Problem Gambling and Sub-dimensions of Impulsivity among Regular Online Poker Players

Barrault S1 and Bonnaire C2

1Psychology Laboratory Ages of Life, Francois Rabelais University of Tours, 3 rue tanners, France
2Paris Descartes University, Laboratory of Psychopathology and Health Processes, Psychological Institute of Paris Descartes University, France

Corresponding author: Céline Bonnaire, Laboratory Psychology of Ages of Life, University of Tours Francois Rabelais, 3 rue des tanneurs, 37000 Tours, France, Tel: +33 1 75 53 29 52; E-mail: celine.bonnaire@parisdescartes.fr

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Abstract

Introduction: Impulsivity is a personality dimension known to be closely linked to addictive behaviour, including problem gambling. The aim of the present study is to assess impulsivity and its sub-dimensions (non-planning, attentional and motor impulsivity) among a sample of regular poker players, in order to determine whether these subtypes are linked to problem gambling and its severity.

Method: 232 regular online poker players completed online questionnaires (socio-demographic data, CPGI, BIS-11). CPGI was used to divide them into four groups according to the intensity of their gambling practice (non-problem gamblers, low problem gamblers, moderate problem gamblers and severe problem gamblers).

Results: Impulsivity significantly differentiated gamblers according to the intensity of their gambling behaviour and correlated significantly with problem gambling, confirming the idea that impulsivity is linked to the severity of problem gambling. Among its sub dimensions, only attentional impulsivity did not discriminate between the four groups of gamblers. Motor impulsivity and non-planning were significantly higher in severe problem gamblers and correlated with problem gambling. Motor impulsivity was also a significant predictor of problem gambling.

Discussion: Consistent with the literature, our results underline the link between impulsivity and problem gambling among poker players. In particular, motor impulsivity and non-planning appeared to play a role in the development and/or maintenance of problem gambling. These results may have clinical implications in terms of treatment and prevention, and open avenues of research regarding impulsivity among problem gamblers.

Keywords: Problem gambling; Online poker; Impulsivity; Sub-dimensions; Motor impulsivity

Introduction

Impulsivity, defined as "a predisposition toward rapid, unplanned reactions to internal or external stimuli without regard to the negative consequences of these reactions to the impulsive individual or to others" [1] appears to be specifically linked to addictive behaviors [2], including problem gambling [3,4].

Studying impulsivity among problem gamblers could provide a better understanding of how they function. Impulsivity could explain both impaired decision-making in gambling situations and the persistence of gambling despite negative consequences (financial losses); focusing on immediate rewards (potential win), these players do not take into account long-term negative consequences (accumulation of losses) [5].

Despite mixed findings in the literature, numerous studies suggest that impulsivity constitutes a risk factor for problem gambling [6,7]. Several longitudinal studies have shown that impulsivity preexists problem gambling and constitutes both a predictor and a risk factor [8-10]. Likewise, empirical evidence of an association between impulsivity and problem gambling comes from a number of studies reporting a higher level of impulsivity in pathological gamblers [11,12].

Furthermore, impulsivity also appears to be a factor of clinical complexity. For example, Błaszczynski, Steel and McConaghy [13] showed that the severity of psychological and behavioral changes in problem gambling is associated with the level of impulsivity, and they proposed a model in which the severity of problem gambling is mediated by both impulsivity and psychopathy. Moreover, several studies have found that the severity of problem gambling is linked to the level of impulsivity [3,14,15] and to specific dimensions of impulsivity [16]. In line with the multidimensional nature of impulsivity [17,18], Ginley et al. [16] found differences between non-gamblers, low-risk gamblers and symptomatic gamblers in three impulsivity dimensions. However, the aim of that study was not to diagnose problem gambling, but to investigate dimensions of impulsivity and gambling disorder intensity.

In recent decades, the development of Internet gambling has led to the intensive spread of gambling behaviour [19]. Internet, a medium that inherently favours immediateness, could provide a facilitating frame for impulsivity, some of its features (ease of access, availability and speed) being conducive to impulsive decision-making, at the expense of thinking and planning. Assessing impulsivity among online gamblers thus seems to be a relevant line of research. Poker has
particular online gambling features [20] and appears to be one the most popular types of gambling, mostly because of the component of skill involved in long-term success [21]. As gambling appears to be a heterogeneous activity, according to the type of gambling practiced [22], we chose to focus our research on this single type of gambling.

Only a few studies have so far studied impulsivity among poker players, but they show that it has a predictive value for problem gambling [23-25]. In view of the important role of impulsivity in gambling disorders and the multidimensional aspect of this aspect of personality, it seems relevant to examine this dimension more closely, especially by investigating its sub-dimensions among problem gamblers. Thus, the objective of this research was to study the intensity of each subtype of impulsivity among regular poker players and to compare the results of non-problem and problem players in order to identify specific sub-dimensions involved in problem gambling in this population.

Methods

Participants and procedure

Participants were recruited from one of the most active Internet poker-related forums in France with the permission of the site's webmaster. An advertisement was posted on the website providing general information about the study. Potential participants were invited to click on a link leading to a description of the goals and method of the study and a consent form. Once they had given their consent, participants had access to the online questionnaires. The ethics committee of the University of Paris Descartes (CERES) approved the study.

Our sample was composed of regular online poker players, playing at least once a week for a minimum of one year. Age range was set at 18 to 55 years. Participants with any regular gambling activity other than poker were excluded.

Measures

- Socio demographic data: a questionnaire (6 items) was designed for the study, with questions on age, marital status, and professional status.
- Gambling data: for each gambling activity (e.g., poker, betting on sporting events), participants were asked whether they played and, if so, how often.

|        | NPG (n=24) | Low PG (n=50) | Moderate PG (n=126) | Severe PG (n=32) | All sample (n=232) | ANOVA |
|--------|------------|---------------|---------------------|------------------|--------------------|-------|
| AGE    | Mean (SD)  | Mean (SD)     | Mean (SD)           | Mean (SD)        | Mean (SD)          | F     | p    |
| N (%)  | N (%)      | N (%)         | N (%)               | N (%)            | N (%)              | CHI   | p    |
| PROFESSIONNAL ACTIVITY | | | | | | | |
| Active | 19 (79)    | 40 (80)       | 81 (64)             | 19 (59)          | 159 (68)           | 18,4  | 0.03* |
| Student| 1 (4)      | 3 (6)         | 21 (16)             | 3 (9)            | 28 (12)            |       |      |
| Unemployed | 2 (8)   | 5 (10)        | 22 (17)             | 10 (31)          | 39 (16)            |       |      |
| Other  | 2 (8)      | 2 (4)         | 2 (1)               | 0 (0)            | 6 (2)              |       |      |

Statistical analysis

Statistica® software (version 9) was used for the statistical analyses. The distribution was normal (assessed by measures of skewness and kurtosis). The Kaplan-Meier test and the Browne-Forsythe test confirmed normality and homoscedasticity. There were no significant outliers. Continuous variables (CPGI, BIS-11) were compared using a one-way analysis of variance (ANOVA), followed by post-hoc tests (Sheffé test) to ascertain the direction of differences. For categorical data, differences in percentages were compared using the chi-square test. Pearson's correlation coefficient was used to calculate correlations between variables. Multiple linear regressions were conducted to examine whether the variables had a predictive value for problem gambling. A p-value of <0.05 was used to indicate statistical significance.

Results

CPGI scores and socio demographic data (Table 1).
Table 1: Sociodemographic data; NPG: non-problem gamblers; Low PG: low problem gamblers; Moderate PG: moderate problem gamblers; Severe PG: severe problem gamblers; *p<0.05.

Socio-demographic Characteristics

A total of 232 regular online poker players completed the online questionnaires. We used the CPGI to divide them into four groups: 24 (10.3%) had no gambling problem (NPG; CPGI =0), 50 (21.5%) showed low problem gambling (Low PG; CPGI score of 1 and 2), 126 (54.3%) showed moderate problem gambling (moderate PG; CPGI scores between 3 and 7), and 32 (13.7%) showed severe problem gambling (severe PG; CPGI scores between 7 and 27).

Only four of the participants were women (1.7%); three had a moderate level and one a severe level of problem gambling. As the prevalence and characteristics of problem gambling may differ between men and women [28], we conducted a statistical analysis to determine whether the women in our sample had significantly different scores than the men. As no impact on the results was found, we decided to keep the women in the sample.

Socio-demographic data of these groups are presented in Table 1. The mean age for the whole sample was 31.4 years (SD=8.5). There were no significant differences in the socio demographic data between the four groups, except for professional activity (Chi=18.4; df=9; p=0.03): fewer professionally active participants had severe PG (59%) than NPG (79%) or low PG (80%).

Gambling Activities

We asked participants whether they participated in any gambling activity other than poker and if so, how often. Non-problem poker players had no other regular (once a week or more) gambling activity, except for two players (8%) who reported regular betting on horses. Among low-problem gamblers, four (7%) regularly bet on sporting events online and played online casino games, and six (11%) regularly bet on sporting events. In the moderate problem gambling group, nine (7%) regularly bet on sporting events, and nine (7%) bet on sporting events online. Sixteen (13%) regularly played online casino games. Among severe problem gamblers, two (6%) regularly bet on sporting events and two (6%) bet on sporting events online. Lottery tickets (n=4; 12.5%) and casino games (n=4; 12.5% for live casino games; n=3; 10% for online casino games) were the most frequently associated regular gambling activities.

Impulsivity Scores

BIS-11 scores (Tables 2,3).
As for the overall and motor subscale of the BIS-11, there were differences in the non-planning subscale, participants with NPG and low PG having lower scores than those with moderate and severe PG. ANOVA results show that these differences are significant (F=6.6; f=0.30; p<0.001). Scheffe’s test revealed no significant differences between participants with NPG and low PG or between those with moderate and severe PG. However, participants with severe PG had significantly higher scores than those with NPG (p=0.002) and low PG (p=0.001).

### Non-planning subscale

As for the overall and motor subscale of the BIS-11, there were differences in the non-planning subscale, participants with NPG and low PG having lower scores than those with moderate and severe PG. ANOVA results show that these differences are significant (F=6.6; f=0.30; p<0.001). Scheffe’s test revealed no significant differences between participants with NPG and low PG or between those with moderate and severe PG. However, participants with severe PG had significantly higher scores than those with NPG (p=0.002) and low PG (p=0.001).

### Multivariate analysis

Correlations (Table 4): Results of the correlation analysis show a weak but significant negative link between impulsivity (overall BIS-11) and the attentional subscale and age (r=0.10; p<0.05 for overall BIS-11 and r=0.14; p<0.05 for attentional subscale). Furthermore, gambling problems (CPGI scores) appeared to be significantly linked to impulsivity (r=0.34, p<0.05) and its three subscales. The strongest link was between CPGI scores and motor impulsivity (r=0.32, p<0.05).

### Multiple linear regression

A multiple regression model, including the three BIS-11 subscales, was conducted to determine whether components of impulsivity could predict CPGI scores. This model shows that these variables (non-planning, motor impulsivity and attentional impulsivity) account for 11% of the variance of CPGI scores (Adjusted R2=0.10; F (3,28)=10.26; p<0.001). Although this model is statistically significant, only one sub-dimension of impulsivity, motor impulsivity, constitutes a significant predictor of CPGI scores (β=0.22; p<0.001).

| Table 2: BIS-11 scores and ANOVA results; NPG =Non-problem gamblers; Low PG=low problem gamblers; Moderate PG=moderate problem gamblers ; Severe PG=severe problem gamblers; BIS-11=barratt Impulsiveness Scale 11; *p<0.05.  

| Overall BIS-11 scores  

| The ANOVA results show a significant difference between the four groups for the overall BIS-11 (F=8.8; f=0.34; p<0.001). Except for the NPG and low PG groups who obtained almost identical scores, there seemed to be a gradation in BIS-11 scores according to the intensity of gambling behavior. A more specific group comparison using Scheffe’s test revealed no significant differences between NPG and low PG in overall BIS-11 scores. By contrast, participants with severe PG had significantly higher scores than those with NPG (p=0.002) and low PG (p=0.001).

| Table 3: Comparisons between groups on BIS-11 and its subscales (Scheffe’s test); NPG: Non-problem gamblers; Low PG: low problem gamblers; Moderate PG: moderate problem gamblers; Severe PG: severe problem gamblers; BIS-11: Barratt Impulsiveness Scale 11; *p<0.05.  

| Table 3: Comparisons between groups on BIS-11 and its subscales (Scheffe’s test); NPG: Non-problem gamblers; Low PG: low problem gamblers; Moderate PG: moderate problem gamblers; Severe PG: severe problem gamblers; BIS-11: Barratt Impulsiveness Scale 11; *p<0.05.  

| Motor subscale  

| As for the overall and motor subscale of the BIS-11, there were differences in the non-planning subscale, participants with NPG and low PG having lower scores than those with moderate and severe PG. ANOVA results show that these differences are significant (F=6.6; f=0.30; p<0.001). Scheffe’s test revealed no significant differences between participants with NPG and low PG or between those with moderate and severe PG. However, participants with severe PG had significantly higher scores than those with NPG (p=0.03) and low PG (p=0.001). Those with moderate PG also scored higher than those with low PG (p=0.01) but not NPG.

| Non-planning subscale  

| As for the overall and motor subscale of the BIS-11, there were differences in the non-planning subscale, participants with NPG and low PG having lower scores than those with moderate and severe PG. ANOVA results show that these differences are significant (F=6.6; f=0.30; p<0.001). Scheffe’s test revealed no significant differences between participants with NPG and low PG or between those with moderate and severe PG. However, participants with severe PG had significantly higher scores than those with NPG (p=0.03) and low PG (p=0.001). Those with moderate PG also scored higher than those with low PG (p=0.01) but not NPG.
Attentional Impulsivity  -0.14*  0.46*  0.50*  1.00  0.74*  0.21*
BIS-11 total     -0.10  0.86*  0.84*  0.74*  1.00  0.34*
CPGI              0.00  0.28*  0.32*  0.21*  0.34*  1.00

Table 4: Correlations between age and BIS-11 total and subscales; BIS-11: Barrat Impulsiveness Scale 11; CPGI: Canadian Problem Gambling Index; *p<0.05.

Discussion

This research examined the intensity of different sub dimensions of impulsivity among poker players and their links with problem gambling and its intensity. We found that a substantial number of our sample of regular poker players encountered gambling issues: 13% displayed severe PG and 54% moderate PG. In our sample, only 10% had no gambling problem at all. These prevalence rates appear to be high. A recent study in France, where this study took place, found that among regular gamblers (all types of gambling activity), 3.7% are excessive gamblers and 7.1% have a moderate risk for problem gambling [29]. About 1 in 10 of these regular gamblers is a poker player. This discrepancy can partially be explained by the fact that we recruited our participants among regular and committed poker players on a very popular French poker forum. These results underline the need for a better understanding of gambling pathology among poker players, in order to propose preventive and therapeutic actions adapted to this specific population and its psychological characteristics.

The literature about problem gambling underlines its close links with impulsivity [3,7,14, 15]. Among regular and professional poker players, Biocalti, Passini and Griffiths [25] found that those who did not show a gambling problem had low impulsivity scores, whereas problem gamblers had significantly higher, although moderate, levels of impulsivity. Our results are consistent with these studies, showing a gradation in impulsivity level according to the intensity of gambling, and a significant positive correlation between impulsivity and problem gambling. Among poker players, impulsivity has already been found to be a predictor of problem gambling [12,23,24].

The present study adds to existing knowledge by examining the three sub dimensions of impulsivity (non-planning, motor and attentional impulsivity) among poker players. Among these three subtypes, only attentional impulsivity, which characterizes fast and mindless decision-making, did not differentiate between gamblers according to their intensity of gambling. It is also interesting to note that poker players, whatever their intensity of gambling, had lower scores on this sub-dimension than on the other two. However, although differences in scores were not significant, we found a weak but significant correlation between attentional impulsivity and problem gambling.

By contrast, motor impulsivity and non-planning significantly differentiated players according to their intensity of gambling. Non-planning, characterized by an orientation toward the present rather than the future and a lack of anticipation, was significantly higher in severe PG than in NPG and low PG, and was significantly correlated with problem gambling. This may largely explain the persistence of gambling, through the focus on immediate rewards and the lack of anticipation of negative financial consequences, as suggested by Petry [5].

Motor impulsivity is the behavioural dimension of impulsivity and involves mindless action. Like non-planning, it is significantly higher in severe PG than in NPG and low PG, and is significantly correlated with problem gambling. Our results suggest that this dimension may be involved in poker players with problem gambling. In fact, we found that impulsivity significantly predicted problem gambling among poker players but that, among the three sub-dimensions, only motor impulsivity was a significant predictor. The involvement of motor impulsivity may explain the mindless actions of betting, especially online where gambling actions are immediate, encouraging players to click impulsively, without thinking.

This study focuses on online poker players. It has several limitations, which should be taken into account when interpreting and generalizing the results. First, this is an online study with self-selected participants, who may not be totally representative of poker players. Secondly, the online survey format did not allow us to make a diagnostic observational evaluation of problem gambling, and we therefore assessed problem gambling using the CPGI [26], a self-report measure. This limitation also applies to impulsivity, which was only assessed with a self-report measure. Future studies should use both behavioural and self-report measures of impulsivity, including the multiple components within each domain [2]. Furthermore, the use of the BIS-11 scale may raise questions, as Reid, Cyders, Moghaddam and Fong [30] found that the factor structure of the BIS was not replicated in a sample of participants exhibiting addictive behaviours and impulsivity (pathological gamblers, hypersexual patients, and individuals seeking treatment for methamphetamine addiction). The authors suggested that future studies should investigate comparisons with a modified version of the BIS, and other impulsivity scales such as the UPPS-P Impulsive Behaviour Scale in clinical populations.

Despite these limitations, this study offers interesting results and suggests avenues for future research. Our results are consistent with the literature and confirm the links between impulsivity and problem gambling. They also identify the sub-dimensions that could play a role in problem gambling: attentional impulsivity did not differentiate between gamblers according to their intensity of gambling, whereas non-planning and motor impulsivity were specifically linked to problem gambling in our sample. As suggested by Canale, Vieno, Griffiths, Rubaltelli and Santinello [31], it is important to consider different routes when addressing impulsivity in problem gambling prevention and intervention. These two sub-dimensions should be taken into account when planning treatment and preventive actions aimed at poker players who are problem gamblers. For instance, in behavioural and cognitive therapy, therapeutic protocols could include actions that delay reward gratification. Furthermore, as motor impulsivity significantly predicted problem gambling among poker players, preventive actions could be targeted particularly at these at-risk individuals.
As our results show that impulsivity is not homogeneously involved in problem gambling, further research should assess its sub-dimensions among other types of gamblers to see whether the same sub-dimensions are involved as in poker players.

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