# The Chinese version of the substance use risk profile scale: factor structure, reliability, and validity in Chinese university students

Hong Fan[1,2] · Lihua Pan[2,3] · Liangmin Wei[1] · Ran Zhao[1] · Nan Zhao[2] · Yanling Wu[1]

## Abstract

The wide use of tobacco among a substantial portion of university students could foreshadow an increase in overall adult tobacco use. This cross-sectional study aimed to explore the impact of smoking intention on each of the Substance Use Risk Profile Scale (SURPS) subscales amongst a sample of Chinese university students and examine factor structure, reliability, and validity. A cross-sectional survey was conducted in this study. Data were collected from a randomly selected sample that consisted of 2864 students in six universities in China. 2700 university students (53.4% females, mean age 20 years) were included in this study. Factor analysis and correlation coefficient were used for the validity of the SURPS, Cronbach's alpha was used for the reliability of the SURPS, and confirmatory factor analysis (CFA) was used to assess the psychometric properties of the SURPS. The factor analysis of construct validity identified four dimensions of the SURPS, explaining 56.07% of the total variance. Good internal consistency and adequate concurrent validity were found in four subscales of the SURPS. Significant group differences were found on the Impulsivity, Anxiety Sensitivity, and Sensation Seeking subscales, with substance-dependent groups scoring higher than controls. Our findings demonstrate SURPS can be usefully applied in China, especially in respect of the risk assessment of substance use from individual characteristics in China. It also has the potential to implement early intervention for reducing substance use among university students.

**Keywords** SURPS · University students · Smoking intention · Substance use · Factor analysis

## Introduction

Long-term smoking habits are easily developed among university students. Tobacco use among a substantial portion of university students could indicate an increase in overall adult tobacco use in the future (Rigotti et al., 2000). Identifying university students' intentions can help tailor smoking cessation interventions to this high-risk population.

Hong Fan and Lihua Pan These authors contributed equally to this work.

✉ Hong Fan
fanhong@njmu.edu.cn

[1] School of Public Health, Nanjing Medical University, 101 Longmian Road, Nanjing 211166, People's Republic of China

[2] School of Nursing, Nanjing Medical University, 101 Longmian Road, Nanjing 211166, People's Republic of China

[3] Jockey Club School of Public Health and Primary Care, Faculty of Medicine, The Chinese University of Hong Kong, Hong Kong SAR, China

In 2016, China announced the "Healthy China 2030" blueprint, which set the goal to reduce the smoking prevalence to 20% by 2030 (Goodchild & Zheng, 2019). The Chinese Center for Disease Control and Prevention released the 2018 Chinese Adults Tobacco Survey Report (2019), which revealed that approximately 26.6% of Chinese adults (defined as age ≥ 15 years and amounting to more than 307 million people) were current smokers. Further, the percentage of smokers who started smoking in the past 12 months rose sharply from 14.4% in 2010 to 19.8% in 2018.

Smoking is a leading cause of preventable disease and death. Deaths caused by smoking in China are estimated to rise from 1 million in 2010 to about 2 million by 2030 (Chen et al., 2015). Thus, developing smoking behaviors at formative stages in life is potentially concerning and merits further study (Johnston et al., 2021). Harmful and risky factors associated with smoking can be avoided when smoking habits are controlled before age 30 (Doll et al., 2004). As the use of controlled substances among the Chinese population is a focus of interest in the field of public health, the need for a validated instrument for Chinese university students to

use to determine personality traits as risk factors that predict future smoking intention is necessary.

The Substance Use Risk Profile Scale (SURPS) is a measuring tool developed in 2009 to predict substance use and misuse based on four personality traits. Some studies have shown that such personality traits are risk factors for the substance use of alcohol and other drugs (Newton et al., 2016). A total of 23 items were included in the questionnaire, including four personality traits that were identified as risk factors for substance use disorders: anxiety sensitivity (AS), hopelessness (H), impulsivity (IMP), and sensation seeking (SS). Individuals with high AS or H scores were considered more susceptible to negative reinforcement motivation for substance use. In contrast, individuals with high IMP or SS scores were more sensitive to positive reinforcement motivation for substance use. According to the scale sum scores, a high or low risk of substance use-related problems could be identified among university students (Memetovic et al., 2016).

Currently, research utilizing the SURPS is mainly concerned with American teenagers, but the United States as a proportion of the world population is relatively small. The validation of the psychometric properties of SURPS in English has been widely investigated. Psychological research has tended to pay more attention to the phenomenon of American children, but the narrow range of samples will potentially limit the extension of results (Blanchard et al., 2019). The SURPS has been adopted in Australia (Newton et al., 2016), Bulgaria (Long et al., 2018), and Spain (Fernández-Calderón et al., 2018)

(Table 1). A previous study examined the psychological assessment and validation of the German and French adolescent SURPS and compared it with the British and Irish samples (Jurk et al., 2015). The Bulgarian version of SURPS has good reliability and validity. The scale can be used as a research tool for Substance Use Disorders (SUD) and substance-related diseases (Long et al., 2018). The rationality of the scale's theoretical framework was constructed and examined, revealing that the scale has outstanding reliability and validity and is highly compliant with psychometric standards (Guo & Deng, 2017).

In addition, the scale was applied to analyze the risk of substance use among 250 middle school students in Hong Kong (Siu, 2011). However, as the sample size and population range are relatively small, and there are certain cultural differences in different regions, this paper will enlarge the sample size and investigate other areas of China. Although the SURPS has been shown to be applicable in some cultural settings as a screening tool, to our knowledge, there is little evidence on the personality factors related to substance abuse and the validation of the Chinese-translated version of the SURPS for detecting the smoking intention of Chinese university students. Therefore, studies focusing on a sample of Chinese university students are specifically required. The present study aims to explore the impact of smoking intention on each subscale in a sample of Chinese university students and examine the factor structure, reliability, and validity of SURPS.

**Table 1** Previous studies reporting on the cross-cultural adaptation of the Substance Use Risk Profile Scale (SURPS)

| Author, year | Newton et al., 2016 | Long et al., 2018 | Fernández-Calderón et al., 2018 | Siu, 2011 | Guo & Deng, 2017 |
|---|---|---|---|---|---|
| Country | Australia | Bulgaria | Spain | China | China |
| Setting | Australian schools | A larger ongoing studyon neurocognitive functioning | Spanish universities | Secondary schools in Hong kong | Primary schools in Guangxi Zhuang Autonomous Region |
| Recruitment Period | 2012–2015 | Not reported | Not reported | Not reported | 2014–2015 |
| Sample | 527 adolescents | 238 individuals | 455 undergraduate students | 250 adolescents | 948 primary students |
| Gender: | | | | | |
|    Male | 176(33%) | 131(55%) | 96(21.1%) | 137(54.8%) | 465(49.05%) |
|    Female | 351(67%) | 107(45%) | 359(78.9%) | 113(45.2%) | 452(47.68%) |
|    Age (Mean±SD) | 12~15, (13.38±0.43) | 18~50 | 18~55, (21.53±5.14) | Not reported | 9~15, (11.17±1.10) |
| Cronbach's Alpha: | | | | | |
|    H | 0.86 | 0.85 | 0.806 | 0.65 | 0.811 |
|    SS | 0.67 | 0.78 | 0.706 | 0.70 | 0.765 |
|    IMP | 0.78 | 0.71 | 0.685 | 0.73 | 0.698 |
|    AS | 0.62 | 0.73 | 0.652 | 0.74 | 0.807 |

## Methods

### Participants

The study protocol and the questionnaire were approved by the Research Ethics Committee of Nanjing Medical University, Nanjing, China. All participants read a statement that explained the purpose of the survey and gave written informed consent before the investigation.

A total of 2864 university students were recruited, using a random sampling approach from universities located in the Eastern, Central, and Western regions of China. Among these questionnaires, 164 were excluded for missing basic information. Eventually, a total of 2700 university students were included in this survey, with an overall response rate of 94.3%. The sample comprises 1258 (46.6%) male students and 1442 female students (53.4%), with ages ranging between 18 and 27 years old (mean = 20.38; SD = 1.58), all of whom agreed to participate voluntarily and anonymously.

### Measurement

#### Substance use risk profile scale (SURPS)

The scale consists of 23 items and has four subscales which are followed by AS (Anxiety Sensitivity), H (Hopelessness), SS (Sensation Seeking), and IMP (Impulsivity). Each subscale has a different meaning. AS is a personality factor that motivates individuals to use substances to relieve anxiety, whereas H is a personality factor that reflects the substance use pathway specific to depression. SS is a personality factor that stimulates individual use of substances, reflecting stimuli and seeking danger, resulting in increased psychological arousal. It is a personality factor characterized by a rapid response to potential reward cues and a minimum tolerance for negative emotions when it refers to IMP.

Participants were asked to answer each question on a five-point Likert scale, ranging from (1) strongly disagree to (5) strongly agree. The higher the score, the more likely it is that this particular personality factor exists. Several studies have shown that the SURPS possesses good psychometric properties, including internal reliability, convergent, and discriminant validity (Castellanos-Ryan et al., 2013; Siu, 2011; Woicik et al., 2009).

#### University students' smoking intention

One item was produced to investigate the smoking intention of university students. The item followed the lead-in statement, "Do you think you might try smoking in the next one year?" Responses are rated on a five-point Likert scale (1 = extremely impossible, 2 = impossible, 3 = generally possible, and 4 = possible, 5 = extremely possible). The first three indicate weak smoking intention, while the latter two indicate strong smoking intention. The collected data are all in a normal distribution. Two sample t-tests compared the weak and the strong smoking intention group, males and females, between four personality traits.

### Procedure

The Chinese version of the SURPS questionnaire survey was used in this study. First, the SURPS was translated into Chinese and then independently translated back into English by two proficient translators in both English and Chinese. Second, an independent bilingual translator has compared the multiple translated versions. In addition, the discrepancies in conceptual equivalence have been reviewed with the original version. Corrections were checked by consensus among the translators and the author. 2864 students were sampled randomly from Nanjing Medical University, Nanjing University of Posts and Telecommunications, Guangxi Normal University, Guilin Medical University, Shanxi Medical University, and the Taiyuan University of Technology, resulting in a total of 2700 effective questionnaires. A paper-based and online survey was conducted. According to the accessibility, some participants were allocated paper-based questionnaire to fill in with pencil. Others were presented with an online questionnaire via Wenjuanxing, an online survey platform in mainland China that has functions similar to Qualtrics or Survey Monkey. Research assistants collected the completed questionnaires for further processing.

### Data analysis

We used EpiData 3.1 to have data entry and establish the database. All data can be imported from EpiData to SPSS at one time. Data were processed using the program SPSS 26.0. Internal reliability of the Chinese version of the SURPS was assessed by examination of Cronbach's alpha, correlations, as well as factor analysis. A confirmatory factor analysis (CFA) using maximum likelihood estimation (AMOS 21.0) was conducted to test the hypothesized four-factor structure of the Chinese version of SURPS.

## Results

### Factor structure of the SURPS

Exploratory factor analysis (EFA) was performed to examine possible alternative structures to the Chinese version of the SURPS. The factors showed generally irrelevant or minor intercorrelations in EFA. The four latent factors explained a substantial proportion of the variance of the observed sum scores. Table 2

**Table 2** Correlation coefficients among items and subscales of SURPS (*N* = 2700)

| Subscales | Item | Scores(mean ± SDs) | *r* | *P* |
|---|---|---|---|---|
| Hopelessness | 1 | 2.96 ± 1.037 | 0.685 | < 0.001 |
| | 4 | 2.62 ± 0.976 | 0.812 | < 0.001 |
| | 7 | 2.42 ± 1.001 | 0.826 | < 0.001 |
| | 13 | 2.81 ± 1.006 | 0.671 | < 0.001 |
| | 20 | 2.59 ± 0.946 | 0.827 | < 0.001 |
| | 23 | 2.43 ± 1.024 | 0.826 | < 0.001 |
| Impulsivity | 2 | 2.87 ± 0.986 | 0.755 | < 0.001 |
| | 5 | 3.03 ± 0.984 | 0.741 | < 0.001 |
| | 11 | 2.55 ± 0.955 | 0.802 | < 0.001 |
| | 15 | 2.68 ± 0.986 | 0.765 | < 0.001 |
| Sensation Seeking | 3 | 2.47 ± 1.094 | 0.648 | < 0.001 |
| | 9 | 2.49 ± 0.995 | 0.683 | < 0.001 |
| | 12 | 2.69 ± 1.135 | 0.637 | < 0.001 |
| | 16 | 2.02 ± 0.998 | 0.583 | < 0.001 |
| | 19 | 2.65 ± 1.106 | 0.618 | < 0.001 |
| Anxiety Sensitivity | 8 | 3.09 ± 0.975 | 0.745 | < 0.001 |
| | 10 | 2.92 ± 0.995 | 0.731 | < 0.001 |
| | 14 | 3.12 ± 0.996 | 0.752 | < 0.001 |
| | 18 | 2.91 ± 1.037 | 0.721 | < 0.001 |
| | 21 | 2.88 ± 0.976 | 0.714 | < 0.001 |

shows the correlation coefficients of each item score and its dimension from 0.58 to 0.83 (*P* < 0.001). It has demonstrated good item discrimination (Guo & Deng, 2017), with results from the present study proving consistent discrimination. Pearson product-moment correlation was used to analyze the scores of four subscales of Chinese translation SURPS. The results are shown in Table 3. The highest positive correlation coefficient (IMP and AS) was 0.626, followed by 0.486 (IMP and SS). The correlation coefficients of each subscale score were significant at the level of *P* < 0.001.

**Table 3** The intercorrelations among various subscales in SURPS (*N* = 2700)

| | H | AS | IMP | SS |
|---|---|---|---|---|
| Hopelessness (H) | 1 | -0.350** | -0.295** | -0.210** |
| Anxiety sensitivity (AS) | | 1 | 0.626** | 0.422** |
| Impulsivity (IMP) | | | 1 | 0.486** |
| Sensation seeking (SS) | | | | 1 |

**p < 0.001

## Reliability of the SURPS

The degree to which all the items in the scale are consistent and whether the items in the scale measure the same thing is commonly referred to as internal consistency reliability. All items are loaded on each prominent factor. Cronbach's alpha value was used to evaluate the consistency between various items in the scale, which shows 0.713 in total. H, IMP, SS and AS were 0.865, 0.765, 0.660 and 0.784, respectively. These values were similar to those reported by Canfield et al. (2015) in a Brazilian sample (with Cronbach's alpha as 0.77, 0.69, 0.70, and 0.76, respectively). All Cronbach's alpha values have basically reached 0.7, indicating that the homogeneity of the items in the same dimension was reliable and the approved Chinese-translated version of the SURPS has good internal consistency reliability.

## Validity of the SURPS

In order to evaluate the effectiveness of improvements, we used factor analysis method and the confirmatory factor analysis. Samples were divided into two groups randomly. One for PCA and another for CFA. The main function of the factor analysis was to extract some common factors from the scale variables.

Confirmatory factor analysis was used to verify that each item has a significant loading on the predicted factor. Items with low loading weights (< 0.5) were removed from the model (Item 6, item 17, and item 22). Previous investigations also discovered these problematic items.(Fernández-Calderón et al., 2018; Guo & Deng, 2017; Kaminskaite et al., 2020; Robles-García et al., 2014; Saliba et al., 2014; Schlauch et al., 2015). In this study, CFA was performed by using AMOS program. Chi-square = 1402.982, Degrees of freedom = 164, Probability level = < 0.001. The model fit was assessed using the comparative fit index (CFI) criteria recommended by Cheung and Rensvold (Cheung & Rensvold, 2002). The closer the fitting index (CFI), the normative fit index (NFI), the incremental fit index (IFI), and the goodness-of-fit index (GFI) were to 1, the better the model fit would be. The Root Mean Square Error of Approximation (RMSEA) and standardized residual mean root (SRMR) were within the recommended estimate value of about or below 0.08(Wu, 2010). The results of the Chinese-translated version of the SURPS model could be fitted well with sample data (*n* = 1358) (*P* < 0.001, CFI = 0.875, NFI = 0.861, IFI = 0.875, GFI = 0.898, SRMR = 0.065, RMSEA = 0.075).

The criterion for the factor extraction threshold was eigenvalues greater than one. The common factors were respectively related to the height of a certain set of variables. These common factors represented the basic structure of the scale. The results are shown in Table 4. KMO test value is 0.889,

**Table 4** Exploratory factor analysis for the 20 items of the cross-cultural adaptation of the SURPS into Chinese after orthogonal Varimax rotation ($n = 1342$)

| Item | | Factors | | | |
|---|---|---|---|---|---|
| | | Hopelessness | Anxiety Sensitivity | Sensation Seeking | Impulsivity |
| 23 | I am very enthusiastic about my future | ***0.836*** | 0.097 | 0.045 | -0.032 |
| 7 | I have faith that my future holds great promise | ***0.829*** | 0.110 | 0.020 | 0.078 |
| 20 | I feel pleasant | ***0.820*** | 0.177 | 0.086 | -0.029 |
| 4 | I am happy | ***0.809*** | 0.097 | -0.007 | 0.162 |
| 1 | I am content | ***0.614*** | -0.060 | 0.070 | 0.351 |
| 13 | I feel proud of my accomplishments | ***0.583*** | 0.266 | 0.154 | 0.073 |
| 18 | I get scared when I experience unusual body sensations | 0.073 | ***0.725*** | 0.103 | 0.142 |
| 14 | I get scared when I'm too nervous | 0.198 | ***0.671*** | 0.048 | 0.282 |
| 21 | It scares me when I'm unable to focus on a task | 0.144 | ***0.656*** | 0.244 | 0.107 |
| 10 | It frightens me when I feel my heart beat change | 0.126 | ***0.616*** | 0.184 | 0.197 |
| 8 | It's frightening to feel dizzy or faint | 0.138 | ***0.593*** | 0.020 | 0.466 |
| 16 | I am interested in experience for its own sake even if it is illegal | -0.190 | 0.094 | ***0.694*** | 0.121 |
| 9 | I like doing things that frighten me a little | 0.068 | 0.190 | ***0.669*** | 0.155 |
| 3 | I would like to skydive | 0.210 | -0.105 | ***0.619*** | 0.189 |
| 12 | I would like to learn how to drive a motorcycle | 0.210 | 0.162 | ***0.553*** | 0.054 |
| 19 | I would enjoy hiking long distances in wild and uninhabited territory | 0.007 | 0.411 | ***0.526*** | -0.091 |
| 2 | I often don't think things through before I speak | 0.151 | 0.153 | 0.101 | ***0.766*** |
| 5 | I often involve myself in situations that I later regret being involved in | 0.134 | 0.416 | 0.048 | ***0.622*** |
| 11 | I usually act without stopping to think | -0.029 | 0.315 | 0.391 | ***0.616*** |
| 15 | Generally, I am an impulsive person | 0.085 | 0.277 | 0.388 | ***0.531*** |
| | Eigenvalue | 5.906 | 2.793 | 1.463 | 1.053 |
| | Variance (%) | 29.528 | 13.964 | 7.313 | 5.263 |
| | Accumulative Variance (%) | 29.528 | 43.492 | 50.806 | 56.069 |

Note: Items selected in each subscale are in bold italic

and the difference in Bartlett's spherical test was statistically significant (chi-square approximated 9845.813, $p < 0.001$, $n = 1342$), which was suitable for factor analysis. In this study, the maximum variance orthogonal rotation approach of factors was applied, with the assumption that items were independent. After principal component analysis and varimax rotation analysis, 20 out of 23 items identified four principal components based on the Kaiser's rule and visual inspection of scree plot (Fig. 1) with eigenvalues greater than 1 (5.91, 2.79, 1.46, 1.05, and the corresponding mutation interpretation rates were 29.53%, 13.96%, 7.31%, and 5.26%, respectively), explaining 56.069% of the overall variance.

T-test analysis was performed on the scores of different dimensions of the strong and weak intentional smoking group. The results showed that the difference between the two groups was statistically significant among the three dimensions of IMP, SS, and AS. Moreover, in the strong smoking intention group, the scores of these three dimensions were higher than those of the weak smoking intention group, that is, those high on IMP, SS, and AS

may be more susceptible to the reinforcing risk of substance (Table 5). Table 6 presents the differences in subscale scores between males and females in the current study. Males scored significantly higher than females on the H and SS subscales, $t = 7.64/8.52$, $p < 0.001$, whereas females scored significantly higher on the IMP and AS subscales, $t = -3.50/-6.77$, $p < 0.001$.

## Discussion

This study investigated the factor structure, reliability, and validity of the Chinese translated version of the SURPS in a cross-sectional sample of Chinese university students. Although a Chinese translated version of the SURPS has been developed in Hong Kong and Guangxi in a relatively small sample, the large cultural differences in several regions in China have warranted the development of a Chinese version examined in a large population. Our data set was applied to Conrod and Woicik's (2002) personality risk

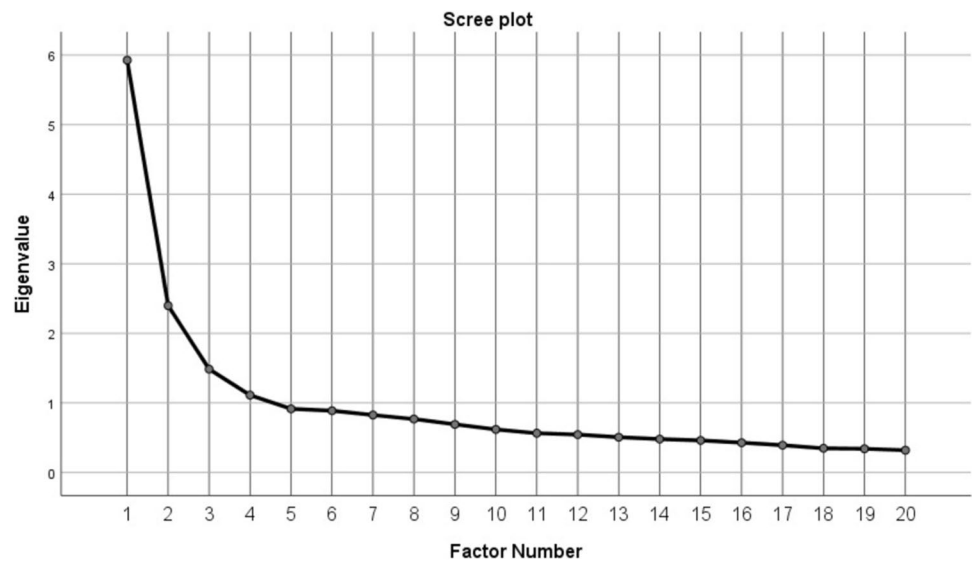**Fig. 1** Scree plot of the exploratory factorial analysis of the SURPS



**Table 5** Differences in scores between different levels of smoking intentions ($N=2700$)

| Subscale | Mean (SD) | t | P |
|---|---|---|---|
| H subscale | | | |
| Weak smoking intention | 15.87 (4.668) | 1.796 | 0.073 |
| Strong smoking intention | 15.23 (4.093) | | |
| IMP subscale | | | |
| Weak smoking intention | 11.01 (2.938) | -6.874 | <0.001 |
| Strong smoking intention | 12.74 (3.294) | | |
| AS subscale | | | |
| Weak smoking intention | 14.85 (3.632) | -4.435 | <0.001 |
| Strong smoking intention | 16.09 (3.673) | | |
| SS subscale | | | |
| Weak smoking intention | 12.12 (3.372) | -10.624 | <0.001 |
| Strong smoking intention | 14.90(3.831) | | |

**Table 6** Differences in subscale scores between male and female ($N=2700$)

| Subscale | Mean (SD) | t | P |
|---|---|---|---|
| H subscale | | | |
| Male | 16.55 (4.843) | 7.641 | <0.001 |
| Female | 15.19 (4.347) | | |
| IMP subscale | | | |
| Male | 10.91 (3.036) | -3.504 | <0.001 |
| Female | 11.31 (2.946) | | |
| AS subscale | | | |
| Male | 14.43 (3.689) | 8.523 | <0.001 |
| Female | 15.37 (3.554) | | |
| SS subscale | | | |
| Male | 12.91 (3.522) | -6.765 | <0.001 |
| Female | 11.78 (3.345) | | |

model for substance use, exploring the underlying factorial nature. Furthermore, the SURPS is a valuable instrument to determine who is more likely to have smoking intention among university students (Siu, 2011). The SURPS helps identify adolescents at high risk for substance use and other emotional and behavioral problems (Woicik et al., 2009).

The current study results were generally consistent with what was previously found in a Chinese sample. Results suggest that the SURPS is a valid instrument for measuring four different personality dimensions for substance use disorders. This study examined the utility of the 4-factor scale and predicted the personality of substance use and related issues in Chinese university students' samples. Results align with previous studies that showed that IMP, SS, and H are significant concurrent and predictive correlative factors of smoking problems among university students in China. Studies have also shown that these factors were important and relevant factors. Expressly, our results agreed with all the personality-specific hypotheses either concurrently or prospectively, except that H was not found to be associated with smoking in a sample of Chinese university students, which is highly consistent with a previous study of Australian adolescents (Newton et al., 2016). Our findings suggest no significant difference between the weak and strong smoking intention groups in this subscale. Consistent with previous studies, IMP was the most important predictor of substance use, especially in behavior and hyperactive problems, identified as a factor related to general deviations (Krueger et al., 2002; Robles-García et al., 2014). Additionally, IMP was positively associated with smoking behavior (Newton et al., 2016). Several explanations are possible. First, many previous studies have found relations between substance abuse and depression. Second, the H subscale may be more helpful in dealing with clinical samples with severe substance use

problems than trait-like personality dimensions representing a risk for substance use (Schlauch et al., 2015).

Woicik and his colleagues hypothesized that the lack of association between AS and the frequency of drug use among adolescents might be due to the sample's age, avoiding anxiety sensitivity, and that substance abuse may be detected only in older populations (Schlauch et al., 2015). However, some studies did not support such conclusions. This inconsistency has led some researchers to believe other factors may play a role in the relationship between AS and substance abuse (Forsyth et al., 2003). Despite these limitations, the present study results strongly support for the excellent concurrency and predictive validity of SURPS in a sample of university students. Applying SURPS to this high-risk population may help improve the extent of initial screening and prediction of people at risk for abuse of various substances such as smoking. To provide strong support for the use of SURPS, thus, it is necessary to identify high-risk populations who may benefit greatly from tailored prevention methods. This study will be of practical importance in the formulation of interventions intended to control the substance use of university students. If it works, this edition of the instrument could identify behavioral and emotional problems of young adults at an early stage. To further test the generalizability of SURPS, it may also be applied in other countries with large numbers of university students (Epton et al., 2013).

## Limitation

This study has several limitations. Firstly, the cumulative scale contribution rate in this study is not high enough. Secondly, self-selection and potential deviations in social expectations in voluntary samples are inevitable. Thirdly, self-reporting was obtained as a measure, which may lead to reporting bias. Moreover, the results of this study may be affected by the natural maturity of university students and their peer groups. Therefore, future studies could benefit from enlarged sample sizes and different group populations. For example, a control group could be included to compare and explore the effects of intervention in further research (Kazemi et al., 2015). Finally, the positive relationship between negative thinking and substance use suggests that the present findings are conservative estimates of the validity of the SURPS in predicting smoking problems (Woicik et al., 2009). The study design was cross-sectional, which was limited in resolving the causal relationship or direction of the observed association.

Future research should collect data longitudinally or use structural analysis of path analysis and cross-sectional data to explore the underlying relationships. Moreover, some potential presence of confounding factors may create biases that can be considered in future research.

## Conclusion

Our findings provide strong support for the structural validity, internal consistency, good concurrent and predictive validity of the SURPS. The scale can be applied to risk assessment of individual characteristic factors related to substance use in China. Such personality-matched approaches have already shown promise as early interventions in reducing substance use behavior and problems among university students. The results of this study demonstrate that AS, SS, and IMP are more helpful in detecting higher intentions of smoking. This result suggests that SURPS may be a useful screening tool to identify and provide personality-specific interventions to guide and reduce the risk of developing smoking intention and ultimately decrease the rate of smoking initiation. Therefore, in future studies, the sample size could be enlarged to improve the representativeness of the samples. It may also be beneficial to expand the study to universities in different regions to explore the applicability of the scale in China.

## Declarations

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