An Analysis of the Causes of Test Anxiety in Secondary School and University Students

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Abstract. In recent years, test anxiety has become one of the main subjects of research in the field of education. Test anxiety is a common psychological phenomenon during students' growth and development. Therefore, this paper aims to prevent the negative effects of test anxiety at its root by examining the causes of test anxiety in secondary school and university students.

In this paper, 200 secondary school and university students were used as subjects to study the factors that influence test anxiety. The perspective of the study is both endogenous and exogenous. The endogenous factors were mainly related to physiological causes, with factors such as the degree of HPA axis activity and hippocampal development as the main indicators. In terms of exogenous factors, personality, and parental relationships were measured. After reliability and validity tests, all three large variables in this study met the criteria needed for the study. The results showed that: a) Test Anxiety Inventory (TAI) and Parental Bonding Instrument (PBI) showed significant differences between school levels, with the TAI at the high school level being significantly higher than at the middle school and college levels, while the PBI at the middle school level was significantly lower than at the high school and college levels; b)The TAI of seniors in high school is significantly higher than others; c) Big Five Inventory (BFI) showed significant differences under the indicator of monthly household income, with the personalities of children with a monthly household income of less than RMB 10,000 and between RMB 10,000 and 20,000 forming a significant difference to the personalities of families with a monthly household income of 50,000 or more.

Keywords: Exam anxiety · Psychology of Education · Statistical analysis · Psychological Health · Test of variability

1 Introduction

1.1 What is Test Anxiety

In the course of human development, the term "stress" has long been given high priority in the fields of psychology and medicine. In recent years, with the "psychologization of education" proposed by the Swiss educationalist Pestalozzi, the study of the mental health of young people has also become a hot topic in education. Among these researches,

the psychological problems of adolescents caused by test anxiety have been increasingly emphasized and widely studied [1, 2].

With the increasing competition in society and the rapid development of technology, psychological disorders of all kinds are becoming commonplace. In schools, test anxiety is becoming the most common problem that adolescents encounter during the intense learning process [3]. Test anxiety is a stressful emotional response of students to exam situations. Moderate anxiety is necessary for a healthy life and is a force for good health and maximum efficiency, but strong anxiety can cause adverse psychological manifestations in individuals, and in severe cases can lead to the emergence of various anxiety disorders [4].

We are now analyzing the causes of anxiety in students' daily lives and studies, and exploring countermeasures to reduce students' examination anxiety in order to help them better adapt to their studies, improve their efficiency and promote their physical and mental health.

1.2   Manifestations of Test Anxiety in Secondary School and University Students

Test anxiety in secondary school and university students does not only refer to the anxiety reaction during the test, but also includes pre-test anxiety and post-test anxiety: (1) Pre-test anxiety: it is manifested as continuous anxiety before the test. (2) Anxiety during the test: this is manifested by stage fright and dizziness during the test. (3) Post-examination anxiety: This is manifested by post-examination apprehension, insomnia, and even the beginning of fear and loathing of the next examination.

1.3   Endogenous Causes of Test Anxiety in Secondary School and University Students

There is a specific mechanism for the development of stress. In studies of secondary school and university students, scientists have come to certain conclusions. During adolescence, human sex steroid levels change dramatically, which mediates increased basal and stress-induced activity in the HPA axis. This also means that if more pronounced stress is experienced during adolescence, this may lead to greater activation of the HPA axis, which in turn secretes more glucocorticoids. At the same time, the adolescent brain is particularly sensitive to stress and to increased glucocorticoid levels. Furthermore, cognitive and emotional processes regulated by the prefrontal cortex are sensitive to glucocorticoid-mediated GR regulation and are age-dependent. Certainly, glucocorticoid overproduction can affect hippocampal growth to some extent, and some hippocampal development can continue into adulthood. At the same time, adolescents exposed to early (and sustained) stress have altered grey matter volume and neuronal integrity in the frontal cortex, as well as a reduction in the size of the anterior cingulate cortex. During this time, secondary school and university students' brain undergoes dramatic changes that not only lead to increased test anxiety, but may even affect memory and thus limit performance [5].

2 Methods

The analysis of the exogenous factors influencing the test anxiety of secondary school and university students was carried out by using questionnaires to collect data and SPSS to process the data, and finally by using statistical analysis to analyze the data for demographic variables at frequencies, reliability and validity tests, test of variability, and relevant analysis. The questionnaires used in the study were based on three major questionnaires: (1) Test Anxiety Inventory (TAI); (2) Parental Bonding Instrument (PBI); and (3) Big Five Inventory (BFI). A detailed description of the three questionnaires will be developed in *2.2 measurements.*

Test anxiety will be measured primarily by the results of the TAI scores, and it is generally accepted that the higher the overall TAI score, the more severe the test anxiety.

The exogenous factors mainly include personality, and parental relationships, which are tested by BFI and PBI respectively. Other factors that have been taken into account are gender, level of study, whether junior, whether senior, whether to go to graduate school or study abroad, type of school attended, ranking at school, and monthly household income. In order to obtain realistic and reliable data, the subjects were mainly secondary school and university students from various provinces in mainland China, and the data was collected through a questionnaire posted on the Questionnaire Star platform. The subjects who participated in the survey were a real sample, as follows.

2.1 Participants

In this study, three scales were selected for information collection in the form of a questionnaire and 200 subjects ranging from 11 to 22 years old participated in this test. The ratio of males to females was close to 1:2, which was basically balanced. The survey involved 83 secondary school students, including 37 junior high school students and 46 high school students, and the number of both was basically equal; at the same time, it also involved 117 university students, and the ratio of university student subjects to secondary school students was close to 1:1, so this survey can basically reflect the test anxiety situation and the difference between secondary school students and university students in a comprehensive manner. In addition to the basic gender and grade surveys, we also investigated whether students were in their junior or senior year or preparing for graduate school (including overseas study), the type of school they attended, their grade ranking and their monthly household income.

2.2 Measurements

2.2.1 Test Anxiety Inventory (TAI)

The Test Anxiety Inventory (TAI) is one of the most commonly used scales to study test anxiety. It was developed by the American clinical psychologist Spielberger in 1980, and since its introduction, the TAI has been revised and used by scholars from all over the world because of its high reliability and ease of use. The TAI is a two-dimensional scale that measures test anxiety as a situational personality trait: Worry, e.g., thinking about the test score during the test, which prevents me from answering the questions;

and Emotionality, e.g., I feel unusually distracted and overwhelmed when taking an important test. I feel very distracted when taking an important exam. The Anxiety and Emotionality subscales each contain eight items and are based on the Liken 4-point scale. The TAI was first piloted by Chinese psychologists Song Weizhen and Zhang Yao in 1987 among university students and has since been adopted and used by more and more researchers, and is now one of the main scales used to measure test anxiety in the Chinese academic community [6–9].

2.2.2   Parental Bonding Instrument (PBI)

The Parental Bonding Instrument (PBI) is one of the main scales used to study the parenting styles of children. It was developed in 1979 by Parker, Tupling, and Brown at the University of New South Wales in Australia. It is designed to measure the influence of parenting styles on a child's personality. There are 50 questions, 25 in the father's and 25 in the mother's section, and the questions are identical and have the same dimensions. The translated questionnaire is divided into four dimensions: care, indifference/rejection, overprotection, and self-determination. He/she understands my problems and concerns"; 6 questions on the indifference/rejection dimension, e.g. "He/she does not give me enough help", "He/she seems emotionally indifferent to me"; 7 questions on the overprotective dimension, e.g. He/she doesn't want me to grow up", "He/she tries to control everything I do"; 6 questions on the self-determination dimension, e.g. "He/she allows me to do what I like", "He/she likes me to do what I like", "He/she likes me to do what I like". "He/she likes me to make up my own mind". Over the past 30 years, the PBI has gained popularity among researchers and has become a commonly used tool for assessing parenting attitudes in clinical and research settings abroad, and has been translated into several languages and used in countries with different cultural backgrounds. Researchers have used the PBI to assess the relationship between parenting styles and personality disorders, depression, schizophrenia, and eating disorders, and have found that low parental care and high overprotection are significantly associated with mental illness.

The questionnaire was first translated into Chinese by four graduate students in psychology, and the first draft was consolidated after a comparative discussion of the translations. Three English graduate students were then asked to back-translate the first draft, revise the questions that differed significantly, and refer to the Chinese version translated by Biqing Xu et al. The original questionnaire was scored on a 4-point Likert scale of 0–3, with 0 representing very much in line and 3 representing very much not in line [10, 11].

2.2.3   Big Five Inventory (BFI)

The Big Five Inventory (BFI) was developed in 1991 by Oliver P John, a psychologist at the University of California, Berkeley, USA. The most significant advantage of the BFI is that it is highly efficient, taking only about 10 min to administer. The BFI is divided into five dimensions: extroversion, e.g. I will talk to a variety of people at a party; agreeableness, e.g. I will be sensitive to the feelings of others; responsibility, I

will do trivial things immediately; neuroticism, e.g. I am submissive most of the time; openness, e.g. I am not interested in abstract ideas.

The questionnaire has 44 items and is scored on a 5-point Likert scale, with 28 items being scored positively and 16 items being scored negatively. In this study, we used a short version of the BFI questionnaire, with 20 questions, but the dimensions and scoring remained the same and the reliability remained similar [12].

2.3 Analysis

Reliability and validity tests, as well as descriptive analysis, were analyzed by SPSS 26.0. Pearson correlation among scores of PBI, BFI, and TAI were analyzed by SPSS 26.0, too.

3 Results

In the test of variance: (i) according to the results of the independent sample t-test, it can be seen that TAI, PBI, and BFI do not show significant differences in terms of gender. (ii) Based on the results of the one-way ANOVA, it can be seen that TAI and PBI showed significant differences across school segments, with TAI at the high school level being significantly higher than that at the junior high school and university levels, while PBI at the junior high school level was significantly smaller than that at the senior high school and university levels, but BFI did not show significant differences across school segments. (iii) The TAI of senior high school students was significantly higher than that of freshmen and sophomores, but the TAI of junior high school students or students preparing for graduate school or studying abroad was not significantly higher than that of students in other grades in the same academic range. (iv) The results of the one-way ANOVA showed that there were no significant differences in TAI, PBI, and BFI among students of different school ranks. (v) Based on the results of the one-way ANOVA, it can be seen that TAI and PBI did not show significant differences under the indicator of different monthly household incomes, but BFI showed significant differences under the indicator of monthly household income, and the personality of children with monthly household incomes below RMB 10,000 and between RMB 10,000 and 20,000 was significantly different from the personality of families with monthly household incomes above 50,000, forming a significant difference.

In the correlation test: (i) The PBI and BFI scales have a significant positive correlation with TAI, and it is very reasonable for this study to cut from these two perspectives. (ii) Of the four dimensions of the PBI, only the two dimensions of indifference/rejection and overprotectiveness had significant positive correlations with TAI, i.e. parental indifference/rejection and overprotectiveness had significant effects on test anxiety (iii) Of the five dimensions of the BFI, only the two dimensions of neuroticism and openness had significant positive correlations with TAI, i.e. neuroticism and openness in personality had significant effects on test anxiety.

3.1 Frequency Analysis of Demographic Variables

Based on the results of the above analysis the numerical characteristics of the demographic variables can be seen, reflecting the distribution of the respondents to this survey. The total number of these respondents was 200. Based on the results of the frequency analysis of the individual variables it can be seen that the distribution basically meets the requirements of the sample survey. For example, among the gender survey results, the proportion of males is 36.5% and the proportion of females is 63.5%, which can be seen that the results of this survey are focused in favor of female students. The ratio of males to females was 1:2, which is basically balanced, so the final results of the study can be equally male students' test anxiety status. The survey involved 83 secondary school students, including 37 junior high school students and 46 senior high school students, both of whom were basically equal in number; at the same time, it also involved 117 university students, and the ratio of university subjects to secondary school students was close to 1:1, so the survey can basically reflect the test anxiety status of secondary school students and university students and the differences between them (Table 1).

Table 1. Frequency analysis of demographic variables

Variables	Options	Frequency	Percentage	Variables	Options	Frequency	Percentage
Gender	Male	73	36.5%	Type of school attended	Public Schools	177	88.5%
	Female	127	63.5%		International Schools	5	2.5%
Level of study	Junior High School	37	18.5%		Private Schools	16	8.0%
	High School	46	23.0%		Vocational Schools	2	1.0%
	University	117	58.5%	Ranking at school	Others	37	18.5%
Whether junior (to be answered by junior students only)	NO	23	62.2%		Top 10%	53	26.5%
	YES	14	37.8%		Top 10%–20%	51	25.5%
Whether senior (to be answered by high school students only)	NO	17	37.0%		Top 20%–50%	59	29.5%
	YES	29	63.0%	Monthly household income	Under 10,000 RMB	34	17.0%

(continued)

Table 1. (*continued*)

Variables	Options	Frequency	Percentage	Variables	Options	Frequency	Percentage
Whether to go to graduate school or study abroad (to be answered by university students only)	NO	37	31.6%		10,000 RMB–20,000 RMB	80	40.0%
	YES	80	68.4%		20,000 RMB–50,000 RMB	58	29.0%
					50,000 RMB or more	28	14.0%

In addition to the basic gender and grade surveys, we also investigated whether students were in their junior or senior year or preparing for graduate school (including overseas study), the type of school they attended, their grade ranking and their monthly household income, with the aim of exploring the factors affecting the test anxiety of secondary school students and university students.

3.2 Reliability and Validity Tests

3.2.1 Reliability Tests of TAI

The authoritative data originally provided by the previous researchers are as follows: (1) Internal consistency: the Cronbach α coefficients for the two TAI subscales (worry, emotion) and the total scale were 0.80, 0.84, and 0.90 respectively. (2) The correlations between the items and the above subscales or total scale were 0.57, 0.74, 0.60, 0.78, and 0.47 to 0.74 respectively. All correlations reached the significance level ($p < 0.01$).

In the current use of the TAI scale, the investigators again tested the reliability of the scale and obtained a Cronbach α coefficient of 0.928 for the total scale which was very close to the authoritative data of 0.90, and the rest of the data were also generally consistent.

The software used SPSS version 26 to implement the steps.

3.2.2 Reliability Tests of PBI

The results showed that the four-factor structural model of the questionnaire was better than the two-factor and three-factor structural models, and all the fit indicators were above 0.90. The internal consistency reliability of the questionnaire ranged from 0.740–0.851, and the retest reliability ranged from 0.619–0.765, all of which met the requirements of psychometrics. Therefore, the revised Chinese version of the PBI has good reliability indicators and can be used as a measurement tool to assess the parenting style of university students.

The overall standardized reliability coefficient for the PBI was 0.736, and the reliability coefficients after item deletion were less than the overall reliability coefficient of 0.736. Therefore, no adjustment was needed for the BPI questions.

The overall standardized reliability coefficient is 0.736. The range of values for the reliability coefficient is between 0 and 1. The closer it is to 1, the higher the reliability. The result of this analysis is 0.736, which is a relatively good reliability.

The software used SPSS version 26 to implement the steps.

3.2.3 Reliability Tests of BFI

The overall standardized reliability coefficient for this finding was 0.706 on the PBI. The reliability coefficients based on item deletions were all less than the overall 0.706. Therefore, no adjustment was required for the BPI questions.

The overall standardized reliability coefficient is 0.706. The range of values for the reliability coefficient is between 0 and 1. The closer it is to 1, the higher the reliability. The result of this analysis was 0.706, which is relatively good reliability.

The software used SPSS version 26 to implement the steps.

3.2.4 Validity Tests

The validity of this questionnaire was analyzed by SPSS version 26, exploratory factor analysis to achieve the testing process: according to the results of the above exploratory factor analysis, it can be seen that the coefficient result of the KMO test is 0.837, the coefficient of the KMO test takes a range of values between 0–1, the closer to 1 means that the validity of the questionnaire is better (Table 2).

According to the significance of the sphericity test, it can also be seen that the significance of this test is infinitely close to 0. The original hypothesis is rejected, so the questionnaire has good validity.

3.3 Test of Variability

Tests of variance are used to examine differences in different dimensions of variables through independent sample t-tests, chi-square distributions, and one-way ANOVAs. In this analysis, independent sample t-tests and ANOVA were used depending on the characteristics of the data.

The software uses SPSS version 26 to implement the steps.

Table 2. KMO and Bartlett's test

KMO Number of sampling tangibles		0.837
Bartlett Sphericity Test	Approximate cardinality	7575.122
	Freedom	2080
	Significance	0.000

Table 3. Differences between dimensions in terms of gender (73 male and 127 female)

	Options	Average	Standard Deviation
Test Anxiety Inventory	Male	40.45	15.16
	Female	39.48	8.29
Parental Bonding Instrument	Male	36.99	10.83
	Female	35.99	5.70
Big Five Inventory	Male	40.77	11.64
	Female	41.26	5.53

3.3.1 Gender

Based on the results of the independent sample t-test, it can be seen that the difference in the effect of gender on TAI, PBI, and BFI is significantly greater than 0.05 for TAI, with a significant difference of 0.61 for TAI. Similarly, the PBI and BFI tests of significance for gender were 0.47 and 0.73 respectively, both of which were significantly greater than 0.05 and did not reject the original hypothesis, thus reflecting the fact that parents generally treat boys and girls equally in their early education and do not overly spoil or are extremely indifferent to their children because of their gender. There are no major differences in the basic personalities of either boys or girls (Table 3).

3.3.2 Levels of Schooling

Based on the results of the one-way ANOVA above, it can be seen that among the three scales, test anxiety and early parenting styles differed significantly by the school band, as the significance test results were 0.01 and 0.02 respectively, both significantly less than 0.05.

Also, based on the results of multiple comparisons, it can be seen that test anxiety is particularly evident among high school students, who have significantly greater test anxiety status than middle school and college students. It is well known that the college entrance examination is one of the most important turning points in the life of high school students, and therefore most seniors have relatively high examination anxiety. This was tested using SPSS26 and the findings were consistent.

As shown in Table 5, the significance test was 0.02, which is significantly less than 0.05, indicating that test anxiety was significant in seniors compared to non-seniors, with a mean score of 46.97, indicating that test anxiety is common among high school students.

However, similar findings were not found in the study of junior and college students who were about to enter graduate school or study abroad. This result is also closely related to the Chinese education system and the mindset of the students. For junior high school students, the importance of the secondary school examinations faced in junior high school is not comparable to that of the entrance examinations, although it has a greater impact on the choice of schools and the educational resources to which students will be exposed in the future. In China, nearly the majority of secondary school students

Table 4. Differences between dimensions at different levels of schooling

	Options	Average	Standard Deviation	F	Multiple comparisons
Test Anxiety Inventory	Junior High School	37.00	11.01	4.58*	2 > 1; 2 > 3
	High School	43.91	13.28		
	University	39.13	10.10		
Parental Bonding Instrument	Junior High School	33.03	8.90	4.16*	1 < 2; 1 < 3
	High School	37.43	8.60		
	University	36.98	7.13		
Big Five Inventory	Junior High School	38.95	10.25	1.52	/
	High School	41.67	7.96		
	University	41.52	7.64		

#. Where 1 is for junior high school, 2 is for senior high school and 3 is for university. The numbers are 37, 46, and 117 respectively
*$p < 0.05$

Table 5. The impact of senior year on test anxiety

	Options	Number	Average	Standard Deviation	t
Test Anxiety Inventory	YES	29	46.97	14.83	2.44*
	NO	17	38.71	8.08	

*$p < 0.05$

enter vocational schools through the Chinese language examinations, or some of the most outstanding students take the self-admission examinations for high schools at an early stage. From an objective point of view, therefore, society and the education system as a whole have given junior students more options and increased the tolerance for error in the Chinese examinations.

Similarly, students who are preparing for graduate school or studying abroad have a clearer plan for their future development, although there are lots of pressure and challenges in taking graduate school or applying to overseas universities, students already have a certain academic foundation and the ability to earn money. The majority of university students are already adults and have a stronger ability to cope with stress than high school students, and can adjust to their stress more quickly in the face of exam anxiety.

However, the above does not apply to seniors, most of whom have successfully entered their senior year of high school with their college entrance exams as the main

goal of their senior year, and most do not have the opportunity or ability to turn the tide against them again.

In addition, Table 4 shows that in addition to the differences in TAI by the academic band, there are also significant differences in PBI. Based on the results of the multiple comparisons, it can be seen that parents' scores on early parenting are significantly lower among junior high school students, and according to the scale of the PBI questionnaire, parents of junior high school students are significantly more restrained and disciplined than high school and university students, and they are more likely to evaluate and care about their children's lives, but they are also more likely to ignore the self-determination of junior high school children, and may even impose their own views on their children. This may be related to parents' perception that their children are still young and lack basic judgment and self-control. This explains why junior high school students are significantly less anxious about exams than high school students: junior high school students are less self-aware and their perceptions of exams and studying come more from their parents, so for themselves, the vast majority of junior high school students may not be aware of the importance of exams, whereas the opposite is true for high school students who are 15–17 years old. High school students have a significantly higher sense of independence than junior high school students in the PBI survey, and they have a clearer sense of their future, and this endogenous drive explains the significant increase in test anxiety. For a junior student, who may not be aware of the importance and significance of the test, even if he is doing well, this naturally does not lead to a higher TAI result [13].

3.3.3 Score Stages

As shown in Table 6, the significance tests were 0.13, 0.80, and 0.45 respectively, all of which were greater than 0.05, showing that there were no significant differences in the corresponding test anxiety conditions of students in different achievement ranges. At the same time, the parents' attitudes towards their children and their parenting style did not change significantly because of their children's ranking in school. It can be seen that parents today value their children's all-round development more than putting their care and evaluation criteria on their children's grades alone, which is more conducive to their children's all-round development. Thus, there is no significant difference between secondary school students and university students with different grades as reflected in the BFI Personality Inventory, and there is no inferiority of self-esteem due to the mixed grades, which is closely related to the diversified way in which their parents evaluate and nurture them.

3.3.4 Monthly Household Income

The SPSS26 analysis showed that the significance of TAI for monthly household income was 0.27, which was significantly greater than 0.05. Therefore, the monthly household income did not directly affect the test anxiety of secondary school and university students, and there was no significant difference in test anxiety between students with different household incomes. Similarly, the significance of the PBI for monthly household income was 0.18, which was significantly greater than 0.05. Therefore, parents in families with different monthly incomes did not lack care and education for their children because of

Table 6. Differences between dimensions at different score stages

	Options	Average	Standard Deviation	F
Test Anxiety Inventory	Top 10%	37.79	10.61	1.94[*]
	Top 10%–20%	40.08	12.34	
	Top 20%–50%	39.20	10.09	
	Others	43.43	11.95	
Parental Bonding Instrument	Top 10%	36.64	9.31	0.34
	Top 10%–20%	35.39	8.28	
	Top 20%–50%	36.63	7.39	
	Others	36.84	6.27	
Big Five Inventory	Top 10%	41.74	9.36	0.88
	Top 10%–20%	39.57	6.94	
	Top 20%–50%	41.92	8.29	
	Others	40.89	8.29	

#. The numbers for top10%, top10%-20%, top 20%-50%, and others are 53, 51, 59, and 37 respectively

*$p < 0.05$

their higher or lower incomes, and secondary school students and university students generally had a positive family environment during their development, even though their incomes were different.

However, the BFI was significant at 0.05 for monthly household income, which means that different monthly household incomes do have a significant impact on the formation of children's personalities. In the multiple comparisons, it can be seen that the personality of children with a monthly household income below RMB 10,000 and between RMB 10,000 and RMB 20,000 is significantly different from the personality formation of families with a monthly household income above RMB 50,000. And from Table 7, it is easy to see that the mean score on the BFI scale increases as the monthly household income increases. The higher the BFI score, the more confident and outgoing the student is and the more secure he or she feels. Thus, the difference in monthly family income does have a significant impact on the personality formation of secondary school and university students, with students from more economically disadvantaged families being more likely to exhibit self-denial and sociability difficulties. This may well be related to the inferiority of self-esteem brought about by unconscious comparison, or it may be related to the fact that a solid financial situation can free students from the most basic worries of life and thus make them more confident. In any case, however, there is no evidence that this lack of confidence and instability in self-perception may have a direct effect on test anxiety, only that there may be a link between the two [14].

Table 7. Differences in monthly household income across dimensions

Variables	Options	Average	Standard Deviation	F	Multiple comparisons
Test Anxiety Inventory	Under 10,000 RMB	43.03	15.07	1.31	/
	10,000 RMB–20,000 RMB	38.83	10.16		
	20,000 RMB–50,000 RMB	38.93	8.60		
	50,000 RMB or more	40.71	13.45		
Parental Bonding Instrument	Under 10,000 RMB	37.71	10.54	1.65	/
	10,000 RMB–20,000 RMB	35.51	5.97		
	20,000 RMB–50,000 RMB	35.59	6.20		
	50,000 RMB or more	38.71	11.54		
Big Five Inventory	Under 10,000 RMB	38.71	11.07	2.72^{*}	$1 < 4; 2 < 4$
	10,000 RMB–20,000 RMB	40.41	6.26		
	20,000 RMB–50,000 RMB	41.86	7.50		
	50,000 RMB or more	44.25	10.06		

[*]Where 1 is for Under 10,000 RMB, 2 is for 10,000 RMB–20,000 RMB and 4 is for 50,000 RMB or more. The numbers are 34, 80, 58 and 28 respectively
*$p < 0.05$

3.4 Relevant Analysis

Correlation analysis is the most commonly used analysis method in correlation studies, and in this case, the SPSS version 26 correlation analysis panel time analysis process was used to process the data (Table 8).

Table 8. Pearson Correlation of PBI and BFI with TAI

	Test Anxiety Inventory	Parental Bonding Instrument	Big Five Inventory
Test Anxiety Inventory	1		
Parental Bonding Instrument	0.462**	1	
Big Five Inventory	0.208**	0.582**	1

*p < 0.05 **p < 0.01

Table 9. Pearson Correlation of each of the four dimensions of PBI with TAI

	Test Anxiety Inventory	Care	Indifference/rejection	Overprotection	Self-determination
Test Anxiety Inventory	1				
Care	0.016	1			
Indifference/Rejection	0.430**	−0.468**	1		
Overprotection	0.347**	−0.223**	0.599**	1	
Self-determination	0.062	0.688**	−0.323**	−0.407**	1

*p < 0.05 **p < 0.01

Based on the results of the correlation analysis above it can be seen. Each variable was significantly correlated at the 99% significance level and the correlation coefficients were all greater than zero, thus showing a positive correlation. These results indicate that the PBI and BFI scales have a significant positive correlation with TAI, i.e. early parenting style has a significant effect on the personality of both secondary school and university students in relation to test anxiety, with correlation coefficients of 0.462 and 0.208 respectively, so it is reasonable to approach this study from these two perspectives.

However, analyzing the correlations from the three different scales is not sufficient to reflect which dimension of each scale has a significant impact on TAI, so that the impact factors can be specified (Table 9).

The PBI scale is divided into a total of four dimensions: caring, indifference/rejection, overprotection, and self-determination. Based on the results of the correlation analysis above it can be seen. Not all variables were significantly correlated at the 99% significance level, but only two of the four dimensions, indifference/rejection, and overprotection, were significantly correlated with TAI at the 99% significance level, and the correlation coefficients were both greater than 0, thus showing a positive correlation. These results show that only two of the four dimensions of PBI, indifference/rejection and overprotection, have a significant positive correlation with TAI, i.e.

parental indifference/rejection and overprotection have a significant effect on test anxiety, with correlation coefficients of 0.430 and 0.347 respectively.

If parents are too indifferent to their children's behavior or always reject their children's requests, this will, to a certain extent, cause the children to feel stressed and lost, believing that their parents do not communicate with them well, and thus test anxiety will not be relieved, thus forming a vicious circle; similarly, if parents are not indifferent to their children, they will take the initiative to understand their children's concerns and study situation, and help and guide them. If, on the other hand, parents are not indifferent to their children, take the initiative to understand their children's concerns and learning situation, help and guide them, and put themselves in their children's shoes, then their children's exam anxiety can indeed be largely relieved. This is why the dimension of rejection/indifference has a significant impact on test anxiety.

On the other hand, parents who are overprotective by caring too much for their children are also detrimental to their children's well-being. For example, parents who want to keep track of all aspects of their children's lives, whether it is school assignments or school performance, will largely increase their children's aversion to school, especially in the case of secondary school students and some university students, who are in the process of growth and development, and are likely to rebel against their parents and increase their test anxiety. Similarly, if parents only give their children a moderate amount of attention within a reasonable range and give them more freedom and space for independent learning, this will instead alleviate their children's exam anxiety and thus improve their children's academic performance. Therefore, our findings on the relevance of the overprotective dimension to TAI are very convincing (Table 10).

The BFI scale is divided into a total of five dimensions: extraversion, agreeableness, responsibility, neuroticism, and openness. Based on the results of the correlation analysis above, it can be seen. Not every variable was significantly correlated at the 99% level of significance. Of the five dimensions, only the two dimensions of neuroticism and openness were significantly correlated with the TAI at the 99% level of significance, and the correlation coefficients were both greater than zero, thus showing a positive correlation. These results show that only two of the five dimensions of the BFI, neuroticism, and openness, are significantly and positively correlated with the TAI, i.e. neuroticism

Table 10. Pearson Correlation of each of the five dimensions of BFI with TAI

	Test Anxiety Inventory	Extroversion	Agreeableness	Responsibility	Neuroticism	Openness
Test Anxiety Inventory	1					
Extroversion	0.120	1				
Pleasantness	0.058	0.448^{**}	1			
Responsibility	0.136	0.326^{**}	0.459^{**}	1		
Nervousness	0.194^{**}	0.394^{**}	0.441^{**}	0.466^{**}	1	
Openness	0.245^{**}	0.418^{**}	0.423^{**}	0.443^{**}	0.490^{**}	1

$^{*}p < 0.05$ $^{**}p < 0.01$

and openness in personality have a significant effect on test anxiety with correlation coefficients of 0.194 and 0.245 respectively.

Neuroticism refers to the degree of sensitivity and vulnerability of a person. If a secondary school or university student scores high on the neuroticism dimension, this means that he or she is very susceptible to mood swings. For example, a student with a low neuroticism score may quickly pick up the pieces and prepare for the next test, whereas a student with a high neuroticism score is likely to dwell on the sadness of losing the test and may even be psychologically disturbed by the failure, thus showing more test anxiety in the next test. Thus, the Neuroticism dimension does have a strong correlation with TAI.

Openness is primarily a measure of a person's imagination and the degree to which they think outside the box. Imaginative thinking is generally considered to be a sign of creativity, but if a secondary school or university student scores too high on the openness dimension, this means that he or she is thinking too much outside the box and is likely to imagine a variety of consequences or situations arising from failing the test, creating unnecessary worries and fears for himself or herself and thus increasing his or her test anxiety; similarly, a person who scores low or moderate on the openness dimension. In the same way, a person who scores low or moderate on the openness dimension is only aware of the test itself and does not make superfluous, in other words, directly unrelated associations; this way of thinking about things reduces unnecessary anxiety for the secondary school or university student, thus showing a lower level of test anxiety. Thus, the openness dimension has also become an important indicator of TAI.

4 Conclusions

In this article, three scales were selected for information collection using a questionnaire. These three scales were: (1) Test of Test Anxiety (TAI); (2) PBI Parenting Style Questionnaire; and (3) BFI Big Five Personality Test Questionnaire and were tested for reliability and validity using SPSS26. Descriptive statistics, tests of discrepancy and correlation analyses were also conducted.

The total number of subjects for this survey was 200. The ratio of males to females was close to 1:2, which was basically balanced. The survey involved 83 secondary school students, including 37 junior high school students and 46 high school students, and the number of both was basically equal; at the same time, it also involved 117 university students, and the ratio of university student subjects to secondary school students was close to 1:1, so this survey can basically reflect the test anxiety situation and the difference between secondary school students and university students in a comprehensive manner. In addition to the basic gender and grade surveys, we also investigated whether students were in their junior or senior year or preparing for graduate school (including overseas study), the type of school they attended, their grade ranking and their monthly household income.

The reliability and validity of this questionnaire were tested. The results were good.

In the test of variance: (i) according to the results of the independent sample t-test, it can be seen that TAI, PBI, and BFI do not show significant differences in terms of gender. (ii) Based on the results of the one-way ANOVA, it can be seen that TAI and PBI

showed significant differences across school segments, with TAI at the high school level being significantly higher than that at the junior high school and university levels, while PBI at the junior high school level was significantly smaller than that at the senior high school and university levels, but BFI did not show significant differences across school segments. (iii) The TAI of senior high school students was significantly higher than that of freshmen and sophomores, but the TAI of junior high school students or students preparing for graduate school or studying abroad was not significantly higher than that of students in other grades in the same academic range. (iv) The results of the one-way ANOVA showed that there were no significant differences in TAI, PBI, and BFI among students of different school ranks. (v) Based on the results of the one-way ANOVA, it can be seen that TAI and PBI did not show significant differences under the indicator of different monthly household incomes, but BFI showed significant differences under the indicator of monthly household income, and the personality of children with monthly household incomes below RMB 10,000 and between RMB 10,000 and 20,000 was significantly different from the personality of families with monthly household incomes above 50,000, forming a significant difference.

In the correlation test: (i) The PBI and BFI scales have a significant positive correlation with TAI, and it is very reasonable for this study to cut from these two perspectives. (ii) Of the four dimensions of the PBI, only the two dimensions of indifference/rejection and overprotectiveness had significant positive correlations with TAI, i.e. parental indifference/rejection and overprotectiveness had significant effects on test anxiety (iii) Of the five dimensions of the BFI, only the two dimensions of neuroticism and openness had significant positive correlations with TAI, i.e. neuroticism and openness in personality had significant effects on test anxiety.

5 Future Prospects

Based on the findings of this study, the researcher found that both parenting styles and students' personalities have a significant impact on test anxiety. The most severe stage of test anxiety is the senior year when students are preparing for the entrance exams, and this is also the stage where test anxiety is most likely to lead to psychological disorders. At present, schools and parents are still lacking in the guidance of senior students' psychological state and positive exam mindset. In the future, schools could set up courses or platforms specifically for senior students to alleviate their exam anxiety.

In our research, we have found that differences in income levels can have a significant impact on students' psychological well-being, which can lead to low self-esteem and other emotions that can affect students' test anxiety in the long run. To address this, schools should focus on establishing good school discipline, treating every student equally, establishing a sense of fair competition and integrity in examinations, putting an end to the culture of comparison, keeping the privacy of poor students strictly confidential to reduce their psychological burden, and setting up a special psychological counseling platform. And keep in touch with their parents in a timely manner to prevent the emergence of psychological disorders [15, 16].

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