

Original Study

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The influence of cognitive factors on pathological gambling

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Abstract

The purpose of this study was to examine the role of cognitive factors, such as superstition, locus of control, decision-making and unrealistic optimism, on gambling. Eighty-six subjects participated in this study. They were divided into four groups: non-players, social players, problem gamblers, and pathological gamblers. Groups were formed on the basis of South Oaks Gambling Screen Scale. Results showed that pathological gamblers group obtained a high superstition index. With reference to unrealistic optimism, gambler group believed that they had a better chance of success compared to non-gamblers. They also showed a higher impulsivity index in decision making than non-gamblers. This study supports the idea that cognitive factors such as superstition, unrealistic optimism, impulsivity and external locus of control are involved in gambling.

KEYWORDS: gambling, locus of control, decision-making, superstition and unrealistic optimism.

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Introduction

The term “gambling” can be defined as any risky behaviour based on a combination of skill or chance, or both, in which something of value can be won or lost [1]. Gambling activities are also characterised by the fact that the number of winners is lower than the number of participants [2]. Cognitive theories of gambling assume that the core beliefs of the gambler are dysfunctional. These dysfunctional beliefs can be summarized with the following statements: 1) it is possible to make money through gambling; 2) the regular gambler is in some way better equipped than most people to win in the long run; 3) persistence will ultimately bring reward [2, 3]. Moreover, according cognitive theories, cognitive factors can contribute to gambling behaviors and gambling disorder. Several studies [4-7] showed that cognitive factors can play a key role in the development and maintenance of gambling problems. Individuals with pathological gambling presented differences in multiple cognitive processes, such as: unrealistic optimism, superstitious belief, locus of control, and decision-making. Erroneous perceptions about the usefulness of making links between random events appeared to be the core misconception held by gamblers [8]

Ladouceur and Walker [9] demonstrated that magical thinking was the basis of the dysfunctional behavior, for example the slot machine players were convinced that even the machine will not pay for a long time, however, in the end it had to pay. Bingo players believed that if a person next to them has one number, then it is a sign that luck is approaching. Therefore, they persevered, as victory was very close. Gamblers tried various strategies and believed that their abilities will help them to win [9, 10]. Zakay [11] studied this phenomenon called “unrealistic optimism”. It is a cognitive predisposition in which the subject believes to have the illusion of control. People think that he can control the situation and believes that losers are almost the winners. Blaszczynski and Nowe r[12] examined the relationship between unrealistic optimism and gambling. The research showed that players, as opposed to non-players, showed more unrealistic optimism about the possibility of winning. Another factor that influences gambling is superstitious belief. Superstitious beliefs can lead to cognitive distortions identified as contributing to false belief that can influence the outcome of a change of events [13]. Glicksohn and Zilberman [13] investigated whether gamblers will be able to perform better than non-gamblers. A test simulates the choices a player must make when gambling (IGT). This research shows that gamblers make more mistakes because they do not pay attention to the rules of the test that change during the game. Another factor that may influence gambling is the locus of control, showing that the reinforcements following their actions depend directly on their own behavior (Rotter, 2010). The pathological gamblers in general show an external locus of control rather than an internal one. According to St-Pierre and Derevensky [15] this is the result of continuous reinforcement, of the odds that the players receive from the outside. The assignment of external cause, is characterized by the fact that what happens in one is largely determined by forces outside its control, the other, luck or fate. The subject, who believes in his own personal effectiveness or ability to control events, has an internal locus of control. The locus of control is a multidimensional construct. A person can have an internal locus of control, but can also believe in luck [8].The theoretical arguments discussed so far and the existing empirical evidence allow us to formulate some hypotheses on the influence of cognitive factors on pathological gambling. For these reasons, the main aim of the present study was to examine the role of cognitive factors on gambling. Firstly, it was hypothesized that gamblers would obtain higher levels of unrealistic optimism than non-gamblers. Secondly, it was hypothesized that gamblers would be more superstitious and impulsive compared to non-gamblers. Thirdly, it was hypothesized differences in locus of control between pathological gamblers, problem gamblers, social players and non-players.

Material and Methods

Eighty-six subjects (range age = 18-50, Mean = 35.9) participated in this study. Participants were recruited from a Clinical Service for Addiction Treatment of Messina. They were selected by appropriate inclusion and exclusion criteria. The inclusion criteria were: (1) age 18–50 years, (2) diagnosis of pathologic gambling, (3) absence of neurological or psychiatric diseases and dopaminergic drug. The exclusion criteria were: (1) comorbidity with other psychiatric disorders, (2) substance dependencies or neurological diseases. Non gamblers were recruited through printed and electronic advertisements on notice boards at University of Messina. After contacting the experimenter, they received the written informed consent and were invited to participate in a clinical interview carried out by a specialised psychologist in order to exclude neurological or psychiatric disorder. Participants were divided into four groups: non-players, social players, problem gamblers, and pathological gamblers. Groups were formed on the basis of South Oaks Gambling Screen Scale (SOGS)[10] (Table 1). The SOGS is a 20-item questionnaire for the identification of pathological gamblers. Groups included: 24 subjects as non-players; 21 subjects as social players; 19 subjects as problematic players; 22 subjects as pathological players. Reply to SOGS measures are in tab. 1.

Instruments

The delay discounting was used to evaluate the decision making. Two tests were used to assess the superstitious belief. The first was the "thinking aloud" [16] which consists of thinking aloud during a game, selected and transcribed. The second questionnaire investigated the most common forms of superstition behaviours. The Levenson Scale was employed to assess the locus of control and a questionnaire [17] that measures the unrealistic optimism was used.

South Oaks Gambling Screen (SOGS)

The South Oaks Gambling Screen is a 20-item questionnaire for the identification of pathological gamblers. It may be self-administered or administered by nonprofessional or professional interviewers. The questionnaire is divided into two parts: the first part deals with demographic data subjects: employment status, age, gender. The second part evaluates the gambling thought two sections. To check the reliability of the instrument, two alternative procedures were used. The 749 surveys were submitted to an internal consistency reliability check. The analysis showed that the screen is highly reliable (Cronbach's alpha = .97, $p < .001$). In addition, 74 inpatients and 38 outpatients at South Oaks filled out the questionnaire twice 30 or more days apart while in-group sessions; 20 (18%) of these patients were pathological gamblers. The test-retest correlation (using a dichotomous classification of pathological or non pathological) was .71 (df = 110,

$p < .001$). There was a tendency for scores to drop between test and retest. This was attributed to the patients' awareness that scores were being used in decisions about plans for inpatient treatment. The test-retest correlation was higher for outpatients ($r = 1.0$, $df = 36$, $p < .001$) than for inpatients ($r = .61$, $df = 72$, $p < .001$) (Lesieur & Blume, 1987).

The delay discounting

The delay discounting was used to assess the decision making. Participants are asked to make a series of choices between large rewards (e.g. 14 €) delayed by various delay intervals (1 day, 1 month) and smaller immediate rewards (e.g. 1 €). At each delay, the magnitude of the small immediate rewards is adjusted until the small immediate and large delayed rewards are subjectively equivalent in value, referred to as the indifference point. The rate at which the value of a reward is discounted as a function of the delay to its delivery is best described by a hyperbolic equation developed by Mazur (1987):

$$V = A / (1 + KD)$$

Where V is the present or subject value of some amount A , to be delivered after some delay D , the free parameter K describes the slope of the hyperbolic function and is used as an index of the extent to which individuals discount the value of future rewards. In other words, the higher K value indicates a propensity to devalue future rewards at a higher rate and suggest greater levels of impulsivity.

Thinking aloud

The "thinking aloud" is a task used to evaluate the superstitious beliefs [16]. It consists in thinking aloud during a game, selected and transcribed. Subjects were required to consider how likely each item was on a Likert scale of 5 points. [16] assessed the reliability of the scale. The Cronbach's alpha for internal consistency was 0,73. The test statistic T2 Hotelling on the scale was significant ($F = 6.549$, $p < .001$) and allows to reject the hypothesis that the items represent parallel measures, the coefficient interclass correlation of time for each item was equal to 0.226 ($F = 4.209$, $p < .001$), while the estimate of the average of the scale appears significantly different from zero and confirmed the reliability of the scale.

The Superstition Questionnaire is a ten-item questionnaire, created for the current study, that assesses the most common superstitious behaviors performed by people in our culture. Subjects responded to each item using a Likert-type scale, from 1 (not at all likely) to 8 (very likely).

Levenson Scale

The Levenson Scale [17] distinguishes multiple dimensions within the external side of the Locus of Control continuum. 25 items explore different situations and the thoughts that are common in the subject's everyday life. There are four alternative answers to each question: A = completely

true, B = true enough, C = completely false, D = quite untrue. The items are structured in such a way as to reveal any inconsistencies three answers given by the subjects. Each respondent receives three scores (from 0-48) indicating his/her relative standing on each of the three dimensions. The concurrent validity of the questionnaire, as measured by the three Levenson's IPC subscales was .57 ($p < .001$), .49 ($p < .01$) and .53 ($p < .001$). Exploratory principal components analysis supported a three-factor structure that items loading adequately on each factor. Moreover, the approximate orthogonal of the dimensions were obtained through correlation analyses ([17]).

Unrealistic Optimism Questionnaire

The questionnaire [11] that measures the unrealistic optimism was taken from a test designed and calibrated by Zakay [11] to measure optimism. The test is composed of the 12 controllable or uncontrollable events. Participants assigned rating for each event from 1 to 5. The internal consistencies of the ratings within each group ranged between 0.68 and 0.75 (alpha Cronbach's values).

Results

Table 2 shows means and standard deviation of each parameter considered. As regards to the decision-making test, data were analyzed with reference to one week and one month delay. The one-way analysis of variance of K index related to one month showed a significant effect of "group" variable, $F(3, 81) = 3.21$, $p < .05$.

The players group and gamblers prefer to accept a small amount of money immediately and not a substantial sum extended over the time. As regards to superstition, the one-way analysis of variance showed a significant effect of group, $F(3, 81) = 2.81$, $p < 0.04$. Post hoc analyses showed that the pathologic gamblers group had a higher superstition index compared to social players and non-players groups, respectively $t = 9.28$, $p < .001$; $t = 7.64$, $p < 0.005$. The internal locus index showed no significant effects. Although it is not statistically significant, the data in Table 2 showed that the pathological gamblers tend to have higher levels of external locus of control. In other words, they tended to attribute success to factors such as luck and fate.

Table 2. Means and standard deviations (SD) of cognitive parameters relative to four groups: pathological gamblers, problem gamblers, social gamblers and non players.

	Patological gamblers	Problem gamblers	Social gamblers	Non players
Decision making:				
K week	224 (.361)	383 (.383)	341 (.341)	344 (.354)
K month	126 (.241)	130 (.045)	187 (.999)	225(.134)
Locus of control:				
Internal	28.9 (4.77)	27.0 (3.66)	27.85 (4.33)	27.81 (4.24)
External	43.7 (6.02)	40.3 (5.45)	42.80 (6.09)	40.9 (5.73)
Superstition beliefs	37.0 (14.6)	33.0 (10.7)	27.7 (9.1)	30.8 (11.4)
Superstition behaviour	19.53 (8.42)	17.72 (5.25)	16.17 (4.93)	17.23 (6.12)
Unrealistic optimist	69.53 (22.7)	62.66 (19.8)	62.91 (14.4)	62.45 (18.2)
Unrealistic control	57.20 (16.58)	55.22 (21.04)	60.48 (14.45)	58.04 (16.6)

With reference to unrealistic optimism, the one-way analysis of variance, assuming group as independent factor and unrealistic optimism index as dependent factor, showed a significant effect of “group” variable, $F(3,81) = 2.1$ $p < 0.05$. The pathological gamblers group showed higher unrealistic optimism indices than the other groups. Post hoc test indicated significant group differences too.

Discussion.

In line with previous studies [1-7], pathological gamblers show high unrealistic optimism indices. Precisely, they present the illusion of control, i.e. the belief that is possible to influence randomly the events. Consistently, although it is not statistically significant the pathological gamblers tend to have higher levels of external locus of control. In other words, they attribute the causes of certain events to chance or luck, or factors beyond their control. As hypothesized, this group presents a higher impulsivity index than non-gambler group. They accept a small amount of money immediately and not a substantial sum extended over the time. Finally, they exhibit cognitive biases that may contribute to the increase of superstitious beliefs. The results of the present study are in line with the findings of the current psychological literature. However, in this study, we highlight that there are significant differences in cognitive dimensions between gamblers and non gamblers which are mostly overlooked by the dominant psychological research. In conclusion, the results of our study suggest that cognitive factors, such as impulsivity, superstition, unrealistic optimism and external locus of control, are involved in pathological gambling. Although gambling is a multidimensional phenomenon, the aforementioned cognitive factors can be considered as risk factors to the development and maintenance of this disease.

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