

# **A study on the influence of Neuroticism on Anxiety levels, Attention and Intrinsic Motivation of undergraduate students.**

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## **Abstract**

This study investigated the influence of the personality trait Neuroticism affects Agreeableness, anxiety, attention and intrinsic motivation of undergraduate students. Participants completed personality assessments (Big Five), anxiety measures (State and Trait), and were assessed on attention and intrinsic motivation using Digit Span Test and Intrinsic Motivation Inventory (IMI), respectively.

Key words: Personality traits, intrinsic motivation, digit span.

## **1. Introduction**

University students face multiple challenges while balancing academic, social and personal lives. Growing academic stress, financial concerns and social pressure contribute to increased stress level (Gore et al., 2013) decreased focus, span of attention and intrinsic motivation. Personality and the anxiety level of students often determine their span of attention as well as intrinsic motivation. Personality, as defined by Allport, 1937, "Personality is the dynamic organization within the individual, of those psycho-physical systems that characterize his/her characteristic adjustment to the environment". Personality of students is measured using the NEO-Five Factor Inventory-3, Paul T Costa et al., 2007 which provides a quick assessment of general personality traits using the five main dimensions of personality. Anxiety is an emotion characterized by feelings of tension, worried thoughts, and physical changes like increased blood pressure. The State-Trait Anxiety Inventory (STAI) is a commonly used measure of trait and state anxiety, Spielberger et al., 1983 in individuals. Attention span is the amount of time spent concentrating on a task before becoming distracted. Distraction or loss of focus is a commonly occurring experience for many students. It occurs when attention is uncontrollably diverted to another activity or sensation. Students' attention span is measured using the Digit Span Questionnaire, Melissa Lamar et al., 2010. This questionnaire allows us to better understand the working memory. Intrinsic motivation is the act of doing any task solely because it is internally rewarding. It can be achieved by engaging into activities that give you internal satisfaction, as simple as happiness, over external rewards and punishment. The intrinsic motivation of students is examined by Intrinsic Motivation Inventory (IMI), Ryan et al. This inventory is used to assess a person's subjective experience of interest, effort, and other factors. Over the years numerous researchers have documented a significant relationship between personality and social attention (Bischof et al., 2014), commitment to goals (Maria et al., 2021), intrinsic motivation (Saleh et al., 2018), learning and motivation of college students (Tian & Ou, 2023). Anxiety has been negatively correlated to

attention (Shi, 2019), positively correlated to poor academic performance and degrading mental health (Hartanto, 2023), along with a significant negative correlation with intrinsic motivation (Pei & Junhong, 2023) among others.

Numerous studies have been conducted on personality and anxiety but there is an incomplete understanding of the interplay of personality type and anxiety level experienced by university students and its impact on their academic performance, social and personal life. The existing literature offers little insight into how individual differences in personality and anxiety affect attention span and intrinsic motivation among university students. The ability to sustain attention, particularly in demanding academic contexts, is crucial for student success. If difficulties arise in sustaining attention it will hinder academic performance and contribute to student stress. Span of attention is affected by multiple factors, including personal, psychological and external factors, such as physical and mental health, personality traits, classroom environment, teaching method used and individual differences. It has been noted that traditional lecture methods used in universities are unable to retain students' attention (Bradbury & A, 2016) and the presence of digital devices and multitasking behaviors may negatively impact attentional control (H & S, 2013). Evaluating intrinsic motivation in students is crucial, as it provides valuable insights into their learning process, engagement, and overall academic success. It has been previously noted that students who are intrinsically motivated are better learners, score well, work harder than those who are not intrinsically motivated and eventually, are more academically successful. Intrinsic motivation is driven by a combination of factors that satisfy basic psychological needs for autonomy, competence, and relatedness, as well as factors that make activities interesting, enjoyable, and meaningful.

Evaluating and understanding students' span of attention and intrinsic motivation is crucial for enhancing learning outcomes as both the factors are fundamental for receiving and processing information and performing in crucial academic moments. Understanding individual differences is beneficial as students largely vary in their cognitive abilities, learning styles and differ in perceiving stress. Using the Digit Span Test, the attention span, working memory and verbal short-term memory of students is examined. It gives an insight into how well students can encode, store and retrieve information over a period of time. The IMI or Intrinsic Motivation Inventory is a valuable tool which helps in understanding how people experience an activity. Even though the tool is called IMI, it also measures other factors such as, interest/enjoyment, perceived competence, effort, value/usefulness, etc.

This present study on 60 undergraduate students gives us an in-depth understanding of the underlying differences in cognitive processes and how it affects their intrinsic motivation and attention span. Furthermore, identifying external distractions, which reduce span of attention, and introducing conducive learning environment to minimise distractions and maximise overall potential.

Aim of this study is to understand the effects of personality type and level of anxiety on span of attention and intrinsic motivation of 60 undergraduate students.

## **2. Literature Review**

Multiple studies of personality have been conducted on students using the NEO Five Factor Inventory-3 (Paul T Costa et al., 2007). A study was conducted on medical students, given the influence personality can have on empathy and exploring the relationship between empathy and personality, using three different measures of empathy, and taking into account gender and specialty preference (Guilera et al., 2019). Empathy scales showed weak and moderate correlation with personality. The strongest correlations were observed between IRI-Fantasy and Openness, and between IRI-Personal Distress and Neuroticism.

Authors of this study confirmed that empathy is related to personality and that these results can help to design programs to study if some personalized intervention strategies could improve the empathy in medical students. Another important study was conducted in India which aimed at investigating “Relationship between Study Habits and NeoFFI’s Factors among Private and Government School Students’. Forty students, who participated in the study were examined on Three factors i.e. extraversion, conscientiousness and openness to experience, and it was noted that these factors have a significant relationship with study habits .This may be because self discipline, the habit of trying new ideas and altruism have more impact on the ability of individuals for learning (Chouhan & Kackar, 2016). This study through the use of Study habit Inventory and NEO –Five factor inventory concludes on the basis of findings that the traits of assertiveness, positive emotions, task orientation and comprehension are significantly correlated in the private group. It is also found out that the traits of self discipline, dutifulness, self actualization, task orientation, concentration, and study sets are significantly correlated for government groups. The State-Trait Anxiety Inventory (STAI) is one of the most widely used scales for the evaluation of anxiety in medical and, to a lesser extent, psychiatric patients. A study conducted by Akhdan & Aminatun (2022) in Indonesia examined “The Correlation between Anxiety and Student GPA & EPT Score during COVID 19 Pandemic”. This study investigated the relationship between anxiety, GPA, and EPT scores among 39 Indonesian English education students at Universitas Teknokrat Indonesia during online learning due to the COVID-19 pandemic. The results showed a strong negative correlation between anxiety and both GPA and EPT scores, with the t-test value exceeding the t-table value. This led the researchers to conclude that anxiety has a statistically significant negative impact on student achievement. Leal et al. (2017) investigated the relationship between trait anxiety (a general tendency to be anxious) and state anxiety (anxiety in a specific situation) in two different threatening situations: interpersonal threat (measured by a video-monitored Stroop test) and physical threat (measured by anxiety before tooth extraction). They hypothesized that trait and state anxiety would be correlated in both situations. However, they found that trait anxiety correlated with state anxiety only in the interpersonal threat situation, not in the physical threat situation. Attention span of students affects their information retaining capacity and eventually their performance. “Challenging the six-minute myth of online video lectures: Can interactivity expand the attention span of learners?” (Geri et al., 2017)- this study investigated whether adding interactive elements to online video lectures could improve learner engagement, particularly for longer videos. Authors conclude that learning analytics can help improve learning processes and that adding interactive elements can effectively extend learners' attention spans during online video lectures. “Attention span during lectures: 8 seconds, 10 minutes, or more?” (Bradbury & A, 2016) stated that the traditional lecture format is being criticized, with some institutions shortening lectures because student attention tends to drift away in 10-minute intervals. Bradbury found that the greatest variability in student attention arises from differences between teachers and not from the teaching format itself. Certainly, even the most interesting material can be presented in a dull and dry fashion, and it is the job of the instructor to enhance their teaching skills to provide not only rich content but also a satisfying lecture experience for the students. Intrinsic motivation provides an indication of whether a learner is driven by internal rewards, internal satisfaction, personal fulfilment and a desire to learn, understand and explore novelty. A Turkish university conducted a study on 316 students to understand the “Impact of Motivation and Personality on Academic Performance in Online and Blended Learning Environments”. The authors, Alkış & Temizel, (2018) found that in online learning, conscientiousness was linked to LMS( Learning Management System) use, while no such link existed in blended learning. Self-

efficacy predicted LMS use online, whereas task value and test anxiety were predictors in blended learning. Conscientiousness and LMS use correlated with course grades in both environments. Finally, self-efficacy for learning performance also predicted grades in the online setting.

**Participants:**

The current study was done on 60 participants (men, n=30; female, n=30) all college students aged 19-21 years. All participant data are from Kolkata, West Bengal. The current sample provided an opportunity to examine an age group that had not yet been examined in a study of personality and anxiety with respect to intrinsic motivation and attention span. This study was conducted on this age group since the effect of the DVs play a vital role in academic excellence and student social relations and personal lives.

**Procedure:**

All participants were selected through purposive sampling (non-parametric). The participants were assessed using the 4 questionnaires, NEO-FFI-3, STAI, Digi Span and IMI. All participants were seated and the assessments were conducted. The NEO-5, STAI and IMI Questionnaires were self-report paper-and-pencil tests administered in person at baseline to all participants. While the Digit Span test was conducted through face-to-face communication with the experimenter.

Paul T. Costa, Jr., PhD, and Robert R. McCrae, PhD (1989, 1992), NEO Personality Inventory (NEO PI), Revised NEO Personality Inventory (NEO PI-R), and NEO Five-Factor Inventory (NEO FFI). The NEO-FFI-3 (Normative Update) is a shorter, 60-item version of the NEO-PI-3 (Normative Update) and was developed with the aim of assessing the five domains: (a) neuroticism (N), the tendency to experience negative emotions and psychological distress in response to stressors; (b) extraversion (E), the degree of sociability, positive emotionality, and general activity; (c) openness to experience (O), levels of curiosity, independent judgment, and conservativeness; (d) agreeableness (A), altruistic, sympathetic, and cooperative tendencies; and (e) conscientiousness (C), one's level of self-control in planning and organization. The five domains are hypothesized to be relatively orthogonal to one another. The NEO inventories are composed of descriptive statements (e.g., "I am not a worrier," "I really enjoy talking to people") rated on a 5-point Likert-type scale (1 = strongly disagree to 5 = strongly agree).

The State-Trait Anxiety Inventory (STAI) is a commonly used measure of trait and state anxiety (Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983). It can be used in clinical settings to diagnose anxiety and to distinguish it from depressive syndromes. It is an inventory with 2 forms, form Y-1 and form Y-2, one measuring the state or general anxiety of an individual whereas the later measures the overall anxiety of the individual. It has 40 questions in total, 20 on each form. Internal consistency coefficients for the scale have ranged from .86 to .95; test-retest reliability coefficients have ranged from .65 to .75 over a 2-month interval (Spielberger et al., 1983). Test-retest coefficients for this measure in the present study ranged from .69 to .89. Considerable evidence attests to the construct and concurrent validity of the scale (Spielberger, 1989).

The Digit Span Test was first introduced as part of the Wechsler-Bellevue Intelligence Scale (1939) by psychologist David Wechsler. It is now a subtest in the Wechsler Intelligence Scales (WAIS & WISC) and is widely used to assess attention, working memory, and cognitive processing.

The test consists of two main components:

1. Digit Span Forward – The participant repeats a series of numbers in the same order as presented, assessing short-term auditory memory and attention.
2. Digit Span Backward – The participant repeats the numbers in reverse order, testing working memory, cognitive flexibility, and executive functioning.
3. A variation, Digit Span Sequencing, requires the participant to recall numbers in ascending order, further assessing memory manipulation.

The Intrinsic Motivation Inventory (IMI) is a multidimensional tool used to assess participants' subjective experience in laboratory experiments on intrinsic motivation and self-regulation (Ryan, 1982; Ryan, Mims & Koestner, 1983; Plant & Ryan, 1985; Ryan, Connell, & Plant, 1990; Ryan, Koestner & Deci, 1991; Deci, Eghrari, Patrick, & Leone, 1994). It measures six subscales: interest/enjoyment, perceived competence, effort, value/usefulness, pressure/tension, and perceived choice. The interest/enjoyment subscale is the primary measure of intrinsic motivation. Perceived choice and competence positively predict intrinsic motivation, while pressure/tension negatively predicts it. Effort relates to some motivation studies, and value/usefulness is used in internalization research (Deci et al., 1994).

### 3. Methodology

A quantitative study on the effect of Neuroticism on individuals' Agreeableness, anxiety, intrinsic motivation and attention span was conducted on college students. The study focuses on understanding what role factors such as Neuroticism play on how much an individual is agreeable in nature, anxious and focussed on completing the work at hand. The dependent variables (DV) in this study are thus agreeableness, anxiety, intrinsic motivation and attention span and the independent variable (IV) is Neuroticism. Statistical analysis was conducted with respect to the data collected. This is a non parametric study using purposive or judgemental sampling methods.

Based on existing literature and observed patterns, the following hypothesis has been proposed for the present study:

$H_0$ = there is no significant relation between personality trait of neuroticism with agreeableness, anxiety, attention and internal motivation

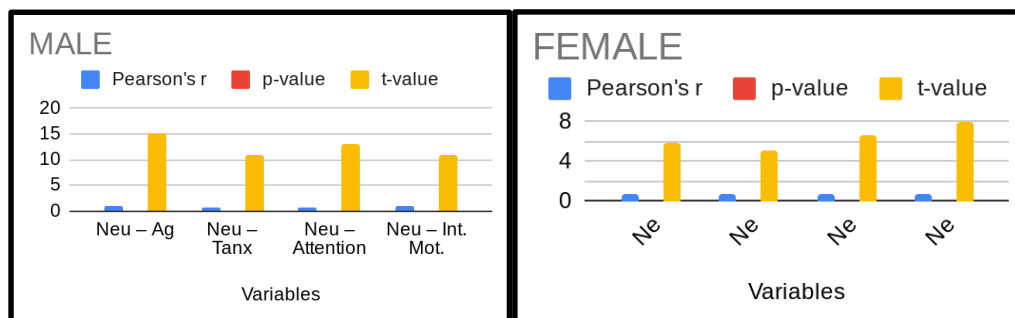
$H_1$ = there is a significant relation between personality trait of neuroticism with agreeableness, anxiety, attention and internal motivation

Variables	Pearson's r	p-value	t-value
Neu – Ag	0.84	0.0001	15.19
Neu – Tanx	0.75	0.0003	11.02
Neu – Attention	0.8	0.003	13.06
Neu – Int. Mot.	0.9	0.005	10.93

**Fig 1 : male**

**Fig 2 : female**

Variables	Pearson's r	p-value	t-value
Neu – Ag	0.74	0.000001	5.82
Neu – Tanx	0.701	0.0001	5.2
Neu – Attention	0.78	0.001	6.6
Neu – Int. Mot.	0.83	0.0005	7.88



## 4. Interpretation

The tables above display the relationship between Neuroticism with Agreeableness, Trait Anxiety, Attention and Internal Motivation.

Fig.1 displays the Pearson's r value and t-values for the male population.

All the obtained values are greater than their critical values hence proving that they are significant in nature. Thus, H1 is accepted whereas H0 is rejected.

Fig.2 displays the Pearson's r value and t- values for the female population. All the obtained values are greater than their critical values hence proving that they are significant in nature. Thus, H1 is accepted whereas H0 is rejected.

Therefore, there is a significant relationship between Neuroticism with Agreeableness, Trait Anxiety, Attention and Internal Motivation.

## 5. Conclusion:

Thus from this study the relationship between the personality trait Neuroticism with agreeableness, anxiety, attention and internal motivation among undergraduate college students was found using Five Factor Inventory-3 (NEO-FFI-3), State Trait Anxiety Inventory (STAI), Digi Span Questionnaire, and Intrinsic Motivation Inventory (IMI).



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