STRUCTURE OF THE UNIVERSITY PERSONALITY INVENTORY FOR CHINESE COLLEGE STUDENTS[1,2]

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Summary

The University Personality Inventory, a mental health instrument for college students, is frequently used for screening in China. However, its unidimensionality has been questioned. This study examined its dimensions to provide more information about the specific mental problems for students at risk. Four subsamples were randomly created from a sample (N = 6,110; M age = 19.1 yr.) of students at a university in China. Principal component analysis with Promax rotation was applied on the first two subsamples to explore dimension of the inventory. Confirmatory factor analysis was conducted on the third subsample to verify the exploratory dimensions. Finally, the identified factors were compared to the Sympton Checklist–90 (SCL–90) to support validity, and sex differences were examined, based on the fourth subsample. Five factors were identified: Physical Symptoms, Cognitive Symptoms, Emotional Vulnerability, Social Avoidance, and Interpersonal Sensitivity, accounting for 60.3% of the variance. All the five factors were significantly correlated with the SCL–90. Women significantly scored higher than men on Cognitive Symptoms and Interpersonal Sensitivity.

Suicide has become increasingly prevalent among college students in China. Suicide accounts for 19% of deaths among 15- to 34-year-olds in China (Phillips, Yang, Zhang, Wang, Ji, & Zhou, 2002); 10% of Chinese college students reported suicidal ideation in a survey conducted at a Chinese university between 2006 and 2007 (Kay, Li, Xiao, Nokkaew, & Park, 2009). These statistics reflect the importance of mental health intervention and access to psychological counseling for this population. However, many college students in need of mental health services do not seek professional help and, in fact, suicidal ideation has been associated with lower help-seeking intentions (Carlton & Deane, 2000). Universal mental health assessment among first-year college students in China provides an important opportunity to refer higher-risk people to mental health services to prevent subsequent problems.

In the past two decades the Symptom Checklist–90 (SCL–90; Hoffmann & Overall, 1978; Evenson, Holland, Mehta, & Yasin, 1980; Huang & Li, 2009) and the University Personality Inventory (UPI; Yu & Cai, 2007) have commonly been used to screen for general mental health problems among Chinese college students (Wang & Su, 2009). The SCL–90 was developed for clinical populations, including people with severe mental health disorders and healthy people experiencing serious stress events (Tong, 2010). Several studies (e.g., Feng, Zhang, 2001; Liu, 2009) showed that the SCL-90 performed acceptably in differentiating people with and without mental problems. However, the subscale scores of the SCL–90 are highly correlated, and the factor structure has been inconsistent across different populations (Clark & Friedman, 1983; Hafkenscheid, 1993; Holi, Sammallahti, & Aalberg, 1998; Zack, Toneatto, & Streiner, 1998; Vassend & Skrondal, 1999; Steinberg, Barry, & Sholomskas, 2005; Gao, Mao, & Zhou, 2006; Tong, 2010; Wang & Zhou, 2010). For instance, Clark and Friedman (1983) only found five of the nine factors in a sample of 442 veterans undergoing psychiatric treatment; Steinberg, Barry, and Sholomskas (2005) found only three factors in 194 outpatients with dissociative disorders. The UPI was developed specifically for detecting common mental health problems among college students and is perhaps more suitable for mental health assessment in this population (Yoshitake, 1996). It assesses a wide variety of psychological symptoms and may provide universities with a rapid and effective mental health screen (Yu & Cai, 2007).

In recent years, mental health researchers and practitioners have proposed combining the SCL–90 and UPI, accompanied with the Eysenck Personality Questionnaire (EPQ; Artistico, & Laicardi, 2002; Abdel-Khalek, 2012), to evaluate the mental health of first-year students and assess personality characteristics, especially for hostility and emotional instability (Lin, 2007; Jiang, He, & Xu, 2009). For example, Jiang and colleagues suggested that the UPI and SCL–90 could be applied in the first screening. Students with a UPI total sum score above 25 or those who respond positively to the suicidal ideation item ("Have I ever thought of ending my life?") should be further diagnosed by a personal interview with a mental health professional. It has also been suggested that the SCL–90 could be a good supplement for diagnosing specific problems for students considered at high risk (Liu, 2009). Then to gain additional information, students diagnosed with serious mental health issues would be assessed with the EPQ, which can be helpful in choosing the specific methods for mental health intervention according to personality type.

Further study of the UPI has suggested ways to use the instrument to screen the general Chinese college population more effectively for mental health problems. First, the cutoff of sum scores above 25 is too low and produces lower specificity relative to other inventories (e.g., SCL–90; Lin, 2007; Yu & Cai, 2007; Yang, Wang, Cheng, Luo, Zhang, & Cheng, 2008; Liu, 2009). The low specificity of the UPI has a high cost: many low-risk students are inadvertently targeted for further evaluation. Moreover, some studies of Chinese and Japanese populations (e.g., Yoshitake, 1995; Zhang, Zheng, Ning, Guo, Bai, Feng, Zuo, *et al.*, 2003) have shown instability of the UPI in prevalence and screening criterion by sex and district (Yu & Cai, 2007; Liu, 2009).

Although dimensionality of the UPI was not mentioned when the scale was developed in 1966, some researchers in Japan and China have shown it to be multi-dimensional. Fan (1993) proposed dimensions corresponding to physical symptoms and psychological symptoms when it was introduced to China; Yoshitake (1995) further suggested the psychological symptoms could be decomposed into symptoms of depression and schizophrenia. Zhang and Zhu (2007) assumed six factors in their study, which used the UPI to describe college students' mental health: Paranoia and obsessiveness, Depression, Being emotional, Interpersonal disorder, Physical symptoms, and Sensitivity. However, little is known about the statistical basis for classifying the items. In Zheng and Wang's (2005) study, exploratory factor analysis was used to investigate the factorial structure of UPI based on 13,154 undergraduates from four classes at Xi'an Shiyou University. Principal component analysis was applied to extract factors, orthogonal rotation was applied to, and items were selected based on loadings above .30. Twelve factors were selected, accounting for 42.11% of the total variance (i.e., Self-confusion, Dependent, Interpersonal frustration, Somatization and Digestion problem, Social avoidance, Emotional vulnerability, Lack of thought, Obsessiveness, Compulsive behavior, Sense of crisis, and Nervousness).

Previous studies of the UPI have relied on standard factor analysis, which assumes that indicators are normally distributed; items with skewed distributions have smaller factor loadings and bias the number of factors (Muthén, 1978, 1989; Parry & McArdle, 1991). Dichotomous factor analysis assumes a continuous latent response variable as the specific tendency to report the symptom for each binary observed indicator, and when the tendency exceeds an indicator-specific threshold, the corresponding symptom is reported. This method accommodates the nonlinear relationships between latent factors and binary indicators by building a logistic model between indicators and latent response variables, and then a linear factor model between latent response variables and factor variables. This method can overcome artificial factors and attenuated loadings (Muthén, 1989; Woods, 2002).

The present study reports a careful factor analysis of the UPI, which may guide better mental health screening of first-year college students in China. Usually, the mental disorder has more than one significant dimension. Exploratory and confirmatory analyses of the UPI factor structure will further characterize the structure of the instrument for college students and if it is indeed multi-dimensional, knowledge of the factor structure may also improve the low specificity when using a single cut point in the overall score. This is consistent with other areas of mental health screening, in which researchers are moving away from single

sum score cutoffs. Data used here are from an entire population of first-year college students at a large Chinese university. Based on previous theoretical and empirical studies of the latent structure of the UPI (Zheng & Wang, 2005; Yu & Cai, 2007; Zhang & Zhu, 2007):

Research goals

To examine the factor structure of UPI, and the correlations between the UPI and the SCL–90, and assess sex differences.

METHOD

Participants

The present study used data from the mandatory psychological profiles for the full population of first-year college students ($N = 6,129$; 3,922 women, 2,207 men; M age = 19.1 yr., $SD = 1.0$) at a university in Guangzhou, Southern China. There were 0.3% non-responders due to attending a joint training program at the other universities for the first year. The psychological profile assessments were conducted by the Psychological Counseling Center of the university during the first month of the students' school entry in 2011. Participants completed two mental health instruments, the UPI and SCL–90, and provided demographic information, including sex.

The study was approved by the Human Research Ethics Committee of the university. Informed written consent was obtained from participants before the assessments. Participants were told that they could choose not to answer any questions and that they were free to withdraw from the study at any time.

Measures

University Personality Inventory (UPI)—The 56 symptom items assess whether an individual usually experienced the described symptom (e.g., "Lack of interest in anything") during the past year. Responses were binary (Yes/No) (Fan, 1993). Internal consistency reliability for the 56 items was currently $\alpha = .92$ for this sample.

Symptom Checklist–90 (SCL–90)z—he 90 symptom items were rated by the participants on a Likert-type scale with anchors 0: Not at all and 5: Extremely. Typically the SCL–90 has nine factor scales, including: Somatization, Obsessive Compulsive, Interpersonal Sensitivity, Depression, Anxiety, Hostility, Phobic Anxiety, Paranoid Ideation, and Psychoticism. The internal consistency reliability coefficient for the total scale was .97.

Analytic Approach

Traditional factor analysis assumes linear associations between the observed items, as well as between the observed items and the underlying continuous factor(s). Neither assumption is met for binary items (Woods, 2002). As stated in Muthén (1989), factor analysis for binary indicators allowed us to make the assumptions by integrating continuous variables y^*. Each continuous y^* links with the corresponding binary observed item in the latent trait model, and then the classical factor model is built based on latent factor(s) and y^*s corresponding to the binary items. This method then functions the same as traditional factor

analysis in terms of exploring and confirming the latent structure (for details see Muthén, 1978, 1989).

To determine the latent structure and investigate its relations with other variables, the 6,110 students were randomly separated into four subsamples, with comparable sex and age composition for each. Using M*plus* 7.0 (Muthén & Muthén, 1998–2012), based on tetrachoric correlation coefficients, exploratory factor analysis for binary indicators was conducted on Sample 1 ($n = 1,530$). Using Exploratory Factor Analysis (EFA) with Promax rotation, the factor model was selected according to scree plot of eigenvalues and the structure of the factor loadings, as well as theoretical interpretations. Factor loadings were then examined for the optimal model of the 56 items. After deleting items with loadings lower than .40 on all factors (Posserud, *et al.*, 2008) or cross loadings (i.e., item has substantially high loadings on two or more factors, and their difference of loadings is less than .20), the EFA was repeated on Sample 2 ($n = 1,531$) to ensure a more robust model. Then Confirmatory Factor Analysis (CFA) was conducted to validate the resultant factor model on Sample 3 ($n = 1,518$). Finally, based on Sample 4 ($n = 1,531$), correlations of resultant factors with the SCL–90 total score were examined; differences in UPI subscale scores by sex were analyzed with *t* tests.

RESULTS

An initial factor analysis was conducted using the 56 binary symptom items from the UPI. The scree plot in Fig. 1 clearly demonstrated a break at the third factor, and another at the sixth factor. This indicates that the 2- and 5-factor models merit further consideration. However, the factor structure of 2-factor model was not replicated in the second EFA, and only 41.3% of the total variance was explained. Given its superior replicability and clearer interpretability, the 5-factor solution, which accounted for 52% of the total variance, was further examined. Table 1 presents the rotated factor loadings for the five-factor model. Nineteen items were deleted due to low loadings, i.e., Items 7, 8, 9, 14, 25, 27, 32, 34, 36, 37, 40, 42, 45, 47, 53, 54, 55, 56, and 59; eight items were deleted because of their cross loadings, i.e., 12, 13, 16, 22, 23, 26, 31, and 51. The remaining items were marked in bold.

The second EFA was conducted on the remaining 29 items. In the scree plot for eigenvalues shown in Fig. 2, the curve was clear at the third point, accounting for 45.8% of total value; the eigenvalue dropped below 1 at the seventh point. Therefore, solutions with two through six factors were inspected in terms of interpretability.

After excluding five additional items with low factor loadings (Items 4 and 52) or cross loadings (Items 19, 33, and 44), factors in the five-factor model were consistent with the five-factor solution in the first EFA using Sample 1. According to the factor loadings in Table 2, Factor 1 (Items 1, 2, 3, 17, 18, 46, 48 and 49) was labeled Physical symptoms because the items were all related to feeling bad physically. Factor 2 (Items 10, 11, 41 and 43) was called Social avoidance and represented unwillingness to connect with the outside world. Factor 3 (Items 29, 30, 38 and 39) was called Cognitive symptoms and represented cognitive decline and negative self-image. Factor 4 (Items 57, 58) was labeled Interpersonal sensitivity and was characterized as being sensitive to others. Factor 5 (Items 6,15, 21, 24,

28 and 60) was labeled Emotional vulnerability, which included various manifestations of negative emotion. In the potential two-, three-, and four-factor solutions, factors were grouped from these five factors in various ways. The six-factor solution yielded a new factor characterized by physical symptoms, social avoidance, and emotional vulnerability; moreover, more items had cross loadings, inducing interpretation more difficult. Thus, the five-factor model was again selected as optimal, and accounted for 60.3% of total variance.

Validity and Reliability

The confirmatory factor analysis on the validation data suggested good model fit for the final five-factor model (χ^2 = 457.85, df = 242, χ^2/df = 1.89, RMSEA = 0.02, CFI = 0.98, TLI = 0.98). The internal consistency reliability of Physical symptoms, Social avoidance and Interpersonal sensitivity were low (α = .64, .62, and .62, respectively). Cognitive symptoms and Emotional vulnerability had acceptable internal consistency reliability (α = .72 and .73, respectively).

Associations of UPI factors with the SCL–90 total score and with demographic variables were further investigated. UPI subscales were calculated by averaging the remaining items for the final model, which was defined by loadings > .4 and without cross loadings (see columns for five-factor model in Table 2). The total score for UPI also was calculated by averaging the factor scores. The correlation between the total score for UPI and the SCL-90 was .73 (p < .01). As shown in Table 3, the inter-correlations among UPI subscales, and correlations between the UPI subscales and the SCL–90, were all statistically significant. These correlations were not as high as the correlation between the subscale scores and the UPI total score. Together, this information indicated adequate validity for the revised UPI scale.

Mean scores on each UPI subscale were compared by sex. Higher scores indicate more severity in the related symptoms. As shown in Table 4, women had significantly higher scores than men on Cognitive symptoms (p < .01) and Interpersonal sensitivity (p < .001).

DISCUSSION

The EFA performed here suggested a stable structure of five factors for a measure assessing mental health among Chinese college students; CFA conducted after building an optimal model supported this five-factor model. The items with low factor loadings reflected lower relationships to the factors used to assess students' mental health, which may be due to outdated language. Huge changes have taken place in China in terms of language and behavior since the Internet was popularized in 2006 (Chen, 2013). More attention should be paid to the items by adapting the expressions to the current culture. Moreover, the multi-factor results suggested that the people with the same total scores could have different patterns of scores on the five factors; multiple cutoffs corresponding to the five factors may provide more nuanced information related to risk for particular mental problems. Future research should investigate the importance of each factor in predicting severe mental health problems or high-risk behaviors.

A careful analysis was performed to accommodate the binomial distribution of mental health symptoms in the UPI. The factors Physical symptoms and Interpersonal sensitivity were identified with previous study by Zheng and Wang (2005), and are consistent with the theoretical studies (Yoshitake, 1995, 1996; Zhang & Zhu, 2007). .

Items from the other three factors were classified differently than they were in previous studies (see Appendix). Most of the items in Emotional vulnerability were also defined as Emotional vulnerability in Zheng and Wang's (2005) factor analysis, except Item 28 as "lack of thought." The Cognitive symptoms factor in the current study would have comprised two separate subscales in the previous study by Zheng and Wang (2005): Dependence and Self-confusion. The resultant factor Social avoidance comprised Social avoidance and Self-confusion as extracted by Zheng and Wang.

The current study decomposed mental health problems into five factors (i.e., Physical symptoms, Social avoidance, Cognitive symptoms, Interpersonal sensitivity, and Emotional vulnerability). The proposed five mental health factors may more realistically represent the construction of mental health status among college students. The total revised scale of UPI had a significant correlation with the SCL–90, which indicated its promising generalization as the preliminary screening test among colleges, with many fewer items than the SCL–90.

The present study indicated that the internal consistency reliability for Physical symptoms, Social avoidance, and Interpersonal sensitivity factors was not high. The lower internal consistency may be due to the highly non-normal distribution of responses on the binary items in this general population, with many people reporting no symptoms. Reliability also may be affected by the limited number of items, which are important determinants of Cronbach's α (Posserud, *et al.*, 2008). Adding more related items when calculating reliability will, by definition, increase the reliability coefficient—thus, one might expect the very large overall mental health scale for UPI (with 56 items) to have a quite high internal consistency coefficient. Yet, a more nuanced factor structure could lead the way to a better screening tool in the future as it would rely on cut-points on multiple (in this case, five) subscales as opposed to a single overall cut-point. Future work is needed on the identification of items that could be added to these mental health factors to improve reliability of these subscales.

There were sex differences in mental health symptom scores. Male students had lower scores than their female counterparts on Cognitive symptoms, Interpersonal sensitivity, and Emotional vulnerability. This finding was consistent with some of the previous studies. Zhang, Zheng, Ning, Guo, Bai, Feng, Zuo, and Jin (2003) showed that higher proportion of college women had sum score above the cutoff score 25 than that of men, and this difference was significant for both Chinese and Japanese samples. Zheng and Wang (2005) found the same proportion difference in the Chinese sample, and Liu (2009) also found lower sum scores assessed by UPI for male students. However, a study from Japan found that men had a higher rate of endorsing the item "Have idea of wanting to die" (Yu & Cai, 2007).

Limitations and Conclusions

An important limitation of this study is that the data were based on the general population of college students at one large Chinese university, which may not reflect the structure of mental health problems in clinical populations. In addition, the present study has not shown that the proposed five-factor solution has better prognostic ability due to the lack of data on clinical diagnoses for the population. Validating these five dimensions of mental health problems in terms of predicting future mental health diagnosis, as well as depression, hopelessness, and suicidality (e.g., Holden, Mehta, Cunningham, & McLeod, 2001; Mills, Green, & Reddon, 2005), remains an important area of future research.

The present study found that items in the UPI assess symptoms from multiple dimensions of mental health and that a structure involving five factors of mental health symptoms could be identified in a general population of first-year college students at a Chinese University. These factors were labeled Physical symptoms, Cognitive symptoms, Emotional vulnerability, Social avoidance, and Interpersonal sensitivity. These factors validated well with the SCL–90. These results suggest that future research focused on factor-specific cutoffs for mental health screening among Chinese college students may hold promise as a more sensitive and specific approach to identifying people at risk for mental health problems, and ultimately improve efforts to prevent student issues such as suicide.

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APPENDIX

ITEMS AND FACTORS OF THE UNIVERSITY PERSONALITY INVENTORY IN TWO STUDIES

Item	Classification in Zheng and Wang (2007)	Classification in Current Study
1, 2, 3, 17, 18, 46, 48, 49	Physical Symptoms (Somatization and Digestion problem)	F1: Physical symptoms
10, 11	Self-confusion	F2: Social avoidance
41, 43	Social avoidance	
29, 30, 39	Dependence	F3: Cognitive symptoms
38	Self-confusion	
57, 58	Interpersonal frustration	F4: Interpersonal sensitivity
6, 15, 21, 24, 60	Emotional vulnerability	F5: Emotional vulnerability
28	Lack of thought	
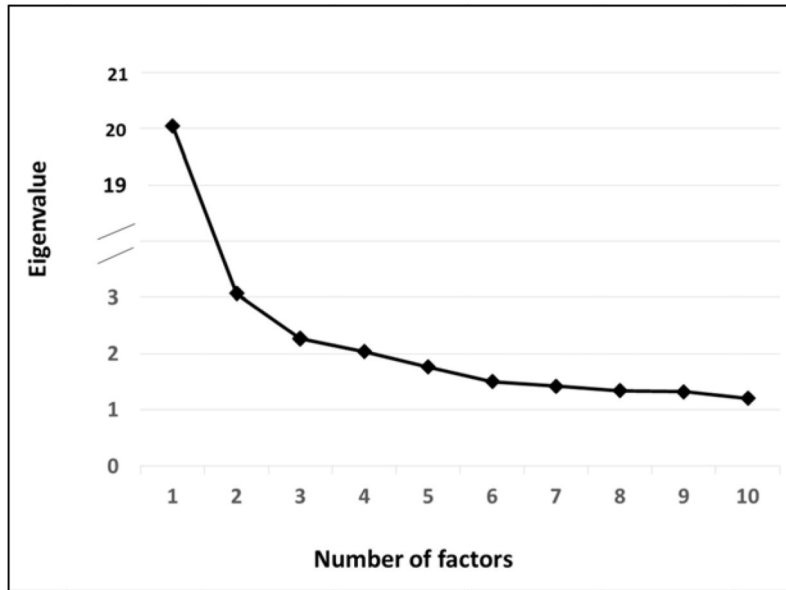
Fig. 1.
Scree plot for the first Exploratory Factor Analysis with 56 items.
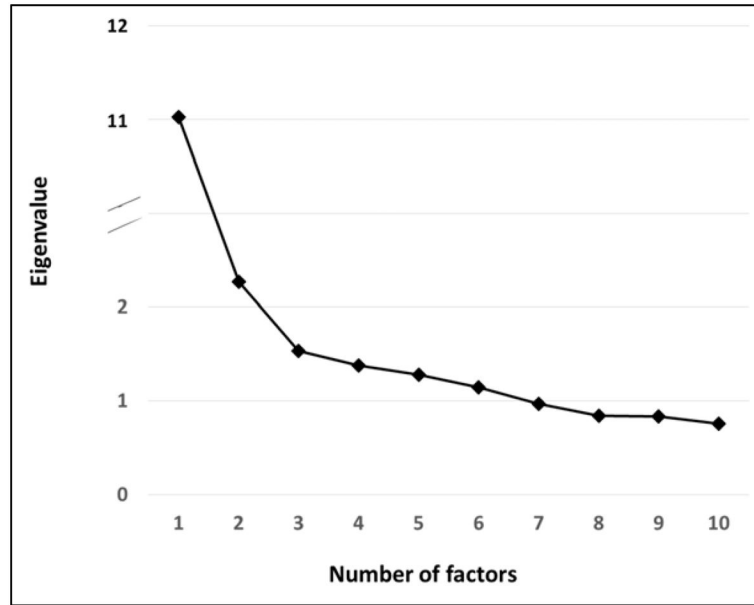
Fig. 2.
Scree plot for the second Exploratory Factor Analysis with 29 items.

TABLE 1

FACTOR LOADINGS IN THE FIRST EXPLORATORY FACTOR ANALYSIS OF THE UNIVERSITY PERSONALITY INVENTORY (SAMPLE 1)

No.	Item: Chinese as Administered	Factor				
		F1	F2	F3	F4	F5
1	食欲不振 [Poor appetite]	**.69**	.15	−.08	.01	.17
2	恶心、胃口难受、肚子痛 [Feel sick, stomachache]	**.90**	−.07	−.02	−.03	.09
3	容易拉肚子或便秘 [Easily have diarrhea or constipation]	**.42**	−.05	.18	.03	−.08
4	关心心悸和脉搏 [Care about palpitation and pulse]	**.49**	−.09	.05	−.01	.00
6	牢骚不满多 [Full of dissatisfaction and complaints]	.11	.11	**.54**	.01	−.07
7	父母期望高 [High expectation from parents]	−.02	.07	.13	−.02	−.21
8	自己的过去和家庭是不幸的 [My past and family is misfortune]	.10	.23	.12	−.06	−.13
9	过于担心自己的前途 [Over-worry about my future]	.02	.23	.12	.15	−.30
10	不想见人 [Do not like meeting others]	−.02	**.64**	−.05	.22	−.09
11	觉得自己不是自己 [Feel that I am not myself]	.13	**.44**	.10	.10	−.12
12	缺乏热情和积极性 [Lack of enthusiasm and positivity]	.14	**.58**	−.20	**.52**	.20
13	悲观 [Pessimistic]	−.01	**.57**	.27	*.39*	.19
14	思想不集中 [Distracted]	.26	.24	.20	.36	.09
15	情绪起伏过大 [Over-uneven in emotion]	.23	.15	**.57**	.02	.01
16	常常失眠 [Frequent insomnia]	*.41*	.28	−.06	−.15	−.13
17	头疼 [Headache]	**.64**	.09	−.06	−.06	−.06
18	脖子、肩膀酸痛 [Ache in neck and shoulder]	**.63**	−.15	.09	.01	−.04

No.	Item: Chinese as Administered	F1	F2	F3	F4	F5
				Factor		
19	胸疼、憋闷 [Chest pain or feel oppressed]	**.80**	−.09	.09	−.10	.02
21	气量小 [Intolerance]	−.17	−.04	**.63**	.14	−.16
22	爱操心 [Inclined to worry]	.05	−.17	*.29*	.08	***−.44***
23	爱操心 [Restless]	.17	.06	***.42***	.29	−.14
24	急躁不安 [Irritable]	.00	.03	**.96**	−.13	.13
25	有过想死的念头 [Have idea of wanting to die]	.12	.37	.23	−.01	−.01
26	对任何事物都没有兴趣 [No interest in anything]	.28	**.58**	−.03	.37	***.46***
27	记忆力减退 [Declining memory]	.31	.03	.18	.33	.00
28	缺乏耐力 [Lack of patience]	.18	−.16	**.53**	.25	.04
29	缺乏决断能力 [Lack of judgment]	.14	−.14	.09	**.67**	−.10
30	过于依赖别人 [Too dependent on others]	−.03	−.07	.13	**.53**	−.22
31	为脸红而苦恼 [Distressed by blushing]	−.04	.06	−.22	*.28*	**−.47**
32	口吃，声音发颤 [Stuttering, faltering voice]	.05	.22	−.17	.30	−.26
33	身体感觉忽冷忽热 [Feel hot and cold]	**.58**	.03	−.11	−.11	−.29
34	注意排尿和性器官 [Concern about urination or sexual organs]	.12	.12	−.02	.01	−.29
36	莫名其妙的不安 [Uneasy without reason]	.26	.09	.19	.22	−.27
37	一个人独处感到不安 [Feel uneasy when alone]	.12	−.08	.12	.22	−.30
38	缺乏自信 [Lack of confidence]	−.04	.08	.02	**.83**	−.03

No.	Item: Chinese as Administered	Factor				
		F1	F2	F3	F4	F5
39	对任何事情都犹豫不决 [Irresolute about anything]	.01	.10	−.07	**.68**	−.18
40	容易被人误解 [Easily feel misunderstood]	.03	.38	.12	−.04	−.35
41	不相信别人 [Lack faith in others]	.03	**.51**	.28	−.13	−.09
42	过于猜疑 [Over-suspicious]	−.11	.32	.35	−.05	−.39
43	不愿交往 [Unwilling to associate with others]	−.08	**.90**	.02	.06	.07
44	自卑 [Feel self-abased]	−.18	.29	.12	**.65**	−.11
45	杞人忧天 [Catastrophizing]	.00	.07	.32	.34	−.21
46	身体倦乏 [Physically exhausted]	**.62**	−.01	.11	.19	.01
47	一着急就出冷汗 [In cold sweat when I hurry]	.31	−.16	−.17	.12	−.34
48	站起来就头晕 [Dizzy when I stand up]	**.41**	.11	−.09	.00	−.21
49	有过失去意识、抽筋 [Have ever lost consciousness, cramp]	**.40**	.17	−.05	−.12	−.18
51	过于拘泥 [Over-rigid]	−.19	.22	−.08	**.48**	−.34
52	对任何事情不反复确定不放 [Cannot give up repeating things]	−.04	.01	−.05	.09	**−.52**
53	对脏敏感 [Susceptible to dirtiness]	−.03	.11	−.03	−.15	−.39
54	摆脱不了毫无意义的想法 [Cannot get rid of meaningless idea]	.03	.20	.20	.12	−.29
55	觉得自己有怪味 [Sense weird smell from myself]	.04	.18	.20	.01	−.21
56	怀疑别人背后说自己坏话 [Suspect others say something bad about me]	−.03	.26	.36	−.13	−.30
57	对周围的人怀有戒心 [Wary of others]	−.01	−.19	−.03	.02	**−.84**
58	在乎别人视线	.01	−.22	.00	.07	**−.82**

No.	Item: Chinese as Administered	Factor				
		F1	F2	F3	F4	F5
	[Care about others' gaze]					
59	觉得别人轻视自己 [Feel others despise me]	−.10	.36	.22	.12	−.31
60	情绪容易伤害 [Sensitive emotions]	.10	.04	**.48**	.14	−.20

Note.—Factor loadings >.40 are in boldface, and cross loadings are in italics.

TABLE 2

FACTOR LOADINGS IN THE SECOND EXPLORATORY FACTOR ANALYSIS OF THE UNIVERSITY PERSONALITY INVENTORY (SAMPLE 2)

No.	Two-factor Solution		Three-factor Solution			Four-factor Solution				Five-factor Solution					Six-factor Solution					
	F1	F2	F1	F2	F3	F1	F2	F3	F4	F1	F2	F3	F4	F5	F1	F2	F3	F4	F5	F6
1	.69	−.12	.64	.07	−.08	.64	.06	−.09	.04	.61	.04	−.03	.03	.02	.66	.38	.23	.38	.33	.42
2	.84	−.24	.92	−.11	−.11	.93	−.14	−.11	.02	.97	−.18	−.01	−.05	−.01	.94	.36	.25	.54	.30	.37
3	.41	.13	.42	.01	.15	.43	−.04	.15	.08	.48	−.10	.18	.04	.05	.53	.35	.36	.39	.32	.32
4	.40	.04	.28	.23	−.05	.29	.20	−.05	.06	.15	.34	−.16	.13	.02	.21	.27	.11	.43	.33	.45
6	.34	.34	.07	.48	.13	.03	.53	.13	−.02	.06	.16	.13	−.08	.47	.39	.62	.43	.28	.33	.49
10	.28	.53	.25	.13	.47	.22	.24	.46	−.12	.03	.72	.19	−.02	−.05	.43	.48	.49	.37	.33	.79
11	.36	.42	.25	.25	.31	.22	.34	.31	−.09	.10	.55	.14	−.05	.12	.44	.54	.46	.42	.41	.72
15	.54	.31	.06	.78	−.02	.03	.78	−.02	.09	.03	.20	−.01	.06	.64	.43	.79	.44	.41	.49	.62
17	.56	−.03	.62	−.06	.05	.61	.01	.05	−.09	.54	.21	.01	−.11	−.04	.52	.32	.23	.51	.24	.46
18	.61	−.12	.63	−.01	−.07	.63	−.02	−.07	.02	.62	−.02	−.03	−.01	.02	.48	.31	.19	.62	.26	.34
19	.61	.11	.55	.13	.10	.54	.17	.10	−.04	.43	.38	−.01	−.01	.02	.54	.46	.33	.59	.40	.64
21	.32	.40	−.04	.60	.14	−.07	.59	.14	.09	−.03	.11	.15	.05	.52	.38	.67	.47	.23	.42	.49
24	.57	.23	−.02	1.00	−.23	−.07	1.02	−.23	.08	.01	−.03	−.12	.00	.97	.41	.90	.37	.33	.42	.50
28	.29	.38	−.01	.50	.16	−.05	.56	.16	.00	.03	.01	.20	−.07	.57	.27	.66	.47	.38	.32	.43
29	−.06	.77	−.07	.06	.73	−.08	.07	.72	.05	.07	−.10	.74	−.06	.22	.28	.53	.82	.40	.35	.38
30	−.06	.71	−.01	−.04	.72	.00	−.09	.70	.12	.14	−.13	.70	.04	.06	.35	.43	.73	.32	.39	.35
33	.69	−.04	.60	.19	−.07	.59	.25	−.07	−.08	.45	.43	−.17	−.04	.05	.52	.43	.19	.59	.35	.62
38	−.16	.94	−.05	−.11	.97	−.05	−.12	.95	.05	−.08	.42	.72	.05	−.18	.41	.42	.82	.18	.48	.62
39	−.10	.85	−.07	.01	.83	−.06	−.02	.81	.09	−.05	.27	.65	.07	−.04	.31	.46	.76	.31	.46	.56
41	.42	.32	.21	.42	.14	.17	.50	.14	−.07	.00	.62	−.06	.01	.23	.39	.57	.33	.36	.43	.73
43	.28	.55	.17	.27	.42	.11	.45	.43	−.22	−.14	.89	.12	−.11	.10	.33	.55	.46	.36	.40	.86
44	.03	.81	.06	.05	.77	.05	.08	.76	−.01	−.07	.60	.51	.03	−.10	.47	.50	.71	.23	.50	.76
46	.53	.17	.52	.08	.18	.52	.05	.17	.06	.49	.15	.14	.04	.03	.56	.46	.41	.59	.42	.54
48	.51	.05	.47	.10	.04	.48	.04	.03	.10	.44	.09	.02	.11	.01	.48	.36	.27	.48	.38	.43
49	.48	−.17	.57	−.18	−.03	.58	−.21	−.03	.03	.60	−.15	.02	.01	−.10	.29	.14	.12	.63	.16	.16
52	.17	.28	.08	.17	.20	.12	.01	.20	.23	.08	.11	.14	.27	−.04	.24	.27	.31	.28	.40	.35

No.	Two-factor Solution		Three-factor Solution			Four-factor Solution				Five-factor Solution					Six-factor Solution					
	F1	F2	F1	F2	F3	F1	F2	F3	F4	F1	F2	F3	F4	F5	F1	F2	F3	F4	F5	F6
57	.32	.29	−.04	**.61**	.02	.07	.16	−.01	**.64**	.01	−.02	−.04	**.74**	.07	.34	**.41**	.32	.27	**.75**	.41
58	.26	.38	−.09	**.58**	.13	−.02	.07	.11	**.80**	−.06	−.12	.09	**.92**	.01	.29	*.42*	*.42*	.30	**.87**	*.40*
60	**.54**	*.36*	.08	**.78**	.03	.06	**.68**	.02	.23	.01	.24	−.01	.25	**.52**	.47	*.78*	.47	*.41*	*.63*	*.68*

Note.—Factor loadings greater than .40 in bold and cross loadings in italics to facilitate interpretation.

TABLE 3

PEARSON CORRELATION MATRIX FOR UPI AND SCL–90 SCORES (SAMPLE 4)

SCL–90 Subscale	UPI Factor				
	F1: Physical Symptoms	F2: Social Avoidance	F3: Cognitive Symptoms	F4: Interpersonal Sensitivity	F5: Emotional Vulnerability
F1: Physical Symptoms	1	.34	.33	.24	.41
F2: Social Avoidance	.34	1	.42	.23	.48
F3: Cognitive Symptoms	.33	.42	1	.36	.51
F4: Interpersonal Sensitivity	.24	.23	.36	1	.38
F5: Emotional Vulnerability	.41	.48	.51	.38	1
UPI Score	.69	.65	.76	.57	.83
Somatization	.63	.36	.24	.20	.38
Obsessive-compulsive	.44	.49	.54	.39	.53
Depression	.46	.59	.51	.31	.53
Anxiety	.48	.52	.48	.37	.52
Anger-hostility	.37	.41	.28	.28	.58
Paranoid ideation	.37	.47	.29	.36	.46
Psychosis	.43	.54	.44	.37	.50
Interpersonal sensitivity	.42	.53	.50	.43	.55
Phobic anxiety	.34	.36	.41	.29	.34
SCL–90 Score	.51	.57	.50	.41	.59

Note.—All correlations are significant at $p < .01$.

TABLE 4

MEAN UNIVERSITY PERSONALITY INVENTORY FACTOR SCORES, OVERALL AND BY SEX, FOR STUDENTS IN SAMPLE 4 ($N=1,531$)

UPI Factor	Total Sample		Sex					
			Men		Women			Cohen's
	M	SD	M	SD	M	SD	t	d
F1: Physical symptoms	1.03	1.38	0.96	1.38	1.07	1.38	−1.42	0.07
F2: Social avoidance	0.36	0.79	0.36	0.79	0.36	0.78	0.12	0.01
F3: Cognitive symptoms	1.20	1.33	1.05	1.33	1.27	1.33	−3.06*	0.17
F4. Interpersonal sensitivity	0.95	0.85	0.84	0.85	1.01	0.84	−3.76†	0.20
F5. Emotional vulnerability	1.34	1.60	1.24	1.61	1.40	1.60	−1.90	0.10

*
$p < .01$.

†
$p < .001$.