

A study on the relationship between motivation and psychological state during preparation for the examination

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Abstract. To explore the relationship between motivation of further education and students' psychological state during exam preparation, and to provide guidance for preventing students' anxiety due to excessive stress and for early psychological intervention. The students' motivation for graduate school was quantified by preparing a Postgraduate Motivation Scale (PMS). Reliability testing of the PMS using the results of a survey of 800 school students. The students' psychological state was analyzed in combination with anxiety and stress values, Mental health monitoring for students once a month during exam preparation (June–December). Cronbach's α was 0.926, the fold-half reliability was 0.887, the retest reliability was 0.931, and the Cronbach's α coefficients of the four subscales were 0.74, 0.83, 0.79, and 0.92. The results of the anxiety and stress tests showed that the average anxiety value of the "active" group was 5.81 less than that of the "passive" group, and 61.64% of the total number of students had anxiety during the preparation period, while 31.2% felt too much stress. Students' negative emotions are positively related to the value of motivation to study for the exam, and the phenomenon of anxiety and the emergence of stressful emotions have a certain time difference. Feelings of anxiety during exam preparation are temporary and disappear with the end of the exam.

Keywords: Motivation of further education; Anxiety; Stress; Students.

1. Introduction

In recent years, Post-graduate has become an important choice for college graduates, making it more and more difficult for students to "get through". Since 2017, the number of postgraduate candidates has increased substantially. Although the number of admissions has more than doubled compared to ten years ago, the acceptance rate is still less than one-third. In 2022, the number of postgraduate candidates reached 4.57 million for the first time^[1], which means that candidates who want to be admitted must give their best during the preparation period.

Compared with college entrance exams, the Graduate School Entrance Exams is more like a one-person "war" that requires students to arrange their own study time and adjust study status alone. Therefore, in addition to mastering professional knowledge, psychological state and external environment are also key factors affecting students' learning efficiency during the examinations^[2-4]. And the motivation to study for the exam is directly related to students' psychological state; in other words, if students are more motivated to study for the exam, then they will plan their revision in advance and put in more effort; adversely, they will not pay attention to the preparation process if they are less motivated to study for the exam. Research shows that there is an "inverted U-shaped" curve between learning efficiency and motivation^[5]. Only when the motivation is at a moderate level, the learning effect can reach its peak.

The reason that the student takes an examination of grind is decided jointly by a variety of elements normally, such as consideration for their own development and possibly the influence of family^[6]. According to the survey, the reasons why students choose to take the postgraduate entrance examination can be classified as Active type and Passive type, the former is to improve competitiveness or love scientific research work to actively choose postgraduate entrance examination, this kind of students usually have a clearer life and review plans, so the early preparation is more adequate. The latter is because the current employment environment is not ideal, it is difficult to find the desired job, turn to the idea of taking part in the postgraduate entrance examination, or have no plan for themselves^[7].

2. Methodology

2.1 Subjects

The respondents of this paper are college students who have the intention to go on to higher education. Among them, 382 (55.44%) were male students and 307 (44.56%) were female students; 351 (50.94%) were senior students and 338 (49.06%) were junior students; among them, 256 (37.16%) were from Science and Technology Disciplines, 119 (17.27%) were from Economics and Management Disciplines, 72 (10.45%) were from Agriculture and Medicine Disciplines, and 42 (6.1%) students from Arts, History and Philosophy Disciplines. In addition, the researchers followed up on the psychological status of 60 students.

2.2 Instruments

2.2.1 Postgraduate Motivation Scale

Postgraduate Motivation Scale (PMS) was developed based on the previous survey and interview results^[8]. The PMS consists of 20 items, divided into four dimensions, academic pursuit, employment expectations, environmental impact and blind behavior. The PMS is a 3-point scale, with 1 point for A (never), 2 points for B (occasionally), and 3 points for C (often). The test results indicate the student's level of motivation and are obtained by summing the results of each question. The results of PMS were classified as: low level (20-32), moderate level (33-47) and high level (48-60).

2.2.2 Self-Rating Anxiety Scale

Self-Rating Anxiety Scale (SAS) was developed by W.K.Zung in 1971, is a self-rating instrument for anxiety symptoms commonly used in counseling clinics to assess patients' anxiety, which is generally applicable to adults with anxiety symptoms to assess the anxiety of patients through subjective feelings^[9]. The SAS consists of 20 items, containing 5 reversing questions. A scale of 1 (never or rarely) to 4 (usually or always) is used, with scores less than 50 indicating no anxiety phenomenon, from 50 to 59 is mild anxiety, from 60 to 69 is moderate, and more than 69 is severe.

2.2.3 Psycho Somatic Tension Relaxation Inventory

Psycho Somatic Tension Relaxation Inventory (PSTR) was developed by Swiss psychologist Edwards in 1983. The PSTR contains a total of 50 items and uses a 0 (never) to 4 (always) scale. When the score is less than 43 indicates little or no stress, 43 ~65 shows moderate current stress, and more than 65 means greater stress^[10]. The stress value, which is greater than 93, indicates that the sense of stress is damaging physical health.

2.3 Scale development

Thirty students of different majors were Investigated, which included items related to academic interests, personal plans, employment expectations, and revision effects^[11]. Based on the results of the interviews, we initially compiled the PMS and the Self-Evaluation of Learning Effectiveness Scale, administered a validation test to the above-mentioned students, asked them whether they understood the entries during the test, whether the language expression of the scale was clear, and whether it included all aspects of their ideas involving examinations, and invited the participants to propose modifications. Based on the results of the feedback from the students, the revised topics of the PMS were determined as shown below.

1. Do you think you have a strong interest in this expertise?
2. Do you think that your current level of knowledge is not enough to cope with the job requirements?
3. Do you think that education has great influence on your future work?
4. Do you aspire to a better school?

5. Do you think you will be influenced by the study status of your classmates?
6. Do you think the current employment situation is not optimistic?
7. Do you feel that you are not yet ready to face the job?
8. Do your parents express their expectations for your own study?
9. Do you want to study a course other than your major?
10. Do teachers tell the stories of senior students' experience of taking part in the postgraduate entrance examination?
11. Do you want to live in a better city?
12. Do you think that the career you are engaged in requires higher education degree?
13. Do you have to study to understand the problems you don't comprehend?
14. Do you willingly learn from others' opinions in life?
15. Do you have good friends or girl (boy) friend who are interested in studying for a degree?
16. Have you participated in academic competitions during your college years?
17. Do you usually come into contact with the propaganda of graduate school through various channels?
18. Do you have the highest and stable grades during your college years?
19. Do you consider that you are not interested in daily life usually?
20. Do you think you have wasted too much time during your undergraduate years?

Items 1, 9, 13, 16, and 18 belong to the academic pursuit dimension; the employment expectation dimension includes items 2, 3, 6, 12, and 20; items 4, 8, 10, 11, and 17 belong to the environmental influence dimension, and the blind behavior dimension involves items: 5, 7, 14, 15, and 19.

3. Results

3.1 Reliability and Validity Test of the PMS

3.1.1 Validity Testing

Common validity tests include content validity test and structural validity test^[12]. The prepared questionnaire has been pre-tested on 30 students of different majors, and the test results basically match the reality. The revised questionnaire was analyzed by 15 graduate student supervisors of different majors, who will assess the content of this questionnaire according to the learning situation of the graduate students in the subject group during their school years. Results showed that KMO was 0.917 and $\chi^2 = 426.144$.

3.1.2 Reliability Test

The commonly used reliability test indexes are Cronbach's alpha coefficient^[13], fold-half reliability^[14] and retest reliability^[15]. The Cronbach's alpha coefficient of the first survey result of the PMS was 0.926, the folded reliability was 0.887, and the retest reliability was 0.901. The Cronbach's alpha coefficients of the subscales were 0.74, 0.83, 0.79, and 0.92; retest reliability was 0.76, 0.88, 0.91, and 0.79 respectively.

3.1.3 Correlation analysis among the dimensions

The correlation analysis of each dimension was done using SPSS^[16]. The results of the analysis show that there is a significant positive correlation between the three dimensions of academic pursuit, employment expectation, and environmental influence; blind behavior has a non-significant negative correlation with the other three dimensions. Therefore, it indicates that students' motivation to enter graduate school is influenced by multiple factors and generally have higher expectations.

Table 1. Correlation analysis among the dimensions

Number	Dimension	$M \pm SD$	1	2	3	4
1	Academic Pursuit	11.64 ± 1.21	1			

2	Employment Expectation	12.01 ± 1.19	0.46**	1		
3	Environmental Impact	9.98 ± 0.7	0.44**	0.52**	1	
4	Blindness Behavior	6.27 ± 1.34	-0.12**	-0.07**	-0.09**	1

** P < 0.01

3.2 Psychological Conditions

Students face high stress during the examination period, and insomnia and crankiness due to anxiety are very common^[17]. A total of seven questionnaires were administered in the present study at one-month intervals. The examinations were held on a weekend in late December each year, so the last time the questionnaires were administered was after the examinations were over as the students' psychological states could be observed in time. A total of 391 valid questionnaires were returned, the results are shown in Tables 2 and 3.

Table 2. Students' SAS situation from June to December

Time	Anxiety Free	Mild Anxiety	Moderate Anxiety	Severe Anxiety
June	311 (79.54%)	45 (11.51%)	18 (4.6%)	17 (4.3%)
July	292 (74.68%)	54 (13.81%)	24 (6.14%)	21 (5.37%)
August	282 (72.12%)	46 (11.76%)	35 (8.95%)	28 (7.16%)
September	227 (58.06%)	93 (23.79%)	39 (9.97%)	32 (8.18%)
October	191 (48.85%)	116 (29.67%)	48 (12.3%)	36 (9.21%)
November	150 (38.36%)	134 (34.27%)	58 (14.8%)	49 (12.5%)
December	270 (69.05%)	80 (20.46%)	21 (5.37%)	20 (5.12%)

Table 3. Students' PSTR situation from June to December

Time	Mild Pressure	Moderate Pressure	Severe Pressure
June	249 (63.68%)	107 (27.37%)	35 (8.95%)
July	208 (53.20%)	122 (31.20%)	61 (15.60%)
August	163 (41.69%)	156 (39.90%)	72 (18.41%)
September	94 (24.04%)	193 (49.36%)	104 (26.60%)
October	100 (25.57%)	179 (45.78%)	112 (28.64%)
November	102 (25.56%)	167 (42.71%)	122 (31.20%)
December	281 (71.87%)	87 (22.25%)	23 (5.88%)

The results of the survey conducted in December showed that the anxiety of most students disappeared after the end of the examination, and the stress value was basically the same as that of the pre-preparation period. Therefore, it can be judged that the high psychological stress and anxiety problems faced by students during the examination period were temporary and did not have long-term effects. The average monthly stress and anxiety values of students mentioned above are shown in Table 4, of which 126 are in line with the "active" type of examinations and the remaining 265 belong to the "passive" type of examinations. The mean SAS value of the "active" group is 5.81 smaller than that of the "passive" group. They are more emotionally stable and study according to their own plans.

Table 4. Stress and Anxiety Values in Different Month

Time	Mean Stress		Mean Anxiety	
	Fresh Graduates	Past Graduates	Fresh Graduates	Past Graduates
June	39.21	48.85	41.37	45.22
July	41.14	46.73	41.81	46.04
August	43.63	47.41	47.35	50.07
September	51.17	55.03	48.41	51.95

October	59.38	62.44	50.83	52.66
November	63.83	62.72	53.34	55.82
December	37.47	47.21	39.06	46.79

3.3 Relationship between motivation and stress in graduate school

From the results of the PMS, the students' average motivation value of senior students is 5.82 higher than that of junior students, and the motivation value of former students is 4.22 higher than that of freshmen students. The results of the survey show that all students' motivation values are greater than 25, meaning that no student has a motivation value between 20 and 25. The distribution of the results shows that the average value of personal stress is positively correlated with the motivation to study for the exam, and the greater the motivation, the greater the sense of stress. The motivation values were used as independent variables for data fitting analysis, and the instrument applied was developed by Orgin (2019), and the fitting results are shown in Figure 1, and the coefficients of the fitted equations are shown in Table 5.

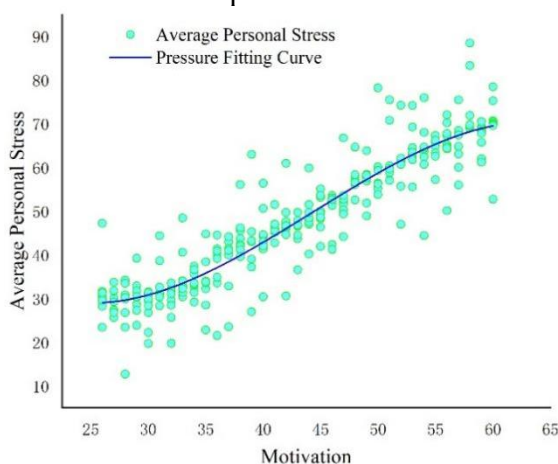


Fig. 1 Fitted relationship

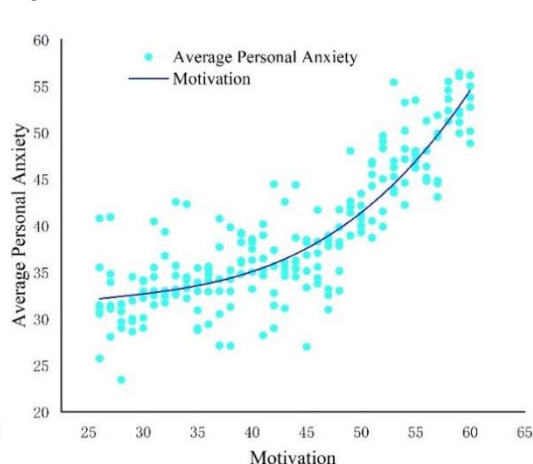


Fig. 2 Fitted relationship

Table 5. Parameters of Fitting Equation

Parameter	Numerical Value
Equation	$y = \text{Intercept} + B1*x^1 + B2*x^2 + B3*x^3$
Weighting	Unweighted
Intercept	106.94551 ± 29.47918
B1	-7.12552 ± 2.17734
B2	0.19756 ± 0.05196
B3	$-0.00149 \pm 4.01886E-4$
Residual sum of squares	10269.49258
R-squared (COD)	0.85113
Adjusted R-squared	0.84969

3.4 Relationship between Motivation and Anxiety during the Examination

The results of the survey revealed that it was more common for students to experience anxiety during the examination. The data were fitted to the motivation values and anxiety values. The fitting results are shown in Figure 3 and Table 6. It can be seen that the anxiety value of the students increases significantly when the motivation value of the examination reaches 45.

Table 6. Parameters of Fitting Equation

Parameter	Numerical Value
Equation	$y = \text{Intercept} + B1*x^1 + B2*x^2 + B3*x^3$

Weighting	Unweighted
Intercept	20.10329 ± 22.6858
B1	1.13136 ± 1.67558
B2	-0.0382 ± 0.03999
B3	4.81904E-4 ± 3.09273E-4
Residual sum of squares	2685.60445
R-squared (COD)	0.76916
Adjusted R-squared	0.76579

4. Discussion

For freshmen students, June and July is the summer vacation, and some students just entered the revision stage, the overall psychological problems are relatively light, although some individual students are more stressful, the general anxiety value is relatively low. Starting from August, students' stress values changed significantly compared to the first two month, because the questionnaire was conducted at the end of August, when students faced a series of problems such as the start of school and internship. In comparison, students' emotions change less in October and November. As the time of the exam approaches, students' pressure to review is increasing and their anxiety gradually worsens, with both anxiety and stress values reaching the peak.

For former students, the value of anxiety and stress is generally higher than that of fresh students, but the changes of anxiety and stress values during the preparation period of the former students were not as dramatic as that of the fresh students. Some of the former may face the reform of the examination schools, or re-choice the schools they apply to, and the content of the exams may change a lot, requiring them to prepare again. Meanwhile, On-the-job graduate student have even less time to review and have to face the dual pressure of work and study, causing them to have to allocate their study time wisely.

The interviews revealed that students' emotional changes during exam preparation were mainly focused on four points in time. The first is that in mid-June, the final exams are basically over for freshmen students, and they will have more time to study during the summer holidays, so their revision gradually enters a stable state; at the same time, some students are affected by job fairs, and the contradiction between exams and employment is especially prominent, so most students are looking for jobs while taking exams, and their anxiety is most serious at this time. In the beginning of October, students' sense of urgency is stronger when they start to register for the examination, and their stress level reaches the maximum at this time, and students who do not have satisfactory results in their review will face the situation of choosing schools again. In mid-December, students' anxiety and stress levels drop because the exam review is almost complete.

We should improve the career guidance for college students, help them identify their own position and judge whether they are suitable for work or graduate school. Encourage students to establish their own career plans to avoid students going to graduate school all at once. Secondly, to create a good learning environment and learning atmosphere for students to prepare for their exams. Last but certainly not least, the emotional changes of students deserve attention, and the school staff should give timely psychological guidance to some students with high anxiety value, pay extra attention to the several points of time when students' emotional changes are more obvious, and provide psychological counseling services for students through psychological counseling stations.

References

- [1] Zhang Cheng. The reason behind 4.57 million people choose to study for the exam[J]. Prosecutorial View,2022(03):68-69.
- [2] Wu D, Yang T Z. Late bedtime, uncertainty stress among Chinese college students: impact on academic performance and self-rated health.[J]. Psychology, health & medicine, 2022, : 11-12.
- [3] Teng D C, Zhou L X, Han Y X, et al. The influence of college students' learning attitude on learning

- effect[J]. BASIC & CLINICAL PHARMACOLOGY & TOXICOLOGY, 2021, 128 : 131-131.
- [4] WANG G H, REN F, LIU Z J, et al. Sleep Patterns and Academic Performance During Preparation for College Entrance Exam in Chinese Adolescents. J Sch Health. 2016 Apr;86(4):298-306.
- [5] Wang Z, SARAH L L, SARA A H, et al. Is Math Anxiety Always Bad for Math Learning? The Role of Math Motivation[J]. Psychological Science, 2015, 26(12) : 1863-1876.
- [6] Cong Kanglin, Li Xican, Dong Chao, et al. Survey Analysis of Factors Influencing College Students' Examination[J]. Industrial & Science Tribune, 2019, 18(13):139-140.
- [7] Gao Li. Factors influencing psychological anxiety and coping with it among exam students[J]. Education Modernization, 2019, 6(76):301-302.
- [8] Su Dan, Song Juan, FANG P. Self-Regulated Learning Inventory: Developmental Revision[J]. Studies of Psychology and Behavior, 2011, 9(03), 225-230.
- [9] ANGGI S, CHUNG M H, YUSUF A. Development of self-report assessment tool for anxiety among adolescents: Indonesian version of the Zung self-rating anxiety scale[J]. Journal of Public Health in Africa, 2019, 10(1s).
- [10] Xu Chao, Zang Di. Reliability and validity study of the Depression, Anxiety, and Stress Scale of the Chinese version in the residents under standardized training[J]. Medical Journal of Wuhan University, 2020, 41(05):828-831.
- [11] Che Guixu. Investigation and Analysis of Local College Students' Concept of Postgraduate Entrance Examination[J]. Journal of Hebei Normal University of Science & Technology (Social Sciences), 2020, 19(04):124-128.
- [12] CUOCO S, CAROTENUTO I, CAPPIELLO A A, et al. Reliability and validity of the novel Italian version of the 14-item Resilience Scale (RS-14) in adults[J]. Neurological Sciences, 2021, 43:3079-3087.
- [13] ZUMBACH J, OSTER A, RADEMACHER A, et al. Reliability and Validity of Behavior Observation Coding Systems in Child Maltreatment Risk Evaluation: A Systematic Review[J]. Journal of Child and Family Studies, 2021, 31: 545-562.
- [14] LIU R, WANG F, LIU S, et al. Reliability and Validity of the Quick Inventory of Depressive Symptomatology—Self-Report Scale in Older Adults With Depressive Symptoms [J]. Frontiers in Psychiatry, 2021, 12 : 686-711.
- [15] CHIU H C, BUCKERIDGE K, LEE T A, et al. Reliability and validity of the Eating and Drinking Ability Classification System (EDACS) for children with cerebral palsy in Taiwan.[J]. Disability and rehabilitation, 2021, : 1-7.
- [16] Chen Lu, Cao Hui, Zhu Zhuohong, et al. Validity and Reliability of the Chinese Version of the Parental Reflective Functioning Questionnaire[J]. Chinese Journal of Clinical Psychology, 2022, 30(02):340-345.
- [17] Zhou T. The Associations between Sleep Duration, Academic Pressure, and Depressive Symptoms among Chinese Adolescents: Results from China Family Panel Studies[J]. International Journal of Environmental Research and Public Health, 2021, 18(11) : 1-16.