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Reliability, Validity and Preliminary Hypothesis Tests for the English Version of the Psychological Strain Scales (PSS)¹

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Abstract

Background—The original Psychological Strain Scales (PSS) was published with data from a sample of a Chinese population, which consisted of four strain scales: value strain, aspiration strain, deprivation strain, coping strain. This study aims to validate and develop the English version of the PSS instrument.

Method—Together with the PSS, Moos's Coping Response Inventory (CRI), Spielberger Trait-Anxiety scale, CES-D depression scale, and the NCS suicidal behavior scales were administered in a survey to a sample (N=280) of American college students. Item-total statistics, Cronbach's Alpha, Guttman Split-Half coefficient, factor analyses, correlation analysis and t tests were applied to test the reliability and validity of the English version of the PSS. Univariate and multivariable regression analyses were operated to know how extent the PSS predicts psychopathology such as anxiety, depression and suicidal behaviors.

Results—Cronbach's Alpha coefficient of PSS was 0.936. The Split-Half Coefficient of PSS was 0.839. The reliability of the PSS was excellent. The factor analysis results demonstrated strong construct validity of each scale. The criterion validity and the discriminant validity were both excellent for the English version of PSS instrument.

Conclusions—With the excellent scores on both reliability and validity, the English version of the PSS scales can be an excellent measurement for estimating the psychological strain levels of

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American college students as well as predicting their psychopathology. The PSS can be applicable for research to evaluate and predict suicidal behaviors and mental disorders.

Keywords

Psychological Strain Scales (PSS); Reliability; Validity; Mental Disorder; Suicide

1. Introduction

The Strain Theory of Suicide and mental disorder (Zhang, 2005; Zhang, Wieczorek, Conwell, & Tu, 2011) has been used to predict suicide, suicidal behavior, and mental disorders, and there is a need to develop some standardized instrument to facilitate quantitative research where the theory is applied. The Psychological Strain Scales (PSS) was developed by the Center for Suicide Prevention Research (CSPR) at Shandong University of China and the Chinese version of the instrument was previously validated and published (Zhang et al., 2012). This current study is another effort to further validate the PSS instrument with its English version of the scale.

The strain theory of suicide and mental disorders is based on the theoretical frameworks established by previous sociologists on criminal behaviors, e.g. Durkheim (1951), Merton (1957), and Agnew (2006). When strains exceed the tolerance capability of a person, they can be released outward hurting others as a criminal behavior (Agnew, 2006) or released inward hurting self as a suicidal behavior. Either outward or inward violence is outlet of tension, frustration, and anger that has been built up with strains (Freud, 2002).

A single stress is not a strain. A strain consists of at least two forces, or two stresses, which pushing a same person to different directions. The self-perceived strain makes the person so uncomfortable, frustrated, or even angered that something has to be done to release the tension. There are four sources of psychological strains (Yan, Zhang, & Zhao, 2012) by the Strain Theory of suicide and mental disorder: (1) differential values strain, (2) discrepancy between aspiration and reality, (3) relative deprivation, and (4) crisis and the lack of coping skills (Zhang, 2005; Zhang et al., 2011). Each of them is likely to precede a suicidal behavior or mental disorder onset.

What is the rationale for the strain theory of suicide and mental disorders, why these four domains were chosen, how do these measures differ from and better than the existing measures of psychological stress were all elaborated in the previous literature (Zhang et al., 2012).

The psychological strain theory has been tested and supported in a number of empirical studies (Zhang, Dong, Delprino, & Zhou, 2009; Zhang & Lester, 2008; Zhang et al., 2011). It emerged as an additional theoretical conceptualization to explain the unique patterns of Chinese rural young suicide (Zhang, 2005). The previous studies had indicated that psychological strain was significantly associated with suicide, and all suicides had experienced at least one type of the four strains (Hvistendahl, 2012; Zhang et al., 2009; Zhang et al., 2011). Negative emotions and mental disorders may be mediators between

strain and suicide. This social psychological theory can be employed as a complementary conceptualization to explain suicidal behaviors as well as mental disorders.

The Chinese version of the Psychological Strain Scales (PSS) has been tested and demonstrated with excellent reliability and validity and published in Social Indicators Research (Zhang et al., 2012). However, the lack of empirical studies on the reliability and validity of English version of PSS limits its application in scientific research to some extent. Because of the cultural context differences, it is urgent to develop the English version based on the success of the Chinese version of the scales. This research aims to test the validity and reliability of the English version of PSS systematically. For the preliminary hypothesis testing of the Strain Theory of Suicide and mental disorder, the dependent variables included anxiety, depression, and suicidal ideation.

2. Methods

2.1 Development of the English version of PSS

Previous studies indicated that the Chinese version of the Psychological Strain Scales (PSS) has been validated in a Chinese sample and proved to be an excellent measure with good reliability and validity (Zhang et al., 2012). First, The 20 items of Chinese version in each proposed strain scale were translated and back translated into English by bilingual and English experts major in psychology and statistics. Second, experts were invited to review the 20 items in each of the four strain scales to test the face validity. The experts, who were psychologists, psychiatrists, sociologists, epidemiologists, and social science methodologists, were all conversant with the Strain Theory of suicide and mental disorders. They went over each of the items and exchanged views each other. Some items that did not have good face validity or were not suitable for English cultural background were either replaced or revised. In the end, there was 10 items in each of the four psychological strain scales. It ensured that every item was satisfactorily fit to its corresponding conceptualization in the English version.

2.2 Measurement

The demographic information was measured by a self-report questionnaire, which included age, gender, marital status, parents' marital status, family economic status, religion, physical health status, and racial identity. Because the samples were undergraduates and most of undergraduates could finished the courses under 23 year older, so 23 years old was recorded to 0 and 24 years old was recorded to 1. Marital status was dichotomized as "0=single" and "1=non-single" with the latter including those who were currently married, in love and cohabiting. Religion was categorized to "0=atheist" and "1=believer" (Taoism, Muslim, Christian, Catholicism, Buddhism). The family economic status was measured by "How do you rank your family's economic situation compared with others". The physical health status was measured by the subject's self-perception. Racial identity was categorized to "0=white" and "1=non-white" (Black, Hispanic, Asian, Native American). Table 1 illustrates the demographic variables and the operationalized coding for this study.

The English version of the Psychological Strain Scales (PSS) consisted of 10 items in: value strain, aspiration strain, deprivation strain, coping strain. For each statement in the scales,

response options included 1=never, it's not me at all; 2=rarely, it's not me; 3=maybe, I'm not sure, 4= often, it's like me; and 5=yes, strongly agree and it's exactly me. Please see the Appendix for the 10 items for each of the four scales of English version of PSS.

The criterion items for validity tests for each of the four scales were included in the questionnaire. The value strain was estimated by a cultural value scale, which aimed to survey the subjects' viewpoint about the importance of the following issues such as polygamy, arranged marriage, women should not have that much education, women should have no social life, etc. There were four choices for each item: 1=absolutely disagree, 2=disagree, 3=neutral, 4=agree, 5=absolutely agree. The cultural value scale has been used in previous studies as a measure of the psychological strain on differential values and has been well validated in Chinese youth (Zhang et al., 2012). The criterion item to check the aspiration strain was the question: "Have your wishes (Desire) been realized in the past years." Subjects were asked to respond the question with these choices: 1=never, 2=rarely, 3=maybe, 4=often and 5=yes. Relative deprivation was assessed by the criterion item: "How do you rank your family's economic status in comparison with other families in the village?" Options for the response included 1=very good, 2=relatively good, 3=average, 4=relatively bad, and 5=very bad. The criterion items of aspiration strain and relative deprivation all have been used in previous studies and verified good validity in Chinese version of PSS (Zhang et al., 2012). Moos's Coping Response Inventory (CRI) (Moos, Brennan, Fondacaro, & Moos, 1990) was employed as the criterion scale for the coping strain. We used its 24 items to assess coping skills and the choices range from 1=not at all to 4=fairly often. The previous studies have indicated the high validity of the CRI scale in the West (Agnew & Kaufman, 2010; Doveston & Cullingford-Agnew, 2006) and the East (Li & Zhang, 2012) samples.

The Spielberger Trait-Anxiety Scale was used to measure the subjects' anxiety level. The Trait Anxiety Scale that includes 20 items is half of Spielberger's State-Trait Anxiety Inventory Form (Castaing et al., 2011; Spielberger, 1983). It was often used to assess the subjects' personality characteristics of anxiety and its validity and reliability have been confirmed in numerous previous studies.

The Center for Epidemiologic Studies – Depression Scale (CES-D) was used to assess the respondents' depression level (Radloff, 1977). The CES-D is a self-report scale, and it was originally developed for assessing depression symptoms and was specifically designed for research use in the general and non-clinical populations (Haringsma, Engels, Beekman, & Spinhoven, 2004; Orme, Reis, & Herz, 1986; Radloff, 1977). The CES-D covers affective, cognitive, behavioral, and somatic symptoms associated with depression.

Suicidal ideation was measured by the scale developed in Kessler's National Comorbidity Survey (NCS) (Kessler, Berglund, Borges, Nock, & Wang, 2005). There has seven items, measuring a subject's degree of suicidality from thoughts, plans, gestures, and attempts (Pan, Stewart, & Chang, 2013). In current study, 0 was recoded if all responses to the seven items were no and if any of the seven items is yes then recoded to 1.

2.3 Administration of the Questionnaire Survey

The random cluster sampling method was used to choose the subjects randomly from a comprehensive university in the United States. First, ten classes were completely randomly selected from the whole university, and then all the students subjected to the selected classes were chosen as the subjects. Administrative approval was obtained from the university as well as its Institutional Review Board before the sampling and administration of the questionnaire survey to ensure the protection of human subjects. The subjects were asked to answer the questions voluntarily and truthfully. The informed consents were signed. Graduate assistants were trained to administer the survey and ensure the quality of the data collection. The questionnaire survey was not only anonymous but also the information provided was absolutely confidential. After questionnaire survey, survey inspect and date sorting were carried out. Some questionnaires were rejected because of the data missing or logical error.

The ethics committee of the University had approved this current study.

2.4 Statistical analysis

The analyses of the data from the sample included item-total statistics, reliability test and validity test of English version PSS. Item-total statistics was performed on each of the 80 items. Multivariate linear regression analyses were used to test the relationship between each item and total score for each strain scale. Cronbach's Alpha coefficient and Guttman Split-Half Coefficient were used in current study to test the internal consistency reliability and Split-half reliability of each strain scale and the total PSS. Validity tests were carried out for the PSS by various aspects, which included face validity, structure validity, criterion validity and discriminate validity.

Factor analysis was conducted to test the structure validity of PSS. Initially, the KMO and Bartlett's Test were used to test the application condition of factor analysis. The varimax orthogonal rotation was used to make the factor meaning more obvious.

Correlation analysis was operated to demonstrate the correlation of each strain scale with its corresponding criterion scale or variable. Spearman's correlation coefficient was used to test the criterion validity of PSS.

If the Spielberger Trait-Anxiety scale score large than 56 for male and 57 for female, we defined the subjects anxiety symptom group (Spielberger, 1983). If the CES-D score >16 , the subjects were defined depression symptom group (Farmer et al., 1988). Mean and standard deviation ($\bar{x} \pm s$) were used to describe the score of each strain scales and total PSS score. The t test was used to compare the different between the symptom group and its corresponding non-symptom group.

Univariate and multivariable linear and Logistic analyses were operated to investigate to what extent the demographics variables, the strain scales and the total PSS predict psychopathology.

We used version 17.0 of the SPSS. All analyses were 2 tailed, and statistical significance determined by $P < 0.10$ in the process of univariate linear and Logistic analyses to sift the variables. Another statistical significance was determined by $P < 0.05$.

3. Results

3.1 Descriptive analysis

Table 1 illustrates the coding the demographic variables and their distribution in the current sample. Majority of the college student sample was or under 23 years of age (87.1%). There were less males ($n=76$, 30.5%) than females ($n=173$, 69.5%) in the sample. Most of the students were single ($n=180$, 70.9%), and few of them were married or living together ($n=74$, 29.1%). A collapse of the racial categories of the respondents yielded 63.1% for the white and 36.9% for non-white.

The total PSS score was described in Table 1 by $\bar{x} \pm s$. There was no significant difference on the major demographic variables, except for family economic status, religion, physical health status variables. The more poverty the higher PSS score is. The PSS score of the atheist (190.33 ± 38.11) is higher than the believers (168.47 ± 42.39).

3.2 Reliability Tests of Scales

Cronbach's Alpha coefficient and Guttman Split-Half Coefficient were used to evaluate the internal consistency reliability and Split-half reliability of each strain scales and the total PSS. Table 2 shows the consistency Cronbach's Alpha values for the each strain scales are all larger than 0.800 and Cronbach's Alpha coefficient of the total PSS is 0.936. The Guttman Split-Half Coefficient of four scales are all larger than 0.710 and the total PSS is 0.839. Those evaluation indexes all indicate that the reliability of the four scales and the total PSS are excellent.

3.3 Validity Tests of Scales

(1) Content Validity—Experts were invited to review the 10 items in each strain scale to test the face validity of PSS. The experts, who were psychologists, psychiatrists, sociologists, social science methodologists, health statistician, and scale design experts were all conversant with the strain theory of suicide. Some items that did not have good face validity were either replaced or revised.

Multivariable linear regression analyses were used to assess the relationship between each item and its corresponding scale. The result is shown in Table 3. The P values for each of the 40 coefficients are all smaller than 0.001, which declares that there are strong correlation between each item and its corresponding scale total score.

(2) Structure Validity: Exploratory Factor Analysis (EFA)—The results of KMO and Bartlett's test were showed in Table 4. The KMO value of each of the four scales are larger than 0.84 and all the P value of Bartlett's test are smaller than 0.01. The result indicates that the database is suitable for factor analysis.

Factor analyses were conducted to evaluate the structure validity of each scale. The varimax orthogonal rotation method was used. The cumulative contribution rates in each of the four scales were larger than 60%. The factor analysis results demonstrated strong construct validity of each scale. The value strain consists of dimensions in thought and cognition, tradition and modernity, and family life. Aspiration strain covers dimensions in life goal, life obstacles, and social structure. Deprivation strain includes dimensions in the work, income, and treatment by others. Coping strain is comprised of dimensions in difficulties, getting lost, face problems. The statistic details of the factor analyses are not listed here because of space, but they can be available from the authors upon request.

(3) Criterion Validity—As illustrated in Table 5, we used the culture value scale from our previous studies (Zhang, Conwell, Zhou, & Jiang, 2004; Zhang et al., 2012) as the criterion scale for the value strain scale. The Cronbach's Alpha of the cultural value scale is 0.834 in current study. Wishes (Desire) were realized or not as the criterion variable for the aspiration strain scale. The family economic status was used as the criterion variable for the deprivation strain scale. The Moos's Coping Response Inventory (CRI) was the criterion for the coping strain scale.

The total score of each scale except for aspiration strain was found correlated with its corresponding criterion scale or variable significantly ($P < 0.001$). Aspiration strain not significantly correlated with the criterion variable ($P < 0.689$), which maybe due to the choice of the criterion variable. So far, there are not standard measuring questionnaire to measure aspiration, which would be a research subject in the future.

(4) Discriminant Validity—The subjects were divided into anxiety symptom group and non-anxiety symptom group, depression symptom group and non-depression symptom group according to boundary score of the previous study (Farmer et al., 1988; Spielberger, 1983). When it comes to the suicidal behaviors, suicidal group was coded as 1, and non-suicidal group coded as 0. The *t* test was used to compare the difference of PSS score between the symptom group and its corresponding non-symptom group. Table 6 illustrates that the score of each of the four scales and total PSS were significantly different between the symptom group and its corresponding non-symptom group. This demonstrates that the discriminant validity of PSS was high enough.

3.4 Effects of Psychological Strains on Psychopathology: Preliminary Hypothesis Tests

Univariate and multivariable analyses were operated to investigate to what extent the demographics variables, the strains scale and the total PSS predict psychopathology. Table 7 shows the univariate correlation and Logistic analyses of psychopathology on each of the strains and the major demographic variables. The scores of four strains were significantly associated with each of the three psychopathologies: anxiety, depression, and suicidal behaviors. In order to make demographic variable as many as possible enter the following multivariable analyses, we set the significant level $P = 0.10$. Demographic variables, such as gender, religion, and physical health status were statistically significant in the anxiety model; family economic status, religion, and physical health status were statistically

significant in depression model; parents marital status and physical health status were statistically significant in suicidal behaviors model under the significant level $P=0.10$.

The total PSS score and the statistical significant demographic variables of univariate analyses were entered into multivariable analyses to investigate to what extent the psychological strains predict anxiety, depression, and the suicide behaviors in this sample. Table 8 presents the three regression models to predict anxiety, depression and suicidal behaviors respectively. A two-tailed $P < 0.05$ was considered statistically significant. As shown in Table 8, psychological strains successfully predicted anxiety, depression, and suicidal behaviors separately with $P < 0.001$ in each of the three models. Females were more likely than males to score high on anxiety. Individuals with poor health status were more likely to be suicidal than those who enjoy better health.

4. Discussion and conclusion

The Strain Theory of Suicide and mental disorder is based on the theoretical frameworks of previous sociologists on criminal behaviors (Agnew & Kaufman, 2010; Durkheim, 1951; Merton, 1957; Zhang et al., 2009), and it was put forward several years ago as a theoretical framework predicting suicidal behaviors in Chinese populations (Zhang, 2005). The theory has been tested and supported in a number of empirical studies (Yan et al., 2012; Zhang et al., 2009; Zhang & Lester, 2008; Zhang et al., 2011). However, the lack of standardized measurement and systematic testing of its reliability and validity limited the development of this theory. The current study aimed to test the quality of the English version of PSS systematically in order to popularize and enlarge the applications of the theory.

The reliability of each of the four scales and the total PSS were excellent. The P values for each of the 40 coefficients were all smaller than 0.001, indicating that there is strong correlation between each item and its corresponding scale score. The factor analysis demonstrated strong construct validity of each scale. The total score of each of the tested scales was found significantly correlated with its corresponding criterion scale or variable and the criterion validity of PSS was very good. The t test illustrated that the score of each of the four scales and total PSS were significantly different between the symptom group and its corresponding non-symptom group, and the discriminant validity of PSS was high enough.

The preliminary hypothesis that the psychological strains as such measured predict psychopathology in the symptoms of anxiety, depression, and suicidal behavior was supported in both univariate and multivariable analyses. The statistical result showed that the PSS was an excellent measure to estimate and predict anxiety, depression, and the suicide behaviors in student populations. In sum, this English version of the PSS instrument has outstanding reliability and validity traits, and is applicable for research in evaluating and predicting suicidal behaviors and mental disorders.

One limitation of the study was the over representation of females in the sample. Future studies to test the reliability and validity of the PSS instrument among college students maybe conducted in larger and more diverse samples of college students. Further, with this current successful reliability and validation test, studies on different populations with larger

samples are needed to further test and modify the Psychological Strain Scales to increase both its internal and external validities. Other limitation of the study was the choices of criterion variable for aspiration strain and deprivation strain. So far, there are not standard scales to measure the two strains. Future studies on the measurements are still needed.

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Appendix. The English Version of the Psychological Strain Scales (PSS)

Introduction

The following statements are hypothesized to indicate how you feel about yourself or view the world around you. Please read each of them carefully and respond truthfully by 1 (never, it's not me at all), 2 (rarely, it's not me), 3 (maybe, I'm not sure), 4 (often, it's like me), and 5 (Yes, strongly agree and it's exactly me). There are not right or wrong answers.

Value Strain Scale

No.	Issue	Never	Rarely	Maybe	Often	Yes
1	I am often confused about what life means to me.	①	②	③	④	⑤
2	I am unsure about what is right and wrong regarding some things in my daily life.	①	②	③	④	⑤
3	I don't know why my thoughts are often different from others.	①	②	③	④	⑤
4	My parents and my best friends (peers) sometimes have different views on certain things, and I always find it difficult to deal with them.	①	②	③	④	⑤
5	I don't know if women should have the same rights that men do.	①	②	③	④	⑤
6	Between traditional and modern values, I don't know what I should follow.	①	②	③	④	⑤
7	Between chastity and sexual liberty, I don't know what I should do.	①	②	③	④	⑤
8	I am always troubled by some conflicting ideas.	①	②	③	④	⑤
9	I am not living in the way I want, and I feel bad about it.	①	②	③	④	⑤
10	The traditional values are always opposite to what I have learned from school, I cannot make a choice what to believe.	①	②	③	④	⑤

Aspiration Strain Scale

No.	Issue	Never	Rarely	Maybe	Often	Yes
1	Society is not fair to me.	①	②	③	④	⑤
2	I wish I were living in a better family, but I cannot realize it according to some reasons.	?	?	?	?	?
3	I wish I had a chance to get more education, but I cannot realize it according to some reasons.	?	?	?	?	?
4	I wish I had more power in my life, but I cannot realize it according to some reasons.	?	?	?	?	?
5	Many people have got in the way of my success.	?	?	?	?	?
6	My life quality is not as good as it was before.	?	?	?	?	?
7	I wish I could change my current living condition, but I cannot.	?	?	?	?	?
8	I wish I could achieve the highest goal in my life, but I cannot.	?	?	?	?	?
9	I wish I could be successful, but there are too many obstacles in my life.	?	?	?	?	?
10	I wish I had fewer burdens in my life, but I have to deal with so many responsibilities every day.	?	?	?	?	?

Deprivation Strain Scale

No.	Issue	Never	Rarely	Maybe	Often	Yes
1	Compared to others in my neighborhood (village), I am a poor person.	①	②	③	④	⑤
2	Compared to other families in my community, my family is poor.	①	?	?	?	?
3	I believe I am good enough, but I am not satisfied with the treatment from others.	?	?	?	?	?
4	My family does not have the money to support me to go to school.	?	?	?	?	?
5	I cannot go to church as much as people around me can, because I am poor.	?	?	?	?	?
6	I have the same qualities as some of my colleagues, but they are paid much more than I am.	?	?	?	?	?
7	Most people around me have better and more comfortable working environment.	?	?	?	?	?
8	I work hard and my performance is excellent, but I am not appreciated and promoted as are others who did not do their jobs so good.	?	?	?	?	?
9	Compared to others, it is more difficult for me to make money.	?	?	?	?	?
10	I have worked too much and gained too little.	?	?	?	?	?

Coping Strain Scale

No.	Issue	Never	Rarely	Maybe	Often	Yes
1	Face is so important to me that I will do everything to protect my public image, even suicide.	?	?	?	?	?

No.	Issue	Never	Rarely	Maybe	Often	Yes
2	I cannot handle too many things at the same time.	☐	☐	☐	☐	☐
3	When confronted with some crisis, my head usually turns blank.	☐	☐	☐	☐	☐
4	I always to do things as I like, without thinking of the consequence.	☐	☐	☐	☐	☐
5	I cannot forget unpleasant experiences, and the more I think, the worse my feelings are.	☐	☐	☐	☐	☐
6	Even with small problems, I sometimes feel low and cannot get going.	☐	☐	☐	☐	☐
7	When I have problems, I feel difficult to fall asleep and lose my appetite.	☐	☐	☐	☐	☐
8	When I have difficulties in what I am doing, I usually give up the task.	☐	☐	☐	☐	☐
9	When I have a problem, I always stay alone and away from others.	☐	☐	☐	☐	☐
10	In dealing with things, I often feel out of control and not able to catch up.	☐	☐	☐	☐	☐

Table 1

Demographic Characteristics of the Sample (N=257)

Demographic Variable	Freq. (%)	Total PSS Score ($\bar{x} \pm s$)	t/F Value	P
Age (year) (n=256)			-.997	.320
23 (0)	223 (87.1%)	173.82±41.28		
24 (1)	33 (12.9%)	181.67±48.26		
Gender (n=249)			.719	.473
Male (0)	76 (30.5%)	177.83±43.00		
Female (1)	173 (69.5%)	173.65±41.98		
Marital Status (n=254)			.387	.699
Single (0)	180 (70.9%)	175.66±42.83		
Non-single (1)	74 (29.1%)	173.41±40.47		
Parents Marital Status (n=230)			.496	.620
Never married (0)	39 (17.0%)	177.62±34.19		
Ever married (1)	191 (83.0%)	173.94±43.55		
Family Economic Status (n=255)			6.959	.001
High (1)	91 (35.7%)	162.88±41.15		
Middle (2)	130 (51.0%)	178.61±40.31		
Low (3)	34 (13.3%)	190.94±44.89		
Religion (n=234)			3.704	<0.001
Atheist (0)	69 (29.5%)	190.33±38.11		
Believer (1)	165 (70.5%)	168.47±42.39		
Physical Health Status (n=255)			3.693	.026
Bad (1)	15 (5.9%)	172.80±49.19		
Average (2)	100 (39.2%)	183.49±42.40		
Good (3)	140 (54.9%)	168.64±40.58		
Racial Identity (n=255)			-.084	.933
White (0)	161 (63.1%)	174.50±42.40		
Non-white (1)	94 (36.9%)	174.96±42.15		

Table 2

The Internal Consistency Reliability and the Split-half Reliability

Strain	Cronbach's Alpha	Guttman Split-Half Coefficient	N of Items
Value Strain	0.802	0.777	10
Aspiration Strain	0.863	0.805	10
Deprivation Strain	0.868	0.717	10
Coping Strain	0.851	0.814	10
Total PSS Score	0.936	0.839	40

Table 3

Correlation between Each Item and the Total Score for Each Strain Scale

Item No.	Value strain β	Aspiration strain β	Deprivation strain β	Coping strain β
Item 1	.166	.147	.124	.135
Item 2	.145	.135	.135	.152
Item 3	.185	.135	.147	.141
Item 4	.166	.156	.186	.137
Item 5	.164	.119	.128	.174
Item 6	.170	.146	.145	.157
Item 7	.155	.177	.148	.178
Item 8	.174	.160	.153	.127
Item 9	.195	.144	.137	.167
Item 10	.140	.168	.166	.154

Note: The β have been standardized. All the P values for all the 40 coefficients are smaller than 0.001.

Table 4

Kaiser-Meyer-Olkin and Bartlett's Test

Strain Aspect	KMO value	χ^2 of Bartlett's Test	<i>P</i>
Value Strain	.848	609.668	<0.001
Aspiration Strain	.894	899.391	<0.001
Deprivation Strain	.855	1146.905	<0.001
Coping Strain	.882	882.745	<0.001
Total PSS Score	.902	4746.996	<0.001

Table 5

Correlations of Each Strain Scale with Its Corresponding Criterion Scale/Variable

Strain	Corresponding Criterion Scale/Variable	Spearman's Correlation Coefficients	<i>P</i>
Value Strain	Culture Value Scale	.226	<0.001
Aspiration Strain	Wishes have not been realized	-.025	.689
Deprivation Strain	Family Economic Status	.406	<0.001
Coping Strain	CRI Coping Scale	-.231	<0.001

Table 6

Test for the Discriminate validity of PSS

Strain	Anxiety ($\bar{x} \pm s$)		t	Depression ($\bar{x} \pm s$)		t	Suicidal Behaviors ($\bar{x} \pm s$)		t
	Yes	No		Yes	No		Yes	No	
Value	26.24 ± 4.96	20.79 ± 6.44	3.776*	23.78 ± 6.45	18.59 ± 5.43	6.969*	23.47 ± 7.071	20.17 ± 6.12	3.656*
Aspiration	27.62 ± 8.35	20.39 ± 7.56	4.163*	23.72 ± 7.56	18.14 ± 7.15	6.068*	23.63 ± 7.73	19.74 ± 7.79	3.557*
Deprivation	28.10 ± 9.56	20.59 ± 7.79	4.152*	23.66 ± 8.31	18.64 ± 7.24	5.154*	23.48 ± 8.15	20.28 ± 8.08	3.266*
Coping	32.48 ± 7.18	22.31 ± 6.95	6.402*	26.01 ± 7.21	20.17 ± 6.60	6.770*	27.16 ± 7.45	21.61 ± 7.02	5.510*
Total PSS	114.43 ± 23.22	84.08 ± 23.40	5.698*	97.17 ± 23.10	75.54 ± 21.51	7.761*	97.73 ± 23.48	81.80 ± 24.24	3.557*

* Note: Indicated $P < 0.001$.

Table 7
Univariate Analyses of the Psychopathology by Each of the Strains and Relevant Demographic Variables (N=257)

Variable	Spielberger-Trait Anxiety		CES-D Depression		Kessler NCS Suicidal Behaviors	
	r	P	r	P	χ^2	P
Total Score of Value Strain	.493	<0.001	.478	<0.001	11.888	.001
Total Score of Aspiration Strain	.499	<0.001	.477	<0.001	11.580	.001
Total Score of Deprivation Strain	.481	<0.001	.404	<0.001	7.431	.006
Total Score of Coping Strain	.625	<0.001	.540	<0.001	24.095	<0.001
Age (24 years)	.039	.530	.051	.419	.331	.565
Gender (Female)	.124	.051	.021	.739	2.108	.147
Marital Status (Non-single)	.042	.501	.026	.680	.028	.867
Parents Marital Status (Ever married)	-.023	.724	-.049	.458	3.406	.065
Family Economic Status (Poverty)	.069	.275	.121	.053	.064	.800
Religion (Believer)	-.153	.019	-.170	.009	1.917	.166
Physical Health Status (Excellence)	-.218	<0.001	-.169	.007	9.663	.002
Racial Identity (Non-white)	-.091	.146	.036	.565	1.364	.243
Only Child (Yes)	.063	.312	.067	.283	.313	.576

Note: r is the spearman correlation coefficient. Significant level is 0.10.

Predicting Psychopathology by the Psychological Strains with Social Demographic Factors as Covariates (N=257)

Table 8

Variable	Spielberger-Trait Anxiety		CES-D Depression		Kessler NCS Suicidal Behaviors	
	β	P	β	P	β	P
Psychological Strains	.605	<0.001	.478	<0.001	.252	<0.001
Gender (Female)	.127	.016				
Parents Marital Status (Ever married)					-.120	.063
Family Economic Status (Poverty)			.018	.759		
Religion (Believer)	-.024	.647	-.061	.295		
Physical Health Status (Excellence)	-.085	.109	-.098	.089	-.178	.007
R ²	.410		.271		.127	

Note: The β in the three models have been standardized. Significant level is 0.05.