

The Relationship Between Big Five Personality Traits and Preferences in Learning Styles Among University Students of Odisha

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ABSTRACT

Objectives: The main objectives of the current study are to assess the gender differences in Big Five personality traits and learning styles and also investigate the relationship between Big Five personality traits and learning styles of adolescents in Odisha.

Methods: The data was collected from three state universities by using the VARK questionnaire, and Big Five Inventory. Two hundred twenty-five participants were selected through purposive sampling techniques within the age between 18-21 years (19.38 ± 1.26). Data were analyzed by SPSS using one-way MANOVA and Pearson 'r'.

Results: Findings suggested that gender differences are found in conscientiousness traits in the Big Five personality. Boys are more identified with conscientiousness personality traits than girls. The descriptive analysis suggested that girls more preferred auditory and read/write learning styles compared to boys, whereas boys more preferred visual and kinaesthetic learning styles. The Results also revealed different personality traits distinctly associated with learning styles among adolescents.

Conclusion: The boys are more rational or thoughtful compared to girls and they are more curious about seeking knowledge and ideas, more goal-directed, and less impulsive.

Keywords: Gender, Learning Styles, Personality Traits, Adolescents, Odisha.

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INTRODUCTION

Learning is a complex continuous process by which knowledge or behaviour changes due to experience (Paolini, 2015). As a result, learning from experience plays a major role in enabling us to do many activities that we are not born to do, e.g., from simplest activities, such as running or walking in the field, to the more complex tasks, such as solving mathematical problems (Krause & Cortis, 2012). A learner has the freedom and capability to learn from any of the modes of learning, but he/she chooses one of them as their preference (Bhardwaj & Pal, 2012). Duff (1995) defined learning style as the tendency of individuals to select one mode of learning over others. This might be possible because a person tends to favour a particular learning style for gaining knowledge. Cassidy (2004) also denoted learning style as a person's preferred tactics for acquiring knowledge. Mackeracher (2004)

delineated learning styles as responding toward learning in an overall pattern (i.e., physical, emotional, social, and cognitive). The preferences of learning styles allow individuals to choose suitable classroom activities, develop an interest in their study, create meaningful goals, high academic engagement, and increase their academic performance (AlNazeer, 2015; Alwin, 2012). Education is just one approach to learning, and it is preferred as a key to success in economic demand, advancement, and career development. Furthermore, necessary knowledge and skills may fulfill and achieve societal demand and economic prosperity for present and future generations (Zu, 2009). The students differ in interpreting, understanding, and perceiving the world (Siddiqui & Rashid, 2022).

Concept of VARK Model of Learning Styles
VARK acronym stands for Visual, Auditory, Read/Write, Kinaesthetic. This model focuses on

how learners can achieve their optimal level of learning and enjoy it in a full-fledged manner. The VARK model is designed for different types of learners and their best way of doing the task (Fleming & Baume, 2006). Neil D added the name, and Neil Fleming conceptualized it as aVARK in 1987. The VARK model is a perceptual model of learning by which students gain knowledge and skills. Some learners equally value the four modes of learning to complete their task known as multimodal learners, whereas some learners prefer only a single mode to complete their task known as unimodal learners.

Gender and Learning Styles

Boys and girls differ in their learning styles. The VARK scale was used to measure the different modes of learning preferences. To examine the gender differences may influence preferences for learning styles, Peyman et.al. (2009) conducted a study to identify the learning styles of medical college students. They suggested that more than 56% of participants prefer a multimodal learning style to complete and reach the academic goal. Girls tended to be more diverse in preference modalities for learning styles compared to boys. To determine the learning styles among young adolescents, Mohammed et al. (2010) demonstrated and concluded that out of the total participants, 48.4% of participants preferred single learning styles, and the rest of the participants preferred multimodal learning styles. The study concluded that there was a statistically significant relationship between gender and preferences of learning styles, and boy participants prefer more kinaesthetic learning styles compared to counterpart girls (Silva et al., 2005; Hartlieb et al., 2017)). The research evidenced that girls used a reflective learning style. Other related studies stated that boys are more likely to use the kinaesthetic learning style, while girls use the auditory learning style (Asiabar et al., 2015).

Hartlieb et al. (2017) concluded that girls preferred the single-mode learning style of reading/writing, but boys preferred multimodal learning styles like reading/writing and kinaesthetic. Fida et al. (2017) conducted a study on gender differences in learning styles among boys' and girls' learners. It was evinced that male learners had higher scores in three modes of

learning styles (i.e., active-reflective, sensing-intuitive, and sequential-global modes of learning style) than their female counterparts. Whereas female learners had higher scores in the visual-verbal mode of learning style in comparison to their male counterparts. How easily to reach academic goals, students identify and set their learning styles (Khajavikhan et al., 2014).

Gender and Personality Traits

Some studies suggested that boys and girls differ in some personality characteristics (Ashmore, Del Boca, & Wohlers, 1986; Deaux & Lewis, 1983). Many research findings stated boys are seen to be more aggressive, arrogant, competitive, energetic, independent, dominant, cruel, rude, and unemotional relative to girls, and girls seem to be more anxious, affectionate, dependent, emotional, sensitive, submissive, compassionate, and sentimental (Shinar, 1975; Williams & Best, 1982, 1990; Aros, Henly & Curtis, 1998; Liben & Bigler, 2002). Although past research has examined the gender difference in Big Five personality traits among students, the findings still are not clear enough. For example, studies reported there is a gender difference in the personality traits of agreeableness, conscientiousness, and neuroticism. Whereas no significant gender difference was found between boys and girls regarding extraversion and openness to experience (Siddiqui & Khalid, 2014). However, girls had higher levels of agreeableness and conscientiousness in comparison to their counterparts, and the neuroticism personality trait was high among boys in comparison to girls (Vianello et al., 2013). Many studies concluded that girls are more trustworthy, helping, kind, quite thoughtful, knowledgeable about social skills, can control impulses, show goal-directed behaviour in life, are emotionally expressive, sociable, confident, friendly, and talkative, and may also experience negative emotions such as aggression, sadness, unstable emotions, or emotional instability (Vianello et al., 2013).

Personality Traits and Learning Styles

Komaraju et al. (2011) attempted to find out the relationship between Big Five personality traits and learning styles among undergraduate college

students. Results of the study indicated that two of the Big Five personality traits (i.e., conscientiousness and agreeableness) were positively related to all four learning styles of students. However, the neuroticism personality trait was negatively correlated with all four learning styles. A well-evidenced by researchers was that of having a linkage between personality traits and learning styles. Prior Studies indicated that learning styles, including visual-auditory-reading-kinaesthetic methods, become an essential part or element of learning style and efficiency (Byl & Brand, 2019; Apipah et al., 2018). Similarly, Varadwaj (2016) reported that there was a positive relationship between personality traits (i.e., conscientiousness, agreeableness, openness to experience, and extraversion) and learning styles, whereas a negative relationship or association prevailed between neuroticism personality traits and learning styles of learners. The research shreds of evidence supporting the previous studies stated and evinced that there was a predominantly strong relationship between the personality type and learning styles of participants (Treeton & Walter, 2009).

Rationale of the study

As we observed some research gaps in our previous. Gender is always a big challenge in psychology research to provide a conclusion. If one study confirmed that females are more agreeable, conscientious, and extraverted than boys, another study rejects the findings (Slobodskaya & Kornienko, 2021). Murphy et al. (2021) reported that there is a cross-cultural factor limiting our conclusion to define the gender differences in Big Five personality traits. Similarly, there have a mixed findings among the previous studies on the role of gender in the VARK model or preferences of learning styles.

In addition, Big Five personality and learning styles influence their academic achievement, thinking, communication between the teachers and students, creativity, and teachers' teaching strategies. The findings of the previous studies suggested that lack of consistency in the results of the correlation between the Big Five personality traits and preferences in the learning styles of Seyal et al. (2019), and Abouzeid et al. (2021). A trend of inconsistent, unexpected, interesting, and

contradictory results was found in previous studies which highlighted the findings of no gender differences in preference in learning styles among boys and girls (Eid et al., 2021; Nuzhat et al., 2013). The examination and generalization of gender differences in personality is a big challenge and may be limited for all cultures (Schmitt et al., 2016). Many times, our cultural values and beliefs decide our personality, it decides how a girl and a boy should behave in society and express their traits through behaviours and which should not (Schmit et al., 2016). Sometimes, societies may influence personality traits such as patriarchal societies different from egalitarian societies. Hence present study will address such issues to fill the research gaps.

Research objectives:

The main objectives of the present study are as follows:

1. To examine the gender differences in Big Five personality traits.
2. To examine the gender differences in preferences of learning styles.
3. To examine the relationship between Big Five personality traits and learning styles among university students of Odisha.

Research hypotheses:

The following are some major hypotheses:

1. The girls would score high on agreeableness, and neuroticism and boys would score high on extraversion, openness to experience, and conscientiousness in Big Five personality traits.
2. The boys would prefer visual and auditory learning styles and boys would prefer read/write and kinaesthetic learning styles.
3. The kinaesthetic, and visual learning styles would be positively associated with conscientiousness and openness to experience.

METHODOLOGY

Design and Sample

Participants were purposively selected from three different universities in Odisha. Among those 250 selected adolescent participants, 25 participants did not participate in this study due to some reasons. They dropped out due to personal reasons and unwillingness. 225 (125 boys and 100 girls) participants were included as final samples for the current study. The data was

collected from two groups of participants, boys and girls aged 18 to 21 (Mean Age = 19.38 years, SD = 1.26). The demographic data was collected from every participant using a demographic questionnaire (see Table 1).

Table 1 Demographic Characteristics of Participants

Characteristics	Participants' Demographics	
Gender	Boys	125 (55.56%)
	Girls	100 (44.44%)
Age (Years)	Range	18 to 21 Years
	M_n ± SD	19.38 ± 1.26
Education	Graduate	197 (87.56%)
	Non-Graduate	28 (12.44%)
Socio-Economic Status (SES)	High	41 (18.22%)
	Moderate	139 (61.78%)
	Low	45 (20%)
LivingPlace	Urban	60 (26.67%)
	Semi-Urban	45 (20%)
	Rural	120 (53.33%)
MobileUse	Yes	214 (95.11%)
	No	11 (4.89%)

Inclusion and Exclusion Criteria: The participants who came under the age of 18 to 21 and were pursuing a graduation degree or already completed their graduation were included. The absent and aged more than 21 and lower than age 18 students were excluded from the participants. Students' treatment under any medical supervision (physical or mental) was excluded.

Measures

- Demographic Questionnaire:** A demographic questionnaire used to assess personal details. The main purpose was to reduce the external error or effect in the current study. Close-ended questions were used for demographic information about life, e.g., age (18 to 21), gender (Male/Female), educational status (Graduate/Non-Graduate), socioeconomic status (High, Moderate, Low), Living place (urban, semi-urban, and rural), and Mobile Use (Yes/No).
- VARK Instrument:** The VARK scale has sixteen items with multiple-choice (each item has four choices). It is divided into four subscales: Visual, Auditory, Read/Write, and Kinaesthetic. The participants chose one mode at a time. The scale provided an acceptable internal consistency reliability, with an $\alpha = .77$.

- BFI Instrument:** We used the Big Five Inventory (BFI) which is comprised of a 44-item self-report inventory and is based on a five-factor model (John & Srivastava, 1999). The inventory is based on the Likert continuous 5 rating scale within a range from 5 (Strongly Disagree) to 1 (Strongly Agree). The inventory was a good reliability coefficient with each factor of the personality traits, openness to experience is .78, conscientiousness is .72, extraversion is .80, neuroticism is .85, and the overall reliability coefficient ranges from $\alpha = .65$ to .86 (Worrell & Cross, 2004; Nunes et al., 2018).

Procedure

The researchers did face-to-face interactions with participants provided a brief idea about the study and informed them of their role and importance in their study. First, participants were assessed through the Big Five Inventory, and then the VARK scale was applied to them. The VARK questionnaire and BFI were applied to a total of 225 university students in Odisha. Although there was no time bound to end the test, the participants were expected to complete it within 20 to 25 minutes. Informed consent was obtained from each participant after a brief explanation of the study.

STATISTICAL ANALYSIS

For the analysis of data, the Multivariate Analysis of Variance (MANOVA) test was administered to examine the gender differences in learning preference and personality trait scores of the data. Along with MANOVA, we examine the relationship between personality traits and learning style preferences through the Pearson 'r' correlation in SPSS Version 26.

RESULTS

Table 2 presented the mean and standard deviation of boys and girls and the total score of both genders in the total of nine factors listed above with different divisions. The big five personality traits have five basic domains,

extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience. The learning styles of the VARK model have four basic domains, visual, auditory, read/write, and kinaesthetic. By analysing the big five traits and comparing the mean scores of boys and girls in extraversion, agreeableness, conscientiousness, and openness to experience traits, the mean scores of boys were slightly higher than girls, but in neuroticism, the mean score of girls was higher compared to scores of boys. In learning styles, scores of girls in auditory and read/write were higher than their counterparts, whereas scores of boys in visual and kinaesthetic were higher.

Table 2 presented descriptive statistics values of included variables

Descriptive Statistics			
	Gender Type	Mean	Std. Deviation
Extraversion	Boys	27.4640	5.05541
	Girls	26.8600	2.81059
	Total	27.1956	4.21063
Agreeableness	Boys	35.6400	2.81528
	Girls	35.6000	2.66667
	Total	35.6222	2.74422
Conscientiousness	Boys	29.6720	3.90982
	Girls	27.3100	3.12273
	Total	28.6222	3.76241
Neuroticism	Boys	20.3600	6.23518
	Girls	22.4600	4.64371
	Total	21.2933	5.66972
Openness to Experience	Boys	38.4800	3.33747
	Girls	36.9800	3.58160
	Total	37.8133	3.52045
Visual	Boys	3.3040	1.17243
	Girls	2.8000	1.25529
	Total	3.0800	1.23303
Auditory	Boys	4.5120	1.35370
	Girls	5.5400	1.29037
	Total	4.9689	1.41860
Read	Boys	3.0240	1.48359
	Girls	4.1000	1.27525
	Total	3.5022	1.49142
Kinaesthetic	Boys	5.1760	1.25122
	Girls	3.6600	1.45796
	Total	4.5022	1.54146

The current study used Box's M test of equality of covariance, which deals with the null hypothesis and states that covariance matrices of the dependent variables are equal across different

groups. It is stated the significant differences in covariance matrices among groups using $p < .001$, the assumption equality covariance

matrices are violated, and Pillai’s test is used for multivariate analysis instead of Wilk’s Lambda test. Levene’s Test of Equality of Error Variances examines the error of dependent variables across groups. The assumption of the error variance across dependent variables was not violated, $p > .05$, error variance was not varied from one group to another group. The error variances of extraversion, agreeableness, conscientiousness, neuroticism, openness to experience, visual,

auditory, Read, and Kinaesthetic are equal in all factors.

Table 3 presented a multivariate test of MANOVA by using Pillai’s Trace with an alpha of .05. The current study revealed that boys and girls differ; Pillai’s Trace = **.102**, $F(9, 215) = 2.704, p < .01$, multivariate $\eta^2 = .102$. The results revealed that gender difference was shown between personality traits and preferences of learning styles. The Partial Eta squared indicated that exposure effected only 10% effect on outcome variables.

Table 3 presented values of multivariate analysis

Multivariate Tests							
Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Gender	Pillai's Trace	.102	2.704	9	215	.005**	.102
	Wilks' Lambda	.898	2.704	9	215	.005**	.102
	Hotelling's Trace	.113	2.704	9	215	.005**	.102
	Roy's Largest Root	.113	2.704	9	215	.005**	.102

Note: ** $p < .01$

Through SPSS Version-26 software used data analysis and interoperation, MANOVA was used for one independent factor (gender) and nine dependent factors (extraversion, agreeableness, conscientiousness, neuroticism, openness to experience, visual, auditory, read/write, and kinaesthetic). The significance of MANOVA ($p < .01$), the test used univariate ANOVA to examine the effects between groups, both boys and girls (refer the Table 4 for detailed information). There were no significant differences shown among boys and girls on extraversion, agreeableness, neuroticism, and openness to experience personality traits, $F(1,$

223) = 2.340 (extraversion), .866 (agreeableness), .077 (neuroticism), and 1.673 (openness to experience), $p > .05$. But conscientiousness trait was influenced by gender and boys were more conscience compared to girls, $F(1, 223) = 14.597, p < .001$. Similarly, in the preferences of learning styles, boys and girls were preferred equally in all modes of learning, and not any significant differences among them, $F(1, 223) = .398$ (visual), .005 (auditory), .014 (read/write), and .004 (Kinaesthetic), $p > .05$. The findings of the current study suggested that gender does not influence the personality traits and preference for learning modes except conscientiousness trait.

Table 4 Gender Differences on Big Five Personality Traits and Preferences of Learning Styles

Tests of Between-Subjects Effects							
Source	Dependent Variable	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Gender	Extraversion	91.592	1	91.592	2.340	.128	.010
	Agreeableness	73.728	1	73.728	.866	.353	.004
	Conscientiousness	665.858	1	665.858	14.597	.000***	.061
	Neuroticism	3.042	1	3.042	.077	.781	.000
	Openness to experience	232.562	1	232.562	1.673	.197	.007
	Visual	.968	1	.968	.398	.529	.002
	Auditory	.008	1	.008	.005	.946	.000
	Read	.022	1	.022	.014	.906	.000
	Kinaesthetic	.008	1	.008	.004	.948	.000
Error	Extraversion	8728.408	223	39.141			

	Agreeableness	18978.112	223	85.104
	Conscientiousness	10172.142	223	45.615
	Neuroticism	8776.798	223	39.358
	Openness to experience	31000.878	223	139.017
	Visual	542.472	223	2.433
	Auditory	386.632	223	1.734
	Read	352.760	223	1.582
	Kinaesthetic	417.832	223	1.874
	Extraversion	148696	225	
	Agreeableness	163756	225	
	Conscientiousness	166863	225	
	Neuroticism	93112	225	
Total	Openness to experience	184584	225	
	Visual	2886	225	
	Auditory	7510	225	
	Read	4305	225	
	Kinaesthetic	3487	225	

Note: *** $p < .001$

Figure 1 represents the mean score differences between boys and girls in their personality traits. From the above figure-1, it can be observed that boys have higher mean scores in the personality traits of openness to experience, neuroticism, conscientiousness, and extraversion in comparison to girls. Whereas, girls have higher mean scores in the personality traits of agreeableness in comparison to their counterparts' boys. However, in table 4 is stated that there is a significant difference between boys and girls in their conscientiousness ($p < .001$) and , auditory, read/write, and kinaesthetic).

boys have higher conscientiousness as compared to girls.

Figure 2 represents the mean score differences between boys and girls in their learning styles. From the above figure-2, it can be observed that boys have higher mean scores in the read/write and auditory learning styles. Whereas, girls have higher mean scores in the kinaesthetic and visual learning styles. However, regarding Table 4, it is stated that there exists no significant difference between boys and girls in all four learning styles (i.e., visual

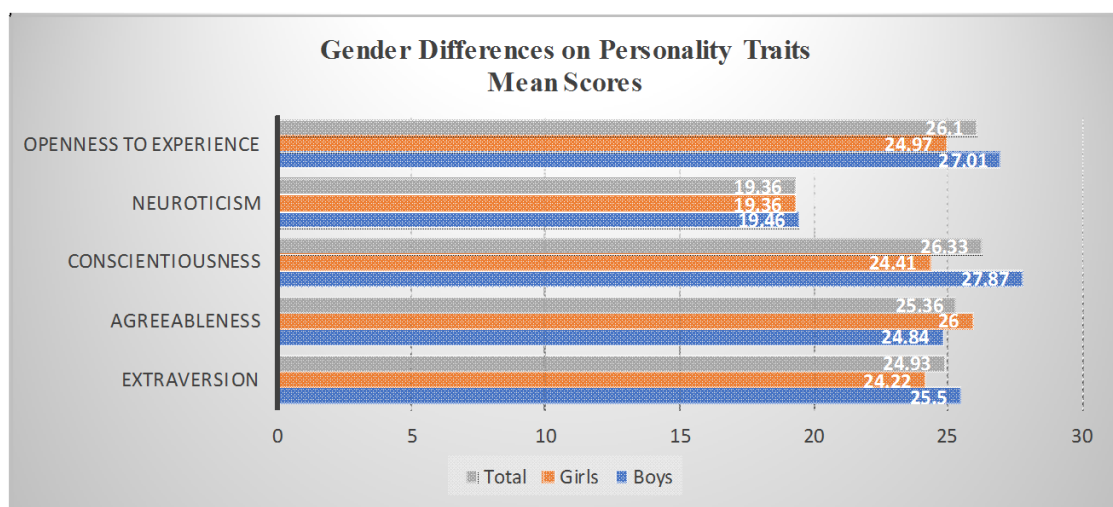


Fig. 1 Graphical representation of mean scores on personality traits of boys' and girls' university students of Odisha.

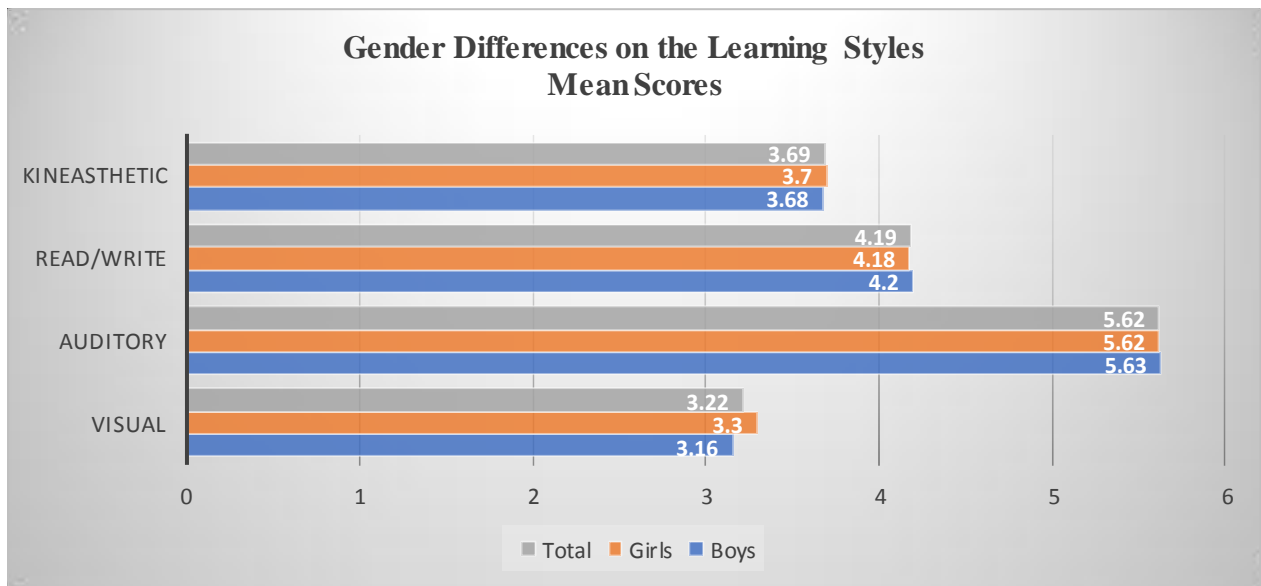


Fig. 2 Graphical representation of mean scores on learning styles of boys’ and girls’ students in Odisha.

Table 5 presented the Pearson ‘r’, which was used to find out the relationship between learning styles and personality traits.

Table 5 Bivariate Correlations between Big Five personality traits and preferences of learning styles.

	1	2	3	4	5	6	7	8	9
Extraversion	1								
Agreeableness	0.15*	1							
Conscientiousness	0.13*	0.10*	1						
Neuroticism	-0.11*	-0.37**	-0.18*	1					
Openness to Experience	-0.03	0.18*	-0.03	-0.18*	1				
Visual	-0.07	-0.12*	0.11*	-0.06	0.05	1			
Auditory	0.05	0.09	-0.11*	0.03	-0.08	-0.21**	1		
Read	0.07	-0.08	-0.10*	0.23**	-0.08	-0.21	0.08	1	
Kinaesthetic	-0.09	-0.03	0.16*	-0.13*	0.14*	0.08	-0.40	-0.3	1

Note: * = p < .05, ** = p < .01

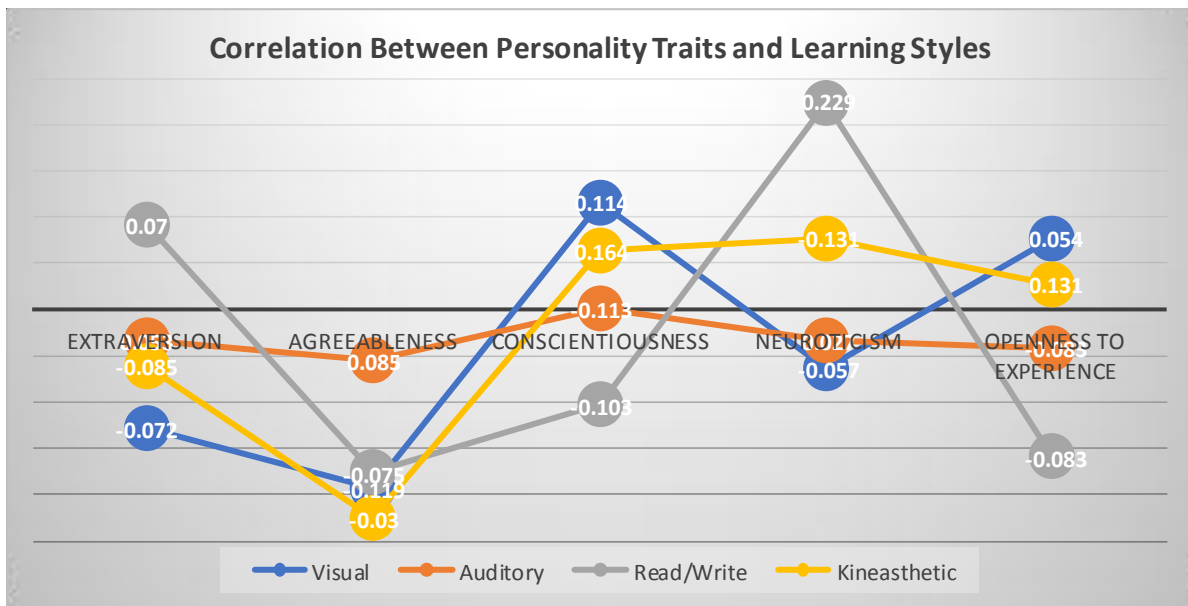


Fig. 3 Graphical representation of correlation values of personality traits and learning styles of boys and girls in Odisha.

DISCUSSION

The multivariate analysis revealed that gender impact on personality traits and preferences of learning styles was 10.2 percent only. By the way after the COVID-19 pandemic somehow, we got to look at some changes in Indian education systems. It was transformed from the traditional method to the online method. But overall, nowadays Indian students prefer both conventional and modern systems. According to Nuzhat et al. (2013), preferences of learning styles were not influenced by gender differences or academic performance. The student's memory may be influenced through discussing with assistance, teaching others, and listening to again recording of radio tapes. However, descriptive statistics reported that girls' students preferred auditory and read/write, whereas kinaesthetic and visual learning styles were preferred by boys. The auditory preference learners have command over the language. They easily narrate stories and poetry, learn a foreign language with less support, spell smoothly, and can remember facts, names, and detailed characteristics. However, kinaesthetic preference learners have command over their environment and learn through practice. They have a high level of energy and prefer to move, touch, and interact with their environment, and give importance to experience in learning something. The read-or-write method is considered a harder skill by young boys' learners than girls' learners. Studies revealed that young

learners do not possess high patience to read and make notes of every sentence which makes them boring. Hence, they prefer easy and selective tasks to complete in a short period. That is why, most students prefer practical learning or hands-on practice and lecture method to learn (Eid et al., 2021).

The visual learning style was positively related to conscientiousness and openness to experience whereas negatively related to extraversion, agreeableness, and neuroticism personality traits. Another way, the auditory learning style is fully opposite of the visual learning mode, because it is positively related to extraversion, agreeableness, and neuroticism, and negatively to conscientiousness and openness to experience. We compared visual and kinaesthetic learning styles and concluded that both are related to similar personality characteristics. We can say that visual and kinaesthetic learners are more friendliness, emotionally expressive, sociable, confident, talkative, trustworthy, helpful, and kind, they are also involved in negative effects e.g., emotional instability, aggressive, and experience mood disturbance but in low quantity, and the auditory learners are opposite of it. The read/write learners are feeling negative effects but they are more sociable and want to express emotions in low quantity.

This study revealed that boys and girls yielded no gender differences in the personality traits of extraversion, openness to experience,

agreeableness, and neuroticism. However, there was a significant gender difference in the conscientiousness personality trait, and boys scored higher on conscientiousness than girls. The current study was fully based on the Indian context or collectivistic culture. According to the context of India, a large population of females are unemployed and involved in housekeeping and working as a housewife. Before independence (1947), women of India were not treated equally to men populations and were not getting educational facilities from inside or outside. Even today, females' foeticide is higher and lacks facilities like males (Gupta & G Singh, 2022).

There were mixed results findings from previous studies and the current research findings are partially supported by previous empirical research (Zai & Jan, 2019). From the research study of gender and regional differences in the Big Five personality traits among students in Punjab, Pakistan, it was evinced that there was a significant gender difference in the openness to experience personality trait. However, no significant gender differences were found in the measures of conscientiousness, extraversion, agreeableness, and neuroticism personality traits among boys and girls (Zai & Jan, 2019). Gender differences in Big Five personality traits and academic performance among students of a Nigerian private university. They concluded from the results that girls had higher levels of agreeableness and neuroticism personality traits in comparison to boys. Moreover, no significant gender difference was found in conscientiousness personality traits among boys and girls (Olowookere et al., 2020).

CONCLUSION

The current study suggested that there are no gender differences in personality traits only except the trait of conscientiousness in adolescents of Odisha. The boys are more rational or thoughtful compared to girls and they are more curious about seeking knowledge and ideas, more goal-directed, and less impulsive. However, there are no gender differences found in learning styles, and both boys and girls prefer multimodal learning styles. We can also conclude that there are significant relationships present between the big five personality traits and preferences of learning styles.

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