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The Effect of Mere Presence on Electronic Gaming Machine Gambling

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Contributors: Dr. Rockloff was involved in conducting the research study, analyzing the data, drafting the initial manuscript, and editing final versions of the manuscript. Nancy Greer and Lionel Evans were involved in data analysis and in writing and editing the manuscript.

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Abstract

Intensification of gambling behavior may partly result from arousal caused by the mere physical presence of others in the gaming venue moving through the gaming floor on their way to enjoy other amenities. In an experiment, 56 male and 76 female participants ($N=132$) gambled on a laptop-simulated electronic gaming machine (EGM), either alone or with a simulated crowd of 6 or 26 others who were wearing blindfolds and earphones. These crowds of other persons were falsely said to be participating in another experiment on sensory deprivation. Among players with preexisting gambling problems, the results showed that these crowds contributed to a particular style of gambling whereby players generally bet smaller amounts but were more persistent as losses mounted. These changes in persistence occurred despite the inability of these others to witness or evaluate the participants. The experiment suggests that the mere presence of others in a gaming venue can affect EGM betting behavior.

Résumé

Il est possible que l'intensification des comportements associés au jeu soit partiellement liée à la stimulation que provoque la simple présence physique dans un espace de jeu d'autres personnes déambulant dans le même lieu et profitant d'autres services et installations. Dans le cadre d'une expérience, nous avons demandé à 56 hommes et 76 femmes ($N=132$) de s'adonner au jeu depuis un ordinateur portable simulant un appareil électronique de jeux de hasard. Les participants étaient dans un lieu où il n'y avait personne d'autre, ou encore dans un lieu où il y avait une fausse foule composée de 6 ou de 26 personnes avec les yeux bandés et des écouteurs, et croyant faussement participer à une autre expérience sur la privation sensorielle. Parmi les joueurs ayant déjà un problème de jeu, les résultats ont montré que la présence d'une foule favorise un style de jeu particulier en fonction duquel les joueurs misent de plus petites sommes, mais font preuve d'une plus grande obstination à mesure que les pertes augmentent. Cette modification quant à la ténacité des joueurs s'est produite malgré l'incapacité des autres personnes présentes à voir ou à évaluer les participants. Les résultats de l'expérience laissent ainsi entendre que la simple présence d'autres personnes dans un espace de jeu peut avoir un effet sur la façon de miser d'un joueur utilisant un appareil électronique de jeux de hasard.

Introduction

At first glance, gambling on electronic gaming machines (EGMs) appears to be an asocial activity in which interaction with the machine is favored over interactions with other players. EGM betting is nevertheless profoundly impacted by social forces ([Rockloff & Dyer, 2007](#); [Rockloff & Greer, 2010](#)). Past research indicates that information about the wins of other players magnifies gambling intensity by increasing the persistence of betting in the face of mounting losses ([Rockloff & Dyer, 2007](#)). [Rockloff, Greer, and Fay \(2011\)](#) likewise found increased gambling intensity in the presence of other players in the form of gambling persistence, faster betting speed, and greater total losses. One component leading to the social facilitation effect is the informational content transmitted by the broadcasting of wins within the venue by way of lights and winning bells. A greater number of simultaneous players within a venue necessarily means that more wins will be broadcast within any given time period and thus could potentially alter patrons' perceptions about the likelihood of winning. Another component to social facilitation is the audience effect, whereby players are aware that their betting behavior may be monitored by others, including both other players and nonplayer observers. [Rockloff and Greer \(2011\)](#) suggested that the audience effect may inhibit rather than encourage intense gambling. Lastly, the drive theory of social facilitation suggests the possibility that the mere presence of other people may motivate behavior by raising arousal levels, thereby facilitating dominant responses ([Zajonc, 1965](#)). The current mere-presence study examines the influence that crowds of other people have on EGM gambling in the absence of their being able to observe the actions of the gambler.

Even if other people in the gaming environment are not betting (and thus providing no information on the likelihood of winning) and cannot observe the betting of the target player (and thus do not contribute to a fear of negative appraisal), the mere presence of other people in the gaming venue may still act to intensify individual betting behavior. This study is important on theoretical grounds, but also has a practical interpretation. Foot traffic unrelated to gambling is common in many commercial gaming venues. This foot traffic results from patrons moving through the gaming area to access other amenities at the site, including restaurants and live entertainment. If the mere presence of others intensifies betting behavior, there is a potential to alter the design of gaming floors to limit such nongambling-related foot traffic.

Mere Presence

Several theoretical accounts of the social facilitation effect have included some aspects of cognitive mediation whereby the actor adheres more closely to a salient standard of performance ([Carver & Scheier, 1981](#)), or is motivated by a need for

social approval ([Cottrell, Wack, Sekerak, & Rittle, 1968](#)), or is driven by distraction ([Baron, Moore, & Sanders, 1978](#)). [Zajonc, Heingartner, and Herman \(1969\)](#) provided convincing animal evidence that *no* cognitive mechanism is necessary to generate social facilitation effects. Using cockroaches as a model, Zajonc et al. created “simple” and “complex” mazes into which a torch (flashlight) was shown into one side of the maze. The cockroaches, as a dominant response, would race to a darkened chamber at the terminal of each maze. Zajonc et al. found that cockroaches ran faster when placed in a simple maze with an audience of other cockroaches being in view through plexiglass. Conversely, cockroaches ran slower in complex mazes in the presence of others. Obviously, cockroaches lack the mental capacity to fear evaluation of their performance by the other animals. According to [Zajonc's drive theory \(1965\)](#), the “mere-presence” of other conspecifics increased the drive of the animal to produce a dominant response (running to a dark chamber), rather than a more complex cognitively mediated response.

Evidence for social facilitation effects in humans has proved more difficult, as it is hard to eliminate the possibility that humans might believe themselves to be judged on any performance-related task. [Guerin \(1986\)](#) identified 13 studies that adequately tested for the mere-presence effect in people and concluded that social facilitation only occurred in situations of mere presence in which others were a source of uncertainty for the actor. Thus, for humans, it appears that the mere presence of other people in the environment can sometimes—but not always—produce uncertainty. The uncertainty, by provoking a state of arousal and drive, facilitates performance on easy or well-learned tasks and inhibits performance on complex or novel tasks.

Hypotheses

Gambling is an easy and well-learned task for most regular players. As such, it is reasonable to hypothesize that betting behavior on EGMs should be intensified by the mere presence of others, as long as that mere presence also creates an environment of uncertainty in the gambler. Gambling intensity is defined here as any marker or trace of behavior that would contribute to long-run gambling losses. As the expected return in a commercial gaming venue is always negative, betting larger amounts, playing faster, and placing more bets will contribute to greater losses in the long run. Likewise, final payouts are a direct measure of gambling losses. In the current mere-presence study, the participants were predicted to gamble more intensively on these measures in the presence of larger crowds of nonevaluative others.

Methods

Participants

One hundred thirty-two participants, including 56 males and 76 females, were recruited from newspaper-flyer advertisements in Bundaberg, Australia. The average age of the subjects was 52.3 years ($SD=16.7$, range 18–71). The cultural backgrounds of the participants included the following: 114 (86.4%) Australian, 10 (7.6%) English, 2 (1.5%) Assyrian, and 6 (4.5%) other (unspecified). The Problem Gambling Severity Index (PGSI) ([Ferris & Wynne, 2001](#)) indicated that the problem-gambling status of the participants included 58 (43.9%) nonproblem gamblers, 28 (21.2%) low-risk gamblers, 31 (23.5%) moderate-risk gamblers, 8 (6.1%) problem gamblers, and 7 (5.3%) unclassified due to incomplete questionnaires.

The Simulated EGM

The study used a laptop-simulated EGM created in Visual Basic by the first author (cf. [Rockloff, Greer, Fay, & Evans, 2011](#)). The EGM was a traditional three-reel design, with three fruits on each reel. The player had the choice of betting 25, 50, or 100 cents on each trial (spin), and payoffs were 10 times the amount bet (i.e., \$2.50, \$5.00, or \$10.00, respectively). Starting credits were \$20 (2,000 cents), and the machine was rigged with a short sequence of five wins in the first 20 trials (on spins 4, 7, 14, 18, and 20), with losses programmed thereafter. The theoretical maximum payout was \$61.50, calculated as follows: \$20 starting bankroll plus \$50 maximum wins less \$8.50 in minimum bets required. The EGM produced the typical sounds of play, including the music of spinning reels and winning bells.

Design and Procedure

In the alone control condition, subjects were given \$20 compensation and completed a basic demographic questionnaire as well as the PGSI ([Ferris & Wynne, 2001](#)). Subjects in the alone condition proceeded immediately to the EGM task ($n=41$). By random assignment, other participants were placed in the six-person mere-presence condition (five-person video plus one live confederate, $n=43$) or the 26-person mere-presence condition (25-person video plus one live confederate, $n=48$). In the two mere-presence test conditions, subjects sat alongside one live confederate (a fake subject), who was described as participating in a separate study on sensory deprivation. The experimenter stated, “I’ll be running both studies today.” Both the participant and the confederate were given \$20 as compensation for their arrival at the session.

Participants were given brief instructions on how to operate the EGM and told that they could quit playing at any time. They were shown how to signal the experimenter from outside the room by pressing a call button fixed to the table (a remote doorbell alarm). Subjects were informed that they would receive any amounts remaining on the EGM at the conclusion of play and that they would receive one ticket in a \$500 grand lottery for each \$1 they had remaining on the

machine at the conclusion of play. This lottery draw was introduced to provide an incentive to conserve some money, as the low stakes of the game might otherwise cause subjects to expend their entire initial stake regardless of condition (a ceiling effect).

For the benefit of the subject who was listening, the confederate was told in a scripted dialogue that she would be participating in a study exploring the “effect that visual and audio-sensory deprivation has on tactile tasks.” She was told that she would be wearing headphones and a blindfold so that she could not see or hear anything around her. The task was to thread beads and safety pins from a container filled with rice and to string them onto a short length of fishing line. The confederates' stated objective (ostensibly) was to thread as many beads and pins onto the line as possible until the experimenter indicated that it was time to stop. The confederate was told that a “group of participants on the Rockhampton campus (approximately 290 km distant) would also be doing the sensory deprivation experiment at the same time live via videoconference.”

A short questionnaire was completed by both the subject and the confederate. The subject's questionnaire contained basic demographic questions as well as the PGSI ([Ferris & Wynne, 2001](#)). The confederate completed her (fake) survey slowly to allow the real subject ample time to finish.

After the completion of the questionnaires and informed consent documents, the experimenter announced: “We are going to start the sensory deprivation experiment first.” The experimenter told the confederate to place the blindfold over her forehead and to wait for the experimenter to signal for her to cover her eyes and begin the task. The experimenter instructed the confederate to put on earplugs and full ear-covering headphones. Up-tempo classical music ([Cardio Classics –Orchestral Workout!, 2008](#)) was played into the headphones at a volume that allowed the music to seep out. The full-ear covering headphones were specifically chosen to leak audio and thus create the impression that the music was being played at high volume.

The experimenter started the fake videoconference by using an Access Grid videoconference system ([Suarez, 2007](#)), which included one of two prerecorded videos for the “remote” site (see [Figure 1](#)). Each videoconference session included a camera view of the confederate and the subject projected onto the wall (and thus presumably also broadcasted to the remote site). On the basis of an audio cue embedded in the video (a book drop), the experimenter signaled the confederate to begin the task with hand gestures, while persons in the video also began the fake sensory deprivation task. The experimenter said to the real participant: “I want you to ignore this other experiment. They can't see or hear you.”

The \$20 compensation was retrieved from the participant after he or she was

asked: “Are you ready to gamble with this \$20 on the EGM for the chance to win up to \$62 and the possibility of \$500 in a jackpot draw?” These instructions were intended to create the (correct) impression that subjects were gambling with their own money. Participants were reminded that they could quit the game at any time and that they would receive the full amount remaining on the EGM in cash, as well as one ticket in a \$500 jackpot draw for every \$1 remaining on the machine. The experimenter left the room after starting the EGM, which had a 30-sec countdown to allow sufficient time to leave.

Confederates

Because of an unanticipated lack of availability of the first confederate past June 2009, a second confederate was employed to complete data collection. The first confederate was a 44-year-old blonde female who completed 50 sessions (including 23 of the six-person crowd and 27 of the 26-person crowd). The second confederate was a 40-year-old blonde female who completed 41 sessions (including 20 of the six-person crowd and 21 of the 26-person crowd).

Results

Data Analysis

The outcomes of bet size, speed of betting, total trials, and final payouts were analyzed with an analysis of covariance (ANCOVA) model. The independent variables included condition (alone, six-person crowd, 26-person crowd) and PGSI gambling status ([Ferris & Wynne, 2001](#)), as well as the covariates of age and gender. PGSI gambling status was coded as two categories for the purposes of the analysis (no problems, or one or more problems), as there were only eight subjects with severe gambling problems, and this limitation of range prevented a finer analysis of this variable.

Bet Size

There was no significant main effect for condition, $F(2,117)=0.18$, $p=.83$, *ns*, or PGSI status, $F(1,117)=1.03$, $p=.31$, *ns*, on the outcome of bet size, nor were there any significant simple effects. However, there was a significant interaction between condition and PGSI status, $F(2,117)=3.25$, $p=.04$ (see [Figure 2](#)). Participants with some preexisting gambling problems bet smaller amounts in the mere presence of confederates compared with the alone condition. In contrast, participants with no identifiable preexisting problems bet larger amounts in the mere-presence condition compared with the control. There was no significant effect for either age, $F(1,117)=1.91$, $p=.17$, *ns*, or gender, $F(1,117)=1.24$, $p=.27$, *ns*, on the outcome of bet size.

Speed of Betting

Bets per minute was a variable calculated as the average number of bets placed by each participant in 1 min of play, with higher means indicating faster speeds. There was a significant main effect for condition, $F(2,117)=5.23$, $p<.01$, on the speed of betting (see [Figure 3](#)). Tests of simple effects revealed a significant increase in bet speed from the alone condition to the six-person crowd, $p<.01$, and a significant decrease from the six-person crowd to the 26-person crowd, $p=.01$. There was no significant main effect for PGSI status, $F(1,117)=0.04$, $p=.85$, *ns*, and no significant interaction between condition and PGSI status, $F(2,117)=2.12$, $p=.13$, *ns*. There were also no significant effects for either age, $F(1,117)=0.11$, $p=.74$, *ns*, or gender, $F(1,117)=0.25$, $p=.62$, *ns*.

Total Trials

There were no main effects for condition, $F(2,117)=0.26$, $p=.77$, *ns*, or PGSI status, $F(1,117)=1.03$, $p=.31$, *ns*, on the total trials played (or bets placed in a session), nor were there any significant simple effects. However, there was a significant interaction between condition and PGSI status, $F(2,117)=3.83$, $p=.02$ (see [Figure 4](#)). Gambling persistence increased for players with some preexisting gambling problems in the mere presence of others compared with the alone condition. Conversely, persistence decreased for players with no identifiable problems in the mere presence of others compared with the alone condition. There was a significant effect for age, $F(1,117)=7.83$, $p<.01$, such that older players tended to place more bets. There was no significant effect for gender, $F(1,117)=0.10$, $p=.76$, *ns*.

There was a significant raw correlation between bet size and total trials, $r(130)=-.24$, $p<.01$. It is therefore reasonable to suspect that persistence, as measured by total trials, may be influenced by a player's initial choice of bet size and subsequent history of wins. That is, those who bet more and win more in the first 20 trials are tempted to quit early to lock in their gains. An ANCOVA model was run to repeat this analysis, but with the additional covariate of bet size. The overall pattern of results was identical to those in [Figure 4](#), although the condition by PGSI-status interaction was no longer significant, $F(2,116)=2.66$, $p=.07$, *ns*.

Final Payouts

There were a total of 60 (45.5%) participants who continued to play the EGM until there were no credits remaining. As such, the final payouts variable was converted into rank scores to make it amenable to analysis with the ANCOVA model. There were no significant effects for condition, $F(2,117)=3.26$, $p=.07$, *ns*, or PGSI status, $F(1,117)=3.26$, $p=.07$, *ns*, on final payouts, and there was no interaction between these variables, $F(2,117)=1.44$, $p=.24$, *ns*. However, there was a significant main effect for age, $F(1,117)=6.91$, $p=.01$, such that older players had lower payouts. Lastly, there was no significant effect for gender on final payouts, $F(1,117)=0.02$, p

=.90, *ns*.

Discussion

The results of the mere-presence study did not conform well to initial predictions. The mere presence of other people who were falsely presented as participating in another experiment on sensory deprivation did not cause a uniform increase in gambling intensity among the subjects. Prior research on the mere-presence effect suggests that the mere presence of others can cause uncertainty in the actor in some situations and that this uncertainty is necessary for social facilitation effects to occur ([Guerin, 1986](#)). It is important to note that there is no measure of “uncertainty” in this experiment, and it is only an assumption that this might be a driving force in producing the observed changes in behavior. The apparent absence of other plausible evaluative sources of influence, however, implicates uncertainty as the active ingredient of change. In the present study, mere presence clearly had some impact on gambling behavior, although some of the results were unexpected.

Speed of Betting

As expected, betting speed was higher in the mere presence of six people compared with the alone control, which suggests some “energizing” or arousing effect created by the mere presence of others (see [Figure 3](#)). Unexpectedly, however, the 26-person mere-presence condition failed to show greater speed than that in the alone condition. It is possible that the six-person condition created more uncertainty in the subjects than the 26-person condition because the uniformity of their actions (i.e., threading beads and pins on a fishing line) enhanced the impression that no individual would suddenly “do something” or act out of character with the demands of the situation. It is also possible that a larger crowd created a greater feeling of anonymity on the part of the subject, so that the consequence of any imagined disturbance in the 26-person condition would have less impact on them than a disturbance in the six-person condition.

Bet Size

The assumed potential for uncertainty created by the mere presence of others may be a source of autonomic arousal that influences betting behavior. The results of bet size conform well to previous work that specifically investigated the influence of autonomic arousal on bet size. [Rockloff, Signal, and Dyer \(2007\)](#) blasted a loud “white noise” at players during their betting session on a similarly structured EGM task. In this prior study, persons with many gambling problems had lower average bet sizes in the white-noise condition compared with the alone control, whereas those with few or no problems had higher average bet sizes. The results of the current mere-presence study conform to these prior findings. Gamblers with

preexisting problems had lower bet sizes in the mere presence of others compared with those in the alone condition, whereas those with no preexisting problems had higher bet sizes in the mere presence of others (see [Figure 2](#)). It is likely that a similar explanation is applicable to these results. Mere presence, much like the white-noise event, creates autonomic arousal that influences gambling. Some of the arousal caused by the mere presence of others can be misattributed to the gambling task (cf., [Schachter & Singer, 1962](#)). In a study investigating imagined gambling sessions, [Sharpe \(2004\)](#) found that social gamblers become more aroused, as measured by galvanic skin response, when imagining situations in which they had won at gambling compared with imagining losses. In contrast, problem gamblers were equally aroused by imagining both wins and losses. Thus, gamblers with preexisting problems are more likely to associate physiological arousal with losing and thus to moderate their betting accordingly. In contrast, players without problems associate arousal exclusively with winning and therefore bet larger amounts to capitalize on this assumed luck.

Total Trials

Persistence at gambling, as measured by total trials (or bets placed during the session), is another feature of gambling intensity. As the EGM was rigged with indefinite losses past the 20th trial, this variable captures persistence in the face of mounting losses. For players with preexisting gambling problems, persistence at betting was greater in the mere-presence conditions than in the alone condition. It is possible that the greater potential for uncertainty, and the accompanying arousal, was interpreted as a signal that their luck might soon change for the better as play progressed. In contrast, for players with no identifiable problems, gambling persistence was lower in the mere-presence conditions compared with the alone condition. Initial confidence, as represented by bet size, appears to dissipate with mounting losses; players without problems quit early in the mere presence of others.

The results for total trials, interpreted in terms of intensity, contrast with those of bet size. Players with preexisting problems bet small amounts in the mere presence of others, but failed to quit as losses mounted. In contrast, players without identifiable problems bet large amounts in the mere presence of others, yet quit early when losses began to accumulate. Future research can explore reasons behind these results. It may be, for instance, that different salient aspects of performance ([Carver & Scheier, 1981](#)) are active for problem players (e.g., staying in the game) versus nonproblem players (e.g., maximizing profits).

Age

Older players in the mere-presence study tended to place more bets and lose more money overall. These results were unexpected, as younger players are often

cited as betting more intensely and being more likely to have gambling problems. However, the results may only reflect a peculiarity of this sample.

Limitations

There are limits to extending the results of the study to natural environments, such as commercial gaming venues. The abstract nature of the mere-presence condition, being a fake sensory-deprivation experiment, is clearly not representative of the precise social situations experienced in real gaming environments. Instead, the research relies on a tradition of experimental realism that has proved successful in past social psychological research. The fake sensory-deprivation experiment was introduced to create an environment in which the subjects could gamble in the presence of other people without the fear or expectation that these others would judge their behavior. In fact, our postexperiment debriefings indicated that subjects believed this to be the case, although it is impossible to entirely discount some unexpressed fears of evaluation by others. As such, the mere-presence study was intended to be a psychological equivalent of foot traffic, or crowds, moving through a casino floor, but not necessarily attending to the activities of gamblers. This can happen in gaming venues, where patrons move through the gaming-floor space on their way to enjoy other facilities such as dining and live entertainment.

A further impact on the realism of the experiment was the award of lottery tickets to players for each dollar remaining at the end of play. This procedure is not representative of the situation faced by gamers in commercial venues. The lottery ticket award was intended to reduce the overall experiment-wide persistence of gambling to aid in the detection of potential differences between conditions, but also clearly contributed to some disconnect between the incentives faced by gamblers in the experiment and those faced by gamblers in real-world environments.

Foot traffic in real venues may have a larger or smaller effect on actual gambling behavior in venues. In particular, past research has suggested that mere presence has an influence on the social facilitation of behavior only if those others contribute to an environment of uncertainty. Foot traffic may create larger or smaller effects on the gambler than was present in this experiment as a result of differences in socially generated uncertainty. Lastly, the experiment does not provide any enlightenment with regard to which aspects of uncertainty may be impacting player behavior and therefore implicitly defines uncertainty only as the absence of some informational or evaluative component of social facilitation.

Implications and Conclusions

Mere presence has an influence on gambling behavior, although the influence is

not as simple as intensifying gambling on all measures of behavior. Instead, the effects of mere presence appear to have different influences on gamblers with and without preexisting gambling problems. Gamblers with preexisting problems display a particular style of gambling in the mere presence of others whereby they bet smaller amounts, but are resistant to quitting while losing money. Persistence is not simply a consequence of relatively lower bet sizes and modest initial wins, as the pattern of persistence is maintained after statistically controlling for bet size. In contrast, players without identifiable gambling problems choose to bet large amounts, but quit early in the face of mounting losses. The results of this study suggest that changes in gambling behavior arising from social facilitation are not solely due to informational effects (from coactors) or evaluation by others (from an audience), but can be a consequence of the mere presence of others in the venue who can neither see nor hear the actions of the gambler. Future research may be able to identify why mere presence has these contradictory effects on measures of gambling intensity.

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Figures

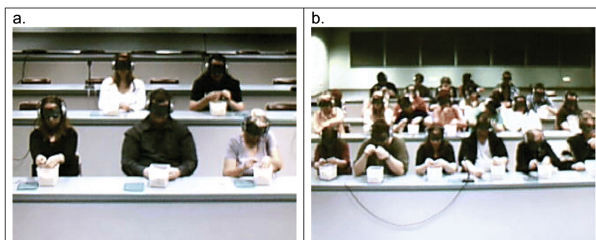


Figure 1

Frame capture from prerecorded videos of five (a) and 25 persons (b) participating in a fake sensory-deprivation task

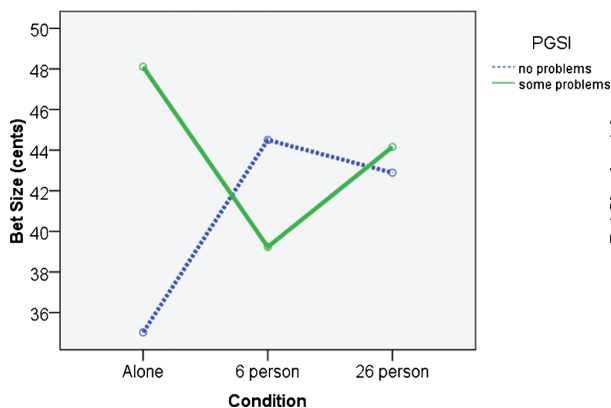
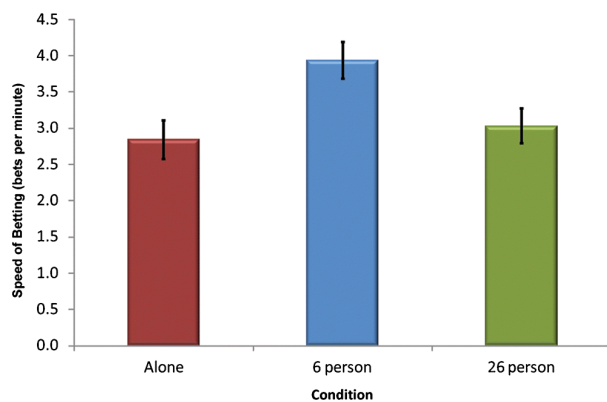
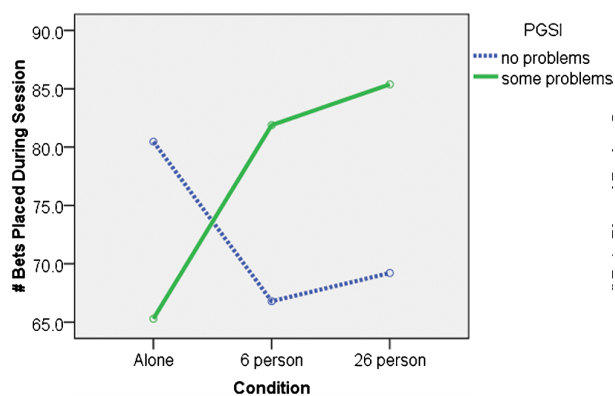


Figure 2

Bet size by condition and PGSI problem-gambling status. PGSI=Problem Gambling Severity Index

**Figure 3**

Speed of betting by condition

**Figure 4**

Total trials by condition and PGSI
problem-gambling status. PGSI=Problem
Gambling Severity Index

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