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# Psychometric Qualities of the Dutch Version of the Substance Use Risk Profile Scale Adapted for Individuals with Mild Intellectual Disabilities and Borderline Intellectual Functioning

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## ABSTRACT

**Introduction:** Personality traits may predict the use of substances in individuals with mild intellectual disabilities (MID) or borderline intellectual functioning (BIF). The Dutch version of the Substance Use Risk Profile Scale (SURPS), adapted for this population, was tested on its psychometric properties.

**Method:** Individuals with MID or BIF (IQ 50–85;  $N = 91$ ) were recruited via disability care facilities or addiction treatment centers in the Netherlands. Reliability and validity was assessed with confirmatory factor analyses, internal consistency, and correlational analyses.

**Results:** The original four-factor structure of the SURPS was supported. Criterion validity was partially supported by associations between substance use and three subscales, and moderation analyses confirmed that these findings are independent of IQ status (MID vs. BIF).

**Conclusion:** The Dutch version of the SURPS adapted for individuals with MID-BIF has adequate psychometric properties, and seems suitable for research both within samples of individuals with MID and individuals with BIF.

## KEYWORDS

Personality traits; substance use; mild intellectual disabilities; borderline intellectual functioning; psychometric qualities

## INTRODUCTION

Consuming alcohol and smoking tobacco provides a major health threat worldwide (WHO, 2014). Although reliable estimates of the prevalence of the use of these and other substances among people with mild intellectual disabilities or borderline intellectual functioning (MID-BIF; IQ 50–85) are generally lacking, available evidence suggests that both uptake and continued use of substances among individuals with MID-BIF is common and similar to

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people with average intelligence (VanDerNagel et al., 2011a, 2017; Emerson et al., 2016; Kiewik et al., 2016; Lin et al., 2016; Pacoricona Alfaro et al., 2017; Reis et al., 2017). Yet, research on interventions aimed at reducing substance abuse in individuals with intellectual disabilities is scarce (Kiewik et al., 2017; Van Duijvenbode et al., 2015). Similarly, evidence on causal mechanisms of substance (ab)use in this group is largely lacking, which impedes the development of targeted interventions (Van Duijvenbode et al., 2015).

Personality traits as determinants of substance use and abuse provide a promising avenue for research among individuals with MID or BIF. Many studies among individuals with average intelligence have demonstrated the role of personality traits in substance use (Sher et al., 2000), as well as the initiation of substance use in young people (Comeau et al., 2001; Gunnarsson et al., 2008; Sher et al., 2000). One of the most frequently used questionnaires for this purpose is the Substance Use Risk Profile Scale (SURPS) developed by Conrod et al. (2000). The SURPS contains four distinct personality traits, two of which represent a susceptibility to pleasant, positively reinforcing effects of substance use. Sensation Seeking (SS) reflects the desire for high arousal, intense and novel experiences, and proneness toward risky behaviors. Impulsivity (IMP) relates to impeded behavioral inhibition, difficulty in resisting tempting situations, and acting thoughtlessly. The other two traits reflect sensitivity for negative reinforcement, and a motivation to avoid undesired and unpleasant experiences. Anxiety Sensitivity (AS) involves a fear of anxiety-related bodily sensations (Conrod et al., 2000; Woicik et al., 2009). Negative Thinking (NT) refers to proneness to depression and to negative thoughts and affect. Both pathways to the initiation and sustenance of substance abuse are supported by a large body of empirical evidence and theory (Van Lier et al., 2017).

The SURPS has been shown to predict the use of several substances (e.g., alcohol, tobacco, and cannabis) in individuals with average intelligence. With respect to alcohol use, the SURPS is associated with a variety of alcohol use estimates among adolescents and young adults (Castellanos-Ryan et al., 2013; Janssen et al., 2014; Jurk et al., 2015; Krank et al., 2011; Loxton et al., 2015; Mackinnon et al., 2014; Malmberg et al., 2012; Mushquash et al., 2014; Omiya et al., 2015; Peeters et al., 2014; Woicik et al., 2009). Similar associations with tobacco use have been found (Comeau et al., 2001; Malmberg et al., 2010; Memetovic et al., 2014).

For clinical purposes, the SURPS is promising as it allows designing personality targeted interventions, which have been shown to be effective in the reduction of substance use and abuse in young individuals with average intelligence (Conrod et al., 2010, 2013; Lammers et al., 2015), and which might also be appropriate for people with MID-BIF (Schijven et al., 2015). The factorial structure, reliability, and construct validity of the SURPS has been established in individuals with average intelligence in several countries

(Canfield et al., 2015; Krank et al., 2011; Omiya et al., 2015; Robles-García et al., 2014; Siu, 2011; Woicik et al., 2009) including an adolescent sample in the Netherlands (Malmberg et al., 2012, 2010). The Dutch version of the SURPS has been adapted for MID-BIF individuals and validated for the first time by Poelen et al. (2017). Their study included 118 persons admitted to care facilities for persons with MID-BIF and behavioral problems, aged between 14 and 37 years (mean age 20.5) with a mean IQ of 71. After removing 3 of the 23 original SURPS items the hypothesized four-factor model demonstrated good fit with adequate to good internal consistency of the subscales. Alcohol use was positively correlated with SS, NT, and IMP, and negatively correlated with AS. Poelen et al. (2017) also tested whether level of IQ (IQ 50–85) moderated the relationship between the personality dimensions and severity of alcohol use. This revealed no significant moderations, indicating that associations were similar for individuals with MID and BIF. Tobacco use was not included in this study.

Primary aim of the present study is to further explore the validity of the Dutch version of the SURPS adapted for individuals with MID-BIF by replicating and extending the study by Poelen et al. (2017). The psychometric properties of the scale are assessed, including its factor structure and internal consistency of constructs. Similar to Poelen et al. (2017), the ability to explain concurrent alcohol consumption level is tested, as well as the moderating effects of IQ status on the associations between SURPS subscales and alcohol use. We extend the study by Poelen et al. (2017) by adding tobacco use as a dependent variable to further explore the predictive validity of the SURPS. Moreover, the sample in the current study also includes individuals recruited from addiction treatment facilities, ensuring more heterogeneity in substance abuse. Finally, we operationalized alcohol use with a different measure. First, to replicate the analyses of Poelen et al. (2017) we also performed analyses with the Alcohol Use Disorders Identification Test (AUDIT, Babor et al., 2001). The AUDIT can be regarded as an index of alcohol dependency, which is relevant in the clinical context of addiction care. Second, we added a volume measure of the average number of units consumed monthly during the past 12 months. A volume measure of drinking behavior primarily represents the habit of hazardous drinking without considering dependency characteristics, which allows for testing the psychometrics of the SURPS from a broader, public health perspective.

## **METHOD**

### ***Procedure***

Participants for this study were primarily recruited among participants in a larger study on the Substance use and misuse in Intellectual Disability

Questionnaire (SumID-Q) (see below) as described in more detail in VanDerNagel et al. (2017), complemented with convenience sampling among clients from Tactus, a Dutch addiction treatment center. Individuals from 16 care organizations of the Dutch Association of Healthcare Providers for People with Disabilities [Vereniging Gehandicaptenzorg Nederland, VGN] were invited to participate. Participants were visited at a venue of their choice by a trained research assistant who explained the study procedures using a DVD presentation and an illustrated leaflet with an easy to read text. Written informed consent was obtained from both the client and/or his or her (legal) representative. The study was approved by the Medical Ethical Review Board Twente (NL27716.044.09). Participants received a small gift (worth approximately €2.50) after the interview.

Of the 419 participants who participated in the study by VanDerNagel et al. (2017), 43 participants also had completed the SURPS. For these 43 participants AUDIT scores were available. An additional sample of  $N = 54$  was recruited among clients of Tactus Addiction Treatment Center with a MID-BIF who agreed to participate during the intake phase of their treatment. This procedure was approved by the internal ethical committee of Tactus.

## **Participants**

Individuals were eligible for participation if they 1) received care from VGN organizations (see Procedure), 2) were  $\geq 18$  years old, 3) had MID (IQ 50–69) or BIF (IQ 70–84), and 4) had no such language problems that participation was unfeasible.

In total 97 clients agreed to participate. Respondents with no information available about IQ status ( $N = 2$ ), or with an estimated IQ below 50 ( $N = 4$ ) were excluded. This resulted in a final sample size of 91 respondents, with 57.1% individuals classified with a MID (IQ 50–69) and 42.9% with BIF (IQ 70–84). In Table 1 demographic characteristics are shown for the total sample and for the two groups separately. Individuals of this sample, which consisted of 60.4% males, had an average age of 34.2 years, ranging from 17 to 63 ( $SD = 11.1$ ). Most participants (95.9%) were of Dutch origin. Only one participant had a Turkish background and one participant was Surinamese. The remaining two participants were of other non-Western cultural origins.

## **Measures**

### **Personality Traits**

In this study, the Dutch version of the Substance Use Risk Profile Scale (SURPS) adapted for individuals with MID-BIF (SURPS-MID/BIF-NL) was used. The adapted items and scale were pretested on comprehensibility among the target group in a preliminary qualitative study (Bergsma et al., 2010). This

**Table 1.** Demographic characteristics and descriptive statistics.

	MID (IQ: 50–69) N = 52	BIF (IQ: 70–84) N = 39	Total N = 91	<i>p</i>
Age, mean (SD)	34.2 (11.4)	34.3 (10.7)	34.2 (11.1)	.967
Gender (N; %)				.539
Female	22 (42.3)	14 (35.9)	36 (39.6)	
Male	30 (57.7)	25 (64.1)	55 (60.4)	
Ethnicity (N; %)				-
Dutch origin	48 (92.3)	39 (100)	87 (95.6)	
Other	4 (7.7)	-	4 (4.4)	
Living situation (N; %)				.724
Supported independent living	12 (23.1)	10 (26.3)	22 (24.4)	
Residential care	40 (76.9)	13 (73.7)	39 (75.6)	
Total consumption (past 12 months)				
Tobacco (cigarettes/)	9.6 (7.6)	10.3 (5.6)	9.9 (6.7)	.669
Alcohol	10.0 (10.1)	17.0 (11.5)	12.9 (11.1)	.005
AUDIT, mean (SD)	13.0 (8.5) <sup>a</sup>	13.1 (10.5) <sup>c</sup>	13.1 (9.4)	.973
SURPS-MID/BIF-NL				
Hopelessness	1.82 (0.62)	1.94 (0.66)	1.87 (0.64)	.371
Impulsivity	2.47 (0.69)	2.29 (0.77)	2.39 (0.72)	.249
Sensation seeking	2.20 (0.64)	2.20 (0.79)	2.20 (0.70)	.980
Anxiety sensitivity	2.33 (0.72)	2.46 (0.76)	2.39 (0.73)	0.403

<sup>a</sup>N = 22. <sup>c</sup> N = 21.

MID: mild intellectual disabilities. BIF: borderline intellectual functioning

version was used by Poelen et al. (2017) and demonstrated good factor structure and acceptable to good internal consistency. Similar to the original SURPS, it consists of 23 items divided over four subscales, all shown in Table 3. The first, Sensation Seeking (SS), contains six items (e.g., “I enjoy new and exciting things, even if they are unusual”). The second, Impulsivity (IMP), is measured by five items (e.g., “I often don’t think things through before I speak”). The third, Anxiety Sensitivity (AS), consists of five items (e.g., “I get scared when I feel unusual body sensations”) and the fourth, Negative Thinking (NT), is assessed by seven items (e.g., “I have faith that I will have a great future”). Using a 4-point scale (1 = “is not correct at all” to 4 = “is completely correct”), respondents had to indicate how much they rated each statement as true. Each response category was supported visually by thumbs up or thumbs down pictograms. As there was only one missing response on one item (item 22), this missing value was replaced with the respondent’s median on other items of the subscale. The subscale scores maintained the range of the individual items (1–4) by summing item scores within subscales and dividing the total by the number of subscale items.

### Substance Use

Data on tobacco and alcohol consumption were obtained from the SumID-Q (J. E. L. VanDerNagel et al., 2011b). The SumID-Q maps knowledge about substance use, perceived consequences of use, perceived use by others in the social environment, motivation to change, and self-reported substance use.

The SumID-Q was designed and validated to be administered to persons with MID-BIF.

For *lifetime prevalence of tobacco and alcohol use* respondents answered the question: “Have you ever smoked/used any alcohol?” with “yes” or “no.” When participants confirmed with a “yes” they were asked further about their level of consumption. When respondents indicated “no,” a score of zero was assigned for the consumption level estimates.

Estimates of *total consumption for alcohol and tobacco* were calculated with quantity-frequency (QF) measures. For alcohol use, QF measures are widely used and are considered suitable when a rough estimate of consumption volume is sufficient (Sobell & Sobell, 2003). First, frequency of using the substance was calculated on an 8-point scale (0 = “never used,” 1 = “used, but not in the last year,” 2 = “used a single time in the past year,” 3 = “used about five times in the past year,” 4 = “used once a month in the past year,” 5 = “used two or three times a month in the past year,” 6 = “used weekly in the past year,” and 7 = “used (almost) daily in the past year”). Second, quantity of use was calculated, for tobacco on a 5-point scale (0 = “none,” 1 = “one to nine cigarettes/cigars/pipes a day,” 2 = “ten to nineteen cigarettes/cigars/pipes a day,” 3 = “twenty to twenty nine cigarettes/cigars/pipes a day,” 4 = “thirty or more cigarettes/cigars/pipes a day”), and for alcohol consumption on a 6-point scale (0 = “none,” 1 = “one or two glasses a day,” 2 = “three or four glasses a day,” 3 = “five or six glasses a day,” 4 = “seven or eight glasses a day,” and 5 = “ten or more glasses a day”). Finally, an index of Total consumption volume for each substance was obtained by multiplying the Frequency estimate with the Quantity estimate. For tobacco this yielded a score ranging from 0 to 28, and for alcohol from 0 to 35.

All participants recruited for the SumID study (VanDerNagel et al., 2017) completed the Alcohol Use Disorders Identification Test (AUDIT; Babor et al., 2001). The AUDIT is a 10-item validated measure for identifying persons with hazardous and harmful patterns of alcohol consumption. Total scores are interpreted as non-hazardous drinking (score < 8), hazardous drinking (score 8–15), harmful drinking (score 16–19), or possible alcohol dependence (score ≥ 20). The AUDIT was shown to be suitable for use in individuals with MID-BIF as part of the SumID-Q (VanDerNagel et al., 2011b). Cronbach’s alpha of the AUDIT in the present study was 0.78.

Demographic (date of birth, ethnicity, marital status), contextual (living arrangement, daytime activities), and diagnostic (IQ status) characteristics were obtained from participants’ files and provided by their professional caregivers.

### **Statistical Analyses**

Confirmatory factor analyses (CFA) were performed for in total three models. Starting with the original 23-item SURPS (Model 1), we then removed the items with insufficient factor loadings in model 2 to arrive at an optimal fit. Finally, we

performed a third CFA with the identical set of 20 items as used in Poelen et al. (2017) to enable a direct comparison of the goodness of fit with their findings. All CFAs were performed with the lavaan package (Rosseel, 2012, 2016) in R (R Core Team, 2016) to validate the hypothesized 4-factor structure of the SURPS-MID/BIF-NL. Given the small sample size and ordinal nature of the item responses, robust weighted least squares mean and variance adjusted (WLSMV) estimation was used (Flora & Curran, 2004; Moshagen & Musch, 2014). In addition to the minimum fit function chi-square ( $\chi^2$ ) statistic, where small and non-significant values indicate good fit, multiple indices were used to examine model fit, including the Tucker–Lewis Index (TLI), the comparative fit index (CFI), the standardized root mean square residual (SRMR) and the root mean square error of approximation (RMSEA) (Hu & Bentler, 1998). TLI and CFI values  $\geq 0.90$  and  $0.95$  were considered indicative of acceptable and good model fit, respectively. For the SRMR and RMSEA, values  $\leq 0.10$  and  $0.08$  and  $\leq 0.08$  and  $0.06$ , respectively, were considered to reflect acceptable and good fit (Browne & Cudeck, 1993; Hu & Bentler, 1999). For the model showing the best fit indices, we also tested whether adding any error correlations (based on modification index) would improve fit.

Next, for the model with the best fit, internal consistency of the subscales was examined by calculating the Cronbach's alpha ( $\alpha$ ). This allows a direct comparison with the findings by Poelen et al. (2017). However, as Cronbach's alpha has deficiencies for congeneric measures, categorical omega ( $\omega$ ) coefficients for ordered categorical items were additionally calculated as a more appropriate estimate of internal consistency reliability (Kelley & Pornprasertmanit, 2016). Point estimates with 95% bias-corrected and accelerated (BCa) bootstrap confidence intervals (CI) based on 1000 bootstrap samples were calculated using the MBESS package (Kelley, 2016). Internal consistency estimates  $\alpha$  and  $\omega \geq 0.70$  were considered to reflect acceptable and  $\geq 0.80$  good internal consistency (Cicchetti, 1994).

Criterion validity of the SURPS-MID/BIF-NL scales, using the best fitting model, was explored by examining associations with alcohol use (total consumption estimate and the AUDIT score), and the total consumption estimate for tobacco, using Spearman correlations. A moderating effect of level of IQ on these correlations was explored by performing these analyses separately within both subgroups (MID: IQ 50–69; BIF: IQ 70–84). Due to insufficient statistical power, no multivariate moderator analyses were conducted for this purpose.

## RESULTS

### *Confirmatory Factor Analyses*

In the first CFA, all 23 items of the original SURPS-MID/BIF-NL were entered. This model showed a good fit for RMSEA, but inadequate fit for the other

indices (see Table 2). Inspection of the factor loadings revealed two items with problematic loadings, these are item 15 (IMP: “Generally, I am impulsive, that means unrestrained and spontaneous”; standardized loading: 0.17), and item 19 (SS: “It would be fun to make trips in the wild”; standardized loading = - 0.09). After removing these two items, the second CFA with the remaining 21 items showed good fit for RMSEA and adequate fit for SRMR, TLI, and CFI. No strong error correlations were found (with the largest modification index for items 3 and 12 = 8.80,  $r = 0.34$ ). As adding these error correlations resulted in a minimal improvement in fit, the outcomes

**Table 2.** Results from the confirmatory factor analyses with the SURPS-MID/BIF-NL.

Model	df	$\chi^2$	p	TLI	CFI	SRMR	RMSEA (90% CI)
23 items (complete)	224	268.59	0.022	0.80	0.82	0.10	0.05 (0.02–0.07)
21 items (w/o 19, 15)	183	204.62	0.131	0.90	0.91	0.09	0.04 (0.00–0.06)
20 items (w/o 19, 12, 3) <sup>a</sup>	164	197.23	0.039	0.84	0.86	0.10	0.05 (0.01–0.07)

<sup>a</sup>Identical model as tested in Poelen et al. (2017).

**Table 3.** Detailed results from the final confirmatory factor analysis.

SURPS-MID/BIF-NL items per subscale	Standardized Factor loading	Cronbach’s Alpha (95% CI)	Categorical Omega (95% CI)
Negative Thinking (7 items)		0.88 (0.82–0.91)	0.91 (0.83–0.94)
SURPS1* “I am content with my life”	0.78		
SURPS4* “I am happy”	0.84		
SURPS7* “I have faith that I will have a great future”	0.71		
SURPS13* “I feel proud of my accomplishments”	0.50		
SURPS17 “I feel that I’m a failure”	0.50		
SURPS20* “I feel pleasant”	0.85		
SURPS23* “I am very enthusiastic about my future”	0.76		
Impulsivity (4 items)		0.77 (0.66–0.84)	0.80 (0.69–0.86)
SURPS2 “I often don’t think things through before I speak”	0.72		
SURPS5 “I often get in situations that I later regret”	0.78		
SURPS11 “I usually act without thinking first”	0.77		
SURPS22 “I often persuade others to get what I want”	0.43		
Sensation Seeking (5 items)		0.67 (0.55–0.77)	0.71 (0.53–0.79)
SURPS3 “I would like to parachute”	0.48		
SURPS6 “I enjoy new and exciting things, even if they are unusual”	0.78		
SURPS9 “I like doing things that frighten me a little”	0.41		
SURPS12 “I would like to learn how to drive a motorcycle”	0.36		
SURPS16 “I like experiences purely for the kick, even if they are not allowed”	0.69		
Anxiety Sensitivity (5 items)		0.74 (0.63–0.83)	0.81 (0.66–0.90)
SURPS8 “It’s frightening to feel dizzy”	0.62		
SURPS10 “It frightens me when I feel my heart beat change”	0.41		
SURPS14 “I get scared when I’m too nervous”	0.70		
SURPS18 “I get scared when I feel unusual body sensations”	0.52		
SURPS21 “It scares me when I’m unable to focus on a task”	0.79		

\*reverse coded items

are not further reported. Internal consistency was found acceptable (SS) to good for all subscales within this 21-item model (see Table 3).

In a third CFA the 20-item solution found by Poelen et al. (2017) was replicated, in which item 19 was again removed, but item 15 remained included. Additionally, two items from the Sensation Seeking subscale (3: “I would like to parachute,” 12: “I would like to learn how to drive a motorcycle”) were removed. This model showed overall inadequate fit in this sample, with poor fit for both TLI and CFI, and acceptable fit for SRMR and RMSEA. Cronbach’s alphas for SS ( $\alpha = 0.65$ ; 95% CI: 0.49–0.76) and AS ( $\alpha = 0.75$ ; 95% CI: 0.62–0.83) in this model were similar to both subscales from the 21-item model as shown in Table 3, although Impulsivity appeared slightly lower ( $\alpha = 0.73$ ; 95% CI: 0.62–0.81) due to retaining item 15 in this subscale despite a low factor loading.

Given the superiority of the 21-item solution, this version of the SURPS-MID/BIF-NL was employed in the subsequent analyses presented below.

### Criterion Validity

To explore the validity of the SURPS-MID/BIF-NL, correlational analyses for the four subscales with tobacco and alcohol consumption were performed for both the total sample, and for the two IQ groups separately, as shown in Table 4. For Sensation Seeking no correlations were found with any of the substance use measures. Impulsivity was correlated positively with total alcohol consumption ( $r_s = 0.23$ ), which appeared to originate primarily from the MID subsample ( $r_s = 0.32$ ), but not with tobacco use. Negative Thinking showed the highest correlation coefficient for alcohol consumption ( $r_s = 0.32$ ), which again seemed to be more outspoken among individuals with MID. No correlation was found for NT with tobacco use among the total sample, but among the BIF subsample a correlation ( $r_s = 0.50$ ) was present. In the subsample of participants for which an AUDIT score was available, NT appeared to be positively correlated with the AUDIT score, which seemed slightly more marked among BIF individuals. Anxiety Sensitivity was not correlated with tobacco or alcohol use among the

**Table 4.** Correlations between SURPS-MID/BIF-NL and substance use Non-parametric Spearman correlations between the four SURPS-MID/BIF-NL subscales and substance use (total consumption of tobacco, alcohol, AUDIT), for the total sample ( $N = 91$ ), and for both sub-samples (MID: IQ 50–69;  $N = 52$ ; BIF: IQ 70–84;  $N = 39$ ) separately.

	Sensation seeking			Impulsivity			Negative Thinking			Anxiety sensitivity		
	All	MID	BIF	All	MID	BIF	All	MID	BIF	All	50–69	70–84
Tobacco	0.08	0.10	0.05	0.11	0.01	0.30	0.17	–0.08	0.50**	0.06	–0.09	0.26
Alcohol	–0.14	–0.16	–0.22	0.23*	0.32*	0.19	0.32**	0.33*	0.26	0.14	0.27	–0.11
AUDIT <sup>a</sup>	–0.20	–0.20	–0.20	0.29	0.39	0.20	0.44**	0.41	0.49*	0.30*	0.25	0.28

<sup>a</sup>The AUDIT was taken in a subsample of 43 individuals (22 MID, 21 BIF).

\*  $p < .05$ ; \*\*  $p < .01$

total sample, nor within MID or BIF subsamples. However, a positive correlation ( $r_s = 0.30$ ) was found with the AUDIT for the total sample.

## DISCUSSION

The aim of this study was to conduct further exploration of the psychometric qualities of the SURPS-MID/BIF-NL, a questionnaire assessing four personality traits associated with substance use and misuse, among 91 individuals with MID-BIF. This study replicated and extended the study by Poelen et al. (2017) and estimated factorial structure and internal consistency of subscales. Secondly, criterion validity was tested by correlating the four traits with measures of self-reported tobacco and alcohol use. The SURPS-MID/BIF-NL was found to be a psychometrically adequate instrument to assess four personality dimensions among a Dutch sample of individuals with MID-BIF. The original four-factor structure of the SURPS was supported by the confirmatory factor analysis, which largely confirms the results by Poelen et al. (2017). The model showing the best fit was a 21-item solution after removing an item from the Impulsivity subscale and an item from the Sensation Seeking subscale. This model showed good to adequate model fit indices, with good to adequate internal consistency of the four subscales. Consistently, both in our analyses and in the study by Poelen et al. (2017) removal of item 19 from the Impulsivity subscale (“Generally, I am impulsive, that means unrestrained and spontaneous”) was found to improve model fit. Although this item appears to reflect the core feature of the Impulsivity construct, it is also a rather abstract statement when compared to items representing specific behavioral responses. Such abstract items require a level of self-awareness that may be difficult to achieve for some individuals with MID-BIF. The removal of item 15 from the SS subscale (“It would be fun to make trips in the wild”) may result from the Dutch context, where wild nature is practically not available. However, as it was retained in the model proposed by Poelen et al. (2017), the position of this item remains inconclusive. The final 21-item model found in the CFA analyses also deviated from Poelen et al. (2017) on two other items, both from the SS subscale (3: “I would like to parachute,” 12: “I would like to learn how to drive a motorcycle”). In contrast to the solution proposed by Poelen et al. (2017), these two items were retained in our CFA analysis.

Although these differences in the final models may not invalidate the model fit of the full SURPS scale as such, on subscale level inconsistencies in item selection may have several consequences. From a research perspective, when using such scales at population level, reliability tends to improve with larger numbers of scale items (Furr & Bacharach, 2017; Nunnally & Bernstein, 1994). Therefore, removing items may result in reduced (comparative) content validity and may also impede the interpretability of comparisons with findings

in other studies and samples that used the full set of items. From a clinical perspective, parsimony in the number of items is preferred to minimize the burden for clients subjected to such instruments, as well as for clinicians. This would favor choosing the briefest available version of a validated scale. When intended to be applied as a diagnostic instrument, however, validated norm scores to allow prognostic identification of at-risk individuals are asked for. Evidently, norm scores derived from a scale will depend on the specific set of items included in that scale, possibly requiring adjusted norm scores. At the same time, SURPS subscales have already been successfully used for the purpose of selecting at-risk individuals to personality-targeted interventions aimed at substance use (Conrod et al., 2010, 2013; Lammers et al., 2015), without generally accepted norm scores being available. Similarly, in the Netherlands, Gosens, Otten, Didden & Poelen (submitted) have recently developed “Take it Personal!”, an personalized intervention for substance abuse in clients with MID-BIF and which is based on the SURPS personality profiles of participants.

Criterion validity was partially supported by associations found between substance use and three of the four subscales. Strongest associations with both alcohol and tobacco use were found for Negative Thinking, and as predicted by studies among individuals with average intelligence (Krank et al., 2011; Malmberg et al., 2010; Woicik et al., 2009), all coefficients indicated that a higher level of NT correlates with more substance use. Impulsivity was found to be associated with alcohol use, but not with tobacco use. Anxiety Sensitivity was positively associated with alcohol use, but only for the AUDIT measure that was taken within the subsample recruited from the disability care facilities. For Sensation Seeking no significant associations were found. Clearly, further research is called for, to confirm and expand these findings on criterion validity of the SURPS-MID/BIF-NL. This could include testing the associations of the subscales, AS and SS in particular, with the use of other substances that may be prevalent among people with intellectual disabilities, such as cannabis and cocaine.

When comparing these findings with those of the study by Poelen et al. (2017), the ambivalent role of Anxiety Sensitivity draws attention. High Anxiety Sensitivity appears a risk factor for substance use from our sample, but as a protective factor in Poelen et al. (2017). Similar contradictory evidence for AS has been found in studies among people with average intelligence (Krank et al., 2011; Malmberg et al., 2010; Woicik et al., 2009). This may point to a curvilinear effect of this personality dimension on substance use, depending on sample characteristics. One such characteristic may be the phase of substance use trajectory prevailing in the sample. In the sample of the current study approximately half of participants were recruited in an addiction care facility and consequently many of them have established a problematic pattern of substance abuse, in most cases alcohol. This is confirmed by the

average AUDIT score of 13.1 in this sample, which is clearly higher than the 6.8 score in the sample of Poelen et al. (2017). It is conceivable that a fear of anxiety-related bodily sensations and a motivation to avoid unpleasant experiences may initially daunt individuals to engage in substance use. However, once dependency of a substance has manifested itself, this same tendency may reverse into a perpetuating factor driving the user to seek alleviation of craving or negative affect by continued consumption. Interestingly, the finding that the AUDIT correlated with both traits reflecting a susceptibility to negative reinforcement (AS and NT), but not with both reward-seeking traits (IMP and SS), also supports this hypothesis.

Finally, although a moderating effect of IQ status on the association between the SURPS-MID/BIF-NL subscales and substance use could not be formally tested in this study due to the small sample size, we did perform exploratory analyses. For this purpose, correlations between the SURPS-MID/BIF-NL subscales were calculated for the total sample and within both subsamples separately. A comparison of these within-group analyses revealed no consistent pattern, and consequently this does not indicate a differential role of personality traits depending on IQ status.

### ***Strengths and Limitations***

Two strengths of this study are noteworthy. First, being the second study available to validate a widely used instrument for measuring personality traits, our findings contribute to the field of research and clinical practice in individuals with MID and BIF who use and misuse alcohol and/or tobacco. Second, when compared to the study by Poelen et al. (2017), our sample contained more heavy drinking subjects by also recruiting among clients from an addiction treatment center known with MID or BIF. As such, the findings from our study add to the generalization of the psychometric qualities of the SURPS adapted for MID and BIF samples, including individuals in the clinical setting of addiction care.

Several limitations in this study need to be considered, as these may give directions for future studies. First, the sample size of this study is rather small. This may have caused insufficient statistical power for several of the planned correlational analyses, potentially resulting in an underestimation of criterion validity of the SURPS-MID/BIF-NL. Furthermore, potential measurement invariance by sample characteristics, such as IQ status, could not be verified. Second, a cross-sectional design does not allow for testing predictive validity, nor test–retest reliability. Assessing these psychometric aspects of the SURPS-MID/BIF-NL is warranted in a next step. Third, using self-reports may have introduced bias, as has been discussed in numerous studies on substance use (Fendrich & Miller, 2000). With regard to substance use, underestimation of consumption levels is a well-known phenomenon (Brenner et al., 2003), which

may also occur in MID-BIF samples. However, although self-report bias may lower the reliability and validity of consumption level estimates, it is unlikely to affect within-subject correlations between substance use and other self-reported constructs (Cheung et al., 2017), or the within-subject correlational structure underlying the CFA analyses.

## Conclusion

The SURPS-MID/BIF-NL was shown to have adequate psychometric properties, largely confirming a previous study among a Dutch sample of individuals with MID-BIF (Poelen et al., 2017). This supports the use of the SURPS-MID-BIF-NL in research on the role of personality traits in substance use among people with MID and BIF. Differences between the best fitting models between this study and Poelen et al. (2017) regarding three of the original 23 SURPS items, justifies further psychometric research, preferably within larger samples, to optimize item selection within the Impulsivity and Sensation Seeking subscales. Criterion validity was only partly confirmed and needs further testing. Similarly, predictive validity and test-retest reliability needs to be tested in future studies using a prospective design. The adapted version of the SURPS is promising and may allow for designing personality targeted interventions in an effort to reduce substance misuse in individuals with MID-BIF.

## DISCLOSURE STATEMENT

No potential conflict of interest was reported by the authors.

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