

Psychometric properties of Drinking Motives Questionnaire-Revised (DMQ-R) in
Spanish Adolescents

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Titles of all figures and tables

Table 1

Fit indices

Table 2

Results of the CFAs, interfactor correlations, Cronbach's alphas, and means (SD) of the drinking motive dimensions

Note. FL = Standardised Factor Loading, SE = Standard Errors. All correlations significant at $p < .001$. Cohen's *ds* are those associated with gender differences in the means. Values of 0.20, 0.50, and 0.80 correspond to small, medium, and large effect sizes, respectively (Cohen, 1992).

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Figure 1

Final path analyses

Over the unidirectional, bidirectional and dashed lines, the standardised beta coefficients, correlations and factor loadings appear, respectively. Boxes contain the R^2 .

* $p < .05$. ** $p < .01$. *** $p < .001$.

Summary

1
2 The Drinking Motives Questionnaire-Revised (DMQ-R; [Cooper, 1994](#)) is the
3
4 most widely used questionnaire to assess drinking motives. This research aimed to
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6 adapt and study the validity and reliability of the Spanish DMQ-R and its short form in
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8 a sample of adolescents.
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11 We assessed 504 drinkers at Time 1 (T1, $M_{age}=14.15$, $SD=0.60$, 52.38% female),
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13 of whom 238 participated in a 1-year follow-up (T2, $M_{age}=15.05$, $SD=0.54$, 58.82%
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15 female). They completed the DMQ-R at T1, the alcohol use measure at T1 and T2, and
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17 the alcohol-related problems questionnaire at T2. We performed Confirmatory Factor
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19 Analyses (CFAs) to test the structure validity of the questionnaire, Cronbach's alphas to
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21 test the internal consistencies of the scales, and path analyses to test the concurrent and
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23 predictive validity of motives on alcohol outcomes.
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29 CFA indicated that the short form of the four-factor model best fitted the data.
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31 Cronbach's alphas were .70, or higher. Direct effects of the path analysis showed that
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33 social motives cross-sectionally predicted alcohol use, while coping motives
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35 prospectively predicted alcohol-related problems. Indirect effects showed that social
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37 motives prospectively predicted alcohol use and problems.
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41 To conclude, the DMQ-R short form appears to be reliable and valid to assess
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43 drinking motives among Spanish adolescents.
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46 **Keywords:** assessment, drinking motives, prospective, adolescents, DMQ-R.
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Psychometric properties of Drinking Motives Questionnaire-Revised (DMQ-R) in
Spanish adolescents

Alcohol is the most used drug, and age of initiation is around 13-14 years (National Plan of Drugs, 2013). Alcohol drinking during adolescence constitutes the main risk factor to disability-adjusted life years worldwide (DALYs) (Gore et al., 2011), and has also been associated with several health problems in adulthood (McCambridge, McAlaney, & Rowe, 2011). Thus, understanding adolescents' motivations to drink may help prevent and reduce its use (Cox & Klinger, 1988). Accordingly, the main aim of the present study is to examine the most widely used instrument to assess drinking motives (Kuntsche, Knibbe, Gmel, & Engels, 2005), Drinking Motive Questionnaire Revised (DMQ-R, Cooper, 1994), in Spanish adolescents.

Inspired by Cox and Klinger's (1988) Motivational Model of Alcohol Use (MMAU), which postulates that people drink to obtain valuable outcomes, Cooper (1994) proposed four drinking motives based on the (a) type of reinforcement desired (positive or negative reinforcement), and (b) the source of reinforcement (internal or external). Crossing these two dimensions results in four distinct drinking motives: social motives (external, positive) refer to drinking to facilitate social relationships; enhancement motives (internal, positive) refer to use of alcohol to increase positive affect; conformity motives (external, negative) relate to drinking in order to form part of a group of people; finally, coping motives (internal, negative) relate to drinking to manage negative affect.

Based on this theoretical model, Cooper (1994) adapted to adolescents several items from the DMQ (Cooper, Russell, Skinner, & Windle, 1992), which assess social, enhancement and social drinking motives in adults, and added the conformity motives

1 scale. The resulting questionnaire, the DMQ-R ([Cooper, 1994](#)) contained 20 items, five
2 per scale, and shows adequate psychometric properties for assessing drinking motives in
3 adolescents from North America ([Cooper, 1994](#); [Kuntsche et al., 2008](#)) and Europe
4 ([Kuntsche, Knibbe, Gmel, & Engels, 2006a](#)). Another modified version of the DMQ,
5 which is also available in Spanish, is the Modified DMQ-R ([Mezquita et al., 2011](#)). This
6 version subdivides coping motives into coping-with-anxiety and coping-with-
7 depression (see Supplementary Material 1, SM1 for a detailed review of the DMQ
8 versions). However, like the DMQ ([Cooper et al., 1992](#)), the Modified DMQ-R was
9 developed for assessing drinking motives in adults.
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21 Recently, [Kuntsche and Kuntsche \(2009\)](#) developed a short form of the DMQ-R
22 (DMQ-R SF). After taking into account statistical and theoretical considerations, they
23 identified those items that better measure different aspects of the motive dimension and
24 selected a pool of 12 items, 3 per scale. This DMQ version shows good psychometric
25 properties in samples of adolescents from Switzerland ([Kuntsche & Kuntsche, 2009](#)),
26 Hungary ([Németh, Urbán, Farkas, Kuntsche, & Demetrovics, 2012](#)) and Italy
27 ([Mazzardis, Vieno, Kuntsche, & Santinello, 2010](#)). Although one study has employed
28 this version in a sample of Spanish young adults ([Németh et al., 2011](#)), as far as we
29 know, no other study has explored their psychometric properties in Spanish adolescents.
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44 Several cross-sectional studies in adolescents have also suggested that unique
45 patterns of drinking behaviour characterise each motive dimension ([Cooper, 1994](#);
46 [Kuntsche et al., 2005](#)). Social motives would relate to moderate drinking in social-
47 affiliative situations, while enhancement motives would relate to heavy drinking in
48 environments where heavy drinking is condoned (e.g., in bars). An association between
49 negative reinforcement motives, mainly coping and, to a lesser extent, conformity, with
50 alcohol-related problems would exist ([Cooper, 1994](#); [Kuntsche et al., 2008](#)). Moreover,
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1 coping motives seem to relate to alcohol abuse in more private situations (e.g., at home
2 or alone) ([Cooper, 1994](#)). Recent studies with young adults have also suggested that
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4 while social and enhancement would be strongly related to weekend alcohol use due to
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6 more time spent with friends in leisure activities, coping motives would be related
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8 mainly to drinking on weekdays when more stress and worries likely arise (Mezquita,
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10 Ibáñez, Moya, Villa, & Ortet, 2014; [Studer et al., 2014](#)). However, these associations
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12 still have not been studied in samples of adolescents.
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17 There are only a handful of prospective studies on motives and alcohol use in
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19 adolescents, which have shown a less clear pattern of associations. They have found that
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21 social, enhancement, and coping motives predict alcohol use and misuse (Bradizza,
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23 Reifman, & Cooper, 1999; [Cooper et al., 2008](#)). However, one research work has
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25 indicated that when controlling for the correlations between drinking motives, only
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27 social motives prospectively predict alcohol outcomes (Schelleman-Offermans,
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29 Kuntsche, & Knibbe, 2011). The fact that there are only a small number of prospective
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31 studies, and that they have been carried out in North American and Swiss samples, are
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33 reasons for recommending additional prospective studies in adolescents in other
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35 sociocultural contexts.
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41 As a result, the present study aims to adapt and study the validity and reliability
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43 of the Spanish DMQ-R in a sample of adolescents. Specifically, we study the structure
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45 validity of the DMQ-R. We hypothesised that a 4-factor solution of the DMQ-R would
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47 fit better our data than: a) one general model of drinking motives; b) a 2-factor model
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49 that compares positive and negative reinforcement (enhancement combined with social;
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51 coping combined with conformity); c) a 2-factor model that compares the internal vs.
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53 the external source (social combined with conformity; enhancement combined with
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55 coping); and d) a 3-factor model with social and enhancement loading on a single factor
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(Cooper, 1994). We also tested if a short form of the 4-factor model (DMQ-R SF), previously validated in European adolescents (Kuntsche & Kuntsche, 2009; Németh et al., 2011), better fitted our data than the original DMQ-R. Based on previous adaptation studies of the questionnaire in Europe (Kuntsche et al., 2006a; Kuntsche & Kuntsche, 2009), we also expected gender invariance for the four-factor structure.

We aimed to study the reliability of the scales. We expected them all to be .70, or higher, based on the standard Cronbach's alphas cut-off (Kaplan & Saccuzzo, 2009). Finally, we aimed to study the concurrent and predictive validity of the scales of motives to predict alcohol outcomes. We predicted that social, enhancement and coping motives would relate to alcohol consumption, while coping and conformity motives would associate with alcohol-related problems (Cooper, 1994; Kuntsche et al., 2006a; Kuntsche & Kuntsche, 2009; Mazzardis et al., 2010). According to recent studies in young adults (Mezquita, Ibáñez, Moya, Villa, & Ortet, 2014; Studer et al., 2014), we expected enhancement and social motives to relate to weekend alcohol use, while coping motives to relate to drinking on weekdays (see SM2 to consult the hypothesised path analysis).

Method

Participants

At Time 1, 504 adolescent drinkers participated in the study (mean age = 14.15, $SD = 0.60$, age range 13-17 years), 52.38% female. One year later, 238 of them participated again (mean age = 15.05, $SD = 0.54$, age range 14-17 years), 58.82% female. The sample that participated only at Time 1 ($N = 266$) was older ($d = .45$), and scored higher in drinking motives (cope: $d = .25$; conformity: $d = .24$; social: $d = .40$;

enhancement: $d = .38$), and alcohol consumption ($d = .22$) than the participants at both time points ($N = 238$).

Procedure

In order to translate and adapt the DMQ-R (Cooper, 1994), various experts on drinking motives wrote the Spanish DMQ-R items from the original English scale. A back-translation was then carried out by a native English speaker and was compared to the original questionnaire. This process resulted in a Spanish version that was considered comparable to the original (see SM3).

Afterwards, we contacted the psychologists from six high schools in Castellón. Parents gave their informed consent for their children to participate in the study. All the study procedures obtained the approval of the Ethics' Committee. During the assessment sessions, trained psychologists followed the standard instructions: handed out the scales, guaranteed confidentiality and encouraged participants to provide sincere answers. All the attending students voluntarily completed the questionnaires in the classroom and did not receive any compensation for their participation. One year later, we conducted the same assessment process. At Time 1 (T1), students answered the Spanish adaptation of the DMQ-R (Cooper, 1994), together with the drinking quantity questions. One year later (Time 2, T2), they completed the alcohol intake measures again and AUDIT ([Babor, Higgins-Biddle, Saunders, & Monteiro, 2001](#)).

Materials

The Spanish DMQ-R (SM3) consists of 20 items, and each contributes to one of four subscales: social, coping, enhancement and conformity motives. After taking into account all the occasions on which they had drunk, the participants indicated how often

1 they drink for each reason specified in each item on a 5-point scale (1 = *almost never or*
2 *never* and 5 = *almost always or always*).

3
4 Drinking quantities were assessed in two open-ended questions. Adolescents
5 responded how many drinks (beers, glasses of wine, liquors and spirits) they drank on
6 weekdays (Monday to Thursday) and at weekends (Friday to Sunday). Then we
7 calculated the number of Standard Drink Units (SDU) after taking into account that
8 beers and glasses of wine are the equivalent to one SDU, while liquors and spirits are
9 the equivalent to two SDUs. In Spain, an SDU is the equivalent to 10 g of alcohol
10 (Rodríguez-Martos, Gual, & Llopis, 1999).

11
12 We included the three items from the dependence symptoms scale (e.g., morning
13 drinking) and the four items from the harmful alcohol use scale (e.g., alcohol-related
14 injuries) from AUDIT ([Babor et al., 2001](#)) to assess alcohol-related problems. Five of
15 the seven items were assessed on a 5-point scale (0 = *never* and 4 = *daily or almost*
16 *daily*), while the other two were assessed on a 3-point scale (0 = *No*, 2 = *Yes, but not in*
17 *the last year*, and 4 = *Yes, in the last year*). The internal consistencies of both scales in
18 our sample were .75 and .67, respectively.

19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 **Missing data imputation**

42 The missing values in the sample used to analyse the cross-sectional data (T1,
43 $N=504$) were .23%, or lower, of the total data. Similarly, among those who participated
44 in both time frames ($N=238$), we found only .21% of missing values. For these reasons,
45 we followed a person mean imputation approach on each scale ([Bentler, 2006](#)).

46 47 48 49 50 51 52 53 54 55 56 **Data analyses**

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1 We conducted Confirmatory Factor Analyses (CFA) to compare which of the six
2 models better fitted our data. We performed a path analysis to test the concurrent and
3 predictive validity of each motive scale on alcohol outcomes with the factor solution
4 that showed the best fit in the CFAs. We performed multi-group analyses to study the
5 gender invariance of the structure, and the moderation effect of gender in the relation
6 between motives on alcohol outcomes. These analyses were carried out with the EQS 6
7 software. In addition, with SPSS 21, we calculated Cronbach's alpha to test the internal
8 consistency of the scales, and the means and *SDs* to explore the rank order at the mean
9 endorsement levels of the four motives.
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21 In all the SEM, we employed Satorra-Bentler's robust method, as our data was
22 non-normally distributed (Satorra & Bentler, 2001). To consider that a model has an
23 *excellent* fit, the χ^2_{S-B} must be non significant. However, this is uncommon in CFA. So
24 the use of other fit indices to compare competing models is interesting: normed chi-
25 square ($\chi^2_{S-B}/d.f.$), Comparative Fit Index (CFI), Incremental Fit Index (IFI), McDonald
26 Fit Index (MFI), Root Mean Square Error of Approximation (RMSEA), and Akaike's
27 Information Criterion (AIC). Lower AIC values indicate a better fit. We considered a
28 model with CFI, IFI and MFI $\geq .90$, RMSEA $\leq .10$, and a normed chi-square of between
29 3 and 4 to be an *acceptable* fit; while CFI, IFI and MFI $\geq .95$, RMSEA $\leq .06$ and a
30 normed chi-square of between 1 and 2 to be an *adequate* fit (see Byrne, 2006, for a
31 review of fit indices).
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48 In the path analysis, we considered the Lagrange multiplier (LM) and Wald tests
49 suggestions to either include or remove the additional paths to those hypothesised in the
50 model. We obtained the direct effects and indirect effects. Lastly, we tested if there
51 were differences in the magnitude of the paths between motives and weekday SDUs and
52 weekend SDUs by constraining the paths to be equal (Byrne, 2006; Bentler, 2006). The
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relative goodness of fit between models was analysed via the scaled χ^2_{S-B} difference test (Satorra & Bentler, 2001) using the “sbdiff” software.

Results

Confirming the factor structure

The CFA results revealed that a 20-item 4-factor model of the DMQ-R showed *acceptable* fit indices. This factor solution significantly better fitted our data than the 1-factor model ($\chi^2_{S-B} \text{ diff}(6) = 97.80, p < .001$); the two-factor models (positive vs. negative reinforcement: $\chi^2_{S-B} \text{ diff}(5) = 75.86, p < .001$; internal vs. external motives: $\chi^2_{S-B} \text{ diff}(5) = 68.18, p < .001$); and the three-factor model ($\chi^2_{S-B} \text{ diff}(3) = 98.17, p < .001$) (see Table 1). Factor loadings were high, except for items "to be sociable" and "because your friends pressure you to drink" (see Table 2). We also compared the 20-item 4-factor model with the 12-item 4-factor model (short form, SF) and found that the second showed *adequate* fit indices and a significantly better fitted the data than the former ($\chi^2_{S-B} \text{ diff}(118) = 264.37, p < .001$). All the factor loadings of the 12-item solution on their corresponding factors were high (see Table 2).

Factorial invariance of the DMQ-R SF across gender groups

The fit indices of the multi-group analysis were *adequate* (see Table 1). The addition of cross-gender equivalence constraints for factor loading ($\chi^2_{S-B} \text{ diff}(8) = 14.32, p > .05$), variances ($\chi^2_{S-B} \text{ diff}(4) = 4.17, p > .05$) and covariances ($\chi^2_{S-B} \text{ diff}(6) = 7.68, p > .05$) did not result in a significant degradation in fit, which suggests that the structure of the DMQ-R SF was invariable between boys and girls.

Internal consistencies, means and SDs of the 4-factor models

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In both, long and short versions of the questionnaire, Cronbach's alphas were .70 or higher (DMQ-R: from .75 to .84; DMQ-R SF: from .70 to .85) (see Table 2). The highest endorsement of drinking motives was on the social motives scale, followed by enhancement, coping and conformity motives (see Table 2).

Path analysis

When we tested the hypothesised model (see SM2), the fit indices came close to the adjustment (see Table 1). However, when we included the path suggested by the LM test (social on weekday SDU T1), and when were removed the non-significant paths suggested by the Wald test (enhancement on weekend SDUs, coping on weekday SDUs, conformity on alcohol-related problems), the fit indices were *excellent* (see Table 1). Direct effects showed that social motives predicted weekend and weekday SDUs at T1, while coping motives predicted alcohol-related problems at T2 (see Figure 1).

When indirect effects were tested, we found that social motives predicted weekday SDUs ($\beta = .14, p < .05$), weekend SDUs ($\beta = .25, p < .001$) and alcohol-related problems ($\beta = .12, p < .05$) at T2.

When we constrained the path of social motives on weekday SDUs to be equal to the path of social motives on weekend SDUs, the differences in fit ($\chi^2_{S-B} \text{ diff } (1) = 56.99, p < .001$) indicated that social motives were significantly more strongly related to weekend SDUs than to weekday SDUs at T1.

The differences in fit between the multi-group analysis of the final path model (see Table 1), and the model that included the paths constrained to be equal between boys and girls, were not significant ($\chi^2_{S-B} \text{ diff } (7) = 9.65, p > .05$). This indicates that the model was invariant between groups.

Discussion

The present research aimed to adapt and study the psychometric properties of DMQ-R (Cooper, 1994) in Spanish adolescents. According to the hypothesis, the results showed that a 20-item 4-factor solution better fits our data than a 20-item 1-factor, a 20-item 2-factor and a 20-item 3-factor solution, as found with the original DMQ-R (Cooper, 1994). However, even when the fit indices were considered *acceptable* and were similar to those found in previous studies (Kuntsche, et al., 2006a), some of the items showed low factor loadings (items 2 and 5). When we removed these items (together with six other items) and we tested an equivalent 12-item 4-factor solution to the DMQ-R SF (Kuntsche & Kuntsche, 2009), we obtained an *adequate* fit. In addition, the factor structure of DMQ-R SF was equivalent across gender groups. The similarity of our results with those found in the Swiss (Kuntsche & Kuntsche, 2009), Hungarian (Németh et al., 2012), and Italian (Mazzardis et al., 2010) adaptations suggest that DMQ-R SF is the questionnaire version with the best structure validity, at least among European adolescents.

The scales of both the short and long versions of the 4-factor model showed Cronbach's alpha at the widely accepted .70 cut-off point, or at an even higher one, which indicates adequate reliability indices (Kaplan & Saccuzzo, 2009). They also presented the same rank order at the mean endorsement levels of the four motives and patterns of interfactor correlations (e.g., higher correlations between social-enhancement and lower correlations between conformity-enhancement) than in previous studies conducted in adolescents from North America and Europe (Cooper, 1994; Kuntsche & Kuntsche, 2009; Kuntsche et al., 2008; Mazzardis et al., 2010; Németh et al., 2012), which confers validity to our results.

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In reference to the concurrent validity of the motive scales to predict alcohol use, social motives were the only ones that cross-sectionally and directly predicted alcohol drinking. Although they were related to weekday SDUs, the strongest relationships were found with weekend SDUs. However unlike our hypothesis, the specific associations between enhancement and weekend SDUs, and between coping and weekday SDUs, were not significant. This lack of significance is probably due to a confounding effect of the social motives. Since social and enhancement correlated highly and positively (see Figure 1 and SM4 for the Table of Correlations), the significant effect of the social motives on weekend SDUs may overshadow the influence of the enhancement motives (Studer et al., 2014). We can apply the same explanation to the non-significant association between coping and weekday drinking as the correlations between the coping and social motives were also high.

When we looked at the validity of motives to prospectively predict alcohol use, social motives were the only ones that indirectly predicted weekend SDUs, and the weekday SDUs, but to a lesser extent. Previous studies with Dutch adolescents obtained similar results, where social motives were the single predictor of total weekly consumption and also heavy episodic drinking at the 1-year follow-up (Schelleman-Offermans et al., 2011). Thus it seems that among European adolescents, social motives are the most relevant drinking motives to prospectively predict alcohol use.

In relation to the associations of motives with alcohol-related problems, no significant associations were found between conformity and alcohol-related problems. However, this association has been found only in some cross-sectional studies (Cooper et al., 1994), but not in others (Kuntsche & Kuntsche, 2009; Németh et al., 2012). What is consistent in previous cross-sectional studies is the relationship between coping motives and alcohol-related problems (Cooper, 1994, Kuntsche et al., 2008; Kuntsche &

1 Kuntsche, 2009; Németh et al., 2012). This prospective association between coping
2 motives and alcohol-related problems found in the present research adds a relevant
3 contribution to previous evidence, and suggests that this effect persists in time, at least
4 in Spanish adolescents and 1 year later. Finally, the fact that social motives also
5 indirectly and prospectively predicted alcohol-related problems ([Bradizza et al., 1999](#))
6 has several implications for prevention and treatment programs. Previous programs
7 have aimed to reduce alcohol use in adolescents with specific personality-internal
8 drinking motive profiles (i.e., negative emotionality-coping motivated,
9 impulsivity/sensation seekers-enhancement motivated) ([Conrod, Castellanos-Ryan, &](#)
10 [MacKie, 2011](#)). However our results, together with previous prospective studies done in
11 adolescents ([Bradizza et al., 1999](#); [Schelleman-Offermans et al., 2011](#)), suggest that we
12 should not neglect social motives to prevent or reduce alcohol misuse.
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29 The present study has several limitations. The first is the sample attrition
30 between both assessments (52.78%). This is partly because some participants at T2
31 were of legal age to drop out of high school. High school psychologists also informed
32 about a high level of mobility in that year. In relation to this, the attrition may lead to
33 bias; for example, we found that the participants who dropped out of the study scored
34 higher in alcohol use, motives and age than those who continued at T2. However,
35 previous studies have shown that attrition has a minor impact on the associations
36 between predictors and outcomes ([Wolke et al., 2009](#)). Secondly, we did not assess
37 drinking motives in the second wave, so it was not possible to explore the test-retest
38 reliability of the scales, and also the reciprocal influences between alcohol and motives.
39 Finally, we did not include measures of binge drinking or heavy drinking that are highly
40 informative, especially in the case of enhancement motives ([Cooper, 1994](#); [Kuntsche et](#)
41 [al., 2008](#)).
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In summary, the present research shows the utility of the Spanish DMQ-R SF (Kuntsche & Kuntsche, 2009) for assessing drinking motives in adolescents. The sound psychometric properties and the similarity of our results with findings from previous studies in different countries (Kuntsche & Kuntsche, 2009; Mazzardis et al., 2010; Németh et al., 2012) indicate that the Spanish DMQ-R SF may be suitable for cross-cultural comparisons. The cross-sectional and prospective associations between motives and alcohol outcomes indicate that we should bear in mind the social motives, in addition to coping motives, in order to prevent and reduce alcohol use and problems in adolescents.

References

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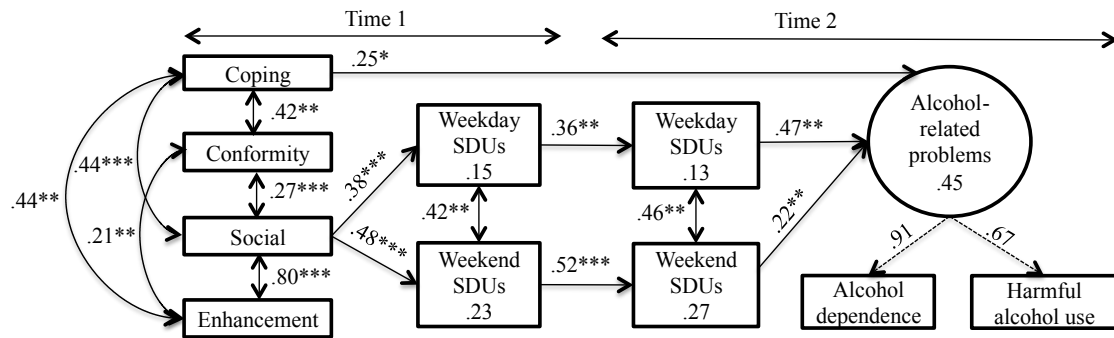


Figure 1

Final path analyses

Over the unidirectional, bidirectional and dashed lines, the standardised beta coefficients, correlations and factor loadings appear, respectively. Boxes contain the R².

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 1

Fit indices

		χ^2_{S-B}	d.f.	<i>p</i>	$\chi^2_{S-B}/$ d.f.	CFI	IFI	MFI	RMSEA (90% CI)	AIC	
CFAs	1-Factor model	698.35	170	<.001	4.11	.70	.71	.59	.08 (.07, .09)	358.35	
	2-Factor model (positive vs. negative)	535.56	169	<.001	3.17	.79	.80	.70	.07 (.06, .07)	197.56	
	2-Factor model (internal vs. external)	659.37	169	<.001	3.90	.72	.73	.62	.08 (.07, .08)	321.37	
	3-Factor model	405.09	167	<.001	2.43	.87	.87	.79	.05 (.05, .06)	71.09	
	4-Factor model	348.36	164	<.001	2.12	.90	.90	.83	.05 (.04, .05)	20.36	
	DMQ-R SF	4-Factor model	81.11	48	<.01	1.69	.97	.97	.97	.04 (.02, .05)	-14.90
	Multi-group analysis	145.08	96	<.001	1.51	.95	.95	.95	.05 (.03, .06)	-46.92	
Path analyses	Hypothesised model	38.99	26	<.05	1.50	.94	.95	.97	.05 (.00, .07)	-13.01	
	Final model (Figure 1)	32.32	28	>.05	1.15	.98	.98	.99	.03 (.00, .06)	-25.98	
	Multi-group analysis	85.37	56	<.01	1.52	.90	.91	.94	.07 (.04-.09)	-26.63	

Table 2

Results of the CFAs, interfactor correlations, Cronbach's alphas, and means (SD) of the drinking motive dimensions

Items ¹	DMQ-R				SF DMQ-R											
	Social	Enhancement	Coping	Conformity	Social	Enhancement	Coping	Conformity								
	FL	SE	R ²	FL	SE	R ²	FL	SE	R ²							
3. Because it helps you enjoy a party	.79	.05	.63				.81	.05	.66							
5. To be sociable	.35	.04	.12													
11. Because it makes social gatherings more fun	.76	.06	.57				.76	.06	.58							
14. Because it improves parties and celebrations	.89	.04	.80				.88	.04	.78							
16. To celebrate a special occasion with friends	.78	.05	.60													
7. Because you like the feeling		.84	.06	.71			.80	.06	.64							
9. Because it's exciting		.70	.05	.49												
10. To get high		.66	.07	.44			.67	.07	.45							
13. Because it gives you a pleasant feeling		.90	.05	.81												
18. Because it's fun		.86	.05	.75			.88	.06	.78							
1. To forget your worries			.63	.07	.40			.53	.07	.29						
4. Because it helps you when you feel depressed or nervous			.74	.07	.55			.73	.07	.54						
6. To cheer up when you are in a bad mood			.68	.06	.46			.74	.07	.54						
15. Because you feel more self-confident and sure of yourself			.59	.07	.35											
17. To forget about your problems			.77	.06	.60											
2. Because your friends pressure you to drink				.35	.04	.12										
8. So that others won't kid you about not drinking				.64	.07	.42										
12. To fit in with a group you like				.67	.06	.45				.68	.05	.46				
19. To be liked				.77	.06	.59				.75	.05	.57				
20. So you won't feel left out				.70	.05	.50				.71	.06	.50				
α		.84		.81		.81		.75		.85		.82		.70		.75
Means (SD) total	9.67	(4.47)	8.23	(4.40)	7.05	(3.13)	5.61	(1.55)	5.95	(3.16)	5.06	(2.85)	4.25	(1.93)	3.38	(1.08)
Means (SD) boys	10.26	(4.92)	8.70	(4.73)	7.06	(3.37)	5.76	(1.74)	6.38	(3.46)	5.36	(3.03)	4.23	(2.10)	3.50	(1.23)
Means (SD) girls	9.13	(3.96)	7.80	(4.05)	7.04	(2.89)	5.47	(1.33)	5.57	(2.82)	4.78	(2.64)	4.27	(1.77)	3.28	(.91)
<i>d</i>		.25		.20		.01		.19		.26		.20		-.02		.20

Note. FL = Standardised Factor Loading, SE = Standard Errors. All correlations

significant at $p < .001$. Cohen's *ds* are those associated with gender differences in the means. Values of 0.20, 0.50, and 0.80 correspond to small, medium, and large effect sizes, respectively (Cohen, 1992).

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