

The Correlation Between Neuroticism in Big Five Personality Traits with Short-term Memory

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Abstract. The main research is working memory, long-term memory, and integrated study of memory. Most modern research barely covered the study of short-term memory. Nevertheless, short-term memory can let your life change in many ways, such as forgetting the key or forgetting your idea in a discussion. As an important part of memory, we decided to research its correlation with Neuroticism in Big Five personality traits. We will ask participants to watch a video and do a Big Five personality traits test for data measure and use the questionnaire to collect their data of ability in Neuroticism and short-term memory. We will also do related tests of other personality traits' correlation with short-term memory. For the data analysis part, we will use cor-test to calculate the data. The result shows there is a negative correlation between Neuroticism and short-term memory, which means people who have low levels of neuroticism should have better short-term memory. Extraversion has a positive correlation with short-term memory.

Keywords: Short-term memory, Neuroticism, Big Five personality trait.

1. Introduction

Most modern research prefers to research working memory because it is been used the most in many different situations and is closely related to daily life, by addressing daily situations, remembering some code or reading information, and having a relatively long memory period, which is enough for study and working; or long-term memory, which can influence people's lives for a few months or several years, which is usually used to record the most important information, or some other memory that might be used every day, such as your physical address, password for your bank account, or your daily speaking language. Compared to those two types of memory, as another part of memory, short-term memory seems to be less important than working memory and long-term memory. From many people's viewpoint, only a few seconds, even if not last for a minute's memory seems less important than the memory of several minutes, days, and months because it is truly way too short compared to other types of memories. However, Short-term memory could be the most important part, even if it just takes several seconds; short-term memory could be the most important type of memory in our daily life. Most people might have that experience that forgetting what they were trying to say a few seconds ago in a discussion; some people usually forget where they put their phones a few seconds ago; do they take their house key with them even the house key might just inside their hands; or do they lock the door when they leave their house? There are just several

common issues that short-term memory will affect people's lives, and that might be even worse: such as forget passport when you are going on a travel, forget submit your key assignment to lose your grade, or ignoring a main rule that might let you lost your job. All of those situations are based on the effect of the short-term memory. Even though short-term memory is only about a few seconds, it still can affect people's lives in many different ways, all those effects can easily be ignored; however, when they accumulate, they will create a huge amount of effect on people's lives, and the terrifying part is most people don't even notice this effect. That will cause people life fall into an awkward situation, which is people will never think their issue is related to their short-term memory, but they are unlucky. With a better short-term memory, people could have a way more efficient daily working time, or a better grade after the exam. Could you imagine if you could be more focused on what you are working with and decrease the amount of time you spend on weird thoughts that jump up when you are studying and working, how would that change your efficiency? Or you don't need to recheck your equipment when you already leave the house for 2 minutes. All those situations show the importance of short-term memory.

In that case, if people could have better short-term memory, their lives could be more efficient and easier. By improving that short-term memory, humans could have more efficient work in other areas. In research about working memory with unpredictable childhood memory experiments. It shows out people with unpredictable childhood memory have better working memory; nevertheless, under unpredictable and unstable situations, the working memory shows a decreasing trend. [1]. In unpredictable environments, people are more likely to be depressed and feel stressed about something they cannot control [2]. Depression and stress will let people have unrelated thoughts and worries, those thoughts can easily distract people's attention, and decrease the rehearse of what they trying to concentrate on. That decrease will be relatively weaker with people who have an unpredictable childhood, which lets people start to have a tolerance for stress and upset, however, when that unpredictable situation is maintained for a longer period, the people who have unpredictable childhoods will be the same as others. All of their working memory will decrease. As a memory produced by Short-term memory, there also might be a connection between short memory and stress. Another research about mindfulness meditation with visual short-term memory shows that mindfulness meditation could improve short-term memory. Their speculation is meditation could reduce depression and relieve stress, and the decreasing of those negative emotions leads to the improvement of short-term memory. [3]. That means after meditation, people will have less depression and stress, and that change lets people could be more concentrate and as a result improve their short-term memory. Connecting to the first research, people with unpredictable childhood memory have better working memory because they are less likely to be affected by depression, so they can be more concentrated ignore the influence of negative emotion, and have better working memory.

But all of their ideas are mainly speculations, what we will do is try to prove that speculation is true. We will prove that there is a correlation between those negative emotions and short-term memory. The way we want to test their correlation is to focus on Neuroticism in Big Five Personality traits In previous study, Kang and Doughty already prove the correlation between memory and personality[4,5]. In the Big Five Personality traits, Neuroticism is the personality trait that is deeply related to emotions and stress. If we could test the correlation between Neuroticism and short-term memory, in that case, we could test the correlation between negative emotion and short-term memory. This research will help people to have a deeper understanding of how Neuroticism interacts with short-term memory. That will as fundamental research help the following researcher to keep studying the causation between Neuroticism and short-term memory. And help

people to understand how to improve their short-term memory and improve the efficiency of working and studying. So, we research question is what is the correlation between Neuroticism in Big Five personality traits with short-term memory? We hypothesize that neuroticism has a negative correlation with short-term memory.

2. Methods

For participants, we will collect data from participants around 18 to 35 years old people from all around the earth, but mainly focus on China and America. We want our data to come from as wide a range as possible, so we will try to questionnaires as a method of how we will collect the data. The participants will be asked to take a Big Five personality traits test first on <https://bigfive-test.com/>. In that Big Five personality trait test, participants will be asked to finish that test by answering questions about whether the description is similar to their situation, their answers will be selected from five levels, very accurate, moderately accurate, nether accurate nor inaccurate, moderately inaccurate, and very accurate. The score of their choice will be placed from 5 to 1. And they will fill in the questionnaire about each five score for their Big Five personality traits. Also, the subsection of Neuroticism, which includes anxiety, anger, depression, self-consciousness, immoderation, and vulnerability, will be required to fill in their score for the later data analysis. After the Big Five personality traits test, the participants will be asked to remember a sequence of an orderless letter in ten seconds, the total letter will be 20 different characters, and the amount of letters the participants remembered will be listed as the score they got for one of the grade to test their verbal short-term memory. In the third part of the questionnaire, the participants will be asked to watch an 8 seconds video of a person who is walking on the street. After the participants watch the video, they will be asked, to recall some of the details in that video about the main character's cloth's color. That is to test the visual short-term memory. After they finish, we will use the cor. Test to test the correlation between each of the Neuroticism in Big Five personality traits with both visual short-term memory, and verbal short-term memory.

3. Result

The average neuroticism in the Big Five personality traits will be 81.5 (sd = 5.3). The average score of Anxiety is 16.3 (sd = 1.1), Anger is 13.3 (sd = 0.3), Depression is 14.3 (sd = 1), Self-consciousness is 15.3(sd = 0.7), Immoderation is 12.5(sd=0.2), and Vulnerability is 15.6 (sd = 0.7). That result of an average score for Extraversion is 85 (sd = 2.4), Openness is 86.4 (sd = 1.3), Agreeableness is 65.3(sd = 9.3), and Conscientiousness is 76 (sd = 8.4). Participants with higher scores in verbal short-term memory have a high correlation ($r = -0.67$). In the subsections, Anxiety has a strong negative correlation with short-term memory($r = -0.64$), and Depression also has a strong negative correlation with short-term memory($r = -0.54$). Those two subsections of Neuroticism have a higher correlation with short-term memory compared to other subsections. The participants' scores of Extraversion in Big Five personality traits also have a high correlation with visual short-term memory ($r = 0.63$). For the rest of the traits in the Big Five personality traits don't have a strong correlation with short-term memory. The Neuroticism and Extraversion in Big Five personality traits are the main traits that have a strong correlation with short-term memory.

4. Conclusion

There is a strong negative correlation between Neuroticism in Big Five personality traits with short-term memory, and Neuroticism, Depression, and Anxiety are the main results that will affect the result of short-term memory formation. Extraversion in the Big Five personality traits also has a strong positive correlation with short-term memory forming. The reason why Depression and Anxiety of Neuroticism correlate with short-term memory is that they can easily distract people's attention to prevent them from totally concentrating on what they view and memorize, which will cause a decrease in their short-term memory. Anxiety and Depression all easily let people distract from their concentration by increasing many useless thoughts, which means people cannot rehearse their thoughts and decrease their short-term memory.

Extraversion's score is way too high in my questionnaire, with a small standard division, we think that might be the reason for all of the people who try to give us feedback on this questionnaire are those people who like to socialize and get that information from their other friends. Those people who have a low Extraversion might not be willing to take this questionnaire. That might be a type 1 error, most of the data that I collect are high Extraversion, and their Neuroticism is relatively lower than the main group. That might also need to be retested or use other types of research to redo it again. But that might also show that there is a correlation between Extraversion and Neuroticism.

Also, because this research is an observation research that used the questionnaire, and several questions are based on limited time or have some other restriction. We can hardly control all of the participants who will follow our decided steps to finish their questionnaire, they might not follow the time limit or go back to rewatch the video for a better score for themselves. Our questions for both verbal short-term memory and visual short-term memory are only about one or two questions, the data might be not accurate, and the amount of questions should be more than that and increase the difficulty for deeper research. Also, it's kind of hard to keep providing different short-term memory measure tests if the participants already understand how will the researcher test them. That is another issue that needs to be conquered.

All in all, we successfully prove that there is a strong negative correlation between Neuroticism in Big Five personality traits and short-term memory. In Neuroticism, Anxiety, and Depression are relatively more important compared to other subsections of Neuroticism. Extravagance has also been finding have a strong positive correlation with short-term memory, but because the sample seems to cover a limited population, that might a possible to have a type 1 error that still needs to be retested. There are still some limitations to this research, such as the data collection methods cannot be strictly controlled, and the questionnaire could cover a more broad area with extra questions. Also, we are not sure if our third variable exists, and we did not do the test between people with different personality traits might have affected the result we percent.

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