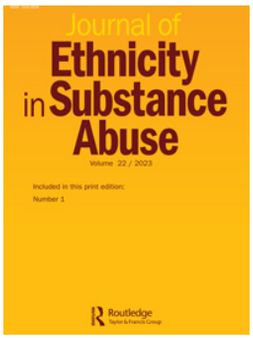

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A psychometric analysis of the Daily Drinking Questionnaire in a nationally representative sample of young adults from a Mediterranean drinking culture

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ABSTRACT

Aims: To examine psychometric properties of the Daily Drinking Questionnaire (DDQ) in a Mediterranean "wet" drinking culture.

Methods: Three studies were conducted using random samples drawn from a representative sample of Italian young adults (N = 5,955; females = 62%; mean age = 27): Study 1 explored the factorial structure of weekly alcohol consumption; in Study 2 multi-group confirmatory factor analysis tested measurement invariance across gender; Study 3 applied item response theory analysis to: a) assess how each item discriminated between different alcohol consumption levels; and b) determine if drink propensity on a given day of the week varied according to individual characteristics.

Results: In Study 1, a one-factor solution with no clear differentiation between weekdays and weekend alcohol use was found. Study 2 confirmed measurement invariance of the one-factor solution across gender. Results of Study 3 indicated that alcohol use on weekdays (Monday to Thursday) provided more information on overall alcohol consumption than alcohol use on weekends (Friday to Sunday).

Discussion: Cultural differences of alcohol use are reflected in relatively simple alcohol measures, such as the DDQ. In contrast with peers from "dry" drinking cultures, Italian young women and men do not clearly differentiate between weekdays and weekend drinking. In Italy, the DDQ best captures participants' average alcohol consumption levels rather than light or heavy, and should be used in national epidemiological research accordingly.

KEYWORDS

Alcohol measures; Daily Drinking Questionnaire; psychometric assessment; item response theory; drinking cultures; Italy

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Introduction

The issue of using comparable survey instruments to measure drinking patterns across countries has been well recognized both by researchers and policy makers (Bloomfield et al., 2013). The use of standardized measures is indeed important to increase cross-country comparability, however measures are generally used assuming they are culture-neutral, and little is known on how they work in different cultural contexts. Despite reductions in cultural differences in drinking practices in Western countries (Gordon et al., 2012; Kuntsche et al., 2011), there is evidence that differences in key sociocultural determinants of alcohol use and related drinking patterns continue to exist across nations (Aresi & Bloomfield, 2021; Castro et al., 2014; Inchley et al., 2018; Savic et al., 2016). These differences may be reflected in how people respond to alcohol survey instruments.

One example of a very popular alcohol measure is the Daily Drinking Questionnaire (DDQ) (Collins et al., 1985). For its relative simplicity and because it is able to capture daily fluctuations in alcohol use, this questionnaire has been used in a large number of studies. The DDQ consists of a set of seven questions that prompts respondents to indicate the number of drinks consumed each day of a typical week in a specific period of time (e.g., the previous month). To our knowledge, there is only one study that has examined psychometric properties of the DDQ (Lac et al., 2016). The authors used Confirmatory Factor Analysis (CFA) and Item response theory (IRT) to analyze data from a large sample of adults from the U.S.A. Results suggest most Americans adopt the heavy drinking weekend/sober weekdays pattern that is typical of "dry" drinking cultures, which are often associated with English-speaking and Scandinavian countries (Room, 2007, 2010; Room & Mäkelä, 2000).

Despite no study has examined the psychometric properties of the DDQ in any country other than the U.S.A., this measure has often been used in cross-cultural research (e.g., Aresi et al., 2020; Bravo et al., 2017; Gmel et al., 2006), and as a criterion validity instrument in studies aiming to validate national versions of measurement instruments (e.g., Ferreira et al., 2014).

Notably, the weekend/weekdays distinction found by Lac et al. (2016) may not extend to other countries characterized by a Southern European "wet" drinking culture, such as Italy and Southern European countries (Room, 2007, 2010; Room & Mäkelä, 2000). In this culture, weekend heavy drinking is common (Agnoli et al., 2018), though even among young people, alcohol use is still relatively integrated into everyday life (e.g., to enhance enjoyment of food) and it is consumed more often but in lower quantities per occasion (Aresi et al., 2018, 2020; Aresi & Pedersen, 2016; Beccaria et al., 2012). Accordingly, in these populations, frequency of

alcohol use *per se* is unrelated to poor outcomes, such as psychological distress and lower well-being (Piumatti, 2018; Piumatti et al., 2019).

In order to provide information on how to best measure drinking patterns in countries where a wet culture predominates, it is important to examine the psychometric properties of the DDQ. More specifically, there is need to gain insight on which day(s) of the week best provide information about individuals' overall alcohol consumption levels. In addition, it is important to examine whether this measure is able to account for differences in drinking patterns across genders, and if it captures different levels of alcohol use and misuse. This can inform epidemiological research on how to best measure alcohol use patterns in the general populations or in subpopulations at greater risk for harm.

As demonstrated by recent studies in the alcohol and drug field (Marmet et al., 2019; Saha et al., 2012; Sunderland et al., 2020) the combination of psychometric techniques such as factor analysis and item response theory (IRT) can serve the purpose of analyzing the factorial structure of a measurement instrument, testing its invariance across groups, and the differential functioning of scale items.

Aim and hypotheses

The present study aimed to examine psychometric properties of the DDQ in a representative sample of Italian young adults. Study 1 used Exploratory Factor Analysis (EFA) to determine the best factorial structure of the data from the seven DDQ items. We hypothesized that the bifactorial sober weekdays/heavy -drinking weekends structure will not hold true in the Italian population, where differences between weekdays and weekend drinking patterns are not as pronounced as in the U.S.A. population (Lac et al., 2016). Study 2 used Multi-Group Confirmatory Factor Analysis (MGCFA) to test measurement invariance across males and females. Gender differences in drinking are well recognized by research in this area and gender-specific analyses are almost always warranted. Despite convergence in the amount of alcohol consumed by men and women, women generally continue to drink more lightly than men (Kuntsche et al., 2011; Wilsnack et al., 2009), and this particularly evident in the Italian drinking culture, which is thought to be more anchored to traditional values (Aresi et al., 2020; Törrönen et al., 2017). For this reason, it is important to highlight whether we can reliably examine gender differences in weekly alcohol consumption among Italian young adults using the DDQ or whether we should expect systematic bias at the item-level. Finally, as pointed out by Meade and Lautenschlager (2004), researchers and practitioners may receive an incomplete picture of

measurement invariance assumptions and psychometric properties of a given instrument when adopting factorial analysis and IRT techniques separately. Thus, Study 3 used IRT to examine: a) to what extent the DDQ is able to discriminate between different levels of weekly alcohol consumption; and b) whether specific sub-groups of Italian young adults, based on socio-demographic or alcohol use characteristics, are more likely to report drinking on specific days of the week.

Method

Data

This study involves the secondary analysis of data. Participants were drawn from a pre-recruited web panel (Panel Giovani Ipsos – Osservatorio Giovani of the Toniolo Institute). Data was collected in December 2015. More information on sampling procedures can be found in Aresi et al. (2018) The sample was representative of the Italian young adult population (Istituto Nazionale di Statistica, 2015). In this study, lifetime nondrinkers were excluded and the analytic sample of 5,955 current or past drinkers only was used. Nearly two-thirds (62.7%) of these participants were female and the mean age was 27.2 ($SD = 4.14$; range 18–33 years).

Measures

All measures were translated by native speakers from English (and back translated for accuracy) into Italian.

Alcohol use

Participants were asked if they ever had any alcohol. They were then prompted to consider a typical week during the last three months, and asked to indicate the number of drinks consumed each day of a typical week in the last three months, using the Daily Drinking Questionnaire (DDQ, Collins et al., 1985). As it was done in previous studies (Aresi et al., 2018, 2020; Lac et al., 2016), responses were dichotomized to whether participants drank alcohol (1 = at least 1 drink) or not (0 = 0 drinks) on each day.

Binge drinking

Following established recommendations (Chavez et al., 2011), participants were asked the number of times during the past month they consumed four (females) or five (males) or more drinks within a two–hour drinking session. These two items included six response options, ranging from 1 = *never* to 6 = *9 or more times*. A dichotomous item was derived from

this set of questions defining whether participants engaged in binge drinking at least once in the previous month (0 = *no/never*, 1 = *yes*).

Alcohol-related negative consequences

The summed score of seven dichotomous items (0 = *no*, 1 = *yes*) adapted from the Brief Young Adult Alcohol Consequences Questionnaire (BYAACQ - Kahler et al., 2008) represented the total number of consequences experienced in the previous 30 days: *"I have had a hangover (headache, sick stomach) the morning after I had been drinking"*, *"I've not been able to remember large stretches of time while drinking heavily"*, *"The quality of my work or school work has suffered because of my drinking"*, *"While drinking, I have said or done embarrassing things"*, *"I have felt very sick to my stomach or thrown up after drinking"*, *"My drinking has created problems between myself and my boyfriend/girlfriend/spouse, parents, or other near relatives"*, and *"I have driven a car when I knew I had too much to drink to drive safely"*. A dichotomous variable was created for defining whether participants suffered at least once from any alcohol-related negative consequences (0 = *no/never*, 1 = *yes*).

Samples construction and analytical strategy

Missing rates were overall low across DDQ's items: <0.1% (i.e., less than three missing values). On the other hand, 13.8% (n = 824) of participants did not answer to the BYAACQ. No missing values were registered regarding gender and binge drinking. Complete-case analysis was adopted, unless stated otherwise (see Study 2). Three samples of 1,985 participants were randomly selected from the original total sample of 5,955. The three groups did not significantly differ according to age ($F = 0.21$, $p = 0.812$), gender ($\chi^2 = 1.56$, $p = 0.459$), occupational status ($\chi^2 = 2.25$, $p = 0.324$), civil status ($\chi^2 = 8.20$, $p = 0.414$) or student status ($\chi^2 = 0.69$, $p = 0.707$), nor binge drinking ($\chi^2 = 15.01$, $p = 0.132$) and number of alcohol-related negative consequences ($\chi^2 = 2.79$, $p = 0.247$).

The samples were used in three consecutive studies. In Study 1, EFA was used to determine which conceptual factorial structure best describes the data from the seven DDQ items. In Study 2, MGCFA was used to test the measurement invariance of the factor solution obtained in Study 1 across males and females. In Study 3, IRT was used to determine: a) to what extent does each DDQ item discriminate between the different levels of weekly alcohol consumption; and b) whether, on the basis of specific sociodemographic and alcohol use individual characteristics, the probability of consuming alcohol on a specific day can be significantly explained. The three following variables were selected as possible sources of response

variability: gender (males are considered more probable alcohol consumers than females), binge drinking and having experienced alcohol-related negative consequences in the previous month. Testing within the IRT framework the association between these variables and the probability of consuming alcohol on a specific day of the week can be helpful in two ways: first, it can improve our understanding of which portion of the alcohol use spectrum is most reliably measured by this set of items (i.e., high or low alcohol use levels); second, it allows to determine whether specific sub-groups of Italian young adults are more likely to report drinking on specific days of the week. All analyses were conducted using Stata (version 15; StataCorp LP, College Station, TX, USA).

Study 1: exploratory factor analysis

Analyses

As preliminary analysis, we explored the response patterns' frequencies. As suggested by Muthén and Kaplan (1992) and Gilley and Uhlig (1993), we then conducted an EFA using the raw-data matrix of polychoric correlations between the seven binary items of daily alcohol consumption. This method has proven to be more robust than one based on the Pearson's correlation matrix when dealing with ordinal (including binary) variables (Muthén, 1984), especially in absence of bivariate normality (Coenders et al., 1997). We thus ran an EFA of the polychoric correlation matrix between DDQ's items using a principal-component factor method and orthogonal varimax rotation. As a criterion to decide upon the number of factors to retain we used the eigenvalue-greater-than-one rule (eigenvalue >1) (Kaiser, 1974) and examined the percentages of the total variance explained by each factor. In addition, through the Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy (ranging from 0 to 1) we assessed the magnitude of the relationships between items, with small values meaning that overall the variables have too little in common to warrant a factor analysis (Kaiser, 1974).[1]

Results

Examination of the frequencies of response patterns revealed that the most typical patterns resemble weekend drinking behaviors, namely either Saturday-only ($n = 345$, 17%) or weekend-only (i.e., Saturday and Sunday) drinking ($n = 337$, 17%). Everyday drinking was well represented in the current group ($n = 254$, 13%) as well as never drinking ($n = 212$, 11%). Overall, Italian young

[1]The following labels were given to values of KMO (Kaiser, 1974): 0.00 to 0.49: unacceptable; 0.50 to 0.59: miserable; 0.60 to 0.69 mediocre; 0.70 to 0.79: middling; 0.80 to 0.89: meritorious; and 0.90 to 1.00: marvellous.

adults in the current sample were more likely to drink on Saturdays (83% of positive responses), Sundays (55%) and Fridays (46%). Nevertheless, only one factor with eigenvalue >1 emerged explaining 74% of the variance in the model. Supplemental Table S1 presents results of EFA. Standardized item factor loadings ranged between 0.659 (for Saturday) to 0.968 (for Tuesday). KMO values showed acceptable results for all items except for Saturday for which this was just above acceptable. However, the overall KMO value was equal to 0.755, indicating the adequacy of the current sample for conducting EFA on this set of questions. Cronbach's alpha was equal to 0.83. A clear differentiation between weekdays and weekend alcohol use was not found, and the one-factor solution was thus retained as valid.

Study 2: multi-group confirmatory factor analysis

Analyses

Gender invariance testing followed a series of hierarchical models each adding an increasing number of constraints (Van de Schoot et al., 2012). According to Milfont and Fischer (2010), measurement invariance can be reliably assessed adopting the following three sequential steps. The first model tested *configural invariance*, namely whether the pattern of factor relationships is identical across males and females. The following model tested *metric (pattern) invariance*, namely whether the coefficients allowing to estimate the latent variable from the original score (i.e., factor loadings) were identical across groups. The last model tested *strong* (*scalar) invariance* by adding intercepts' constraints across groups in order to ascertain that the meaning of the construct (i.e., the factor loadings), and the levels of the underlying items (i.e., intercepts) were equal across groups. If the assumption of invariance holds across according to these steps, the groups can be compared based on their latent scores. Given the binary nature of our observed variables, MGCFA was tested within the generalized structural equation modeling framework (Muthén, 2002). For model identification purposes, in both groups the factor loading for the first item (i.e., Monday) was constrained to equal one and the corresponding intercept equal to zero. Estimated with maximum likelihood with observed information matrix standard errors, the models were analyzed with the ordinal distribution and logit link. Likelihood-ratio tests were used to compare adjacent hierarchical models, the underlying assumption being that constrained models are nested in unconstrained ones. Non-significant results from these tests indicate that the models with free parameters do not fit the data significantly better than the models where the parameters were constrained to be equal across groups. In addition, to determine which model fitted the data best, we looked at differences in Akaike (AIC) and Bayesian

Table 1. Results of one-factor solution's measurement invariance testing across males and females (Group 2 – n = 1,985).

			Likelihood ratio test			
Model	AIC	BIC	χ^2	*df*	*p*	Comparisons
Model 1. Configural invariance: all parameters free	10,513.91	10,670.52				
Model 2. Metric (pattern) invariance: loadings are invariant	10,501.89	10,624.94	−0.02	6	1.000	Model 2 vs. Model 1
Model 3. Strong (scalar) invariance: loadings and intercepts are invariant	10,442.58	10,526.48	−45.31	7	1.000	Model 3 vs. Model 2

Note. AIC: Akaike information criterion; BIC: Bayesian information criterion; χ^2: Chi-square goodness of fit; *df*: degrees of freedom.

Table 2. Results of one-factor confirmatory analysis by gender. Unstandardized results are shown (Group 2 – n = 1,985).

	Males (*n* = 740)			Females (*n* = 1,245)		
Item	B	SE	95% CI	B	SE	95% CI
Monday	1			1		
Tuesday	2.79	0.64	1.53, 4.05	2.45	0.51	1.44, 3.45
Wednesday	1.43	0.25	0.93, 1.92	0.95	0.12	0.71, 1.18
Thursday	1.69	0.35	1.00, 2.38	1.29	0.20	0.91, 1.68
Friday	0.64	0.10	0.46, 0.83	0.72	0.11	0.50, 0.93
Saturday	0.41	0.07	0.28, 0.54	0.58	0.07	0.43, 0.72
Sunday	0.36	0.05	0.26, 0.46	0.32	0.04	0.25, 0.39

Note. B: Unstandardized factor loadings; SE: Standard error; 95% CI: 95% Confidence Intervals.

information criteria (BIC) between different solutions, with lower values being indicative of a better fit (Royston, 2001).

Results

Results of MGCFA (Table 1) supported the assumption of strong factorial invariance for the one-factor solution across males and females, implying that all factor loadings and intercepts are invariant across groups. Thus, the latent factor mean of alcohol consumption in a typical week based on this set of questions can justifiably be compared between males and females (Byrne et al., 1989). Unstandardized factor loadings reported in Table 2 show that the rank-order of the items is similar for both genders. Cronbach's alphas were equal to 0.85 for males and 0.81 for females.

Study 3: IRT analysis analyses

Analyses

IRT analyses were conducted in two steps. First, a one-parameter model was tested against a two-parameter one. The former, also called Rasch

model, differentiates items based on their 'difficulty', namely the level of the measured underlying trait (in our case consuming alcohol on a certain day of the week) a subject must have to have a .50 probability of responding 'yes' to a specific item. The two-parameter model instead differentiates items based on both item difficulty and item discrimination, which reflect the extent to which an item discriminates between different levels of the underlying trait: higher values indicate a stronger association with the measured construct (Hays et al., 2000; Van Der Linden & Hambleton, 1997). Because the one-parameter model is nested in the two-parameter one, the best fitting solution was decided using the likelihood-ratio test. A significant result from this test indicates that the two-parameter model fitted the data significantly better than the one-parameter model. Items' characteristic curves, conditional standard errors and test information function were graphically plotted.

In the second step, the Differential Item Functioning (DIF) was examined. In the case of the DDQ, an item demonstrates DIF if individuals with the same underlying level of alcohol consumption have a different probability of answering 'yes' vs. 'no' because they belong to different sub-groups (Holland & Wainer, 2012; Raykov & Marcoulides, 2018). DIF was assessed according to gender, binge drinking and alcohol-related negative consequences using logistic regression and the Mantel-Haenszel (MH) test to account for multiple testing (Agresti & Kateri, 2011; Benjamini & Hochberg, 1995). Items' characteristic curves for single items reporting significant DIF based on the individual characteristics taken into consideration were graphically plotted.

Results

The two-parameter model fitted the data significantly better than the one-parameter model ($\chi^2 = 279.65$, $df = 6$, likelihood ratio test $p < 0.001$), thus suggesting that the DDQ seven items can be differentiated on their capacity to discriminate, with a certain degree of reliability, between individuals reporting lower or higher alcohol consumption. Supplemental Table S2 reports difficulty and discrimination parameters for each item. Figures 1 and 2 display items' information functions and characteristic curves, respectively. Weekdays (i.e., Monday to Thursday) appeared to be the most "difficult": an individual must have a latent alcohol consumption score between 0.72 and 0.88 to get a 50% chance to answer "yes" on these items (see Figure 2). The scaled score represents the true latent score in alcohol consumption and it has been standardized on a scale from −4 to 4, although it is unlikely to find somebody scoring at those extremes. Accordingly, an individual with a very low level of alcohol consumption

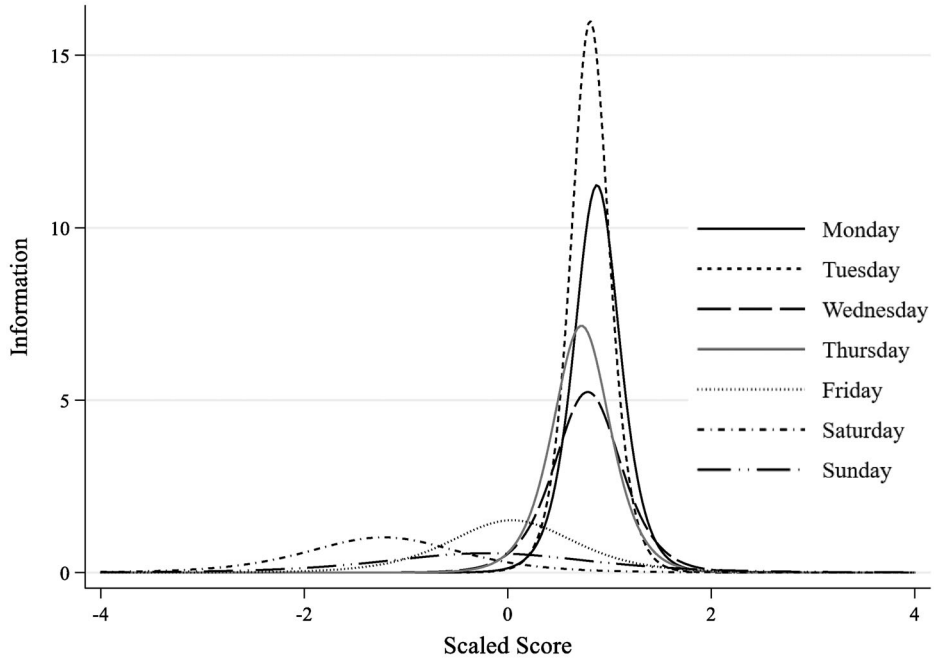

Figure 1. Item information functions (Group 3 × 96 n = 1,985).

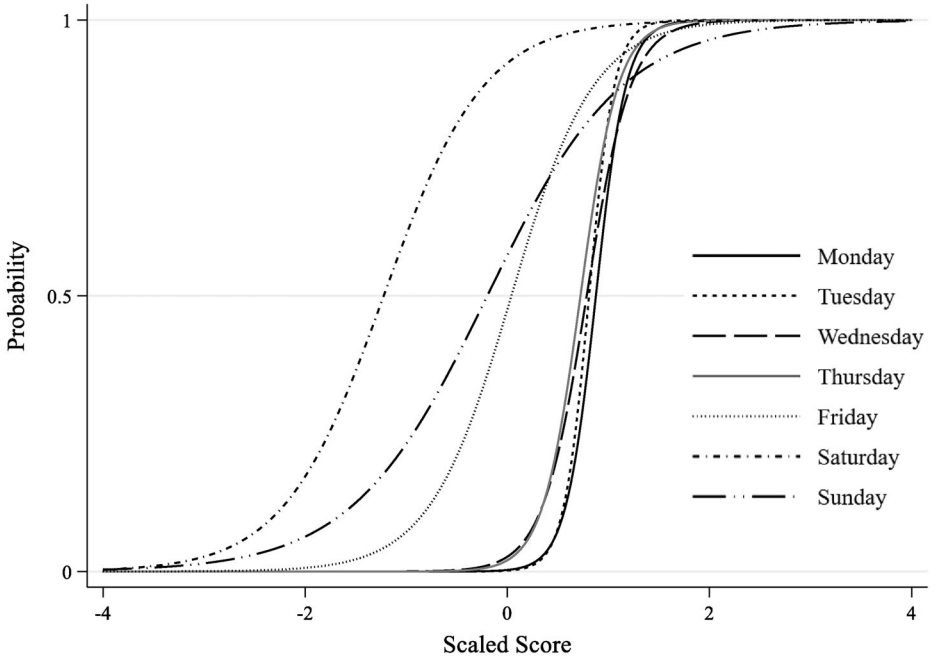

Figure 2. Item characteristic curves (Group 3 × 96 n = 1,985).

(e.g., −2) would have a smaller probability of answering "yes" to each item. Conversely, those exhibiting an alcohol consumption level equal to 2 would most certainly answer "yes" to every item. For what concerns items'

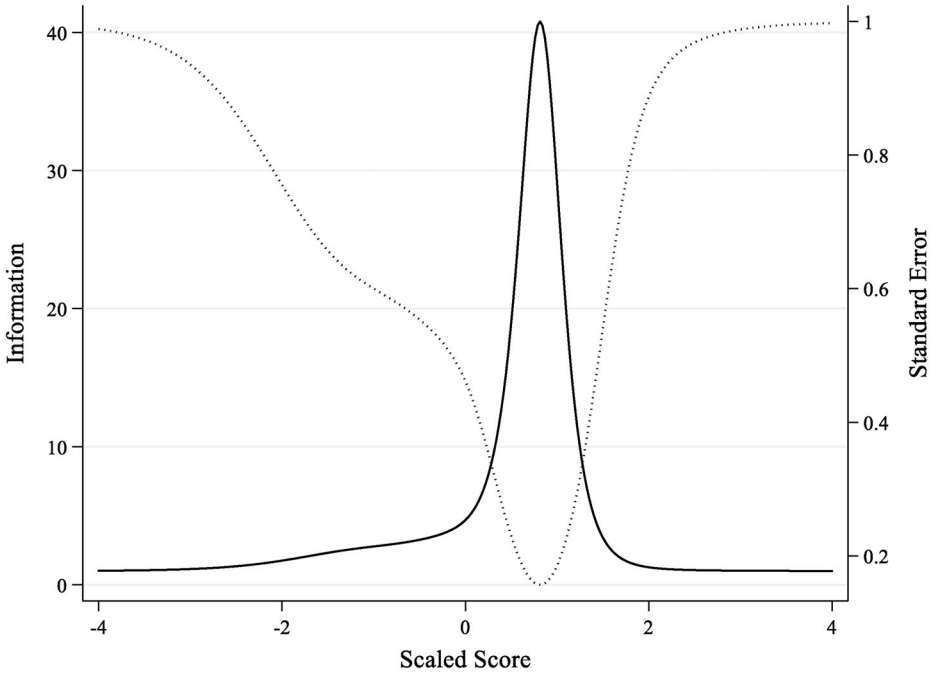

Figure 3. Information graph showing the test information function (solid line) and the conditional standard error curve (dotted line) (Group 3 × 96 n = 1,985).

provided information, while weekend days (i.e., Friday to Sunday) appear to be the "easiest" ones, they also produce the least amount of information to discriminate between individuals with different levels of alcohol consumption (see Figure 1). Weekdays items can better differentiate between lower and higher alcohol consumers. Figure 3 displays the conditional standard errors and test information function for the whole seven-item scale. Based on these results, this set of items shows low levels of standard error and a high level of provided information only for latent scores ranging from 0 to approximately 1.8. For these reasons, the DDQ appears to be best appropriate to capture average levels of alcohol consumption, whereas high or low levels are not assessed as adequately.

DIF were then tested according to gender, binge drinking and alcohol-related negative consequences. Based on the Mantel-Haenszel correction on the logistic regression test, no significant DIF was observed according to gender and binge drinking, meaning that these individual characteristics do not significantly differentiate participants according to their propensity to drink at any given day of the week (see supplementary Table A3). On the other hand, the Sunday item showed a significant non-uniform DIF between participants who never suffered alcohol-related consequences in the previous month vs. those who did at least once. To clarify the interpretation of this result, the item characteristic curve for this item was

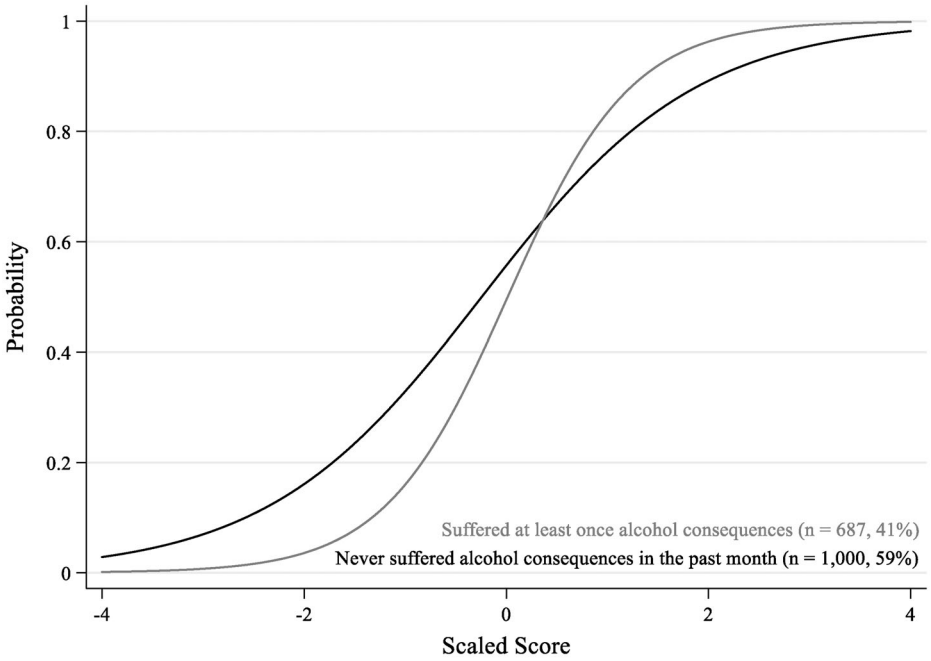

Figure 4. Item characteristic curve for the item 'Sunday' according to alcohol-related negative consequences (previous month).

graphically plotted by sensitive categories. As Figure 4 illustrates, the non-uniform DIF according to alcohol-related consequences can be interpreted as a significant group by underlying trait interaction: at lower levels of alcohol consumption the likelihood of consuming alcohol on Sunday is higher for participants who never suffered alcohol-related negative consequences in the previous month, but the reverse is true for higher levels of alcohol consumption (Table 3).

Discussion

Results from this series of studies support the theoretical assumption that young adults in a Mediterranean wet drinking culture differ from those in dry cultures because they do not clearly differentiate between weekdays and weekend alcohol use (Lac et al., 2016). This result confirms those of previous studies that questioned the predominance of the heavy drinking weekend/sober weekdays dry pattern in Southern European countries (Aresi et al., 2018, 2020; Aresi & Pedersen, 2016; Beccaria et al., 2012). The novelty of this study consists in providing empirical evidence to the idea that even relatively simple alcohol measures, such as the DDQ, are not culture-neutral. In other words, cultural differences on how alcohol is used and understood extend to alcohol measures. Even though the DDQ has been used in different countries and cross-cultural research, this is the first time

Table 3. Results of Mantel-Haenszel tests for differential item functioning (Group 3 – n = 1,985).

Item	χ^2	*p*	OR	95% CI
Gender (RC: *Male*)				
Monday	1.87	0.172	0.673	0.399, 1.137
Tuesday	1.47	0.225	1.432	0.847, 2.421
Wednesday	0.40	0.529	0.859	0.571, 1.292
Thursday	0.61	0.435	1.212	0.795, 1.850
Friday	0.08	0.776	0.947	0.702, 1.277
Saturday	0.70	0.403	1.228	0.802, 1.880
Sunday	0.06	0.811	0.960	0.737, 1.249
Binge drinking (*previous month*; RC: *Never*)				
Monday	3.25	0.071	1.671	0.976, 2.860
Tuesday	2.60	0.107	0.575	0.310, 1.067
Wednesday	1.44	0.230	0.720	0.444, 1.167
Thursday	0.26	0.609	0.857	0.534, 1.375
Friday	0.32	0.571	1.151	0.766, 1.730
Saturday	0.14	0.708	1.231	0.588, 2.577
Sunday	0.23	0.629	1.120	0.770, 1.632
Alcohol-related negative consequences (*previous month*; RC: *Never*)				
Monday	0.02	0.891	1.080	0.623, 1.873
Tuesday	0.64	0.425	0.782	0.462, 1.323
Wednesday	0.29	0.588	1.152	0.753, 1.762
Thursday	0.00	0.998	1.025	0.665, 1.580
Friday	2.48	0.115	1.304	0.952, 1.785
Saturday	0.56	0.456	1.264	0.754, 2.120
Sunday	4.24	0.040	0.729	0.546, 0.973

Note. χ^2: Chi-square goodness of fit; OR: Odds Ratio; 95% CI: 95% Confidence Intervals; RC: Reference Category. Gender was coded 0 = *Male* and 1 = *Female*. Binge drinking was coded 0 = *Never* and 1 = *At least once*. Alcohol consequences was coded 0 = *Never* and 1 = *At least once*.

its psychometric properties are examined in a non-U.S. sample. This is not to say that standardized measures should not be used, but that more reflection and research is needed in this area (Bloomfield et al., 2013).

This study further contributes to the literature by providing valuable information on DDQ items performance across socio-demographic and alcohol use variables in a representative sample of young Italians. First, the DDQ appears to capture a unique dimension of alcohol use which is largely similar across genders, thus supporting the convergence hypothesis (Törrönen et al., 2017; Vieno et al., 2013). Second, alcohol use during any single weekday (Monday to Thursday) can provide much more information about individuals' overall alcohol consumption levels (low to heavy) than frequency of alcohol consumption during the weekend (Friday to Sunday). Accordingly, in contexts characterized by a wet drinking culture, any effort to detect and measure alcohol abuse or misuse among young adults should focus on drinking behavior during the week rather than weekends. Interestingly, results of drinking preferences also suggest a potential carry-over effect of weekend drinking into Sundays. The observed significant interaction between alcohol-related negative consequences in the previous month and overall alcohol consumption may indicate that those with higher levels of alcohol consumption are more likely to consume alcohol on Fridays and Saturdays. These individuals may therefore experience

increased chances to suffer negative consequences following weekend drinking sessions and thus avoid drinking alcohol on Sundays. Such behavior may reflect the adoption of the dry drinking pattern by Italian heavy drinkers that features infrequent but heavy consumption, often concentrated over the weekends, resulting in visibly acute consequences (Aresi & Bloomfield, 2021; Room, 2007, 2010; Room & Mäkelä, 2000).

Third, our IRT results confirmed and extended to the Italian youth population those reported by Lac et al. (2016) on the properties of the DDQ in the U.S.A.: weekday items better capture higher levels of the alcohol consumption spectrum, whereas weekend days better detect lower levels. Even just very low levels of alcohol consumption are likely to increase the chances to report alcohol consumption from Friday to Sunday, thus to offer more solid statements on significant individual differences in terms of weekly alcohol consumption, weekday items may prove to be more efficient and reliable.

Overall, these results support the inclusion of the DDQ in future epidemiological surveys interested in obtaining a self-reported measure of average alcohol consumption among the general population of young adults. Other types of instruments, such as the CAGE questionnaire (Dhalla & Kopec, 2007), the AUDIT (Saunders et al., 1993) or DSM-5 criteria (Sunderland et al., 2020), are preferable in studies interested in observing more problematic alcohol use behaviors in high-risk populations.

Future research could examine the psychometric properties of the DDQ among populations other than young adults, and determine to what extent results on Italian young adults can be extended to other age groups. As drinking cultures are constantly changing (Aresi & Bloomfield, 2021), any difference that will be found across age groups could offer insight on how cultural features attached to alcohol use have evolved. Lastly, cross-cultural studies combining samples from different Southern European countries could also test whether the DDQ properties are similar across countries that share similar cultural meanings of alcohol use.

Limitations

This study was not without limitations. First, the possible underreporting tendency of drinking behavior when using a self-report measure needs to be acknowledged. In addition, several other individual characteristics may be tested to explore probability differences for the propensity to drink at any given day of the week. Most notably, mental health measures should be used to differentiate young adults according to lower or higher levels of psychological well-being and test their relationship with the probability of drinking during weekdays and weekends. Finally, despite translation and

back-translation of the other adopted measures in the current study (i.e., BYAACQ) further research is needed to assess their validity in the Italian context.

Conclusions

Findings from this study indicate that cultural differences related to how alcohol is used and understood are reflected in alcohol measures, such as the DDQ. Italian young adults do not clearly differentiate between weekdays and weekend drinking, thus revealing the existence of a dominant wet drinking culture, except for heavy drinkers. The DDQ is confirmed to be a specific gauge to capture the average traits of alcohol consumption levels most common in the general population, and should be used in research and epidemiological studies accordingly. Other types of instruments meant to measure problematic alcohol use behaviors should be selected when targeting high-risk populations.

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