

# Analysis of Mental Health and Impact Factors of International Students of Science and Engineering in China-Taking a University in Western China as an example

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**Abstract.** To explore the mental health of international students of science and engineering in China and provide an empirical basis for psychological crisis prevention and intervention, Symptom Check List-90 (SCL-90) was used to investigate 116 such international students in a university of western China and demographic variables including gender, education level, Chinese proficiency, and social support are analyzed. The results show that each factor score of SCL-90 is less than 2 points; the top three factors are obsessive-compulsive symptoms, depression, and others. The scores of each factor of SCL-90 are different and follow certain regularity with different demographic variables. Each factor's female score is higher than that of male; Mental health status is positively correlated with Chinese proficiency and social support and negatively correlated with education level. The overall mental health of international science and engineering students is relatively good. Specific efforts should be implemented to decrease the prevalence of psychological disorders, and some associated mental health education should be carried out based on the characteristics of such international students.

**Keywords:** SCL-90; international students in China; mental health

## 1. Introduction

Under the deepening development of higher education, China has become the largest destination for international students in Asia [1]. By 2020, there will be nearly 500,000 international students in China. Compared with domestic students, international students are more likely to have problems in mental health [2, 3]. Malignant events caused by mental health problems bring tremendous pressure to university management. Higher education institutes urgently need to systematically analyze and summarize the mental health status of international students in China and construct a mental health prevention and crisis intervention mechanism.

Researchers have also made a series of investigations on the mental health of international students in China: discussing the working mechanisms and strategies of psychological education from a macro perspective [4-8]; paying attention to different regions and types of international students from a medium perspective [9-12], and the mental health characteristics of international students from a micro perspective [13]. Nevertheless, there is little attention on international science and technology students in western China.

This study used the SCL-90 scale to investigate the mental health status of international students of science and technology in western China and combined with demographic variables to study the mental health influencing factors of international students in China to provide scientific reference for psychological intervention and prevention.

## 2. Subjects and Methods

### 2.1 Subjects

International students of science and engineering in a university in western China are selected as the respondents. One hundred eighty (180) electronic questionnaires are randomly distributed

through the questionnaire star, and 151 questionnaires are received. The response time is less than 6 minutes, and overseas respondents are excluded. Finally, 116 valid questionnaires are obtained.

## 2.2 Instruments and Methods

The questionnaire method is used as a research instrument. The first part of the questionnaire consists of a self-made demographic characteristic questionnaire, including four dimensions: gender, education level, Chinese proficiency, and social support. The second part of the questionnaire uses Symptom Check List (SCL-90) for mental health assessment. After the questionnaire is prepared, five international students are randomly selected to test the questionnaire. A depth interview is conducted with five students to help adjust the questionnaire. Finally, the revised questionnaire is randomly distributed to the international students through the questionnaire star. The Excel data is processed using descriptive analysis, One-Way ANOVA, and independent sample-T test in SPSS17.0.

## 3. Results and analysis

### 3.1 Basic information of the respondents

Among the 116 international science and engineering students, males and females are 91 and 25, respectively. The number of doctors, masters, and bachelor's is 56, 33, and 27, respectively. The Chinese proficiency consists of very good (5), good (24), normal (48), poor (35), very poor (4). The social support consists of very good (39), good (35), normal (31), poor (9), very poor (2). The results are shown in Table I.

Table I. Demographic characteristics of international students of science and engineering in China

Demographic Characteristics		Number	Percentage
Gender	Male	91	78.4
	Female	25	21.6
Education level	Doctor	56	48.3
	Master	33	28.4
	Bachelor	27	23.3
Chinese proficiency	Very	5	4.3
	Good	24	20.7
	Normal	48	41.4
	Poor	35	30.2
	Very poor	4	3.4
Social support	Very	39	33.6
	Good	35	30.2
	Normal	31	26.7
	Poor	9	7.8
	Very poor	2	1.7

### 3.2 Analysis of SCL-90 score

The ten (10) factors' scores of SCL-90 in the sample are shown in Table II. The results show that the score of each factor is between 1.23 and 1.85, and scores rank as follows: obsessive-compulsive symptoms > depression > other > paranoid ideation > interpersonal sensitivity > somatization > anxiety > psychoticism > hostility > terror. Only the score of obsessive-compulsive symptoms factor calculated by the mean plus the standard deviation reaches between 2 and 3 points, moderate severity.

Table II. SCL-90 score in the sample (n=116)

Factor	Mean	Standard
Somatization	1.47	0.67
Obsessive- Interpersonal	1.85	0.73
Depression	1.53	0.60
Anxiety	1.70	0.73
Hostility	1.46	0.66
Terror	1.33	0.61
Paranoid ideation	1.23	0.54
Psychoticism	1.58	0.76
Other	1.42	0.60
	1.65	0.67

### 3.3 Effect of gender on SCL-90 score

The gender differences in the SCL-90 factors are analyzed using an independent sample-T test, and the results are shown in Table III. The results demonstrate that the female's score in SCL-90 is higher than those of males, and the scores of the four factors, including obsessive-compulsive symptoms, depression, interpersonal sensitivity, and anxiety, were significantly higher than those of males, achieving a statistically significant difference ( $P < 0.05$ ).

Table III. Effect of gender on SCL-90 score

Factor	Male (n=91)	Female (n=25)	T
Somatization	1.43±0.64	1.61±0.76	-1.165
Obsessive- compulsive	1.76±0.68	2.18±0.84	-2.568*
Interpersonal sensitivity	1.49±0.59	1.68±0.62	-1.439
Depression	1.60±0.63	2.10±0.94	-2.506*
Anxiety	1.38±0.58	1.76±0.83	-2.160*
Hostility	1.27±0.52	1.56±0.85	-1.636
Terror	1.22±0.51	1.29±0.62	-0.614
Paranoid ideation	1.53±0.70	1.75±0.95	-1.271
Psychoticism	1.39±0.56	1.54±0.71	-1.142
other	1.62±0.65	1.77±0.75	-1.005

(note: \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ ; The same below)

### 3.4 Effect of education level on SCL-90 score

A One-Way ANOVA test analyzes the education level differences in SCL-90, and the results are shown in Table IV. The results show that eight factors, including somatization, interpersonal sensitivity, anxiety, hostility, terror, paranoid ideation, psychoticism, and others, increase with education level. For education level, there are statistically significant differences in somatization and anxiety.

Table IV. Effect of education level on SCL-90 score

Factor	Doctor (n=56)	Master (n=33)	Bachelor (n=27)	F
Somatization	1.62±0.78	1.43±0.64	1.22±0.22	3.474*
Obsessive-compulsive	1.89±0.77	2.00±0.82	1.60±0.43	2.398
Interpersonal sensitivity	1.62±0.70	1.54±0.56	1.35±0.35	1.881
Depression	1.77±0.71	1.83±0.94	1.42±0.34	2.750
Anxiety	1.55±0.70	1.53±0.75	1.18±0.24	3.402*
Hostility	1.40±0.71	1.37±0.62	1.12±0.23	2.076
Terror	1.30±0.63	1.23±0.56	1.11±0.18	1.081
Paranoid ideation	1.70±0.89	1.61±0.73	1.31±0.38	2.353
Psychoticism	1.49±0.66	1.44±0.66	1.24±0.28	1.645
Other	1.71±0.79	1.65±0.64	1.52±0.41	0.706

### 3.5 Effect of Chinese proficiency on SCL-90 score

A One-Way ANOVA test analyzes the Chinese proficiency differences in SCL-90, and the results are shown in Table V. The results show that except for the very good group of Chinese proficiency, the lower the Chinese proficiency, the higher the SCL-90 score, and there is a statistically significant difference in the somatization factor. It is worth noting that scores of poor Chinese proficiency international students are above 2.5 in somatization, obsessive-compulsive symptoms, interpersonal sensitivity, anxiety, paranoid ideation, psychoticism, and other factors

Table V. Effect of Chinese proficiency on SCL-90 score

Factor	Very good (n=5)	Good (n=24)	Normal (n=48)	Poor (n=35)	Very poor (n=4)	F
Somatization	1.32±0.30	1.30±0.36	1.46±0.71	1.50±0.70	2.58±0.69	3.59*
Obsessive-compulsive	1.82±0.36	1.70±0.60	1.79±0.78	1.95±0.77	2.55±0.77	1.42
Interpersonal sensitivity	1.53±0.52	1.36±0.33	1.56±0.67	1.57±0.63	1.97±0.81	1.10
Depression	1.66±0.35	1.52±0.55	1.69±0.77	1.77±0.79	2.44±0.80	1.50
Anxiety	1.42±0.25	1.33±0.45	1.44±0.71	1.50±0.70	2.23±0.71	1.71
Hostility	1.30±0.30	1.17±0.26	1.30±0.60	1.45±0.79	1.63±0.72	1.01
Terror	1.17±0.23	1.10±0.16	1.26±0.60	1.26±0.61	1.57±0.87	0.85
Paranoid ideation	1.83±0.75	1.44±0.49	1.53±0.77	1.67±0.89	1.92±0.91	0.69
Psychoticism	1.48±0.30	1.26±0.33	1.45±0.64	1.45±0.68	1.63±0.93	0.59
Other	1.66±0.64	1.52±0.50	1.61±0.68	1.73±0.77	2.25±0.62	1.18

### 3.6 Effect of social support on SCL-90 score

A One-Way ANOVA test analyzes the social support differences in SCL-90, and the results are shown in Table VI. The results indicate that excluding the very poor social support group, the higher social support, the lower SCL-90 scores. There are statistically significant differences in social support among five factors: somatization, obsessive-compulsive symptoms, interpersonal sensitivity, depression, and paranoid ideation.

Table VI. Effect of social support on SCL-90 score

Factor	Very good (n=39)	Good (n=35)	Normal (n=31)	Poor (n=9)	Very poor (n=2)	F
Somatization	1.25±0.47	1.37±0.41	1.79±0.77	1.70±1.25	1.58±0.71	3.69**
Obsessive-compulsive	1.59±0.62	1.80±0.64	2.24±0.79	1.92±0.92	1.40±0.14	4.08**
Interpersonal sensitivity	1.31±0.44	1.49±0.46	1.75±0.66	1.98±1.05	1.22±0.00	4.04**
Depression	1.45±0.61	1.60±0.66	2.07±0.76	1.97±0.99	1.54±0.33	3.94**
Anxiety	1.27±0.46	1.41±0.60	1.71±0.73	1.63±1.10	1.30±0.28	2.24
Hostility	1.22±0.42	1.25±0.40	1.54±0.78	1.48±1.14	1.00±0.00	1.67
Terror	1.11±0.32	1.19±0.33	1.35±0.61	1.59±1.24	1.00±0.00	2.09
Paranoid ideation	1.34±0.49	1.54±0.69	1.91±0.93	1.69±1.08	1.42±0.35	2.61*
Psychoticism	1.25±0.45	1.38±0.43	1.64±0.68	1.63±1.12	1.10±0.14	2.42
Other	1.44±0.56	1.61±0.55	1.91±0.78	1.83±0.98	1.71±0.00	2.35

#### 4. Discussion and conclusion

The results show that the mental health level of international students of science and engineering in a university in western China is relatively good, but there are some hidden dangers. The top three factor scores of SCL-90 are obsessive-compulsive symptoms, depression, and others. This conclusion is similar to several scholars [8, 11]. The reasons can be explained as: obsessive-compulsive symptoms are related to the academic background of science and engineering. The experiments and procedures that students engage in need strict thinking and logic, making students' thinking and behavior more rigid. Depression is associated with tension and irritability due to a low cross-cultural adaptation, academic stress, and developmental confusion. The other item, including dormitory and diet state, reflects the large gap between international students' basic physical and living needs and psychological needs. Therefore, on the one hand, colorful activities and academic guidance should be carried out to help students release obsessive-compulsive symptoms. On the other hand, improving the living conditions of international students can improve the recognition of the environment and reduce psychological illness.

Comparative analysis of SCL-90 scores of international students with different demographic variables finds that the mental health level of female international students is generally lower than that of male international students. The four factors, including obsessive-compulsive symptoms, depression, interpersonal sensitivity, and anxiety, are statistically significant gender differences. This result is consistent with other academic findings [11]. This phenomenon may be comprehensively influenced by physiology, social culture, family factors, behavior patterns, and other aspects, but there is still no unified conclusion in the academic community. The mental health level of such international students in China is negatively related to education level and positively associated with Chinese proficiency and social support. Specifically, Chinese proficiency has a statistically significant influence on the somatization factors. Social support has a statistically significant effect on five factors: somatization, obsessive-compulsive symptoms, interpersonal sensitivity, depression, and paranoid ideation. The main reasons are as follows: on the one hand, with the improvement of the education level, the academic difficulty and pressure are increasing; on the other hand, the factors affecting mental health increase with increasing time away from formal work and from parents, such as self-development, marriage relationship, family relationship, pressure to get employment, and many more.

Better Chinese proficiency can help improve students' cross-cultural adaptability. In other words, Chinese proficiency directly impacts the students' studies, interpersonal relationships, social

interaction, and many other aspects. If international students face a high language barrier, they are prone to fear, tension, and other negative emotions, resulting in psychological discomfort. The improvement of social support can help reduce negative emotions and release pressure. Therefore, there is the need to conduct some related mental health education and measures. Mental health education should focus on female international students, doctor degrees, poor Chinese proficiency, and social support. It is necessary to strengthen the popularization of the basic knowledge of mental health. Identify mental health problems and the primary treatment methods, and enhance the awareness of actively maintaining their mental health and the adaptability to mental health. According to different objects, there should be a set up for targeted psychological counseling courses. For example, the undergraduates who are young and lack life experience, emphasis should be laid on improving cross-cultural adaptation ability to help them transition to a better life, accommodation, diet, interpersonal communication, and other aspects of psychological adaptation. For Ph.D. students who are older and have rich life experience, emphasis should be laid on self-cognition, self-positioning, and career planning. Finally, there should be an improvement in the social support system for such international students. At present, the social support of international students in China mainly comes from their families or compatriots and less help from the universities [11]. Therefore, universities should establish institutionalized visits, discussions, and other forms to take the initiative to care about the problems encountered by international students and relieve psychological pressure. Additionally, a rich and diversified extracurricular time for international students should be organized, encourage international students to participate in activities actively, and enhance the links with teachers and students.

This study's subjects are from a single science and engineering university. The number of female international students and the sample size are insufficient. Therefore, the extrapolation of conclusions has certain limitations.

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