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Neuropsychological and Personal Factors Influencing Students' Attitudes Toward Hazards

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Abstract

The importance of addressing this issue stems from the need to understand the psychological factors that shape individuals' varying responses to potential risks. This research aimed to investigate how neuropsychological systems regulating behavior—specifically activation and inhibition—relate to personal traits and individuals' attitudes toward danger, focusing on a student population. The study included 327 students from four universities across Russia (Moscow, Cherepovets, and Ivanovo), with 60 men and 267 women, with a mean age of 20 years (SD = 2.17). The study employed several diagnostic instruments to assess these factors including questionnaires designed by the authors to evaluate sensitivity to threats and response strategies in dangerous situations, the Carver-White questionnaire to measure BAS/BIS sensitivity, the Big Five personality assessment adapted by L. F. Burlachuk and D. K. Korolev, and the "Adaptability" scale by Maklakov-Chermyanin (Moral Normativity). The results showed that an appropriate response to risk is closely related to personal characteristics such as openness to experience, benevolence, and moral normativity, while over- or underestimation of threats is associated with neuropsychological factors tied to BAS and BIS. These findings have practical applications for improving safety measures in various fields and can contribute to educational initiatives aimed at teaching young people and adults how to effectively respond to dangerous situations.

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

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Introduction

The survival of living organisms and the existence of inanimate objects are constantly at risk from various dangers, which can compromise the integrity and proper functioning of these systems. For humans, any situation that threatens life, health, or psychological and social well-being is considered dangerous.

In contemporary research, the theory of reinforcement sensitivity provides a solid framework for understanding how animals and humans react to threats. This theory was developed by Gray [1] and suggests that behavior is governed by two key neuropsychological systems: the behavioral inhibition system (BIS) and the behavioral activation system (BAS). This model

has been expanded over time [2-4] to incorporate a third system, the fight-flight-freezing (FFFS) system, which is also crucial in responses to danger.

Modern reinforcement sensitivity theory now includes these three interconnected systems. The BAS is activated by rewards and the cessation of punishment, prompting behaviors that move towards significant goals, and fostering positive emotions. A heightened sensitivity to BAS is linked to increased substance use and aggression and correlates with extroversion. The BIS comes into play during conflict, aiming to inhibit behavior, and is associated with traits like anxiety and neuroticism. The FFFS, which governs responses to direct and indirect threats, triggers panic, fear, and anger, which motivate defensive behaviors such as fleeing, fighting, or freezing [5]. Fear is primarily associated with escape, while anger leads to confrontation [6, 7]. Freezing may occur as a preparatory reaction to danger or as a post-threat response, often appearing as a "stupor" [8]. These systems are highly interconnected.

When considering how BAS and BIS influence the choice of response to danger, such as fight, flight, or freeze, it has been shown that a heightened BIS sensitivity tends to drive avoidance behaviors, while certain BAS scales are linked to approaching the threat [9]. BIS activation has been associated with increased anxiety and rumination, promoting avoidance or freezing responses [10, 11]. Conversely, heightened BAS sensitivity may lead to impulsivity, reduced self-control, and risk-taking behavior [12, 13], or conversely, confidence and goal-driven behavior that can foster a "fight" response [14].

Fight, flight, or freeze reactions are fundamental responses to danger, but human behavior is more complex. For example, in conflict situations, individuals may choose cooperative or compromise strategies, which do not align with the fight or flight categories, let alone freezing. Thus, it is more appropriate to discuss attitudes towards danger, which encompass both threat sensitivity and the selection of appropriate or inappropriate responses. Threat sensitivity refers to the ability to recognize and assess whether external or internal signals are dangerous or safe, such as the brain's preference for detecting warning signals first, followed by prohibitive and mandatory signs [15].

The way an individual responds to danger is their capacity to engage in various forms of defensive behavior depending on the situation. An adequate response involves actions that provide the best protection, while an inadequate response may worsen the situation, often by either exaggerating or underestimating the threat. The combination of threat sensitivity and response choices shapes different attitudes toward danger in individuals [16].

Research has demonstrated that individual responses to threats are shaped by a combination of personal traits, emotional dispositions, cognitive abilities, and the presence of irrational beliefs [17, 18]. A key factor influencing these responses is how aware an individual is of potential risks [19], as well as the influence of leadership on fostering a sense of safety [20]. For example, studies have shown that employees who view their leaders as guardians of their safety tend to experience less burnout at work [21].

In this context, studies examining the relationships between the behavioral activation system (BAS), behavioral inhibition system (BIS), and personality traits from the "Big Five" model—neuroticism, extraversion, openness, agreeableness, and conscientiousness—are particularly significant. Smits and Boeck [22] identified a positive correlation between BIS and neuroticism and agreeableness, while it was negatively related to extraversion and openness. Additionally, BAS persistence was positively linked to extraversion and conscientiousness, but negatively to neuroticism and agreeableness. BAS-pleasure seeking correlated positively with extraversion and openness but negatively with neuroticism, agreeableness, and conscientiousness. Moreover, BAS responsiveness to rewards was found to be positively associated with both extraversion and conscientiousness. A similar pattern of results was noted by Mitchell *et al.* [23], with minor differences. These findings suggest that variations in the sensitivity of BAS and BIS, combined with personality traits, might influence how individuals approach and respond to danger, particularly in terms of recognizing threats and choosing appropriate or inappropriate responses. This insight formed the foundation for the research aim, which sought to explore the relationship between neuropsychological systems involved in behavior regulation and personal traits, and how these affect students' attitudes toward threats.

Proposed hypotheses

- Sensitivity to threats may be influenced by a combination of BAS/BIS sensitivity, high conscientiousness, and normativity of behavior.
- Adequate responses to danger are expected to correlate with BAS sensitivity, extraversion, conscientiousness, and adherence to social norms.
- Overestimating danger may be associated with high BIS sensitivity, high neuroticism, and low extraversion and openness to experience.
- Ignoring threats may result from heightened BAS sensitivity, low levels of benevolence, conscientiousness, and normativity of behavior.

The inclusion of "normativity of behavior" in the hypotheses is based on several key factors. Social norms act as guidelines for acceptable behavior in specific situations, defining what is appropriate within a given society [24]. Normativity reflects

how motivated a person is to conform to these rules [25]. Previous studies have demonstrated that a person's ability to adhere to norms often determines how effectively they respond to dangerous situations. For instance, wearing a mask during the COVID-19 pandemic was considered an appropriate response to the danger of viral infection, while refusal to wear a mask signified noncompliance with societal norms [26]. This suggests that normativity plays a more significant role in choosing appropriate responses to danger, rather than exaggerating or diminishing the perceived threat itself. Therefore, it is reasonable to assume that the normativity of behavior will be more closely linked to the adoption of suitable responses to threats than to the tendency to overstate or ignore dangers, as well as the sensitivity to BAS and BIS.

Materials and Methods

This research involved 327 students from various universities in the Russian Federation, specifically Moscow City Pedagogical University, Moscow Humanitarian University, Cherepovets State University, and Ivanovo State Medical Academy. The sample consisted of 60 men and 267 women, with an average age of 20 years (SD = 2.17). The study utilized a combination of theoretical and empirical techniques, along with mathematical analysis methods to process the results.

To assess students' attitudes toward danger, two interrelated author-developed questionnaires were employed: one for measuring sensitivity to threats and another for evaluating responses to dangerous situations, categorizing them as adequate, exaggerated, or ignored. The Carver-White questionnaire was used to assess the activation and inhibition systems of behavior, while personal traits were measured using the "Big Five" personality test adapted by L.F. Burlachuk and D.K. Korolev. The "Adaptability" test by Maklakov-Chermyanin, specifically the "Moral Normativity" scale, was used to measure the normativity of behavior.

The sensitivity to threats questionnaire [27] consists of 12 situational questions that simulate common scenarios with four response options. Respondents select the answer that most closely reflects their view, and the total score is then converted into a standard 10-point scale.

The questionnaire on response strategies to danger [28] comprises 17 statements describing potential reactions to threats. Participants are asked to choose among four options reflecting either an adequate response, an exaggerated response, or downplaying the threat. The resulting scores for each response category are converted into a standard 10-point scale.

The Carver-White questionnaire, adapted into Russian by G.G. Knyazev [29, 30], contains 24 statements, which respondents evaluate on a four-point scale ranging from "very true for me" to "completely wrong for me." The BAS scale is made up of three subscales: "Perseverance," "Sensitivity to Reward," and "Pleasure Seeking," while the BIS scale focuses on one subscale: "Reaction to Negative Stimuli." The raw scores are converted into standard 10-point scales.

The Big Five personality traits questionnaire [31] asks participants to evaluate 25 pairs of opposing qualities on a five-point scale to assess five major personality traits: extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience. A scoring system was used to transform the raw scores into standardized results, which contributed to developing a personality profile.

The normativity of behavior was assessed using the "Adaptability" Test by Maklakov-Chermyanin, with a focus on the "Moral Normativity" scale [32]. This test includes 27 statements, and respondents are required to indicate their agreement or disagreement. The total score is calculated based on the responses and then converted into a standard 10-point scale.

The data analysis involved correlation methods, with the Pearson linear correlation coefficient being applied to examine relationships among variables.

Results and Discussion

The primary findings of the study will now be presented. The characteristics of the participants, based on the parameters being studied, are detailed in **Table 1.** The study's outcomes regarding students' attitudes toward hazards are also outlined.

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
Всего:	327	100

Table 1 illustrates that 48.62% of the participants (159 individuals) exhibit high sensitivity to threats, while 29.36% (96 individuals) show moderate sensitivity, and 22.02% (72 individuals) display low sensitivity. Overall, these results are deemed satisfactory, as a substantial portion of future professionals in medicine, psychology, and education (77.98% when combining high and moderate levels) can adequately identify potential dangers from both external and internal sources. However, a notable fraction of them appear less concerned about threats, with 41.9% (137 individuals) demonstrating an appropriate response to dangers. A considerable portion, 26.6% (87 individuals), tend to overestimate the significance of threats, while 13.15% (43 individuals) typically ignore them. Additionally, 18.35% (60 individuals) did not exhibit any clear response to dangers. This ambiguous response can be attributed to different factors: for some, particularly adolescents, the lack of developed skills for responding to threats is a key reason, while for others, their reaction may vary depending on the type of threat, the situation, and the environment. As a result, they may react to the same threat in diverse ways, from overemphasizing it to disregarding it altogether.

Next, let us examine the relationship between the levels of sensitivity to BAS and BIS, the personal characteristics that make up the "Big Five," and the normativity of behavior **(Table 2)**.

Table 2. Levels of sensitivity to BAS and BAS, 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

Based on the data displayed in **Table 2**, the majority of students demonstrated a high level of BAS persistence, with 61.47% (201 individuals) scoring high. For BAS-pleasure seeking, 44.04% (144 students) exhibited high sensitivity, and 74% (242 individuals) showed high BAS responsiveness to rewards. Notably, there were no participants with low sensitivity to BAS-responsiveness to rewards, suggesting that most students are goal-oriented and focused on achieving certain outcomes. However, the study also found that a significant portion of students (30.89%-101 individuals at a high level, and 51.07%-167 individuals at an average level) exhibited sensitivity to BIS. This creates a potential contradiction: students may have a strong desire to be rewarded for their actions, yet in the face of difficulties, dangers, or unexpected situations, their inhibitive mechanisms may be triggered, possibly reducing their effectiveness. The results revealed that about 25% of the students displayed a combination of high BAS responsiveness to rewards and high BIS sensitivity to negative stimuli.

In terms of neuroticism, 28.44% (93 individuals) scored high, while only 12.54% (41 individuals) showed emotional stability. Given that high neuroticism can hinder performance in fields such as medicine and psychology, this result raises concerns. Regarding extraversion, most students were ambiverts, comprising 62.08% (203 individuals), with only 8.87% (29 individuals) being strong extroverts and 29.05% (95 individuals) identified as introverts. The level of openness to experience varied, with 6.12% (20 individuals) scoring high, 59.94% (196 individuals) at a moderate level, and 33.94% (111 individuals) at a low level. It is expected that students with lower openness to experience may encounter more challenges in their university studies. As for benevolence, 28.44% (93 students) scored high, 51.99% (170 individuals) were moderate, and 19.57% (64 individuals) showed little inclination towards benevolence. A similar distribution was seen with conscientiousness, where 73.39% (240 individuals) exhibited moderate conscientiousness, 12.54% (41 individuals) showed low conscientiousness, and 14.07% (46 individuals) had high conscientiousness. Lastly, only 17.13% (56 individuals) demonstrated a high level of normativity of behavior, with 56.88% (186 individuals) generally following social norms while allowing some violations, and 25.99% (85 individuals) were more likely to disregard norms in favor of their interests. This lack of strict adherence to norms may pose challenges to adaptation and success in both academic and social environments.

In conclusion, the findings reveal a broad spectrum of individual differences among students across the various parameters studied. If we were to describe a generalized profile of a student, it would suggest that most are capable of perseverance, particularly when their activities are motivated. They tend to be ambivalent, moderately friendly, and conscientious, though not always open to new experiences. Furthermore, they may sometimes neglect social norms depending on the situation or circumstances.

Next, the study focuses on the core objective: identifying the relationships between attitudes toward hazards and sensitivity to BAS and BIS, personality traits, and behavioral normativity. To address this, a correlation analysis using the Pearson linear correlation coefficient (r) was conducted, with the results presented 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	-0.22
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.

Table 3 reveals several notable correlations between the factors under study. While we will later focus on the primary relationships concerning attitudes toward threats and their links to BAS and BIS sensitivity, personal traits, and behavioral normativity, we first summarize the connections between activation and inhibition systems with personal traits and behavior norms.

BAS persistence had a positive relationship with extraversion, openness to experience, and conscientiousness. BAS-pleasure seeking showed a positive correlation with openness to experience but a negative one with conscientiousness and moral normativity. BAS responsiveness to rewards was positively linked to conscientiousness and neuroticism. BIS was found to positively correlate with neuroticism and benevolence, but negatively with openness to experience. These findings support previous findings about the links between neuropsychological factors and the Big Five personality traits [22, 23], highlighting the generality of these patterns across different populations and regions.

To enhance clarity and ease of interpretation, the relationships between threat sensitivity, response strategies to danger, and personality and neuropsychological factors are illustrated in **Figure 1**.

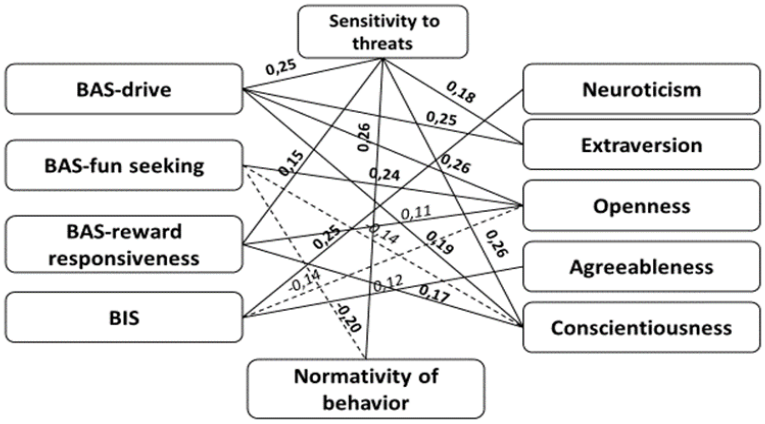

Figure 1. The relationship of sensitivity to threats and neuropsychological and personal factors*

*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.

Figure 1 shows that sensitivity to threats has a positive correlation with BAS persistence, BAS responsiveness to rewards, extraversion, conscientiousness, and behavioral normativity. No negative correlations were observed. BAS persistence was also positively linked to extraversion, while BAS responsiveness to rewards correlated with conscientiousness. In other words, extroverted individuals tend to exhibit a higher sensitivity to threats, demonstrate perseverance toward achieving goals, approach tasks responsibly and possess strong control over situations and self-discipline. These traits align with the concept of "sensitivity to threats," as they emphasize adherence to societal norms and rules in various aspects of life. On the other hand, those with low sensitivity to threats are generally more introverted, less goal-oriented, lack perseverance and organizational skills, and are more likely to violate social norms and behavior rules.

Next, we will examine the relationship between choosing appropriate responses to danger and neuropsychological and personal factors, as illustrated in **Figure 2**.

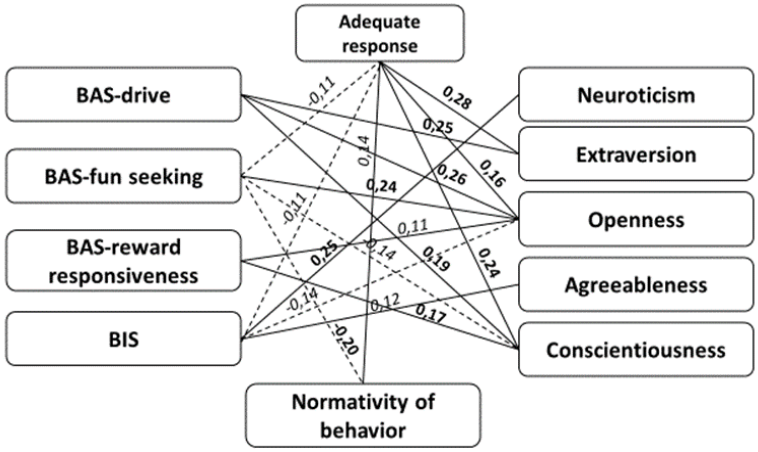

Figure 2. The relationship of adequate response in threat situations with neuropsychological and personal factors

A suitable response to danger matches the nature of the threat and is carried out in line with socially recognized behavioral norms for handling hazardous situations. The study's results show that an adequate response is positively linked to traits such as extraversion, openness to experience, conscientiousness, and adherence to social norms, while it is negatively associated with BAS-pleasure seeking and BIS-responsiveness to negative stimuli. In other words, individuals who are extroverted, open to experiences, conscientious, and compliant with norms, with a high degree of self-regulation, are more likely to respond appropriately to threats. For them, challenges and dangers do not cause behavioral inhibition but rather motivate them to find an appropriate course of action.

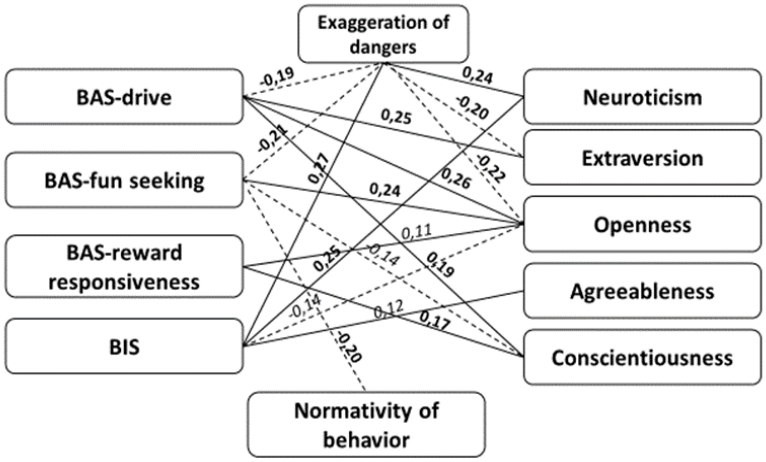

Figure 3. The relationship between exaggeration of the significance of threats and neuropsychological and personal factors

An inadequate response, characterized by exaggerating the significance of threats, is illustrated in **Figure 3**. This response type reveals the highest number of both positive and negative correlations. Exaggerating the dangers involves amplifying

anxiety over even minor threats, transforming a non-hazardous situation into one perceived as catastrophic. This tendency is positively correlated with neuroticism and BIS sensitivity to negative stimuli, with a mutual positive relationship between BIS and neuroticism. Conversely, there is a negative correlation between BAS persistence and BAS pleasure-seeking, as well as with traits like extraversion and openness to experience. In other words, individuals who exaggerate threats tend to be introverted, emotionally unstable, anxious and lack the drive for goal persistence. They are also less interested in seeking pleasure or new experiences and tend to abandon tasks when faced with challenges or threats—real or perceived. No significant correlations were observed with adherence to behavioral norms.

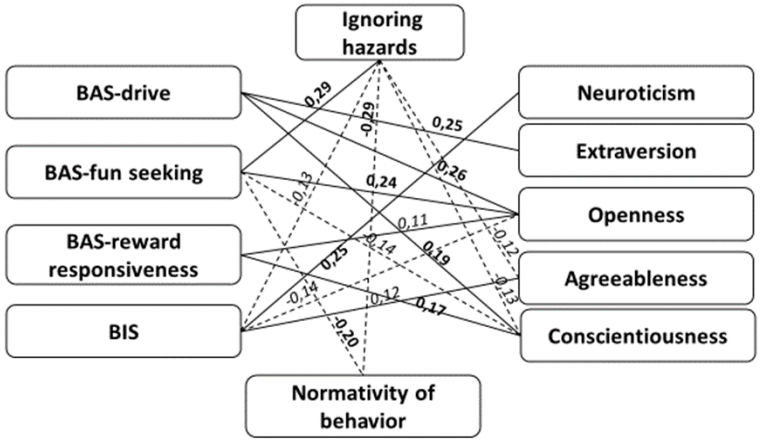

Figure 4. The relationship of ignoring dangers with neuropsychological and personal factors

Ignoring dangers, whether through intentional disregard or due to carelessness, is depicted in **Figure 4**. This behavior is positively linked to only one factor—BAS-pleasure seeking—while the remaining connections show negative associations. Ignoring dangers correlates negatively with BIS, indicating a lack of behavioral inhibition when faced with unforeseen challenges or threats. It is also negatively associated with benevolence, conscientiousness, and adherence to norms. Students who tend to ignore dangers are typically ambiverts, focused on pleasure and entertainment, indifferent to norms and rules, and prone to carelessness and disorganization. These individuals often exhibit low sensitivity to negative stimuli, which leads them into potentially dangerous situations.

Numerous studies have explored the connections between the BAS/BIS systems and personal traits, as well as people's reactions to danger. For example, gender differences have been observed in how the BAS/BIS systems influence emotional reactions to negative events in different social settings. Logan, Kaye and Lewis [33] examined risk-taking behavior in young drivers, noting that women with higher BAS-pleasure-seeking tendencies were less likely to view speeding as risky behavior, while men with higher BAS persistence avoided speeding, perceiving it as risky. In another study, Ma-Kellams and Wu [34] found that BIS is linked to inhibitory emotions, with women experiencing more fear and sadness than men, which hindered their actions, such as the fear of loved ones contracting COVID-19 [35].

BIS/BAS systems also correlate with social anxiety and obsessive thinking. Research by Ranđelović and Čirović [36] revealed that BAS has both direct and indirect effects on social anxiety through facilitating reflective thinking styles, while BIS is a major vulnerability factor for social anxiety, influencing it through maladaptive thought patterns.

Further studies have explored the influence of BAS/BIS on perfectionism. For instance, Randles *et al*. [37] found that self-oriented perfectionism was linked to BAS persistence, but not to pleasure-seeking, whereas socially prescribed perfectionism correlated with high BIS sensitivity.

Additionally, there is significant research on the connection between BIS/BAS and various psychopathologies. For example, Johnson *et al.* [38] confirmed that BIS plays a key role in the vulnerability to depression and anxiety, while BAS is associated with vulnerability to substance abuse. Chat *et al.* [39] examined how individuals with inflammatory brain conditions respond to rewards, noting that their response depends on the expectation of reward, rather than the actual outcome.

Current studies also delve into the relationship between attitudes toward danger and personal traits from the “Big Five.” Dennis and Chen [40] emphasized that an adequate response to danger arises from a balance of emotional reactivity and situational control. Perkins *et al.* [41] and Taju *et al.* [42] discussed how exaggerating danger is linked to heightened anxiety and fear, particularly during adverse events like the COVID-19 pandemic, when a person sneezing or coughing is seen as a health threat [43]. On the other hand, underestimating dangers is tied to an inability to predict outcomes and an increased propensity for risk-taking [44, 45]. Wallace and Vodanovich [46] showed that low conscientiousness, combined with cognitive failures like inattention, increases the risk of injuries and accidents. Clarke and Robertson [47] found that extraversion is a predictor of road accidents, while low conscientiousness and goodwill are predictors of workplace accidents and other types of mishaps.

The findings from this study both affirm existing research and add new insights into understanding how attitudes toward danger relate to neuropsychological and personal traits. Specifically, the role of conscientiousness in making appropriate responses to danger [41, 47, 48], the impact of neuroticism in exaggerating perceived risks [41], and the influence of a desire for pleasure combined with diminished control in ignoring dangers [44, 46] were all confirmed.

What sets this study apart is its suggestion to consider attitudes toward danger as a two-part construct: sensitivity to threats and responses to danger. Additionally, the study highlights how neuropsychological and personality factors interact to shape an individual's overall attitude toward danger. Specifically, it was found that individuals with high BAS persistence and BAS-reward expectation, coupled with low BIS sensitivity to negative stimuli, tend to be extroverted, emotionally stable, open to experience, conscientious, and socially norm-oriented. This group represents the “adequate sensitive” type, optimal for safety, making up around 25% of the study's participants.

When high BAS-pleasure seeking is combined with low BIS sensitivity and lower levels of benevolence, conscientiousness, and adherence to norms, the result is an “ignoring with reduced sensitivity” type, which constitutes approximately 10% of participants. The third type, characterized by low BAS sensitivity and high BIS sensitivity, combined with increased neuroticism, introversion, low conscientiousness, and closed-off tendencies, represents an “anxious with reduced sensitivity” type. This group, which accounts for around 15% of participants, displays exaggerated reactions to threats, often viewing challenges as insurmountable obstacles due to anxiety and a lack of situational awareness.

While this research offers valuable contributions to understanding how people respond to danger, it also has limitations. The study sample predominantly consisted of female and junior students, which may have influenced the results. However, these factors did not significantly alter the overall relationships between neuropsychological traits and attitudes toward danger. Another limitation lies in the difficulty of explaining some types of attitudes toward danger, particularly those where sensitivity to threats clashes with response patterns. For instance, “adequate with reduced sensitivity,” “anxious sensitivity,” and “ignoring sensitive” types present challenges in interpretation. The correlation between threat sensitivity and BAS persistence, along with the negative relationship between exaggerating dangers and sensitivity, raises questions about how these conflicting attitudes manifest. The need to address these and other unanswered questions provides a clear direction for future research into understanding the complexities of danger-related attitudes.

Conclusion

In summary, the findings of this research suggest that a person’s response to danger is shaped by the intricate interplay between their neuropsychological traits and personality characteristics. Neuropsychological factors are key in determining how behavior is activated or inhibited, while personal traits influence both sensitivity to threats and the methods employed to respond in risky situations.

The proposed hypotheses were largely confirmed. It was revealed that sensitivity to threats is more strongly connected to BAS sensitivity than BIS sensitivity and is associated with extraversion, conscientiousness, and adherence to societal norms. A similar pattern emerged for responses to danger, which were positively correlated with extraversion, openness to experience, conscientiousness, and adherence to norms, and negatively correlated with BAS-pleasure seeking and BIS-sensitivity to negative stimuli. The tendency to exaggerate danger (anxiety-driven response) was linked to a stronger BIS influence over BAS and was positively associated with neuroticism and introversion, while negatively correlated with openness to experience. The tendency to ignore dangers was influenced by a stronger sensitivity to BAS-pleasure seeking, with lower levels of benevolence, conscientiousness, and normativity.

This research also underscores how different combinations of neuropsychological and personality traits predict a person’s attitude toward danger. This insight can be useful in making adjustments both in organizational settings and in individual behaviors to enhance safety and prevent potential violations of safety protocols.

The results from this study can be applied to improve safety measures, taking into account the human factor, as well as in educating both youth and adults on safe behavior and managing risks in daily life.

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References

1. Gray JA. The neuropsychology of anxiety: an enquiry into the functions of the septohippocampal system. Oxford: Oxford University Press; 1982.
2. Grey JA, McNaughton N. The neuropsychology of anxiety: an enquiry into the functions of the septo-hippocampal system. 2nd ed. Oxford: Oxford University Press; 2000.
3. McNaughton N, Corr PJ. 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; 2008.
4. Corr PJ, McNaughton N. Neuroscience and approach/avoidance personality traits: a two stage (valuation–motivation) approach. Neurosci Biobehav Rev. 2012;36(10):2339-54. doi:10.1016/j.neubiorev.2012.09.013
5. Donahue JJ. Fight-Flight-Freeze system. In: Zeigler-Hill V, Shackelford TK, eds. Encyclopedia of personality and individual differences. Springer: Cham; 2020. doi:10.1007/978-3-319-24612-3_751
6. Blanchard DC, Hynd AL, Minke KA, Minemoto T, Blanchard RJ. Human defensive behaviors to threat scenarios show parallels to fear-and anxiety-related defense patterns of non-human mammals. Neurosci Biobehav Rev. 2001;25(7-8):761-70. doi:10.1016/s0149-7634(01)00056-2
7. Veenstra L, Schneider IK, Bushman BJ, Koole S L. Drawn to danger: trait anger predicts automatic approach behaviour to angry faces. Cogn Emot. 2017;31(4):765-71. doi:10.1080/02699931.2016.1150256
8. Lojowska M, Gladwin TE, Hermans EJ, Roelofs, K. Freezing promotes perception of coarse visual features. J Exp Psychol Gen. 2015;144(6):1080-8. doi:10.1037/xge0000117
9. Krupić D, Križanić V, Corr PJ. Personality and defensive behaviour: a factor analytic approach to threat scenario choices. Pers Individ Differ. 2016;94:303-8. doi:10.1016/j.paid.2016.01.045
10. Kimbrel NA, Nelson-Gray RO, Mitchell JT. BIS, BAS, and bias: the role of personality and cognitive bias in social anxiety. Pers Individ Differ. 2012;52(3):395-400. doi:10.1016/J.PAID.2011.10.041
11. Borders A. Rumination and related constructs: causes, consequences, and treatment of thinking too much. Academic Press; 2020.
12. Knyazev GG, Slobodskaya HR. Personality types and behavioural activation and inhibition in adolescents. Pers Individ Differ. 2006;41(8):1385-95. doi:10.1016/j.paid.2005.11.035
13. Buelow M. Risky decision making in psychological disorders. Academic Press; 2020.Available from: https://www.twirpx.org/file/3179615/
14. Krupić D. High BAS and low BIS in overconfidence, and their impact on motivation and self-efficacy after feedback. Primenj Psihol. 2017;10(3):297-312.
15. Bian J, Fu H, Jin J. Are we sensitive to different types of safety signs? Evidence from ERPs. Psychol Res Behav Manag. 2020;13:495-505. doi:10.2147/PRBM.S248947
16. Maralov VG, Gura AY, Tatlyev RD, Epanchintseva GA, Bukhtiyarova IN, Karavaev DM. Influence of the sex and age people's attitude toward hazards. Astra Salvensis. 2019;7(13):343-52.
17. Maralov VG, Sitarov VA, Kudak MA, Maralova TP, Koryagin II. Phenomena of adequate response, exaggeration or understatement of dangers by people. Perspect Sci Educ. 2020;45(3):360-78. doi:10.32744/pse.2020.3.27 (In Russ)
18. Maralov VG, Sitarov VA, Koryagina II, Romanyuk LV, Kudaka MA. The influence of irrational beliefs on attitudes to dangers among medical and psychological-pedagogical students. IJPRAS. 2021;10(1):77-87. doi:10.51847/Gqcy-uT
19. Karim S, Ahmad V. Level of awareness among staff and students of academic institutions towards Covid-19 in Western and Central Regions of Saudi Arabia. IJPRAS. 2020;10(4):169-75.
20. Niu L, Liu Y. The relationship between leadership safety commitment and resilience safety participation behavior. Psychol Res Behav Manag. 2022;15:517-31. doi:10.2147/PRBM.S349712
21. Molero F, Mikulincer M, Shaver PR, Laguía A, Moriano JA. The development and validation of the leader as security provider scale. J Work Organ Psychol. 2019;35(3):183-93. doi:10.5093/jwop2019a20
22. Smits DJ, Boeck PD. From BIS/BAS to the big five. Eur J Pers. 2006;20(4):255-70. doi:10.1002/per.583
23. Mitchell JT, Kimbrel NA, Hundt NE, Cobb AR, Nelson-Gray RO, Lootens CM. An analysis of reinforcement sensitivity theory and the five-factor model. Eur J Pers. 2007;21(7):869-87. doi:10.1002/per.644
24. Kelly D, Setman S. The psychology of normative cognition. The stanford encyclopedia of philosophy (Spring 2021 Edition), Edward N. Zalta, ed. 2020. Available from: https://plato.stanford.edu/archives/spr2021/entries/psychology-normative-cognition/.
25. Morris A, Cushman F. A common framework for theories of norm compliance. Soc Philos Policy. 2018;35(1):101-27. doi:10.1017/S0265052518000134
26. Kemmelmeier M, Jami WA. Mask wearing as cultural behavior: an investigation across 45 US states during the COVID-19 pandemic. Front Psychol. 2021;12:648692. doi:10.3389/fpsyg.2021.648692
27. Maralov VG, Malysheva EY, Nifontova OV, Perchenko EL, Tabunov IA. Development of a test questionnaire on the sensitivity to threats in adolescence. Prospect Sci. 2012;8(35):32-7. (In Russ.)

28. Maralov VG, Malysheva EY, Smirnova OV, Perchenko EL, Tabunov IA. Development of a test questionnaire to identify ways of responding in situations of danger in adolescence. Alm Mod Sci Educ. 2012;12(1):92-6. (In Russ.)
29. Carver CS, White TL. Behavioral inhibition, behavioral activation, and affective responses to impending reward and punishment: the BIS/BAS scales. J Pers Soc Psychol. 1994;67(2):319-33. doi:10.1037/0022-3514.67.2.319
30. Knyazev GG, Slobodskaya ER, Savostyanov AN, Ryabichenko TI, Shushlebina OA, Levin EA. Activation and inhibition of behavior as the basis of individual differences. Psychol J. 2004;25(4):28-40. (In Russ.)
31. Burlachuk LF, Koroljov LK. Adaptation of the big five locator scale. Vopr Psikhol. 2000;(1):126-34. (In Russ.) Available from: https://lib.iitta.gov.ua/707228/1/korolyov_lokator_bolshoy_pyatyerki.PDF (access date:17.03.2022)
32. Raygorodsky DY. Practical psychodiagnostics, methods and tests. Samara: Publishing House “BAHRAKH-M”; 2006. p. 549-672.
33. Logan E, Kaye SA, Lewis I. The influence of the revised reinforcement sensitivity theory on risk perception and intentions to speed in young male and female drivers. Accid Anal Prev. 2019;132:105291.
34. Ma-Kellams C, Wu MS. Gender, behavioral inhibition/activation, and emotional reactions to negative natural and social events. Pers Individ Differ. 2020;157:109809. doi:10.1016/j.paid.2019.109809
35. Oniszczenko W. The association between BIS/BAS and fear of COVID-19 infection among women. Curr Issues Pers. Psychol. 2021;9(3):237-45. Available from: https://czasopisma.bg.ug.edu.pl/index.php/CIiPP/article/view/6052
36. Ranđelović K, Ćirović N. Social anxiety and rumination in the context of the revised reinforcement sensitivity theory and the mediation model of social anxiety. Psihologija. 2022;55(1):1-24. doi:10.2298/PSI200702034R
37. Randles D, Flett GL, Nash KA, McGregor ID, Hewitt PL. Dimensions of perfectionism, behavioral inhibition, and rumination. Pers Individ Differ. 2010;49(2):83-7. doi:10.1016/j.paid.2010.03.002
38. Johnson SL, Turner RJ, Iwata N. BIS/BAS levels and psychiatric disorder: an epidemiological study. J Psychopathol Behav Assess. 2003;25(1):25-36. doi:10.1023/A:1022247919288
39. Chat IKY, Nusslock R, Moriarity DP, Bart CP, Mac Giollabhui N, Damme KS, et al. Goal-striving tendencies moderate the relationship between reward-related brain function and peripheral inflammation. Brain Behav Immun. 2021;94:60-70. doi:10.1016/j.bbi.2021.03.006
40. Dennis TA, Chen CC. Emotional face processing and attention performance in three domains: Neurophysiological mechanisms and moderating effects of trait anxiety. Int J Psychophysiol. 2007;65(1):10-9. doi:10.1016/j.ijpsycho.2007.02.006
41. Perkins AM, Cooper A, Abdelall M, Smillie LD, Corr PJ. Personality and defensive reactions: fear, trait anxiety, and threat magnification. J Pers. 2010;78(3):1071-90. doi:10.1111/j.1467-6494.2010.00643.x
42. Taju NFS, Ahmed BG, Abukhalid NH, Alsaikhan AS, Alhayyaf HH, Alotaibi KH, et al. An overview on the role of MRI in diagnosis and management of berry aneurysm. WJEB. 2021;10(3):38-41. doi:10.51847/0hl1BHlLpm
43. Bouayed J. Sorry, I am sneezing and coughing but I do not have COVID-19. Brain Behav Immun. 2022;101:57-8. doi:10.1016/j.bbi.2021.12.018
44. Zuckerman M. Sensation seeking and risky behavior. Washington, DC: American Psychological Association; 2007. doi:10.1037/11555-000
45. Castro C, Ventsislavova P, Garcia-Fernandez P, Crundall, D. Risky decision-making and hazard prediction are negatively related and could be assessed independently using driving footage. Psychol Res Behav Manag. 2021;14:857-76. doi:10.2147/PRBM.S305979
46. Wallace JC, Vodanovich SJ. Workplace safety performance: conscientiousness, cognitive failure, and their interaction. Occup Health Psychol. 2003;8(4):316. doi:10.1037/1076-8998.8.4.316
47. Clarke S, Robertson IT. A meta-analytic review of the Big Five personality factors and accident involvement in occupational and non-occupational settings. J Occup Organ Psychol. 2005;78(3):355-76. doi:10.1348/096317905X26183
48. Nikolskaya EY, Lepeshkin VA, Uspenskaya ME, Ushakov RN, Logunova NY, Novak LV. Formation of regional marketing system in the current context. J Adv Pharm Educ Res. 2021;11(3):144-9. doi:10.51847/ECJa7Yq4X8