



2528-9705



THE RELATIONSHIP OF NEUROPSYCHOLOGICAL AND PERSONAL FACTORS WITH THE ATTITUDE TO DANGERS AMONG STUDENTS

Vladimir Georgievich MARALOV¹, Vyacheslav Alekseevich SITAROV^{2*}, Irina Ivanovna KORYAGINA³, Marina Aleksandrovna KUDAKA¹, Olga Valerievna SMIRNOVA¹, Larisa Valerievna ROMANYUK⁴

¹Department of Psychology, Cherepovets State University, Cherepovets, Russia.

²Department of Pedagogy, Moscow City University, Moscow, Russia.

³Department of Humanities, Ivanovo State Medical Academy, Ivanovo, Russia.

⁴Department of Pedagogy and Psychology of Higher School, Moscow University of Humanities, Moscow, Russia.

*Corresponding Author

E-mail: sitarov@mail.ru

ABSTRACT

The urgency of the problem is due to the importance of identifying psychological factors and conditions that determine the existence of various types of people's attitudes to dangers. The study aimed to identify the interrelationships of neuropsychological systems of activation and inhibition of behavior with personal factors and people's attitude to dangers on the example of students. The study involved 327 students from four universities of the Russian Federation (Moscow, Cherepovets, and Ivanovo). Among them, there were 60 men and 267 women. The average age is 20 years old ($SD = 2.17$). As the diagnostic tools the author's questionnaires to identify sensitivity to threats and the choice of ways to respond in situations of danger, the Carver-White questionnaire to identify sensitivity to BAS/BIS (Behavioral Activation System/Behavioral Inhibition System), the questionnaire for the diagnosis of five personality factors (the "Big Five") in the adaptation of L. F. Burlachuk and D. K. Korolev, the questionnaire "Adaptability" Maklakov-Chermyanin (scale "Moral normativity") were used. Mathematical processing was carried out using correlation analysis methods. As a result, it was found that an adequate response to dangers is associated with personal qualities (openness to experience, benevolence, normativity of behavior), and exaggeration and understatement of dangers - with neuropsychological properties (BIS and BAS). The results can be used in the process of organizing work to ensure safety in various spheres of human activity, as well as in the educational process in the course of teaching the younger generation and adults adequate ways to respond to hazards.

Keywords: Attitude to dangers, Behavioral Activation System (BAS), Behavioral Inhibition System (BIS), Five-factor model of personality, Normativity of behavior.

INTRODUCTION

The life of living organisms and the existence of any inanimate objects are associated with constant danger, which means anything that can violate the integrity of a living or inanimate system and the possibility of its full functioning. Concerning a person, any impact that can lead to death, loss of health, violation of psychological or social well-being will be considered dangerous.

In modern science, the basic ways of animals and humans respond to dangers are well described by the theory of sensitivity to reinforcement. This theory was developed by Gray (1982), who

Geliş tarihi/Received: 06.12.2021 – Kabul tarihi/Accepted: 04.03.2022 – Yayın tarihi/Published: 30.03.2022

© 2022 Journal of Organizational Behavior Research. Open Access - This article is under the CC BY NC SA license

<https://creativecommons.org/licenses/by-nc-sa/4.0/>



showed that the activity of the behavior of living beings and humans is based on two neuropsychological systems, called behavioral inhibition System (Behavioral Inhibition System - BIS) and Behavioral Activation System (Behavioral Activation System - BAS). Subsequently, this theory was revised and substantially supplemented (Gray & McNaughton, 2000; McNaughton & Corr, 2008; Corr & McNaughton, 2012) by including another system in it, namely the “Fight-Flight-Freezing (Freezing)” system (“Fight, Flight, Freezing System” - FFFS).

Thus, in its modern form, the theory of reinforcement sensitivity includes three neuropsychological systems. The Behavior Activation System (BAS) reacts to rewards and the termination of punishment. It promotes the actualization of positive emotions that encourage behavior, which is associated with approaching significant objects or goals. High sensitivity to BAS predicts substance use and aggression. It has been established that BAS is associated with such a personality trait as extroversion. The behavior inhibition system (BIS) is actualized in conflict situations, its main task is to stop or inhibit activity, and it correlates with increased anxiety and neuroticism as a personality trait. The Fight-Flight-Freeze (FFFs) system is a neurobehavioral system designed to mediate defensive responses to unconditional and conditional stimuli associated with a threat (Donahue, 2020). It activates such emotions as panic, fear, and rage, which initiate such ways of reacting as running, fighting, or fading. It has been established that fear contributes to the orientation of moving away from the threat, that is, escape (Blanchard *et al.*, 2001), and anger is aimed at approaching a threat and fighting (Veenstra *et al.*, 2017). Fading may precede the reaction to danger by performing an indicative function (Lojowska *et al.*, 2015), or it may follow it, for example, in the form of a "stupor" reaction. These three systems are closely interrelated with each other.

Let's turn to the role of BAS and BAS in people's choice of ways to respond to dangers, in particular, in choosing to fight, escape or freeze. It has been established that a high level of sensitivity to BIS causes removal from the threat, its avoidance, and some BAS scales, on the contrary, are positively associated with movement towards the threat (Krupić *et al.*, 2016). It is also known that BIS is associated with increased anxiety, obsessive thoughts (rumination), which cause the use of avoidance or fading tactics (Kimbrel *et al.*, 2012; Borders, 2020). High BAS may be associated, on the one hand, with increased impulsivity, decreased self-control, a tendency to risk (Knyazev & Slobodskaya, 2006; Buelow, 2020), on the other hand, with confidence and self-confidence, a desire to achieve goals at all costs (Krupić, 2017), which often contribute to the choice of struggle as a means of responding to threats.

Fighting, fleeing, or fading are the basic reactions of any living being to danger. When it is connected with a person, his or her behavior in situations of danger cannot be reduced to the three indicated ways of responding, it is much more complex and diverse. For example, you can protect yourself in a conflict by using a strategy of cooperation or compromise, which are not reducible to either struggle or flight, much less to fading. And there are a lot of such examples. Concerning a person, it is more expedient to talk about his attitude to danger, which consists of sensitivity to threats and the choice of adequate or inadequate ways of responding. Sensitivity to threats is manifested in the ability to detect and identify signals from the external or internal environment as dangerous or safe. For example, it has been established that the human brain primarily reacts to warning signs of danger, then to prohibiting and mandatory signs (Bian *et al.*, 2020).



The choice of response methods is an individual's ability to use various forms of defensive behavior in a particular situation. An adequate response should include all those behaviors and activities that give the best result and provide the person with full or partial protection. The inadequate response is a response that does not give the desired effect, and often aggravates the situation, most often it manifests itself either in exaggerating the importance of threats or in downplaying or ignoring them. The combination of sensitivity to threats and the choice of ways to respond in situations of danger can form types of people's attitudes to dangers (Maralov *et al.*, 2019).

It has been empirically proved that the choice of response methods is due to several personal, emotional, and intellectual qualities, as well as the severity of irrational beliefs (Maralov *et al.*, 2020; Maralov *et al.*, 2021). An important role in this process is played by the level of awareness of dangers (Karim & Ahmad, 2020), the commitment of leaders to security ideas (Niu & Liu, 2022). In particular, it was revealed that employees' perception of their leader as a guarantor of safety has a protective effect on their burnout at work (Molero *et al.*, 2019).

In the context of the problem under consideration, works related to studies of the relationship of BAS and BIS with personal characteristics of a person, in particular, with the factors that make up the "Big Five" personality traits, which include neuroticism, extraversion, openness to experience, benevolence and conscientiousness, are of particular interest. D. Smits and P. Boeck (Smits & Boeck, 2006) revealed a positive relationship of BIS with neuroticism and friendliness, negative – with extraversion and openness to experience. BAS-persistence correlates positively with extroversion and conscientiousness, negatively – with neuroticism and benevolence. BAS-pleasure seeking is positively associated with extraversion and openness to experience, negatively – with neuroticism, benevolence, and conscientiousness. And finally, BAS responsiveness to rewards found a positive correlation with extroversion and conscientiousness. Similar results with some nuances were obtained by J.T. Mitchell and colleagues (Mitchell *et al.*, 2007). These studies suggested that different sensitivity to BAS or BIS in combination with the factors that make up the "Big Five" may be organically related to people's attitude to dangers, that is, sensitivity to threats and the choice of adequate or inadequate ways to respond in situations of danger. The need to prove this hypothesis determined *the purpose* of this study – to identify the relationship of neuropsychological systems of activation and inhibition of behavior with personal qualities and people's attitude to dangers based on the students' material.

Specific Hypotheses

- sensitivity to threats can be determined by a different combination of BAS/BIS, high self-control (conscientiousness), and normativity of behavior;
- adequate response can be associated with BAS, with extraversion, and also with conscientiousness and normativity of behavior;
- the exaggeration of dangers will be due to high levels of BIS, high neuroticism, low extroversion, and low openness to experience;
- ignoring dangers may be due to high BAS, low benevolence, conscientiousness, and normativity of behavior.

Including the normativity of behavior in the hypothesis of the study, the authors were guided by the following considerations. Norms are social rules and requirements that regulate people's



behavior in various situations, that is, they determine what is appropriate or inappropriate to do in a particular case, what is allowed or prohibited for various members of the community (Kelly & Setman, 2020), and normativity of behavior is adherence to norms, that is, the degree to which a person is internally motivated to comply with them (Morris & Cushman, 2018). Special studies show that adequate behavior in situations of danger is largely determined by how much a person can follow regulatory prescriptions and rules. This can be demonstrated by the example of people's attitude to wearing masks during the COVID-19 pandemic (Kemmelmeyer & Jamie, 2021). Wearing a mask (regulatory prescription) is an adequate form of response to the danger of infection with the virus, refusing to wear a mask is a clear denial. Therefore, it is logical to assume that the normativity of behavior will be more associated with the choice of adequate ways of responding than with exaggeration and understatement of dangers, as well as with BAS and BIS.

MATERIALS AND METHODS

The study involved 327 students of medical and psychological-pedagogical training profile of several universities of the Russian Federation: Moscow City Pedagogical University (Moscow), Moscow Humanitarian University (Moscow), Cherepovets State University (Cherepovets, Vologda region), and Ivanovo State Medical Academy (Ivanovo, Ivanovo region). Men – 60, women – 267. The average age is 20 years old (SD=2.17). It used a set of theoretical and empirical methods, as well as methods of mathematical processing of the results.

The attitude to dangers was revealed with the help of two interrelated author's questionnaires: a questionnaire of sensitivity to threats and a questionnaire aimed at identifying ways to respond in situations of threat: adequate, exaggerating the danger, and ignoring the danger. The level of severity of the systems of activation and inhibition of behavior was measured using the Carver-White questionnaire, the diagnosis of personal qualities was carried out using the questionnaire of five personality qualities ("Big Five") in the adaptation of L.F. Burlachuk and D.K. Korolev, and the normativity of behavior - with the help of the "Adaptability" test of Maklakov-Chermyanin (the scale of "Moral normativity").

Questionnaire of sensitivity to threats (Maralov *et al.*, 2012). It consists of 12 task questions that simulate real typical situations, which provide four possible answers. Respondents need to choose the option that best corresponds to their opinion. The resulting final score is converted to a standard scale, a ten-point scale.

Questionnaire of identifying ways to respond in situations of danger (Maralov *et al.*, 2012). It consists of 17 statement questions that simulate human behavior in real standard threat situations. Here it is also necessary to choose from four response options that correspond to an adequate way of responding, exaggerating the danger and downplaying the danger. Then the total points for each type were also converted to a standard ten-point scale.

The Russian version of the Carver-White Questionnaire was adapted by G. G. Knyazev (Carver & White, 1994; Knyazev, 2004). There are also 24 statements, the agreement with which must be evaluated on a four-point scale: from very true for me to absolutely wrong for me. The BAS scale is represented by three subscales: "Perseverance", "Sensitivity to reward", "Pleasure seeking". BIS scale – one scale: "Reaction to negative stimuli". The total scores for all indicators were also translated into standard ten-point scales.



Questionnaire of five personality qualities (“Big Five”) in the adaptation of Burlachuk and Korolev (2000). People were asked to evaluate 25 pairs of opposite qualities on a five-point scale, which makes it possible to judge the level of expression of five personality traits: extroversion, benevolence (propensity to consent), conscientiousness, neuroticism, openness to experience. A scale for translating “raw” points into walls has been developed. As a result, based on the assessment of these qualities, it is possible to compile a personality profile.

The normativity of behavior was revealed using the “Adaptability” test of Maklakov-Chermyanin (a multi-level personality questionnaire), the “Moral Normativity” scale was also used (Raygorodsky, 2006). It includes 27 statements with which the respondent needs to express either agreement or disagreement. The points are summed up according to the key and then translated into a standard ten-point scale.

The mathematical processing of the results was carried out using correlation analysis methods, the Pearson linear correlation coefficient was also used.

RESULTS AND DISCUSSION

Let's turn to the main results of the study. Let's characterize the sample to the subjects according to all the parameters, which have been studied. The results of the study of students' attitudes to hazards are presented in **Table 1**.

Table 1. Students' attitude to dangers

	N	%
Sensitivity to threats		
High	159	48,62
Medium	96	29,36
Low	72	22,02
Total:	327	100
Ways to respond in situations of danger		
Adequate	137	41,9
Exaggeration of dangers	87	26,6
Downplaying (ignoring) hazards	43	13,15
Uncertain response	60	18,35
Bcero:	327	100

Table 1 clearly shows that 48.62% of the probationers (159 people) can show a high level of sensitivity to threats, 29.36% (96 people) demonstrated moderate sensitivity and 22.02% (72 people) showed reduced sensitivity to threats. In general, it can be argued that a satisfactory result has been obtained. The vast majority of future doctors, psychologists, and educational psychologists (in total, high and average level - 77.98%) can identify signals from the external and internal world as dangerous or safe at a sufficient level. Nevertheless, some among them do not attach much importance to dangers and threats. 41.9% (137 people) of students can adequately respond to dangers. There is a significant percentage of people who, for one reason or another, exaggerate the importance of dangers – 26.6% (87 people). 13.15% (43 people) are used to not attaching much importance to dangers, simply ignoring them. Attention is drawn to the fact that 18.35% of the subjects (60 people) did not demonstrate any particular type of

response to hazards. An undefined response has a different reason. For some people, for example, in adolescence, this is due to the lack of formed skills to respond to dangers. For others, an uncertain response is due to a selective approach to dangers determined by the nature of the danger, the situation, the place of meeting with the danger, and many others. Therefore, depending on the circumstances, they can react to the same threat in different ways: from exaggerating its significance to completely ignoring it.

Let's consider the levels of sensitivity to BAS and BIS, the personal factors that make up the "Big Five" and the normativity of behavior (**Table 2**).

Table 2. Levels of sensitivity to BAS and BIS, the severity of personal qualities, and normativity of behavior among students

N	Characteristics	Levels			Total n/%
		High n/%	Medium n/%	Low n/%	
1.	BAS-drive	201/61,47	111/33,94	15/4,59	327/100
2.	BAS- fun seeking	144/44,04	166/50,76	17/5,2	327/100
3.	BAS- reward responsiveness	242/74,00	85/26,00	0/0	327/100
4.	BIS-sensitivity to negative stimuli	101/30,89	167/51,07	59/18,04	327/100
5.	Neuroticism	93/28,44	193/59,02	41/12,54	327/100
6.	Extraversion	29/8,87	203/62,08	95/29,05	327/100
7.	Openness	20/6,12	196/59,94	111/33,94	327/100
8.	Agreeableness	93/28,44	170/51,99	64/19,57	327/100
9.	Conscientiousness	46/14,07	240/73,39	41/12,54	327/100
10.	Normativity of behavior	56/17,13	186/56,88	85/25,99	327/100

According to the results presented in **Table 2**, a high level of Bas-persistence was found among 61.47% of the probationers (201 people), BAS-pleasure seeking - among 44.04% (144 people), BAS-responsiveness to rewards - among 74% (242 people). Attention is drawn to the fact that there were no students with low sensitivity to BAS-responsiveness to awarding (0%). This indicates that the majority of students are focused on a certain level of achievement. At the same time, the study revealed a relatively high percentage of students, who are sensitive to BIS (high level 30.89% - 101 people, average - 51.07% - 167 people). Hence, a contradiction arises, on the one hand, and expressed desire to receive remuneration for work or behavior related to people's relationships, on the other hand, in the event of difficulties, dangers, or unforeseen circumstances, braking mechanisms are triggered, which can negatively affect the effectiveness of activities. The study showed that there are about 25% of such students with a high BAS responsiveness to reward and at the same time with a high BIS sensitivity to a negative stimulus. A high level of neuroticism is shown by 28.44% (93 people), and emotional stability is shown by only 12.54% (41 people), whereas it is known that for a medical worker, a psychologist, and other representatives of the helping field of activity, high neuroticism is an obstacle to work. As for extraversion, the expected results are obtained here. The overwhelming majority are ambiverts (62.08% - 203 people), pronounced extroverts - only 8.87% (29 people), introverts - 29.05% (95 people). A high level of openness to experience, that is, interest in various kinds of knowledge is shown by only 6.12% (20 people), a moderate level - 59.94% (196 people), a low



level - 33.94% (111 people). It can be predicted that students with a low level of openness to experience will face the greatest difficulties associated with studying at university. Benevolence at a high level is manifested among 28.44% (93 people), at an average level – among 51.99% (170 people), 19.57% (64 people) are not prone to manifestations of special benevolence. Approximately the same picture is observed concerning the manifestations of such qualities as conscientiousness, manifested in consciousness, conscientiousness, ability to control, and self-control. Here, the majority of 73.39% (240 people) has moderate conscientiousness, among 12.54% (41 people) it seemed to be at a low level, which again is fraught with problems of studying at the university, and only among 14.07% (46 people), it is expressed at a high level. And finally, a high level of the normativity of behavior was found among only 17.13% (56 people), more than half (56.88% - 186 people) generally observe the norms of behavior, allowing individual violations. At the same time, there are a lot of such students – 25.99% (85 people) who can neglect the norms in favor of their interests, which is also fraught with certain difficulties of adaptation and obtaining a quality education, establishing adequate relations with the social environment.

Thus, a fairly wide range of data was obtained for all the studied parameters, which indicates the existence of significant individual differences among students. If you try to make some generalized portrait of a student, it will look like this. This is a person capable of perseverance, especially in cases where the activity is motivated, ambivalent, moderately friendly and conscientious, not always seasoned and open to experience, capable in some cases, under the influence of the situation and circumstances, to neglect the generally accepted norms and rules of behavior.

Let us turn to the central task of this study - to identify the interrelationships of the parameters of the attitude to hazards with sensitivity to BAS and BIS, personal factors, and normativity of behavior. For this purpose, a correlation analysis was carried out using the Pearson linear correlation coefficient (r). The results are shown in **Table 3**.

Table 3. Matrix of correlations of parameters of attitude to hazards, sensitivity to BIS/BIS, personal factors, and normativity of behavior*

№	5	6	7	8	9	10	11	12	13	14
1. Sensitivity to threats	0,25	-0,03	0,15	0,05	-0,01	0,18	0,07	0,10	0,21	0,25
2. Adequate response	0,09	-0,11	0,02	-0,11	-0,10	0,28	0,16	0,09	0,24	0,14
3. Exaggeration of dangers	-0,19	-0,21	-0,01	0,27	0,24	-0,20	-0,22	0,01	-0,03	0,06
4. Ignoring hazards	0,04	0,29	0,04	-0,13	-0,03	-0,10	0,02	-0,12	-0,13	-0,29
5. BAS-drive		0,32	0,41	-0,01	0,07	0,25	0,26	0,07	0,19	0,03
6. BAS- fun seeking			0,29	-0,02	-0,01	0,06	0,24	0,01	-0,14	-0,20
7. BAS- reward responsiveness				0,18	0,15	0,10	0,10	0,04	0,17	-0,06
8. BIS-sensitivity to negative stimuli					0,25	-0,09	-0,14	0,12	-0,04	0,08
9. Neuroticism						0,17	-0,07	0,09	-0,06	0,02

10.	Extraversion	0,32	0,30	0,09	0,07
11.	Openness		0,28	0,22	<i>-0,22</i>
12.	Agreeableness			0,10	0,16
13.	Conscientiousness				0,01
14.	Normativity of behavior				

***Note:** Correlation coefficients significant at the 1% significance level are in bold, while those in italics are at the 5% significance level.

As can be seen from **Table 3**, a large number of significant correlation coefficients between all the studied factors were obtained. Without touching on the main issue related to the analysis of the interrelationships of the parameters of the attitude to hazards with sensitivity to BAS and BIS, personal qualities, and normativity of behavior, we'll characterize the results of studying the links between the systems of activation and inhibition of behavior with personal qualities and normativity of behavior.

BAS-persistence was positively associated with extraversion, openness to experience, and conscientiousness. BAS-the search for pleasure - correlates positively with openness to experience and negatively with conscientiousness and moral normativity. BAS responsiveness to rewards was positively associated with neuroticism and conscientiousness. BIS gave a positive correlation with neuroticism, benevolence and a negative association with openness to experience. These results generally confirm the previously obtained data on the relationship of neuropsychological and personality factors of the "Big Five" (Smits & Boeck, 2006; Mitchell *et al.*, 2007), this indicates the universality of the revealed patterns, regardless of the contingent of the surveyed people and the territory of residence.

To visualize and facilitate the interpretation of the data obtained, the results of the interrelationships of sensitivity to threats, as well as ways to respond in situations of danger with neuropsychological and personal factors are presented graphically in **Figures 1-4**.

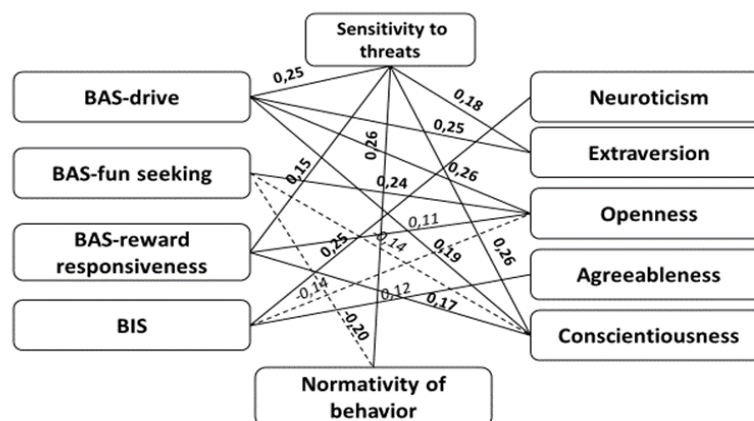


Figure 1. The relationship of sensitivity to threats and neuropsychological and personal factors*

***Note:** here and further, a solid line indicates a positive relationship, dotted - negative; correlation coefficients significant at 1% significance level are in bold, italics - at 5% significance level.



Sensitivity to threats (**Figure 1**) positively correlates with BAS-persistence, BAS-responsiveness to rewards, extraversion, conscientiousness, and normativity of behavior. No negative connections were found. In turn, BAS-persistence was positively associated with extraversion, and BAS-responsiveness to reward – with conscientiousness. Thus, extroverts are more often highly sensitive to threats, capable of perseverance for the sake of a goal, responsibly suited to any business, with a developed ability to control the situation and self-control, which in principle implies the concept of “sensitivity to threats”, striving to comply with the norms and rules of behavior accepted in society in various spheres of life. Accordingly, low sensitivity to threats is more evident among people who are prone to introversion, are not focused on achieving goals, do not have a sufficient level of perseverance, organization, and allow violation of generally accepted norms and rules of behavior.

Similarly, we'll analyze the relationship of choosing adequate ways of responding in situations of danger with neuropsychological and personal factors as a priority (**Figure 2**).

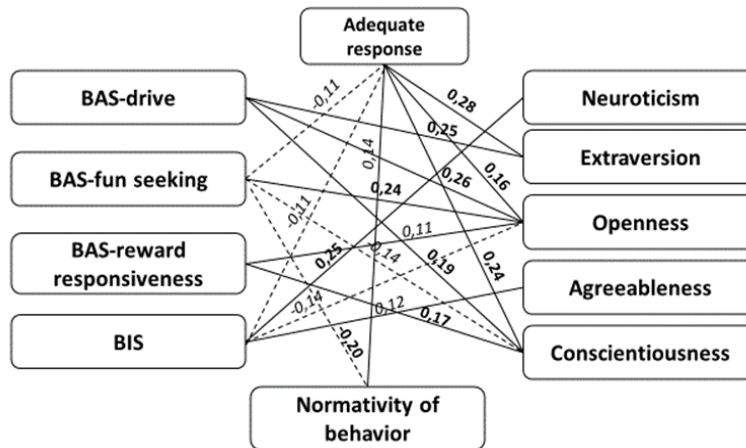


Figure 2. The relationship of adequate response in threat situations with neuropsychological and personal factors

An adequate response in situations of danger is a response that fully corresponds to the nature of the threat, carried out through socially developed and approved rules of conduct for a particularly dangerous situation. According to the data obtained in this study, the adequate response is positively associated with extraversion, openness to experience, conscientiousness, and normativity of behavior, negatively – with BAS-pleasure seeking and BIS-sensitivity to negative stimuli. Consequently, people of the extroverted type, who are open to experience, observing norms and rules of behavior, conscientious with a high level of self-control, not sensitive to BAS-the search for pleasure and BIS-the reaction to negative stimuli, respond adequately to dangers more often. In other words, difficulties and dangers do not cause them to inhibit behavior but stimulate the search for an adequate way out of the situation.

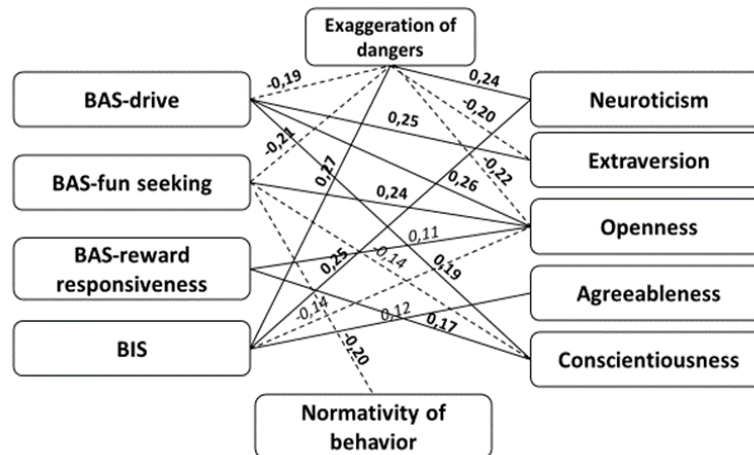


Figure 3. The relationship between exaggeration of the significance of threats and neuropsychological and personal factors

Inadequate response manifested in the desire to exaggerate the importance of hazards, is shown in **Figure 3**. Here, perhaps, the greatest number of positive and negative connections is obtained. Exaggerating the importance of dangers is a reaction that manifests itself in increased anxiety about even a minor threat, to turn an essentially non-dangerous situation into a catastrophic one. Exaggeration of dangers positively correlates, as one would expect, with neuroticism and BIS-sensitivity to negative stimuli. BIS and neuroticism are also positively related to each other. A negative correlation was obtained with BAS-perseverance and BAS-pleasure seeking, and from personal qualities - with extraversion and openness to experience. Thus, the exaggeration of dangers is resorted to people of the introverted type, who are emotionally unstable, anxious, not striving for persistent achievement of the goal, at the same time not looking for pleasure and entertainment, conservative, not feeling much interest in anything, prone to termination of activity if it involves difficulties or real, and more often imaginary, threats. There were no significant positive or negative connections with the normativity of behavior.

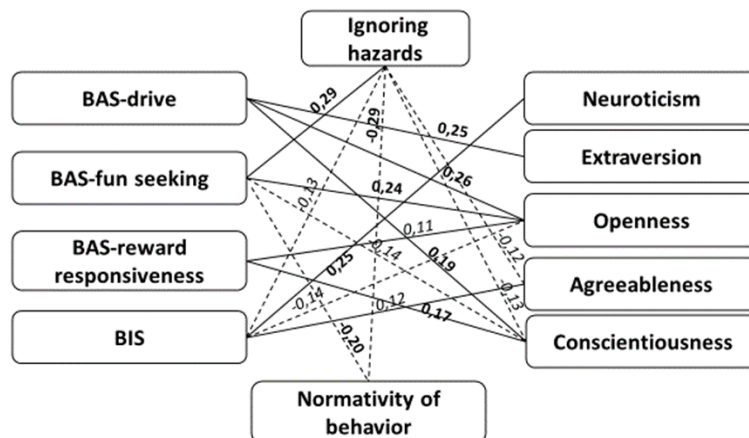


Figure 4. The relationship of ignoring dangers with neuropsychological and personal factors

Ignoring dangers is either a deliberate disregard for threats or behavior caused by manifestations of carelessness, inattention. As can be seen from **Figure 4**, ignoring dangers is positively

associated with only one factor – BAS-the search for pleasure and entertainment. The remaining connections are negative. Ignoring dangers is negatively associated with BIS, which indicates that there is no inhibition of behavior as a result of encountering unforeseen circumstances, difficulties, or dangers, as well as benevolence, conscientiousness, and normativity of behavior. It can be clearly stated that a person, in this case, a student, who ignores dangers, is an ambivert, striving for pleasure and entertainment, neglecting norms and rules of behavior, careless, disorganized, often not friendly to people, due to low sensitivity to negative stimuli, often gets into unpleasant and often dangerous situations.

By now, a lot of studies have been conducted, which reveal the diverse connections of the activation and inhibition systems of behavior (BAS/BIS) with the personal and behavioral characteristics of people and their attitude to danger.

Gender differences in the relationship of BAS/BIS systems with emotional reactions to negative events in different social contexts were revealed. E. Logan, S. Kaye, I. Lewis (Logan *et al.*, 2019) studied the features of the relationship of risk propensity among young drivers depending on BAS. It was found that women with increased impulsivity (BAS-pleasure seeking) are not inclined to rate speeding as risky behavior. Men with a higher level of BAS persistence, on the contrary, were not inclined to exceed the speed limit, perceiving it as risky behavior. In another study (Ma-Kellams & Wu, 2020) BIS is associated with inhibitory emotions. It has been found that women, compared with men, are more likely to experience negative emotions (fear, despondency) that inhibit behavior. For example, BIS is statistically significantly correlated with women's fear associated with the fear that their loved ones may become infected with COVID-19 (Oniszczenko, 2021).

The relationship of BIS/BAS with social anxiety and obsessive thinking style was found (Randelović & Čirović, 2021). The BAS system has a complex effect on social anxiety - with a direct protective effect and indirectly - with the facilitation of the style of reflection. BIS is the most important vulnerability factor for the development of social anxiety, it has both direct and indirect effects on it, mediated by the style of thinking associated with the dominance of maladaptive thoughts.

There is some evidence of the influence of BAS/BIS on perfectionism (Randles *et al.*, 2010). Self-centered perfectionism turned out to be associated with BAS-persistence, but not with the search for pleasure. On the contrary, socially prescribed perfectionism is with a high BIS.

A lot of studies have been devoted to identifying the connection of BIS and BAS with various kinds of psychopathologies. These studies, for example, conducted by Johnson *et al.* (2003), confirmed the role of BIS as a vulnerability factor to depression and anxiety, and the role of BAS as a vulnerability factor to drug and alcohol abuse with concomitant diagnoses. The specificity of the response to reward among people with inflammatory processes in brain cells, depending on the significance of the goal pursued, is associated with the expectation of reward, but not with the result itself (Chat *et al.*, 2021).

In the context of the ongoing research, works on the relationship of various parameters of the attitude to dangers with the personal factors of the “Big Five” and related indicators are also of particular interest. For instance, adequate perception of the situation, according to T.A. Dennis & C.C. Chen (Dennis & Chen, 2007), as the basis of an adequate response is due to the balance of emotional reactivity and the ability to control the situation. Exaggeration of danger, as pointed



out by A.M. Perkins and colleagues (Perkins *et al.*, 2010; Taju *et al.*, 2021), is determined by increased anxiety and fear. Moreover, it has been proven that it worsens during adverse situations, as it is observed during the COVID-19 pandemic, when a sneezing or coughing person is perceived as a source of infection (Bouayed, 2022). Downplaying the dangers is associated with the inability to predict the situation and with an increased propensity to risk (Zuckerman, 2007; Castro *et al.*, 2021). Low conscientiousness with cognitive failures in the form of inattention and inability to correctly understand the task, according to a study by Wallace and Vodanovich (2003), leads to increased injuries and accidents. Thanks to the research of Clarke and Robertson (2003), it was found that extraversion is a predictor of road accidents, and low conscientiousness and low goodwill are predictors of accidents at work and outside it.

The results obtained in this research, on the one hand, confirm some existing studies of the relationship of attitudes to dangers with neuropsychological and personal characteristics of a person, on the other hand, contribute to understanding the problem.

In particular, the role of conscientiousness (control of the situation) in choosing adequate ways to respond to danger (Clarke & Robertson, 2005; Perkins *et al.*, 2010; Nikolskaya *et al.*, 2021), the role of neuroticism in the desire to exaggerate dangers (Perkins *et al.*, 2010), the role of the desire for pleasure with reduced control in ignoring dangers (Wallace & Vodanovich, 2003; Zuckerman, 2007) were confirmed.

The novelty of this study is that, firstly, it suggests considering the attitude to dangers in a complex of two components: sensitivity to threats and ways of responding in situations of danger, and secondly, it shows that neuropsychological and personal factors interacting with each other determine the type of human attitude to dangers.

In particular, the following was established. If a person has a high BAS-perseverance in combination with a high BAS-expectation of reward and a low BIS-sensitivity to negative stimuli, while he tends to be an extroverted type, emotionally stable, open to experience, conscientiously treats the case and evaluation of any situation in accordance with accepted norms and rules of behavior, then such a person can be attributed to an adequate sensitive type of attitude to dangers. This type is optimal from the point of view of ensuring security. According to this study, about a quarter (25%) of students belongs to this type.

In such cases where high BAS-the search for pleasure is combined with low BIS, as well as with reduced benevolence, conscientiousness, and normativity of behavior - there will be a type of attitude to dangers that ignores with reduced sensitivity. This type makes up approximately 10% of the subjects.

The combination of low sensitivity to BAS and high sensitivity to BIS with increased neuroticism and a tendency to introversion, as well as with closeness to experience, low conscientiousness gives an alarming (exaggeration of dangers) with reduced sensitivity type of attitude to dangers. The normativity of behavior does not play a special role here. The main thing is anxiety, inability to understand situations that leads to inhibition of behavior, inaction, which is compensated by a protective mechanism in the form of a desire to make any difficulty or threat an allegedly insurmountable obstacle. In this study, about 15% of such people were found.

This research makes a certain contribution to understanding the peculiarities of people's attitude to dangers. At the same time, it has certain limitations. Firstly, the data were obtained on a contingent of students, where female and junior students are predominated, which could not



but affect the final results, although this did not distort the overall picture of the relationship between neuropsychological and personal factors with people's attitude to dangers. Secondly, the obtained results explain the existence of one optimal type (adequate sensitive) and two non-optimal types (anxious with reduced sensitivity and ignoring with reduced sensitivity types) well, but difficulties arise with explaining the types of attitude to dangers, where sensitivity to threats confronts with ways of responding in situations of danger. This includes adequate with reduced sensitivity, anxious sensitivity, and ignoring sensitive types. For example, according to the obtained data, sensitivity to threats is positively correlated with BAS-persistence, and exaggeration of dangers is negative, or – sensitivity to threats is positively correlated with the normativity of behavior, and ignoring is negative. The question arises, then, how to explain the existence of the disturbing sensitive and ignoring sensitive types? The need to answer this and some other questions related to the study of types of attitudes to hazards determines the prospects for further research.

CONCLUSION

Summing up the results of this study, it should be stated that people's attitude to dangers is due to the complex interaction of neuropsychological and personal properties, where neuropsychological factors determine the dynamic side of behavior associated with its activation or inhibition, and personal factors determine the level of sensitivity to threats and the choice of ways to respond in situations of danger.

The hypotheses put forward were generally confirmed. It was found that sensitivity to threats is more associated with sensitivity to BAS than to BIS, with extraversion, conscientiousness, and normativity of behavior. The adequate response to hazards revealed similar relationships. It positively correlates with extraversion, openness to experience, conscientiousness, and normativity of behavior, negatively - with BAS-pleasure seeking and BIS-sensitivity to negative stimuli. Exaggeration of dangers (anxiety response) is caused by the priority of BIS over BAS, positively correlates with neuroticism and introversion, negatively - with openness to experience. Ignoring is determined by the predominance of sensitivity to BAS-the search for pleasure over BIS, low benevolence, conscientiousness, and normativity of behavior.

A certain combination of neuropsychological and personal factors predicts the type of attitude of a particular person to dangers, which makes it possible, if necessary, to make adjustments, both in the organization of activities in which this individual is included and in his behavior to prevent possible undesirable excesses associated with non-compliance of safety rules.

Thus, the obtained results can be used in the process of organizing security activities taking into account the so-called human factor, as well as in the process of teaching and educating the younger generation on the basics of safe behavior, adults – in the process of solving practical tasks related to hazards and risks.

ACKNOWLEDGMENTS: The authors thank the participants for their cooperation in this study.

CONFLICT OF INTEREST: None

FINANCIAL SUPPORT: None



ETHICS STATEMENT: None

References

- Bian, J., Fu, H., & Jin, J. (2020). Are we sensitive to different types of safety signs? Evidence from ERPs. *Psychology Research and Behavior Management, 13*, 495-505. doi:10.2147/PRBM.S248947
- Blanchard, D. C., Hynd, A. L., Minke, K. A., Minemoto, T., & Blanchard, R. J. (2001). Human defensive behaviors to threat scenarios show parallels to fear-and anxiety-related defense patterns of non-human mammals. *Neuroscience & Biobehavioral Reviews, 25*(7-8), 761-770. doi:10.1016/s0149-7634(01)00056-2
- Borders, A. (2020). *Rumination and Related Constructs: Causes, Consequences, and Treatment of Thinking Too Much*. Academic Press.
- Bouayed, J. (2022). Sorry, I am sneezing and coughing but I do not have COVID-19. *Brain, Behavior, and Immunity, 101*, 57-58. doi:10.1016/j.bbi.2021.12.018
- Buelow, M. (2020). *Risky decision making in psychological disorders*. Academic Press. Available from: <https://www.twirpx.org/file/3179615/>
- Burlachuk, L. F., & Koroljov, L. K. (2000). Adaptation of The Big Five Locator scale. *Voprosy Psikhologii, (1)*, 126-134. (In Russ.) Available from: https://lib.iitta.gov.ua/707228/1/korolyov_lokator_bolshoy_pyatyerki.PDF (access date:17.03.2022)
- Carver, C. S., & White, T. L. (1994). Behavioral inhibition, behavioral activation, and affective responses to impending reward and punishment: the BIS/BAS scales. *Journal of Personality and Social Psychology, 67*(2), 319-333. doi:10.1037/0022-3514.67.2.319
- Castro, C., Ventsislavova, P., Garcia-Fernandez, P., & Crundall, D. (2021). Risky decision-making and hazard prediction are negatively related and could be assessed independently using driving footage. *Psychology Research and Behavior Management, 14*, 857-876. doi:10.2147/PRBM.S305979
- Chat, I. K. Y., Nusslock, R., Moriarity, D. P., Bart, C. P., Mac Giollabhui, N., Damme, K. S., Carroll, A. L., Miller, G. E., & Alloy, L. B. (2021). Goal-striving tendencies moderate the relationship between reward-related brain function and peripheral inflammation. *Brain, Behavior, and Immunity, 94*, 60-70. doi:10.1016/j.bbi.2021.03.006
- Clarke, S., & Robertson, I. T. (2005). A meta-analytic review of the Big Five personality factors and accident involvement in occupational and non-occupational settings. *Journal of Occupational and Organizational Psychology, 78*(3), 355-376. doi:10.1348/096317905X26183
- Corr, P. J., & McNaughton, N. (2012). Neuroscience and approach/avoidance personality traits: A two stage (valuation–motivation) approach. *Neuroscience & Biobehavioral Reviews, 36*(10), 2339-2354. doi:10.1016/j.neubiorev.2012.09.013



- Dennis, T. A., & Chen, C. C. (2007). Emotional face processing and attention performance in three domains: Neurophysiological mechanisms and moderating effects of trait anxiety. *International Journal of Psychophysiology*, 65(1), 10-19. doi:10.1016/j.ijpsycho.2007.02.006
- Donahue, J. J. (2020). Fight-Flight-Freeze System. In: Zeigler-Hill V., Shackelford T.K. (eds) Encyclopedia of Personality and Individual Differences. Springer, Cham. doi:10.1007/978-3-319-24612-3_751
- Gray, J. A. (1982). The neuropsychology of anxiety: An enquiry into the functions of the septohippocampal system. Oxford: Oxford University Press.
- Gray, J. A., & McNaughton, N. (2000). The neuropsychology of anxiety: An enquiry into the functions of the septo-hippocampal system (2nd ed.). Oxford: Oxford University Press.
- Johnson, S. L., Turner, R. J., & Iwata, N. (2003). BIS/BAS levels and psychiatric disorder: An epidemiological study. *Journal of Psychopathology and Behavioral Assessment*, 25(1), 25-36. doi:10.1023/A:1022247919288
- Karim, S., & Ahmad, V. (2020). Level of Awareness among Staff and Students of Academic Institutions towards Covid-19 in Western and Central Regions of Saudi Arabia. *International Journal of Pharmaceutical and Phytopharmacological Research*, 169-175.
- Kelly, D., & Setman, S. (2020). The Psychology of Normative Cognition, The Stanford Encyclopedia of Philosophy (Spring 2021 Edition), Edward N. Zalta (ed.). Available from: <https://plato.stanford.edu/archives/spr2021/entries/psychology-normative-cognition/>.
- Kemmelmeier, M., & Jami, W. A. (2021). Mask wearing as cultural behavior: An investigation across 45 US states during the COVID-19 pandemic. *Frontiers in Psychology*, 12, 648692. doi:10.3389/fpsyg.2021.648692
- Kimbrel, N. A., Nelson-Gray, R. O., & Mitchell, J. T. (2012). BIS, BAS, and bias: The role of personality and cognitive bias in social anxiety. *Personality and Individual Differences*, 52(3), 395-400. doi:10.1016/J.PAID.2011.10.041
- Knyazev, G. G., & Slobodskaya, H. R. (2006). Personality types and behavioural activation and inhibition in adolescents. *Personality and Individual Differences*, 41(8), 1385-1395. doi:10.1016/j.paid.2005.11.035
- Knyazev, G. G., Slobodskaya, E. R., Savostyanov, A. N., Ryabichenko, T. I., Shushlebina, O. A., & Levin, E. A. (2004). Activation and inhibition of behavior as the basis of individual differences. *Psihologicheskij zhurnal= Psychological Journal*, 25(4), 28-40. (In Russ.)
- Krupić, D. (2017). High BAS and low BIS in overconfidence, and their impact on motivation and self-efficacy after feedback. *Primenjena Psihologija*, 10(3), 297-312.
- Krupić, D., Križanić, V., & Corr, P. J. (2016). Personality and defensive behaviour: A factor analytic approach to threat scenario choices. *Personality and Individual Differences*, 94, 303-308. doi:10.1016/j.paid.2016.01.045



- Logan, E., Kaye, S. A., & Lewis, I. (2019). The influence of the revised reinforcement sensitivity theory on risk perception and intentions to speed in young male and female drivers. *Accident Analysis & Prevention, 132*, 105291.
- Lojowska, M., Gladwin, T. E., Hermans, E. J., & Roelofs, K. (2015). Freezing promotes perception of coarse visual features. *Journal of Experimental Psychology: General, 144*(6), 1080-1088. doi:10.1037/xge0000117
- Ma-Kellams, C., & Wu, M. S. (2020). Gender, behavioral inhibition/activation, and emotional reactions to negative natural and social events. *Personality and Individual Differences, 157*, 109809. doi:10.1016/j.paid.2019.109809
- Maralov, V. G., Gura, A. Y., Tatlyev, R. D., Epanchintseva, G. A., Bukhtiyarova, I. N., & Karavaev, D. M. (2019). Influence of the sex and age people's attitude toward hazards. *Astra Salvensis, 7*(13), 343-352.
- Maralov, V. G., Malysheva, E. Y., Nifontova, O. V., Perchenko, E. L., & Tabunov, I. A. (2012). Development of a test questionnaire on the sensitivity to threats in adolescence. *Perspektivy nauki =Prospects of Science, 8*(35), 32-37. (In Russ.)
- Maralov, V. G., Malysheva, E. Y., Smirnova, O. V., Perchenko, E. L., & Tabunov, I. A. (2012). Development of a test questionnaire to identify ways of responding in situations of danger in adolescence. *Al'manah sovremennoj nauki i obrazovaniya =Almanac of Modern Science and Education, 12*(1), 92-96. (In Russ.)
- Maralov, V. G., Sitarov, V. A., Koryagina, I. I., Romanyuk, L. V., & Kudaka, M. A. (2021). The Influence of Irrational Beliefs on Attitudes to Dangers among Medical and Psychological-Pedagogical Students. *International Journal of Pharmaceutical Research & Allied Sciences, 10*(1), 77-87. doi:10.51847/Gqcy-uT
- Maralov, V. G., Sitarov, V. A., Kudak, M. A., Maralova, T. P., & Koryagin, I. I. (2020). Phenomena of adequate response, exaggeration or understatement of dangers by people. *Perspectives on Science and Education, 45*(3), 360-378. doi:10.32744/pse.2020.3.27 (In Russ)
- McNaughton, N., & Corr, P. J. (2008). The neuropsychology of fear and anxiety: A foundation for Reinforcement Sensitivity Theory. In P. J. Corr (Ed.), *The Reinforcement Sensitivity Theory of Personality* (pp. 44–94). Cambridge: Cambridge University Press.
- Mitchell, J. T., Kimbrel, N. A., Hundt, N. E., Cobb, A. R., Nelson-Gray, R. O., & Lootens, C. M. (2007). An analysis of reinforcement sensitivity theory and the five-factor model. *European Journal of Personality: Published for the European Association of Personality Psychology, 21*(7), 869-887. doi:10.1002/per.644
- Molero, F., Mikulincer, M., Shaver, P. R., Laguía, A., & Moriano, J. A. (2019). The development and validation of the leader as security provider scale. *Journal of Work and Organizational Psychology, 35*(3), 183-193. doi:10.5093/jwop2019a20
- Morris, A., & Cushman, F. (2018). A common framework for theories of norm compliance. *Social Philosophy and Policy, 35*(1), 101-127. doi:10.1017/S0265052518000134



- Nikolskaya, E. Y., Lepeshkin, V. A., Uspenskaya, M. E., Ushakov, R. N., Logunova, N. Y., & Novak, L. V. (2021). Formation of regional marketing system in the current context. *Journal of Advanced Pharmacy Education and Research*, 11(3), 144-149. doi:10.51847/ECJa7Yq4X8
- Niu, L., & Liu, Y. (2022). The Relationship Between Leadership Safety Commitment and Resilience Safety Participation Behavior. *Psychology Research and Behavior Management*, 15, 517-531. doi:10.2147/PRBM.S349712
- Oniszczenko, W. (2021). The association between BIS/BAS and fear of COVID-19 infection among women. *Current Issues in Personality Psychology*, 9(3), 237-245. Available from: <https://czasopisma.bg.ug.edu.pl/index.php/CliPP/article/view/6052>
- Perkins, A. M., Cooper, A., Abdelall, M., Smillie, L. D., & Corr, P. J. (2010). Personality and defensive reactions: fear, trait anxiety, and threat magnification. *Journal of Personality*, 78(3), 1071-1090. doi:10.1111/j.1467-6494.2010.00643.x
- Randelović, K., & Ćirović, N. (2022). Social anxiety and rumination in the context of the revised reinforcement sensitivity theory and the mediation model of social anxiety. *Psihologija*, 55(1), 1-24. doi:10.2298/PSI200702034R
- Randles, D., Flett, G. L., Nash, K. A., McGregor, I. D., & Hewitt, P. L. (2010). Dimensions of perfectionism, behavioral inhibition, and rumination. *Personality and Individual Differences*, 49(2), 83-87. doi:10.1016/j.paid.2010.03.002
- Raygorodsky, D. Y. (2006). Practical psychodiagnostics, Methods and tests. Samara: Publishing House "BAHRAKH-M", pp. 549-672.
- Smits, D. J., & Boeck, P. D. (2006). From BIS/BAS to the big five. *European Journal of Personality*, 20(4), 255-270. doi:10.1002/per.583
- Taju, N. F. S., Ahmed, B. G., Abukhalid, N. H., Alsaikhan, A. S., Alharryaf, H. H., Alotaibi, K. H., Alsaifi, A. S., Alotaibi, M. S., Alqahtani, F. T., Alanazi, A. F., et al. (2021). An overview on the role of MRI in diagnosis and management of berry aneurysm. *World Journal of Environmental Biosciences*, 10(3), 38-41. doi:10.51847/0hl1BHILpm
- Veenstra, L., Schneider, I. K., Bushman, B. J., & Koole, S. L. (2017). Drawn to danger: Trait anger predicts automatic approach behaviour to angry faces. *Cognition and Emotion*, 31(4), 765-771. doi:10.1080/02699931.2016.1150256
- Wallace, J. C., & Vodanovich, S. J. (2003). Workplace safety performance: conscientiousness, cognitive failure, and their interaction. *Journal of Occupational Health Psychology*, 8(4), 316. doi:10.1037/1076-8998.8.4.316
- Zuckerman, M. (2007). Sensation seeking and risky behavior. American Psychological Association. doi:10.1037/11555-000

