Analysis of Gambling Behavior

Volume 4 | Issue 2 Article 1

2010

Investigating the Relationship Between Escape and Gambling Behavior

Jeffrey N. Weatherly
University of North Dakota, jeffrey_weatherly@und.nodak.edu

Kevin S. Montes
University of North Dakota

Danielle M. Christopher
University of North Dakota

Analysis of Gambling Behavior 2010, **4**, 79-87 Number 2, Winter 2010

Investigating the Relationship Between Escape and Gambling Behavior

Jeffrey N. Weatherly, Kevin S. Montes, and Danielle M. Christopher
University of North Dakota

Recent research suggests that there is a potentially strong relationship between gambling as a means of escape and the presence of pathological gambling. The goal of the present study was to establish whether there was a correlation between endorsing gambling as a means of escape and how participants played video poker in a laboratory setting. Forty eight participants completed several questionnaires and then played video poker. Results demonstrated that endorsement of gambling as a means of escape, as measured by the Gambling Functional Assessment (Dixon & Johnson, 2007), was significantly positively correlated with number of credits risked during video-poker play. It was not, however, correlated with number of hands played or number of errors made. The results therefore support the idea that escape and gambling have a unique relationship and suggest that this relationship may display itself as increased risk taking.

Keywords: Gambling, Escape, Video poker

According to the *Diagnostic and Statistical Manual of Mental Disorders* (American Psychiatric Association, 2000), an individual must display five of the 10 possible symptoms of pathological gambling before the disorder is officially diagnosed. This diagnosis should occur within the framework of a clinical interview. However, because clinical interviews can be costly and time consuming, a number of paper-pencil diagnostic screens have been developed to identify the potential presence of pathology (e.g., the Canadian Problem Gambling Index, Ferris, Wynne, & Single, 1999; the South Oaks Gambling Screen (SOGS), Lesieur & Blume, 1987). The most popular screen has been the SOGS, which consists of 20 questions pertaining to the respondent's gambling history. A score of five or more on the SOGS suggests the potential presence of pathology, although research suggests that the SOGS (and other measures) may be overly liberal in raising this possibility (i.e., false positives; e.g., see Gambino, 1997, for a discussion).

Borrowing from the literature in behavior analysis, Dixon and Johnson (2007) took a different tack. They introduced the Gambling Functional Assessment (GFA), which is a paper-pencil measure that was intended to identify the maintaining contingencies for the respondent's gambling behavior, not to identify the potential presence of pathology. The GFA itself was patterned off of similar measures designed to identify the maintaining contingencies for self-injurious behavior (Durand & Crimmins, 1988) and it adopts the rationale behind functional analyses that have become widely accepted in the field of behavior analysis (e.g., see Iwata, Dorsey, Slifer, Bauman, & Richman, 1994). As proposed, the GFA supposedly identifies four possible maintaining consequences of gambling behavior: tangible outcomes, social attention, sensory experience, and escape. It

Author Note: The authors thank Adam Derenne for his assistance in data analysis and Chase Rost for his help in data collection. Correspondence pertaining to this paper should be addressed to:
Jeffrey N. Weatherly, Ph.D.
Department of Psychology
University of North Dakota
Grand Forks, ND 58202-8380
Phone: (701) 777-3470
Fax: (701) 777-3454
Email: jeffrey.weatherly@und.edu

consists of 20 questions, with five items assessing each of the four potential consequences. Scores from the five questions are summed and the consequence with the highest sum score supposedly represents the primary maintaining contingency.

When the GFA was proposed, its psychometric properties were not known. To tests its reliability, Miller, Meier, and Weatherly (2009) had 124 college students complete the GFA twice, with the two test administrations separated by 12 weeks. Overall, reliability measures were quite good. That is, the total score on the GFA (i.e., summing across all four consequences), as well as for three of the four individual consequences, correlated between administrations at or above acceptable levels (e.g., Groth-Marnat, 2003). Furthermore, the correlations compared favorable to reliability measures reported for established instruments (e.g., the SOGS). Reliability for the consequence of escape, however, was suboptimal, leading Miller et al. (2009a) to suggest that factors related to this consequence were likely associated with state, rather than trait, variables.

Miller, Meier, Muehlenkamp, and Weatherly (2009) tested the construct validity of the GFA by having 949 undergraduates complete the tool. This sample was divided in half, with an exploratory factor analysis conducted on the responses from the first group and a confirmatory factor analysis then conducted on responses from the second group. Measures of internal consistency (i.e., Crombach's α) were quite good, ranging from 0.80 to 0.92 across the four consequences and the summed score on the entire GFA. However, as originally proposed, the GFA was intended to measure four different contingencies that might be maintaining gambling behavior, but results from the factor analyses suggested a two-, not a four-, factor solution. The results showed that the items intended to measure tangible outcomes, social attention, and sensory experience loaded on to one factor and the items intended to measure escape loaded on to the second factor. These results lead Miller et al. (2009b) to conclude that the GFA, although intended to identify four maintaining contingencies, likely identifies only two: positive reinforcement (factor 1) and negative reinforcement (factor 2).

As did Miller et al. (2009a), Miller et al. (2009b) noted an anomaly when it came to the consequence of escape (i.e., scores on factor 2). Namely, although relatively few respondents scored high in the category of escape, when they did, these respondents also tended to display a high total score on the GFA. This finding lead Miller et al. (2009b) to suggest that these particular individuals might be those in the sample prone to demonstrate signs (or even the presence) of pathological gambling. In other words, although the GFA was only intended to identify the consequences that were maintaining the respondent's gambling behavior, the data were suggestive that the score in the escape category on the GFA might also be identifying the presence of problem gambling behavior.

To test this possibility, Miller, Dixon, Parker, Kulland, and Weatherly (2010) collected data from adults on the streets of Las Vegas and Wendover, Nevada and in two sports bars in Rockford, Illinois. Respondents were asked to complete the SOGS and the GFA. Consistent with the results of Miller et al. (2009b), the correlation between respondents' total score on the GFA and their score in the category of escape was high. More importantly, however, was the finding that the category of escape did an adequate job identifying individuals who also scored five or more on the SOGS (i.e., the potential pathological gamblers). In fact, in the Illinois sample, where the base rate of respondents scoring above five on the SOGS was nearly 30%, an escape score of 11 or

more on the GFA accurately identified 78% of the sample as defined by their SOGS scores.

Thus, the results from Miller et al. (2009a, b, 2010) suggest that there is a potentially unique relationship between the contingency of escape and gambling behavior. Such a claim might not be overly surprising given that escape is one of the 10 official symptoms of pathological gambling. What is surprising, however, would seem to be the ability of one particular contingency to be so strongly associated with the disorder. Phrased another way, if pathological gambling is strongly tied to escape contingencies, then treatment providers may be well served to tailor their treatments accordingly.

The present study was designed to be another step toward identifying whether escape contingencies were related to high levels of gambling behavior and, if so, what aspects of gambling behavior. Participants were recruited to complete the GFA and the SOGS. Participants then had the opportunity to play video poker. Given the results of Miller et al. (2009a, b, 2010), the prediction was that escape scores on the GFA would be positively correlated with video- poker play. Of particular interest, however, was determining what aspects of video-poker play with which escape might be associated. That is, video poker allows for a number of dependent measures to be assessed, such as hands played (i.e., persistence), credits bet (i.e., risk), and accuracy of play (i.e., efficiency). It is possible that gambling for escape might be associated with all or just one of these measures. If so, that information may give insight in to how gambling for escape might be related to gambling problems.

METHOD

Participants

The participants were 48 (24 female; 24 male) individuals recruited from the psychology department participant pool at the University of North Dakota. This recruitment consisted of an open advertisement for potential participants to participate in a study on video poker. The mean age of the participants was 20.70 years (SD = 3.28 years), with one female participant failing to report her age. Forty three participants self-identified as Caucasian while five self-identified as an ethnic minority. Only two of the participants reported being married. Forty five of the participants reported an annual income of less than $25,000.

Materials and Apparatus

The research was conducted in a room measuring approximately 1.5 by 4.0 m that contained a table, a chair, and a file cabinet. A personal computer, equipped with two monitors, was located on the table. WinPoker 6.0 (see Jackson, 2007) software was loaded on the personal computer.

Four paper-pencil instruments were used. The first item was an informed-consent form, which outlined the study as approved by the Institutional Review Board at the University of North Dakota. The second was a demographic-information form that asked for the information reported in the participants section above. The third was the SOGS (Lesieur & Blume, 1987), which consists of 20 questions pertaining to the respondent's gambling history. Research on the SOGS suggests that it is internally consistent (e.g., Lesieur & Blume, 1987; Stinchfield, 2002) and scores are relatively stable across time (Lesieur & Blume, 1987; Poulin, 2002). The fourth instrument was the GFA (Dixon & Johnson, 2007), which consists of 20 questions pertaining to why the participant gambles. Due to a duplication error by the experimenters early in the study, nearly half the participants completed the GFA with the last four items (i.e., questions 17 – 20) missing. To ensure uniformity across the sample, the remaining participants also

completed only the first 16 items on the GFA. Germane to the present hypothesis, the final item related to the consequence of escape ("If I have a hard day at work, I am likely to gamble.") was part of this omission.

Procedure

Participants were run individually. When the participant arrived for the session, the researcher initiated and completed the informed-consent process. The participant was then asked to complete the paper-pencil measures described above. After completing the paper-pencil measures, the researcher oriented the participant toward the personal computer and read the participant the following instructions:

> You will now be given the opportunity to play a computer generated, five-card-draw poker game. You will be staked with 100 credits. We ask that you treat these credits as if they had monetary value. You may bet up to five credits per play and your goal should be to end the session with as many credits as you can. How you play the game is up to you. You may quit (i.e., end the session) at any time by informing the researcher that you wish to end the session. The session will end when a) you quit playing, b) you reach 0 credits, or c) 15 minutes have elapsed. Do you have any questions?

Questions were answered by repeating the above instructions. The poker game participants played was "Loose Deuces," which is a five-card-draw poker game in which "2s" are wild. This particular game was chosen because previous research suggests that players make more errors in play with this particular game than they do in five-card-draw poker games that do not involve "wild" cards (e.g., "Jacks or Better;" see Weatherly, Austin, & Farwell, 2007). Importantly, that research also demonstrated that self-identified "experienced" poker players played this particular game no more optimally than did self-identified "novices." WinPoker 6.0 allows for the virtual "coin slot" to display a denomination. In the present study, the displayed value was 25 cents. Thus, a maximum bet of five credits would equal a fictitious $1.25. Participants were not provided with any guidance on how to play the game either from the experimenter or from the software, nor were they provided any feedback if they made a decision that deviated from the optimal play (i.e., made an "error"). Each play was also independent of the others. Thus, participants did not receive the same (order of) outcomes. The participant played the video-poker game until one of the three criteria for ending the session was met. The researcher then debriefed the participant, provided the participant compensation in the form of extra course credit, and dismissed the participant.

The demographic form, SOGS, and GFA were scored by hand. The dependent measures associated with the video-poker game were calculated by the software and recorded after the session by the researcher.

RESULTS

The participants' mean score on the SOGS was 1.46 (SD = 1.50; Range = 0 – 5).[1] Likewise, the mean scores on the GFA were 4.58 (SD = 3.57; Range = 0 – 11) for Tangible, 4.08 (SD = 3.02; Range = 0 – 9) for Sensory, 2.90 (SD = 3.09; Range = 0 – 12) for Attention, 1.65 (SD = 2.26; Range = 0 – 7) for Escape, and 13.21 (SD = 8.96; Range 0 –31) across all four possible categories (i.e., GFA total score).[2] Participants played a mean of 64.44 hands (SD = 32.46; Range = 3 – 146), bet a mean of 200.31 credits (SD = 122.14; Range = 3 – 506), and

[1] A total of three participants scored 5 on the SOGS. These individuals scored 0, 0, & 1 in the category of Escape on the GFA.

[2] Because of the omission of questions 17 – 20 on the GFA, the highest possible scores in the areas of Tangible, Sensory, Attention, Escape, and total score were 18, 24, 30, 24, & 96, respectively.

Table 1 Bivariate correlations with the separate dependent measures in the study.

					GFA				
	Hands Played	Credits Bet	Total Errors	SOGS	Tang.	Sensory	Atten.	Escape	Total
Hands Played	1.000	0.662**	0.801**	0.005	0.156	0.236	0.086	0.018	0.176
Credits Bet		1.000	0.511**	0.053	0.232	0.422**	0.164	0.302*	0.367*
Total Errors			1.000	0.012	0.175	0.176	0.044	0.042	0.155
SOGS				1.000	0.548**	0.273	0.561**	0.124	0.535**
GFA Tangible					1.000	0.427**	0.671**	0.277	0.847**
GFA Sensory						1.000	0.397**	0.298*	0.723**
GFA Attention							1.000	0.260	0.812**
GFA Escape								1.000	0.552**
GFA Total									1.000

* = $p < .05$, ** = $p < .01$

made a mean of 33.46 errors (SD = 18.59; Range = 2 – 84) over the session when playing video poker.

Table 1 presents the correlations observed between the different measures in the present study. Scores on the SOGS were not significantly (i.e., $p < .05$) correlated with any of the behavioral measures for video-poker play, but were significantly correlated with two of the categories of the GFA designed to measure positive reinforcement contingencies (i.e., Tangible & Attention), as well as with the total score on the GFA. Two categories of the GFA were significantly correlated with video-poker play. Specifically, both Sensory and Escape were significantly positively correlated with the number of credits participants bet across the session. Total score on the GFA was also significantly positively correlated with the total number of credits bet across the session.

DISCUSSION

Previous research has suggested that the maintaining contingency of escape may play a unique role in the appearance and/or maintenance of pathological gambling. The present study was therefore designed to determine whether participants' self reports of gambling as a means of escape, as measured by the GFA (Dixon & Johnson, 2007), would be related to their gambling-like behavior in a laboratory setting. Results demonstrated that a significant positive correlation was observed. Interestingly, however, this significant relationship was observed for only one of the behavioral measures of video-poker play. Namely, the number of credits participants risked across the session. Escape scores were not correlated with either the total number of hands participants played or the total number of errors they made while playing.

Results also indicated that another maintaining contingency measured by the GFA was correlated with video-poker play. Specifically, scores in the sensory experience category were even more strongly associated with the number of credits bet across the session than were scores in the

escape category. Given the procedure employed in the present study, this result may be less than surprising. Participants were asked to play the video-poker game "as if" the credits were worth money, but in reality they were not. Thus, it would seem reasonable that the main positive-reinforcement contingency that was in effect, aside from earning extra course credit for participation, was the feedback from the game itself. That being the case, one might expect to observe positive correlations with video-poker play and the tendency to gamble for the sensory experience. Although only one behavioral measure was significantly correlated with GFA scores in the category of sensory experience, scores in this category were the most strongly related scores to all the behavioral measures of the four categories measured by the GFA.[3] The correlation between any of the positive reinforcement contingencies and the behavioral measures, as well as the explanations for them, should be interpreted with caution. That is, Miller et al. (2009b) argued that the consequences of tangible, sensory experience, and social attention were tapping into the same underlying construct (i.e., positive reinforcement), which makes drawing conclusions about any of the individual consequences as originally proposed in the GFA (Dixon & Johnson, 2007) difficult.

The fact that the present participants did not play for actual money is one of the major limitations of the present study. Several studies (Weatherly & Brandt, 2004; Weatherly & Meier, 2007) have demonstrated that participants' gambling in a laboratory situation varies systematically as a function of the value of the credits/tokens they are betting. In short, participants become more conservative in their play with increases in the value of what they are betting. Thus, one cannot conclude that the observed significant correlation between scores in the category of escape and the number of credits bet would still be observed had the participants been playing for actual money. This limitation was foreseen, but was considered a necessary evil for the following reason. Previous research (Miller et al., 2009a, b, 2010) had demonstrated a potential positive relationship between scores in the category of escape and scores on the SOGS. We wanted to maximize the chances of recruiting participants who might score high on the SOGS (and the escape category of the GFA). Having such individuals gamble for money would have posed ethical concerns (i.e., having potentially pathological individuals engage in their pathology). We therefore did not have participants gamble for actual money to avoid these concerns. Thus, the present results are consistent with the idea that the contingency of escape may play a unique role in the formation and maintenance of pathological gambling, but future research will be needed to determine whether the present findings can be replicated when people actually gamble.

The other major limitation of the present study was that, due to a duplicating error when generating the materials for the study, questions 17 – 20 of the GFA were not asked. It is not possible to conclude with any certainty how this error might have influenced the present results. Because the excluded question related to escape pertained to gambling after a hard day of work and the participants in the present study were enrolled in college, one could argue that this question, and its omission, would

[3] One could also make a similar argument for scores in the categories of tangible and social attention. That is, because participants were not playing for real money, one might predict that scores in this category would not be significantly correlated with video-poker play, which turned out to be the case. Likewise, because video poker is a one-person game, and because participants were run individually, one might also predict the absence of a correlation between the score in social attention and video-poker play. That outcome was also observed.

have little impact on the results (i.e., one might expect a lower level of employment in a college sample relative to the population at large). It could also be argued that finding a significant correlation between the escape contingencies and betting behavior despite not having access to the full range of items on the GFA pertaining to escape highlights how strongly the two may be related. Given that one might expect, for college students participating in a research study for extra course credit, that the major escape contingency would not be betting more, but rather completing the study as soon as possible, this second argument may have some support. Regardless, both arguments are speculative and results of the present study will need to be replicated to determine their validity.

Other limitations of the present study are also worthy of note. The present study used a relatively homogenous sample of university students. Future research will want to employ a more diverse sample than the present one. The present procedure measured behavior on only one type of game, video poker. Future research will be needed to replicate and/or extend the present results to other games of chance (e.g., slot machines, table games).

Consistent with previous research (Miller et al., 2009a, b, 2010), several measures on the GFA were significantly correlated with scores on the SOGS. Notably, however, escape scores were not one of them. Given the current sample, however, this result might be expected. Although several individuals scored five on the SOGS, five was the highest observed score. Miller et al. (in press) argued that the contingency of escape may be highly correlated with pathological gambling. The present study had very few individuals who might qualify as such. A replication of the present procedure should take more active steps to recruit potentially experienced gamblers than did the present study. Our belief that a study on video poker would inherently attract a large proportion of experienced gamblers turned out to be incorrect.

In fairness to the SOGS (Lesieur & Blume, 1987), it should be pointed out that the measure was designed as a diagnostic screen, not as a behavioral predictor. Thus, finding that SOGS scores did not significantly correlate with any behavioral measure in the present study does not negate its value as a diagnostic tool. However, it does spotlight a limitation of the instrument. The SOGS is the most widely used diagnostic screen for problem gambling and has been well researched (see Miller et al., in press, for a discussion), but scores on the SOGS should not be expected to be reliable predictors of gambling behavior in any given situation.

The main contribution of the present study is that it supports the idea that people whose gambling behavior is maintained by escape contingencies gamble differently than people who may gamble primarily for other reasons. Importantly, the present results suggest that the relationship between escape contingencies and gambling may be isolated to specific aspects of gambling. Escape scores on the GFA were not correlated with the number of hands played or the number of errors made while playing, suggesting that this contingency does not necessarily manifest itself in persistence or efficiency, respectively, when gambling. Rather, the relationship found in the present study was with number of credits bet, suggesting that gambling as a means of escape is related to increases in the amount of risk (and ultimately losses) that the gambler is willing to take. Why this relationship might exist is not known, but one could potentially generate a number of possibilities (e.g., when one gambles for escape, what one is gambling has little value and thus betting large amounts is inconsequential; betting

large amounts might perpetuate the escape contingency by leading to wins – which allow the person to continue gambling – or losses – which would require the person to return and gamble again to regain the losses). Future research will need to focus on this issue, as well as identifying whether or not there is a particular subcategory of escape contingencies that is the most strongly associated with gambling (e.g., escaping aversive affective states, aversive relationships, aversive environments, etc.). Given the systematic finding that escape and gambling may be uniquely correlated, such research endeavors certainly seem warranted.

REFERENCES

American Psychiatric Association. (2000). *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., text revision). Washington, D.C.: American Psychiatric Association.

Dixon, M.R., & Johnson, T.E. (2007). The gambling functional assessment (GFA): An assessment device for identification of the maintaining variables of pathological gambling. *Analysis of Gambling Behavior, 1*, 44-49.

Durand, V.M., & Crimmins, D.B. (1988). Identifying the variables maintaining self-injurious behavior. *Journal of Autism and Developmental Disorders, 18*, 99-117.

Ferris, J., Wynne, H., & Single, E. (1999). *Measuring Problem Gambling in Canada: Draft Final Report*. Ottawa, ON: Canadian Centre on Substance Abuse.

Gambino, B. (1997). The correction for bias in prevalence estimation with screening tests. *Journal of Gambling Studies, 13*, 343-351.

Groth-Marnat, G. (2003). *Handbook of psychological assessment. (4th Ed.).* NY: John Wiley & Sons.

Iwata, B.A., Dorsey, M.F., Slifer, K.J., Bauman, K.E., & Richman, G.S. (1994). Toward a functional analysis of self-injury. *Journal of Applied Behavior Analysis, 27*, 197-209.

Jackson, J.W. (2007). Using WinPoker 6.0 to study gambling behavior. *Analysis of Gambling Behavior, 1*, 58-74.

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.

Miller, J.C., Dixon, M.R., Parker, A., Kulland, A.M., & Weatherly, J.N. (2010). Concurrent validity of the Gambling Function Assessment (GFA): Correlations with the South Oaks Gambling Screen (SOGS) and indicators of diagnostic efficiency. *Analysis of Gambling Behavior, 4*, 61-75.

Miller, J.C., Meier, E., & Weatherly, J.N. (2009a). Assessing the reliability of the Gambling Functional Assessment. *Journal of Gambling Studies, 25*, 121-129.

Miller, J.C., Meier, E., Muehlenkamp, J., & Weatherly, J. (2009b). Testing the construct validity of Dixon and Johnson's (2007) Gambling Functional Assessment. *Behavior Modification, 33*, 156-174.

Poulin, C. (2002). An assessment of the validity and reliability of the SOGS-RA. *Journal of Gambling Studies, 18*, 67-93.

Stinchfield, R. (2002). Reliability, validity, and classification accuracy of the South Oaks Gambling Screen (SOGS). *Addictive Behaviors, 27*, 1-19.

Weatherly, J.N., Austin, D.P., & Farwell, K. (2007). The role of prior experience when people gamble on three different video-poker games. *Analysis of Gambling Behavior, 1*, 34-43.

Weatherly, J.N., & Brandt, A.E. (2004). Participants' sensitivity to percentage payback and credit value when playing a slot-machine simulation. *Behavior and Social Issues, 13*, 33-50.

Weatherly, J.N., & Meier, E. (2007). Studying gambling experimentally: The value of money. *Analysis of Gambling Behavior, 1*, 133-140.

Action Editor: *Becky L. Nastally*