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Personality and substance use in Japanese adolescents: The Japanese version of Substance Use Risk Profile Scale

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ABSTRACT

Substance Use Risk Profile Scale (SURPS; Conrod & Woicik, 2002) measures four risk personality dimensions related to substance use; anxiety sensitivity (AS), hopelessness (H), sensation seeking (SS), impulsivity (IMP). The aim of this study is to develop the Japanese version of Substance Use Risk Profile Scale (SURPS-J) and to probe the reliability and validity of this scale to the Japanese context. This study consists of the test of the factor analysis (Study 1; $N = 462$), the reliability (Study 2; $N = 64$), and the validity (Study 3; $N = 182$). Our findings are as below; Study 1 showed the conformed factorial structure of SURPS-J and Study 2 revealed the good test–retest reliability. Additionally, Study 3 demonstrated the adequate validity of SURPS-J and its sensitivity in identifying risky drinking motivations and lifetime tobacco and alcohol use. Results showed that high H individuals are likely to experience smoking under the personal and collective situations, while high SS and IMP individuals are prone to drink alcohol under the collective situation. Additionally, high AS individuals are prone to drink by virtue of negative reinforcement motives and high SS and IMP drink by reason of all drinking reinforcement motives.

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1. Introduction

The prevention and treatment of substance use in young people involves not merely personal (e.g., developmental and medical problem) (De Bellis et al., 2000, 2005) but also social problems (e.g., legal problem or a factor of crime) (Farrington & Hawkins, 1991); the substance use has the possibility of leading to far-reaching consequence which requires multidimensional approaches. In Japan, several studies on Japanese junior – high and high school students have demonstrated that the participants had been exposed to substances such as tobacco, alcohol, organic solvents, marijuana, and amphetamines (Shimane & Wada, 2007; Suzuki et al., 1999; Wada, Kobori, Shimane, Tachimori, & Katsuno, 2011) and tobacco and alcohol use for youth are at high risk of other substance use (e.g., Suzuki et al., 1999). Additionally, young Japanese are more prone to becoming alcohol-dependent in a short period of time than adults (Ishii & Suzuki, 1994). Therefore, the prevention of substance use for youth is important, and the risks of substance use should be identified in earlier age.

Substance use is closely linked to personality (Comeau, Stewart, & Loba, 2001; Jaffee & D’Zurilla, 2009) and recent studies focused

on the relationship between substance use and personality dimensions (e.g., Woicik, Stewart, Pihl, & Conrod, 2009). Personality is the most promising dimension by which to understand individual differences on substance use and misuse (Woicik et al., 2009). Different personality traits such as introversion (e.g., anxiety sensitivity, hopelessness) and extraversion (e.g., sensation seeking, impulsivity) reveal different relationships with substance use. Individuals with high levels of anxiety sensitivity (AS) tend to experience fear in response to symptoms of physical arousal, such as elevated heartbeat and shortness of breath (Jaffee & D’Zurilla, 2009); they are at risk of using or abusing substances such as alcohol or benzodiazepines to cope with or escape from anxiety and anxiety-provoking situations (Conrod, Pihl, Stewart, & Dongier, 2000). Individuals with high trait hopelessness (H) expect that negative events will occur and are more likely to have depressive disorders or depend on analgesic drugs, such as opiates (Rounsaville et al., 1991). On the other hand, individuals inclined toward sensation seeking (SS) respond more to reward and drink to gain positive reinforcement (Comeau et al., 2001). Individuals with high impulsivity (IMP) are intolerant toward negative emotion and give rapid responses to reward cues (Zuckerman & Kuhlman, 2000) and has been linked to self-report motives for alcohol use that involve enhancement of positive affect (Comeau et al., 2001). Although impulsivity is similar to sensation seeking

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(Zuckerman & Kuhlman, 2000), it differs from 'sensation seeking and venturesomeness' (e.g., Eysenck & Eysenck, 1978) through its link with neuroticism (Jaffee & D'Zurilla, 2009).

The Substance Use Risk Profile Scale (SURPS) assesses these four personality dimensions of AS, H, SS, and IMP related to substance use, which was developed by Conrod and Woicik (2002). This scale has high cross-cultural validity, as demonstrated by studies conducted in England (Conrod & Woicik, 2002), Canada (Krank et al., 2011), the Netherlands (Malmberg et al., 2010), a French-speaking province in Canada (Castonguay-Jolin et al., 2013), Sri Lanka (Ismail, De Seneviratne, Newcombe, & Wanigaratne, 2009), and China (Siu, 2011). Additionally, the SURPS is a useful tool for screening individuals who are susceptible to drug reinforcement and substance use, and a number of studies using this measure have been conducted on a variety of samples, such as young people in child protective services (Stewart, McGonnell, Wekerle, Adlaf, & The MAP Longitudinal Study Research Team, 2011), adolescent samples (Mackie, Castellanos-Ryan, & Conrod, 2011), and imprisoned offenders (Brunelle, Douglas, Pihl, & Stewart, 2009; Hopley & Brunelle, 2012). In particular, a study for adolescents examined the role of social problem solving in the relationship between personality dimensions and substance use reported the rational problem solving significantly mediated the relationship between hopelessness personality and lifetime alcohol and marijuana use (Jaffee & D'Zurilla, 2009). Moreover, a number of studies reported the preventive educational approach focusing-on its personality were proven to be effective in preventing escalation in the frequency of drug use or preventing experimentation with new illicit substance use (e.g., Conrod, Castellanos, & Mackie, 2008; Conrod, Castellanos, & Strang, 2010; Conrod, Stewart, Comeau, & Maclean, 2006; Conrod et al., 2000; Watt, Stewart, Birch, & Bernier, 2006).

These previous studies have suggested that the SURPS has a viable potential in screening for at-risk personality dimensions with the goal of providing preventive intervention against substance use. Despite the usefulness and relevance of this scale, there is currently no Japanese version of the SURPS. The purpose of this study is to develop a Japanese version of the SURPS (SURPS-J; Study 1) and examine its reliability (Study 2) and construct validity (Study 3). Study 3 also focuses on the relationships between personality dimensions and substance use or risky drinking motives.

2. Study 1

2.1. Methods

2.1.1. Participants

Approval to conduct this study was obtained from the research ethics committee at Chiba University. In this study and all subsequent studies, all participants were given verbal and written assurance of confidentiality and anonymity of their responses.

A total of 486 Japanese adolescents who are undergraduates were recruited to participate in this study, but 6 students did not provide informed consent or gave largely incomplete responses and 18 students whose age range of 23–59 constituted less than 1% of this sample. Therefore, these data were excluded in the final analysis, and the final sample consisted of 122 males and 340 females with ages ranging from 18 to 22 years (mean = 19.51, *SD* = 1.13).

2.1.2. Scale translation

Permission to translate and validate the SURPS was obtained from Dr. Conrod, who developed the SURPS, through personal communication with a lecturer at the Center for Forensic Mental Health, Chiba University. The lecturer translated the original version (English) of the SURPS into Japanese, and then a professor of psychology independently back-translated it into English. Finally, Conrod and her colleagues compared the back-translated version

with the original English version in order to identify any conceptual discrepancies. There were no discrepancies.

2.2. Results

The distributions of all 23 items of SURPS-J were assessed through examination of standardized skewness and kurtosis. The skewness (–.41 to .80) and kurtosis (–1.48 to .02) of all 23 items were statistically warranted, because although there are no absolute criteria for skewness and kurtosis, values for skewness and kurtosis that do not exceed ± 2 are often used to suggest that the data are normally distributed (e.g., Kunnan, 2000).

Table 1 shows the means, standard deviations, Cronbach's alphas, and internal correlations of the four-factor subscales. A parallel analysis (i.e., considered an accurate method for determining the number of factors to retain (Horn, 1965)) and a scree plot (which visualizes the relative importance of the factors) suggested a four-factor model, which is very similar to the original SURPS. Thus, the four-factor model was adopted, and exploratory factor analysis (EFA) was performed. Although the factor loadings of item 5 and item 22 of IMP subscale (.234 for item 5 and .140 for item 22, respectively), and Cronbach's alpha values .584 of IMP subscale were inadequate, the 23 items and the four-factor model was adopted according to the original SURPS because the reliability and/or validity of 23 items and the four-factor model were supported in the previous studies (e.g., Malmberg et al., 2010). Subsequently, the confirmatory factor analysis (CFA) was proved the goodness-of-fit index, adjusted goodness-of-fit index, comparative fit index, root mean square residual, and root mean square error approximation values to be .880, .852, .770, .055 and .067, respectively, suggesting that our four factor-model had good fit.

3. Study 2: test-retest reliability of the SURPS-J

3.1. Purpose

The aim of Study 2 was to examine the test-retest reliability of the SURPS-J by calculating intra-class correlation coefficients (ICC, one way random) for each score of subscale at both times 1 and 2 (separated by a 2-week interval).

3.2. Methods

3.2.1. Participants and measure

Aside from Study 1, 105 Japanese adolescents were newly recruited from psychology class in another university. 13 students of them did not give informed consent and 25 students were provided substantially blank responses and thereby their data

Table 1
Means, standard deviations, Cronbach's alphas, and internal correlations.

	Study 1 N = 462 M/F = 122/340				Study 3 N = 182 M/F = 52/130			
	AS	H	SS	IMP	AS	H	SS	IMP
M	11.94	17.12	13.07	11.62	12.20	17.25	12.57	11.09
SD	3.03	3.57	3.66	2.50	2.71	3.70	3.20	2.17
α	.714	.731	.676	.584	.629	.693	.603	.523
<i>Internal correlations</i>								
AS	–				–			
H	.049	–			.106	–		
SS	–.073	.145**	–		–.001	–.161*	–	
IMP	–.001	.218**	.314**	–	.187*	.140	.077	–

Note. AS = anxiety sensitivity; H = hopelessness; SS = sensation seeking; IMP = impulsivity; SURPS-J = Japanese version of Substance Use Risk Profile Scale.

* $p < .05$.

** $p < .01$.

were excluded. Additionally, 3 students aged 22–27 constituted less than 2% of this sample and they were also not included in the final analysis. The final sample consisted of 64 Japanese undergraduates (40 males and 24 females) aged 18–21 years (mean = 19.41, $SD = .96$). Participants administered SURPS-J developed in Study 1.

3.3. Results

Table 2 shows the SURPS-J subscale means, standard deviations, and Cronbach's alphas at two different points of time. The ICC between the corresponding subscales at Time 1 and Time 2 were all significant ($p < .01$; Table 2). The range of Intraclass correlation coefficients were almost perfect for the AS and SS scales, substantial for IMP, and moderate for H (Landis & Koch, 1977).

4. Study 3: construct validity—drinking motives and the SURPS-J

Study 3 aimed to (1) examine the construct validity of the SURPS-J, (2) test its validity in respect of measuring personality vulnerability to reinforcement-specific substance use patterns. As for the second aim, we hope to show specific relationships between the subscales of SURPS-J and individual difference in the tobacco and alcohol use.

4.1. Methods

4.1.1. Participants

One-hundred and eighty-two Japanese adolescents who are undergraduates participated in this study. The sample consisted of 52 males and 130 females aged 18–23 years (mean = 19.99, $SD = 1.29$) after excluding 17 students who did not provide informed consent.

4.1.2. Measures

The four measures were used, which corresponds to the four subscales of the SURPS. The State-Trait Anxiety Inventory (STAI), which was translated into Japanese version (Shimizu & Imae, 1981; $\alpha = .85$) from the original English version (Spielberger, Gorsuch, & Lushene, 1970), measures trait anxiety. The Beck Hopelessness Scale (BHS) is a 20 items questionnaire (e.g., “I never get what I want, so it's foolish to want anything”) that measures the hopelessness and the internal consistency of it was .86 (Tanaka, Sakamoto, Ono, Fujihara, & Kitamura, 1996). The Behavioral Inhibition System and the Behavioral Activation System (BIS/BAS; Carver & White, 1994; translating Japanese by Takahashi et al., 2007) were also used. BIS is activated by cues of potential threat, punishment, or non-reward, and its function is “to suppress behavior that is expected to lead to punishment” (Corr, Pickering, & Gray, 1995). BIS (item sample; “I have very few fears compared to my friends.”) assesses an individual's response to anxiety-relevant cues in a given environment, and BIS activation is associated with anxiety (Gray, Feldon, Rawlins, Owen, & McNaughton, 1978), being described as anxiety (Takahashi et al., 2007). In contrast, BAS

controls sensitivity to potential reward; its purpose is to initiate behavior that brings the organism closer to biological reinforcers, such as food or sexual partners (Corr et al., 1995). BAS (item sample; “When I get something I want, I feel excited and energized.”) assesses an individual's disposition to pursue and achieve goals, and BAS activation associated with the anticipation of pleasure. Gray associated impulsivity with reward seeking behavior (Norman et al., 2008), and BAS was referred to as impulsivity (Takahashi et al., 2007). Cronbach's alphas of the Japanese version are .80 for BIS and .81 for BAS (Takahashi et al., 2007).

Motivation for alcohol use was measured by the Drinking Motives Questionnaire-Revised (DMQ-R; Cooper, 1994) to examine the concurrent validity. This measure assess 4 motives for drinking that are derived from two dimensions which are the source of motivation (internal vs. external) and valence of motivation (positive vs. negative reinforcement); Social motives (SOC; external, positive motives; 5 items; e.g., “to be sociable”), Enhancement motives (ENH; internal, positive motives; 5 items; e.g., “to get high”), coping motives (COP; internal, negative reinforcement; 5 items; e.g., “to cheer up when you are in a bad mood”), and Conformity motives (CON; external, negative reinforcement; 5 items; e.g., “to be liked”). Literature supported the relationship between drinking motives and personality dimensions; Enhancement motives are associated with SS (Comeau et al., 2001) and IMP (Cooper, Agocha, & Sheldon, 2000). Coping motives appear to be associated with high level of AS (Comeau et al., 2001), while students with low anxiety sensitivity drink primarily for social or enhancement motives (Comeau et al., 2001), and this motives were also related to depression (Stewart & Devine, 2000), SS and IMP (Woicik et al., 2009). Social and conformity motives whose source is external were weakly associated with SS and IMP (Cooper, 1994; Woicik et al., 2009) because they are more context-dependent and less stable over time (Cooper, 1994).

Moreover, the lifetime alcohol and tobacco use, which is under two different situations such as personal and collective, were measured in the way that participants chose answers, ranging from “not use in their life” to “almost every day use”.

4.1.3. Hypothesis

Our hypothesis about the relationship between SURPS-J and the existing scale were as below: (1) AS would be positively correlated with STAI and BIS while it would be negatively correlated with BAS; (2) H would have the positive relationships with BHS and BIS, and the negative relationship with BAS; (3) SS would be positively with BAS and negatively correlated with BIS and have no relationship with STAI; and (4) IMP would be positively STAI and BIS and BAS. Particularly, the difference between SS and IMP accounts for the following reason: whereas IMP is associated with neuroticism and aggressiveness (Zuckerman & Kuhlman, 2000), SS is not (Jaffee & D'Zurilla, 2009).

The hypothesis of relationships between personality dimensions and self-reported motivational determinants of alcohol use were as below: (5) AS would be positively associated with COP and CON

Table 2
Test–retest reliabilities of SURPS-J subscales.

SURPS-J subscales	Time 1			Time 2			ICC _{T1T2}	F
	Mean	SD	α	Mean	SD	α		
Study 2 (N = 64; M/F = 40/24)								
AS	11.39	2.82	.676	11.31	.478	.813	.845	6.45***
H	16.75	3.32	.789	16.70	.307	.614	.600	2.50***
SS	13.02	3.33	.682	13.67	2.878	.706	.842	6.34***
IMP	12.11	2.10	.561	12.55	.000	.551	.667	2.94***

Note. AS = anxiety sensitivity; H = hopelessness; SS = sensation seeking; IMP = impulsivity; SURPS-J = Japanese version of Substance Use Risk Profile Scale. ICC = intraclass correlations.

*** $p < .001$.

motives; (6) H also would be related to COP and CON motives; (7) SS would have the relationship with all four drinking motives; and (8) IMP would have the correlations with all four motives.

4.2. Results

The means, standard deviations, Cronbach’s alphas, and internal correlations of the SURPS-J are shown in Table 1.

As for the concurrent validities of the SURPS-J, AS had significant positive relationships with the STAI, BIS, and BAS. H had significant positive relationships with the STAI, BHS, and BIS, and a significant and negative relationship with the BAS. In contrast, SS had a significant positive correlation with the BAS and a significant negative correlation with the BIS. IMP had a significant positive correlation with the STAI, BIS and BAS (Table 3).

Table 4 shows the relationship between the SURPS-J and drinking motives, AS had significant positive relationship to COP and CON motives, while H had no relationship with all subscale of DMQ-R. On the other hand, SS had the significant relationships with all four drinking motivation of DMQ-R, and IMP was significantly associated with the three subscale of DMQ-R, except for SOC motives.

The relationship between the lifetime tobacco and alcohol use and the four personality dimensions were investigated. Individuals who had the experience of smoking in single situation were 15% while those who did in group situation were 23%, and Individuals who had the experience of consuming alcohol in single situation were 61% while those who did in group situation were 87%. As for the relationships between personality dimensions with lifetime these substance uses, H was significantly related to lifetime use tobacco use in single and group situation. SS also was significantly associated with lifetime tobacco and alcohol use group situation (see Table 4).

5. Discussion

The purpose of the present study were to develop the SURPS-J (Study 1), to examine its reliability (Study 2), and reveal its validity and its correlations with drinking motives (Study 3).

Table 3
SURPS-J subscales and existing personality inventories.

	STAI	BHS	BIS	BAS
AS	.363**	.124	.460**	.215**
H	.679**	.773**	.421**	-.319**
SS	-.081	-.083	-.161*	.310**
IMP	.242**	.133	.256**	.229**

Note. AS = anxiety sensitivity; H = hopelessness; SS = sensation seeking; IMP = impulsivity; SURPS-J = Japanese version of Substance Use Risk Profile Scale; STAI = State-Trait Anxiety Inventory; BHS = Beck Hopelessness Scale; BIS = Behavior Inhibition System; BAS = Behavior Activation System.

* p < .05.
** p < .01.

Table 4
Correlation between SURPS-J and lifetime prevalence and DMQ-R.

	Lifetime alcohol		Lifetime tobacco		DMQ-R				
	Single use	Group use	Single use	Group use	SOC	COP	ENH	CON	Total
AS	.090	.055	.038	.044	.102	.178*	.112	.153*	.161*
H	.095	-.036	.218**	.160*	-.139	.133	-.144	-.103	-.091
SS	.101	.234**	.075	.167**	.151*	.310**	.252**	.173*	.276**
IMP	.090	.117	.067	.086	.130	.192**	.194**	.171*	.212**

Note. AS = anxiety sensitivity; H = hopelessness; SS = sensation seeking; IMP = impulsivity; SURPS-J = Japanese version of Substance Use Risk Profile Scale; DMQ-R = Drinking Motives Questionnaire-Revised; SOC = social; COP = coping; ENH = enhancement; CON = conformity.

* p < .05.
** p < .01.

Study 1 showed that the SURPS-J had the same four factors as the original version and that although factor loadings of items 5 and 22 were unsatisfactory for the IMP subscale, this four factor model was applied. This applicability is because the internal consistencies of the SURPS-J were generally concordant with those obtained in previous studies (e.g., Malmberg et al., 2010). Additionally, other preceding studies (Castonguay-Jolin et al., 2013; Krank et al., 2011) also reported item 22 would be problematic. Furthermore, Study 2 demonstrated that the generally adequate test-retest reliabilities (Table 2).

As for the concurrent validity in Study 3, the relationship between AS and BAS, the relationship between H and STAI and the higher relationship STAI and H than AS were unexpected. The former result suggests that anxious Japanese adolescents may actively engage in distracting activities in order to counter and/or relieve their anxiety, although the correlation was low. The latter unexpected relationship and higher relationships was affected by the similarity of contents of question items, such as items of H (e.g., “I am content.” and “I am proud of my accomplishments.”) and those of STAI (e.g., “I feel satisfied with myself.” and “I am content.”) that measure one’s feeling and/or emotional reaction.

As for the relationships between personality dimensions and lifetime substance uses, high H adolescents are prone to smoke in both single and group situations because Japanese adolescents do not generally drink in the daytime, and smoking instead of drinking may be shortcut method to relive their feeling. On the other hand, high SS adolescents are likely to drink or smoke in group situation, and this reason may be arose from peer pressure or special kind of enthusiasm such as the moment that there is safety in numbers.

Analyses on motives suggest that there may be reinforcement-specific relationships between each personality dimension and self-reported motivational determinants of drug use. AS adolescents are likely to drink under the influence of negative reinforcement motives (Comeau et al., 2001; Woicik et al., 2009) from both internal and external sources. As a result, they would be prone to drink for the purpose of relieving their anxiety, in the hope of being liked or for fear of being isolated. On the other hand, the absence of a significant relationship between H and any drinking motives suggested that high H adolescents are unlikely to think that alcohol is cheering to them when they feel depressed or nervous. This may be because they think that drinking in order to cope with negative emotion is only stopgap measure and does not lead underlying solutions, or that they may have a hung-over after drinking and getting high. In contrast, high SS adolescents drink under the influence of both positive and negative reinforcement motives by both internal and external sources, thus suggesting that they has non-specific pattern of motives for alcohol use and drink with all any motives. High IMP individuals also drink under the influence of only positive motives by internal source and negative reinforcement motives by both internal and external sources. This unexpected non-relationship between IMP and SOC (positive motives

and external source) suggests that high IMP adolescents may be prone to drink focusing on only one's interest without thinking that they boost the party mood or behave sociably.

This current study has some limitations that should be acknowledged. Firstly, our findings should be carefully looked at when generalizing and applying these results to other populations. The present studies was conducted for only Japanese adolescents, and thus further studies are necessary for other samples, such as truly alcohol disorders and drug offenders, or junior high school and high school students in order to widen the scope of interventions. Second, because our findings only showed that the relationship between personality dimensions and substance uses, further studies should be conducted in order to examine the dynamics leading to the use of these substances, such as peer pressure and problem solving skills (e.g., Jaffee & D'Zurilla, 2009).

Despite these limitation, this studies provide strong support for adequate reliability and validity of the SURPS-J and the potentially sensitivity to specific motivations for substance use in adolescents. Additionally, Japanese adolescents' characteristics were revealed: High H individuals are likely to experience smoking under the personal and collective situations, while high SS and IMP individuals are prone to drink alcohol under the collective situation. Moreover, high AS individuals are prone to drink by virtue of negative reinforcement motives and high SS and IMP drink by reason of all drinking reinforcement motives. Therefore, high H adolescents about tobacco use and high AS, SS and IMP about alcohol use should be focused and careful when interventions are conducted. Further work is required for elaborating the SURPS-J in order to apply to the Japanese context.

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