Development and validation of the alcohol Expectancy Questionnaire Short Form (EQ-SF)

Desarrollo y validación de la versión corta del cuestionario sobre expectativas de los efectos del alcohol (EQ-SF)

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Abstract

Alcohol expectancies are proximal variables to alcohol use and misuse. In recent decades, different measures have been developed to assess this construct. One of the most frequently used and recommended instruments is the Expectancy Questionnaire (EQ; Leigh y Stacy, 1993). Our aim is to develop a short version of the EQ (EQ-SF) for suitable use in time-limited administrations. Two samples, adolescents (N = 514, 57.20% females) and adults (N = 548, 61.50% females), completed the EQ together with alcohol-use measures. Different item selection strategies were applied to select the 24 items. The EQ-SF structure was explored using confirmatory factor analysis, and measurement invariance was tested running a multi-group analysis comparing groups by sex and age. Reliability was tested using Cronbach's alpha and omega coefficients. Concurrent validity was investigated with regression analyses. The EQ-SF showed acceptable between-groups measurement invariance. Alphas and omegas ranged from .77 to .93. Positive expectancies predicted both alcohol use and alcohol-related problems. Negative expectancies predicted alcohol-related problems. Sex and age moderated these associations. Males with high positive alcohol expectancies showed higher alcohol consumption than females, while adults with high negative alcohol expectancies showed greater alcohol-related problems than adolescents. Different evidence on the validity and reliability of the EQ-SF suggest that it is a suitable instrument to assess alcohol expectancies in the Spanish population.

Keywords: expectancies; alcohol; EQ-SF; assessment; psychometric properties.

Resumen

Las expectativas sobre los efectos del alcohol son una variable proximal al consumo de alcohol. Uno de los instrumentos más usados y recomendados para evaluar este constructo es el Expectancy Questionnaire (EQ; Leigh y Stacy, 1993). El objetivo es desarrollar una versión corta del EQ (EQ-SF) útil para administraciones en las que el tiempo de evaluación es reducido. Dos muestras, una de adolescentes (N = 514, 57,20% mujeres) y una de adultos (N = 548, 61,50% mujeres), completaron el EQ y diversas medidas sobre consumo de alcohol. Se utilizaron diversas estrategias para seleccionar los 24 ítems. Se exploró la estructura del EQ-SF mediante análisis factoriales confirmatorios y la invarianza de medida entre sexos y grupos de edad realizando análisis multigrupo. Se calculó la fiabilidad de las escalas mediante el alfa de Cronbach y el coeficiente omega, y la validez concurrente a través de análisis de regresión. La invariancia entre grupos fue aceptable. Los coeficientes alfa y omega iban de ,77 a ,93. Las expectativas positivas predijeron la cantidad de alcohol consumida y los problemas derivados del consumo, mientras que las negativas predijeron los problemas derivados. Sexo y edad moderaron estas asociaciones. Los hombres con elevadas expectativas positivas bebían más que las mujeres, mientras que los adultos con elevadas expectativas negativas mostraron mayores problemas derivados del consumo que los adolescentes. Las diferentes fuentes de evidencia sobre la validez y fiabilidad del EQ-SF sugieren que es un instrumento adecuado para evaluar las expectativas sobre los efectos del alcohol en población española.

Palabras clave: expectativas; alcohol; EQ-SF; evaluación; propiedades psicométricas.

Received: December 2016; Accepted: June 2017.

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Alcohol is one of the most frequently consumed psychoactive drugs worldwide, and one of the most serious global public health problems (World Health Organization, 2014). In fact alcohol is one of the five main causes of illness, disability and death for all age groups (Lim et al., 2012; Rehm et al., 2009), and is the first risk factor that contributes to disability-adjusted life years (DALYs) in young individuals aged 10-24 (Gore et al., 2011). In this scenario, accurate and efficient assessments of the risk and protective factors for alcohol use have become an essential practice to improve current prevention and intervention programs (Hawkins, Catalano, & Miller, 1992; Hawkins, Catalano, & Arthur, 2002).

Alcohol expectancies (AEs) have repeatedly predicted current and future alcohol use (Jones, Corbin, & Fromme, 2001). AEs are defined as positive and negative beliefs about cognitive, affective and behavioral effects of alcohol (Jones et al., 2001; Reich, Below, & Goldman, 2010). Specifically, positive AEs have been related to alcohol use in adolescents (Camacho et al., 2013; Ibáñez et al., 2015; Morean, Zellers, Tamler, & Krishnan-Sarin, 2016) and adults (Harnett, Lynch, Gullo, Dawe, & Loxton, 2013; Mezquita et al., 2015; Wardell, Read, Colder, & Merrill, 2012). Positive AEs have been linked to alcohol-related problems (i.e., abuse and dependence symptoms and other behavioral problems associated with excessive drinking) in younger (Grigsby, Forster, Unger, & Sussman, 2016; Ibáñez et al., 2015; Morean et al., 2016) and older individuals (Corbin, Iwamoto, & Fromme, 2011; Dunne, Freedlander, Coleman, & Katz, 2013; Mezquita et al., 2015).

As negative AEs have been less frequently examined, their role in alcohol use and abuse is not that clear. Different studies have shown a slightly protective role for alcohol use (Camacho et al., 2013; Ibáñez et al., 2015; Leigh & Stacy, 2004), whereas other authors have failed to replicate these associations (Mezquita et al., 2015; Nicolai, Moshagen, & Demmel, 2012; Pabst, Kraus, Piontek, Mueller, & Demmel, 2014).

Regarding alcohol-related problems (APs), there is evidence for positive associations between negative AEs and APs in younger (Ibáñez et al., 2015) and older participants (Dunne et al., 2013; Mezquita et al., 2015; Pabst et al., 2014). These positive associations between negative AEs and APs suggest that negative AEs might be the result of bad alcohol consumption experiences rather than their cause (Spillane, Cyders, & Maurelli, 2012). In line with this idea, differences between AEs when comparing clinical and non clinical samples are bigger for negative AEs than for positive AEs (Li & Dingle, 2012). Despite previous findings, more research is needed to clarify the role of negative AEs in different alcohol-related outcomes.

As a result of existing research into AEs, the assessment of alcohol expectancies has been recommended in prevention and treatment programs of alcohol use and abuse (Cox & Klinger, 2004). Several measures of AEs exist (see Camacho et al., 2013 for a discussion on existing measures). Of these, the Expectancy Questionnaire (Leigh & Stacy, 1993) is frequently recommended because it includes both positive and negative expectancies, and presents good reliability and predictive validity indices (Mezquita et al., 2015; Monk & Heim, 2016). The EQ is composed of 34 items. Exploratory and confirmatory factor analyses have consistently replicated a hierarchical model with eight first-order factors (i.e. four positive and four negative AEs) and two second-order factors, namely positive and negative AEs (Camacho et al., 2013; Leigh & Stacy, 1993). Positive expectancies of alcohol use include social positive (i.e., social facilitation), fun (i.e., positive affect potentiation), sex (i.e., sexual disinhibition) and tension reduction (i.e., stress relief). Negative expectancies are social negative (i.e., antisocial effects of alcohol use), emotional negative (i.e., negative emotional states due to alcohol consumption), physical negative (i.e., undesirable physical effects), and cognitive negative (i.e., cognitive impairment).

Although the EQ is a psychometrically robust measure, as far as we know no other research has tested whether the EQ can be reduced to a more manageable set of items. Item reduction is a highly recommended practice in both clinical and research settings, especially when several questionnaires are to be administered together, and particularly in samples of youngsters for whom long scales could be a problem due to tiredness. As AEs are only one of the psychological factors involved in alcohol use, reducing the number of items in the EQ might facilitate the inclusion of a measure of AEs in future studies or treatment programs for which administration time is limited. Therefore, the aim of the present study was to create a reduced version of the Expectancy Questionnaire (EQ-SF) with adequate psychometric properties. Like the EQ, we expected the EQ-SF to receive evidence from different sources about its validity and reliability in the assessment of alcohol expectancies. Specifically, we hypothesized that the EQ-SF: a) will present a similar hierarchical structure to the original EQ; b) the measure will be invariant between males and females and between adolescents and adults; c) its scales will present between good and excellent reliability indices; and d) associations with alcohol-related outcomes will be in line with previous studies (see the Introduction) (Camacho et al., 2013; Leigh & Stacy, 1993). Finally, as some differences in the association of alcohol expectancies and alcohol-related outcomes have been found among sex and age groups (Monk & Heim, 2016; Nicolai et al., 2012), we explored whether sex and age would moderate associations.

Method

Procedures

The development and evaluation of the EQ-SF was carried out with two different Spanish samples: adolescents and adults.

Adolescents sample. Seven high schools from rural and urban areas of the provinces of Valencia and Castellon participated in this study. Research assistants asked students to answer questionnaires in class during three different sessions, and helped them whenever necessary. All the participants returned an informed consent form signed by their parents. Adolescents voluntarily completed the questionnaires and did not receive any compensation for participating in the research.

Adult sample. Adults were recruited via advertisements placed at the Universitat Jaume I. Participants were offered to respond to the most of the battery of questionnaires (i.e., demographics, alcohol expectancies, alcohol-related problems among others) either in a paper-and-pencil format (academic year 2011) or online (academic year 2012). To ensure that participants understood the SDUs concept and completed the alcohol use measure correctly, they all responded to the AIS-UJI in the lab. All the participants signed an informed consent form and were paid 30 euros for their collaboration.

Participants

Adolescents sample. The sample that completed the EQ was composed of 514 secondary education students, aged 14-17 years (57.20% females; mean age = 15.21, *SD* = .63). Of these, 428 (83.3%) completed a measure of alcohol use (57.24% females; mean age = 15.18; SD = .61). This subsample showed differences in age ($t = 2.63$; $p = .01$) and sex ($\chi^2 = 10.65$; $p = .001$) compared to the total sample. However, they did not show any significant differences in the EQ. Once again, only a subsample of 393 students (76.5% of the initial sample) completed a measure of alcohol-related problems (57.25% females; mean age = 15.16; *SD* = .60). As in previous analyses, differences in age ($t = 3.09$; $p = .002$) and sex ($\chi^2 = 10.65$; $p = .001$) were found, but not in alcohol expectancies. The reasons for not completing the second and third administrations could not be changed (i.e., not wanting to continue or to participate, or missing school). Most participants were born in Spain (81.1%). The remaining countries of origin obtained very low rates and are not presented herein for the sake of simplicity.

Adults sample. The adults sample comprised 548 participants aged 18-53 years (61.50% females, mean age = 24.19, *SD* = 3.92). Of these, 202 (36.9%) completed the survey online (except for the AIS-UJI, which was completed in the lab), while 326 (59.5%) completed it as a paper-and-pencil format in the lab. Of the total sample, 64.00% were students, 23.30% were active workers, 8.30% were unemployed, and the remaining 4.40% presented other job situations. Regarding level of educational, almost all participants had either completed university (77.1%) or secondary (22.3%) education studies. Only a few participants (0.6%) indicated lower levels of educational. The vast majority of participants were Spanish (91.8%).

Measures

Alcohol Expectancies. The Spanish version (Camacho et al., 2013) of the Expectancy Questionnaire (EQ; Leigh & Stacy, 1993) consists of 34 items and uses a 6-point Likert format to measure positive and negative AEs. Positive AEs (19 items) comprise expectancies about social facilitation, positive affect potentiation, sexual disinhibition and tension reduction; negative AEs (15 items) include expectancies about antisocial effects of alcohol, negative emotional states, as well as undesirable physical and cognitive effects. Items are short phrases prefaced by "When I drink alcohol..." Respondents have to indicate the likelihood of the indicated consequences happening to them when they drink. Non drinkers were asked to answer according to what they thought would have happened if they had drunk. The Spanish version of the EQ showed reliability indices that ranged from good to excellent in previous studies ($.76 \leq \alpha \leq .93$) (Camacho et al., 2013).

Alcohol use. The Alcohol Intake Scale-UJI (AIS-UJI; Grau & Ortet, 1999) is a 21-item self-report questionnaire of alcohol use-related variables. In this research we used questions that asked about the participants' alcohol consumption during the week (Monday–Thursday) and at weekends (Friday–Sunday) in Standard Drink Units (SDUs; Rodríguez-Martos, Gual, & Llopis, 1999). In Spain, one SDU is the equivalent to 10 g of alcohol (Rodríguez-Martos et al., 1999).

Alcohol misuse. The Alcohol Use Disorders Identification Test (AUDIT; Babor, Higgins-Biddle, Saunders, & Monteiro, 2001) includes 10 items on 3- and 5-point Likert scales. They are grouped into three subscales, namely "alcohol consumption," "alcohol dependence", and "harmful alcohol use". We used the last two scales (seven items) to assess alcohol-related problems, which presented an alpha coefficient of .76.

Missing data imputation

In the item analysis and structure analysis, of the possible values of the EQ (1062 participants x 34 items), missing values only amounted to 0.31%. Consequently, we followed a person mean imputation approach on each EQ scale (Bentler, 2006). In the regression analyses we used the pair-wise deletion of the missing values because missing completely at random (MCAR) could not be guaranteed.

Data analyses

Item selection strategies. The aim of this study was to reduce the number of the original scale items without losing conceptual breadth, while maintaining psychometric robustness. For this reason, we reduced only the length of the scales with more than three items; i.e., social positive, fun positive, sex positive, physical negative, and cognitive negative.

We used different item-selection strategies. Following Meyers' recommendations (2014), we combined classical item analysis and Rasch measurement procedures to identify the best items for each scale. First, we performed item-total correlations (i.e., classical item discrimination). By considering the number of points on the Likert scales, the discrimination index should be .58, or higher. Second, we evaluated person-item outfit and infit using the unweighted mean square (UMS) and the weighted mean square (WMS) fit statistics, respectively. Values between .80 and 1.20 are recommended in both cases, where more attention should be paid to high values rather than low ones (Meyer, 2014). In order to illustrate the probability of a response, as well as the item's contribution to measurement given different values of the theta scores, the characteristic curve and the item information function were also performed. Before running the item analysis, the dimensionality and local independence assumptions were confirmed.

As the EQ has been previously used in adolescents and adults samples, and in males and females, we decided to create a short version that would be useful for all these populations. In order to test this, we carried out a differential item functioning (DIF) analysis. We calculated the magnitude of the differences in performance in each item between groups (males/females; adolescents/adults) using the standardized P-DIF (sP-DIF). A standardized P-DIF value below .05 indicates no differences in performance between groups; values between .05 and .09 indicate a moderate difference; values of .10 or above indicate a large amount of DIF, and are a matter of concern (Meyer, 2014).

In addition to these statistical considerations, when items showed good fit indices, we preferred items that pointed out the different aspects of an expectancy factor; i.e., when the content of two items was similar, only one was included in the short form. We also made some theoretical considerations; i.e., we did not remove any items that were a crucial component of an expectancy scale (see Kuntsche & Kuntsche, 2009 for a similar procedure). All the item analyses were performed with the jMetrik software (Meyer, 2014).

Testing the questionnaire structure. Following previous research conducted with the EQ (Camacho et al., 2013; Leigh & Stacy, 1993), and after selecting the final 24 items, a hierarchical confirmatory factor analysis (CFA) was performed. In the CFA, we followed the Satorra-Bentler's robust method as our data were non normally distributed. In order to consider that a model has an *excellent* fit, the $_{S\text{-}B}$ χ^2 must be non significant. However as this is infrequent in a CFA, using other fit indices to compare competing models is a common practice. Our study included the non normed fit index (NNFI), the comparative fit index (CFI), the incremental fit index (IFI), the root mean square error of approximation (RMSEA), the 90% CI of RMSEA, and Akaike's information criterion (AIC). The models with NNFI, CFI, and IFI values above .90, a RMSEA value below.10, and low AIC scores, are argued to have an *acceptable* fit. The models with CFI, IFI and NNFI ≥ .95 and RMSEA ≤ .06 are considered to present an *adequate* fit (Byrne, 2006).

Reliability of scores. To test the reliability of the eight subscales and the two second-order factors, we calculated the Cronbach's alphas and omegas (Dunn, Baguley, & Brunsden, 2014) with 95% CI using the jMetriK (Meyer, 2014) and the R 3.4.0 (R Core Team, 2013) software, respectively.

Measurement invariance across sex and age groups. Structural Equation Models (SEM) were performed to determine the measurement invariance of the questionnaire across males and females, and also across different age groups. In the first step, we tested the model separately for each sex and age group. Second, we explored configural invariance across groups by performing a multi-group analysis between the sex and age groups. Then we tested metric, scalar, and error invariances (Milfont & Fischer, 2010). Differences in CFI and RMSEA were not allowed to exceed .01 and .015, respectively, to be able to consider that there were no differences between groups when adding constraints (Chen, 2007; Cheung & Rensvold, 2002). All the CFAs were performed with version 6.1 of the EQS software (Bentler & Wu, 2002).

Relation between alcohol expectancies and alcohol outcomes. We conducted descriptive analyses with version 22 of the SPSS statistic package (IBM Corp, 2013). The same software was used to carry out the regression analyses to investigate the associations between alcohol expectancies and alcohol-related outcomes. We also calculated the moderation effect of the age and sex groups in these associations. In the regression we entered the standardized scores of the following variables: sex, age group, and positive and negative AEs; and the interactions of sex x positive AEs, age x positive AEs, sex x negative AEs, and age x negative AEs. We performed graphical representations as a *post hoc* test whenever any significant interactions appeared (Dawson, 2014).

Results

Item selection

The results of the Item and Rash analyses are presented in Table 1, while the item response category characteristic curves and the item information curves are graphically represented in Figure 1.

Similar plots emerged in the items of the same subscale (Figure 1) and all of them showed positive discrimination indices (Table 1). However item 24, which corresponded to the physical negative scale, and item 30, which corresponded to the fun positive scale, showed low discrimination indices (Table 1). Based on the UMS and WMS statistics, we ruled out items 1 and 9, which both corresponded to the social positive scale, and item 8, which corresponded to the cognitive negative scale. When taking the remaining

Table 1. *Item and Rasch Analyses.*

Subscale	Item	Discrimination	Difficulty	UMS	WMS	sP-DIFF Sex	sP-DIFF Age
Social positive	1. I am more accepted socially	.59	1.30	1.84	1.37	.04	.02
	9. I am more outgoing	.73	-.74	1.22	1.28	-.01	.03
	16. It is easier for me to socialize	.81	-.17	.85	.86	.00	-.00
	23. I am able to talk more freely	.74	-.17	1.03	1.11	.01	-.06
	28. I am friendlier	.83	-.20	.67	.71	.00	-.01
	32. I feel more social	.82	-.02	.77	.78	.01	.02
Fun positive	**3. I enjoy the buzz**	.74	-.33	1.11	1.19	-.01	.05
	10. I feel happy	.75	-.27	1.00	1.03	-.02	-.03
	18. I have a good time	.80	-.93	.85	.88	.00	-.03
	25. It is fun	.80	-.06	.80	.82	.01	.01
	30. I feel pleasant physical effects	.51	1.61	1.90	1.50	.02	.00
	33. I feel good	.82	-.02	.68	.70	.00	-.00
Sex positive	5. I have more desire for sex	.83	-.39	.96	.99	-.01	.03
	12. I become more sexually active	.79	.61	1.21	1.14	-.01	-.02
	19. I am more sexually responsive	.87	.11	.76	.77	-.00	.00
	27. I am more sexually assertive	.82	-.32	1.06	1.10	.02	-.01
Physical negative	**6. I feel sick**	.61	.23	.96	.94	-.02	-.02
	15. I get a hangover	.59	-1.00	1.13	1.18	.01	.04
	24. I experience unpleasant physical effects	.53	.81	1.08	1.01	.01	-.01
	29. I get a headache	.66	-.04	.86	.85	-.00	-.01
Cognitive negative	8. I am less alert	.61	-.59	1.35	1.41	.02	.05
	17. I become clumsy or uncoordinated	.73	.04	.83	.83	.01	.02
	26. I have problems driving	.67	.33	.99	.97	-.01	-.06
	31. I can't concentrate	.73	-.04	.86	.89	-.00	-.01
	34. I have problems with memory and concentration	.69	.25	.97	.95	-.01	.01

Note. In bold, items that were retained in the EQ-SF. The positive sP-DIF values favor the female and adolescent participants.

items, items 23 and 26 showed the lowest discrimination indices on their scales, as well as medium-sized differences in performance between adolescent and adult participants. Accordingly, they were excluded from the short version of the EQ. For the final selection of items, we preferred those with better indices and less content overlap. The item composition of the EQ-SF is marked in bold in Table 1 and Figure 1.

Sources of validity evidence of the EQ-SF structure

As seen in Table 2, the fit indices of the hierarchical CFA using EQ-SF were between acceptable (i.e., NNFI, CFI, and IFI) and adequate (RMSEA). The item-to-subscale factor loadings were between .67 and .89 (Figure 2).

Measurement invariance of the scale across sex and age groups

Measurement invariance of the EQ-SF across sex and age was tested using the hierarchical cumulative steps recommended by Milfont and Fischer (2010). When the hierarchical model was tested separately for each sex and age group, the fit indices were acceptable (Table 2). Next configural invariance was calculated. The results from the multigroup CFA for the sex and age groups also showed acceptable fit indices (Table 2). Adding constraints between the factor loadings (metric invariance), intercepts (scalar invariance) and error variances of both groups resulted in going below ΔCFI and ΔRMSEA than .01 and .015, respectively. This suggests a full measurement invariance of the EQ-SF between males and females and between adolescents and adults.

Reliability of scores

The Cronbach's alphas and omega coefficients of the scales with 95% CI are presented in Table 3. The reliability of all the scales went from good to excellent (all the alpha and omega coefficients between .77 and .93).

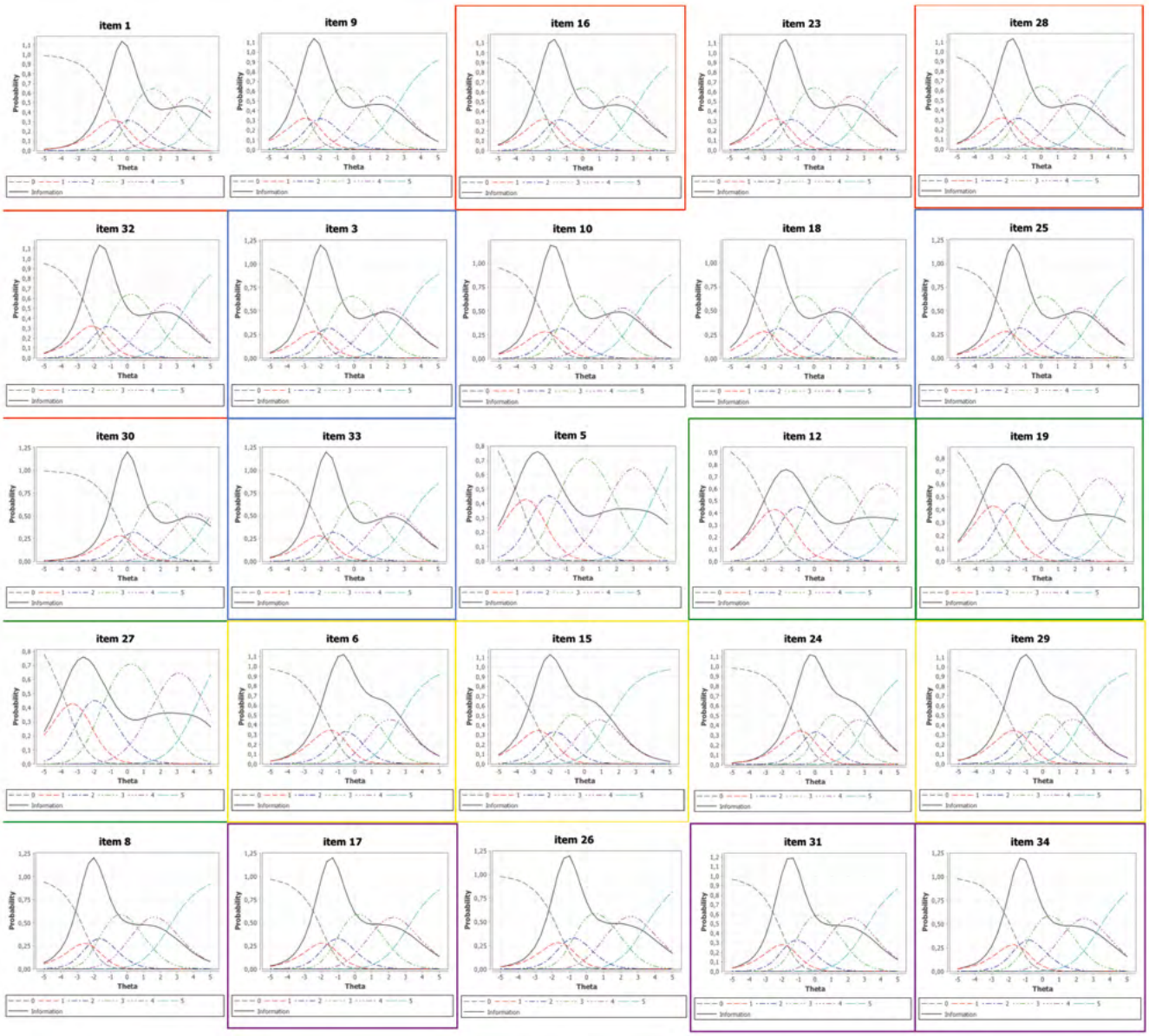

Figure 1. Item response category characteristic curves and item information curves of the EQ scales with more than three items. The final 3-item solution for the social positive, fun positive, sex positive, physical negative and cognitive negative scales of the EQ-SF is marked in red, blue, green, yellow and purple, respectively.

Sources of validity evidence in relation with other variables

The descriptive analyses gave higher scores in sex positive, social negative expectancies, and alcohol use in males than females, but effect size was small (Table 3). Adults scored significantly higher than adolescents for all the expectancies scales, except for emotional negative expectancies, and also for all the alcohol-related outcomes. The magnitude of the effect was: low for the fun positive, tension-reduction positive, social negative, physical negative, cognitive negative, negative expectancies, and alcohol-related problems; medium for the social positive, sex positive, positive expectancies and weekdays SDUs; large for the weekend SDUs (Table 3).

The regression analyses showed that positive expectancies predicted alcohol use (SDUs) during the week and at weekends, while positive and negative expectancies predicted alcohol-related problems (Table 4). Five significant interactions were also found. Given the number of independent variables, we set a more restrictive p value of .005 (Bonferroni correction). The interactions that remained significant after this correction were the sex x positive expectancies in the prediction of weekday and weekend SDUs, and the age x negative expectancies in the prediction of alcohol-related problems (see Figure 3 for a graphical representation). The effect of positive alcohol expectancies on alcohol use during the week and at weekends was much stronger for males than for females. Being an

Table 2. *Analysis of the Model Fit of the EQ-SF.*

		$_{S\text{-}B}\chi^2$	df	NNFI	CFI	IFI	RMSEA (90% CI)	AIC
Hierarchical CFA	Whole sample	948.79	243	.938	.945	.945	.052 (.049/.056)	462.79
	Males	570.05	243	.925	.934	.934	.056 (.050/.062)	84.05
	Females	620.59	243	.947	.953	.953	.050 (.045/.054)	134.59
	Adolescents	601.29	243	.942	.949	.949	.054 (.048/.059)	115.29
	Adults	617.54	243	.922	.932	.932	.053 (.048/.058)	131.54
Sex invariance	Configural invariance	1189.02	486	.938	.945	.946	.052 (.048/.056)	217.14
	Metric invariance	1213.76	502	.939	.945	.945	.052 (.048/.055)	209.76
	Scalar invariance	1356.91	526	.936	.944	.944	.053 (.049/.056)	304.91
	Error variance invariance	1367.55	550	.937	.945	.945	.051 (.048/.055)	267.55
Age invariance	Configural invariance	1217.78	486	.933	.941	.941	.053 (.050/.057)	245.78
	Metric invariance	1266.42	502	.932	.938	.938	.054 (.050/.057)	262.42
	Scalar invariance	1605.36	526	.932	.940	.941	.056 (.052/.059)	553.36
	Error variance invariance	1729.11	550	.926	.935	.936	.058 (.054/.061)	629.11

Note. All $_{S\text{-}B}\chi^2$ values were significant at p < .001.

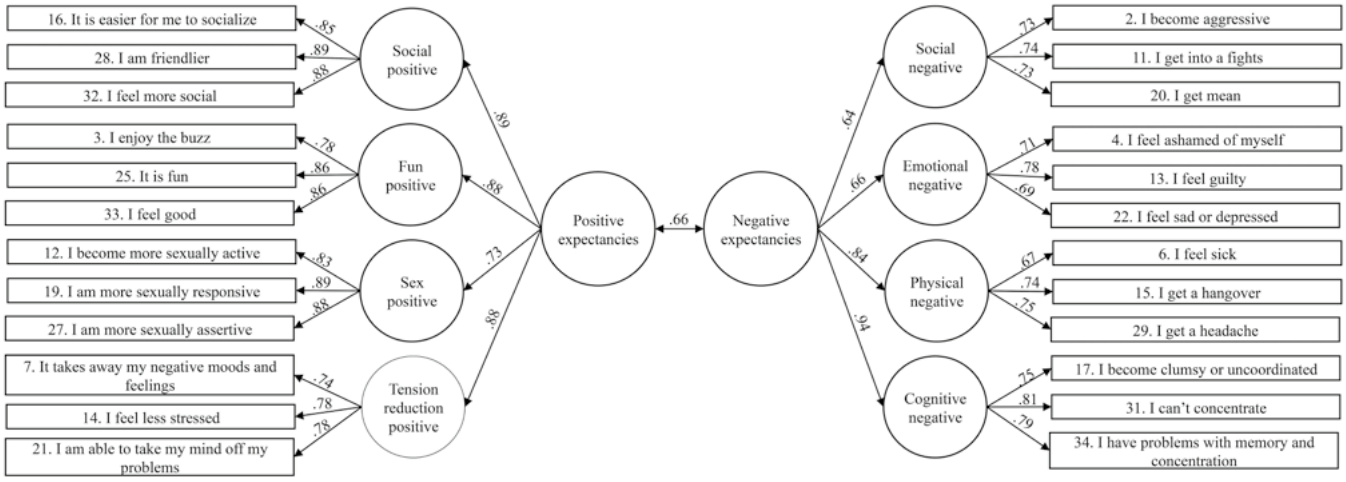

Figure 2. The CFA of the EQ-SF. Factor loadings are on the unidirectional lines, correlations are on the bidirectional lines. They were all significant at p< .001.

Table 3. *Descriptive Analysis and Reliability Indices for the EQ-SF, t-Test Values, and Cohen's d Associated with Sex and Age.*

	Whole sample				Males		Females				Adolescents		Adults			
	X	SD	α	Ω	X	SD	X	SD	*t*	*d*	X	SD	X	SD	*t*	*d*
Social positive	7.81	3.89	.91 (.90/.92)	.91 (.89/.92)	7.58	3.82	7.97	3.93	-1.63	-.10	6.72	4.10	8.84	3.37	-9.23***	-.56
Fun positive	8.40	3.59	.87 (.85/.88)	.87 (.85/.89)	8.33	3.68	8.45	3.52	-0.55	-.03	7.60	4.05	9.16	2.90	-7.25***	-.44
Sex positive	6.00	4.10	.90 (.89/.91)	.90 (.89/.92)	6.53	3.97	5.65	4.15	3.47**	.22	4.82	4.00	7.12	3.87	-9.52***	-.58
Tension positive	6.57	3.62	.81 (.79/.83)	.81 (.78/.83)	6.56	3.65	6.58	3.60	-.05	-.01	6.19	3.69	6.93	3.51	-3.36**	-.21
Social negative	2.66	2.84	.77 (.75/.80)	.78 (.75/.81)	3.35	3.02	2.19	2.61	6.67***	.41	2.90	3.14	2.44	2.51	2.66**	.16
Emotional negative	3.40	2.92	.77 (.74/.79)	.78 (.75/.80)	3.45	2.93	3.36	2.92	.48	.03	3.41	3.02	3.39	2.83	.15	.01
Physical negative	6.45	3.62	.77 (.74/.79)	.77 (.74/.80)	6.17	3.50	6.64	3.69	-2.07*	-.13	5.83	3.81	7.03	3.33	-5.49***	-.34
Cognitive negative	6.55	3.65	.82 (.81/.84)	.83 (.81/.85)	6.70	3.63	6.45	3.65	1.06	.07	5.91	3.82	7.15	3.37	-5.62***	-.34
Positive expectancies	28.79	12.81	.93 (.92/.94)	.93 (.92/.93)	29.00	12.92	28.65	12.75	.44	.03	25.32	13.55	32.04	11.15	-8.85***	-.54
Negative expectancies	19.07	10.29	.88 (.87/.89)	.88 (.87/.89)	19.68	10.50	18.65	10.14	1.59	.10	18.06	11.08	20.01	9.41	-3.10**	-.19
Weekdays SDU	1.17	2.59	-	-	1.74	3.32	.79	1.85	5.72***	.35	.45	1.57	1.74	3.05	-7.95***	-.53
Weekend SDUs	6.32	6.51	-	-	7.63	8.02	5.44	5.06	5.24***	.33	3.21	4.54	8.76	6.77	-14.58***	-.96
Alcohol-related problems	1.67	2.86	-	-	2.00	3.53	1.45	2.28	2.89**	.19	1.37	2.87	1.89	2.84	-2.79**	-.18

Note. Cronbach's alphas and omega coefficients with 95% CI. The Cohen's d values of .20, .50, and .80 correspond to the small, medium and large effect sizes, respectively (Cohen, 1992). *p< .05, **p< .01, ***p< .001.

Table 4. *Regression Analyses between Expectancies and Alcohol Outcomes, Including Moderation of Sex and Age.*

	Weekdays SDUs			Weekends SDUs			Alcohol-related problems		
	β	*p*	R^2	β	*p*	R^2	β	*p*	R^2
Sex	-.19	.000	.12*	-.18	.000	.31**	-.08	.007	.15*
Age	-.22	.000		-.36	.000		-.02	.612	
Positive expectancies	.13	.000		.31	.000		.26	.000	
Negative expectancies	.01	.895		-.03	.377		.13	.000	
Sex x positive expectancies	-.11	.002		-.12	.000		-.09	.015	
Sex x negative expectancies	.06	.089		.01	.783		-.04	.251	
Age x positive expectancies	-.07	.059		-.07	.022		-.01	.758	
Age x negative expectancies	-.01	.820		-.04	.187		-.12	.001	

*p ‹ ,05,**p ‹ ,001.

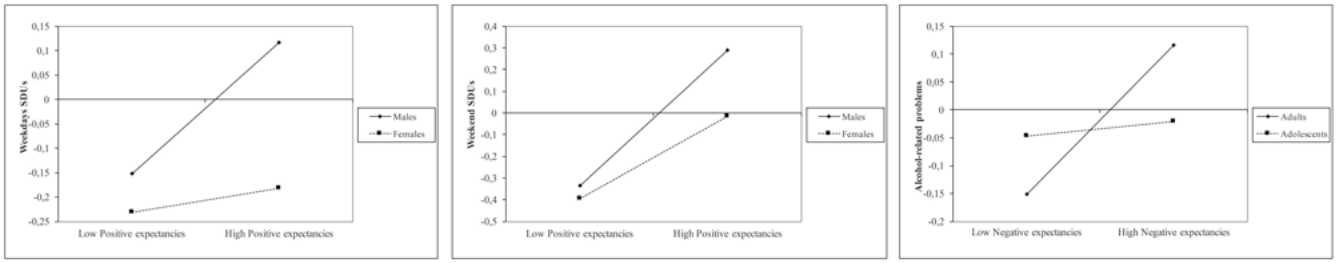

Figure 3. Graphical representation of the moderation effect of sex and age on the relationship between alcohol expectancies and alcohol-related outcomes.

adult and presenting high negative expectancies were also associated with higher alcohol-related problems.

Discussion

The present study aimed to develop a short version of the EQ (Camacho et al., 2013; Leigh & Stacy, 1993) by Item and Rasch analyses. We also hypothesized that evidence for validity and reliability of the EQ-SF to assess alcohol expectancies would emerge from difference sources: the study of the questionnaire structure, the measurement of invariance between the age and gender groups, the reliability indices of the scales, and the ability of the questionnaire scales to predict alcohol outcomes. The moderating role of sex and age in these last associations was also explored.

The results of the Item and Rasch analyses provided a 24-item solution in which all the items showed adequate discrimination, as well as good UMS and WMS indices (Meyer, 2014). When item functioning was compared between the sex and age groups, the magnitude of the differences in the performance in the 24-item solution indicated no differences in performance between groups, except for item 3 when comparing adolescents and adults. As this difference was only moderate, the item was kept because it is a crucial component of the fun expectancy scale.

The CFA results showed that the hierarchical model with the 24-item solution presented not only similar fit indices to the original questionnaire (Leigh & Stacy, 1993), but also better indices than the previous Spanish adaptation of the long measure (Camacho et al., 2013). It is also noteworthy that all the factor loadings were adequate and much higher than the recommended cut-off of .30 (Brown, 2006). These findings, together with the fact that the questionnaire showed measurement invariance among males, females, adolescents and adults, suggested that the EQ-SF offers satisfactory construct validity. It is also worth noting that, even though a drop in internal consistency is frequently seen when the number of items lowers (Field, 2009), the expectancy subscales in the EQ-SF displayed good to excellent internal consistency (all the values were higher than .70), and values were similar to those found in the original long version of the EQ. These results, together with those of the omega coefficients, suggest that the EQ-SF is a reliable measure to assess alcohol expectancies in the Spanish population.

When we looked at the criterion validity of the EQ-SF, i.e., the ability of alcohol expectancies to predict alcohol use, our results were consistent with previous findings. Specifically, positive expectancies predicted alcohol-related outcomes (Corbin et al., 2011; Harnett et al., 2013; Morean et al., 2016). However, the effect of positive expectancies on alcohol use was much stronger on weekend SDUs than on weekday SDUs. It is noteworthy that previous results on expectancies and different alcohol use patterns during the week and at weekends were obtained, in part with the present sample (Camacho et al., 2013; Ibáñez et al., 2015;

Mezquita et al., 2015). Nonetheless, other studies on related variables, such as reasons for drinking, have also shown greater associations of drinking motives with weekend SDUs than with weekdays SDUs in adolescents (Mezquita et al., 2018) and adult samples (Mezquita, Ibáñez, Moya, Villa, & Ortet, 2014; Studer et al., 2014). Taken together, these findings suggest that when a large quantity of alcohol is consumed at weekends, expectancies about the positive effects of alcohol use, as well as the motivation to experience these effects, might play a salient role in the decision to drink.

Apart from the aforementioned findings, our interaction analyses showed that the enhancing effect of positive expectancies in alcohol use was much stronger for males than for females. This is important because, even when no differences between the mean levels of positive expectancies between sex groups were found, presenting a higher level of positive expectancies was a higher risk factor of alcohol consumption for males than for females.

Regarding the association between negative alcohol expectancies and alcohol-related outcomes, once the effect of positive expectancies was controlled for, negative expectancies were positively related only to alcohol-related problems. This finding is consistent with previous studies conducted with young adults (Pabst et al., 2014). No moderation effect of sex and age was found in the relationship between negative alcohol expectancies and alcohol use. However, being an adult exacerbated the risk of showing alcohol-related problems when high negative expectancies were present. These results are in line with the hypothesis that negative expectancies are the result of having bad experiences with alcohol, as opposed to the cause (Spillane et al., 2012).

The present study is not without its limitations. First, the study design was cross-sectional and, consequently, causal inferences should be taken cautiously; e.g., while expectancies may be a risk factor for alcohol use and misuse, they might also be a consequence of experimenting with the drug. Second, as the adolescent sample was assessed during different sessions due to time restrictions, part of the sample did not complete all the questionnaires, which compromises the generalizability of the results. These findings support the need for shorter measures, as in the EQ-SF. Third, the procedure followed to assess each sample was different (i.e., with *vs.* without economic compensation, online *vs.* on paper responses). This, together with the fact that all the used measures were based on self-reports, could affect the validity of the findings. Finally, we did not include important measures of alcohol use other than SDUs and alcohol problems, such as binge drinking or heavy drinking, which could be highly informative.

In light of the aforementioned limitations, implications for further research are proposed. First, prospective and experimental studies are necessary to disentangle the direction of the associations between alcohol expectancies and alcohol use. Second, the psychometric properties of the EQ-SF (i.e., sources of validity) would be strengthened by exploring their associations with important alcohol research outcomes not included in the present research. It is also essential to replicate previous findings with the EQ using the EQ-SF and to test if the measure is useful for assessing alcohol expectancies in different languages and cultures (Mezquita, Stewart, Kuntsche, & Grant, 2016).

To conclude, the present research shows the utility of the EQ-SF to assess alcohol expectancies among Spanish adolescents and adults in a shortened form. The sound psychometric properties and the similarity of the results, compared to those reported in previous studies using the EQ (Camacho et al., 2013; Leigh & Stacy, 1993), suggest that the short 24-item version of the EQ is a good alternative to the long questionnaire in time-limited assessments; e.g., with adolescents or clinical samples. Attention should be paid to positive expectancies at all ages, but especially in males because they might be an underlying factor to explain increased alcohol use. Moreover, clinicians might wish to explore negative expectancies as they seem to be a consequence of a longer experience with alcohol effects and could be an indicator of alcohol-related problems.

Acknowledgement

Funding for this study was provided by research projects PSI2015-67766-R from the Spanish Ministry of Economy and Competitiveness, and GV/2016/158 from the Regional Valencian Government.

Conflicts of interest

The authors declare no conflict of interest.

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