns.

Average Bet-Size. An independent samples t-test showed that Average Bet-Size was slightly and non-significantly smaller ($\bar{M} = 18.99$) in the sight-and-sound condition compared with the other combined conditions ($\bar{M} = 22.97$), $t(116) = 1.72$, $p = .09$, ns. As such, Bet-Size differences were not responsible for the comparatively greater losses recorded in the sight-and-sound condition.

Number of Trial Played. As shown in Figure 2, the differences in losses, as cited above, stemmed from greater persistence (number of trials played) at the EGM in the sight-and-sound condition ($\bar{M} = 124.71$ trials) when compared to the other three conditions combined ($\bar{M} = 108.43$ trials),

$t(114) = 1.81, p = .04$ (one-tailed).

[INSERT FIGURE 2 HERE]

Seconds between Spins (or Speed of Play). The speed at which participants played the game, as measured by the number of seconds between successive "spins" or trials, is illustrated in Figure 3. The existence of both sight and sound information, including the bells and instant messages conveying wins from other (fake) players, significantly slowed the pace of gambling ($M = 7.86$ s) compared to the other 3 conditions ($M = 7.42$ s), $t(51) = 1.78, p < .04$ (one-tailed). However, there were no significant differences in speed of play among pairs of the four conditions when analyzed separately, $p > .05$.

[INSERT FIGURE 3 HERE]

Results: Potential Moderating Variables.

Three Factorial ANOVA models explored potential main effects and interactions of Gender (0 = male, 1 = female) and Condition (0 = sight-and-sound condition, 1 = other conditions) on Average Bet-Size, Number of Trials Played and Speed of Play. No main effects or interactions proved significant within the models, $p > .05$. In addition, three Factorial ANOVA models explored potential main effects and interactions of Gambling Problems (0 = no problems on CPGI, 1 = one or more problems on the CPGI) and Condition (0 =

sight-and-sound condition, 1 = other conditions) on Average Bet-Size, Number of Trials Played and Speed of Play. These models also failed to reveal any significant main effects or interactions, $p > .05$.

Discussion

This experiment demonstrates that the implied presence of other gamblers, some of whom are winning, increases the intensity of gambling on an EGM as measured by greater persistence and lower final payouts. However, in contrast, the implied presence of others also slowed play, which by itself would tend to decrease losses over a fixed period of time. There was no evidence for significantly higher average bet-sizes in the sight-and-sound condition compared to the other conditions.

The slower play in the sight-and-sound condition when compared with other conditions may have been an artifact arising from participants having to attend to the novel presentation of information on the wins of other (fake) players. The pattern of speeds across the four conditions is consistent with this post-hoc account (Figure 2), as there was an intermediate slow-down in play for both the sight information (instant messages regarding wins) and sound information (winning bells) when presented separately. The sight-only and sound-only conditions;

however, were not differentially effective in creating an impression of more co-actors participating in adjacent rooms when compared to the no-sight no-sound condition (Figure 1). Unexpectedly, both forms of information; instant messages and winning bells; were needed to alter participant's perceptions regarding the quantity of other co-actors.

The manipulation check (Figure 1) also showed that participants gave surprisingly large estimates for the number of co-actors believed to be participating in the adjacent rooms under the sight-and-sound condition ($\bar{M} = 7.71$). This finding may indicate that participants were using their own experiences on the EGM to impute an estimate for the quantity of other players. Since actual participants had no wins past the 50th trial, they may have assumed that other (fake) players were also rarely winning and thus magnified their resulting estimate. In partial support of this post-hoc explanation, a separate question at the conclusion of the study asked if other participants in the study had earned either, 1) more money, 2) about the same amount of money, or 3) less money. In the sight-and-sound condition, most participants believed that other players in the study earned "about the same" amount of money in total as they had (16 or 50.0%), while slightly

fewer indicated that others had earned more (14 or 43.8%) while few believed that others had made less (2 or 6.3%).

The study supported that the typical social context of gambling, with the (implied) presence of other gamblers, contributes to more intense play. We view it as ironic that a game that is ostensibly asocial nevertheless is profoundly influenced by social forces. This result, however, is consistent with over a century of research into the social facilitation of behavior (Triplett, 1898). In most past research, social facilitation is applied to behavior that has positive consequences or connotation, such as sporting competition (Aiello & Douthitt, 2001). This study extends the application of social facilitation to a potentially problematic behavior of greater gambling persistence, and consequent financial losses.

Applications

The current research has implications for the responsible design and regulation of gambling venues. In particular, large venues may fuel greater intensity in play. Due to the presence of many players, large venues advertise individual wins more frequently to patrons. The psychology of the crowd can guide individual behavior, making the continuation of gambling appear normal, expected and socially desirable to the gambler; despite mounting

losses. Encouraging smaller gambling venues, or smaller rooms within venues, might mitigate some of the impact of social facilitation on intensity of play. In addition, the physical layout of EGMs within a facility, and the prominence of lights and winning bells, can either encourage or discourage knowledge of the performance of other players. It is important to note, however, that this experiment only examined the difference between the implied existences of two other (fake) players compared to zero extra players on behavior, and also did not explore venue layout. Additional research would have to demonstrate the existence of the assumed continuity of greater losses for large compared to small numbers of players, and any variation in losses attributable to the visibility of wins within the venue.

Limitations

Our expectations regarding the social facilitation effect on gambling behavior were drawn from several sources. However, as a first step, the present study made no attempts at discerning which of the many possible explanations for social facilitation were most relevant when applied to gambling on EGMs. Instead, the study was a demonstration that a social facilitation effect exists on EGM play. It is also important to note that the mere

physical presence of another player (co actor) in the same room may have some additional influence on behavior that was not represented in this study (Zajonc, 1965).

Future Research

The present findings could be supported in the future by a natural experiment that would enhance the external validity of the results. In particular, it would be helpful to verify that people actually gamble for longer periods in larger gaming venues. If this could not be observed directly, a comparison of gambling expenditure per machine between large and small venues might be a useful proxy measure for gambling persistence. However, a well controlled study would also have to examine typical player characteristics (e.g., wage income), which may differ between venues, as well as machine utilization rates.

The current experiment is supportive of a growing body of evidence on the social-psychological determinants of gambling behavior (e.g., Hardoon & Derevensky, 2001; Rockloff & Dyer, 2006). The existence of other players within a gambling venue may provide valuable information on "how one is doing" relative to peers (Festinger, 1954); principally by altering perceptions about the frequency of expected wins. In fact, informal follow-up interviews from the present study revealed that some participants expressed

a desire to be competitive with the other (fake) players. Thus, the actions of other players may serve as a guide to continued gambling by the participant despite the losses experienced.

This experiment supports the contention that social facilitation magnifies the intensity of gambling behavior. Further work needs to be done to explore competing explanations for the social facilitation effect, and to address the practical implications of this study for the reduction of problematic play.

Table 1

Number of participants randomly assigned to each condition.

	<i>Sight</i>	<i>No Sight</i>
Sound	35	31
No Sound	32	18

Figure Captions

Figure 1. Average of participants' estimates regarding the number of players (co actors) in adjacent rooms by condition.

Figure 2. Persistence in betting as measured by the average number of trials played (or bets placed).

Figure 3. Speed of play as measured by the average of seconds elapsed between trials (or spins).

Figure 1

Figure 2

Figure 3

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