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Polish adaptation and validation of the Short Inventory of Problems (SIP-2L)

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Summary

Aim. The aim of the research was to present the Polish adaptation and validation of the Short Inventory of Problems (SIP-2L) by Miller et al. (1995). The SIP-2L is a popular self-report measure used to assess the negative consequences of alcohol use in 5 domains with negative consequences: physical, interpersonal, intrapersonal, social and impulse control. The adapted version of SIP assesses lifetime consequences of using alcohol.

Material and method. A total of 256 participants diagnosed with alcohol dependence (71 women and 185 men) completed an assessment battery that included SIP-2L and Polish versions of AUDIT, MAST and KOEP-R, which is a modified Polish adaptation of CEAQ – Comprehensive Effects of Alcohol Questionnaire.

Results. Confirmatory factor analysis demonstrated the hypothesized 5-factor model produced the best fit. Reliability of the entire method (Cronbach's $\alpha = 0.868$) and for all factors was satisfactory, as was convergent validity.

Conclusions. The results support that the Polish version of the SIP-2L has good psychometric properties and can successfully assess the consequences of drinking among patients diagnosed with alcohol dependence.

Key words: alcohol dependence, Polish adaptation, Short Inventory of Problems SIP-2L

Introduction

As the World Health Organization has proven for years [1, 2], alcohol dependence is one of the most severe risk factors for worldwide morbidity and mortality. It is associated with numerous causes of mental and somatic diseases and injuries to individuals and third parties. It also has a negative relationship with family, social and work-life.

Although the harmful effects of drinking alcohol are one of the most characteristic features of alcohol addiction or problem drinking, affecting the health, emotions, and behaviour of both the individual and their relatives, in Poland, according to the

authors' knowledge, there is no reliable and psychometrically proven method which allows for research into the consequences of drinking alcohol. Harm from the use of psychoactive substances is often confused with symptoms of addiction, the frequency and amount of drug use, and seeking help [3]. This is the case, for example, in the most widely used tool for assessing negative consequences – the MAST questionnaire [4]. Also, measuring the level of consumption is not a particularly good predictor of harm caused by substance use [5, 6]. One of the reasons is that several studies on the typology of people with alcohol use disorders indicate the existence of a subtype with lower levels of both consumption and experienced negative consequences of drinking [7].

Researchers postulate the need to create research tools that directly and specifically address the negative consequences of alcohol use [8]. An ideal psychometric method is needed to assess the extent of general drinking problems in isolation from the level of consumption and to diagnose addiction. One of such questionnaires is the Drinker Inventory of Consequences (DrInC) (Miller, Tonigan, Longabaugh [9]), used to measure problems resulting from the use of alcohol understood as a construct different from the level of the consumed substance or symptoms of addiction.

The Short Inventory of Problems (SIP) presented in this study is an alternative, short version of DrInC. Originally developed and validated to measure the consequences of alcohol use, it has also been modified to assess the consequences of other substance use disorders (SIP-SUD; SIP-AD), drugs (SIP-D) and even bipolar disorder (SIP-BD) [3, 5, 6, 10].

The original version of the SIP is a 15-item tool based on the most representative DrInC items. It is a self-report method for measuring drinking consequences across five domains. There are two versions of the questionnaire – one relates to the most recently observed, i.e., in the last three months, consequences – (SIP-2R), the other to consequences that have occurred throughout the life and were related to alcohol use (SIP-2L) [9]. The original version of the tool has good psychometric properties – the coefficients of internal consistency for individual subscales and the entire questionnaire are good, Cronbach's α oscillates in the optimal range (for the entire questionnaire, it is 0.81). The stability of the results measured by the test-retest ratio method ($n = 60$) for the whole scale is 0.94 [9, 11, 12].

The aim of the presented study was the Polish adaptation and analysis of the psychometric properties of the SIP-2L Short Inventory of Problems, i.e., the version covering the entire life of the respondent. It consists of five scales with negative consequences: physical, interpersonal, intrapersonal, social and impulse control. Each scale has three statements. The shortening of the scale done by Miller et al. [5, 9] was intended to save time and minimize the burden on the subjects. The overall result of the entire questionnaire is also counted. The answers are given on a dichotomous scale: 1 – “yes”, 0 – “no”; one can get a result within the range of 0 – 15 points.

Earlier adaptations of this widely used questionnaire showed good psychometric properties – in a repeated study on the American population [11], internal consistency (Cronbach's α) was 0.79 for the full scale. In the Spanish version, α was very good for both the English-speaking (0.95) and Spanish-speaking (0.93) groups, and in the entire sample, it was 0.94 [13]. A similarly revised version of the SIP (SIP-RS) in the

Spanish language version achieved a very high level of internal consistency (0.96) [14]. On the other hand, the adaptation of the DrInC questionnaire in the Swahili language used in Tanzania indicated the optimal reliability of both the entire test (0.96) and individual subscales (0.83 – physical damage, 0.86 – intrapersonal damage, 0.85 – social damage, 0.90 – interpersonal damage, 0.82 – impulse control) [15]. In this study, after conducting CFA, the five-factor structure of the scale was also confirmed, which showed satisfactory fit indices, and all items were within the range of 0.42 to 0.97.

Developing the Polish version of the Short Inventory of Problems and statistical analyses

The linguistic validation procedures were carried out following the recommendations described in the literature on the subject [16]. Later, a psychologist fluent in English translated the instruction and test items into Polish. Two other translators then performed a back-translation. The final version of the tool was established after comparing the obtained versions.

Then, the validity and reliability of the questionnaire were tested. Factor validity was tested using confirmatory and exploratory factor analysis. In the first stage, an exploratory factor analysis (EFA) was carried out to determine the factor loadings and the number of factors present in the Polish version of the scale. After determining the number of factors in the Polish questionnaire version, each was correlated with the full scale to ensure measurement equivalence. The normality of distribution statistics was computed for each variable before correlation by Shapiro-Wilk's W test. Due to the lack of normality of the measured variables, non-parametric tests of significance, i.e., Kendall's tau, were used to determine the relationship mentioned above. Confirmatory factor analysis (CFA) using the maximum likelihood estimator (ML) was used to determine the goodness of fit to the assumed five-factor structure.

The convergent validity of the tool was estimated based on the analysis of Kendall's tau correlation coefficients between the results obtained in the questionnaire and the results of the selected measurement tools. The reliability of the entire method was assessed by estimating the internal consistency based on Cronbach's α coefficient. All calculations were made using the AMOS and SPSS software.

Material and method

The presented study was conducted in 2020-2021 among adult patients of alcohol addiction or withdrawal symptoms treatment departments and addiction treatment clinics. All subjects had a diagnosis of alcohol addiction. The Bioethics Scientific Research Committee of the University of Lodz approved the research (Resolution No. 10-V / KBBN-UŁ/V/2019). All participants filled the tools during group meetings or individually. The authors anonymized the study (however, the respondents, before starting the procedure, signed consent to participate in the study and consent to the processing of personal data). Participation in it was voluntary and did not involve any gratification. After the incompletely filled questionnaires were rejected, the results of

256 people were included in the analysis, which met the assumptions of the power analysis, calculated using the G * Power 3.1 program [17]¹.

Sociodemographic data were collected using a questionnaire covering: age, sex, marital status, level of education and earnings, employment status, age of alcohol initiation and onset of addiction, number of treatment attempts, the occurrence of alcohol problems in the family of origin, other mental disorders and subjective assessment of somatic health. Table 1 presents the sociodemographic characteristics of the respondents.

Table 1. Sociodemographic characteristics of the study sample

	<i>N / SD (%)</i>
Sex	
Female	71 (27.7%)
Male	185 (72.3%)
Age	
Range	20 – 77
M/SD	42.9/11.39
Marital status	
Single	88 (34.4%)
Married	98 (38.3%)
Divorcee	60 (23.5%)
Widower/Widow	10 (3.9%)
Education	
Elementary	30 (11.7%)
Vocational	68 (26.6%)
Secondary	115 (44.9%)
Higher	43 (16.8%)
Employment	
Permanent (full-time)	133 (52.0%)
Part-time job	30 (11.7%)
Unemployed	54 (21.1%)
Student	2 (0.8%)

table continued on the next page

¹ The analyses introduced a priori power (905), effect size ($p = 0.2$) and significance level ($\alpha = 0.05$) for the given required sample size. According to the conducted analysis, the total sample size for the presented study should be at least 255 people.

Other	37 (14.5%)
Age of alcohol initiation	
Range	5 – 33
M/SD	15.8/3.36
Age of onset of addiction	
Range	5 – 59
M/SD	27.68/9.94
Addiction in the family of origin	
Yes/No	172 (67.2%)/ 84 (32.8%)
Mental disorders	
Yes/No	42 (16.4%)/ 214 (83.6%)
The level of somatic health	
Very bad	4 (1.6%)
Bad	10 (3.9%)
Moderate	74 (28.9%)
Good	134 (52.3%)
Very Good	34 (13.3%)

M – mean; SD – standard deviation

The overall result of the SIP-2L test differentiated gender moderately ($p < 0.001$; $d = 0.58$), as did the impulse control ($p < 0.001$; $d = 0.65$) and social harm subscale ($p < 0.001$; $d = 0.58$). It was higher in men, but the effect was moderate.

The general result of the questionnaire ($p = 0.009$) and the results of the subscales of social responsibility and impulse control (respectively: $p = 0.031$; $p = 0.000$) significantly differentiated the respondents in terms of age. The increase in the value in these areas was accompanied by a decrease in the value in terms of the age of the respondents. The younger the respondents, the more negative consequences of drinking were reported (Table 2).

In the context of the age of alcohol initiation, the increase in value for physical harm, impulse control, social responsibility, and the overall score was accompanied by a decrease in the age at which the subject first consumed alcohol. Similarly, excluding the physical harm subscale, the same was true for the age of addiction onset – the higher the score in the given areas, the lower the respondent's age at the declared onset of addiction (Table 2).

Table 2. Correlation matrix between the variables of the SIP-2L and the age of the respondents, the age of alcohol initiation and the age of the onset of addiction

SIP-2L	Age	At what age did you try alcohol for the first time?	At what age did your addiction begin?
Physical consequences	-0.013	-0.167**	-0.061
Interpersonal consequences	-0.091	-0.046	-0.107
Intrapersonal consequences	-0.052	-0.066	-0.121
Impulse control	-0.268**	-0.283**	-0.285**
Social responsibility	-0.135*	-0.220**	-0.224**
Total result	-0.163**	-0.220**	-0.235**

* – correlation is significant at $p < 0.05$; ** – correlation is significant at $p < 0.01$

It is worth noting that the results indicating the relationship between the age of alcohol initiation and the age of the onset of addiction achieved in this study, with the perceived harm, confirm the reports from previous studies. In one of the studies, the negative correlation between alcohol consumption and the age of the respondents was confirmed [18]. In another study, the age of alcohol initiation turned out to be one of the variables indicating a higher risk of relapse after drug addiction treatment [19]. It is also visible in typologies of people with alcohol use disorders – groups characterized by a high rate of antisocial behaviour and significant problems due to their addiction include people with an early onset of both drinking and addiction [7, 20, 21].

However, neither the overall result of the SIP-2L questionnaire nor its subscales (except for impulse control) differentiated the respondents in terms of the presence of a family history of alcohol problems. The impulse control scale differentiated the respondents in terms of the family history of alcohol problems – people who experienced alcohol problems in their family of origin achieved higher results, but the effect turned out to be weak ($p = 0.012$; $d = 0.34$).

In the research, apart from the adapted tool, the following were used:

- AUDIT – Alcohol Use Disorder Identification Test [22]; – containing 10 questions about alcohol use, drinking pattern, addiction symptoms, and drinking effects [23]. Scores between 16 and 19 indicate harmful drinking, while above 20 indicate the possibility of addiction. In its original version and its Polish adaptation, the tool has high reliability and accuracy [23, 24]. In the conducted study, it was used to measure the risk of addiction. In this study, the Cronbach's α was 0.792.
- MAST – Michigan Alcoholism Screening Test [4] (Polish adaptation [25]) consisting of 21 items relating to the depth of alcohol-related problems. The cut-off point is a score of 4, and a higher result suggests meeting the diagnostic criteria for alcohol dependence. The tool has good psychometric properties [26]. The method's reliability in the tested sample, as measured by Cronbach's α , was 0.822.

- KOEP-R – [27] (modified Polish adaptation of CEAQ – Comprehensive Effects of Alcohol Questionnaire [28]), which is used to measure the expected effects of drinking alcohol. It includes 45 statements regarding both positive and negative effects of drinking, which are rated by subjects on a scale of 1-4, where 1 means “disagree” and 4 – “agree”. The factor analyses identified six types of expected drinking effects. Cronbach’s α for individual scales ranges from 0.589 for the area including reducing tension, to 0.887 for the increase in the sense of power, courage, and self-confidence [29]. In this study, Cronbach’s α for the entire questionnaire was 0.920, and in terms of individual areas, it was as follows:
1. area – increase in the sense of power, courage, self-confidence – Cronbach’s $\alpha = 0.831$
 2. area – increase in risky behaviours – Cronbach’s $\alpha = 0.853$
 3. area – cognitive and behavioural impairment – Cronbach’s $\alpha = 0.831$
 4. area – deterioration of well-being, “moral hangover” – Cronbach’s $\alpha = 0.608$
 5. area – tension reduction – Cronbach’s $\alpha = 0.665$
 6. area – increase in openness, sociability and interpersonal freedom – Cronbach’s $\alpha = 0.875$

The KOEP-R questionnaire above, although it does not measure harm from drinking directly, seems to be strongly related to them, as the effects of drinking experienced by an individual are indirectly related to the risk of developing problems and disorders. Moreover, based on the experience of using alcohol, the individual creates his expectations of the effects of drinking [29].

Results

Factorial validity

To perform the necessary calculations, the data from the entire sample ($N = 256$) were divided into two equal subgroups, marked in the study as 1 ($n = 128$) and 2 ($n = 128$). The selection of the subjects to the groups was carried out randomly, following an even distribution. Data from subgroup 1 was subjected to EFA, while CFA was used on data from subgroup 2.

Before beginning the factor analysis, the adequacy of the data was tested with the Kaiser-Meyer-Olkin (KMO) test. Its result ($KMO = 0.89$) and the Bartlett’s sphericity test ($\chi^2=1401.90$; $p < 0.001$) informed about sufficient sampling adequacy.

In the case of EFA (Varimax rotation method with Kaiser normalization), both the scree plot and Kaiser criterion indicated, as in the original version, the presence of five factors explaining 69% of the scoring variance. Table 3 shows the results of the EFA for group 1 for five components, while Table 4 shows the factor loadings matrix for five components for the same group (factor loadings above 0.5 were taken into account).

Table 3. Factor analysis (EFA) for five components for group 1

Component	Initial eigenvalues			Sums of squared charges after separation			Sums of squared charges after rotation		
	Total	% variance	% cumulative	Total	% variance	% cumulative	Total	% variance	% cumulative
Physical consequences	5.863	39.084	39.084	5.863	39.084	39.084	2.420	16.136	16.136
Interpersonal consequences	1.499	9.997	49.080	1.499	9.997	49.080	2.258	15.050	31.187
Intrapersonal consequences	1.126	7.509	56.589	1.126	7.509	56.589	2.182	14.548	45.735
Impulse control	1.109	6.524	63.113	1.109	6.524	63.113	1.741	11.609	57.344
Social responsibility	1.102	5.745	68.859	1.102	5.745	68.859	1.727	11.514	68.859

Table 4. The matrix of factor loadings for (EFA) for the five components for group 1

	Component				
	Physical consequences	Interpersonal consequences	Intrapersonal consequences	Impulse control	Social responsibility
P1			0.840		
P2	0.590				
P3					0.588
P4			0.858		
P5				0.840	
P6				0.822	
P7	0.550				
P8					0.693
P9	0.612				
P10		0.690			
P11		0.701			
P12			0.600		
P13		0.620			
P14					0.734
P15				0.639	

Method of extracting factors – main components. Rotation method – Varimax with Kaiser normalization

CFA analysis (using maximum likelihood estimation) for group 2 showed the existence of strong factor loadings within the five defined factors (Fig. 1). The measures

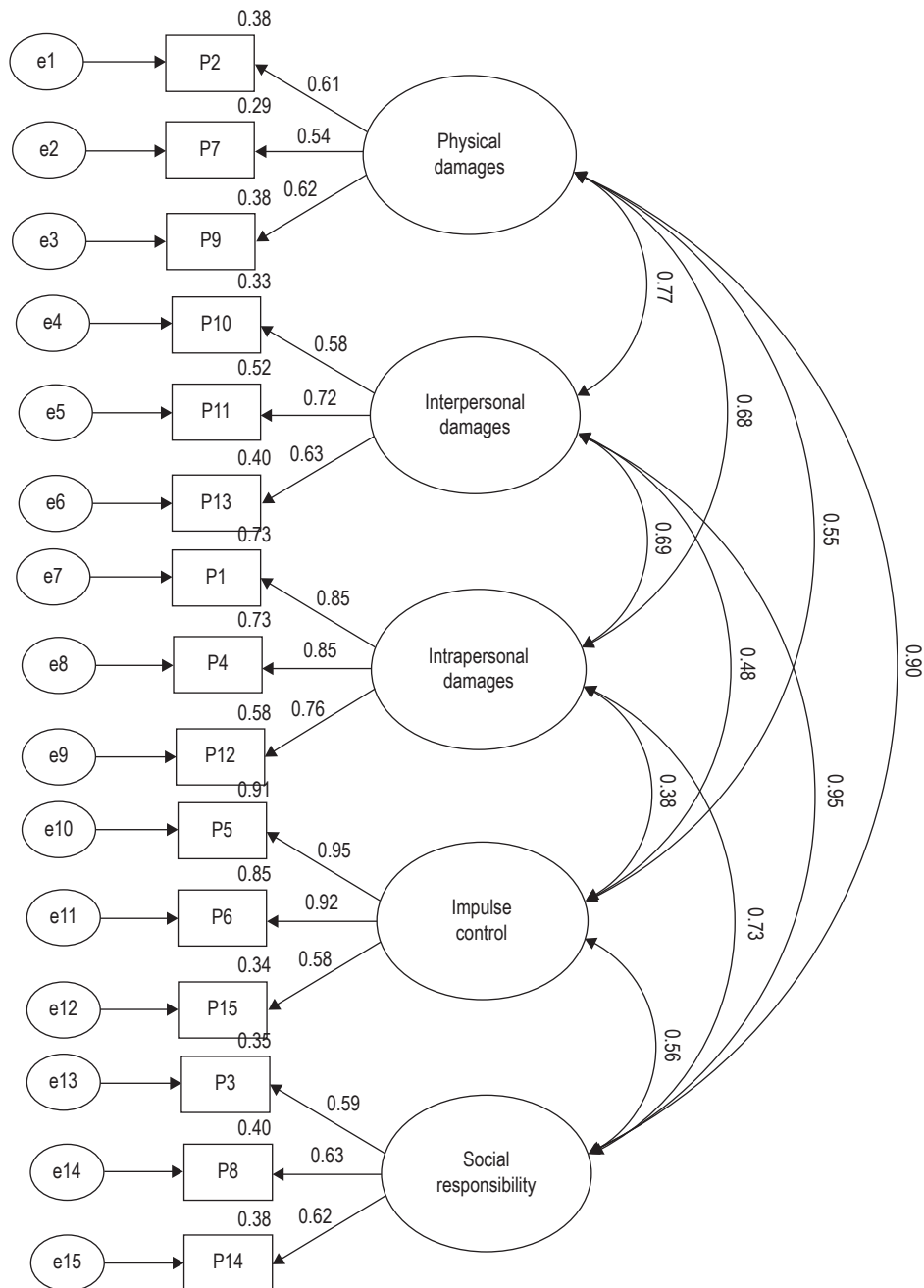


Figure 1. Model fitting structure – confirmatory factor analysis (CFA) for group 2

presented in Table 5 indicate a good fit of the model. RMSEA is at the declared level of <0.06 , GFI > 0.914 , CFI > 0.958 , and SRMR = 0.055.

Table 5. **Confirmatory factor analysis (CFA) – measures of goodness-of-fit model for group 2**

Model	CMIN	DF	P	CMIN/DF	RMSEA	GFI	CFI	SRMR
SIP-2L	129.634	80	<0.01	1.620	0.057	0.914	0.958	0.055

Reliability and validity

The reliability of the entire method was estimated using internal consistency based on Cronbach's α coefficient. Reliability was satisfactory for all factors – it was > 0.700 (Table 6).

Table 6. **Statistics of Cronbach's α reliability analysis and Shapiro-Wilk's test of normality of variables**

Variable		Cronbach's alpha	Shapiro-Wilk W test
SIP-2L	Physical consequences	0.734	W = 0.725, $p < 0.001$
	Interpersonal consequences	0.722	W = 0.682, $p < 0.001$
	Intrapersonal consequences	0.701	W = 0.681, $p < 0.001$
	Impulse control	0.712	W = 0.809, $p < 0.001$
	Social responsibility	0.733	W = 0.691, $p < 0.001$
	Total result	0.868	W = 0.831, $p < 0.001$

All subscales of the SIP questionnaire correlate highly with the overall score. As all correlations are at a comparable substantial level, it can be assumed that the contribution to the overall score of individual items is high (Table 7).

Table 7. **Correlation matrix of Kendall's tau coefficients between scales and the total score of the Polish version of SIP-2L**

SIP-2L	Physical consequences	Interpersonal consequences	Intrapersonal consequences	Impulse control	Social responsibility
Physical consequences	-				
Interpersonal consequences	0.359***	-			
Intrapersonal consequences	0.460***	0.518***	-		
Impulse control	0.322***	0.403***	0.334***	-	

table continued on the next page

Social responsibility	0.457***	0.524***	0.446***	0.445***	-
Total result	0.615***	0.642***	0.618***	0.635***	0.667***

*** – correlation is significant at $p < 0.001$

The convergent validity of the adapted method was estimated by analyzing the correlation between the results obtained on this scale and the results achieved on the other scales. The correlation results (Kendall's tau) are presented in Table 8.

Table 8. Correlation matrix of Kendall's tau coefficients between variables of the SIP-2L and other measured features

	SIP-2L: Physical consequences	SIP-2L: Interpersonal consequences	SIP-2L: Intrapersonal consequences	SIP-2L: Impulse control	SIP-2L: Social responsibility	Total SIP-2L
KOEP-R – I area	0.157**	0.223***	0.153**	0.266***	0.173***	0.236***
KOEP-R – II area	0.252***	0.251***	0.216***	0.331***	0.308***	0.331***
KOEP-R – III area	0.270***	0.212***	0.297***	0.156**	0.203***	0.244***
KOEP-R – IV area	0.193***	0.118*	0.278***	0.015	0.124*	0.146*
KOEP-R – V area	0.082	0.079	0.047	0.133*	0.032	0.077
KOEP-R – VI area	0.159**	0.152**	0.108*	0.172***	0.137**	0.178***
AUDIT	0.285***	0.285***	0.274***	0.291***	0.322***	0.361***
MAST	0.327***	0.347***	0.291***	0.377***	0.354***	0.443***

* – correlation is significant at $p < 0.05$; ** – correlation is significant at $p < 0.01$; *** – correlation is significant at $p < 0.001$

As shown in Table 8, the adapted method is characterized by a satisfactory convergence validity: significant correlation coefficients between individual subscales and the overall SIP – 2L score and the results in individual subscales of the KOEP-R. It can be argued that the increase in self-confidence resulting from drinking is accompanied by negative consequences of drinking in general and in different categories of harm. Also, undertaking risky behaviour or feeling worse is correlated with the negative effects/harms of drinking. On the other hand, the reduction in tension caused by drinking showed no relationship with the damage (no correlation in area 5 of the KOEP-R questionnaire). This relationship requires further research.

Among the significant correlations, it is impossible to ignore the high correlation coefficients of each of the tested types of consequences and consequences understood

as a whole (overall result) with the AUDIT and MAST questionnaires results. This is a confirmation of the high accuracy of the tool.

Summary

The study aimed to create the Polish adaptation of the Short Inventory of Problems (SIP-2L) by Miller et al. The need to adapt the tool resulted both from its short form, which made it possible to conduct the study in a situation where the time for evaluation is limited, and where there is no need to examine individual problems, as well as the shortage of standardized methods for testing harm from drinking available in Poland.

The Polish version of the method demonstrates satisfactory psychometric properties in the studied group of patients diagnosed with alcohol dependence. Based on all the analyses carried out, it can be concluded that the Polish version does not differ significantly from the original. It measures the main factor of consequences of drinking and specific factors of consequences to specific areas with good reliability. The study (including confirmatory analysis not used in other adaptations, except for the adaptation of the extended version of the tool) confirmed the 5-factor structure of the Polish version of the SIP-2L scale, which covers the following consequences: physical, interpersonal, intrapersonal, impulse control, and social responsibility. The Short Inventory of Problems also significantly correlates with the results of the questionnaires used to measure alcohol dependence – MAST and AUDIT.

The study also had some limitations. Firstly, it included unequal groups in terms of gender (M, $N = 185$; F, $N = 71$) or the presence of mental disorders among the examined patients (overrepresentation of people declaring no such disorders).

A second limitation is that the study relied solely on self-report on reporting negative consequences of drinking. Consequently, it cannot be recommended as a standalone questionnaire for assessing drinking harm during clinical diagnosis but rather an adjunct to the diagnostic procedure.

Another significant limitation is that only people diagnosed as struggling with an alcohol use disorder were examined. However, the study did not include hazardous or harmful drinkers and those using alcohol in a normative manner. In further research, it is also worth using the test-retest method.

Being aware of the limitations of the questionnaire, the Polish adaptation of the SIP-2L Short Inventory of Problems can be considered useful both in scientific research and in clinical diagnosis to deepen the conceptualization of the patient. The undoubted advantages of the tool include, first of all, the possibility of measuring harm from substance abuse in isolation from the symptoms of addiction and high reliability with a short measurement time and good discriminatory power.

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