



# Positive and Negative Influencing Factors of University Students' Anxiety and Depression: Academic Burnout Mediates Effects of School engagement on Anxiety and Depression

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**Abstract.** With the intensifying mental health crisis around the world, the high epidemic anxiety and depression of university students as well as their dual damages to individual development and social resources, it is urgent to disclose the influencing mechanism of different factors. This study explores the influencing paths of academic burnout, achievement motivation and school engagement on anxiety and depression. According to 702 effective questionnaires and Spearman correlation analysis, three dimensions (exhaustion, cynicism and decreased professional efficacy) of academic burnout have strong positive correlations with depression ( $r=0.70$ ) and anxiety ( $r=0.66$ ) ( $p<.001$ ), while achievement motivation (depression:  $r=-0.34$ ; anxiety:  $r=-0.31$ ) and three dimensions (behaviors/cognition/social contact and symptoms  $r=-0.40\sim-0.44$ ) of school engagement show negative correlations with depression and anxiety. The multivariate regression discloses that academic burnout shows the strongest predictive power to depression ( $\beta=1.00$ ,  $p<.001$ ) and anxiety ( $\beta=0.98$ ,  $p<.001$ ), followed by school engagement (depression:  $\beta=0.28$ ; anxiety:  $\beta=0.27$ ). Achievement motivation shows weak predictive power ( $\beta=0.07-0.09$ ,  $p<.05$ ). The inhibition effect was found in the further mediation model: school engagement alleviates anxiety ( $\beta=-0.38$ ,  $p<.001$ ) and depression ( $\beta=-0.39$ ,  $p<.001$ ) indirectly by decreasing academic burnout, but the direct effect is significantly positive ( $\beta=0.14$ ). As a result, the total negative effect is offset partially (indirect effect accounts for 152%-154%). The achievement motivation path fails to show significance. This study proves influences of academic burnout on depression and anxiety levels of university students. School engagement affects anxiety and depression indirectly by alleviating burnout. This study provides theoretical guidance and practical significance to researches on intervention of university students' anxiety and depression.

**Keywords:** academic burnout, achievement motivation, school engagement, anxiety, depression

## 1 Introduction

With the increasingly prominent mental health problems around the world, anxiety and depression which are psychological disorders with high incidence have brought severe challenges to individual development and social operation. According to estimates from the World Health Organization [1], approximately 54 million people in China live with depressive disorders, and 41 million are affected by anxiety disorders, constituting a significant public health burden. Core symptoms of depression include continuous black mood (including sadness, emptiness or emotional anesthesia) and loss of interest. The later one is often manifested as decreased desire for social contact, hobbies and even basic physiological needs. Depression is often accompanied with at least four other symptoms, such as sleep disorder (insomnia or excessive sleeping), significant fluctuation of appetite and body weight (monthly changes >5%), psychomotor retardation or agitation. Anxiety is defined as long-term ( $\geq 6$  months) excessive and uncontrollable worries of individuals to daily events. It is accompanied with at least three physical or cognitive symptoms (e.g. restlessness, fatigue, attention disorder, irritability, muscular tension or sleep problems), and it must have caused significant functional impairment [2].

University students are the core power source of social development and their mental health is worth of attention. Influencing factors of their anxiety and depression are highly complicated. Existing studies mainly summarize them as the interaction of positive factors (e.g. psychological resilience and social support) and negative factors (e.g. pressure source and negative cognition). Negative factors influencing anxiety and depression of university students are mainly academic pressure, economic pressure, social relationship risks and individual misconduct. Academic pressure including excessive exam burden (e.g. dissatisfaction to assessment criteria and too much exams) [3], peer comparison caused by competitive classroom environment [4, 5] and continuous fear for academic failures [6]. For positive factors, emotional regulation ability like self-care [7, 8], high tolerance to uncertainty [9] and hope-driven target orientation [10] can block the delay-anxiety circle effectively. Local studies in China emphasize on the two-way enhancement mechanism of their capacity to be alone and satisfaction to life [8], intervention efficacy of Marxist ideological and political education to anxiety environment, effects of moderate physical exercise in alleviating comorbid depression and anxiety symptoms (CDAS) (weekly  $\geq 150$  minutes of moderate and high-intensity exercise) [11].

Besides, some study has pointed out gender and subject differences of university students' anxiety and depression. Specifically, women usually have a higher depression level [12], but men who have been abused during childhood show stronger depression susceptibility [11]. While a negative correlation was observed between internet addiction and mental health, male students reported both a higher prevalence of internet addiction and higher average mental health scores than females [13]. Medical students face with anxiety of career identity transformation [14]. Compared to engineering student, students majored in humanities and social science have pressure of employment uncertainty [15]. According to difference in types of colleges and universities, the incidence rate of anxiety increases significantly among students from private university

[16], while depression level of students from public universities is more remarkable [16]. Such dynamic interaction of multi-level factors highlights the urgency to build an integrated model to interpret core mechanism of university students' mental health problems.

Although some important progresses have been achieved, there are still insufficient studies on influencing factors of depression and anxiety of university students in China. Given the continuously increasing academic pressure and intensifying "involution", more attention shall be paid to effects of learning-related factors on anxiety and depression at present. In this study, three dimensions (exhaustion, cynicism and professional efficacy) of academic burnout, achievement motivation (achievement goal) and behavioral/cognitive/social dimensions of school engagement were chosen as influencing factors. Moreover, demographic variables like gender, grade and major were included. The following core hypotheses were verified through an empirical study: (1) three dimensions of academic burnout, achievement motivation mode and school engagement influence anxiety depression level of university students. Specifically, students with higher academic burnout have more serious anxiety depression, while students with lower scores of achievement motivation and school engagement have the high depression level. (2) Mediation effect of academic burnout / relationships among variables.

## 2 Methodology

Based on the academic "involution", this study focuses on academic burnout, achievement motivation and school engagement. The school engagement and achievement motivation were used as independent variables, while academic burnout was used as the mediating variable. The anxiety and depression levels of students were used as dependent variables. Electronic questionnaires were sent through the Wenjuanxing Platform and invalid ones were eliminated after screening the completeness of answers (screening data criteria are introduced in the following text). Data was all collected by standardized scales in Chinese, including Maslach Burnout Inventory-Student Survey (MBI-SS) to measure three dimensions (including exhaustion, cynicism and professional efficacy) of academic burnout [17, 18], the Achievement Goal Questionnaire (AGQ) to measure achievement motivation [19], School Engagement Scale (SES) to measure behavioural, cognitive and social dimensions of school engagement [20], and Depression Anxiety Stress Scales-21 items to measure anxiety depression level [10]. Moreover, demographic variables (gender, location, grade and major) were collected.

Maslach Burnout Inventory-Student Survey (MBI-SS): occupational burnout is often measured by the Maslach Occupational Burnout Scale. MBI-SS for university students is an adapted version of MBI. Validity of MBI-SS in university students has been proved by existing studies [18]. MBI-SS involves 15 items, covering three dimensions of occupational burnout: exhaustion, cynicism and professional efficacy. Respondents give scores to each item by using the five-level scale (1= "strongly disagree" ~ 5= "strongly agree"). The higher score indicates the higher degree of recognition to the goal.

Achievement Goal Questionnaire (AGQ): It has 12 items, including two dimensions

of the achievement goal, namely, performance goal and comprehension goal. Items were scored by the five-level scale (1= “strongly disagree” ~ 5= “strongly agree”). The higher score indicates the higher degree of recognition to the goal. The reliability coefficient and factor validity all reached the acceptable criteria in previous studies [19].

School Engagement Scale (SES): Wang et al. proved that SES is a psychological measurement scale to evaluate behavioural performances, emotional state, cognitive level and social contact of students [20], which reflect their participation and separation from schools. SES captures multi-dimensional characteristics of school engagement, covering four dimensions of behaviors, emotion, cognition and society. It has 19 items and each is scored by the five-level scale (1= “strongly disagree” ~ 5= “strongly agree”). The higher score indicates the higher degree of recognition to the goal.

Depression Anxiety Stress Scales (DASS-21): it is the simplified version of DASS-21 developed Lovihond&P.F.Lovibond [21]. Antony et al. [22]found that DASS-21 can not only distinguish depression characteristics, physiological activation state and psychological tension, but also shows good or high internal consistency and concurrent validity with DASS. Items are evaluated by the five-level scale (1= “never” ~ 5= “always”). The higher score indicates the higher degree of recognition to the goal and the higher frequency of experience.

This study only involved questions of anxiety and depression in the DASS-21, whereas questions of pressure dimension were not applied. Lovibond (1995)[21] pointed out that DASS could well distinguish anxiety and depression indicators. Moreover, anxiety and depression scales were different from tension/pressure state to some extent. This reveals that three sub-scales of DASS could measure anxiety, depression and pressure, respectively. The results may not be affected by using two sub-scales of DASS. In this study, anxiety and depression subscales were used only since it focuses on anxiety and depression levels of university students.

## 3 Results

### 3.1 Descriptive Statistical Results

Data analysis was completed through SPSS 27.0. This study aims to discuss effects of academic burnout, achievement motivation and school engagement on anxiety and depression of university students. A total of 748 questionnaires were collected through the Wenjuanxing Platform. Firstly, 2 questionnaires of overseas respondents were eliminated. Next, 44 abnormal questionnaires which were finished less than 300 s were further eliminated according to the reasonable time range determined based on pre-test. Finally, 702 valid questionnaires (effective rate =93.9%) were retained. These questionnaires were answered by 347 males (49.4%) and 355 females (50.6%), covering many provinces and professional fields (engineering: 11.4%; medicine: 8.3%; art: 8.1%) around the world. Most respondents were seniors (35.8%) and freshmen (28.6%). Reliability analysis results of scales are shown in Table 1. Clearly, all scales show good reliability ( $\alpha>0.89$ ) except that AGQ shows relatively low internal consistency (Cronbach's  $\alpha=0.43$ ).

The Cronbach's  $\alpha$  of AGQ is 0.433, which is lower than conventional acceptance

criteria ( $\alpha > 0.70$ ). Results shall be interpreted by combining with geometric characteristics of the scale. First, the simplified version of AGQ applied in this study only involves 4 questions. The Cronbach's  $\alpha$  might underestimate the real reliability when the number of questions in the scale is too small [23].

**Table 1.** Reliability analysis results of scales

Scales	Dimensions	Number of items	Cronbach's $\alpha$
MBI-SS	Academic burnout	15	0.94
	Exhaustion	5	0.91
	Cynicism	4	0.90
	Professional efficacy	6	0.94
AGQ	Achievement motivation	4	0.43
SES	School engagement	14	0.97
	Behavioral participation	4	0.90
	Cognitive engagement	5	0.93
	Social interaction	5	0.93
DASS	Depression symptoms	7	0.94
	Anxiety symptoms	7	0.94

Frequency distribution and central tendency of demographic variables (gender, major, grade and location) as well as questionnaire scores of academic burnout, achievement motivation, school engagement, depression and anxiety were analysed. Results are shown in Table 2. The academic burnout (MBI-SS:  $M \pm SD = 51.02 \pm 15.41$ ) and anxiety depression symptoms (DASS-21:  $48.95 \pm 16.20$ ) are at relatively high levels.

**Table 2.** Descriptive statistical results of different variables

Variables	M	SD
Academic burnout	51.02	15.41
Exhaustion	17.66	5.76
Cynicism	14.00	4.81
Professional efficacy	19.36	7.59
Achievement motivation	11.81	3.43
school engagement	38.49	17.11
Behavioral participation	11.04	5.01
Cognitive engagement	13.74	6.34
Social interaction	13.71	13.71
Depression symptoms	24.47	8.18
Anxiety symptoms	24.48	8.29

### 3.2 Correlation and Regression Analyses

The Spearman correlation analysis results are listed in Table 3. The correlation coefficient ( $r$ ) between MBI-SS and depression sub-scale of DASS-21 is 0.70 ( $p < 0.001$ ). The

correlation coefficients (*r*) of exhaustion, cynicism and efficacy with the depression sub-scale of DASS-21 are 0.65 (*p*<0.001), 0.64 (*p*<0.001) and 0.45 (*p*<.001), respectively. The correlation coefficient (*r*) between MBI-SS and anxiety sub-scale of DASS-21 is 0.660 (*p*<0.001). Specifically, the correlation coefficients (*r*) of exhaustion, cynicism and efficacy with anxiety sub-scale of DASS-21 are 0.62 (*p*<0.001), 0.60 (*p*<0.001) and 0.44 (*p*<0.001), respectively. The correlation coefficients (*r*) of achievement motivation with depression and anxiety were -0.34 (*p*<0.001) and -0.31 (*p*<0.001). The correlation coefficients (*r*) of behavioral, cognitive and social dimensions of school engagement with depression are -0.41 (*p*<0.001), -0.42 (*p*<0.001) and -0.44 (*p*<0.001), respectively. The correlation coefficients (*r*) of behavioral, cognitive and social dimensions of school engagement with anxiety are -0.40 (*p*<0.001), -0.42 (*p*<0.001) and -0.41 (*p*<0.001), respectively. The *p*-values of all correlation coefficients after calibration are lower than 0.016 (Bonferroni calibration).

According to the multivariate regression analysis (Table 3), when depression is used as the dependent variable, the standardized regression coefficients ( $\beta$ ) of academic burnout, achievement motivation and school engagement are 1.00 (*t*=26.05, *p*<.001), 0.074 (*t*=1.97, *p*<0.05), and 0.28 (*t*=5.84, *p*<.001). The overall explanation rate of the model is 59.3% (*F*=338.67, *p*<.001). When anxiety is used as the dependent variable,  $\beta$  of academic burnout, achievement motivation and school engagement values 0.981 (*t*=25.14, *p*<.001), 0.09 (*t*=2.33, *p*=0.020), and 0.27 (*t*=5.41, *p*<.001). The overall explanation rate of the model is 56.7% (*F*=304.63, *p*<.001). However, the variance inflation factor (VIF=4.040) of school engagement has a low risk of multicollinearity.

**Table 3.** Regression models of anxiety and depression

Variables	Depression		Anxiety	
	$\beta$	<i>t</i>	$\beta$	<i>t</i>
MBI-SS	1.00	26.054***	0.98	25.138***
AGQ	0.07	1.968*	0.09	2.329*
SES	0.28	5.840***	0.27	5.414**
R <sup>2</sup>	0.59		0.57	
F	339.67		204.63	

Notes: \* indicates *p* < 0.05, \*\* indicates *p* < 0.01, and \*\*\* indicates *p* < 0.001.

### 3.3 Analysis of Variance of Different Demographic Variables

To test effects of different demographic variables on mental health of university students, one-way analysis of variance (ANOVA) was applied in this study, in which major, grade, location and gender were used as independent variables, while depression and anxiety levels were used as dependent variables. Clearly, there’s no significant intergroup difference among different majors in depression symptoms (*F* (*df*=11)=0.77, *p*=0.675) and anxiety symptoms (*F* (*df*=11)=0.91, *p*=0.534). Besides, no significant difference is observed among different grades (depression: *F* (*df*=3)=0.11, *p*=0.975; anxiety: *F* (*df*=3)=0.35, *p*=0.791) and different locations (depression: *F* (*df*=26)=0.70, *p*=0.864; anxiety: *F* (*df*=26)=0.77, *p*=0.789).

Independent sample t-test was carried out to depression and anxiety scores of medical students (N=58, 8.3%) and non-medical students (N=644, 91.7%). Results showed that depression scores of medical students (26.26±6.95) were significantly higher than those of non-medical students ( $t((df=72))=1.90, p<.001$ ), and their anxiety scores were also higher ( $t(df=70)=1.97, p<.001$ ). Similarly, t-test of depression and anxiety scores of art students (N=57) and non-art students (N=645) was carried out. It found that depression scores ( $t(df=66)=-0.37, p=0.924$ ) and anxiety scores ( $t(df=68)=0.16, p=0.060$ ) of art students show no significant differences from those of non-art students. The anxiety difference presents marginal significance. All scores are listed in Table 4.

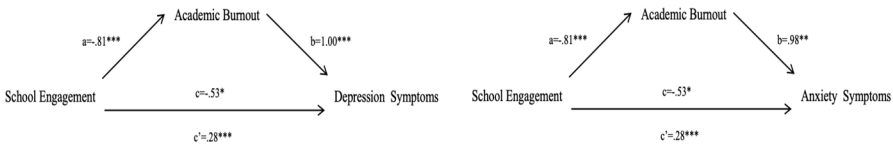
**Table 4.** Average scores of depression and anxiety of medical students, non-medical students, art students and non-art students

Major	Depression scores		Anxiety scores	
	Mean	SD	Mean	SD
Medical students	26.16	6.95	26.38	7.59
Non-medical students	24.32	8.27	24.31	8.33
Art students	24.09	8.17	24.65	7.88
Non-art students	24.51	8.19	24.47	8.33

### 3.4 Mediation Model Analysis

Academic burnout might be able to form the key transmission path between school engagement/achievement motivation and anxiety depression. In other words, achievement motivation and school engagement adjust burnout degree, and they affect the ultimate psychological status by changing the academic burnout together. As a result, this study used school engagement and achievement motivation as independent variables, depression level and anxiety level as dependent variables, and academic burnout as the mediating variable. The mediation mechanisms of academic burnout in the correlations of achievement motivation and school engagement with depression and anxiety levels of university students were tested by the stepwise regression method.

It can be seen from Fig.1 that in the analysis on anxiety level, the total effect of school engagement on anxiety level is significantly negative ( $\beta = -0.522, p < 0.001$ ). After academic burnout is controlled, the direct effect changes to be significantly positive ( $\beta = 0.271, p < 0.001$ ). According to analysis of mediating pathways, the effect of school engagement on academic burnout declines significantly ( $\beta = -0.808, p < 0.001$ ), but the effect of academic burnout on anxiety enhances greatly ( $\beta = 0.981, p < 0.001$ ), forming strong negative indirect effect ( $\beta = -0.793$ ). The superposition results (-0.522) of direct effect (0.271) and indirect effect (-0.793) are completely consistent with total effect, which further verifies the mediating effect of academic burnout. This indicates that after-school activities might increase anxiety, but its effect in decreasing anxiety by alleviating academic burnout takes the dominant role.



**Fig. 1.** Mediating pathway model of school engagement on depression and anxiety levels through academic burnout. Left: Mediation model of academic burnout in the correlation between school engagement and depression level; Right: Mediation model of academic burnout in the correlation between school engagement and anxiety level.

In the analysis of depression level, school engagement has significant negative effect on depression level when academic burnout is excluded ( $\beta = -0.525, p < 0.001$ ), indicating that school engagement is negatively related with depression level. However, after academic burnout is introduced in as the mediating variable, the direct effect of school engagement on depression changes from negative to significantly positive ( $\beta = 0.283, p < 0.001$ ). This demonstrates that effect of school engagement on academic burnout declines dramatically ( $\beta = -0.808, p < 0.001$ ), thus lowering the depression level accordingly ( $\beta = 1.000, p < 0.001$ ). The indirect effect of school engagement on academic burnout is negative ( $\beta = -0.808$ ). This reflects that although school engagement increases the depression risk directly, the depression level finally declines by alleviating academic burnout (Table 5).

For the achievement motivation pathways, no significant effect has been observed in both anxiety model and depression model. The predictive power of achievement motivation to academic burnout is insignificant ( $B=0.19, SE=0.17, p=0.262$ ). The indirect effect of achievement motivation on anxiety ( $Z=1.13, p=0.260$ ) or depression ( $Z=1.13, p=0.259$ ) through academic burnout hasn't reached the statistical significance.

**Table 5.** Mediating effect of school engagement on depression

Effect	Effect value	95%CL	Proportion of effect
Total effect	-0.525*	[-0.300,-0.202]	100%
Direct effect	0.283***	[0.091,0.181]	-54.2%
Indirect effect	-0.808*	[-0.387,-0.342]	154.2%

Notes: \* indicates  $p < 0.05$ , \*\* indicates  $p < 0.01$ , and \*\*\* indicates  $p < 0.001$ .

## 4 Conclusions

This study explores the influencing mechanisms of academic burnout, achievement motivation and school engagement on anxiety and depression of university students. Results show that academic burnout can serve as the mediating variable in the correlations of achievement motivation and school engagement with anxiety and depression of university students. Academic burnout and its three dimensions (exhaustion, cynicism and professional efficacy) can affect anxiety and depression levels of university students. School engagement also alleviates anxiety or depression symptoms indirectly by lowering academic burnout, but it can intensify anxiety and depression directly.

In this study, the psychological risk mechanisms of students are disclosed from several dimensions and the mediating effect of academic burnout is determined. However, there are still some limitations that shall be interpreted carefully. First, representativeness and universality of samples were limited: although the research samples cover 31 provincial administrative districts in mainland China, there are significant regional imbalances (samples in Eastern China account for 64.8%). Besides, the sample imbalance between art students (20.0%) and medical students (8.7%) might weaken the statistical validity of inter-major comparison. The geographical and subject distribution bias might restrict the applications of conclusions to universities in Western China and specific subject groups.

Second, the causality deduction of cross-section design has some limitations. All variables are measured synchronously. Although the regression model confirms that anxiety and depression levels can be predicted from academic burnout, it cannot eliminate reverse causality (i.e. depression intensifies burnout perception) or interference of the third variable (i.e. personality influences burnout and emotional problems simultaneously).

Third, the mechanism is underexplored. The differential effect of motivation types (mastery goal vs. performance goal) is not assessed while verifying the protective effect of achievement motivation and school engagement. Furthermore, the social cognitive pathways (e.g. self-efficacy improvement and acquisition of social support) for school engagement to realize emotional buffering haven't been analysed.

Based on above limitations, future studies can further investigate following aspects. First, vertical tracking and causality mechanism verification: data about students' status in different stages can be acquired (early, middle and late stages of the semester) and a two-way action model between academic burnout and anxiety depression is built. Second, the achievement motivation measured by AGQ can be divided into approach motivation (pursuit for success) and avoidance motivation (avoiding failure) to test its heterogeneous effect on depression.

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