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## The Relationship Between Behavioral Inhibition System Sensitivity and Neuroticism

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# The relationship between Behavioral Inhibition System sensitivity and Neuroticism



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## Abstract

Neuroticism is one of the dimensions of the Big Five personality model that measures different personality traits. Individuals who score high on the scale of neuroticism are more likely to experience negative emotions such as anxiety or fear, and these individuals are prone to lacking adaptive coping skills when dealing with stressors (Widiger, 2009). Another method to better appreciate differences in personality is known as the Behavioral Inhibition/Behavioral Activation System (BIS/BAS). Higher BIS scores are associated with increased sensitivity to punishments and increased experience of negative emotions such as anxiety and guilt (Carver & White, 1994).

The relationship between neuroticism and BIS sensitivity was investigated in this study. My hypothesis was that individuals who score higher on neuroticism will also have greater BIS sensitivity. A Pearson correlation was performed using Neuroticism and BIS data and a significant relationship was uncovered,  $r(112)=0.68$ ,  $p<0.001$ . The hypothesis that high-neuroticism individuals will have more activated BIS is supported by the collected data.

## Background

The big five personality traits established empirically by McCrea and Costa (1987) include five different dimensions -- Extraversion, Agreeableness, Neuroticism, Conscientiousness, and Openness. Neuroticism reflects a propensity towards worrying, insecurity and temperamental (McCrea&Costa, 1987). High neuroticism is associated with poor cognitive skills when dealing with stress (Eysenck,1967).

The BIS/BAS system is another approach to understand behaviors and personalities. The behavioral inhibition system (BIS) is one of the brain systems that are responsible for controlling emotional behavior (Gray,1991). People with high levels of BIS are sensitive to punishments (Smolewska, McCabe&Woody, 2006) and are prone to anxiety with withdrawal or avoidance behavior (Smits & Boeck, 2006).

Previous studies showed that high-neuroticism individuals had more negative primary and secondary appraisals and were prone to lacking effective coping skills to stressors (Gunthert, Cohen & Armeli,1999). Moreover, individuals who score more highly on neuroticism experience anxiety, guilt, and fear (Widiger, 2009). Research involving BIS show that individuals with greater BIS sensitivity are more sensitive to punishments and they avoid the behaviors that may lead to harmful outcomes (Widiger, 2009). It was demonstrated that the BIS system is also responsible for experiencing some negative emotions including anxiety, guilt, and frustration (Carver & White, 1994). Because neuroticism and the BIS system result in similar emotional experiences in individuals, we wished to evaluate the relationship between these 2 constructs.

## Hypothesis

Neuroticism score and BIS activity are positively related. Individuals who score higher on neuroticism will have greater BIS sensitivity.

## Method

To test the hypothesis, a total of 112 participants (69 females and 43 males) completed the study. All participants were recruited from undergraduate Introduction to Psychology courses at Case Western Reserve University. All participants were asked to complete two questionnaires: The Big Five Inventory-version 54 (John & Srivastava, 1999) and the Behavioral Inhibition and Behavioral Activation scales (Carver & White, 1994).

The Big Five Inventory contains 44 questions according to a 5 point Likert scale ranging from “Disagree Strongly” to “Agree Strongly.” For example, participants were asked to respond to items such as “worries a lot” and “get nervous easily.” We used answers from the 8 questions in the inventory that measures neuroticism.

The BIS/BAS scales contain 7 items that measure BIS sensitivity and the items were written in Likert format, ranging from 1 indicating a strong agreement to 4 indicating a strong disagreement. Examples of items that measure BIS activity include “I worry about making mistakes” and “criticism and scolding hurts me a lot”.

## Results

### Sample characteristics

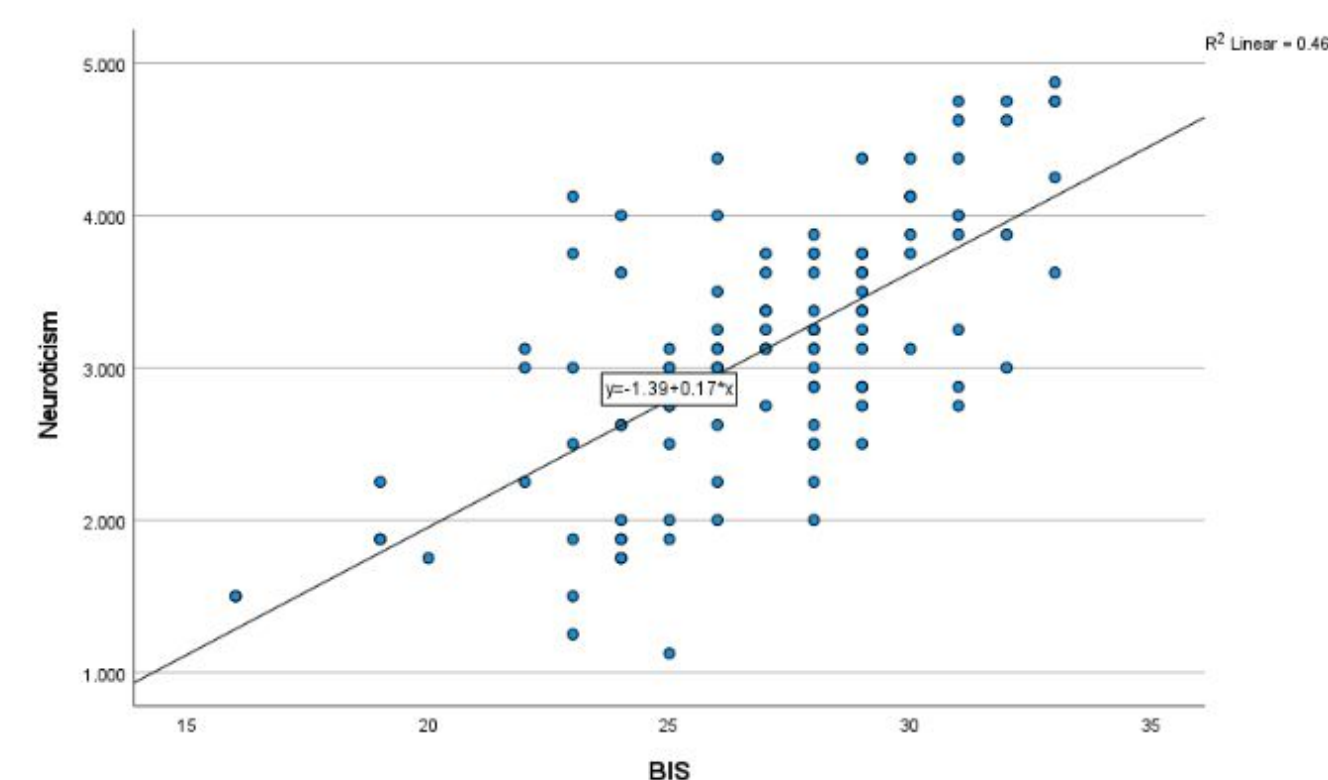
Of the 112 participants, 69 were females and 43 were males. The participants ranged in age from 18 to 22 years old ( $M = 18.98$ ,  $SD = 0.98$ ).

### Hypothesis testing

After running Pearson correlation test on participants' response on neuroticism and BIS sensitivity, we found a significant positive relationship between these two items ( $p<0.001$ ). Participants who score higher on neuroticism have greater BIS sensitivity.

		BIS	Neuroticism
BIS	Pearson Correlation	1	.680**
	Sig. (2-tailed)		.000
	N	112	112
Neuroticism	Pearson Correlation	.680**	1
	Sig. (2-tailed)	.000	
	N	112	112

\*\* . Correlation is significant at the 0.01 level (2-tailed).



## Discussion and Conclusion

In this study, we hypothesized that people who score high on neuroticism will also have high BIS sensitivity as well. The present results support our hypothesis by providing a significant strong positive relationship between people's BIS and neuroticism scores. One explanation for this phenomenon is that individuals who score high on neuroticism are likely to perceive anxiety when facing an ambiguous stimuli, thus their BIS systems are more activated for avoidance behaviors against possible punishments or loss of rewards. This is consistent with the idea from previous studies that the avoidance system is more strongly activated in high-neuroticism individuals (Gray & McNaughton, 2000).

One limitation of this study is that this study does not distinguish the specific causes of high neuroticism and highly activated BIS systems in individuals. As Aron and Aron (1997) claimed, sensitivity is not the same as fearfulness when facing the incoming ambiguous stimuli. However, people who are sensitive and people who are fearful both tend to be anxious when they face ambiguous stimuli. Thus, people can have high neuroticism or a highly activated BIS system with various causes, and figuring out the causes can be one of the important future directions of this study.

Other future directions include testing the generalizability of this research to people of all ages, since this study only relies on sample data collected from CWRU students. Moreover, this study focused on the relationship between neuroticism and the BIS system; the relationship between other dimensions of Big Five Personality traits and the BIS system still needs to be carefully examined. It is also possible that the BAS system, which is associated with positive feelings and responses to rewards, is connected with neuroticism.

In conclusion, based on the data collected, there is a strong positive relationship between neuroticism and BIS sensitivity in individuals.

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