



## Cognitive Flexibility and Big Five Personality Traits of College Students

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DOI: <https://doi.org/10.55248/gengpi.2022.31281>

### ABSTRACT

Cognitive flexibility refers to understanding how to learn and having the flexibility to approach learning in different ways. The person can modify their cognitive processing methods in response to novel and unanticipated environmental circumstances. Previous studies showed that the cognitive flexibility of individuals changes according to their personality traits. The present study investigated the relationship between cognitive flexibility and Big Five personality traits to understand how individuals with different personality traits adapt to new surroundings. 221 college students were selected using the convenience sampling method. The cognitive flexibility scale and ten-item personality inventory were administered online using google forms. The data collected was analysed based on Pearson's bivariate correlational research design. The results of this research showed a significant correlation between cognitive flexibility and Big Five personality traits. Cognitive flexibility was found to have a significant and positive correlation with extraversion, conscientiousness, emotional stability and openness to experience. The results of this study corroborate earlier studies that show a strong relationship between personality traits and cognitive flexibility.

Keywords: Cognitive flexibility, Big Five personality traits, Cognitive processes, Behavioural responses

### 1. Introduction

It is conceivable that the perception of voluntary action by cognitive agents depends on the ability to learn correlations between inputs, actions, and environmental outcomes and to alter continuing behaviour in response to obvious environmental changes or our current objectives. Cognitive flexibility is the capacity to shift back and forth between two notions or to think about several concepts at once. Cognitive flexibility, in animal models, mainly refers to the capacity to change a behavioural response in response to the circumstances (Scott, 1962). According to human functional magnetic resonance imaging (fMRI), some brain regions, such as the prefrontal cortex and the basal ganglia, are active during task-switching activities that require cognitive flexibility (Bell et al., 2008).

Cognitive flexibility is defined as a person's knowledge that there are options and alternatives accessible in any given scenario, their willingness to be flexible and adapt to the situation, and their confidence in their ability to be flexible. People who can recognise prospective changes based on environmental variables have more cognitive flexibility than those who see only one acceptable or proper behavioural reaction. There have been studies that examined cognitive flexibility in executive function or cognitive control (Chan et al., 2008). The adaptability of the systems under investigation, including categorization and language, has been addressed in other studies (Blaye & Bonthoux, 2001). If we shift our attention to more practical areas, cognitive flexibility has been examined in research on autism, depression, and mathematics (Star & Seifert, 2006).

Today, the five-factor model (FFM) is the most preferred method for describing the structure of human traits. According to this model, five fundamental aspects describe most personality traits: Neuroticism, Openness to Experience, Extraversion, Agreeableness, and Conscientiousness (Fayombo, 2010). The Big Five, each stand for a substantial number of connected behavioural traits. Being organised, disciplined, and goal-oriented are examples of

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conscientiousness. The level of emotional stability, impulse control, and anxiety is referred to as neuroticism. A higher level of talkativeness, assertiveness, and sociability are signs of extraversion. A strong curiosity about innovative concepts and a propensity for novelty and variety are signs of openness. Finally, being helpful, cooperative, and understanding of others is referred to as being agreeable.

People can exercise cognitive flexibility when faced with challenges by employing cognitive evaluation and correction. Studies have revealed that cognitive flexibility was affected by an individual's personality traits (Murdock et al., 2013). The goal of the current research is to add to the body of knowledge about how personality factors can predict the cognitive flexibility of individuals. This research sought to determine how cognitive flexibility mediated the relationship between personality traits.

### 1.1. Hypotheses

- There will be a significant relationship between extraversion and cognitive flexibility
- There will be a significant relationship between agreeableness and cognitive flexibility
- There will be a significant relationship between conscientiousness and cognitive flexibility
- There will be a significant relationship between emotional stability and cognitive flexibility
- There will be a significant relationship between openness to experience and cognitive flexibility

## 2. Methods

### 2.1. Participants

Using the convenience sampling method, 221 emerging adults from various colleges in Kerala state were selected as a sample where the ages of the participants ranged from 18 to 25. They had between 5 and 10 minutes during their free time to complete the survey, which was carried out using Google forms. Participant's consent was gained before the distribution of the questionnaire. They were given guidelines for responding to each item. Acquired data were examined using SPSS - 28.0.1.1. Pearson bivariate correlation was used to find the relationship between college student's cognitive flexibility and their personality traits was analysed.

### 2.2. The Cognitive Flexibility Scale

Martin & Rubin (1995) constructed a 12-item inventory called the Cognitive Flexibility Scale to measure the cognitive flexibility of participants. Participant's responses were marked on a six-point Likert scale ranging from Strongly Disagree to Strongly Agree. The reliability of the tool was found to be 0.83 and validity was established

### 2.3. Ten-Item Personality Inventory

Gosling et al. (2003) developed Ten-Item Personality Inventory (TIPI) which is a 10-item short inventory to assess the big-five dimensions (openness to experience, emotional stability, extraversion, agreeableness, and conscientiousness). Each of these traits had two items; one was positive and another was a negative statement where each item contained two descriptors (ex. I see myself as extraverted, enthusiastic). It had a six-week test-retest reliability of 0.72. Seven-point Likert scale from strongly agree to strongly disagree was used as a rating scale for the participants to respond.

## 3. Results and Discussion

Table 1. Bivariate Correlation among Cognitive Flexibility and Big Five Personality Traits

	Cognitive Flexibility
Extraversion	0.329**
Agreeableness	0.036
Conscientiousness	0.363**
Emotional Stability	0.382**
Openness to Experience	0.528**

It was discovered that cognitive flexibility and extraversion ( $r = 0.329^{**}$ ) had a significant and positive correlation. As a result, the hypothesis, which states that "There will be a significant relationship between extraversion and cognitive flexibility" is accepted. There is no significant relationship between agreeableness and cognitive flexibility ( $r=0.036$ ) and therefore the hypothesis "There will be a significant relationship between agreeableness and cognitive flexibility" is rejected. Cognitive flexibility and conscientiousness ( $r = 0.363^{**}$ ) were found to be positively and significantly correlated. Thus, the hypothesis that "There will be a significant relationship between conscientiousness and cognitive flexibility" is accepted. A positive and significant connection existed between cognitive flexibility and emotional stability ( $r=0.382^{**}$ ). Therefore, the hypothesis that "There will be a significant relationship between emotional stability and cognitive flexibility" is accepted. Additionally, there is a significant and positive correlation between cognitive flexibility and the personality trait known as openness to experience ( $r = 0.528^{**}$ ). Hence, the hypothesis that states "There will be a significant relationship between openness to experience and cognitive flexibility" is accepted.

This study aimed to determine the relationship between cognitive flexibility and big-five personality traits. The results of this research revealed a significant correlation between cognitive flexibility and Big Five personality traits such as extraversion, conscientiousness, emotional stability and openness to experience. More extraverted individuals tend to be more gregarious, talkative, sociable, outgoing, active, warmhearted, affiliative, and expressive (Watson and Clark, 1997). Extroverts believe that they are more productive, enjoyable and engaged in different areas of their lives. Extroverted people like working with the community and typically favour social work fields (İnanç & Yerlikaya, 2014). According to the results of the current study, extraversion and cognitive flexibility were positively correlated. The community is where extraverted people love to be, and they frequently exhibit flexibility in the face of diversity. As a result, they can deal with and solve difficulties in a variety of scenarios. Due to their compatible structures, they are resistant to differences, which supports the idea that they are cognitively malleable (İnanç & Yerlikaya, 2014).

In the present study, the findings state that conscientiousness had a positive association with cognitive flexibility. People who score higher on conscientiousness are more likely to be rule-abiding, dependable, organised, efficient, and goal-oriented (Hogan & Ones, 1997). Conscientiousness emerges in the evaluation of motivation directed toward goal-oriented behaviours (Costa & McCrae, 1992). According to certain research, conscientiousness is commonly found to be a reliable predictor of academic performance (O'Connor & Paunonen, 2007). Thus, it is stated that among management students, conscientiousness and academic success are positively correlated. Therefore, it is obvious that conscientiousness and cognitive flexibility are closely related.

The results indicated a positive correlation between emotional stability and cognitive flexibility, thus a negative correlation between neuroticism (emotional instability) and cognitive flexibility. Decision-making challenges, restlessness, anxiety, emotionality, facile rage and grief and excessive reactivity are only a few characteristics of neuroticism (Bouchard et al., 1999). According to the literature, people with low degrees of neuroticism are emotionally stable and have control over how they react to things. Contrarily, a person with a high level of neuroticism is more prone to experiencing mental pain when exposed to stressful situations. When considering the notion of cognitive flexibility, it becomes clear that it encompasses having the capacity to deal with extraordinary circumstances and being open to experiencing them. (İnanç & Yerlikaya, 2014)

Based on our findings a strong and positive relationship existed between openness to experiences and cognitive flexibility. Openness refers to receptivity to new learning, change and novel experience (McCrae and Costa, 1997). Bilingual people were able to have information about both cultures, bilingual people tended to be less bound by one cultural convention and are more receptive to fresh and novel ideas. They thus showed greater degrees of receptivity to new experiences, were able to come up with more original ideas, outperformed peers on insight learning tasks, and generated more imaginative narrative writing (Leung & Chiu, 2010). The findings of this study support prior research that demonstrates a significant correlation between personality factors and cognitive flexibility.

There were a few limitations to this study that must be taken into consideration while interpreting the results. The fact that self-reports of personality traits may not always be reliable was one of the study's main drawbacks. Only 221 people participated in the study, thus more research with a larger sample size had to be done. Emerging adults made up the sole group of the study's sample. To establish consistency, additional studies must be done on a broad population. The dearth of earlier research in this area is another constraint. Additionally, the correlation might not point to a causal connection.

This study's objective was to identify whether there is any connection between cognitive flexibility and Big Five personality traits. Factors of cognitive flexibility were found to have a significant relationship with certain personality traits. There has to be more research done, with a bigger sample size covering a diverse population. This study provided a new avenue for understanding cognitive flexibility about the personality traits of individuals.

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**References**

1. Anderson, C. M. (1998). Aggressive communication traits and their relationships with the cognitive flexibility scale and the communication flexibility scale. *Journal of Social Beonality*, 13(3), 531-540.
2. Bell, J. D., Leber, K. M., Blankenship, H. L., Loneragan, N. R., & Masuda, R. (2008). A new era for restocking, stock enhancement and sea ranching of coastal fisheries resources. *Reviews in fisheries science*, 16(1-3), 1-9.
3. Bouchard, G., Lussier, Y., & Sabourin, S. (1999). Personality and marital adjustment: Utility of the five-factor model of personality. *Journal of Marriage and the Family*, 651-660.
4. Blaye, A., & Bonthoux, F. (2001). Thematic and taxonomic relations in preschoolers: The development of flexibility in categorization choices. *British Journal of Developmental Psychology*, 19(3), 395-412.
5. Canas, J. J., Fajardo, I., & Salmeron, L. (2006). Cognitive flexibility. *International encyclopedia of ergonomics and human factors*, 1(3), 297-301.
6. Chan, Y. E. (2008). Why haven't we mastered alignment? The importance of the informal organization structure. *MIS Quarterly executive*, 1(2), 2.
7. Costa Jr, P. T., & McCrae, R. R. (1992). Four ways five factors are basic. *Personality and individual differences*, 13(6), 653-665.
8. Fayombo, G. (2010). The relationship between personality traits and psychological resilience among the Caribbean adolescents.
9. Gosling, S. D., Rentfrow, P. J., & Swann Jr, W. B. (2003). A very brief measure of the Big-Five personality domains. *Journal of Research in personality*, 37(6), 504-528.
10. Heinström, J. (2003). Five personality dimensions and their influence on information behaviour. *Information research*, 9(1), 9-1.
11. Hogan, J., & Ones, D. S. (1997). Conscientiousness and integrity at work. In *Handbook of personality psychology* (pp. 849-870). Academic Press.
12. Ionescu, T. (2012). Exploring the nature of cognitive flexibility. *New ideas in psychology*, 30(2), 190-200.
13. İnanç Yazgan, B., & Yerlikaya, E. E. (2014). *Kişilik Kuramları*. Ankara: Pegem Akademi.
14. Kehagia, A. A., Murray, G. K., & Robbins, T. W. (2010). Learning and cognitive flexibility: frontostriatal function and monoaminergic modulation. *Current opinion in neurobiology*, 20(2), 199-204.
15. Komaraju, M., Karau, S. J., Schmeck, R. R., & Avdic, A. (2011). The Big Five personality traits, learning styles, and academic achievement. *Personality and individual differences*, 51(4), 472-477.
16. Kertechian, S. K. (2018). Conscientiousness as a key to success for academic achievement among French university students enrolled in management studies. *The International Journal of Management Education*, 16(2), 154-165.
17. Kumaranayake, A. R. (2017). Review of the current status of the studies on personality traits. *IJAR*, 3(11), 38-45
18. Lounsbury, J. W., Steel, R. P., Loveland, J. M., & Gibson, L. W. (2004). An investigation of personality traits in relation to adolescent school absenteeism. *Journal of youth and adolescence*, 33(5), 457-466.
19. Leung, A. K. Y., & Chiu, C. Y. (2010). Multicultural experience, idea receptiveness, and creativity. *Journal of Cross-Cultural Psychology*, 41(5-6), 723-741.
20. McCrae, R. R., & Costa Jr, P. T. (1997). Personality trait structure as a human universal. *American psychologist*, 52(5), 509.
21. Odacı, H., & Cikrikci, Ö. (2019). Cognitive flexibility mediates the relationship between big five personality traits and life satisfaction. *Applied Research in Quality of Life*, 14(5), 1229-1246.
22. O'Connor, M. C., & Paunonen, S. V. (2007). Big Five personality predictors of post-secondary academic performance. *Personality and Individual differences*, 43(5), 971-990.
23. Paaijmans, K. P., Heinig, R. L., Seliga, R. A., Blanford, J. I., Blanford, S., Murdock, C. C., & Thomas, M. B. (2013). Temperature variation makes ectotherms more sensitive to climate change. *Global change biology*, 19(8), 2373-2380.
24. Price, E., Ottati, V., Wilson, C., & Kim, S. (2015). Open-minded cognition. *Personality and Social Psychology Bulletin*, 41(11), 1488-1504.
25. Roccas, S., Sagiv, L., Schwartz, S. H., & Knafo, A. (2002). The big five personality factors and personal values. *Personality and social psychology bulletin*, 28(6), 789-801.
26. Scott, W. A. (1962). Cognitive complexity and cognitive flexibility. *Sociometry*, 405-414.
27. Star, J. R., & Seifert, C. (2006). The development of flexibility in equation solving. *Contemporary educational psychology*, 31(3), 280-300.
28. Tüfekçibaşı, S., & Şahin, M. (2020). Investigation of the Relationship between Cognitive Flexibility Levels and Personal Features of University Students. *International Journal of Psychology and Educational Studies*, 7(2), 142-151.
29. Watson, D., & Clark, L. A. (1997). Extraversion and its positive emotional core. In *Handbook of personality psychology* (pp. 767-793). Academic Press.