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Evaluating Preference and Rate of Gambling on Video Slot Machines

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Casinos increasingly are providing access to five-reel video slot machines and as a result are decreasing the use of traditional three-reel slot machines. Limited research has been conducted on the characteristics of play associated with video slot machines. The present study examined participant's play on a five-reel video slot machine, comparing the number of trials played while wagering one credit on five lines versus five credits on one line. After participants were exposed to both conditions they were asked to choose their preferred condition. The results found that participants played significantly more trials while playing during the five credits on one line setting. The results also found that 12 out of 16 participants selected to play on the five lines on one credit setting when given the option to choose the settings of the slot machine.
Keywords: Gambling, Video slot machine, Rate, Five Reel, Preference

Slot machine gambling has been cited as the largest contributor to the profit margin of casinos, with researchers estimating that 60-70% of casino revenue originates from slot machines (Kilby, Fox, & Lucas, 2004). While the profit margin may vary across casinos, some states have cited even higher profit percentages for slot machines. For instance, Illinois obtained 83% of the state's gross gaming wins from slot machines in 2010 (Illinois Gaming Board, 2011). Modern video slot machines allow participants to alter the number of credits and lines (pay lines) played. The term credit refers to the amount of money an individual bets on one pay line during each spin. The number of lines played is the number of times an individual elects to bet per spin (e.g., playing five lines means five separate bets are being placed on five different sets of stimuli). An individual wins when multiple matching stimuli land on the same line (e.g., three cherries in a row, starting with the left-most symbol).

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Dixon, Harrigan, Sandhu, Collins, and Fugelsang (2010) examined the design documents for a video slot machine and found that as the number of lines bet increases, the likelihood of a win increases. According to the documents participants playing on one line have a 5.1% chance of a win in comparison to 11.9% when playing on five lines. The odds of winning on various line settings relates to a study by Dixon, MacLin, and Daugherty (2006) who evaluated whether participants preferred a smaller payout occurring more frequently (approximately every 10 trials) versus a larger less frequent payout (approximately every 50 trials). The slot machines were programmed to provide equal total monetary wins; therefore the only difference between conditions was the frequency of wins. The results indicated that 83% of participants preferred playing on a machine that had smaller but more frequent payouts. The findings from Dixon et al. (2010) would suggest that the win percentage playing on five lines more closely resembles the more frequent reinforcement schedule that participants preferred from the Dixon et al. (2006) study.

Weatherly and Brandt (2004) also investigated the effects of various payback percentages and credit values on participants'

gambling behavior. On a simulated slot machine the authors used payback percentages of 75%, 83%, and 85% and credit values of $0.00, $0.01, and $0.10. The authors examined the number of trials and credits bet during a session. The results displayed that the payback percentage did not significantly alter the behavior of the participant; however the credit value did alter the participants' behavior. As the value of the credits increased the participant's overall betting behavior decreased. While Weatherly and Brandt found that the machine settings may alter participants betting behavior, Harrigan, Dixon, MacKaren, Collins, and Fugelsang (2011) found that participants' selection of various machine settings did not alter the likelihood of the machine paying out more money. The authors found that the number of lines played or the amount wagered per line did not affect the payback amount of a slot machine. In other words, a machine will pay out the same amount regardless of the player's betting behavior. The authors noted that individuals playing on numerous lines are likely to have more frequent wins in comparison to playing on fewer lines; however the overall payback percentage is not affected.

Little research has been conducted examining the behavior of individuals using video slot machines, and no previous research has been conducted examining rate of play on such games.

The first purpose of this exploratory study was to compare the number of trials played while wagering fives lines with one credit versus one line with five credits on a video slot machine. The second purpose was to evaluate which machine setting was more preferred after participants were exposed to both settings.

METHOD

Participants

Sixteen graduate students took part in the study (13 female, 3 male). Participants' ages ranged from 22 to 30 with an average of 25 (*sd* = 2.51). Recruitment was conducted by one of the experimenters. The recruiter informed the class of the ability to receive course extra credit or a $10 gift card for participating. The class was informed that the study involved playing on a slot machine. An alternative extra credit option was provided to individuals who did not want to participate in the study. All participants were asked to complete the South Oaks Gambling Scale (SOGS), which is a 16-item questionnaire designed to determine if an individual is a pathological gambler (Lesieur & Blume, 1986). Scores of five or higher indicate pathological gambling behavior. Scores ranged from 0-8, with one participants scoring as pathological gambler. The average SOGS score was .75 (*sd* = 2.01). There was no exclusion criterion in regard gambling history or prior experience playing slot machines. Prior to beginning the study each participant was instructed on the characteristics of the machine (e.g., lines, credits, ect.) and how to play, and were informed that they were allowed to leave the study at any time without penalty.

Setting and Materials

All sessions took place in a university laboratory, in a small individual therapy room. The small therapy room (8 feet by 6 feet) contained a desk with a computer, three chairs, a couch, and a slot machine. The slot machine was a Tabasco five reel (five columns where the symbols rotate or "spin") video slot machine, with credit betting levels of 1, 3, 5, 12, and 24. The machine allowed participants to play the line combinations of 1, 3, 5, and 12. Prior to the arrival of the participants all of the buttons on the machine were covered except for the repeat bet button and the machine was preset to 2000 credits.

Outcome Measures and Data Collection

The outcome measures were the number of trials played and the participants' preference for the settings of the slot machine after being exposed to both conditions. Data was collected from a program designed on Microsoft Visual Studio 2008.

Procedure

Each participant was exposed to three 10 minutes conditions (two forced choice conditions and a choice condition). The two forced choice conditions involved participants playing on two different machine settings: five credits wagered on one line and one credit wagered on each of five lines. Thus, the amount bet per spin in both choice conditions was always five credits. The order of the forced choice conditions was randomly determined and counterbalanced across participants. The third phase provided the participant the choice to select their preferred condition. Participants were instructed to choose either the five lines or one line condition. Participants were not provided a "no preference" option; however none of the participants expressed having no preference between the two conditions.

Upon entering the experimental setting participants were asked to complete a consent form, the SOGS, and demographics questionnaire. Participants were then directed to sit in front of the slot machine and were provided with the following instructions.

> "You will now be asked to play on a video slot machine until told to stop. You may not change the number of credits or lines bet. You will be playing the slot machine *wagering one credit on five lines/five credits on one line* (depending on the condition). To play the machine, push the repeat bet button. Do you have any questions? Please begin."

If participants asked any questions the applicable parts of the instructions were restated. After completing both forced choice conditions participants were provided the following instructions.

> "You will now be asked to play on a video slot machine until told to stop. You may choose the machine settings with which you would like to play. You may play on the machine wagering one credit on five lines or five credits on one line. On which setting would you prefer to play?"

Once the participant provided their choice, the experimenter set the machine to the appropriate setting. Participants were then instructed to begin. Upon completion of the third condition the participant was debriefed and provided either course extra credit or a gift card.

Interobserver Agreement

Interobserver agreement was recorded regarding the number of total trials played and was measured for 32% of sessions and was calculated by dividing the total number of agreements by the number of agreements plus disagreements and multiplying by 100%. Agreement was calculated between the experimenter taking data on a laptop using Microsoft Visual Studio and an observer taking written data. Agreement between observers was 98.4% during the one line condition and 97.6% during the five lines condition.

RESULTS AND DISCUSSION

Figure 1 displays the average number of trials played during the one line and five line conditions. A paired samples *t* test was conducted on the number of trials played. There was a significant difference in the number of trials played for the one line (M=130.31, SD=20.25) and five lines (M=112.06, SD=12.85) conditions; t(15)=3.14, $p<.05$, p =

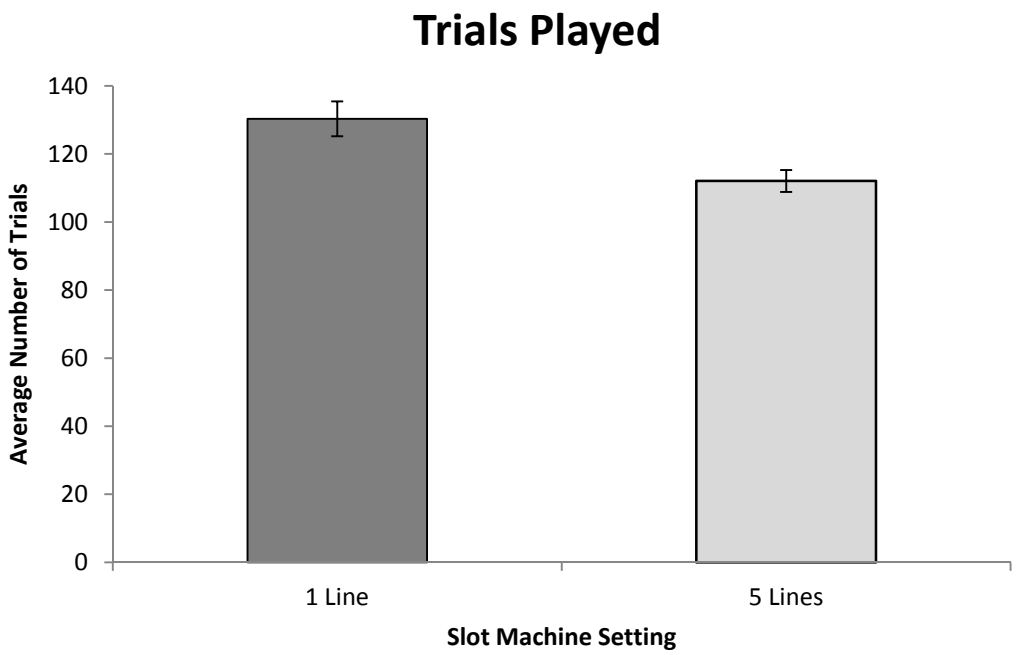

Figure 1. Displays the average number of trials played on the one line and five line settings. Participants played a significantly greater number of spins while betting on one line than when betting on five. The error bars represent one standard error of the mean across participants in each group.

0.0066. Twelve of 16 participants (75%) chose to play on five lines instead of one line when asked to select their preferred setting.

These results suggest that participants played more trials on the slot machine in the same amount of time when they were betting on one line than when they were betting on five lines. The results also display that the majority of participants chose to play on five lines when given the choice to select the machine settings. The present findings are consistent with those of Dixon, MacLin, and Daugherty (2006), who found that 83% of individuals preferred to play on machine settings that provided higher rates of reinforcement. While data was not taken on the number of wins that occurred, numerous participants stated they chose the five line condition because wins were more frequent. The claims of the participants are supported by the findings of Harrigan et al. (2011), which found that wins were more likely to occur as the number of lines increased, suggesting that wins were likely to occur while playing on the five line condition.

The present study was the first to compare participants' rate of play on different slot machine settings. The participants' higher rate of play while playing on one line can potentially be explained through previous research. As previously stated by Dixon and colleagues (2010), placing bets on an increased number of lines results in a greater rate of winning outcomes, and participants tend to follow this betting pattern. Therefore an increased number of wins may be a contributing factor to the decrease in the rate of play during the five lines condition, perhaps due to a more frequent post-reinforcement pause. Based on the present results, there may be an inverse relationship between rate of play and the number of pay lines bet on by an individual. That is, as the number of lines bet increases, the rate of play of the individual

will likely decrease. Another potential reason for the slower rate of play during the five line condition is that participants may have spent more time analyzing the outcome of the spin. While the slot machine automatically notifies the individual of a win, participants may have taken time examining the outcome of the spin. While playing on one line, there was only one outcome to examine, in comparison to five outcomes during the five line condition, which were not all simple horizontal pay lines. For example, on the slot used, the first three pay lines require symbols to line up straight across the row for a win, while the fourth and fifth pay line require symbols to be lined up diagonally. This more convoluted arrangement of pay lines may increase the amount of time required to examine the results of a bet. Therefore the decrease in rate while playing on five lines may originate from extended time analyzing the spin outcome. Subjectively, while some participants were observed analyzing the outcome after each spin, numerous participants would immediately begin the next trial if no win occurred. While participants may gamble at a higher rate while playing on one line, participants tend to prefer playing on five lines. The preference for an individual to play on five lines may lead to gamblers spending longer durations on slot machines potentially increasing the revenues of the casinos. Further research needs to be conducted to test whether gambling will persist for a greater number of trials when playing on a large number of pay lines, or if gambling on one line will cause the greatest loss due to increased rate of play.

A potential confound to the present study involves a lack of tangible motivation for the individual to win as many credits as possible. While the majority of participants behaved as if they had the desire to win, the possibility remains that their rate of play may have been altered if there was a tangible reinforcer for winning during a session (e.g., a chance to win additional extra credit or a second gift card). A second limitation may be the inclusion of the pathological gambler in the data. While only one participant was scored as pathological, the data of that participant was consistent with the majority of the data from those scored as non-pathological gamblers. The pathological gambler played 124 trials during the one line condition and 93 during the 5 lines condition and preferred the five line condition. However, future research may consider an examination of a larger pool of pathological gamblers under the same conditions.

Another potential limitation was the inability to control the payout of the slot machine. The number of wins and the amount paid by the slot machine occurs on a random basis, so no two participants contacted the exact same experience while participating in the study. Further, other specific random combinations of symbols result in access to a minigame. In these minigames, the gambler does not simply win a predetermined amount based on the number and type of symbols aligned, but a bonus event is triggered that allows for increased winnings. In the first possible minigame, the screen displayed three mosquitoes, and the gambler could choose among them. Each provided a fixed amount of credits, the value of which was hidden until one was selected. The second minigame displayed a video of a man cooking chili where ingredients were added to a pot at random, and different combinations netted the gambler varying amounts of credits. The last minigame showed a matching game where the user was provided several attempts to flip over squares and match symbols. The more symbols matched resulted in increased winnings. Once again, as the procedures took place on a real slot machine, contact with these outcomes occurred on a random basis. Studies in this area could be conducted on a simulated slot machine to decrease potential confounding variables.

Last, the study utilized only a small sample of participants. Only 16 participants took part in the study. Though the behavior observed within the experimental sessions allowed for the detection of a significant difference in gambling behavior, a much larger sample size may produce a more stable, convincing result. Additionally, to investigate the phenomenon further, investigations of participants' rate of play and preferences when playing on different line and credit combinations could produce a greater difference. For example, allowing participants to bet on 20 lines rather than 5 may produce a greater effect, potentially due to an increase in winning outcomes and relevant stimuli to examine following a spin.

The present exploratory study was the first to examine the relationship between the number of lines bet and the rate of play of an individual. On average participants played at a higher rate while playing on one line in comparison to five lines; however the majority of participants displayed a preference for the five line condition. With casinos more frequently using five reel video slot machines, more research needs to be conducted on the characteristics of play associated with these types of machines.

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