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Personality Traits, Creative Self-efficacy and Creativity Inventory Among Technical College Students in Shandong, China

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Abstract

In this paper, three questionnaires of personality traits, creative self-efficacy and creativity were verified, and descriptive statistical analysis was carried out on the questionnaires. In this study, quantitative research methods were used, and SPSS software was used to measure reliability and validity, and descriptive statistical analysis was performed. The study found that the overall reliability of the questionnaire was greater than 0.8, and the individual dimensions were greater than 0.6; the validity test showed that the KMO values were all greater than 0.6, and the Bartlett's sphericity test P values were all less than 0.001. Principal component analysis showed that the main factors can effectively reflect the scale information; Descriptive statistical analysis found that the overall level of creativity and self-efficacy of Chinese vocational students was average. Finally, it was concluded that the reliability, validity of the three questionnaires on Big Five personality traits, creative self-efficacy, and creativity all meet the requirements. The creative self-efficacy and creativity level of Chinese vocational students need to be improved urgently, and this study is of great value.

Keywords: *Personality Traits; Creative Self-efficacy; Creativity; Reliability; Validity；Descriptive statistical analysis*

1 Introduction

The 21st century is the century of innovation. The era of innovation requires innovative talents, and innovative talents require innovative education. Faced with the challenges of the rapid development of science and technology in the 21st century and the increasingly fierce competition in the knowledge economy and society, it is particularly important to educate and cultivate innovative talents. Higher vocational education plays an important role in China's innovative development, and the creativity development of higher vocational education significantly affects China's global innovation index. Creativity education cultivates creative talents, and creative talents create an innovative country. Huai Jinpeng, Minister of Education of the People's Republic of China, pointed out that in today's era, science and technology are the first productive force, talents are the first resource, and creativity is the first driving force. Technological innovation relies on talents, and talent cultivation relies on education. The world's century-old changes are accelerating, a new round of scientific and technological revolution and industrial transformation are developing in depth, and international competition around high-quality talents and technological commanding heights is

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unprecedentedly fierce. This urgently requires us to take the road of independent talent cultivation and achieve high-level scientific and technological self-reliance. Cultivating students' creativity has become one of the national strategic requirements for China's innovation-driven development. At the same time, creativity cultivation is also the key to improving the "innovation and entrepreneurship ability" of higher vocational colleges and is an important teaching content. Under the new situation of social development, the society has put forward higher new requirements for higher education, that is, the requirements for talents' creativity ability. This requirement is not only reflected in the society's growing call for innovative talents, but also in the employment situation of graduates. Graduates with innovative ability can easily find a job, while graduates without innovative ability have to go through many twists and turns to find a job. This paper focuses on validating the reliability and validity tests of personality traits, creative self-efficacy, and creativity, as well as descriptive statistical analysis of the sample. Firstly, the research methods, questionnaire composition, and reliability and validity criteria used in the study were explained, and then the verification process of reliability and validity was described in detail, and then descriptive statistical analysis was carried out, and finally the conclusions were drawn.

2 Literature Review

The term "Big Five Personality Traits" is derived from lexicographical orientations and stands as the cornerstone of contemporary personality research. The "Big Five," with its rich history dating back to 1961, has undergone extensive refinement and enhancement. Costa and McCrae's 1992 and 1995 models delineate the five predominant personality factors: openness, extraversion, agreeableness, conscientiousness, and neuroticism.

When it comes to evaluating creative self-efficacy, Tierney and Farmer's "Creative Self-Efficacy Scale," developed across various publications between 2002 and 2011, is often utilized. This scale comprises three key items: generating novel ideas, solving problems creatively, and elaborating on others' ideas. Polish researchers, Karwowski and his colleagues, further contributed the "Creative Self-Brief Scale" in 2011, 2017, and 2018, which is divided into creative self-efficacy (CSE) and creative self-identity (CPI), consisting of 11 items in total. In China, a scale developed by Hong Suping and Lin Shanru in 2004 is widely used to assess students' innovative self-efficacy. This scale encompasses beliefs related to creative thinking strategies, creative products, and resistance to negative evaluations, spanning 17 items. Among the prominent creativity tests frequently used are Hocevar's (1979) Creative Behavior List (CBI), Ludwig's (1992) Creative Achievement Scale (CAS), Carson et al.'s (2005) Creative Achievement Questionnaire (CAQ), Batey and Furnham's (2005) Biographic List of Creative Behavior (BLCB), and Runco's (1985, 2016) Ideational Behavior Scale (RIBS). However, Chinese researchers seldom utilize CBI, CAS, CAQ, and BLCB. The RIBS, which measures individuals' creative behavioral tendencies in daily life, has been translated and adapted into a Chinese version by Professor Zhang Jinghuan. Research has shown that this Chinese version of the RIBS demonstrates strong reliability and validity among domestic adult populations and has been widely adopted by numerous researchers.

3 Research Methodology

3.1 Quantitative Analysis

The present research delves into the interplay between the Big Five personality traits, creative self-efficacy, and creativity, employing data to uncover the quantitative attributes and patterns of the observed phenomena. Consequently, a quantitative analytical approach has been adopted. Reliability, validity, and descriptive statistical analysis were conducted using SPSS software version 29.

3.2 Inventory

3.2.1 Big Five Personality Traits Inventory

The study employed the "Big Five Personality Questionnaire," comprising 25 questions across five facets: adaptability, extraversion, openness, agreeableness, and responsibility. This questionnaire stands as the most prevalent tool in educational and managerial personality assessments. In contrast to the Cattell 16PF scale, frequently utilized in psychological evaluations, it offers greater specificity and brevity.

The survey's findings indicate an inverse relationship for adaptability, where higher scores signify lesser adaptability, whereas heightened scores in extraversion, openness, agreeableness, and responsibility reflect a corresponding increase in those traits (Wang Xin, 2010). During the data processing phase, reverse-scored items were rearranged using SPSS software prior to analysis. The research questionnaire encompasses five dimensions: adaptability, sociability, openness, altruism, and morality. These dimensions slightly diverge from the traditional Big Five personality traits. Notably, adaptability contrasts with neuroticism, while the remaining four dimensions align closely with their traditional counterparts—sociability mirrors extraversion, openness remains consistent, altruism corresponds to agreeableness, and morality reflects responsibility.

The questionnaire originates from Organizational Behavior (9th Edition) by D. Herreger, J. W. Slocum, and R. W. Woodman. Its reliability is well-established and widely recognized. In this study, the questionnaire demonstrated high internal consistency, with a Cronbach’s α coefficient of 0.884 for the overall scale and coefficients exceeding 0.6 for each dimension.

3.2.2 Creativity Inventory

Runco contends that the RIBS serves as a metric for evaluating the production of individual creative ideas, offering a fresh benchmark for assessing the level and potential of personal creativity. The assessment items exclude intellectual and non-intellectual factors pertaining to creativity, focusing solely on the actual generation of creative thoughts, which offers a clear insight into an individual's creative tendencies and cognitive skills.

The updated Creativity Behavior Scale, known as RIBS-24, consists of 24 questions. It employs a Likert 5-point scoring system, where "never" is assigned 1 point, "rarely" gets 2 points, "sometimes" receives 3 points, "often" scores 4 points, and "always" attains 5 points. Participants rate their natural idea-generation tendencies on a scale of 1 to 5. The 24 questions are categorized into three dimensions: fluency, uniqueness, and flexibility.

Consequently, the overall scale score is derived from the average of all items, while the score for each dimension is calculated by averaging the items within that subscale.
Specifically, fluency comprises 8 items (questions 2, 5, 8, 11, 14, 17, 20, and 23), with the average score of these items representing the fluency dimension. Uniqueness encompasses 9 items (questions 1, 4, 7, 10, 13, 16, 19, 22, and 24), and the average score of these items serves as the originality dimension score. Flexibility includes 7 items (questions 3, 6, 9, 12, 15, 18, and 21), with the average score of these items constituting the flexibility dimension score. Notably, the scale lacks reverse-scored items. Prior research has demonstrated the strong reliability and validity of RIBS-24. In this study, the internal consistency Cronbach's α coefficient for the overall scale was 0.920, with each dimension's Cronbach's α coefficient exceeding 0.79.

3.2.3 Creative Self-Efficacy Inventory

The primary instrument utilized in research examining creative self-efficacy is the Creative Self-efficacy Scale, developed by Taiwanese scholars Hong Suping and Lin Shanru in 2004, and employed in studies by Wang Xiaoling, Zhang Jinghuan, among others (2009), as well as Li Jinde and Yu Jiayuan (2011). This 17-item scale adopts a 4-point scoring system and encompasses three subscales: belief in generating creative products, belief in utilizing creative thinking strategies, and belief in withstanding external negative evaluations. The current study employs this scale to gauge individuals' creative self-efficacy. The subscales include: the innovative strategy belief subscale, encompassing items 1 through 5, which assesses students' confidence in applying creative strategies and techniques in various activities; the innovative product belief subscale, comprising items 6 through 11, which evaluates students' faith in their capacity to produce creative outputs; and the anti-negative evaluation belief subscale, consisting of items 12 through 17, which measures students' resilience against setbacks and their determination to persist in creative endeavors amidst challenges. Notably, items 4, 10, and 15 are reverse-scored, whereas the remaining items are scored positively. During data processing, the reverse-scored items were reversed in SPSS software prior to analysis. This questionnaire lacks a standardized norm, allowing only for comparisons of individual item means. In this study, the internal consistency Cronbach's α coefficient for the overall scale was 0.809, with each subscale's Cronbach's α coefficient exceeding 0.75, indicating good reliability and validity.

3.3 Reliability、Validity

3.3.1 Reliability

To assess the reliability of the questionnaire, we employ the Cronbach's alpha coefficient, a widely recognized method for evaluating the internal consistency of a scale or test. This method gauges the reliability by determining the correlation among items within the scale, reflecting the stability and uniformity of the test results. A higher Cronbach's alpha indicates a more reliable test and more dependable outcomes.
The Cronbach's coefficient typically ranges from 0 to 1. Broadly speaking, a Cronbach α reliability coefficient exceeding 0.9 signifies excellent scale reliability, whereas a value between 0.8 and 0.9 is deemed good. A coefficient within the 0.6 to 0.8 range is considered

satisfactory. However, when the reliability falls below 0.6, it is recommended that the scale undergo revision (Cohen, 2009; Nunnally, 1994; Cronbach, 1951).

3.3.2 Validity

In conducting the validity test, we initiate by administering the KMO and Bartlett's sphericity tests on the scale data, with the aim of assessing its appropriateness for exploratory factor analysis. Should the prerequisites be fulfilled, we proceed with the exploratory factor analysis. The KMO test evaluates the adequacy of the sample data, whereas Bartlett's sphericity test verifies the statistical interdependence of the data.

The Kaiser-Meyer-Olkin (KMO) test serves as a measure to evaluate the correlation among variables. The KMO value ranges from 0 to 1, with higher values approaching 1 indicating stronger correlations among variables, thus suitability for factor analysis. Specifically, a KMO value exceeding 0.6 signifies data appropriate for factor analysis, while values closer to 1 indicate highly suitable data. Conversely, Bartlett's test of sphericity examines the independence of data points. Prior to conducting factor analysis, researchers often perform Bartlett's test to ascertain the statistical independence of the data.

Both the KMO test and Bartlett's sphericity test are crucial statistical tools in multivariate data analysis, playing pivotal roles in data processing and factor analysis. Suitable conditions for factor analysis are met when the KMO value surpasses 0.6 and the p-value is less than 0.05. During multivariate data analysis, researchers must thoroughly comprehend and appropriately apply these two methods to guarantee the accuracy and reliability of their findings (Borsboom, 2004; Kline, 2015; Carmines, 1979).

3.4 Data Collection

The questionnaire was filled in by the students in a centralized manner during their evening self-study time. During the time when students were in the evening self-study time, the researchers explained the purpose of the survey and the precautions for filling in the questionnaire to the respondents. After distributing the electronic questionnaire, the respondents filled in the questionnaire immediately and the researchers collected the questionnaire.

The questionnaires are distributed using QR codes. Students can fill out the questionnaires by scanning the code. A WeChat number is set up through the backend of Wenjuanxing so that students can only fill out the questionnaires once to avoid repeated filling out of the questionnaires. At the same time, all questions must be answered before exiting, otherwise the results will not be recorded to avoid missing answers in the questionnaires.

After completing the questionnaire, click Submit, and the Questionnaire Star backend will collect the data and complete the questionnaire collection.

3.5 Descriptive Statistical Analysis

Descriptive statistical analysis is a method to describe the characteristics of sample data, mainly including frequency distribution analysis and contingency table analysis. Frequency distribution analysis describes the central position of the data by calculating statistics such as

mean, median, and mode. Contingency table analysis describes the degree of dispersion of data by calculating statistics such as frequency and percentage. Descriptive statistical analysis focuses not only on the central location of the data, but also on the degree of variation of the data, i.e., how discrete, so as to fully characterize the data.

4 Results and Discussion

This section contains a detailed discussion of the reliability, validity, and common method bias validation process and concludes with the validation conclusions.At the same time, descriptive statistical analysis is carried out, using tabulation and classification, calculating summary data to describe the various activities of data characteristics, and statistically describing the relevant data of all variables in the survey population.

4.1 Reliability Report

In this study, the Cronbach α reliability coefficient was chosen to assess the reliability of three scales: the Big Five Personality Traits Scale, the Creativity Scale, and the Creative Self-efficacy Scale. The outcomes of the reliability calculations for these scales are presented below:

Table 1

Reliability Test

Scale	Dimensions	Cronbach Alpha	Number of items
Big Five Personality Traits	Adaptability	0.690	5
	Sociability	0.679	5
	Openness	0.636	5
	Altruism	0.764	5
	Moral Sense	0.657	5
Big Five Personality Traits Inventory		0.884	25
creativity	Uniqueness	0.837	9
	Fluency	0.784	8
	Flexibility	0.816	7
Creativity Inventory		0.920	24
Creative self-efficacy	creative strategies and beliefs	0.772	5
	creative faith in finished products	0.757	6
	Anti-negative evaluation beliefs	0.757	6
Creative Self-Efficacy Inventory		0.809	17

Source: Developed for this study (paper)

4.2 Reliability Report

4.2.1 Big Five Personality Traits Inventory Validity Test

Structural validity examines the dimensional division of the scale. This study chooses exploratory factor analysis to examine the dimensional division of the Big Five personality trait scale.

First, KMO and Bartlett's sphericity test are performed on the five personality trait scale data to examine whether the scale data is suitable for exploratory factor analysis. The results show that KMO=0.924>0.6, Bartlett's sphericity test P<0.001, which means that the Big Five personality trait scale data can be used for exploratory factor analysis to examine validity.The calculation results are as follows:

Table 2

Exploratory Factor Analysis Results of the Big Five Personality Trait Inventory

	Initial eigenvalues			Extracting the sum of squares of loadings			Sum of squares of rotating loads		
Element	total	Percentage of variance	accumulation %	total	Percentage of variance	accumulation %	total	Percentage of variance	accumulation %
1	7.190	28.760	28.760	7.190	28.760	28.760	3.654	14.615	14.615
2	1.773	7.091	35.851	1.773	7.091	35.851	3.129	12.516	27.131
3	1.694	6.775	42.626	1.694	6.775	42.626	3.032	12.127	39.257
4	1.469	5.875	48.501	1.469	5.875	48.501	1.712	6.850	46.107
5	1.016	4.064	52.565	1.016	4.064	52.565	1.614	6.458	52.565
6	.962	3.848	56.413						

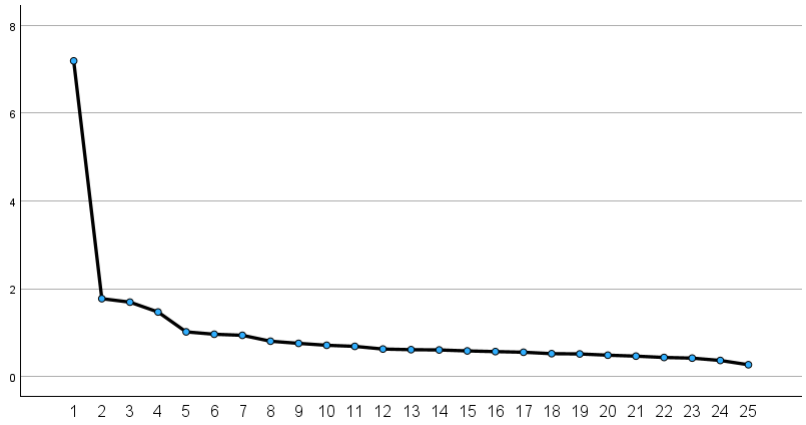
Extraction method: principal component analysis.

Source: Developed for this study (paper)

The analysis results indicate that five primary factors can be derived from the 25 reliable items, collectively accounting for 52.565% of the total scale information. Consequently, the five extracted common factors are highly effective in capturing and elucidating the original scale's information. Based on these findings, it is unequivocally concluded that the Big Five personality trait scale has successfully undergone the validity test. The scree plot illustrating this is provided below:

Figure 1

Big Five Personality Traits Scree Plot



Source: Developed for this study (paper)

Observing the scree plot reveals that the eigenvalues for the fifth and sixth components approximate 1, with the second and fifth components serving as inflection points. The curve flattens out beyond the fifth component, suggesting that extracting five factors is optimal. This aligns with the five dimensions of the Big Five personality traits. Hence, it can be deduced that the single factor extracted in this instance is highly effective in capturing and elucidating the original scale's information, meeting the desired criteria.

4.2.2 Validity test of creative self-efficacy Inventory

The study employed exploratory factor analysis to investigate the dimensional structure of the creative self-efficacy scale. Initially, the suitability of the nursing identity scale data for exploratory factor analysis was assessed using theKaiser-Meyer-Olkin (KMO) measure and Bartlett's test of sphericity. The results indicated a KMO value of 0.902, exceeding the threshold of 0.6, and a significant Bartlett's test result (P<0.001), confirming the appropriateness of applying exploratory factor analysis to validate the nursing identity scale. The computational outcomes are detailed below:

Table 3

Results of Exploratory Factor Analysis of the Creative Self-efficacy Inventory

	Initial eigenvalues			Extracting the sum of squares of loadings			Sum of squares of rotating loads		
Element	total	Percentage of variance	accumulation %	total	Percentage of variance	accumulation %	total	Percentage of variance	accumulation %
1	5.401	31.769	31.769	5.401	31.769	31.769	2.861	16.832	16.832
2	1.860	10.943	42.712	1.860	10.943	42.712	2.443	14.373	31.205

3	1.202	7.068	49.780	1.202	7.068	49.780	2.400	14.115	45.320
4	1.051	6.183	55.962	1.051	6.183	55.962	1.809	10.642	55.962
5	.858	5.048	61.010						

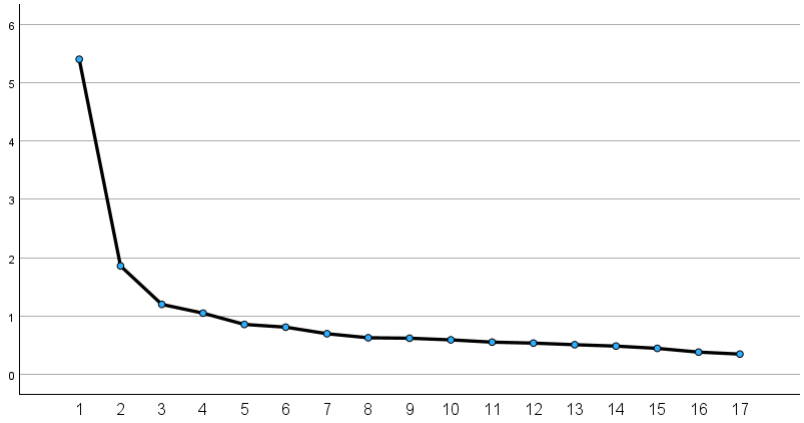
Extraction method: principal component analysis.

Source: Developed for this study (paper)

The analysis results indicate that the four reliable items converge into a single dimension, constituting a single factor. This factor accounts for 55.962% of the total scale information, suggesting its high effectiveness in capturing and elucidating the original scale's information. Consequently, the extracted single factor can be considered highly satisfactory. Based on these findings, it is unequivocally concluded that the creative self-efficacy scale has successfully passed the validity test. The scree plot is presented below for further reference.

Figure 2

Creative Self-efficacy Scree Plot



Source: Developed for this study (paper)

Observing the scree plot reveals that the eigenvalues for the fourth and fifth components are nearly 1, with the second component serving as an inflection point. The curve flattens out after the third component, indicating that extracting three factors is optimal. This aligns with the number of dimensions in creative self-efficacy. Hence, it can be deduced that the factors extracted in this instance are highly effective in capturing and elucidating the original scale's information comprehensively.

4.2.3 Creativity Inventory validity test

The present study utilizes exploratory factor analysis to investigate the dimensional structure of the creativity scale.

Initially, the self-efficacy scale data undergoes the Kaiser-Meyer-Olkin (KMO) measure and Bartlett's test of sphericity to assess its suitability for exploratory factor analysis. The outcomes show a KMO value of 0.956, exceeding the threshold of 0.6, and a statistically significant Bartlett's test result ($P<0.001$), indicating that the creativity scale data is

appropriate for exploratory factor analysis to validate its structure. The detailed results are provided below:

Table 4

Results of Exploratory Factor Analysis of the Creativity Inventory

	Initial eigenvalues			Extracting the sum of squares of loadings			Sum of squares of rotating loads		
Element	total	Percentage of variance	accumulation %	total	Percentage of variance	accumulation%	total	Percentage of variance	accumulation%
1	8.943	37.264	37.264	8.943	37.264	37.264	5.089	21.206	21.206
2	1.735	7.231	44.494	1.735	7.231	44.494	2.898	12.075	33.281
3	1.351	5.629	50.123	1.351	5.629	50.123	2.625	10.939	44.220
4	1.029	4.287	54.410	1.029	4.287	54.410	2.446	10.190	54.410
5	.869	3.619	58.029						

Extraction method: principal component analysis.

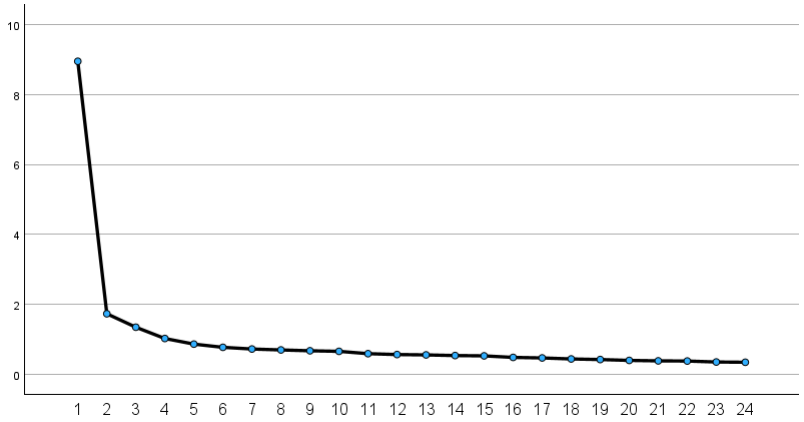
Source: Developed for this study (paper)

The analysis results indicate that the four reliable items coalesce into a single dimension, encompassing a single factor. This factor accounts for 54.410% of the total scale information, suggesting its effectiveness in comprehensively capturing and elucidating the original scale's information. Consequently, the extracted single factor can be deemed highly satisfactory in terms of its information extraction and explanation capabilities.

Drawing from the aforementioned analysis, it is unequivocally concluded that the creative self-efficacy scale has successfully passed the validity test. The scree plot is presented below for further examination:

Figure 3

Creativity Scree Plot



Source: Developed for this study (paper)

Observing the scree plot, it becomes evident that the eigenvalues for the fourth and fifth components hover close to 1, with the second component marking a turning point. After the third component, the curve exhibits a relatively flat trajectory, indicating that extracting three factors is preferable. This aligns perfectly with the number of creativity dimensions. Hence, we can deduce that the factor extracted in this instance is highly suitable for comprehensively capturing and elucidating the information contained within the original scale.

4.3 Descriptive statistical analysis

4.3.1 Questionnaire data recovery

In this study, 3603 questionnaires were collected. If the questionnaires collected online were eliminated and the polygraph questions were answered incorrectly, a total of 3313 valid questionnaires were finally deleted, and the effective recovery rate was 91.95%.

4.3.2 Basic information about the sample

For this time, 3,313 valid questionnaires were collected, and the basic information status of these 3,313 vocational students is as follows：

Table 5

Sample distribution

Type		Num	Percentage（%）	Type		Num	Percentage（%）
Gender	male	1362	41.1	Entrepreneurial experience	Yes	167	5.0
	female	1951	58.9		No	3146	95.0
Grade	Freshman	1890	57	Who to live with	Living with parents	2945	88.9
	Sophomore	1389	41.9		Living with one parent	237	7.1
	Junior	34	1.1		Living with grandparents	131	4.0
Place of origin	rural	2636	79.6	Father's highest education	Bachelor's degree or above	129	3.9
	town	677	20.4		college	275	8.3
Household financial situation	Not so good	382	11.5		high school	911	27.5
	General	2759	83.3		Junior high school and below	1998	60.3

	Bounteous	172	5.2		Bachelor's degree or above	105	3.2
Family relationship atmosphere	Not so good	66	2.0	Mother's highest education	college	206	6.2
	General	814	26.6		high school	737	22.2
	Better	2433	73.4		Junior high school and below	2265	68.4
Participate in various innovation competitions	Yes	729	22.0	Whether you are a school, college, or class officer	Yes	1145	34.6
	No	2584	78.0		No	2168	65.4

Source: Developed for this study (paper)

From the above table, it can be clearly seen that in terms of gender, women account for 58.9%, slightly more than men; In terms of grades, 57% of students are freshmen, 41.9% are sophomores, and 1.1% are juniors, because according to the basic situation of higher vocational education in China, junior students are generally arranged to practice off-campus, and only a few students stay in school because of taking the college entrance examination or other reasons.

From the perspective of the place of origin, the proportion of rural areas is relatively high, reaching 79.6%, which is much larger than that of urban areas (20.4%). From the perspective of household economic status, 83.3% are average, 11.5% are not very good, and 5.2% are well-off, which is consistent with the situation of the place of origin and is related to the current economic slowdown, and most of the families are in average economic condition. From the perspective of the highest education of parents, the proportion of fathers and mothers with bachelor's degree or above is 3.9% and 3.2% respectively, and the proportion of junior high school and below is as high as 60.3% and 68.4%, which shows that the education level of parents of higher vocational students is generally not high. From the perspective of family relationship atmosphere, only 2% of the proportion is not very good, and the family atmosphere of most vocational students is good.

From the perspective of entrepreneurial experience, only 5% of students have entrepreneurial experience; From the perspective of participating in innovation and entrepreneurship competitions, 22% of students have participated in innovation and entrepreneurship competitions, that is to say, nearly one of the four students has participated in innovation and entrepreneurship competitions, indicating that higher vocational colleges attach more importance to innovation and entrepreneurship competitions.

In terms of whether they have served as school, college or class leaders, 34.6% of the students have served as class leaders at all levels, and 65.4% of the students have not served as class leaders.

4.3.3 Analysis of the current situation

Through the questionnaire survey data, we can get the current status of the Big Five personality traits and creativity, and the creation of self-efficacy as follows:

Table 6

Analysis of the current situation

Variables	Dimensions	N	Minimum	Maximum	Average Value	Standard Deviation
Big Five Personality Traits	Adaptability	3313	1.00	5.00	3.13	0.62
	Sociability	3313	1.00	5.00	3.35	0.63
	Openness	3313	2.20	5.00	3.39	0.56
	Altruism	3313	1.60	5.00	3.74	0.62
	Moral Sense	3313	2.20	5.00	3.63	0.58
Creativity	Uniqueness	3313	1.00	5.00	2.66	0.54
	Fluency	3313	1.00	5.00	3.06	0.55
	Flexibility	3313	1.00	5.00	3.06	0.55
	Creativity average score	3313	1.00	5.00	2.91	0.49
Creative self-efficacy	Creative strategies and beliefs	3313	1.00	4.00	2.84	0.43
	Creative faith in finished products	3313	1.17	4.00	2.65	0.36
	Anti-negative evaluation beliefs	3313	1.00	4.00	2.77	0.41
	Average score for total potency	3313	1.24	4.00	2.75	0.32

Source: Developed for this study (paper)

From the above table, it is clear that the average score of uniqueness is 2.66, which is 3 points lower than the average, and the fluency and flexibility are both 3.06, which is slightly higher than the average of 3 points. It can be seen from this that the overall level of creativity of higher vocational students is average.

In terms of creative self-efficacy, the score of creative strategy was 2.84, the score of creative strategy was 2.65, the score of anti-negative emotion was 2.77, and the average score of total efficacies was 2.75, all of which were 3 points lower than the average. It can be seen that the overall level of creative self-efficacy of higher vocational students is average, indicating that higher vocational students lack the motivation or belief to create.

4.4 Discussion

The study revealed that the reliability coefficients for the Big Five Personality, Creative Self-efficacy, and Creativity questionnaires were 0.884, 0.809, and 0.920, respectively, all surpassing the 0.8 threshold. Additionally, the individual dimensions scored above 0.6, confirming that all three questionnaires fulfilled the validity criteria for subsequent research.

The validity assessment of the Big Five Personality Questionnaire indicated a KMO value of 0.924 (exceeding 0.6) and a statistically significant Bartlett's sphericity test ($P<0.001$). Principal component analysis further showed that the five main factors accounted for 52.565% of the total scale information, highlighting their effectiveness in comprehensively capturing and elucidating the original scale's information. In conjunction with the scree plot, extracting five factors was deemed optimal, aligning with the Big Five personality trait dimensions.

Similarly, the Creative Self-efficacy Questionnaire exhibited a KMO of 0.902 and a significant Bartlett's test result (P<0.001). Principal component analysis revealed that four main factors reflected 55.962% of the total scale information, with the extracted factor proving highly suitable for information extraction and explanation. The scree plot suggested extracting three factors, which matched the number of innovation self-efficacy dimensions.

The Creativity Questionnaire also demonstrated a strong validity, with a KMO of 0.956 and a significant Bartlett's test (P<0.001). Principal component analysis showed that four main factors encapsulated 54.410% of the total scale information, with the extracted factor being ideal for information extraction and explanation. Based on the screen plot, extracting three factors was optimal, consistent with the number of creativity dimensions.

In summary, all three questionnaires met the validity requirements for subsequent research. Furthermore, the reliability, validity, and common method bias of the questionnaires on Big Five personality traits, creative self-efficacy, and creativity were all deemed satisfactory.

Descriptive statistical analysis found that the overall level of creativity and self-efficacy of Chinese vocational students was average. This is consistent with the research of Chinese scholars Li Yanni (2023), Han Fang (2023), Guo Rui (2023), and Wang Jianlan (2024), which proves the necessity of this study. Research on improving creative self-efficacy and creativity of Chinese higher vocational students deserves the attention of scholars.

5 Conclusions

The reliability, validity, and common method bias of the three questionnaires used in this study, namely the Big Five personality traits, creative self-efficacy, and creativity, all meet the requirements, and the questionnaires can be used to further study the respondents.

The overall level of creativity and creative self-efficacy of Chinese vocational students was average. The creative self-efficacy and creativity level of Chinese vocational students need to be improved urgently, and this study is of great value.

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