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Rapid Onset of Pathological Gambling in Machine Gamblers

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A particularly rapid onset of pathological gambling (PG-onset) through the use of gambling machines has been widely alluded to, but this is the first study to empirically examine the phenomenon. This study compared the latency of PG-onset in those who gambled primarily on machines, compared to those who gambled primarily on more "traditional" forms of gambling at PG-onset. Subjects were 44 adult pathological gamblers (PGs) seeking outpatient treatment in Rhode Island (17 females; mean age = 46.9). Subjects completed questionnaires and a diagnostic interview including a complete history of gambling activities and the course of PG. The "latency" of PG-onset was defined as the time (in years) elapsed between the age of regular involvement in the primary form of gambling and the age at which DSM-IV criteria were first met. "Machine" PGs (n = 25) had a significantly shorter latency of onset than did "traditional" PGs (1.08 years vs. 3.58 years). Females and machine PGs had a significantly older age of onset, but gender was not associated with latency of PG-onset. Lifetime comorbidity of either substance use disorders (SUDS) or depressive disorders (DDS) was also not associated with the latency of PG-onset. The results of the current study suggest that intrapersonal variables such as gender and comorbid disorders do not generally affect the speed with which people develop PG. Rather, the social, environmental, and stimulus features of mechanized gambling are implicated. Prospective longitudinal studies on the onset and course of PG are needed, as well as more basic research on the features of machine gambling that may contribute to rapid onset.

KEY WORDS: gambling; machines; onset; course; compulsive.

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The number of legal gambling venues has expanded greatly in the last ten years in the US, and the most rapidly expanding activity among all gambling activities is machine gambling, including slots and video poker. Casinos and simulcast racing facilities have come to rely heavily on gambling machines for the majority of their revenue. Whereas not too long ago table games produced 60% of the average casino's revenues, compared to 40% for machines, recently 70% of revenues have come from machines. One study of the two hugely successful casinos in Connecticut reported that an estimated 73% of casino gambling revenue came from gambling machines (Christiansen Capital Advisors, 2000).

Since gambling has become more available, there is greater awareness and interest in pathological gambling (PG) and its potential impact on public health. Where gambling machines are available, many residents question the potential harm of the devices. Concerned parties have been quoted in the media, referring to gambling machines as the "crack cocaine" of gambling, because people develop gambling problems so rapidly following initiation to machine gambling. The analogy implies that machines are more addictive than other, more "traditional" forms of gambling, such as horse-racing or card games. While the juxtaposition of crack cocaine and gambling-machine addiction makes for a sensational sound-byte, there has never been any empirical data presented to support the idea that machine gambling is more rapidly addicting than other forms of gambling. The central aim of this study was to clarify the contribution of machines to the speed of PG-onset.

It is a mistake to conceptualize gambling as a homogeneous activity (Dickerson, 1993). Different forms of gambling vary importantly in terms of stimuli and features that contribute to the experience of the players. For example, many slots players describe the machines as reassuringly hypnotic. The visual stimuli, the repetitive pattern of betting and outcome, and the chance to withdraw into one's own world are features that may contribute to this perception. Machines are the most continuous medium of gambling. Bets can be made and decided in a matter of seconds, with virtually no delay before the pattern is repeated. Machines are non-threatening and user-friendly to the uninitiated, thus they may offer an unparalleled "gateway" activity to gambling.

In contrast, the cards or sports bettor may view betting as an activ-

ity that can be intellectually mastered. A sports bettor may spend much of his/her time exchanging opinions with other players, or poring over statistics. In this case, the activity may be seen (rationally or not) as a means to an end, i.e., winning money. Betting is less continuous and there can be considerably more planning involved. The event itself may last three hours or more before the outcome can be determined. Elements of skill can affect some of the more traditional forms of gambling (e.g., card games, handicapping horses or sporting events).

Often, individuals initiate involvement on one form of gambling, but do not develop problems until they begin gambling on a different form (Morgan, Kofoed, Buchkoski & Carr, 1996). It is also not uncommon for people to gamble pathologically on one form for many years, and then "switch" to another type of gambling, with a continuation of PG (Fabian, 1995). Pathological gamblers (PGs) do not become indiscriminately involved (or even interested in) all forms of gambling, even where all forms are readily available (Lesieur, 1984). This is not surprising given the heterogeneity of gambling. Thus, a PG might play exclusively on machines and have no desire to place a bet on the horses, even if both forms are available under one roof. In a study conducted at the Delaware Council on Gambling Problems (DCGP), 96% of 171 PGs seeking treatment identified one, and only one form of gambling as their *current* primary problem (Breen, 2000a). In the same study 70% of the subjects identified machine gambling as the primary problem form. Other studies have noted that a majority (upwards of 70%) of treatment-seeking PGs participated almost exclusively in machine gambling (e.g., Beaudoin & Cox, 1999; Morgan et al., 1996). It has been suggested that females are more likely to select machines as their primary form of gambling (Crisp et al., 2000). In the DCGP study, 69% of the "machine" PGs were females, while only 9% of the "traditional" PGs were females.

It has also been noted that PG-onset occurs later in life in females (Mark & Lesieur, 1992) and that the "progression of PG" is more rapid in females (Taveres, Zilberman, Beites & Gentil, 2001). The latter study reported that females seeking treatment for PG had significantly fewer years of "intense" gambling prior to PG-onset as well as fewer years of "problem gambling" prior to seeking treatment. However, Taveres et al. failed to consider that many PGs (especially males with a longer duration of problems) could have "switched" their focus from

one primary form of gambling to another. The authors only reported the current primary gambling activity of their subjects, which was mostly a state-funded bingo game in both genders. Whether bingo was the primary form of gambling at the time of PG-onset is unknown. Thus, a crucial piece of the puzzle is missing—what were the *relative* contributions of gender and the primary forms of gambling to the speed of PG-onset *when it occurred*? This study takes an in-depth look at primary forms of gambling prior, during and after PG-onset.

In a pilot study, Breen (2000a) examined data from 147 adults seeking treatment through the DCGP from March 1997 through August 1999. All the subjects met DSM-IV criteria for PG. The sample consisted of 72 males and 75 females, with a mean age of 43.4 years. The data were extracted from a self-report intake questionnaire all subjects completed at their initial appointment. Subjects responded to the question, "At what age did you first start gambling *regularly*?" (italics added). There was no standard formal assessment of the age of PG-onset. Therefore the "latency" of PG-onset was estimated as the elapsed years between the age of regular gambling and age when seeking treatment for PG. Subjects also responded to the question, "What game has caused the most problems for you?" Of the sample, 106 identified machines as their primary problem, and 41 identified a "traditional" form of gambling as their primary problem, including cards, dice, lottery, track and sports betting. The latency of PG was significantly shorter for the machine gamblers (6.6 years) compared to the latency of the "traditional" group (16.0 years).

The data from the DCGP supported the hypothesis that machine gambling may be associated with more rapid PG-onset compared to other, more "traditional" gambling forms. However, those data were limited in several ways. First, the responses to items on the intake questionnaire were open to the subjective interpretation of the respondents. For example, the question about the age of "gambling regularly" was undefined. Second, there was no standard assessment of the age of PG-onset, so the current age of treatment-seeking was used. Thus, although computing the latency of onset this way showed the expected difference between machine PGs and traditional PGs, the estimates of latency were likely inflated. Third, the data did not take into account subjects who may have "switched" gambling forms over the years. As in the Taveres et al. (2001) study, only the current primary form of gambling was recorded. Important information is ob-

scured when only the current "preferred" type of gambling is considered. Therefore a complete and detailed history of gambling involvement must be obtained. The method must also demonstrate acceptable psychometric properties. Clearly, a more rigorous method of data collection was needed to investigate the effect of gambling forms on the development of PG. This study presents the results of such a method.

The main hypothesis of the current research was that the latency of PG-onset would be significantly faster in PGs whose primary form of gambling at onset was machines, compared to those who developed PG while primarily involved with the more "traditional" forms of gambling. We examined the relative contributions of gender and comorbid psychiatric disorders as well. A secondary hypothesis was that most PGs would report being relatively focused on one, and only one form of gambling at any particular point in time. We expected females to be focused on machines more often than males and to report a later age of onset than males. Another research question was exploratory: How many PGs would report "switching" focus from one form of gambling to another during the course of PG?

METHOD

Setting

This study was conducted at the Rhode Island Gambling Treatment Program (RIGTP) in Rhode Island Hospital's Department of Psychiatry. The RIGTP is an outpatient program for combined pharmacological and psychosocial treatment of PG.

Subjects

The subjects were 44 consecutive PGs that completed a diagnostic evaluation at the RIGTP from November 1999 through July 2000. Two patients were evaluated but are not included in the current analysis because of difficulty classifying them in terms of their primary form of gambling. One of these gambled on Internet casino games, and one patient played both blackjack and slot machines pathologically.

Of the 44 patients included in the analysis, there were 27 males

(61%) and 17 females (39%) with a mean age of 46.9 years old (range = 23 to 70). Forty patients (91%) were Caucasian, two (4.5%) African American and two Asian. The mean SOGS score (Lesieur & Blume, 1987) of the subjects was 13.45 (SD = 2.8), which indicates a severe level of problems and is comparable to other treatment samples. The SOGS is a valid and reliable screening measure of PG.

Measures

Patients were mailed a packet of questionnaires that they completed at home and either returned by mail or brought with them to their evaluation. The evaluation of all patients at the RIGTP is comprehensive and includes semi-structured clinical interviews for both DSM-IV Axis-I and Axis-II disorders (SCID; First et al., 1995). The first author, a clinical psychologist, conducted all the diagnostic interviews. For the purpose of the current investigation, three sources of data were used:

Each patient completed the Gambling History Questionnaire (GHQ; Breen, 2000), which is a self-report that collects information about the significant events in the development of gambling problems, such as the age of the very first bet for money; the age of regular gambling involvement, and the age when gambling became a serious problem. It also gathers information about the different types of gambling on which an individual has concentrated during these different periods. The GHQ captures information about shifts in focus from one primary form of gambling to another, when these change points occurred, and how they affected gambling patterns. Terms are defined in plain language. For example, the following question from the GHQ asked about the age of "regular" gambling: *"Somewhere along the line, people become "regular" gamblers. What this means is that they become more interested in gambling, and spend more time doing it on some regular basis. Somewhere along the line they start to think of themselves as "gamblers." How old were you when you became a "regular" gambler?"*

The GHQ also assesses amounts of money lost and time spent on gambling. Blaszczynski and colleagues (1997) pointed out reliability problems associated with self-reports in these areas. The monetary data reported on here refers to *net* losses, and the data on time involvement refers to the average time when subjects gambled on their *primary* problem form. Our efforts to establish reliability and validity are described below.

The GHQ served as a jumping-off point for the psychiatric interview. The interviewer clarified and confirmed the gambling history of each patient by following up GHQ responses with verbal inquiry. Each patient was asked to explain his or her understanding of the items and to provide additional details as necessary. This cross-checking procedure resolved inconsistencies in the data.

To establish the reliability of the GHQ, we used a blind, independent rater to conduct follow-up interviews at re-test intervals of 6 to 12 months. In 16 independent interviews, the GHQ demonstrated good reliability for the age of PG-onset ($r = .94$); the age of regular gambling ($r = .99$); the age of gambling on the first problem form ($r = .96$) and the age of gambling on the current problem form (for "switchers"; $r = .94$); the average amount of money lost ($r = .97$) and the average number of days gambled ($r = .63$) in the month prior to initial evaluation. All test-retest correlations were significant at the .01 level.

The GHQ assessed the amount of time and money allotted to different forms of gambling in the one-month period prior to the assessment. We examined concurrent validity by comparing 33 subjects who reported that machines were the *current* primary problem with the 9 subjects who were currently gambling on traditional forms (note: one subject was not gambling in the prior month, one had missing data). In the "machine" group, 91% of reported gambling losses were from machines, while the "traditional" group only lost 3% of their gambling losses from machines in the prior month [$t(1, 40) = 15.49$, $p < .005$]. The amount of time the subjects devoted to gambling was also consistent with their primary problem form. The machine group spent 79% of their gambling time playing machines in the prior month, compared to 3% for the traditional group [$t(1, 40) = 6.93$, $p < .005$].

We created a semi-structured diagnostic module to assess DSM-IV criteria for PG and included it in our diagnostic evaluation. The module assesses age of PG-onset as well. PG-onset was defined as the age at which the full DSM-IV criteria were met. Although DSM-IV provides no specification of the necessary duration of symptoms required to diagnose PG, other than "persistent and recurrent maladaptive gambling behavior" all patients met criteria continuously for a period of 6 months or longer.

Because of rigorous data collection, we were able to compute the latency of PG-onset with particular sensitivity to "switches" in the major

form of gambling. We computed the latency of onset based on the form of gambling that was predominant at the time of PG-onset. Latency was defined as the period of time (in years) between "regular" gambling and PG-onset when the major form of gambling was the same at both time points. However if the major form of gambling had "switched" to another form of gambling before onset, then latency was defined as the period of time between beginning to gamble on the new form and PG-onset. To illustrate, let us describe the latency of PG-onset in two subjects with very different circumstances: "Mr. K," a 45-year-old man, gambled for the first time at age 18, and began to gamble regularly when he was 22, on horses and dogs. He did not become a PG until the age of 39, after he started playing video poker at age 38. In this case, Mr. K's latency of onset is one year (not 17), and he is classified as a "machine" PG (because he "switched" to machines prior to onset, and he identified machines as the form of gambling associated with onset). "Mr. I," a 56-year-old man, was 10 years old the first time he gambled, and he gambled regularly at 21 years old, on card games. The age of PG-onset for Mr. I was 23, while he was still involved in card playing. Thus, his latency of onset is two years, and he is classified as a "traditional" PG. This is true even though Mr. I currently gambles only on machines. Although Mr. I has been gambling pathologically for 33 years, he began gambling on machines only one year ago.

In summary, there were three sources of data obtained for this study. A self-reported history of gambling involvement and problems was reviewed and confirmed with an unstructured interview. A semi-structured diagnostic module for PG also confirmed the diagnosis and age of PG-onset. The latency of PG-onset was computed based on the problem form of gambling at PG-onset, rather than the current problem form.

RESULTS

Subjects lost an average of $2886 in the prior 30 days ($0 to $20,000; SD = $3402; median = $1900) and they gambled an average of 13.1 days on their primary problem form (0 to 30 days, SD = 9.1; median = 10 days). We distinguished between two concepts of financial loss—current debt and liquidated assets. The mean amount of outstanding debt directly due to gambling was $20,002

(range = $0 to $150,000; SD = $30,722; median = $10,000). Independent of outstanding debt, subjects reported that they had sold assets (stocks, bonds, IRAs, real estate, insurance policies, jewelry, etc.) to finance gambling. The mean amount of assets sold was $25,419 ($0 to $300,000; SD = $51784; median = $5000). Eight subjects had declared bankruptcy in the past, erasing an average of $42,750 worth of debt ($17,000 to $80,000, SD = $19,615; median = $45,000) that was directly related to gambling.

The mean age of PG-onset in this sample was 37.49 years old (SD = 12.35) and as expected, females reported a significantly older age of onset than males [44.06 vs. 33.35; $t(1, 42) = 3.06$, $p < .005$] and a shorter duration of PG [4.77 vs. 13.98 years; $t(1, 42) = 3.51$, $p < .005$]. Females were more likely than males to identify machines as the primary form of gambling at onset [76% vs. 44%; $\chi^2(1) = 4.36$, $p = .04$].

A comorbid lifetime diagnosis of a depressive disorder (DD) occurred in 70% of the subjects; a lifetime alcohol or substance use disorder (SUD) in 34%, and a lifetime anxiety disorder in 25%. Psychiatric comorbidity did not vary as a function of gender, although there was a trend for SUD's to be more prevalent in males [$\chi^2(1) = 3.34$, $p < .07$].

Ten subjects (3 females) reported "switches" in problem forms after PG-onset. In all 10 cases, the switch was from a traditional form to machines.

We conducted a stepwise multiple regression analysis to examine the relative contribution of the following factors to the latency of PG-onset: primary problem form of gambling at PG-onset; gender; lifetime diagnosis of a DD; and lifetime diagnosis of an SUD. Only the primary form of gambling at PG-onset was retained [$F(1, 42) = 8.42$, $p < .01$] explaining 16.7% of the variance in latency. The mean latency of PG-onset in the 19 subjects who were traditional gamblers at the time of onset was significantly longer than the latency of the 25 subjects who were machine gamblers [3.58 vs. 1.08 years; $t(1, 42) = 2.90$, $p < .01$].

In post hoc analyses, we compared the age of onset between machine and traditional PGs. The traditional PGs had a significantly younger mean age of onset than the machine PGs [29.6 vs. 43.5; $t(1, 42) = 4.39$, $p < .005$]. They also started gambling "regularly" at an earlier age [25.9 vs. 37.5; $t(1, 42) = 3.14$, $p < .005$]. No statistical differences were found between the groups on the current amount of

debt due to gambling, the amount of assets sold to pay for gambling, the number of days gambled on primary form in the prior month, or the amount of money lost in the prior month.

We also compared those whose PG-onset occurred after the legalization of machines in RI with those who had onset before legalization (prior to 9/92). PGs with onset after legalization were far more likely (80%) to focus on machines as the primary problem form at onset, while those with onset before were more likely (93%) to focus on traditional forms [$\chi^2(1) = 20.65$, $p < .005$]. Within the group with onset after legalization, males were just as likely as females to choose machines (11 of 15; 73% of males vs. 13 of 15; 87% of females). Although non-significant, the latency of onset was still twice as long in the traditional group [2.3 vs. 1.1 years; $t(1, 28) = 1.35$] within this subset.

To demonstrate the methodological importance of distinguishing the primary form of gambling at PG-onset from the current primary form, we re-ran our analysis on latency using the current primary form as in Tavares et al. (2001). When only the current primary form is accounted for, the results of the stepwise multiple regression suggest that, as Tavares et al. concluded, gender is the only significant factor [$F(1, 42) = 4.43$, $p < .05$]. Thus, the failure to account for the primary form of gambling *at the time of PG-onset* leads to a very different conclusion.

DISCUSSION

The data presented are limited in several ways. First, our subject sample is limited to patients seeking treatment, and thus not representative of PGs in general. Second, although we attempted to maximize the validity and reliability of the data by confirming self-reported information with an interview, we still had to rely on retrospective recall. Third, the data merely shows the hypothesized association between gambling forms and the latency of PG-onset. The causal contributions of the features of machines, the psychological features of those who choose machines, or the convenience, availability, or social acceptability of different forms of gambling cannot be specified.

The data suggest that a large majority of PGs presenting for treatment tend to focus on one, and *only one* primary form of gambling.

When machines are the primary form, PG-onset occurs significantly faster. There are three possible explanations for these findings. First, there could be something intrinsically different about machines when compared to more traditional forms of gambling, which makes machines more powerfully addictive. Second, there could be something intrinsically different about those gamblers who focus on machines. And third, perhaps the convenience and availability of machines accounts for the findings, rather than anything about the actual machines or the gamblers. Of course, all these suggestions could be partially valid and interact in complex ways.

There are numerous differences between machines and traditional forms of gambling. In terms of stimulus variables, machines provide a rapid, continuous and repetitive means of betting. The lack of alternative responses or cues for quitting has been shown to prolong gambling when losing (Breen, 2000b). Machines also provide a continuous stream of visual and auditory stimuli that may promote responding (Fisher & Griffiths, 1995). Machines provide partial reinforcement with frequent small wins and "near-misses" (Reid, 1986). Traditional forms of gambling generally offer less continuous action and frequently, more social interaction.

Typologies of PGs have been suggested based on personality or motivational factors as well as the choice of games. However, after accounting for the primary form at PG-onset, a lifetime comorbid SUD and/or DD was not associated with latency of PG-onset, nor was gender. The age of regular gambling and the age of onset were significantly younger in those with onset using traditional forms, but this is probably due to access and availability factors. Machines were not legally available prior to 1992. There were no differences in current age, gambling debts, frequency of gambling or the amount of money lost in the previous month. The data suggest that traditional PGs take longer to seek treatment, but we think that this is probably because no formal treatment programs were available before 1999.

The current environment could help to explain our findings. The availability of legal gambling opportunities has grown sharply in the last ten years. The present study was conducted in Rhode Island, the smallest state in the US. Native-American casinos (e.g., Foxwoods) are accessible within one hour or less by car. These establishments offer most traditional forms of gambling (e.g., cards, dice, machines, bingo) as well as machines. Gambling machines were legalized at the

state's 2 racetracks in September 1992, making machines even more available (within one-half hour or less) to RI residents. We should consider the possibility that a more rapid PG-onset in machine gamblers occurs because of the geographic proximity and convenience of machines for many of our patients. Onset occurs significantly later in life in machine PGs. They could represent a relatively naïve cohort of adults who became involved in machine gambling because of its proximity, and because machines are relatively user-friendly and non-intimidating to the uninitiated. All forms of gambling are not equally accessible and so it could be hypothesized that these late, rapid-onset PGs would have developed the disorder just as quickly had other forms been equally available. However, an analysis of only those who onset after the legalization of machines in RI still suggested machines were associated with more rapid onset than other forms. The subset of traditional PGs (20%) that onset after this time reported twice the latency of machine PGs. Thus, while its appears that the availability and convenience of machines may influence the choice of gambling forms, it does not appear to influence the latency of onset. Also, it appears that when machines are convenient and accessible, males are just as likely as females to develop problems with them. Convenience also seems to affect the "switching" of forms. After machines were legalized in RI, 8 of 13 (62%) subjects who were already "traditional" PGs switched to machines.

The findings of this study would have been obscured if not for a rigorous multi-method approach. Because PGs often switch their primary focus during the course the disorder, it is not sufficient to only consider the current form of gambling, especially when investigating the onset and progression of PG. Using the GHQ combined with a clinical interview provides richer, more complex information with excellent reliability.

The rapid PG-onset in machine gamblers is a phenomenon that has been widely alluded to, but remained anecdotal and evasive. To our knowledge, this is the first empirical examination of the question. As the analogy of crack cocaine suggested, context matters. The quality of different forms of gambling affect the progression of PG much the same as different substances affect the progression of dependence. We suggest that gambling machines "deliver" their "active ingredient" more rapidly, continuously and directly than the traditional forms of gambling. It is our hope that those who shape social policy and make

funding decisions will utilize this evidence. Prospective longitudinal studies on the onset and course of PG are needed, as well as more basic research on the features of machine gambling that may contribute to rapid onset.

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