The Substance Use Risk Profile Scale: Comparison of Norms and Outcomes for Australian and Korean Adults

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Abstract The Substance Use Risk Profile Scale (SURPS) has been constructed in order to predict substance abuse before it occurs; hence most studies using the SURPS have focussed on adolescents. We examined the SURPS in a Korean and an Australian adult population from each respective country, using a population sampling technique that accurately represented each country. The SURPS was presented as part of an internet survey on alcohol consumption patterns ($N=669$), in English and Korean versions. The Korean version was constructed by translating the English version using an accredited technique. We replicated the four-factor structure of the SURPS. Australians scored lower than Koreans on all four sub-scales based on the factors. Australians also scored lower on the total SURPS, and there was a nationality by gender interaction. The total SURPS, but not the subscales, predicted weekly alcohol consumption regardless of nationality. Our results suggest that we have successfully translated the SURPS into Korean, a country that is receiving increasing attention for health research. The relatively high SURPS scores for the Korean sample, along with the increasing popularity of alcohol consumption in that country raises important concerns for social policy developers. The sampling technique utilised also allows the data to be used for normative purposes for future Australian and Korean research. We further suggest that the predictive value of the SURPS applies across a wider group than 'Western' adolescents.

Keywords Substance Use Risk Profile Scale (SURPS) · Australian norms · Korean norms · Translation · Adults

The Substance Use Risk Profile Scale (SURPS) is a relatively new instrument that is based on findings that personality dimensions of hopefulness, anxiety sensitivity, impulsiveness, and sensation-seeking predict substance use and misuse (Conrod et al. 2000; Woicik et al. 2009). Although the SURPS was developed from initial research on adult substance users (Conrod et al. 2000, p. 237), the first published paper on validation of the SURPS used results from adolescents and young adults (Woicik et al. 2009, p. 1043). A subsequent validation study, also on adolescents, further supported the structure and validity of the SURPS, (Krank et al. 2011). In this paper we seek to extend the use of the SURPS into adult populations, using two

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nationalities, Australian and Korean, for whom SURPS data has not been yet reported. The Korean data is an important contribution because it includes translation of the SURPS.

The SURPS combines the above constructs (hopelessness (H), anxiety sensitivity (AS), impulsiveness (IMP), and sensation-seeking (SS)) within a single instrument. The SURPS measures these four independent constructs (Woicik et al. 2009), unlike other scales which show shared variance across the constructs (Krank et al. 2011, p. 38). The SURPS has been designed to predict vulnerability to substance use, more so than broader measures of the same or similar constructs. Although it is not a specific diagnostic tool, applying SURPS to a wider age range may help improve the extent of initial screening and prediction of people at risk for abuse of various substances. In this paper, we focus on alcohol consumption levels.

Adolescents and young adults form an important group because this age range reflects the period during which many young people develop drinking patterns which may continue into adulthood including patterns leading to substance abuse (e.g. Chassin et al. 2004; Park and Kim 2008; Ronel and Levy-Cahana 2011). Adulthood is also an important period, as it is when some individuals commence drinking or alter drinking behaviours by increasing or decreasing consumption. Accordingly, the SURPS may be a useful instrument to use in middle to later adulthood, but this age cohort has been largely bypassed in studies using non-clinical samples.

Knowledge based on adolescents cannot be readily generalised to adults, given the relevant constructs underlying the SURPS show different relationships to consumption at different ages. The following are based on the broader measures of those constructs, rather than the SURPS itself. For example, Anxiety Sensitivity shows variable relationships with consumption levels and with problem drinking according to whether adolescent or adult participants are studied. Anxiety Sensitivity has been associated with problem drinking in young adolescents, but not frequency or quantity of consumption (Woicik et al. 2009, p. 1049), whereas in adults it has been associated with frequency of alcohol (and other drug) consumption (DeHaas et al. 2001). As another example, Impulsivity tends to decrease from adolescence into adulthood, but the relationship between impulsivity and alcohol use becomes more prominent in adulthood for those whose impulsivity remains high over time (Littlefield et al. 2010, p. 1414). Comparisons across such studies are somewhat limited by the different samples used, for example young high school students compared with adult clinical clients. Even so, the differences point to the value of considering a broad age range when measuring predictor variables for alcohol consumption and risk.

The SURPS constructs have been related to psychopathology, for example, Hopelessness is related to depression (Abramson et al. 1989) and Impulsiveness to antisocial tendencies (Luengo et al. 1994). Anxiety sensitivity can lead to high levels of drinking in order to reduce anxiety symptoms (Norton 2001) with effects on physiological, cognitive, and emotional pathways that can be associated with disorders that emerge in older adulthood (Mohlman and Zinbarg 2000). The potential for the SURPS constructs to be used to identify at risk groups, in areas other than substance abuse should not be underestimated, further highlighting the importance of establishing norms for the SURPS in various adult populations.

The SURPS was originally tested on North American populations and has since been used across wider groups, for example in Sri Lanka (Ismail et al. 2009), Hong Kong (Siu 2011) and Mi'kmaq First Nation Communities (Canada) (Mushquash et al. 2007), with results demonstrating support for the cross cultural relevance of this instrument in adolescent groups. Two countries with little information on the SURPS are Australia and The Republic of Korea. Australia has a relatively high per capita alcohol consumption level for adults, being ranked 29 out of 189 countries, and The Republic of Korea ranks even higher at 15 out of 189 countries (World Health Organisation 2008). A further confound is that Korea is seen as a nation of growing alcohol use (Sharpe et al. 2001) and potential alcohol dependence (see Chou et al.

2012). Studies examining consumption in Korea have used Korean translations of measures such as the alcohol use disorders identification test (AUDIT) and the state-trait anxiety scale (STAI; Sung et al. 2011). We sought to extend this work, to examine the responses and outcomes on the SURPS across adults from Korea and Australia, with respect their relationship to measures of alcohol consumption. In this way we will provide normative data for these two populations on the SURPS which is now becoming established in several countries.

Aims of Study

The first aim of the present study was to examine the factor structure and subscale characteristics of the SURPS in an Australian population. The second aim was to translate the SURPS into Korean and examine the factor structure and subscale characteristics in a Korean adult population. A third aim was to compare scores on the SURPS across the Korean and Australian participants. Based on results from other countries, we hypothesised the factor structure of the SURPS for both nationalities would resemble that reported in the literature. In this way we implicitly hypothesised that our translated Korean version would retain the original properties of the SURPS. A final hypothesis was that the SURPS will show a relationship to alcohol consumption in both our samples, albeit not necessarily at clinical levels of risk.

Method

Participants and Procedure

Participants were contacted via a volunteer database in each country by a professional research company in late 2012 using a national Internet survey method. A representative sample of each population was sought through the use of quotas across primary demographics of age, gender, income, and state and postcode. The resulting population sample therefore approximated the known population distribution in these demographic variables. All respondents needed to be at least 18 years of age in order to participate. There were no other inclusion criteria. The survey took between 20 and 25 min to complete.

The order of presentation for each questionnaire block was the same for all participants: demographic questions, consumption questions, and lastly the SURPS. Demographic questions had categorical response measures, with categories consistent with that used by the Australian Bureau of Statistics and reported elsewhere (e.g. Saliba and Moran 2010), except for age which was asked via the question "year in which you were born". This study was approved by the Charles Sturt University Ethics in Human Research Committee and conforms to the provisions of the Declaration of Helsinki.

Materials

The SURPS used in this study was the 23 item questionnaire, originally written in English, with responses ranging from 1 to 4 for each item, with 1 being strongly agree and 4 being strongly disagree with the statement in each item (Woicik et al. 2009, pp. 1044–1045). Items are based on four constructs: Hopelessness, Anxiety Sensitivity, Impulsiveness, and Sensation Seeking. Alcohol consumption was measured by asking participants to indicate both the proportion of consumption of various alcoholic beverages and the level of weekly consumption expressed as standard drinks. We use the level of weekly consumption in this paper.

All items in the on-line survey, which included the SURPS items, were translated from English into Korean by one of the present authors (YY). The translated material was then reviewed by a *Korean National Accreditation Authority for Translators and Interpreters in Australia* Accredited Translator (NAATI No: 15209) to ensure that the questions had been translated accurately. Five focus groups made up of participants from the *Korean Essay Literature Association* in Sydney completed the questionnaire to ensure that the Korean sample would fully understand the translated items.

Results

The final sample was made up of 699 participants, of whom 342 were from Korea and 327 from Australia. The mean age of the sample was 40.36 years (SD=13.49), with the Korean mean age significantly lower than the Australian mean age (37.38 vs. 43.28, p<0.001). Gender was not differently distributed across nationality (Chi Sq 1.39; p<0.24).

The analysis on the SURPS occurred in three stages. First, we examined the extent to which our data replicated the four factor structure of the original SURPS, first for the total sample, and then for the two nationalities separately. Second, we examined reliability and independence measures of the SURPS items, including those for our translated version. Third, we examined the relationship of SURPS outcomes to alcohol consumption.

Factor Structure of the SURPS

As a starting point in the Factor Analyses, an initial extraction was performed with Eigen values set at > 1, which resulted in five factors rather than the expected four. Four of the factors resembled the predicted structure based on the four constructs H,AS, IMP and SS, but the Impulsivity item '*I feel I have to be manipulative to get what I want*' (IMP item 22) loaded on a separate fifth factor (see also Krank et al. 2011). When four factors were 'forced' in the second factor analysis (Eigen values>=1.28), this item loaded on the Sensation Seeking factor. All other items replicated the expected factor structure as reported in the literature. This second four-factor structure of the SURPS was also replicated in separate analyses of the Korean and Australian data, again with the main exception of IMP item 22. Table 1 presents summary information on the four factors.

For the purposes of our study, we consider that we have replicated the four factor pattern of the SURPS. We also consider that there is sufficient consistency of the factor pattern across the total group and separate national groups. The similarity of the structure of our factors and those in the literature provide support for the subsequent use of four composite scores, calculated by adding the raw score of the items which loaded each factor. Accordingly, we used this approach to calculating composite scores which were labelled H, AS, IMP, and SS. Because we used the composite scores rather than the factor scores, we looked to see if the results would be different using factor scores, but there was an identical pattern of statistical outcomes. This last finding adds support for the use of simple composite scores with the SURPS.

Reliability

We measured reliability of the scores across items for the total SURPS and for the items contributing to the four constructs (H, AS, IMP, and SS). Cronbachs Alpha for the total SURPS was 0.72, and for the four subscales ranged from 0.67 to 0.77 which is similar to the reliability figures reported in the literature. Hotelling's T^2 was significant on all subscales.

Table 1 The substance use risk profile scale

Item number	Item content	Factor from Woicik et al. 2009	Factor from combined Korean and Australian samples (see Note 2 below)
1	I am content.	H	H
2	I often don't think things through before I speak.	IMP	IMP
3	I would like to skydive.	SS	SS
4	I am happy	H	H
5	I often involve myself in situations that I later regret being involved in.	IMP	IMP
6	I enjoy new and exciting experiences even if they are unconventional.	SS	SS
7	I have faith that my future holds great promise.	H	H
8	It's frightening to feel dizzy or faint.	AS	AS
9	I like doing things that frighten me a little.	SS	SS*
10	It frightens me when I feel my heart beat change.	AS	AS
11	I usually act without stopping to think.	IMP	IMP
12	I would like to learn how to drive a motorcycle.	SS	SS
13	I feel proud of my accomplishments	H	H
14	I get scared when I'm too nervous.	AS	AS
15	Generally, I am an impulsive person.	IMP	IMP
16	I am interested in experience for its own sake even if it is illegal.	SS	SS
17	I feel that I'm a failure.	H	H
18	I get scared when I experience unusual body sensations	AS	AS
19	I would enjoy hiking long distances in wild and uninhabited territory	SS	SS
20	I feel pleasant.	H	H
21	It scares me when I'm unable to focus on a task.	AS	AS
22	I feel I have to be manipulative to get what I want.	IMP	SS**, #
23	I am very enthusiastic about my future.	H	H

Note 1. Items from the 23-item SURPS *H* Hopelessness, *AS* Anxiety Sensitivity, *IMP* Impulsiveness, *SS* Sensation Seeking

H=Items 1, 4, 7, 13, 17, 20, 23; AS=Items 8, 10, 14, 18, 21; IMP=Items 2, 5, 11, 15, 22; SS=Items 3, 6, 9 12, 16, 19; Items 1,4,7,13,20 and 23 require scores to be inverted. (Reference: Woicik et al. 2009, p1045)

Note 2. Based on the present Korean/Australian sample. The combined groups analysis similar to separate factor analysis for Korean and Australian samples except for items 9 and 22, see below:

*Korean sample originally loaded items 9 and 22 on a separate 5th factor

**Australian sample originally loaded item 22 on a separate 5th factor

#In the four factor model, Item 22, a proposed IMP item, also behaved 'differently' in our combined group by loading on both the SS factor and to a lesser extent on the IMP item. This item has also been considered a problem item in other studies

Reliability was then calculated for the Korean and Australian data separately, with similar results. Table 2 presents the full reliability data. These results indicate that the items made an independent contribution to the overall constructs and to the total scale, and that the items were also internally consistent with constructs. The results further indicate that the above outcomes were not dependent on nationality.

Table 2 Reliability data SURPS subscale and total

Scale	Korean sample		Australian sample		Total sample	
	Cronbach's alpha	Hotelling's T^2	Cronbach's alpha	Hotelling's T^2	Cronbach's alpha	Hotelling's T^2
AS	0.712	0.001	0.754	0.001	0.772	0.001
Imp	0.660	0.013	0.718	0.001	0.693	0.001
SS	0.717	0.001	0.751	0.001	0.732	0.001
H-less	0.816	0.001	0.826	0.001	0.670	0.001
Total SURPS	0.767	0.001	0.689	0.001	0.724	0.001

SURPS and Gender

Table 3 presents the SURPS means and standard errors, across nationality and gender subgroups. Australians scored significantly lower than Koreans on the total SURPS and on all four SURPS subscales, i.e., H, AS, IMP, and SS. Main effects for gender were found on the total SURPS scale, and also on anxiety sensitivity (females higher) and sensation seeking subscales (males higher) which is in line with other studies on the SURPS and with the original personality scales which informed construction of the SURPS (Reiss et al. 1986; Woicik et al. 2009, p. 1044; Zuckerman and Kuhlman 2000). There was a nationality-by-gender interaction on the total scale and on the sensation seeking subscale, with Australians showing a greater gender difference (males highest and females the lowest means).

Because of the age difference in the samples, we ran another analysis to see whether the national differences were in fact explained by the difference in mean age of the samples, but that was not the case. Given they do not add further information; we do not discuss these additional analyses further.

SURPS and Consumption Levels

The next step was to examine the relationship between SURPS and alcohol consumption, using regression analyses. The alcohol consumption scores were highly skewed and accordingly we converted the scores using a log transformation. Our first set of regression analyses commenced with the total SURPS scores entered as one of the independent variable and was followed by a

Table 3 ANOVA tests on four SURPS variables, with estimated marginal means (and standard errors in parentheses)

	Korean		Australian		ANOVA		
	Males	Females	Males	Females	Main effect nationality	Main effect gender	Interaction gender × country
Anxiety sensitivity	11.14 (0.25)	12.13 (0.27)	10.61 (0.26)	11.35 (0.26)	0.012	0.001	n.s.
Impulsiveness	10.56 (0.22)	10.48 (0.24)	9.67 (0.24)	8.84 (0.24)	0.001	n.s.	n.s.
Sensation seeking	14.41 (0.30)	13.58 (0.33)	14.54 (0.32)	11.90 (0.32)	0.015	0.001	0.005
Hopelessness	14.72 (0.31)	14.51 (0.34)	12.69 (0.33)	11.89 (0.33)	0.001	n.s.	n.s.
Total SURPS	50.83 (0.60)	50.70 (0.68)	47.49 (0.75)	43.96 (0.67)	0.001	0.006	0.010

second analysis using the SURPS subscales. We controlled for gender in the analyses. Because the literature shows consumption is related to age, we also included age in the regressions. Log alcohol consumption was the dependent, or outcome, variable in these analyses.

In the hierarchical regression analysis, gender (being male) and the *Total* SURPS independently predicted alcohol consumption (see Table 4). Nationality did not predict consumption. We ran a second hierarchical regression analysis using the SURPS *subscales, none of which* predicted alcohol consumption with the other variables (nationality, gender and age) in the analysis. In summary, the total SURPS was a better predictor of consumption than any of its subscales for this data, albeit adding only a small proportion of variance to the overall prediction of consumption after gender.

Discussion

The above research provides further support for the four factor structure of the SURPS, including across both nationalities discussed here, regardless of the language it was presented in. In addition we present the first use of the SURPS in an Australian population (that we are aware of at the time of writing). Our results also indicated the factor structure holds with an older set of participants thereby extending its possible application to an older group. The present results with different nationalities and older age group thus extend support for using the SURPS in age groups other than those typically reported in the literature.

The translated Korean version of the scale demonstrated a similar relationship to consumption as the Australian (original English) version, adding weight to our claim that we have successfully translated the SURPS into Korean. Although our results demonstrated that the SURPS factor structure is similar across nationalities, the SURPS was nevertheless sensitive to national differences in terms of overall levels and patterns on SURPS scores. Korean respondents consistently scored higher than Australians. Within the latter group, there were also differences across gender. Sharpe et al. (2001) have reported Korean males are more likely to consume alcohol than Korean females, which we also noted in our Korean sample, but this difference was not paralleled by differences in the Korean males and females SURPS scores in our data.

	Predictor	R^2_{change}	B	β
Table 4 Hierarchical regression on alcohol consumption using *total* SURPS score	Step 1	0.073***		
	Control variables[a]			
	Step 2	0.001		
	Age		0.001	0.03
	Gender		−0.225***	−0.26
	Country		−0.006	−0.03
	Step 3	0.007*		
	Age		0.001	0.05
	Gender		−0.215***	−0.25
	Country		−0.002	−0.01
	Total SURPS		0.004*	0.09
*p<0.05. ***p<0.001	Total R^2	0.080*		
[a]Control variables include age and gender	n	643		

Replication of the factor structure across older adults and nationalities does not on its own indicate the clinical predictive value of the SURPS. We did not select our samples on the basis of clinical evidence, and we did not collect information on variables such as drug use (other than alcohol) and clinical drug dependence or abuse. Siu (2011) reported replication of the 4-factor structure of the SURPS with a group of Hong Kong adolescents, but was unable to relate those measures to any levels of consumption or abuse, including that for alcohol. She concluded that the SURPS was not sensitive to differences in her sample, which were not only Chinese, but also a young sample of high-school students. However, she did not report the total SURPS score, which is the variable we found most sensitive to differences in consumption. Brunelle et al. (2004) reported the IMP subscale was related to substance abuse in high-use groups made up of adolescents and young adults, and that those who demonstrated high heart rates in response to alcohol intoxication were more likely to score higher on IMP and other substance abuse scales. The heart rate effect, however, only approached significance. Their results suggest biological factors as well as social factors may influence the predictive ability of questionnaires assessing overuse. In contrast, Malmberg et al. (2010) reported IMP was not related to alcohol (or other drug) consumption in adolescents, but sensation seeking and hopelessness were. Conrod et al. (2008) also noted the relationship of SS to alcohol overuse in young adolescents.

Stewart and colleagues found the three variables, H, Imp and SS related to consumption in young adolescents, but AS was not related to drinking levels, but was associated with difficulty stopping once started (Stewart et al. 2011). The authors noted that AS was associated with drinking to reduce negative affect, indicating the importance of considering the relationship of personality to motives for drinking. The personality constructs that informed the construction of the SURPS have been differentially related to reinforcement patterns and motives for drinking, for example hopelessness and anxiety sensitivity have been related to drinking to reduce negative affect in a clinical group (age not specified) (Schlauch 2010). We have suggested elsewhere that the relationship between consumption level and motives for drinking may differ for older adults compared with young adults (Moran and Saliba 2012). We are not, at this stage, able to explain why only the *total* SURPS was related to consumption in the present analyses with adults, other than to speculate that the SURPS subscales may be more sensitive to differences within younger samples. Future reporting on the *total* SURPS, as well as the subscales, in other studies would also help understanding differences related to age.

The current study has successfully translated the SURPS into Korean, allowing researchers to use the scale in further related research; moreover, the SURPS can now be used by clinicians in Korea and other countries where clients require a Korean version of the scale.

Limitations of the Study

Importantly, our study did not have a direct measure of problem drinking, but looked at average level of alcohol consumed. Although level of consumption correlates with substance abuse, it is not a direct or foolproof measure as it does not include other problem behaviours associated with excessive consumption. It is possible the behaviour of the SURPS may change with extreme levels of consumption at clinical levels. For this reason, our conclusions remain limited to non-clinical populations.

Conclusion

The present results on Australian and Korean adults supports the use of the SURPS scale beyond adolescent and young adult groups. We have successfully translated the SURPS into

Korean while retaining its useful descriptive and predictive characteristics. Despite some national differences in level of scores, the relationship of the (total) SURPS and alcohol consumption was noted in both Australian and Korean samples. Korea is a country that is receiving increasing attention in research into wellbeing, and thus the availability of the Korean SURPS adds to the research tools available for that nation and for those interested in cross cultural comparisons. The comparability of the factor structure across the two nationalities further supports cross-cultural comparison using this tool. The high SURPS scores reported for Korean participants (relative to the Australian sample) is relevant to social policy developers in the context of the increasing popularity of alcohol consumption in Korea.

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