Satisficers and Maximizers: A Preliminary Examination of Maximization Tendencies and Slot-Machine Gambling

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The present experiment investigated the relationship between maximization, or the extent to which time and effort are spent comparing options before making a choice, and the frequency of switching among concurrently available slot machines. Fourteen adults completed the Maximization Scale and were divided into groups according to maximization tendency, and then gambled hypothetical credits on slot machines of their choice. Across three phases, either 3, 6, or 14 slot machines were available to play. Results suggest those scoring as maximizers switched among available slot machines significantly more than those scoring as satisficers, and that switching among alternatives may be a behavioral correlate of maximization in a gambling context. Implications for pathological gambling and future directions are discussed.

Keywords: choice, maximization, overload, satisficing, slot machine

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Like any form of gambling in a casino, there are a number of variables in regard to slot machines that affect the way a gambler plays. Many of these variables are factors related to the properties of slot machines. For example, in a laboratory gambling study gamblers bet faster when wagering on one line of a slot machine than when betting across five lines when both response effort and bet size were controlled (Dixon, Miller, Whiting, Wilson, & Hensel, 2012). Similarly, a win on a slot machine will produce a post-reinforcement pause and slow play, and larger available jackpots on a slot machine may cause gamblers to respond to a near-miss outcome (i.e., two matching symbols on the payline with the third matching symbol immediately above or below the payline) more like they had won (Dillen & Dixon, 2008).

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Beyond these known characteristics of slot machines that influence gambling, there are a number of traits or conditions that the gambler brings to the casino with him or her that influence play. For instance, a diagnosis of attention deficit hyperactivity disorder was previously demonstrated as a significant predictor of youths later becoming pathological gamblers (Shead, Derevensky, & Gupta, 2010). Other trait variables, such as gender, may also be predictive of gambling behavior; male has been indicated as the more likely gender to engage in problematic gambling (Gupta & Derevensky, 1998). Further analyses of player characteristics that influence gambling behavior are warranted to gain a complete understanding of risk, and may suggest additional risk factors for the development of pathological gambling and future directions for preventative interventions.

One such phenomenon rarely examined in gambling studies is choice tendency in regard to maximizing outcomes. Response options may be compared in terms of usefulness, preference, or value, and after con-

sideration of pros and cons of each alternative, the optimal choice may be made to achieve the best possible result (von Neumann & Morgenstern, 1944). Those who tend to make choices in this way are classified as maximizers (Schwartz et al., 2002). Conversely, satisficers are those who make choices without a complete evaluation of all possible outcomes by selecting an acceptable alternative (Schwartz et al., 2002), and then achieve a more optimal outcome with ongoing adjustment. For example, when listening to the radio, a satisficer may find a preferred song and listen to it, whereas a maximizer would more likely continue search through more stations and listen to his or her most preferred song among all of those currently playing. In comparison to satisficers, maximizers frequently report experiences of less satisfaction with choice outcomes, happiness, self-esteem, and life satisfaction, as well as greater levels of depression, regret, and perfectionism in regard to choices (Schwartz et al., 2002). Further, maximizers prefer to have fewer alternatives to compare (Reed, DiGennaro Reed, Chok, & Brozyna, 2011) and have demonstrated increased time and effort searching through available options (Dar-Nimrod, Rawn, Lehman, & Schwartz, 2009). When the number of available choices increases, maximizers tends to strive toward evaluating every option and more frequently tend to experience choice overload, an adverse effect of choice such as decision regret, dissatisfaction, or a delay or complete suppression in choosing, while the choices of satisficers are often not affected (Iyengar & Lepper, 2000; Schwartz, 2000).

In a casino setting, a gambler must choose to play among a slew of available games, and further choose among the types of that particular game that are available. That is, even a gambler who prefers to play only slots will often have to choose among hundreds or thousands of available slot machines, many with different themes, payouts, and visual configurations. Thus, because the frequency of choices required and the great number of options, maximization may be a relevant variable in understanding how gamblers allocate responding in a casino or persist in gambling. Stated in another way, those who tend to maximize choices may be at risk to engage with many more gambling machines or games as they strive toward evaluating and comparing viable alternatives. Therefore, the present study conducted a preliminary examination of the relationship of maximization tendency and a possible behavioral correlate of maximization during slot machine play. More specifically, we tested the hypotheses that maximizers would switch among slot machines at a greater rate than satisficers, more extensive arrays of options would result in less overall switching, and that maximizers would switch more frequently as the number of choice alternatives increased.

METHOD

Participants

A total of 14 participants completed all of the experimental procedures. The participant pool consisted of undergraduate students at a university in the Midwest and members of the nearby community. Participants' ages ranged from 18 to 45 with an average of 28.36 years ($SD = 7.46$) and included ten females and four males. The experimenters recruited participants via word of mouth, and students in college classes were offered extra credit for participation, while those choosing not to participate were offered alternative forms of extra credit. Each participant in the study completed the South Oaks Gambling Screen (SOGS), a 16-item questionnaire that measures potential gambling pathology (Lesieur & Blume, 1986). Scores of 3-4 indicate some problems with gambling and scores of 5 or greater indicate probable pathological gambling. No partici-

pant's SOGS scores suggested any problems with gambling as marks ranged from 0-2 ($M = 0.35$, $SD = 0.63$) on this measure.

Setting and Materials

All sessions took place either in a university laboratory room measuring approximately 5x7m with a computer, mouse, tables, chairs, cabinets, and only the experimenters present or at home on their own computers in a room with no one else present. The gambling apparatus used in the experiment included virtual slot machines found on www.freeslots.com. The webpage displayed 15 total machines (presented in a top row of seven and a bottom row of eight) from which to choose, including 3-reel machines, 5-reel machines, and one video poker machine. The lone video poker machine (positioned on the very top-right of the array) was not eligible for play in the current study due to its slower rate of play and further differences from the slot machines, so participants were instructed to play only the 14 slot machines and to omit the video poker machine when choosing. Those completing the procedures in an off-campus setting were emailed all questionnaires and links to the website used in the study, connected with an experimenter online on Google+ Hangouts, and were required to use the screen share function so that the experimenters had visual access to that participant's computer screen to monitor slot machine play. When the experimental procedures were completed, participants were prompted to email completed questionnaires to the experimenters to be downloaded prior to analysis.

Response Measurement and Interobserver Agreement

To divide the participants into groups, the experimenters administered Schwartz et al.'s (2002) Maximization Scale. This scale consists of 13 statements (e.g., "Whenever I am faced with a choice, I try to imagine

what all other possibilities are, even ones that aren't present at the moment," and, "I never settle for second best.") in which participants rate which participants rate each item on a Likert-type scale ranging from 1 (completely disagree) to 7 (completely agree). Scores range from 13 to 91, and a neutral score of 4 on every item would yield a total of 52 or the point of indifference. As suggested by Schwartz (2000) and Schwartz et al. (2002), those scoring above indifference were included in the maximizer group, and those scoring less were included in the satisficer group. In addition to these recommendations, any scores of 52 were included in the satisficer group. This measure has shown good internal consistency, consistent relationships with numerous psychological constructs, and good test-retest reliability over a span of nine months (see Schwartz et al., 2002, for further background on the scale).

The primary dependent variable in the study was the slot machine switches per minute, defined as clicking on a link resulting in access to a slot machine different than the one played on the last trial. When beginning a condition, the initial choice of slot machine did not count as a switch, and any change in slot machine thereafter was counted. To ensure the accuracy of observations, a second independent observer recorded slot machine switches for 28.6% of sessions. Sessions were divided into one minute intervals, and an agreement was scored when both observers recorded the same number of slot machine switches in each interval. Inter-observer agreement across all observations averaged 91.63%, ranging from 80 to 100%.

Procedure

After providing consent, participants completed the Maximization Scale and kept the forms until they were finished with the procedures so that the observers were blind

to group inclusion. Next, each participant gambled credits on slot machines in three choice phases. In all phases, the experimenter loaded the necessary web pages and stated the following instructions:

> You will start with 75 credits to gamble on any of these slot machines. Your goal is to win as many credits as possible. I will tell you when to start and stop. Keep in mind that all of these machines have different odds and features, so it may be advantageous to switch or it may be advantageous to keep playing the one you've selected. If you would like to try another machine, click the 'back' button on the browser. The game will always carry over your winnings. Do you have any questions?

The experimenter then answered any questions by restating the relevant part of the instructions.

The three choice phases were introduced in random order to control for effects due to condition sequence. In one phase, the experimenter opened a sub-page that displayed three slot machines, and each participant was required to choose to play among these three options. In another phase, a second window with three additional slot machines was opened and placed next to the first so that the participant could choose among six slot machines. The third phase included all 14 slot machines available on the freeslots.com homepage. Each phase lasted for five minutes (three participants were run in a multiple baseline format, so each phase lasted from four to seven minutes; slot machine switches were converted to a rate measure to account for these varying phase lengths). If a win on any machine resulted in a bonus mini-game, the session timer was stopped until normal slot play returned.

RESULTS AND DISCUSSION

To ensure that groups differed on maximization as intended, an independent samples t test verified that the satisficer group scored significantly lower in maximization than the maximizer group (t (12) = -4.995, p < .001). Figure 1 displays each participant's average rate of slot machine switches across all phases as a function of score on the Maximization Scale. A total of six participants scored 52 or fewer on this scale and were placed in the satisficer group. Members of this group averaged 0.67 switches per minute in the 3 slot phase, 0.23 in the 6 slot phase, and 0.23 in the 14 slot phase. Overall, satisficers switched slot machines at a rate of 0.18 times per minute (SD = 0.13). The remaining eight participants reported scores of 53 or greater on the Maximization Scale and were classified as maximizers. This group switched slot machines at a rate of 0.95 times per minute in the 3 slot phase, 1.17 times per minute in the 6 slot phase, and 1.42 times per minute in the 14 slot phase. Across all choice phases, this group switched slot machines at an average rate of 1.27 times per minute (SD = 0.78). Rate of slot machine switches was analyzed in a 2x3 mixed factorial ANOVA, with choices available (3 slots, 6 slots, 14 slots) as a within subjects variable and maximization tendency (satisficer and maximizer) as a between subject variable. A significant main effect of maximization tendency was observed, $F(1,12)$ = 9.258, p = .01, indicating that maximizers switched slot machines at a greater rate than satisficers. The main effect of choices available on rate of slot machine switches, $F(2,24)$ = 1.154, p = .332, and the interaction effect of choice style x choices available, $F(2,24)$ = .294, p = .748, were not found to be significant.
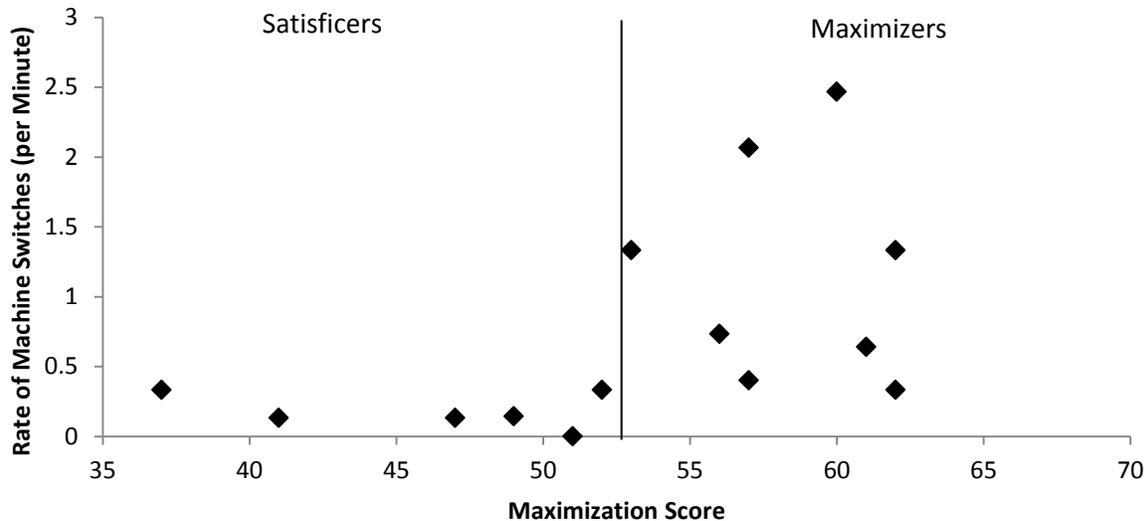
Figure 1. The rate of slot machine switches as a function of score on the Maximization Scale. The solid line marks a score of 52, or indifference, with lower scores on the x-axis indicating satisficing tendencies and higher scores indicating maximizing tendencies.

Overall, the results of the present study support the previous literature on the construct of maximization in choice behavior (e.g., Schwartz et al., 2002) by demonstrating that maximizers, or those said to carefully consider alternatives, switch among available slot machines at a significantly greater rate than satisficers, who frequently choose an acceptable alternative. The effect was reliably observed, as all participants in the maximizer group switched slot machines at least as rapidly as any participant in the satisficer group. Further, the current study extended the previous literature by utilizing an objective, behavioral measure of maximization (i.e., switching) aside from reliance on self-reports of regret or other related constructs.

These results have several implications for the study of risk and disordered gambling. First, maximization tendencies appear related to at least one aspect of gambling behavior. In this preliminary analysis, those who reported satisficing tendencies allocated responding across a fewer number of machines, which may pose consequences related to the development of pathological gambling behavior. In a live casino setting, switching from machine to machine necessarily results in a changeover delay. That is, one must cash out from one machine, move to another, and insert money into that machine before gambling again. Though no such delay was instituted in the present study, the present results might suggest that satisficers who switch machines less may gamble at increased rates compared to maximizers who switch among options frequently. In contrast, maximizers who frequently switch machines or games may lose count of winnings or money lost or track wins poorly, and may play on more gaming machines during a gambling session. Future research in this area may wish to validate any further effects of frequent machine changes to more fully determine the consequences of maximizing tendencies. Second, the adverse side effects of many available choices have included regret, dissatisfaction with choices, deterioration of self-control, and others, and are reported much more frequently by maximizers (see Reed et al., 2011). These side-

effects, or their absence, may be related to the development of gambling pathology. For example, if a gambler ranking very high on the Maximization Scale enters a casino, chooses among the many options, and wins some amount of money, a maximizer may yet report dissatisfaction with the outcome in that more winnings were possible from other opportunities. Research following this line may wish to determine the relative rates of satisficers and maximizers who qualify as pathological gamblers and to examine any differences in gambling behavior of the groups to find potential variables influencing the development of pathological gambling. Last, the results of the present study support the use of Schwartz et al.'s (2002) Maximization Scale in the measurement of maximization tendencies.

Though the results of the present study appear consistent, they are not without limitation. First, the reader must interpret the present results very cautiously due to the limited sample size. Though a statistically significant difference was detected among mean switches between maximizers and satisficers, this preliminary analysis included few data points in each group and more extensive study of the variables of interest is required to determine the reliability of the relationship between maximization and gambling behavior and its generalizability in the general population. Second, the number of available slot machines produced no reliable effect on the switching behavior of the participants. In other words, participants either switched or did not switch among machines at a similar rate whether they could choose from 3, 6, or 14. Other studies have used arrays including hundreds of choices (e.g., Reed et al., 2011), and casinos may have hundreds or even thousands of available slot machines. Researchers may wish to expand upon the number of available slot machines to more closely resemble choice scenarios presented in other studies and in

live casino settings in future examinations of choice overload of gamblers to determine whether differentiated play or other adverse side effects of extensive options will influence the behavior of gamblers, and include additional behavioral measures that may be indicative of choice overload. Third, as used in the present study and as noted previously, Schwartz (2000) suggested that those scoring above or below indifference (52) on the Maximization Scale be categorized as maximizers and satisficers, respectively. Other research has utilized more stringent classification criteria, such as a ceiling score of 40 for satisficers and a floor score of 65 for maximizers (Reed et al., 2011). In the present experiment, only one participant scored at 40 or below and none scored 65 or above. Despite the observed differences in slot machine switching between groups, future research may wish to expand the sample size and range of scores so that the findings are more representative of the greater population, or to recruit according to the more stringent classification criteria so that differences between more disparate groups may be investigated.

In sum, the results of the present study support the previous literature that suggests that maximizers, those scoring above indifference on the Maximization Scale, exhibited a greater rate of switching among slot machines, a potential behavioral indicator of maximization. Due to the relationships between maximization gambling behavior, such as engagement across more gaming machines and possible slower play, future research on personal characteristics that influence gambling behavior and pathology is necessary to progress toward a more comprehensive model of gambling behavior.

REFERENCES

Dar-Nimrod, I., Raw, C. D., Lehman, D. R., & Schwartz, B. (2009). The maximization paradox: The costs of seeking alternatives. *Personality and Individual Differences, 46,* 631-635.

Dillen, J., & Dixon, M. R. (2008). The impact of jackpot and near-miss magnitude on rate and subjective probability of slot machine gamblers. *Analysis of Gambling Behavior, 2*, 121-134.

Dixon, M. R., Miller, J. R., Whiting, S. W., Wilson, A. N., & Hensel, A. M. (2012). Evaluating preference and rate of gambling on video slot machines. *Analysis of Gambling Behavior, 6,* 77-82.

Gupta, R. & Derevensky, J. L. (1998). An empirical examination of Jacob's *General Theory of Addictions:* Do adolescent gamblers fit the theory? *Journal of Gambling Studies, 14,* 17-49.

Iyengar, S. S., & Lepper, M. R. (2000). When choice is demotivating. *Journal of Personality and Social Psychology, 79,* 995-1006.

Lesieur, H. R., & Blume, S. B. (1987). The South Oaks Gambling Screen (SOGS): A new instrument for the identification of pathological gamblers. *American Journal of Psychiatry, 144*, 1184-1188.

Reed, D. D., DiGennaro Reed, D., Chok, J., & Brozyna, G. A. (2011). The "Tyranny of choice": Choice overload as a possible instance of effort discounting. *The Psychological Record, 61,* 547-560.

Schwartz, B. (2000). Self-determination: They tyranny of freedom. *American Psychologist, 55,* 79-88.

Schwartz, B., Ward, A., Monterosso, J., Lyubomirsky, S., White, K., & Lehman, D. R. (2002). Maximizing versus satisficing: Happiness is a matter of choice. *Journal of Personality and Social Psychology, 82,* 1178-1197.

Shead, N. W., Derevensky, J. L., & Gupta, R. (2010). Risk and protective factors associated with youth problem gambling. *International Journal of Adolescent Medicine and Health, 1,* 39-58.

von Neumann, J., & Morgenstern, O. (1944). *Theory of games and economic behavior.* Princeton, NJ: Princeton University Press.

Action Editor: **Andrew E. Brandt**