



MEDICAL UNIVERSITY
"PROF. DR. PARASKEV STOYANOV" – VARNA

FACULTY OF MEDICINE
DEPARTMENT OF PSYCHIATRY AND MEDICAL
PSYCHOLOGY

Petya Dimitrova Petkova
PSYCHOLOGICAL ASPECTS OF GAMBLING BEHAVIOR

SUMMARY
of a dissertation for the award of the educational and scientific degree
"Doctor"

Scientific Supervisor:
Prof. Ivan Alexandrov, PhD in Psychology

VARNA
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Scientific Specialty:

3.2. Psychology (Medical Psychology)

Scientific Jury:

Prof. Valeri Stoilov Stoyanov, PhD

Prof. Mayana Milcheva Mitevska, PhD in Psychology

Prof. Silvia Borisova Tsvetkova, PhD in Clinical Psychology

Prof. Dr. Minko Stoev Hadzhiyski, PhD

Assoc. Prof. Diana Stancheva Dimitrova, PhD in Psychology

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The dissertation contains 148 pages, including 45 tables and 31 figures. The bibliography includes 272 titles, of which 34 are in Cyrillic and 238 in Latin script. The dissertation was reviewed and recommended for defense by the Departmental Council of the Department of Psychiatry and Medical Psychology at the Medical University "Prof. Dr. Paraskev Stoyanov" - Varna.

The defense will take place on at the Medical University of Varna. The defense materials will be available in the library of the Medical University of Varna, as well as on the university's website.

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INTRODUCTION

The problem of gambling is a public health issue, and the investigation of factors leading to its initiation and progressive development continues. Despite the growing interest in gambling etiology, the level of uncertainty and the lack of sufficient research in the field remains high. Over the last decade, Bulgaria has seen a significant increase in the spread and consumption of various forms of gambling.

The escalation of gambling-related problems in our country underscores both the relevance of the topic and its significance today. The impact of problem gambling on society is deepening, and the debate about the causes of its evolution continues to intrigue specialists and researchers.

The present psychological analysis of gambling behavior does not stem from the idea of tracing its evolution to addiction. It is based on the need to identify a characteristic model of gambling behavior, considered not so much in its pathological form but rather before it. This means that the focus will not be primarily on clinical but on subclinical manifestations when examining the phenomenon.

At present, there is still no unified conceptual model of gambling behavior. The prerequisites for its occurrence must be considered long before the behavioral problem related to gambling deepens. The author's idea is linked to the exploration of predictors that are present to some extent in every human individual. In this study, this type of activity (gambling) may be associated with a form of consumer behavior, not just as a degree of burden and viewed as a behavioral addiction. This necessitates, first and foremost, the formulation of a specific model of gambling behavior (GB) based on its specifics, by summarizing the indicators of its formation. The next stage of analysis will be based on comparing it with the criteria definitions in gambling addiction (GA). Despite the abundance of research regarding gambling over the past decades, very little of it focuses on behavioral analysis outside of clinical criteria.

Biopsychosocial models theorize a group of factors in an attempt to reveal their complex interaction. Although these models are based on findings

from empirical research and clinical cases, relatively few studies analyze the in-depth experience and experiences of "gamblers."

Alongside the many fields that study human behavior in the context of its physiological, biological, or social foundation, there is a general understanding of the essence of personality. Within the framework of different psychological theories, behavior is attributed to various characteristics, and the leading factors in determining it are not unambiguous.

Different approaches contrast the examination of behavior, on the one hand, as primarily caused by personality traits, and on the other, as a result primarily of situational factors.

The social-cognitive approach is of particular significance to the current topic, which views behavior as the result of mutual determination by two factors. This model reveals that internal factors (beliefs, expectations) and external factors (consequences) are interdependent and determine behavior. It emphasizes cognitive components and the way behavior and the environment influence the individual.

The main concepts in the science of psychology are related precisely to the study of behavior and behavioral processes, with its primary goal being their prediction and control. Properly defining gambling and distinguishing between different behavioral models are areas that hinder progress in the field. The assumption of similar psychological principles and the tendency to ideologically generalize "gamblers" are significant obstacles. The specificity of a given type of behavior is determined by all acting external and internal factors and the way they interact. It is necessary to consider them in the context of objectively observable but also based on corresponding traditional theories in psychology.

This study aims to present and analyze a theoretical model integrating biological, personality, and cognitive theories in determining behavior. The development of this dissertation represents an attempt to answer many current questions related to this specific type of behavior based on its specifics. A screening methodology for assessing gambling behavior was constructed to achieve this goal. Therefore, the first step is to identify and analyze the factors that will determine a behavior such as gambling.

The goal was to derive the most refined, sensitive parameters whose identification could place the subject of the study at increased risk. This type of tolerant attitude could be interpreted as a potential predisposition. Outside the general framework of severity, the focus of this study is the behavior of individuals who may have never participated, have had a single experience with gambling, or exhibit persistent GB. Based on the identified characteristics, a profile of individuals exhibiting GB in some form, which later poses a risk for problematic behavior and potentially the development of addiction, was composed.

I. Purpose, Objectives, Hypotheses, and Research Model

1. Purpose, Objectives, Hypotheses

Purpose: To construct a screening methodology for assessing gambling behavior.

Objectives:

1. To develop an indicative model of gambling behavior based on its specific characteristics.
2. To identify personal, biological, and psychosocial factors associated with gambling behavior, considering the experience context within the manifested activity.
3. To study existing theories related to psychological functioning and social activity in gambling.
4. To determine the leading factors and the extent to which they correlate with the manifestation of gambling behavior.
5. To conduct a comparative analysis between the predispositions from the author's methodology and other established methods for assessing risk and sensation seeking.
6. To evaluate the factor influence and identify risk factors for the transition from gambling behavior to problematic and pathological gambling.

Hypotheses: The scientific hypotheses that are tested in the course of the research are:

Hypothesis 1: Defining behavior as gambling-related is associated with a readiness to take risks, impulsivity, sensation seeking, emotional intensity, and reduced self-control.

Hypothesis 2: Risk-functioning individuals, as well as those with low behavioral control indicators, are more prone to gambling behavior than impulsive and sensation-seeking individuals.

Hypothesis 3: It is assumed that the factor "attachment model" also influences the formation of gambling behavior.

Hypothesis 4: Males exhibiting a tendency to GB is greater, but not significantly, compared to the general population.

Hypothesis 5: Individuals with the presence of gambling behavior most often have a lower social status and education compared to those without the presence of gambling behavior.

Methods for Conducting Empirical Research:

- 1.1. Gambling Behavior Screening Methodology (MSGGB).
- 1.2. Sensation Seeking Scale (SSS) by Marvin Zuckerman.
- 1.3. Method for Diagnosing Risk Readiness (PSK) by Schubert.
- 1.4. Descriptive statistics.
- 1.5. Correlation analysis.
- 1.6. Factor analysis.
- 1.7. ROC curves (Receiver Operating Characteristic curves) for the variables.

II. Methods for Statistical Data Processing

1. Descriptive statistics - average values, standard deviation, characteristics of numerical series, deviations from mathematical expectation, etc.
2. Correlation analysis of a screening test for assessing gambling behavior; (MSGB): A Methodology for Screening Gambling Behavior.
3. Zuckerman's Need for Strong Experiences and Sensations Research Scale (SSS);
4. Diagnosis of Schubert's degree of readiness for risk (PSK);
5. Correlation analysis of the items from the screening methodology (MSGB);
6. Correlation matrix of Pearson scales;
7. Grouping of items from the methodology regarding personal characteristics;
8. Analysis of ROC curves (graph of operating characteristics); Results expressing the sensitivity-specificity ratio versus the area above the ROC curve:
 - Motivation
 - Sensation seeking
 - Propensity to risk
 - Impulsivity
 - Attitudes and subjective norms
 - Behavioral control
 - Attachment pattern
9. Evaluation of the reliability of the Gambling Behavior Screening Methodology;
10. Factor analysis
11. Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity;

The statistical processing of the results was carried out with the statistical package SPSS – 19 and 22 (form for expert science).

III. Organization, Conduct, and Design of the Empirical Study

The study involved 242 respondents, categorized into three groups:

Group 1: Students from:

- Medical University – Varna
- Varna Free University "Chernorizets Hrabar"

Group 2: Hospitalized individuals and participants in self-help groups:

- Hospitalized at University Hospital "St. Marina," Varna, Psychiatry Clinics – "Clinic of Narcology"
- Adults attending "Anonymous Gamblers" support groups

Group 3: Participants of an online survey:

- Using a link created specifically for the study.

The hybrid approach ensured easy and quick accessibility as well as complete confidentiality. The study was approved by the Ethics Committee for Research at Medical University – Varna, following a review of the two forms of implementation and the provision of a full set of tools, criteria, and assessment indicators.

The profile of the researched persons is compiled based on the following characteristics: age, gender, level of education - general, as well as distribution in two groups/individuals without gambling behavior and individuals with gambling behavior.

The inclusion of hospitalized individuals and participants in anonymous self-help groups fulfilled the need for testing individuals with existing gambling behavior (GB). The sample consisted of self-identified participants in various forms of gambling, with varying degrees of involvement in this behavioral activity, constituting 49 individuals (20.2%) of the total sample.

The research design includes the development of a methodology for the study of gambling behavior - Methodology for the Screening of Gambling Behavior (MSGB)

In accordance with the main criteria for screening methods, namely economy and sensitivity, i.e. a small volume of questions with a high sensitivity to the primary indicativeness of the sought characteristic.

The screening test includes 14 items that, distributed in pairs of questions, correspond to one of the 7 personality predispositions: Motivation, Sensation Seeking, Impulsivity, Risk, Behavioral control, Attitudes and subjective norms, and Attachment model.

1. Brief Description of the Methodology:

The MSGB is primarily designed for mass screening surveys of adults to identify individuals exhibiting gambling behavior who have not yet reached the levels of abuse or dependence. The goal is early identification of individuals at risk of escalation and accompanying financial, psychosocial, and behavioral problems, including deviant behavior.

The term "gambling behavior" implies determining the characteristics and status of an individual based on potential predisposition, attitudes, relationships, and behavior patterns. Based on a comprehensive review of psychological methods and empirical experience in the field, personal predispositions that are most likely to correlate with the specific behavior model were identified. The applied tools were constructed without direct questions about personal experience with gambling.

Besides the main indicator, the methodology's components offer a brief assessment of important aspects such as attitudes, subjective norms, behavioral control, impulsivity, risk-taking, and sensation-seeking. These can be used as additional tools for supporting diagnostic conclusions in individual assessment and counseling. The MSGB also evaluates cognitive and motivational aspects as precursors to gambling behavior (GB).

The goal is a quick and economical way to identify characteristics carrying a potential predisposition to GB.

IV. Results and Discussion

Of the individuals who participated in the study, a total of 242 (after excluding respondents who did not fill out all three forms of testing in full) the minimum age was 18 years and the maximum age was 60 years. The average age of the individuals was 31 years, but the predominant group of persons over 21, due to the anticipated participation of a larger number of young respondents with student status.

The percentage ratio of the examined persons by group and gender shows that women predominate in the group without GB. In the group with the presence of GB, men predominate, which was a completely expected result based on world statistics for the predominant share of men in this population.

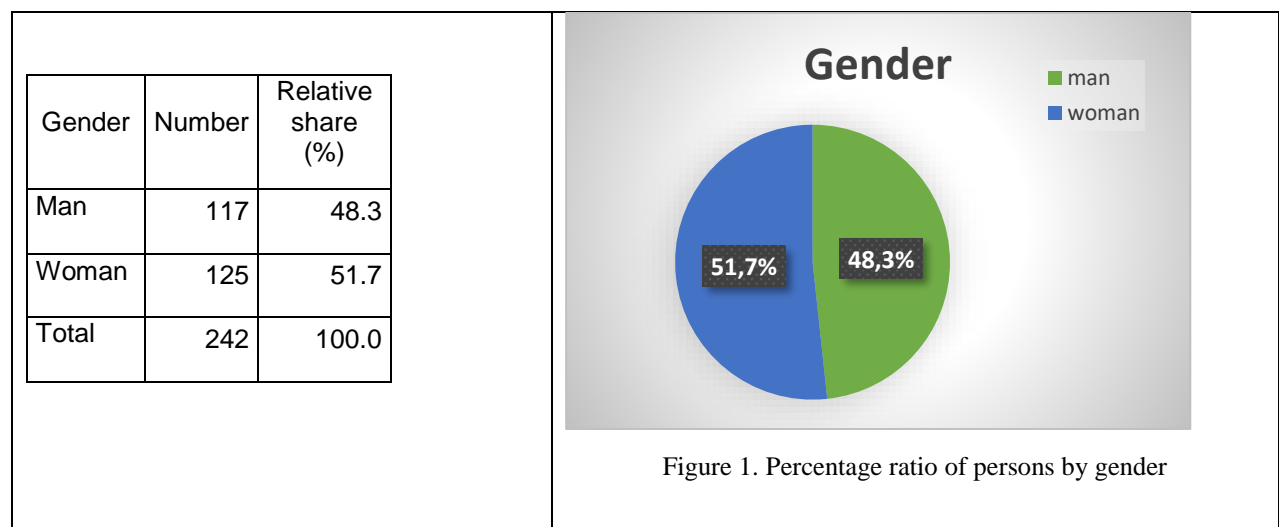
Regarding the individuals from the group without GB, the average age is 32.40 ± 13.49 years. The most common age Mode = is 21 years and the median is 27 years. For individuals from the GB group, the age ranged from 18 to 60 years, with the average age being 30.82 ± 10.63 years. The most common age Mode = is 23 years and the median is 28 years.

Table 1. Percentage ratio by gender

Gender	Frequency	% of total variation	Valid %	Cumulative %
Man	117	48,3	48,3	48,3
Woman	125	51,7	51,7	100,0
Total	242	100,0	100,0	

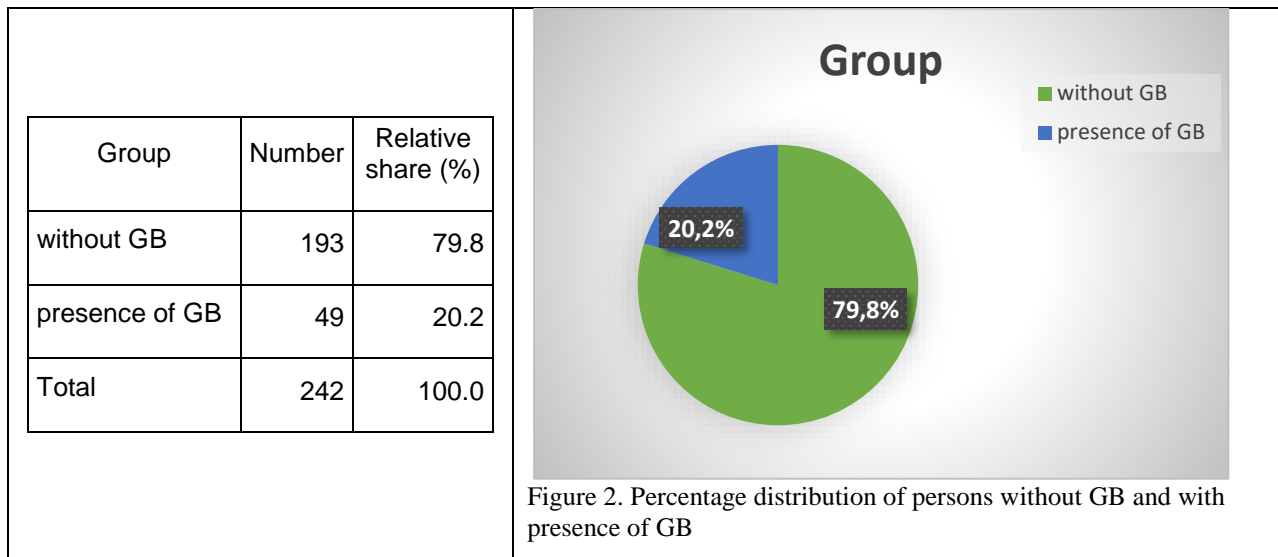
The study included 242 individuals, of which 117 with a relative share of 48.3% were men, and 125, making up 51.7%, were women. For the purpose of equal representativeness, approximately equal numbers of individuals of both sexes were included in the study.

Table 2. Percentage ratio of the examined persons by gender



The distribution of persons by groups - without gambling behavior and with gambling behavior, shows that 193 persons (79.8%) are without GB, and 49 - (20.2%) are with GB.

Table 3. Distribution of the examined persons by group



The percentage ratio of the examined persons by group and gender shows that women predominate in the group without GB - there are 116 of them with a total relative share of 31.8%. Men are 77 and make up 31.8% of the total number of persons. In the group with the presence of GB, men predominate - they are 43 with a total relative share of 17.8%, and women are only 6 with a total relative share of 2.5%

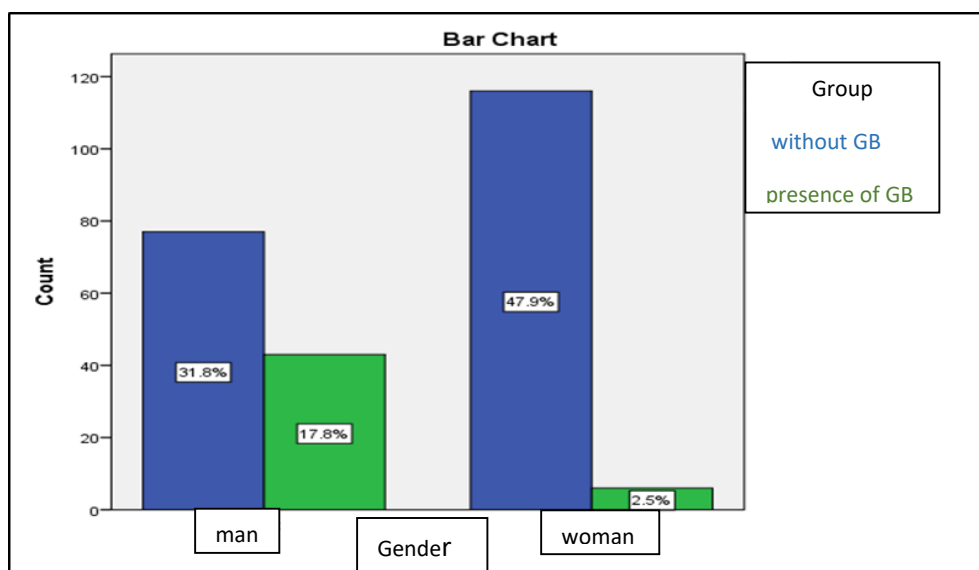
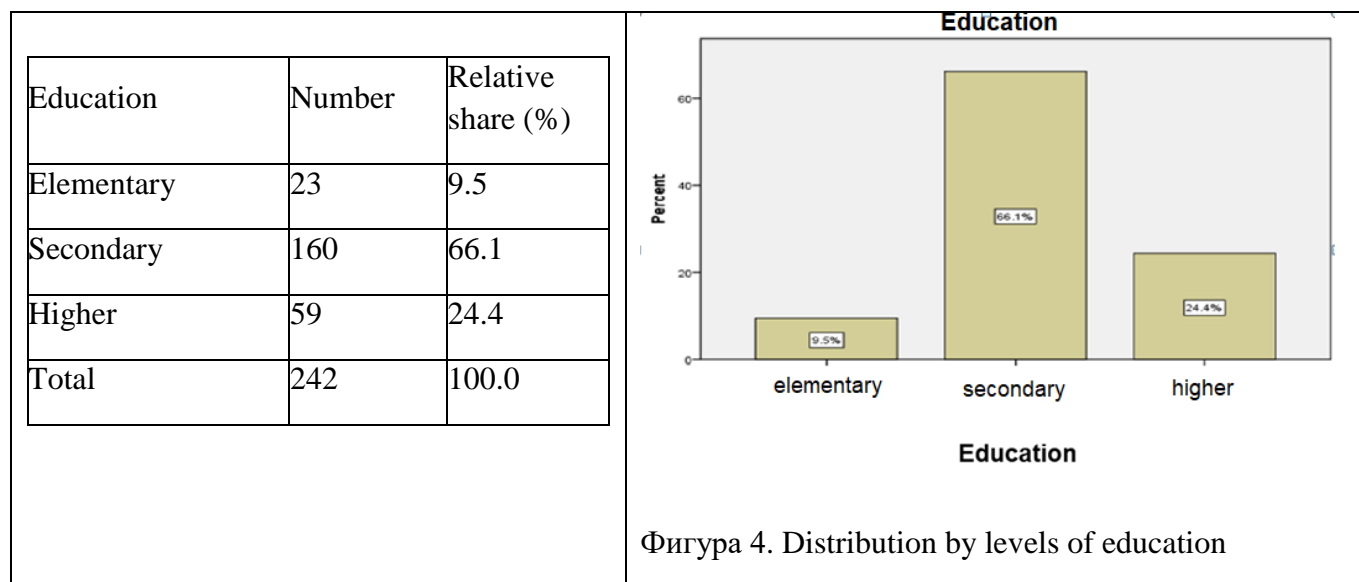


Figure 3. Percentage ratio of the examined persons by group and gender

The persons studied are divided into 3 groups, respectively: primary, secondary, and higher education. The percentage ratio by degrees of education shows that persons with secondary education, which is 160, have the largest relative share of 66.1%. There are 59 persons with a higher education and they make up 24.4%, and those with a primary education are 23 (9.5%).



The following figure reflects the percentage ratio of the surveyed persons by groups and by degrees of education. It can be seen from the results that in the group without GB, there are persons with an average of 54.5% and respectively higher 23%. The share of the group with primary education and the presence of GB is the highest.

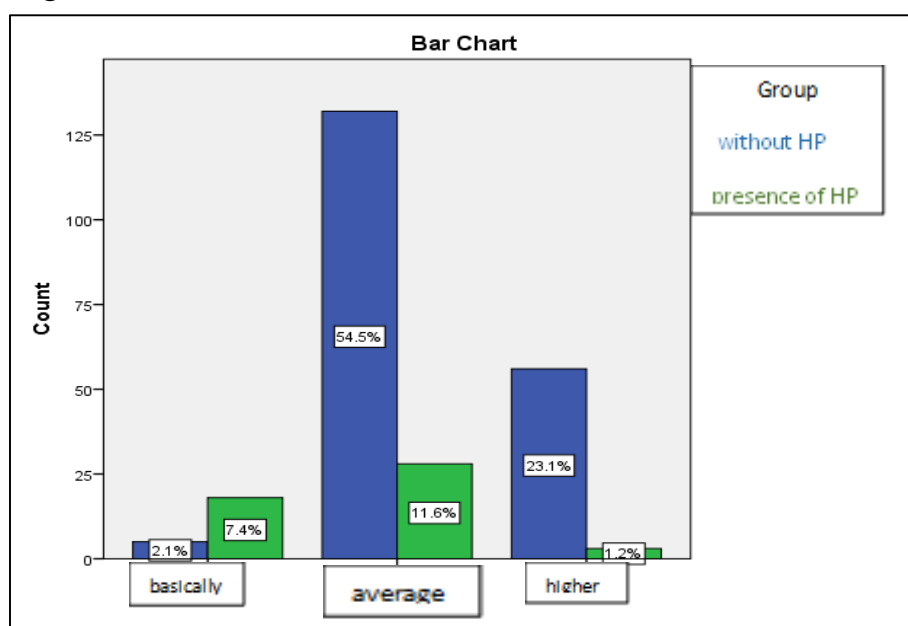


Figure 5. Percentage ratio of the surveyed persons by groups and by degrees of education

The obtained results show that, on this basis, the data of the compared groups differ significantly. Therefore, the hypothesis that individuals with a lower level of education are more prone to gambling behavior can be accepted.

1. Correlation analysis of the Methodology for Screening Gambling Behavior (MSGB).

Validated instruments exist in the literature for the study of related constructs (for the purpose of external validity) related to the scientific problem under study and they can be used directly for the present study.

The correlation analysis is based on the results of the screening methodology proposed by us, as well as a comparison of the 2 selected test methods:

1.1. Zuckerman's Need for Seeking Strong Experiences and Sensations Scale (SSS)

1.2. Schubert's risk appetite (PSK) diagnosis

The correlation analysis made between the proposed variant of the screening methodology and two other methodologies is necessary to objectify the existing relationships between the studied constructs. For this purpose, validated and standardized methods for our country were used.

Table 5. Correlation analysis of the items from the screening methodology (MSGB)

	Screening methodology	Zuckerman Methodology	Schubert method
Screening test	Pearson Correlation	1	,658**
	Sig. (2-tailed)		,000
	N	242	242
Zuckerman	Pearson Correlation	,658**	1
	Sig. (2-tailed)	,000	,000
	N	242	242
Schubert	Pearson Correlation	,619**	,690**
	Sig. (2-tailed)	,000	,000
	N	242	242

** . The correlation is significant at the 0.01 level (two-tailed).

* . The correlation is significant at the 0.05 level (two-tailed).

The first methodology was proposed by Marvin Zuckerman. The methodology is used to examine the level of needs in seeking strong experiences, unexpected situations, and new sensations in adolescents and adults. The scale contains 16 questions.

This personality trait was initially based on the theory of optimal levels of arousal, as an explanation for individual differences in the interaction between the intensity of sensory stimulation and arousal. The Sensation Seeking Scales (SSS by Zuckerman) evolved from Form II to Form VI. Subsequently, Zuckerman and colleagues developed a model of five major personality factors, one of which is called Impulsive Sensation Seeking (ImpSS).

The first version used in this study is justified by the sought properties of the different sensitivity scales included in it. The newer elements of the Sensation Seeking Scale (SSS) focus on a general mechanism for controlling the intensity of stimulation, extraversion, and sensation-seeking. This personality trait is identified with sensation involving activities with a significant physical risk, as seen in the thrill and adventure subscale of the general sensation-seeking scale (Zuckerman & Aluja, 2015). Since in the present study the category "Risk" is examined separately, based on another tool, the basic version of the scale was used, specifically the one that can predict the individual's response to different types of sensory deprivation. It consists of 16 items.

The second methodology consists of 25 statements related to the degree of personal readiness to take risks - "PSK by Schubert" (by A. M. Schubert). It reflects the readiness to engage in risky actions with uncertain outcomes.

The construct is understood as a spontaneous action with the hope for a favorable outcome or as a potential danger, with the action being performed under conditions of uncertainty. High readiness to take risks is accompanied by low motivation to avoid failures (protection).

Table 6. Correlation matrix of Pearson scales

		Motivation	Sensation seeking	Risk	Impulse	Attitudes and subjective norms	Behavioral control	Attachment Model	Zuckerman	Schubert
Motivation	Pearson Correlation	1	,517**	,476**	,371**	,396**	,340**	,291**	,487**	,474**
	Sig. (2-tailed)		,000	,000	,000	,000	,000	,000	,000	,000
Sensation seeking	Pearson Correlation	,517**	1	,409**	,362**	,365**	,412**	,252**	,584**	,578**
	Sig. (2-tailed)	,000		,000	,000	,000	,000	,000	,000	,000
Risk	Pearson Correlation	,476**	,409**	1	,373**	,335**	,230**	,344**	,460**	,488**
	Sig. (2-tailed)	,000	,000		,000	,000	,000	,000	,000	,000
Impulse	Pearson Correlation	,371**	,362**	,373**	1	,243**	,246**	,382**	,334**	,319**
	Sig. (2-tailed)	,000	,000	,000		,000	,000	,000	,000	,000
Attitudes and subjective norms	Pearson Correlation	,396**	,365**	,335**	,243**	1	,405**	,108	,441**	,407**
	Sig. (2-tailed)	,000	,000	,000	,000		,000	,092	,000	,000
Behavioral control	Pearson Correlation	,340**	,412**	,230**	,246**	,405**	1	,160*	,498**	,388**
	Sig. (2-tailed)	,000	,000	,000	,000	,000		,013	,000	,000
Attachment Model	Pearson Correlation	,291**	,252**	,344**	,382**	,108	,160*	1	,225**	,203**
	Sig. (2-tailed)	,000	,000	,000	,000	,092	,013		,000	,002
Zuckerman	Pearson Correlation	,487**	,584**	,460**	,334**	,441**	,498**	,225**	1	,690**
	Sig. (2-tailed)	,000	,000	,000	,000	,000	,000	,000		,000
Schubert	Pearson Correlation	,474**	,578**	,488**	,319**	,407**	,388**	,203**	,690**	1
	Sig. (2-tailed)	,000	,000	,000	,000	,000	,000	,002	,000	

** . The correlation is significant at the 0.01 level (two-tailed).

* . The correlation is significant at the 0.05 level (two-tailed).

The results of the external validity check show a strong consistency between the methodologies, namely the screening for gambling behavior, the need for

sensation seeking and experiences (by M. Zuckerman), and the degree of readiness to take risks by Schubert (PSK).

This gives us the perspective to think that the Gambling Behavior Screening Methodology (MSGb) possesses the necessary content parameters and has relatively high validity. The correlations presented in the matrix highlight several significant interdependencies, namely:

The highest correlation ($r = 0.690^{**}$) is observed between the selected scales regarding external validity, i.e., the correlation between Zuckerman's scale and Schubert's scale. The results provide grounds for significant relationships between the investigated constructs, as well as a good perspective for the development and validation of the proposed methodology.

The next most significant correlation (coefficient $r = 0.584^{**}$) reflects the relationship between the "Sensation Seeking" scale from the screening test and Zuckerman's methodology, i.e., the "Sensation Seeking and Experiences Scale," which supports the idea of high consistency between the selected items comprising the scale and Zuckerman's established methodology.

A correlation of similar significance is observed between Schubert's scale and the "Sensation Seeking" scale from the screening test, specifically $r = 0.578^{**}$, which is also justified by the fact that this construct is most often associated with risky sensation seeking, and the high consistency between them was expected.

The correlation between "Behavioral Control" and Zuckerman's Sensation Seeking scale reflects a significance level with a coefficient of $r = 0.498^{**}$. The positive correlation here can be viewed through the strong interrelationship between the individual's drive for sensation seeking and reduced behavioral control.

The levels of significance between the "Risk" scale from the screening test and Schubert's scale have a coefficient of $r = 0.488^{**}$, and with Zuckerman's scale, it is 0.460^{**} , which also shows a good correlation between the measured constructs from the two methodologies. This indicates that Schubert's risk measurement scale aligns very well with the items proposed in the author's methodology regarding the role of the predisposition "readiness to take risks."

The "Motivation" scale correlates with Zuckerman's sensation seeking scale with a coefficient of $r = 0.487^{**}$, and with Schubert's scale, the coefficient for the same construct is 0.474^{**} . The data reflect very good coherence between the stimulus material in the three proposed scales for investigation.

The "Attitudes and Subjective Norms" scale has a coefficient of $r = 0.441^{**}$, which also shows a relatively high level of correlation with Zuckerman's scale. The data show close values ($r = 0.407^{**}$) of interference connections with Schubert's scale.

The "Impulsivity" construct is relatively less pronounced compared to the correlation relationships of other indicators, but it notably shows the strongest correlations ($r = 0.334^{**}$) with Zuckerman's scale, which is also an expected result due to the broad empirical connection between these two constructs.

The weakest relationships between the individual elements in the correlation matrix ($r = 0.203^{**}$; 0.225^{**}) are those between the "Attachment Style" from the author's screening and the other two scales—the risk scale of Schubert and Zuckerman's sensation-seeking scale. This may be due to the specificity of the examined quality and the relatively small sample size ($N = 242$). Regarding the first point, the specificity of this type of social relationship relative to gambling behavior (GB) and the limitations of individual classification models are considered. Nevertheless, the correlation coefficient is deemed significant according to statistical and psychometric criteria.

Table 7. Screening methodology - positive responses

№	Questions	Group	YES	Rather YES	Rather NO	NO
V1.	Do you believe that luck is the basis of success?	1 without GB	33 (17.1%)	72 (37.3%)	41 (21.2%)	47 (24.4%)
		2 with GB	36 (73.5%)	9 (18.4%)	1 (2.0%)	3 (6.1%)
V3.	Do you think the statement: "He who does not risk - does not win" is true?	1 without GB	75 (38.9%)	85 (44.0%)	22 (11.4%)	11 (5.7%)
		2 with GB	43 (87.8%)	6 (12.2%)		
V4.	Do you often surprise others with your quick reaction in certain situations?	1 without GB	54 (28.0%)	74 (38.3%)	48 (24.9%)	17 (8.8%)
		2 with GB	21 (42.9%)	23 (46.9%)	5 (10.2%)	
V5.	Do you love games and competitions because of the emotion and adrenaline they bring?	1 without GB	59 (30.6%)	70 (36.3%)	35 (18.1%)	29 (15.0%)
		2 with GB	32 (65.3%)	15 (30.6%)	2 (4.1%)	
V6.	Do you often feel misunderstood by loved ones or those around you?	1 without GB	34 (17.6%)	45 (23.3%)	63 (32.6%)	51 (26.4%)
		2 with GB	11 (22.4%)	33 (67.3%)	4 (8.2%)	1 (2.0%)

V8	Have you changed planned activities because of another spontaneous idea?	1 without GB	57 (29.5%)	46 (23.8%)	69 (35.8%)	21 (10.9%)
		2 with GB	19 (38.8%)	28 (57.1%)	2 (4.1%)	
V9.	Your friend shares about winning a large amount on a bet in a game. Do you have a desire for such an experience?	1 without GB	24 (12.4%)	42 (21.8%)	61 (31.5%)	66 (34.2%)
		2 c GB	32 (65.3%)	13 (26.5%)	3 (6.1%)	1 (2.0%)
V10.	Do you often react impulsively and later regret it?	1 without GB	53 (27.5%)	75 (38.9%)	40 (20.7%)	25 (13.0%)
		2 with GB	43 (87.8%)	5 (10.2%)	1 (2.0%)	
V12.	Would you go to extremes to achieve your desired goal?	1 without GB	29 (15.0%)	60 (31.1%)	69 (35.8%)	35 (18.1%)
		2 with GB	26 (53.1%)	22 (44.9%)	1 (2.0%)	
V13.	Are you easily influenced by the people around you?	1 without GB	16 (8.3%)	44 (22.8%)	71 (36.8%)	62 (32.1%)
		2 with GB	7 (14.3%)	17 (34.7%)	21 (42.9%)	4 (8.2%)
V14.	Do you encounter difficulties in complying with the social rules and norms required of you?	1 without GB	10 (5.2%)	24 (12.45)	69 (35.8%)	90 (46.6%)
		2 with GB	13 (26.5%)	31 (63.3%)	5 (10.2%)	

Table 8. Screening test - reversible responses

№	Въпроси	Group	Yes -1	Rather YES -2	Rather NO -3	No -4
RV2.	Can you describe yourself as a cautious and balanced person?	1 without GB	78 (40.4%)	94 (48.7%)	17 (8.8%)	4 (2.1%)
		2 with GB	3 (6.1%)	14 (28.6%)	21 (42.9%)	11 (22.4%)
RV7	Do you strive for circumstances to be completely under your control?	1 without GB	57 (29.5%)	80 (41.5%)	36 (18.7%)	20 (10.4%)
		2 with GB	2 (4.1%)	18 (36.7%)	21 (42.9%)	8 (16.3%)
RV11	Do you need stability and security to feel comfortable?	1 without GB	95 (49.2%)	63 (32.6%)	27 (14.0%)	8 (4.1%)
		2 with GB	2 (4.1%)	9 (18.4%)	25 (51.0%)	13 (26.5%)

2. Results of the Gambling Behavior Screening Methodology (MSGB)

The screening test for examining gambling behavior includes a total of 14 questions (from V1 to V14), with answers represented on the following 4-point Likert scale:

1 – "No," 2 – "Rather No," 3 – "Rather Yes," and 4 – "Yes."

The answers to questions V2, V7, and V11 have been transformed into reverse scoring as follows: 1 – "Yes," 2 – "Rather Yes," 3 – "Rather No," and 4 – "No."

The resulting distributions in terms of the number of individuals and relative percentages for each group separately are presented in the following table.

In the proposed screening test, consisting of 14 questions/items, 7 personality dispositions were identified that characterize the examined individuals to a certain extent. Each of these was represented by two of the items in the screening test.

The items are grouped according to the following personality characteristics:

- V4 and V9 – motivation;
- RV2 and V5 – sensation Seeking;
- V3 and V12 – risk-taking propensity;
- V8 and V10 – impulsiveness;
- V1 and RV11 – attitudes and subjective norms;
- RV7 and V14 – behavioral control;
- V6 and V13 – attachment model.

2.1 To examine **motivation**, the following 2 questions are considered:

V4 "Do you often surprise others with your quick reaction in certain situations?"

V9 "Your friend shares about winning a large amount from a bet in a game. Do you have a desire for a similar experience?"

The results reflect that in the group with gambling behavior, 23 individuals (46.9% of this group) answered positively with "Rather Yes," and another 21 (42.9% of the same group) answered "Yes." For the group without gambling behavior, the relative percentages for the same answers are lower – 74 (38.3%) and 54 (28.0%), respectively.

2.2 Sensation seeking is determined by the answers to the following 2 questions:

RV2 "Can you consider yourself a cautious and balanced person?"

V5 "Do you enjoy games and competitions for the excitement and adrenaline they provide?"

The results showed that in the group with gambling behavior, 21 individuals (42.9%) answered "Rather No," and another 14 (28.6%) answered "Rather Yes." In the group without gambling behavior, positive responses predominated – 94 individuals (48.7%) answered "Rather Yes," and another 78 (40.4% of the same group) answered "Yes."

2.3 Propensity to take risk

This personality characteristic is determined by the following items:

V3 "Do you believe the statement: 'Who does not risk, does not win'?"

V12 "Would you go to extremes to achieve your desired goal?"

The majority of the group with gambling behavior answered "Yes" to the statement that those who do not risk do not win. They are 43 individuals, constituting 87.8% of this group, while another 6 individuals (12.2%) answered "Rather Yes."

From the group without gambling behavior, 85 individuals (44.0%) answered "Rather Yes," and another 75 (38.9%) answered "Yes." The remaining individuals gave negative answers.

2.4 Impulsivity is determined by the responses to the following items:

V8 "Have you changed planned activities because of another spontaneous idea?"

V10 "Do you often find yourself reacting impulsively, only to regret it later?"

The distribution shows that individuals in the gambling behavior group give positive responses to V8, while nearly half of the individuals

without gambling behavior give negative responses. Regarding V10, whether they often react impulsively, 43 individuals (87.8%) in the gambling behavior group answered "Yes," and 5 others (10.2%) answered "Rather Yes." In the group without gambling behavior, one-third of the individuals gave negative responses. Of the remaining individuals, 75 (38.9%) answered "Rather Yes," and 53 (27.5%) answered "Yes."

2.5 Attitudes and subjective norms are assessed with the following 2 items:

V1 "Do you believe that luck is the foundation of success?"

RV11 "Do you need stability and security to feel comfortable?"

Regarding V1, whether they believe that luck is the foundation of success, the majority of 36 individuals (73.5%) with gambling behavior gave a positive response of "Yes," and 9 (18.4%) answered "Rather Yes." Negative responses total 4 and make up 8.1% of this group. Among individuals without gambling behavior, negative responses account for 45.6%. Positive responses are slightly higher—72 (37.3%) answered "Rather Yes," and 33 (17.1%) answered "Yes."

Regarding the question of whether they need stability and security to feel comfortable, the majority of individuals with gambling behavior gave a negative response. This includes 25 individuals (51.0%) who answered "Rather No" and 13 (26.5%) who answered "No." Positive responses were given by 11 individuals, making up 22.5% of this group. In the group without gambling behavior, nearly half—95 (49.2%)—answered "Yes." Additionally, 63 individuals (32.6%) answered "Rather Yes." Negative responses were given by 35 individuals, comprising 18.1% of this group.

2.6 Behavioral control is determined based on the following items:

RV7 "Do you strive for circumstances to be entirely under your control?"

V14 "Do you encounter difficulties in adhering to the social rules and norms expected of you?"

The results show that individuals with gambling behavior preferred to answer negatively regarding the desire for circumstances to be entirely under control. Of these, 21 (42.9%) answered "Rather No," and 8 (16.3%) answered "No." In contrast, the majority of individuals without gambling behavior gave positive responses. 80 (41.1%) answered "Rather Yes," and

57 (29.5%) answered “Yes.” Negative responses were given by 56 individuals, comprising 29.1% of this group.

Regarding whether they encounter difficulties in adhering to the social rules and norms expected of them, individuals with gambling behavior preferred to answer positively. Of these, 31 (63.3%) answered “Rather Yes,” and 13 (26.5%) answered “Yes.”

The majority of individuals without gambling behavior answered that they do not encounter such difficulties. Of these, 90 (46.6%) answered “No,” and 69 (35.8%) answered “Rather No.” Only 34 individuals, making up 17.6%, indicated that they encounter such difficulties.

2.7 Regarding the study of **attachment models**, the responses to the following two items are analyzed:

V6 “Do you often feel misunderstood by close ones or those around you?”

V13 “Are you easily influenced by the people around you?”

In the group with gambling behavior, the majority of responses are positive, whereas in the group without gambling behavior, negative responses are more common. In the group with gambling behavior, 67.3% answered “Rather Yes,” and 22.4% answered “Yes,” while in the group without gambling behavior, 26.4% answered “No,” and 32.6% answered “Rather No.”

Regarding the question of whether they are easily influenced by the people around them, responses in both groups are not one-sided. In the group with gambling behavior, 21 (42.9%) answered “Rather No,” and another 17 (34.7%) answered “Rather Yes.” In the group without gambling behavior, 71 (36.8%) answered “Rather No,” and another 62 (32.1%) answered “No.” Positive responses were given by a total of 60 individuals, comprising 31.1%.

Note: Due to space limitations in the abstract, the tables of the extracted data are omitted; the results are described in the dissertation work.

3. Analysis of ROC Curves (Working Characteristics Graph)

ROC analysis for presenting results and evaluating the effectiveness of classification.

The method is based on constructing ROC curves that work with relative performance indicators. The indicator “Sensitivity” or “Sensitiveness”

determines the proportion of positive cases that were correctly classified by the model, while “Specificity” is the proportion of negative cases that were correctly classified by the model.

The following figure shows the distribution of curves representing the 7 personality characteristics (predispositions) relative to the sensitivity and specificity indicators.

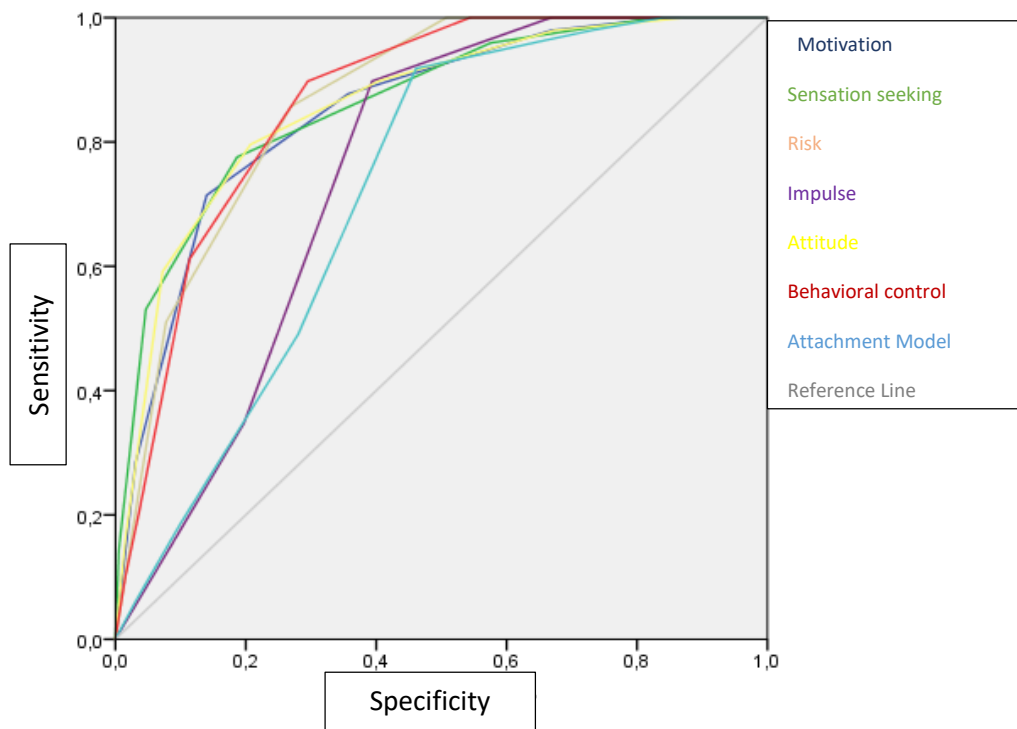


Figure 6. Indicators of sensitivity and specificity.

The test results for the variables Motivation, Sensation Seeking, Risk, Impulsivity, Attitudes, Behavioral Control, and Attachment Model show very strong connections between the two groups—the positive and negative actual states, i.e., the group without gambling problems and the group with gambling problems. Each of the variables has values close to optimal, indicating that these constructs are highly sensitive to the indicators in behavior between the studied groups (Table 9).

Table 9. Results expressing the sensitivity-specificity ratio versus the area above the ROC curve.

Variables	Result
Motivation	,850
Sensation seeking	,862
Risk	,864
Impulse	,749
Attitude	,860
Behavioral control	,865
Attachment Model	,722

4. Calculation of Reliability for the MSGB Scale

The internal consistency of the scale (14 items) was assessed by calculating Cronbach's alpha.

Cronbach's alpha is a method for evaluating reliability by comparing the amount of shared variance or covariance among the multiple items that make up a given instrument with the amount of total variance. Cronbach's alpha was based on standardized items (Cronbach's Alpha Based on Standardized Items) due to significant variance between means and variances for the questions forming the scale: $\alpha = 0.764$.

The alpha coefficient α is above 0.70, which indicates that the scale is reliable with the tested sample.

Table 10. Cronbach's Alpha value of the MSGB scale

Cronbach's alpha		
Cronbach's alpha	Cronbach's alpha based on standardized items	Number of items
.764	.764	14

The table above shows the reliability statistics of the Transparency variable ($\alpha = 0.764$), after rotation of the variables (reverse coded in SPSS).

5. Factor analysis

The application of factor analysis in the present study aims to transform a set of correlated data (14 components) into a new set with uncorrelated artificial variables - factors that explain as much of the total variation of the source data as

possible. In this way, a reduction in the number of initial variables will be achieved by grouping those that correlate with each other into a common factor.

Table 11. Description of the parameters included in the factor analysis

Component	Value	Standard Deviation	Number of analyses
1	2,6942	1,10707	242
2	1,9545	,86543	242
3	3,2893	,81925	242
4	2,9587	,91003	242
5	2,9752	1,00590	242
6	2,5000	1,02763	242
7	2,2025	,93587	242
8	2,8471	,96267	242
9	2,4215	1,12867	242
10	3,3512	1,09155	242
11	1,9959	,98325	242
12	2,6529	,99551	242
13	2,1818	,93791	242
14	2,0331	,99320	242

The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity present the results of the factor analysis assumptions tests.

Table 14. Component transformation matrix

Kaiser-Meyer-Olkin test measurement of adequacy	,807
Bartlett's test of sphericity	667,048
Chi-square	
Degree of freedom/df	91
A significant probability /Sig.	,000

The method used to measure sample adequacy is the Kaiser-Meyer-Olkin (KMO) and Bartlett's test of sphericity coefficients, which indicates whether the number of variables for each factor is sufficient, i.e., whether the variables are correlated strongly enough to begin factor analysis.

The value obtained from the Kaiser-Meyer-Olkin test is 0.807, which falls within the very good to excellent range (results between 0.70 and 0.80 are considered good, while between 0.80 and 0.90 are considered excellent). This

indicates a high level of significance and that the distribution of values is adequate for conducting factor analysis.

Table 13. Principal components analysis (Extraction Method: Principal Component Analysis)

Component	Initial values			Extraction sums of squared loadings			Rotational sums of squared loadings		
	Total	% of deviation	Comulative %	Total	% of deviation	Comulative %	Total	% of deviation	Comulative %
1	3,778	26,983	26,983	3,778	26,983	26,983	2,382	17,011	17,011
2	1,587	11,333	38,317	1,587	11,333	38,317	1,930	13,784	30,795
3	1,254	8,956	47,273	1,254	8,956	47,273	1,833	13,093	43,889
4	1,038	7,413	54,686	1,038	7,413	54,686	1,512	10,797	54,686
5	,956	6,832	61,518						
6	,782	5,588	67,105						
7	,730	5,215	72,321						
8	,701	5,009	77,330						
9	,660	4,713	82,043						
10	,606	4,326	86,369						
11	,574	4,100	90,470						
12	,501	3,580	94,049						
13	,463	3,308	97,358						
14	,370	2,642	100,000						

The Principal Component Analysis (PCA) method applied operates under the initial assumption that all variances are common and shows how much of the variance of a variable can be explained by the factor. The measure for explaining variance is based on the commonly accepted criterion (Eigenvalue greater than 1). The results of the total variance show that the significance of the variance concerning the 14 analyzed variables defines 4 factors. After extracting all factors, it is noticeable that the first value, 3.778, explains the highest eigenvalue of variance.

Table 14. Component transformation matrix

Component	1	2	3	4
1	,647	,561	,366	,365
2	-,512	-,026	,854	,091
3	-,501	,361	-,364	,697
4	-,262	,744	-,070	-,610

The component plot after rotation provides a visual representation of the factor loadings in the coordinate system. Variables that form the same factor are grouped into a single cluster. The table clearly shows that the variables analyzed through factor analysis form four factors. It also reflects which variable pertains to which factor. The extraction method used is Principal Component Analysis, with a rotation method: Varimax with Kaiser normalization.

Based on the theoretical framework of the Gambling Behavior Screening Methodology, the "Scree Plot" provides the eigenvalues for each of the components.

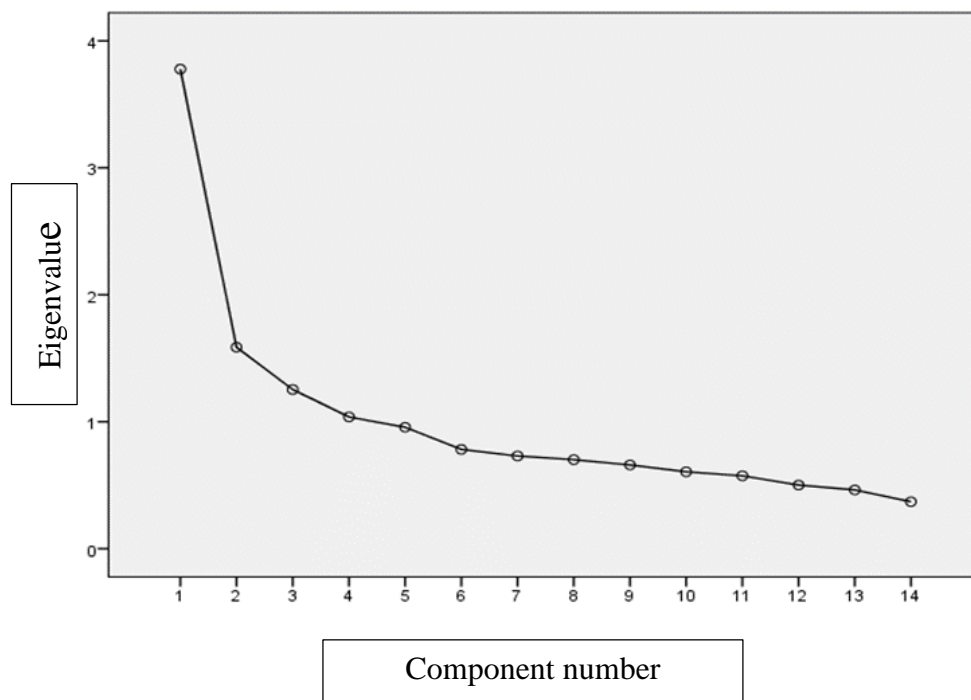


Figure 7. Scree Plot

After extracting all the factors, the first factor (attitudes and subjective norms) explains the highest eigenvalue of the variance.

By applying the Principal Component Analysis method, the variance of these variables explains the factor to the greatest extent, especially in the observed rotation. Thus, the remaining elements, through regrouping, can prospectively serve as a foundation for future research projects in the field.

The research methodology was integrated into the applied scientific process during the analysis of the results obtained from the selected quantitative and qualitative methods. While the quantitative method established predefined parameters for the study before its conduct, the qualitative method provided interpretations of the parameters themselves.

SUMMARY OF RESULTS

The present study included 242 respondents. A hybrid approach was chosen (face-to-face and online surveys).

Among the participants, the minimum age is 18 years, and the maximum age is 60 years. The average age of the participants is 31 years, with the majority being 21 years old, due to the inclusion of a higher number of young respondents, primarily students. The inclusion of hospitalized individuals and participants in anonymous support groups met the need for tested individuals with gambling behavior (GB) - those who self-identified as engaged in various forms of gambling and with varying degrees of involvement, totaling 49 individuals (20.2%) of the overall sample.

The percentage distribution of the respondents by group and gender shows that women predominate in the group without GB. In contrast, men predominate in the GB group, which was an expected result based on global statistics showing a higher proportion of men within this population.

Despite this, an authorial assumption was that the proportion of women among the respondents would be significantly higher than the results suggest. This assumption was based on data from the National Helpline for Drugs, Alcohol, and Gambling over the past few years, indicating a significant increase in women's participation in various forms of gambling seeking help. The results objectively reflect still significant differences between the groups in the sample.

The present study confirms the hypothesis that **male participants are more prone to gambling behavior compared to the female respondents.**

The percentage ratio of the examined persons by groups and degrees of education clearly shows that in the group without GB the proportion of graduates is significantly higher.

The result of respondents with basic education in the group with presence of GB is inversely proportional. This fact objectively indicates **that persons with a lower level of education are more inclined to gambling behavior**, which also confirms the author's hypothesis.

The correlation analysis made between the proposed version of the screening methodology and two other methodologies was **necessary to objectify the existing relationships between the studied constructs**. Existing validated instruments can be used directly for research purposes. Validated and standardized methodologies were used:

Marvin Zuckerman's Sensation Seeking Scale (SSS).

The Schubert risk readiness (PSK) diagnostic methodology.

Within the framework of the present study, correlations are observed between all variables, which allows logically justified statements to be made about the relationships between them.

Through the Pearson correlation coefficient used, significant correlations were found between all the quantities in the study.

The results of the external validity test showed a **strong agreement between the methods**, namely Screening for Gambling Behavior, the Need for Seeking Strong Experiences and Sensations (M. Zuckerman), and Schubert Risk Appetite Scale (PSK).

This gives us the perspective to think that the Gambling Behavior Screening Methodology (MSGB) possesses the necessary content parameters and has relatively high validity.

The highest correlation dependence is reported between the selected scales - regarding the external validity, i.e. the correlation between the Zukerma

scale and the Schubert scale. There are similar results in the correlation between the Schubert scale and the Sensation Seeking scale from a screening test, as well as from the author's methodology and Zuckerman's methodology. This reflects the high consistency between the selected items making up the scale and the methodology approved by Zuckerman. Following are significant correlations from "Behavioral control", "Risk" "Motivation" "Attitudes and subjective norms" and the construct "Impulsivity" (as seen in Table no. 6).

The last item reflecting a weaker relationship was between the "Attachment Model" of the author's screening, respectively, with the other two scales - Schubert's Risk Scale and Zuckerman's Sensation Seeking. However, the correlation coefficient is considered significant, according to statistical and psychometric criteria, which supports the hypothesis that: **“The attachment model” construct influences the gambling behavior model.**

The determination of the factor structure was carried out through sensitivity and specificity analysis (ROC curve), with which to confirm the screening value of the author's methodology, compared to the other two research tools.

The analysis of work characteristics was made based on the test results of the variables Motivation, Sensation Seeking, Risk, Impulsivity, Attitudes, Behavioral Control and Model Attachment show. They showed very strong relationships between the two groups - the positive and the negative actual state, i.e. the group without GB and the group with presence of GB. Each variable has values close to optimal, which confirms the initial hypothesis **that these constructs are highly sensitive to content parameters** (behavioral indicators) between groups.

The observed results suggest that these variables can be a useful screening tool and have a good differentiating influence.

The Reliability Analysis procedure was performed using IBM SPSS Statistics.

The internal consistency of the scale (14 items) was assessed by calculating the Cronbach's alpha index. It was based on the standardized total of 14 items: $\alpha = 0.764$ **The Cronbach-Alpha coefficient is $0.764 > 0.7$** , therefore forming a reliable general scale for measuring gambling behavior.

Regarding the factor analysis performed, the values obtained from the Kayse-Meier-Olkin test are very good to excellent. The "Scree Plot" dot analysis determining the eigenvalues for each of the components showed that after the

fourth component, the difference between the eigenvalues decreases. 4 factors have a greater value than the weight of an individual item (table №14).).

These are grouped, regarding the manifestation of the following personal characteristics: Attitudes and subjective norms, Sensation seeking, Risk and Motivation. After extracting all factors, the first dimension **“attitudes and subjective norms”** explained the highest eigenvalue of the variance.

By applying the method of principal components, the variance of these variables explains the factor to the highest degree and in the observed rotation. Thus, the rest of the elements, through regrouping, can serve prospectively to upgrade future research projects in the field.

Scientific studies and meta-analyses carried out to date in the field of GB and GA suggested that the variations in the increase and decrease of the impulsivity and sensation-seeking factor are mainly explained from the point of view of a general mechanism for controlling the intensity of the stimulus. Research in the field focuses primarily on the impact of impulsivity and sensation-seeking as major factors influencing gambling behavior.

A comprehensive review shows that such a hypothetical relationship leads to ambiguous findings in the analysis of empirical research results. In the present scientific study, it was established that the factor "Attitudes and subjective norms", followed by the factors "Risk" and "Seeking of sensations" lead to the formation of GB. In contrast, the factor "Behavioral control" has a strong influence in generalizing the problem with gambling - the so-called. problem gambling and the development of GA.

CONCLUSIONS

The results obtained from the conducted empirical research show that:

1. The test methods included in the made battery - Gambling Behavior Screening Methodology (MSGB), Marvin Zuckerman's Sensation Seeking Scale (SSS), and Schubert Risk Readiness Diagnostic Methodology (PSK) are interrelated, show high sensitivity, and can be used to study GB.
2. The results of the external validity check show a strong consistency between the methodologies, i.e. the Gambling Behavior Screening Methodology (MSGB) has the necessary content parameters and has relatively high validity.
3. In the correlation analysis, each of the variables has values close to the optimal ones, which confirms the initial hypothesis that these constructs are highly sensitive to content parameters (behavioral indicators) between groups.
4. After extracting all the factors grouped regarding the manifested personal characteristics, the most significant in the formation of GB are: "Attitudes and subjective norms", "Sensation seeking", "Risk" and "Motivation". Based on the results, it can be concluded that the main factor in the formation of this type of behavior is the attitudes and beliefs related to gambling, as well as the subjective norms based on personal experience.
5. The "Sensation Seeking" construct and the resulting tendency to take risks are among the leading motives in the manifestation of this type of behavior due to the need to satisfy the need for emotions.
6. The admission to increase the height of the representatives of the female gender exhibiting GB, i.e. melting distances in relation to the representativeness of men in this segment, was not confirmed. The results of the research show still large differences between the two groups. The representatives of the male sex are significantly more inclined to gambling behavior, compared to the studied women.
7. Persons with a lower level of education are more inclined to GB, respectively, those with a higher education show significantly less modesty towards this type of activity. This reflects a higher financial culture and the ability to make sensible decisions, maintain healthy spending habits, rationality of budget risks and well-being.
8. The age distribution in the study shows the average age of individuals with GB is approximately 31 years. But the formation of GB most often begins before reaching adulthood, at a later stage it has the potential to turn into problematic behavior and quickly reach pathological dimensions. With increasing age, the propensity to seek new experiences,

thrill and emotion, as well as the ability to take risks significantly decreases.

9. Based on the author's assumption about "attachment", as composed of a specific emotional and behavioral mechanism, and more specifically the "Attachment Model" construct, in particular insecure attachment, influences the formation of the GB model.

10. Risk factors for the transition of GB to problematic and pathological are the lack of behavioral control, positive attitudes towards gambling, seeking an optimal level of stimulation and arousal, risk-functioning and impulsive individuals.

The ways of measuring certain personality constructs are of particular importance. Several methods have been established in the field - Gambling Motivation Survey Scale (GMS), Gambling Desire Scale (GACS), Gambling Symptom Assessment (G-SAS), etc. Most of them are based on the Oaks Gambling Screen (SOGS) and mainly predict the severity of problem gambling. All of these methods are designed to screen for problems and pathological gambling.

Despite the wide empirical body, instruments in the literature for measuring behavioral indicators outside the general framework of problem gambling severity are unknown. With the ambition to help fill this gap, the study aimed to develop a screening methodology sensitive to indicators of gambling behavior.

The most sensitive, sensitive parameters, the identification of which could put the subject of the study at increased risk, were derived. Outside of the general severity framework, the focus of this study was on the behaviors of individuals who may have never participated, had a single gambling experience, or manifest persistent gambling behavior. Based on the identified characteristics, a profile was compiled of persons exhibiting GB, which subsequently poses a risk for problem behavior, respectively the development of gambling addiction.

LIMITATIONS AND FUTURE DIRECTIONS

1. Due to the specificity of the phenomenon under consideration, the author's screening methodology was compiled on the basis of statements that exclude direct questions relating specifically to the degree of addiction to gambling.
2. The inclusion of individuals with the presence of GA in the sample was based on the basic principle that predicts the presence of GB, and not on clinical criteria due to the need for evidence for the finding made.
3. The terms “problem gambling” and “gambling disorder” are used interchangeably in a general manner in the overview, but it is recognized that each term derives from different screening methods that differ from each other.
4. Future studies could focus on regrouping the unrotated components of the factor analysis in search of the influence of other latent variables that would be related to GB.
5. Future studies could focus on increasing the demographic criteria and the sample size to establish new relationships with other indicators.

CONTRIBUTIONS

1. Development of a conceptual model for the study of gambling behavior.
2. Identification of sensitive parameters in the personality system for the development of a screening methodology.
3. Creation of a "Gambling Behavior Screening Methodology" (MSGGB).
4. Adaptation of the screening methodology - MSGGB for Bulgarian conditions.

DISSERTATION RELATED PUBLICATIONS

1. Modern theoretical analysis of behavioral models. Specifics of the Gambling Behavior Model (2022) XXI
2. International Scientific Conference "Applied Psychology - Possibilities and Prospects" - Summer Scientific Session.
3. 2. Descriptive Aspects of Generalized Expectations in Depressive Disorders (2022) XXI International Scientific Conference "Applied Psychology - Possibilities and Prospects" - Summer Scientific Session.
4. 3. Analysis of the influence of attitudes in the gambling behavior model (2023) XXVI International Scientific Conference "Personality, Motivation, Sport", Department of "Psychology, Pedagogy and Sociology" at the Vasil Levski National Sports Academy - Sofia
5. 4. Specificity of gambling motives as a moderator of behavior (2023) XXII International Scientific Conference "Applied Psychology - Possibilities and Perspectives" Chernorizets Hrabar VSU - Summer Scientific Session.
6. 5. Identification of personal and environmental factors determining the behavior of high-risk individuals (2024) XXIII International Scientific Conference: "Applied Psychology - Opportunities and Perspectives" - Summer Scientific Session.