Research Article

Psychometric Properties of Drinking Motives Questionnaire-Revised (DMQ-R) in Slovak Adolescents

Marta Vavrova and Zuzana Rojkova[*]

Department of Psychology, University of Ss. Cyril and Methodius in Trnava, Slovakia

[*]*Address Correspondence to Zuzana Rojkova, zuzana.rojkova@ucm.sk*

Abstract

The objective of the study was to verify the psychometric properties of DMQ-R questionnaire in Slovak adolescent population. DMQ-R is targeted at measuring four motives for alcohol consumption. Using the sample of 533 high school students from Slovakia, its content, construct and criterial validity as well as the level of reliability were examined. The given psychometric properties were verified via factor analysis, internal consistency coefficient, correlations with constructs of situation motivation factors and problems caused by alcohol consumption. For data collection, the creation of Slovak version of DMQ-R was needed; the questionnaire battery was further supplemented by the Questionnaire on Situation motivational Alcohol Behaviour Factors (SMF) and the Rutgers alcohol problem index (RAPI). The results showed the DMQ-R (in Slovak version) to be sufficiently valid and reliable in Slovak population.

Keywords: Drinking motives; Alcohol use; Psychometrics; DMQ-R; Situation motivational factors

Introduction

The consumption of alcohol is a common social phenomenon not only in Slovakia but also in other countries. According to European research [1], Slovakia stands among the 10 biggest consumers of alcohol, even though we notice a slight decline in the amount of alcohol consumed over the years. What remains a problem, however, is the consumption of alcohol by youth. Despite the sale of alcohol to persons under 18 years of age being prohibited, the share of children and adolescents who have had experiences with alcohol is on the rise. The first experimentation with alcohol in children occurs around the age of 11. Alcohol, just like other drugs, is considered dangerous for children and the young, especially during the acute stage, while intoxicated. The severity of the risks also depends on the individual long term consequences [2].

Currently, there are many programs available whose goal is to prevent or end the use of alcohol. On the other hand, we see the growing number of consumers among the young. It is, therefore, necessary to propose a form of prevention targeted towards homogeneous groups sharing similar needs and problems. These are reflected in the reasons or situations leading them toward consumption. The uncovering of the motives of the young for alcohol consumption appears primary for which quality psychometric measuring tools are necessary.

Drinking motives questionnaire revised (DMQ-R) by M. Lyne Cooper (1994) is considered the most globally widespread tool for the measurement of the motives for drinking in young people. Within its advantages, there is a valid theoretical framework, psychometric qualities proven across multiple instances of research and its scope is suitable for inclusion in large nationwide surveys [4-6].

In creating the measuring tool, the author bases it on the theoretical work of the motivational model of alcohol use [7]. They proposed a model according to which the motives for drinking can be separated with the help of two dimensions. These correspond to the strength (positive-negative) and source (internal external) of the results which the individual hopes to achieve via alcohol consumption. By combining these, we obtain the four basic motive categories for alcohol consumption Social Motives, Enhancement Motives, Coping Motives, and Conformity Motives.

Based on these findings [3] created a 20 element questionnaire for the measurement of motives for drinking alcohol-5 elements for each of the four drinking motives. The resulting questionnaire contains the instruction: "Think about all the occasions that you have consumed alcohol (beer, wine, liquor, mixed drinks, etc.) over the past 12 months. How often have you drink alcohol for the following reasons?" After the instruction, 20 items ensue on a 5-degree scale from (Almost) Never to (Almost) Always.

The first study by the author of the tool Cooper (1994) was carried out on a representative sample of 1,243 adolescents from the USA in the age range of 13 to 17 years old [3]. In the first phase, the data obtained were compared to several alternative models of the factor structure. The four-factor structure was significantly proven as the best. These findings are in accordance with the theoretical model of motivation towards drinking alcohol [7]. Further analysis confirmed the same four-factor structure in the subgroups divided by age, gender, and race. To verify the reliability, a Cronbach`s Alpha calculation was used for the individual scales. Values of 0.85 for the Social Motives, 0.88 for the Enhancement Motives, 0.84 for the Coping Motives, and 0.85 for the Conformity Motives were achieved, showing adequate reliability of the individual questionnaire scales. In the research, respondents were also asked questions concerning the amount of alcohol consumed, the frequency of drinking, and the problems related to alcohol consumption, to verify the construct and criterion validity of the questionnaire.

The extensive work by Fernandes-Jesus et al. from 2016 was concerned with the verification of the factor structure and internal consistency of the DMQ-R tool in six European countries (Denmark, United Kingdom, Germany, Portugal, Italy, and Switzerland) [8]. The research sample was composed of 1903 university students. As their main goal, the testing of multi group equivalence of the four-factor structure of the DMQ-R was set. The factor structure was verified by using the confirmation factor analysis which included all 20 items of the tool. The analyses were carried out separately for the data from each country. The four-factor model containing 20 items did not satisfy the criteria set by the authors. After a more detailed analysis, they discovered two problematic items: no.8 ("so that others won't kid you about not drinking?") and no.15 ("because you feel more self-confident or sure of yourself?"). They decided to exclude these items and continue the research without them. In the sample of Switzerland, there was even 3rd item found to not satisfy the sufficient factor saturation criterium: no.2 ("because your friends pressure you to drink?"), but researchers decided to keep the item in the questionnaire. The confirmation factor analysis with the remaining 18 elements included, showed the suitable form of the four-factor model of data distribution. This was valid for data from all six countries. The equivalency of the four-factor structure was also shown across the groups, even though the strength of items loadings to the corresponding factors differs across countries. The Cronbach's Alpha coefficient was used to determine the level of reliability. It showed an acceptable internal consistency of scales in samples, as its values ranged from $\alpha=0.701$ to $\alpha=0.912$.

The psychometric quality of the questionnaire as well as the need for an appropriate measuring tool for the motives of alcohol consumption led to the re-standardisation of the questionnaire for the Slovak population. The study is aimed at the psychometric validation of the Slovak revised version of the DMQ-R questionnaire, specifically at verifying the content validity via factor analysis, and construct and criterion validity of the questionnaire by testing the relations to other measurement tools, and reliability in the sense of internal consistency. The adaptation process of the DMQ-R questionnaire for the Slovak population was carried out with the consent and was consulted with the co-author of the revised questionnaire form, prof. Kuntsche.

Materials and Methods

Research sample

The research sample was composed of 533 pupils, of which 328 girls and 205 boys. The age ranged from 14 to 20, with the average age at 16.58 years old. The participants were students of several secondary schools and one primary school. The representation of individual schools from all of the regions of Slovakia was as follows grammar school (243), trade academy (82), hotel academy (44), vocational secondary schools (147), and primary school (17).

Measurements

The Slovak version of DMQ-R questionnaire: The primary step in verifying the psychometric properties of the DMQ-R questionnaire on a sample of Slovak adolescents was the translation from the original English version via a comparison of two independent translations. Dubious items were consulted with experts from the area of psychology and based on these consultations; the wording of the items was specified with the aim to verify the content validity. The pilot Slovak version of the questionnaire was administered to a sample of 70 secondary school students. The construct validity was verified via confirmation factor analysis using Varimax rotation. The result was a 4-factor structure, where factors were saturated by items (with coefficients $\geq$ 0.4) in line with expectations.

The reliability verification as internal consistency via the Cronbach`s Alpha applied on pilot Slovak version of the questionnaire showed values similar to those in the original research [3]. A more detailed analysis of the contribution of individual items in the Conformity Motives scale showed a weak correlation on item no. 2. After its exclusion from the scale, the value increased to $\alpha=0.816$. Even with the item (no. 2) included, however, the internal consistency of all scales achieves $\alpha>0.7$. This amended Slovak version of the DMQ-R tool was then administered in the final sample.

Questionnaire on situational-motivational alcohol behavior factors (SMF)

The questionnaire measures situation-motivational factors of experimentation with and regular use of alcohol. Each factor is composed of 5 items on a Likert scale. The Cronbach`s Alpha values for individual scales ranged from 0.760 to 0.813 in the entire sample [9].

From the SMF questionnaire, items detecting the frequency of drinking alcohol during the last 30 days and the count of standard cups were used in this study. From the individual situation-motivational factors, 3 factors for regular drinking relevant for the verification of construct validity of DMQ-R were chosen: Group influence, Desire for effect,

and Escape from problems.

Rutgers Alcohol Problem Index (RAPI)

RAPI, by authors White and Labouvie (2004) is a tool for detecting alcohol problems in adolescents. It is composed of 23 items describing problems caused by alcohol [10]. For the purpose to verify the criterion validity, the total score was used. These elements ask the respondent whether, and how many times, they have had problems with preparing for school, an argument with their parents, or an argument with their friends as a consequence of alcohol use in the last 3 years.

Results

To verify the construct validity of the Slovak version of the DMQ the confirmation factor analysis was chosen. After checking the values of the KMO test and Bartlett's sphericity test we applied the 4-factor model in accordance with the original construct. The method of Principal Components Analysis with Varimax rotation with a setting of 4 components was applied.

Items with a factor loading value of over 0.4 are sorted into the 4 default factors (Table 1). Items no. 2 and 15 are exceptions, as they have low factor loadings in the components corresponding to the scales to which they should, according to the original study, belong. On the contrary, they saturate non-corresponding components. Other items saturated factors as expected. We also discovered that items no. 6, 10, 13, and 18 appear to be complex, significantly saturating more than one factor.

Table 1: Results of construct validity verification of DMQ-R (Slovak version): Factor analysis

Items*	Components			
	1.	2.	3.	4.
	Social Motives	Conformity Motives	Enhancement Motives	Coping Motives
3. Because it helps you enjoy a party?	**0.79**	0.16	0.27	0.13
5. To be sociable?	**0.74**	0.27	0.16	0.33
11. Because it makes social gatherings more fun?	**0.81**	0.14	0.36	0.07
14. Because it improves parties and celebrations?	**0.83**	0.10	0.30	0.13
16. To celebrate a special occasion with friends?	**0.76**	0.04	0.16	0.13
2. Because your friends pressure you to drink?	0.43	**0.28**	-0.14	0.33
8. So that others won't kid you about not drinking?	0.10	**0.84**	0.10	0.09
12. You drink to fit in with a group you like?	0.18	**0.81**	0.16	0.18
19. To be liked?	0.23	**0.85**	0.15	0.15
20. So you won't feel left out?	0.11	**0.85**	0.11	0.22
7. Because you like the feeling?	0.40	0.14	**0.74**	0.23
9. Because it's exciting?	0.24	0.33	**0.73**	0.23
10. To get high?	0.63	0.08	**0.56**	0.18
13. Because it gives you a pleasant feeling?	0.45	0.15	**0.71**	0.24
18. Because it's fun?	0.61	0.05	**0.56**	0.16
1. To forget your worries?	0.13	0.10	0.09	**0.85**
4. Because it helps you when you feel depressed or nervous?	0.24	0.20	0.25	**0.76**
6. To cheer up when you're in a bad mood?	0.50	0.24	0.16	**0.47**
15. Because you feel more self-confident or sure of yourself?	0.61	0.34	0.24	**0.27**
17. To forget about your problems?	0.12	0.30	0.26	**0.79**
% of Total Variance Explained	71.72			
* wording in the original English version of DMQ-R				

The second method of verifying the criterion validity was the analysis of correlations between indicators of alcohol use-quantity and frequency, and DMQ-R scales. The results of correlations between DMQ scales and the frequency of alcohol use in the last 30 days, as well as the count of standard cups drunk on one occasion, can be also found in Table. Further, we interpret the statistically significant positive relations between all four scales of the DMQ-R questionnaire and the problems caused by the consumption of alcohol on the statistical significance level of $p<0.001$. The strength of the relationships is a positive medium, except for the Conformity Motives scale with a weak correlation (Table 2).

Table 2: Results of criterion validity verification: Pearson's correlations between chosen scales/factors of DMQ-R (Slovak version) and: SMF scales, alcohol use intensity variables (Frequency, Quantity), alcohol problem index (RAPI)

Criteria	DMQ-R scales			
	Social Motives	Conformity Motives	Enhancement Motives	Coping Motives
Group influence	0.31***	0.44***		
Desire for effect			0.67***	
Escape from problems				0.64***
Frequency	0.48***	0.21***	0.45***	0.45***
Quantity	0.57***	0.11**	0.58***	0.43***
Alcohol problem index	0.44***	0.26***	0.41***	0.49***
*** correlation on significance level p < 0.001				
** correlation on significance level p < 0.01				

The reliability of DMQ-R (Slovak version) was verified using Cronbach`s Alpha coefficient. In (Table 3) we state the values of internal consistency for individual DMQ-R scales. For comparison, we also list the coefficient of the original English version. In a more detailed analysis of the items, we found, that item no.2 correlates weakly with the other items of the Conformity Motives scale. After excluding it, the reliability level increased to 0.90. Given that in the factor analysis, this item also had a low factor loading, we decided to exclude item no. 2 from the questionnaire.

Table 3: Reliability verification: Cronbach's Alpha for DMQ-R Scales in Slovak and original (English) version (Cooper, 1994)

Scales	Cronbach`s α	
	DMQ-R Slovak version	DMQ-R original version
Social motive (5 it.)	0.91	0.85
Conformity motive (5 it.)	0.86	0.85
Enhancement motive (5 it.)	0.90	0.88
Stress management motive (5 it.)	0.84	0.84
Conformity motive (4 it.)*	0.90	-
*Conformity Motives scale after exclusion of item no. 2		

Discussion

In the study presented we have dealt with the Drinking motives questionnaire revised (DMQ-R) by Cooper (1994) with the goal of verifying its psychometric properties on a sample of Slovak adolescents via its original Slovak version [3].

The Slovak version of DMQ-R was created by comparing two independent translations from English, where the translation was assessed by experts from the field in the sense of a primary verification of content validity. Subsequently, reliability and factor structure were verified on a sample of 70 students in the pilot phase of the research. Based on the results, the wording of two items was changed. Given that the analysis showed a sufficient level of reliability and the adequacy of four-factor data distribution, the questionnaire was then applied to the final sample. The sample included in the main analysis consisted of 533 adolescents aged 16 to 20.

The subsequent data analysis on the selected sample through confirmation factor analysis showed the existence of four factors. Items that saturated the factors with a co-efficient larger than 0.4 were attributed to them. In comparing the findings stated in the study presented with the findings of the primary research we found that the pertinent items saturate the factors according to the original setting [3]. Items no. 2 and no. 15 were exceptions. These did not achieve the required factor coefficient value. The same findings were brought about, among others (Hauck-Filho, Teixeira, Cooper, 2012), the study by Fernandes-Jesus et al. verifying the factor structure of DMQ-R among six countries in Europe [8,11]. In the aforementioned work, the authors offer an explanation for this phenomenon. Item no.15 is ambiguous since unlike the other items it does not point directly toward negative emotions. From a theoretical perspective, they recommend attributing it to a different dimension (for example Self-efficacy) [8]. Moreover, item no. 2 reached low factor coefficient values (0.42) also in the original research [3]. We identified 4 items (no. 6, 10, 13, 18) that significantly saturated more than one factor. This phenomenon is also described by Kuntsche et al. in an article concerning the overview of motives for drinking alcohol and the tools for their measurement. It could be observed in items where no clear internal motive, but a clear desired behaviour achieved by the consumption of alcohol (Rojkova, Vavrova, 2017) is expressed [5,9]. As presented, the four-factor model explains 71.72% of the data variance. We interpret that the four-factor solution is acceptable, and we can the Slovak version of the DMQ-R tool construct valid.

When verifying reliability via Cronbach`s Alpha, values from 0.84 to 0.91 were found. A similar reliability level is proven by several foreign researchers [6,12]. In a more detailed analysis of the items and their contribution to the overall reliability level of the scales, item no. 2 was identified as problematic, given it correlated weakly with the 4 remaining items of the Coping Motives scale. We decided to exclude item no. 2 from the questionnaire regarding the findings on its low correlations with the other items within a factor. After its exclusion, the Cronbach`s Alpha value rose to α=0.90. Overall, the level of reliability of the Slovak version of DMQ-R is consistent with the values measured in the original study, and it is considered reliable in measuring motives for the consumption of alcohol.

Further analysis was aimed at verifying criterion validity. For this reason, an original, psychometrically valid tool was chosen, the SMF questionnaire [9]. From the SMF questionnaire scales measuring (based on the theory) a similar construct to the DMQ-R scales, were chosen: Desire for effect, Group influence, and Escape from problems in regular drinking, for the reason of representing the external and internal motivational factors of positive or negative quality. The results prove significant positive relations between the chosen factors from both tools, with the highest coefficient values for relations of Enhancement Motives-SMF Desire for effect and Coping Motives-SMF Escape from problems, representing the strong association, which supports the view of the similarity of the measured constructs. Moderate coefficients between SMF Group influence and both DMQ-R scales-Social Motives and Conformity Motives are acceptable given the different number of factors in the constructs (DMQ vs. SMF). Social and Conformity Motives by DMQ-R are represented in the SMF construct by only one SMF Group influence that does not distinguish

between external or internal drinking tendencies in a social situation where alcohol is either consumed by friends or alcohol offered to the individual or otherwise. Based on these findings, we consider the Slovak version of DMQ-R, from the viewpoint of theoretically related constructs, a valid instrument.

The next 3 criteria within further verification were determined based on previous studies: quantity of alcohol drunk on one occasion, frequency of drinking during last 30 days and scale of problems caused by alcohol consumption [11-15]. The results of the analysis showed positive correlations between the Social Motives, Conformity Motives, Enhancement Motives, and Coping Motives scales and all three criteria. Therein, Social Motives and Enhancement Motives showed the strongest correlations with quantity and frequency of alcohol use. In the problems caused by alcohol criterium, the strongest connection with Coping Motives was detected. Compliant findings were brought about by a study on a sample from Hungary and Spain [13]. A difference from the presented study was noted in the relations to the Conformity motives, which had correlated, in several other research studies [3,4], negatively with the given criteria. A possible explanation is a difference in the experiencing the Conformity Motives between adolescents from central Europe and Western Europe or USA.

Conclusion

Based on the analysis we state that the results have shown the psychometric quality of the Slovak version of DMQ-R to be in accordance with the original version.

Acknowledgement

Conflict of Interest

Both authors (Marta Vavrova, Zuzana Rojkova) declare that there are no conflicts of interest.

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