Research Article

Exploring Cognitive Biases in Gamblers: The Player's Error and its Practical Implications

Tessenyi Judit[1]* and Bencsik Gyozo[2]

[1]*Student Counselling Centre of the University of Szeged, Hungary*

[2]*Neumann Janos University Doctoral School of Business and Management, Hungary*

***Corresponding Author**
Tessenyi Judit, Student Counselling Centre of the University of Szeged, Hungary.

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Abstract
In the world of gambling, there are many cognitive distortions and mistakes that can affect the decisions and behaviour of the players, providing the background of the article. In this study, with the participation of 150 respondents, we investigate the occurrence of inconsistencies and errors using the "Gamblers' Beliefs Questionnaire" (GBQ). The purpose of this research is to explore the beliefs and mindsets of players, with particular attention to how these delusions affect attitudes towards gambling and the players' sense of control over the outcome of the game.The GBQ questionnaire method is used to analyse gamblingrelated attitudes and beliefs, as well as their correlations with gambling frequency and cognitive errors. The results of this research can help to better understand the mindset and beliefs of gamblers and contribute to the development of measures to prevent and treat gambling problems.The results showed that players tend to think that the probability of winning increases after consecutive losses. However, in reality, and light of the facts, this results in a false player conclusion that can lead to problematic behaviour.

Keywords: Cognitive Bias, Player Beliefs, Player Sense of Control, Attitudes, Problem Behaviour

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1. Introduction

In their study, Tversky and Kahneman investigated the expectations of gamblers in terms of compensating for their losses, especially regarding consecutive losing sessions [1]. They observed that players tended to think that the probability of winning increases after consecutive losses. This phenomenon is often referred to as the "player's error". Leon Festinger, Henry Riecken and Stanley Schachter studied the phenomenon from a different aspect, though closely related to the research of Tversky and Kahneman, in their 1956 book "When Prophecy Fails". In which, they investigated a sect whose members, guided by an apocalyptic expectation, believed that at a certain time they would encounter extra-terrestrial beings. When this did not happen, the cult members reacted by believing even more strongly that the long-awaited event was going to happen, vindicating the "player's error" theory.

"Player's error " means that players mistakenly assume that the probability of winning increases in the rounds following consecutive losses. Nevertheless, in reality, the probability of winning depends on the rules of the game and does not change from the results of previous rounds. However, this delusion is an important factor in the loss of control over the game.For example,

in a dice game where 6 is the winning number, the probability of winning will always be 1:6, regardless of the results of the previous rounds. So, players are wrong when they think that their losses will somehow compensate and increase their chances of winning the following rounds.

EJLanger's study "The Illusion of Control" showed that people generally act in ways that suggest that they have illusory beliefs thinkingthat they can control the outcome of games determined by chance [2]. Langer's argument is that people experience the illusion of control in situations where their behaviour cannot affect the outcome. In his studies, Langer identified four factors that can produce this effect by creating what is often called the "skill-chance interference": choice, participation, competition, and familiarity. Leopard later elaborated on this "player's error" phenomenon and pointed out that players often find it difficult to accept that game outcomes are independent of each other [3]. As a result, players tend to be more optimistic about the next rounds and expect that their losses will be compensated by winning streaks in the future.

"Almost won" reinforcement patterns similarly validate and reinforce the underlying "player's error" misconception. The

"almost won" phenomenon was first identified and investigated by Reid [4]. Slot machines use a 3×3 matrix to indicate the game position. The matrix consists of 3 rotating columns, which contain symbols in horizontal rows. Depending on the rules of the game, a combination of certain symbols will result in a prize (for example, three lemons horizontally will win). Games (especially slots) often communicate to the player the message that they "almost won". For example, if the player wins if three 7s are next to each other in the game, but there are two 7s next to each other, the game communicates to the player "You almost won", only one 7 is missing to get three 7s should be next to each other At this time, most of the players think that they have almost won and will win in the next round.

According to studies by Armor and Taylor, the key to effective self-regulation of behaviour and well-being lies in the interaction between optimistic expectations and the demands of reality [5]. They also note that optimistic expectations are sometimes contradicted, as in gambling it is the loss, not the win, that determines it. People deal with these by using any of a variety of mechanisms to maintain optimistic beliefs even in the face of disconfirmations. By combining strategic optimism with strategies to minimize disconfirmation of optimistic expectations, people can simultaneously satisfy self-regulatory needs and maintain a positive sense of self.

In Westphal's research, he determined the frequency of occurrence of problematic gambling behaviour, the average age of onset of gambling behaviour, and the co-occurrence of gambling disorder and substance abuse from the 6th to 12th grades in a Louisiana student population in the 1st grade [6]. From the 6th-12th graders, a significant minority- 15.9 per cent - admitted gambling-related symptoms and life problems. The connection between problematic and pathological gambling and the use of alcohol, tobacco and marijuana preliminarily supports the existence of gambling as a risk already in adolescence and the importance of a very conscious social management of it.

According to Judit Tessényi, gambling must also be examined in a dynamic environment, since the fact that the joy, excitement and sometimes profit from the game is preceded by the inability to quit, playing a significant role in the activity becoming pathologicalfailure and remorseindirectly reinforcein them the kind of expectation that their losses will be compensated by winning streaks in the future [7]. These emotional effects are subject to distortions that result in differences between the pre-planned and the actual behaviour that can be observed afterwards, whichare called dynamic inconsistencies in the literature.

In another study, Tessényialsoexaminedthe inconsistency[8]. When the respondent's answers to different questions contradict each other;for example, he answers "very satisfied" to one question, and then answers "not satisfied" to another question; those only differ in wording, but mean the same thing. Respondent inconsistencies can be an important aspect when evaluating research results, and the respondents' unique characteristics and cognitive biases can

contribute to their development.

Based on the study of the literature and the analysis,the following hypothesescan be formulated regarding the behaviour and cognitive distortions of gamblers:

• **Hypothesis 1:** Gamblers' cognitive biases, especially the "player'serror ", significantly contribute to the development of gambling addiction. These biases affect the decision-making process of players, which increases their desire to play and continue to play after losses.

• **Hypothesis 2:** "Near-win" experiences and similar near-successes strengthen gamblers' cognitive biases, increasing gambling frequency and risk of addiction. These experiences create false hope in players, motivatingthem to continue playing.

• **Hypothesis 3:** There is a positive correlation between the degree of cognitive distortions of gamblers and the frequency of gambling. The more often someone gambles, the more likely they are to have stronger cognitive biases, further exacerbating the problem of addiction.

These hypotheses can serve as a basis for further research and investigations aimed at gaining a deeper understanding of the behaviour and cognitive biases of gamblers and developing more effective interventions and treatment methods.

2. Methods
In his 2011 dissertation, Attila Körmendi examined the relationship between the cognitive distortions of gamblers and their personality traits, in which he also described the GBQ questionnaire [9]. Although he only presented the questionnaire and did not collect specific data with it, based on the results of previous international research, the Gamblers' Beliefs Questionnaire (GBQ) is already validated in several languages and is a reliable tool for measuring the cognitive distortions of gamblers. His work was the first to present and translate this questionnaire into Hungarian, enabling its use in Hungarian-language research. Based on the results of previous international validation studies, it is likely that the Hungarian version provides similarly reliable and valid results in the examination of the cognitive distortions and personality traits of gamblers. Thanks to this, researchers in Hungary can effectively use the GBQ for a deeper understanding of cognitive distortions related to gamblers and to develop appropriate interventions. We can focus on the Likert scale responses related to cognitive distortions and the frequency of gambling to analyse the hypotheses. This involves comparing responses and performing statistical tests to identify significant associations.

2.1. Sample
The original questionnaire was filled out by 150 people and analysed with the Python software. A simple random sampling procedure was used. The demographic composition of the sample can be seen in the figure below, in which the adult-middle-aged group dominated in an outstanding proportion of more than 50%.
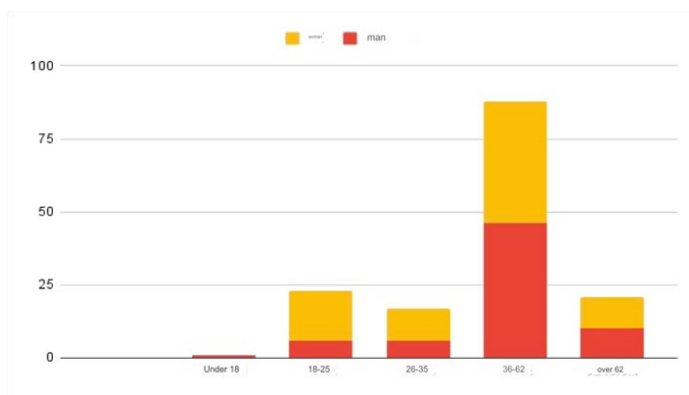
Figure 1: Composition of Respondents by Age and Gender N=150 People

46 percent of the respondents were men, and 58.7 percent belonged to the actively working age group of 36 to 62 years. In terms of income, the largest share wasthose earning over HUF 400,000. Family status dominated with 46.7 per cent, those living in afamily with children. In terms of place of residence, 72% of the respondents lived in the county seat and rural towns.

2.2. Device
The original "Gamblers' Beliefs Questionnaire" (GBQ) is a measure developed by SteenBergh et al., and validation of the questionnaire has been demonstrated in several studies. Validation means that researchers have thoroughly analysed the questionnaire to ensure that the questions measure what they are intended to measure and that the results are reliable.Based on the results, the original GBQ questionnaire was used as an accepted and reliable measurement tool in the investigation of gambling-related beliefs and mindsets. Several studies have used the questionnaire to understand the cognitive processes and psychological aspects of gamblers.

2.3. Proceedings
During the validation and reliability testing of the Hungarian version of the GBQ, the management and analysis of the data was an integral part of the scientific procedure. In this procedure,the Python software was used to load, filter, clean, and extract basic statistics from the data. During data cleaning, different methods to handle missing or incorrect data to ensure the reliability and accuracy of the analysis were used.As a further step in the analysis, we fitted basic regression and classification models to the dataallowingus to analyse the relationships between GBQ scores and cognitive biases in gamblers. Using regression models, we investigated the extent to which certain types of cognitive distortions can be predicted based on GBQ scores. And the classification models allowed us to identify characteristics or groups that are at higher risk of cognitive biases based on the GBQ. When analysing Likert scales, several results can be expected that help to understand respondents' attitudes, opinions, or feelings about the topics surveyed.

Aspects that can be considered during the analysis:
• **Distribution of Answers:** It can be observed how the respondents are divided between the different answer options. For example, if the majority "Strongly Agree" with a statement, this may indicate strong support for that view.

• **Means:** The mean or median of the responses to the Likert scale can help determine the general trend or attitude. In the case of a low average value, for example, the dominance of critical or negative opinions can be inferred.

• **Standard Deviation:** The standard deviation of the data can help to understand the agreement or divergence of respondents' opinions. In the case of a narrow dispersion, the respondents think similarly, while in the case of a wide dispersion, they may express different views.

• **Trends and Patterns:** Recognition of trends and patterns that can be observed in the breakdown according to individual groups or demographic characteristics. For example, if certain age groups or income groups respond differently, this can provide important insights into different perspectives.

• **Correlations:** Examining the correlations between the answers to each statement. If there is a strong positive or negative correlation between the answers to two statements, this may indicate that the respondents evaluate these topics similarly.

During the analysis, it is important to consider the representativeness of the sample and the circumstances of the data collection, as these can influence the interpretation of the results. The correlation matrix shows the correlations between the different Likert scale questions. The values of the correlation coefficients can range between -1 and 1, where 1 means a strong positive correlation, -1 a strong negative correlation, and 0 means no correlation between the variables. During the examination of significant trends and correlations, no pairs where the absolute correlation coefficient was greater than 0.5 were found, which means that there are no highly correlated pairs among the examined questions. This may suggest that the factors perceived by the respondents are independent of each other, or that only a weak correlation can be shown between them.

2.4. Statistical Analysis
During the analysis, we used several statistical methods to interpret the data and explore their relationships. First, the method

of averaging to assign a single "average problematic attitude" score was applied to each respondent, which could later be linked to demographic data. After that, the correlation between the demographic data and the average Likert scores was examined using the Pearson correlation coefficient. Using histograms, we depicted the distribution of the responses to the most problematic Likert questions visually interpretingthe respondents' attitudes.As part of the screening, we identified respondents who gave a value of 4 or 5 to the critical questions, which may indicate a tendency towards gambling addiction. Among the error screening methods was data verification, during which, when loading the data, we checked whether they were in the expected format and whether there were no missing or meaningless values. The distribution of the data was also visually checked using histograms to ensure that it was meaningful and relevant to the analysis.

First, we examined the demographic characteristics of the respondents, such as gender and age distribution, and then analysedbehavioural patterns related to gambling. The purpose of the analysis is to better understand the composition of the sample and to identify any problematic behaviour patterns. Based

on the demographic characteristics, the majority of respondents are women (54%), and the most common age group is the group between 36 and 62 years old. During the analysis of behavioural patterns, it was revealed that a significant number of respondents agree or completely agree with the gambling-related statements for several questions, which may indicate that the proportion of problem gamblers in the sample may be high.

As a first step in the investigation of the illusion of control of gamblers,data was cleanedwith special attention to the variables that indicate the gambling frequency and cognitive errors of the gamblers.Then a statistical analysis was performed separately on the group of players who play regularly to examine the presence of the illusion of control and cognitive errors. We analysed trends of relevant variables in the data set and performed a cluster analysis to identify patterns or groupings in the data. In addition, a correlation matrix between Likert scales was created that helped identify relationships between different statements and indicated how responses to one statement could be associated with responses to another. In addition, we analysed in detail the distribution of responses to each Likert scale statement.

Gender	Man	Woman
How often do you play?		
Per month	11	10
Several times a week	4	1
Weekly	5	14
Daily	3	1
Many times, a day	1	0
Never	15	15
a few times a year	30	40

Table 1: Composition of Respondents by Gender and Playing Frequency N=150 People

This table presents a breakdown of gaming frequency by gender, showing how often individuals by gender engage in gaming activities, ranging from "several times a day" to "never". To determine whether there is a relationship between frequency of play and gender, a statistical analysis such as a chi-square test for independence can be performed. This test can help assess whether there is a significant relationship between two variables. A P-value of 0.195 suggests that there is no statistically significant association between playing frequency and gender at the conventional 0.05 level.

Age	Under 18	18-25	26-35	36-62	Over 62
How often do you play?					
Per month	0	2	1	13	5
Several times a week	0	0	0	4	1
Weekly	0	0	1	15	3
Daily	0	0	0	4	0
Many times, a day	0	0	0	1	0
Never	1	6	3	17	3
a few times a year	0	15	12	34	9

Table 2: Composition of Respondents According to Age and Playing Frequency N=150 People

Based on the data, the following patterns can be observed between game frequency and age:

• **Under 18s:** The most common answer in this age group is playing "a few times a year", which may indicate that the younger age group plays less often or has less of their income to play.

• 18-25- and 26–35-year-olds: In both age groups, the answer "a few times a year" predominates, which suggests that people in this age group may be more inclined to play occasionally, perhaps due to free time or disposable income.Overall, the patterns show that game frequency tends to increase with age, particularly in the 36-62 age group, where the most active players are found. The answer "a few times a year" is generally the most common among all age groups, which may indicate that gaming is more of an occasional pastime than a regular activity.

Attitude Likert	I See the Game as a Challenge	My Decisions Affect the Outcome of The Game	My knowledge and Skills in The Game Help Me Win More Money
Totally Disagree	40	54	55
Somewhat Agree	24	17	19
Slightly Disagree	3	9	6
Largely Agree	8	10	7
Strongly Disagree	7	12	8
Neutral	41	17	27
Totally Agree	3	7	4

Table 3: Respondents' Likert-scale Opinions on 3 Questions from N=150 People

We focused on questions on a 7-point Likert scale, such as: "My knowledge and skills related to the game help me win more money", or "My decisions affect the outcome of the game", or "I view the game as a challenge". The table above shows that most of the respondents do not agree or have a neutral position, but in terms of all three questions - relevant from the point of view of cognitive distortions - 20% to 20% gave some degree of agreement as an answer, which cannot in any way be called negligible.

On the question of whether they see the game as a challenge, 30% gave a neutral answer, while the percentage of respondents who did not agree at all was significant. Regarding knowledge and skills related to the game, about 40% admitted that this does not play a role in achieving the prize. A realistic assessment of the situation is even more favourable in answering the question of whether the decisions affect the outcome of the game. Here, about 47.3 per cent disagreed. On the other hand, 8 per cent think that their own decisions influence the outcome of the game, and another 8 per cent strongly agree. If we add up those who assume that theyhave a decisive role in the outcome of the game, we get a very significant share of 25 per cent.

	My knowledge and skills in the game help me win more money	My decisions affect the outcome of the game	When I'm losing in the game, I feel like I must keep going, because then I'm more likely to win	The situations where I almost win or lose by a hair remind me that I must keep going to win again	Gambling is more than just luck	Average
0	130.0	147.0	40.5	36.0	71.0	84.9
1	30.0	36.0	40.5	36.0	22.5	33.0
2	74.0	119.5	40.5	36.0	71.0	68.2
3	30.0	36.0	138.0	36.0	71.0	62.2
4	30.0	96.0	117.5	118.0	102.0	92.7

Table 4: Respondents' Attitude Values and their Average N=150 People

A cluster analysis was then performed to understand the group of problematic respondents better. Since the Pearson correlation is sensitive to missing values and assumes a normal distribution of the data,the Spearman rank correlation can be used as an alternative, which is less sensitive to these factors and can handle missing values. Using rank correlation, the following behaviours showed the highest correlation with the statement "When I lose in the game, I feel like I have to keep going because then I'm more likely to win":

• My knowledge and skills in the game help me win more money.

• My decisions affect the outcome of the game.
• From my previous experiences, I can deduce the subsequent winning probabilities.
• The situations where I almost win or lose by a hair remind me that I must keep going to win again.
• Gambling is more than just luck.

These correlations suggest that respondents with problematic gambling behaviour may tend to overestimate their abilities and the impact of their decisions on game outcomes, as well as overestimate the significance of "almost wins." These beliefs may

contribute to them continuing to play after losses in the hope that this will increase their chances of winning.

To identify cognitive dissonance, we had to analyse these statements to see if there were contradictions between the respondents' beliefs and attitudes. For example, if someone gives a high score on the statement "I see the game as a challenge" but a low score on "My decisions affect the outcome of the game," this may indicate a discrepancy between the respondent's beliefs. Column averages were calculated for each row and the results were added to a new "average" column. The first few rows show that the averages vary, indicating that respondents agree with the statements to varying degrees. Analysing averages and deviations from averages can help us get an idea of how much respondents feel that their knowledge, decisions, and gambling strategies affect the outcome of the game and their chances of winning.
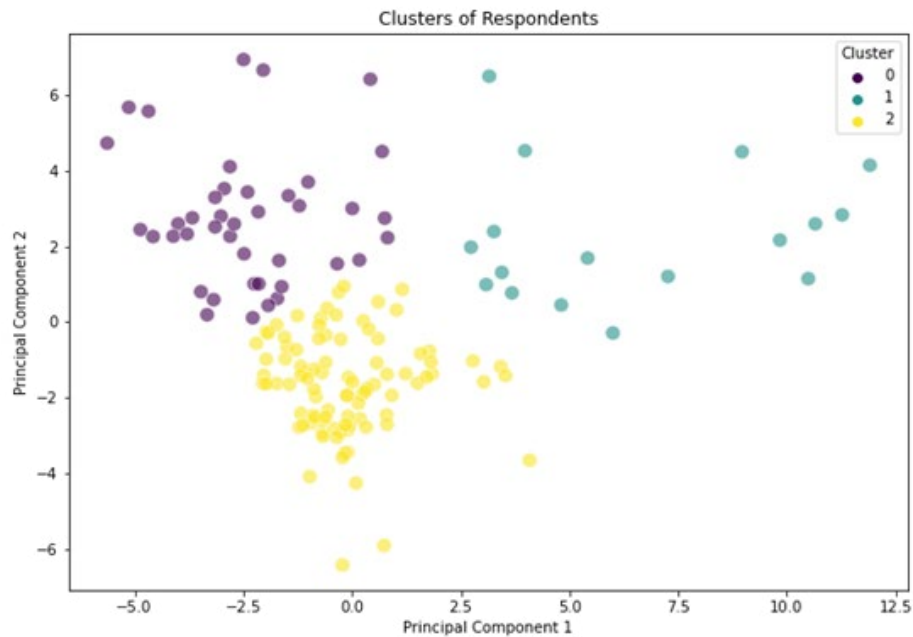

Figure 2: Clusters of Respondents N=150 People

The next step is to calculate the Spearman rank correlation between the selected statements. This statistical method allows us to examine monotonic relationships between statements. The Spearman rank correlation does not assume a normal distribution of the variables and can be used even if the relationship is not linear, but monotonic. This step helps tounderstand how the answers to each statement relate to each other. For example, if someone agrees with the statement "My knowledge and skills in gambling help me win more money," are they more likely to agree with the statement "Gambling is more than just luck"? To calculate the correlation,first the answers need to be transformed into ranks, and then calculate the correlation coefficients based on them.

The results of the Spearman rank correlation show the relationship between the individual statements. The values of the correlation coefficients can range from 1 to -1, where 1 means a perfect positive correlation and -1 means a perfect negative correlation.

Values near 0 indicate no significant relationship. Based on the results, the highest correlations are between "When I lose in the game, I feel like I have to keep going because then I'm more likely to win" and "Situations where I almost win or lose by a hair's breadth remind me that I have to keep going so that I can win again" is among the statements, with a value of 0.517. This means that respondents who need to continue playing after a loss to increase their chances of winning are likely to similarly feel situations, where they almost win or narrowly lose, as motivation to continue. After grouping the respondents into 3 clusters, the visualisation (Figure 2) was completed, which presents the different groups in the two dimensions created by the principal component analysis (PCA). The PCA1 and PCA2 axes represent the combination of the most important variables that explain the most variability among respondents. The colouring of the clusters helps to identify which respondents belong to a group.
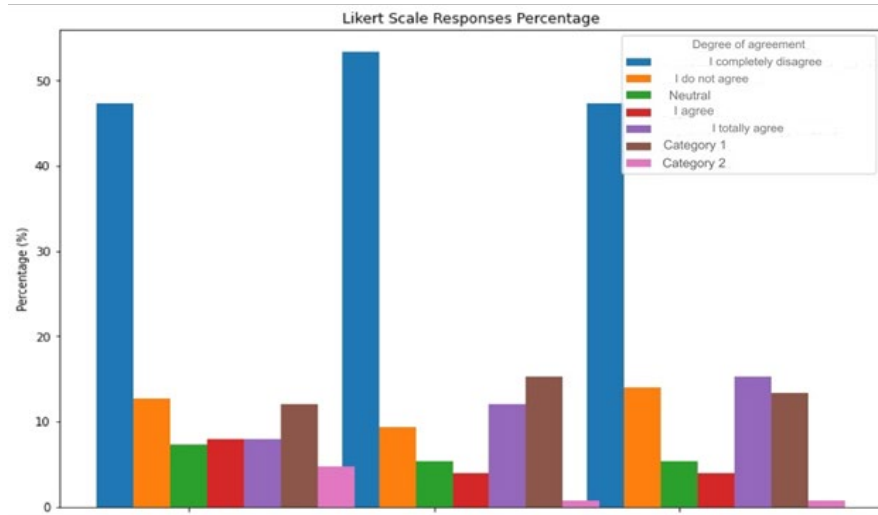
Figure 3: The Composition of the Answers to the "Almost Won" and Omnipotence Questions N=150 People

The values, sums and averages of the Likert scale can be used to measure attitude values, i.e. attitudes, opinions, and feelings. A Likert scale is a psychometric scale often used in questionnaires where respondents rank their opinions or feelings about a particular statement on a scale ranging from strongly agree to strongly disagree.Summing or averaging Likert scale values allows researchers to assign a quantitative value to respondents' attitudes. With the help of the summed or averaged values, the attitudes of different respondents or groups can be compared, and conclusions can be drawn based on statistical analyses.

2.5. Ethical Implications
Regarding the ethical rules of the research, we applied them to ourselves, both to the individual behaviour of the researcher during the research and to the expectations related to the social use of the research results. By researching the topic to be covered, by reading and interpreting the article, we wish to have a positive impact on society.

3. Results
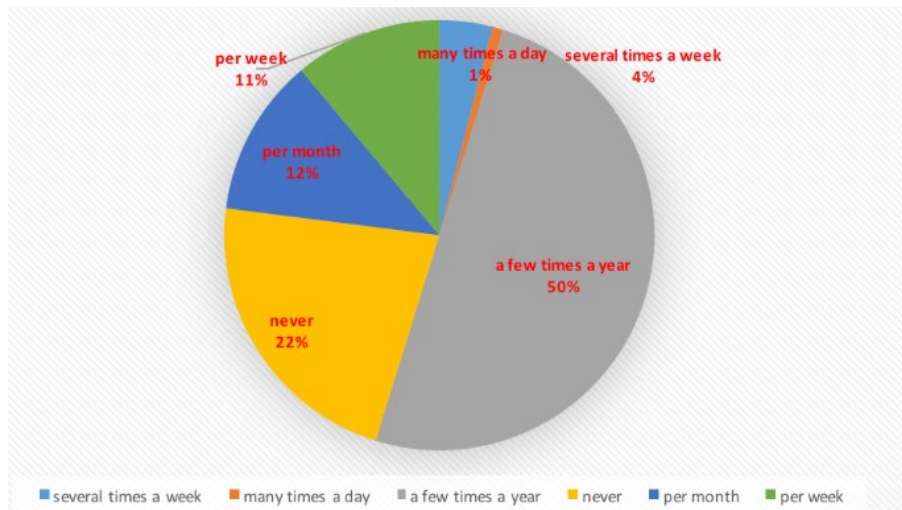
Figure 4: Game Frequency of the Respondents N=150 people

Half of the respondents only play a few times a year and another 22.2% never. In the case of a gambling addiction test,those who gamble daily or several times a day are interestedin the research.

Frequency	Respondents	Average Likert
A few times a year	48	4.2
Never	25	3.5
Every month	14	4.8
Weekly	13	4.0
Several times a week	5	4.5

Table 5: Respondents' Attitude Averages and their Playing Frequency N=150 People

The Pearson correlation coefficient between game frequency and average Likert score is 0.622. This indicates a moderate positive correlation, which indicates that as the frequency of the game increases, the average Likert score also increases, i.e. the respondents agree with the statements to a greater extent (omnipotence).The problematic group refers to those subjects who gave worrying answers to the questions indicating gambling addiction. This group deserves special attention during further analyses. The following observations can be made to characterize the problematic group:Based on the criteria for identifying individuals with potentially problematic gambling behaviour, specifically those with monthly or more frequent gambling, 50 individuals in our sample could be considered problematic. This group reflects individuals who gamble with high frequency (monthly, weekly, daily, or several times a day) or who have beliefs about their control over gambling outcomes. In the problem group, the proportion of men and women is almost the same, which suggests that the gender difference in problematic gaming behaviour cannot be identified in our sample. In terms of age, the members of the group mainly belong to the age group between 36 and 62 years old, which indicates that problematic gaming behaviour can also be significant among middle-aged and older adults. Members of the problematic group are typically those who gave higher scores to statements such as "continue playing after losing to increase the chance of winning" and "almost winning or narrowly losing a hair increases the desire to play." This suggests that group members may be more prone to gambling addiction because they have difficulty resisting the urge to continue playing, even when losing.

Proportion of the problem group: The problem group makes up approximately 38.7% of the entire sample, which can be considered a significant part. This indicates that a significant number of individuals in the study sample exhibit behaviours that raise concerns about gambling addiction.The following table (6) shows the averages of the entire sample and the problem group regarding different statements. The table shows that the problem group gave higher values on average for most of the statements, especially those concerning the attitude to the game, winning strategies and dealing with losses. This supports the assumption that members of the problem group experience gambling more intensely, place more emphasis on increasing the chances of winning, and bear losses more difficult.

Likert Scale Statements	Total Sample Means	Problem Group Averages
I see the game as a challenge	3.43	6.25
My knowledge and skills in the game help me win more money	3.08	4.416
My decisions affect the outcome of the game	2.773	3.66
When I'm losing in the game, I feel like I must keep going because then I'm more likely to win	2.3	3.25
From my previous experiences, I can deduce the subsequent winning probabilities	2.86	3.66
The situations where I almost win or lose by a hair remind me that I have to keep going in order to win again	2.46	4.75
Gambling is more than just luck	3.66	4.83
Winning games is proof that I have the right knowledge and skill in the game	2.593	3.75
I have a luck strategy that I use while playing	2.906	3.83
In the long run, I will win more money than I lose	2.14	3.416
Even though I lose with my strategy, I must continue with that method because sooner or later my plan will work	2.493	2.83
I have certain habits (talisman coin, own permanent numbers, etc.) that I use to increase my chances	3.06	3.66
If I lose money, I have to try to win it back	2.406	4.5

Those who are not used to playing do not understand that persistence and invested money are the guarantee of profit	2.64	3.75
It doesn't matter where I got the money for the game because I'm going to win it back anyway	1.526	1.5
I'm pretty good at predicting when I'm going to win or lose	2.04	2.083
Gaming is the best way to get the excitement I need	2.76	2.83
If I keep playing it will pay off sooner or later	2.24	3.5
I have more skills and knowledge about the game than most people	2.22	2.583
The loss isn't so bad if I don't tell my loved ones	1.85	1.75

Table 6: Attitude Values of The Entire Sample and Problem Players N=150 People

Among the respondents, the most common behaviour indicative of gambling addiction is the tendency of players to continue playing after losing, believing that this will increase their chances of winning. This behaviour is particularly concerning because one of the hallmarks of gambling addiction is the compulsion to continue playing after a loss, which can lead to further losses and potentially more serious problems. Toanalyse the behaviour of the respondents, we converted the answers to the statement "When I lose in the game, I feel that I have to continue because then it is more likely that I will win" into a numerical scale, where 1 means "I completely disagree" and 5 means "I completely agree" answer. Then correlations between this statement and other gambling-related behaviour statements were calculated to understand which behaviours were closely related to this perceived problem attitude.

A cluster analysis was then performed to understand better the group of respondents deemed problematic. Since the Pearson correlation is sensitive to missing values and assumes a normal distribution of the data,the Spearman rank correlation can be used as an alternative, which is less sensitive to these factors and can handle missing values. Using rank correlation, the following behaviours showed the highest correlation with the statement "When I lose in the game, I feel like I have to keep going because then I'm more likely to win":

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• Gambling is more than just luck.

These correlations suggest that respondents with problematic gambling behaviour may tend to overestimate their abilities and the impact of their decisions on game outcomes, as well as overestimate the significance of "almost wins." These beliefs may contribute to them continuing to play after losses in the hope that this will increase their chances of winning.

To identify cognitive dissonance, these statements need to be analysed to see if there are contradictions between the respondents' beliefs and attitudes. For example, if someone gives a high score on the statement "I see the game as a challenge" but a low score on "My decisions affect the outcome of the game," this may indicate a discrepancy between the respondent's beliefs.We first identified the most worrisome questions and then created histograms to represent the distribution of scores for each question. This will help in understanding how respondents felt about these questions:
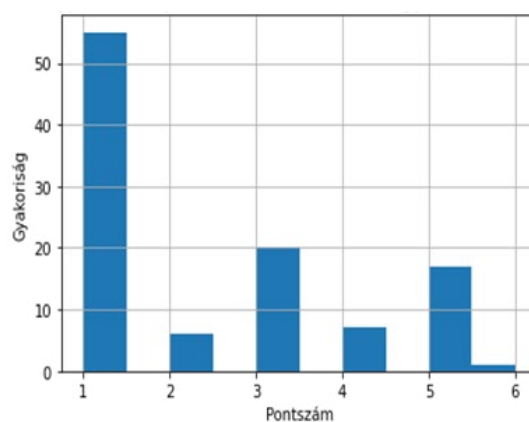
Figure 5: A Possible Step for Eliminating Cognitive Dissonance

The situation is similar to the question "Those situations where I almost win or lose by a hair's breadth remind me that I have to keep going to win again." The majority indicated lower values, but there was also a minority indicating higher values.In conclusion, while the majority disagree with these problematic claims, there is asmall, cause for concerngroup who may be more prone to gambling addiction.

4. Discussion and Conclusions

In our study, we analyzed how misperceptions about loss compensation are revealed by the GBQ questions, based on the work of Tversky and Kahneman [1]. The research showed that players tend to believe that the probability of winning increases after successive losses. However, the probability of winning depends on the rules of the game and does not vary with the results of previous rounds. The "player's error" expresses the players' misconceptions and loss of control during the game.However, this delusion is an essential episode in the loss of control over the game.

The term "omnipotence" implies that players develop a belief system that they can exercise control over the events of the game, even when in fact they have no such control. It covers a delusion whereby players feel as if they can influence the outcome of the game when in reality it is determined by the rules of the game. Omnipotence is relevant because it can contribute to the development and maintenance of gambling addiction. When gamblers mistakenly believe that they can influence the outcome of the game, they are more easily led into cognitive errors and delusions of control. This can increase players' motivation to continue playing and compensate for their losses, even if, they have no effective control over the outcomeof the game.

The research is about the cognitive biases and behaviour of gamblers. It points out that players tend to mistakenly assume that their chances of winning increase after their losses when this is not true. This bias, known as the "player's error," can contribute to addiction.It was revealed that the frequency of the game has a positive correlation with the average level of cognitive distortion. In addition, experiences like "I almost won" reinforce the player's mistake. Gamblers often fall prey to cognitive biases that influence their decisions and behaviour. These biases, such as "I almost won," reinforce the unfounded belief that the odds of winning increase after their losses. According to the document, "almost won" experiences have a significant impact on players' decisions, motivating them to continue playing. This supports our hypothesis that these experiences increase players' willingness to take risks in the hope that they will win next time.The analysis showed that cognitive biases, such as feeling overly confident in the player's ability to influence the results, were significantly correlated with gambling frequency. This supports the hypothesis that players who feel they can influence the outcome of the game are more likely to engage in gambling.

The "Gamblers' Beliefs Questionnaire" study, involving 150 respondents, examined the cognitive biases of gamblers. Based on a detailed review of the analysis, the document thoroughly deals with the relationship between cognitive distortions and gambling behaviour, with particular attention to the following hypotheses:

• **Hypothesis 1:** Gamblers' cognitive biases, especially the "player's error," significantly contribute to the development of gambling addiction. These biases affect the decision-making process of players, increasing their desire to play and continue playing after losses.

• **Hypothesis 2:** "Near-win" experiences and similar near-successes strengthen gamblers' cognitive biases, increasing gambling frequency and the risk of addiction. These experiences create false hope in players, motivating them to continue playing.

• **Hypothesis 3:** There is a positive correlation between the degree of cognitive distortions of gamblers and the frequency of gambling. The more often someone gambles, the more likely they are to have stronger cognitive biases, further exacerbating the problem of addiction.

A better understanding of the mindsets, beliefs, and cognitive biases of gamblers can contribute to the prevention and treatment of addiction. It is important that gambling information and intervention programs take these psychological factors into account [10-18].

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