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Assessment of the Psychometric Properties of the Drinking Motives Questionnaire – Revised Among Irish Drinkers

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CITATION
Motivational models are frequently used within alcohol research to determine why people drink and to assess the relative importance of these reasons. Motives are considered a proximal and diagnostic indicator of drinking behavior (Cooper, 1994) and have been described as a “final, common pathway to drinking” (Cox & Klinger, 1988, p. 168). Research on motivational models offers a greater understanding of why adolescents begin drinking and how that behavior is maintained (Cox, Hosier, Crossley, Kendall, & Roberts, 2006). Furthermore, studies suggest that drinking motives account for as much as 50% of the variance in adolescent drinking (Kuntsche, 2007).

In earlier research, motives tended to be conceptualized with a two-factor approach (MacLean & Lecci, 2000): individuals drink for reasons that are essentially positive (i.e., social benefits) or negative (i.e., tension reduction). While underscoring the importance of examining motives for drinking, this two-factor approach overlooked other dimensions pertaining to alcohol consumption (e.g., social motives discrete to the coping and affect enhancement motives of a two-dimensional model: MacLean & Lecci, 2000). To address this limitation, the Drinking Motives Questionnaire (DMQ) was developed, with research identifying a consistent pattern of three intercorrelated but discrete and separable factors (i.e., social, coping, and enhancement motives: Cooper, Russell, Skinner, & Windle, 1992; Stewart, Zeitlin, & Samoluk, 1996).

A four-factor model (which included conformity as a motive) was subsequently developed. It proposed that individuals drink for positive (social and enhancement) and negative (conformity and coping) reinforcement motives, and that these motives are external (social and conformity) and internal (enhancement and coping) (Cox, 1990; Cox & Klinger, 1988). A revised DMQ (DMQ-R; Cooper, 1994) was subsequently created, which has become the most commonly used way of assessing motives to drink within North American studies (E. Kuntsche, Knibbe, Gmel, & Engels, 2005; MacLean & Lecci, 2000).

Based on a confirmatory factor analysis (CFA), Cooper (1994) reported that the DMQ-R was best represented by a four-factor model. As well, findings attested to the scale’s invariance across gender and age groups, and to its predictive validity. The scale’s dimensionality has been replicated in other studies (e.g., MacLean & Lecci, 2000; Martens, Rocha, Martin, & Serrao, 2008), with researchers also documenting that the four motives are associated with unique patterns of drinking. For example, social motives were associated with environmental cues (i.e., drinking with...
a partner vs. drinking alone); enhancement motives were related indirectly to drinking problems; and coping motives were strongly and directly associated with problematic drinking (MacLean & Lecci, 2000).

Despite its pervasive use in North America, the DMQ-R has been subject to limited psychometric testing in other countries (E. Kuntsche et al., 2005; E. Kuntsche, Knibbe, Gmel, & Engels, 2006). Indeed, one of the first studies to address this omission was published in 2006 (E. Kuntsche et al.). Based on data obtained from 5,617 Swiss adolescents ($M_{\text{age}} = 15.1$ years), the authors conducted a confirmatory factor analysis (CFA) and replicated the four-factor structure identified by Cooper (1994). They also observed that different motives were associated with different drinking-related issues (e.g., coping was associated with alcohol-related problems while conformity was negatively related to heavy drinking: E. Kuntsche et al., 2006).

Using CFA, the four-factor structure of the DMQ-R has been confirmed in several other European countries: Netherlands (Crutzen & Kuntsche, 2013); Switzerland (E. Kuntsche, Stewart, & Cooper, 2008); and Hungary and Spain (Németh et al., 2011). However, to the authors’ knowledge, no cross-cultural studies have utilized exploratory factor analysis (EFA) to assess the dimensionality of this scale. Only one published study – again, using North American participants – employed EFA in this capacity (Mushquash, Stewart, Comeau, & McGrath, 2008). The rationale provided by Mushquash et al. in support of their decision to conduct an EFA was the dearth of research using the DMQ-R with the population of interest; namely, First Nation Canadians. The researchers utilized principal components analysis (PCA), as well as oblique rotation, due to previously observed intercorrelations of the scale’s factors when completed by adolescents (Cooper, 1994; E. Kuntsche et al., 2006) and young adults (Simons, Correia, Carey, & Borsari, 1998). Results suggested that a three-component model offered a more appropriate fit for the data (i.e., coping, conformity, and joint social/enhancement). However, Costello and Osborne (2005) contend that EFA is preferable to PCA as the latter is a data reduction method only, computed without regard to any underlying structure caused by latent variables.

Supporting the three motive model identified by Mushquash and associates (2008), strong correlations have consistently been reported between the Social and Enhancement subscales of the DMQ-R, both of which reflect positive motives to drink. In recent studies, illustrative $r$ values include: .89 (USA: Anderson, Grunwald, Bekman, Brown, & Grant, 2011), .85 (Brazil: Hauck-Filho, Teixeira, & Cooper, 2012), .82 (Hungary: Urbán, Kökönyei, & Demetrovics, 2008), and .92 (Switzerland: E. Kuntsche et al., 2006). The magnitude of these sorts of intercorrelations may cause one to question whether a meaningful difference exists between the social and enhancement motives, as measured by the DMQ-R.

Alternatively, perhaps neither a three-factor nor a four-factor model is sufficient. Some researchers have provided evidence that a five-factor model of drinking motives (partitioning the negative Coping subscale into Coping for anxiety and Coping for depression: Blackwell & Conrod, 2003, as cited in Grant, Stewart, O’Connor, Blackwell, & Conrod, 2007) offers a better fit for the data even in North American samples. Studies identifying three- and five-factor models for the DMQ-R underscore the importance of ongoing assessments of the measure’s dimensionality.

Rationale for the Current Studies

To date, there are no published studies examining the dimensionality of the DMQ-R, when completed by Irish participants. This omission is surprising as Ireland occupies a unique position among Western European nations vis-à-vis alcohol consumption. First, persons in Ireland have been shown to have the most favorable overall expectations about drinking outcomes (Anderson & Baumberg, 2006). Second, it has been argued that alcohol use appears not only to be a cornerstone of many aspects of Irish social and cultural life, but is in fact “deeply woven into [citizens’] national identity” (Mongan, Reynolds, Fanagan & Long, 2007, p. 23). These factors may explain why Irish people spend more money per annum on alcohol (€1,700) than residents of any other country, and are consistently identified as one of the highest global consumers of alcohol (Byrne, 2004) and as the heaviest binge-drinkers in Europe (Ramstedt & Hope, 2005; Special Eurobarometer Report, 2007).

Due to the unique role that alcohol plays within Irish culture and the absence of psychometric assessments with the population of interest (i.e., people from Ireland), we adhered to Mushquash and associates’ (2008) recommendation that EFA was a suitable first step when examining the dimensionality of the DMQ-R. The factor structure that emerged was subsequently tested via CFA.

Study 1

The objectives of this study were fourfold. First, an exploratory factor analysis (EFA) was conducted to determine if the four-factor model often identified with the 20-item
version of the DMQ-R (e.g., Crutzen & Kuntsche, 2013; Németh et al., 2011) would similarly emerge when tested with Irish participants. Second, the replicability of the dimensional solution identified by EFA was tested using confirmatory factor analysis (CFA). Third, the scale score reliability of the DMQ-R and its factors was investigated. Fourth, and finally, tests of construct validity were performed. Consistent with prior research (e.g., Cooper et al., 1992; Kuntsche, 2007; MacLean & Lecci, 2000), it was hypothesized that scores on the DMQ-R would correlate positively with various indicators of self-reported alcohol consumption. To illustrate: participants that believe more strongly in the positive benefits of alcohol consumption also will report greater monthly and yearly alcohol consumption as well as greater monthly and yearly episodes of binge-drinking.

**Method**

**Participants**
The full sample consisted of 874 participants that were recruited from a large university in Western Ireland (n = 508) and four secondary schools (n = 366). Of the 841 that provided details about gender, there were 280 males (33.3%) and 561 females (66.7%). Respondents were between the ages of 14 and 53 (M = 19.18, SD = 4.39), with 87% aged 21 or under. Finally, of the 865 answering the demographic item on nationality, the majority reported being Irish (n = 816; 93.4%). The sample was randomly divided in half (n = 437) so that exploratory factor analysis could be conducted with Sample 1 and confirmatory factor analysis with Sample 2.

**Measures**

*Alcohol Quantity/Frequency (Ramstedt & Hope, 2005)*
Participants were asked two questions about prior/current drinking behavior: (1) Frequency (How many times during the last 12 months have you been drinking beer or wine/cider/spirits?); and (2) Quantity (When you drink beer or cider/wine/spirits, approximately how many bottles/glasses/single measures, etc., do you drink?). Response options to item 1 were: “Daily,” “4–5 days a week,” “2–3 days a week,” “Once a week,” “2–3 days a month,” “Once a month,” “One or a couple of days a year,” and “Never.” The second item was an open-ended question, from which standard drinks are computed (e.g., if an individual reports drinking 1 pint on a usual occasion, this is scored as 2 standard drinks, or a usual amount of standard drink consumption [USDC] of 2). The answers to the frequency and quantity questions were calculated into monthly and yearly totals (monthly and yearly alcohol consumption: MAC and YAC). This was done by multiplying respondents’ answer to item 1 by their response to item 2. For example, if an individual reported drinking “weekly” (item 1), and reported an average consumption of 2 pints (item 2), he/she would receive a yearly alcohol consumption (YAC) score of 208 (52 weeks × 4 standard drinks = 208).

Risky episodic (i.e., binge) drinking was assessed by two items: (1) On a single occasion, have you ever consumed alcoholic beverages corresponding to at least one bottle of wine, or seven single shots of spirits, or six premixed spirit drinks, or four pints of beer?; (2) If yes, please state how often in the last 12 months you have consumed this amount. The response options for item 1 were “yes”/“no” and the options for item 2 were the same as for MAC and YAC. These questions were used to compute binge-drinking occasions in the previous month and previous 12 months (BDM and BDY, respectively).

In all, five alcohol measures/indicants were employed:

1. usual amount of standard drink consumption (USDC: i.e., average number of drinks per day of drinking – Rehm et al., 2003),
2. MAC,
3. YAC,
4. BDM, and
5. BDY (Hope, Dring, & Dring, 2005; Ramstedt & Hope, 2005).

*Drinking Motives Questionnaire-Revised (DMQ-R: Cooper, 1994)*
This 20-item scale examines motives to drink alcohol across four factors (i.e., social, coping, enhancement, and conformity). It uses a six-point Likert scale (1 = never; 6 = almost always). As each subscale contains five items, total scores can range from 5 to 30, with higher scores denoting stronger endorsement of positive reinforcement received through alcohol consumption. Findings, in general, suggest the DMQ-R is a valid instrument when distributed to adolescents and young adults (e.g., E. Kuntsche & Kuntsche, 2009; MacLean & Lecci, 2000).

**Procedure**
Consent forms were sent to parents of students in their final 2 years at four secondary schools situated within the Republic of Ireland. Survey packs were then sent to each school for administration during regular instructional hours. For university students, questionnaires were made available online through university mailing lists (n = 267) or administered within a class setting (n = 241).

All prospective respondents were informed that participation was strictly voluntary; any items could be omitted without penalty or consequence; and no self-identifying information was being gathered. Finally, both secondary and university students were told that debriefing materials would be made available when data collection was finished.
This protocol was approved by the Research Ethics Committee at the home institution of the senior author.

Results

Exploratory Factor Analysis (Sample 1)

The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was .93 and Bartlett’s test of sphericity was statistically significant ($p < .001$) suggesting the data were appropriate for EFA. The DMQ-R’s dimensionality was investigated using principal axis factoring (PAF) with oblique rotation (oblimin, delta set at zero). PAF was selected because it is robust when data are not normally distributed (Fabrigar, Wegener, MacCallum, & Strahan, 1999). To assist with factor retention, the scree plot and traditional parallel analysis (T-PA) were used. Both are considered to be superior to the commonly employed eigenvalue greater than 1 “rule” (Costello & Osborne, 2005).

Results of the parallel analysis suggested that a three-factor solution was appropriate (i.e., eigenvalues 1, 2, and 3 for the real data exceeded the 95% percentile eigenvalues generated for the random data [8.47 vs. 1.47; 2.43 vs. 1.38; and 1.81 vs. 1.31]). The eigenvalue for the 4th factor was .81, which was lower than the 95% percentile eigenvalue for the random data (1.26). The scree plot also suggested that a three-factor solution should be retained. The proportion of total variance accounted for was 63.57% (factor 1: 42.35%, factor 2: 12.14%, and factor 3: 9.07%). The content of the 11 items loading on the first factor represented a combination of Social/Enhancement motives plus one of the Coping items (henceforth labeled Positive Motives); the four items loading on the second factor characterized a Coping Motive; and the five items loading on the third factor reflected a Conformity Motive (see Table 1).

Confirmatory Factor Analysis (Sample 2)

Sample 2 ($n = 437$) was randomly divided into two smaller groups (labeled subsamples 2.1 and 2.2: $n_s = 218$ and 219, respectively) in order to test the replicability of the three-factor, 20-item (3:20) DMQ-R model identified using EFA. Using a maximum likelihood parameter estimate, multiple criteria – comprising a recommended “minimal set” (Schweizer, 2010) – were used to assess model goodness-of-fit: normed chi-square (Chi-Square statistic divided by the degrees of freedom: $\chi^2/df$), Comparative Fit Index (CFI), the Standardized Root Mean Square Residual (SRMR), and the Root Mean Square Error of Approximation (RMSEA). The following thresholds denote good fit: CFI $\geq .95$, RMSEA $\leq .05$, SRMR $< .08$, and $\chi^2/df < 2$. Acceptable fit is reflected when CFI $\geq .90$, RMSEA $\leq .08$, SRMR $< .10$, and $\chi^2/df < 3$ (Hooper, Coughlan, & Mullen, 2008; Kline, 2011; Tabachnick & Fidell, 2007).

Subsample 2.1 ($n = 218$)

The fit statistics for the 3:20 DMQ-R model were suboptimal: CFI = .88, RMSEA = .09, SRMR = .07, and $\chi^2/df = 2.7$. Inspection of the modification indices suggested that deleting three of the “Positive Motives” items as well as one coping item, which loaded on the Positive subscale, would improve model fit: CFI = .94, RMSEA = .07 (.058–.085), SRMR = .06, and $\chi^2/df = 2.1$.

Subsample 2.2 ($n = 219$)

The three-factor, 16-item (3:16) model which emerged with subsample 2.1 was tested with subsample 2.2. Fit was satisfactory (see Table 2), with the modification indices suggesting that no further alterations in terms of item deletion or shared error covariance were warranted.

Scale Score Reliability and Descriptive Statistics for Three-Factor, 16-Item DMQ-R

The alpha coefficients for the 3:16 DMQ-R subscales were good (all as above .80). Descriptive statistics for the 3:16 DMQ-R and the various drinking indicators are given in Table 3.

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2 We thank an anonymous reviewer for drawing our attention to the distinction between traditional and revised parallel analysis (T-PA and R-PA, respectively). R-PA addresses a conceptual flaw with T-PA whereby the “empirical distribution of eigenvalues beyond the first one is conditioned on the presence of zero factors rather than $k$ factors” (Green, Levy, Thompson, Lu, & Lo, 2012, p. 360); that is, for multifactorial solutions, T-PA does not take into consideration the existence of $k$ prior factors. While R-PA would appear to be the method of choice, Green (personal communication, May 9 and 10, 2016) indicated that, at present, he is unaware of any commercially available programs that could be used to perform this analysis. Further, in a Monte Carlo simulation study, Green et al. (2012) found that T-PA and R-PA were similarly “well behaved” when sample sizes were large ($N = 500$), factor loadings were high (.70), and factors were modestly intercorrelated ($r = .5$). As these conditions were noted in Study 1, Green (personal communication, May 10, 2016) felt that T-PA and R-PA would “get similar results.”

3 Item: “How often do you drink because you feel more self-confident or sure of yourself?”

4 Used for all CFAs.

5 All CFA fit statistics rounded to two decimal places for text; full number available in Table 2.

6 We thank an anonymous reviewer for raising the possibility that the three-factor model identified in Study 1 was idiosyncratic and that the original four-factor model endorsed by other researchers might emerge as a suitable representation of the data. Inspection of the resultant fit statistics suggested that this was not the case: GFI = .84, TLI = .87, CFI = .89, RMSEA = .09 (.08–.098), SRMR = .09, and $\chi^2/df = 2.7$.

7 Removed items were: “Because you like the feeling?/to get high?/because it gives you a pleasant feeling?/because you feel more self-confident or sure of yourself?”
Table 1: Exploratory factor analysis: factor loadings

<table>
<thead>
<tr>
<th>Item</th>
<th>Positive Factor loading (mean/standard deviation)</th>
<th>Coping Factor loading (mean/standard deviation)</th>
<th>Conformity Factor loading (mean/standard deviation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>... because you like the feeling?</td>
<td>.64 (3.60/1.38)</td>
<td>-.12</td>
<td>-.05</td>
</tr>
<tr>
<td>... because you think it’s exciting?</td>
<td>.71 (3.45/1.54)</td>
<td>.01</td>
<td>-.01</td>
</tr>
<tr>
<td>... to get high?</td>
<td>.56 (2.89/1.60)</td>
<td>.10</td>
<td>.10</td>
</tr>
<tr>
<td>... because it gives you a pleasant feeling?</td>
<td>.78 (3.64/1.49)</td>
<td>-.06</td>
<td>-.04</td>
</tr>
<tr>
<td>... because it’s fun?</td>
<td>.86 (4.08/1.42)</td>
<td>-.02</td>
<td>-.10</td>
</tr>
<tr>
<td>... because it helps you enjoy a party?</td>
<td>.75 (4.16/1.40)</td>
<td>-.01</td>
<td>.05</td>
</tr>
<tr>
<td>... to be sociable?</td>
<td>.65 (3.72/1.35)</td>
<td>-.12</td>
<td>.15</td>
</tr>
<tr>
<td>... because it makes social gatherings more fun?</td>
<td>.88 (3.97/1.39)</td>
<td>-.07</td>
<td>.01</td>
</tr>
<tr>
<td>... because it improves parties and celebrations?</td>
<td>.91 (3.95/1.42)</td>
<td>-.09</td>
<td>.01</td>
</tr>
<tr>
<td>... to celebrate a special occasion with friends?</td>
<td>.67 (4.48/1.27)</td>
<td>.05</td>
<td>-.08</td>
</tr>
<tr>
<td>... because you feel more self-confident or sure of yourself?</td>
<td>.61 (3.57/1.57)</td>
<td>-.09</td>
<td>.17</td>
</tr>
<tr>
<td>... to forget your worries?</td>
<td>-.01</td>
<td>-.75 (2.01/1.11)</td>
<td>.00</td>
</tr>
<tr>
<td>... because it helps you when you feel depressed or nervous?</td>
<td>-.01</td>
<td>-.77 (1.97/1.16)</td>
<td>.10</td>
</tr>
<tr>
<td>... to cheer up when you’re in a bad mood?</td>
<td>.16</td>
<td>-.70 (2.33/1.24)</td>
<td>-.02</td>
</tr>
<tr>
<td>... to forget about your problems?</td>
<td>-.06</td>
<td>-.89 (2.04/1.16)</td>
<td>.01</td>
</tr>
<tr>
<td>... because your friends pressure you to drink?</td>
<td>-.05</td>
<td>.02</td>
<td>.68 (1.84/1.07)</td>
</tr>
<tr>
<td>... so that others won’t kid you about not drinking?</td>
<td>-.07</td>
<td>-.03</td>
<td>.71 (1.62/0.95)</td>
</tr>
<tr>
<td>... to fit in with a group you like?</td>
<td>.05</td>
<td>-.01</td>
<td>.77 (2.12/1.11)</td>
</tr>
<tr>
<td>... to be liked?</td>
<td>.12</td>
<td>-.04</td>
<td>.69 (1.96/1.19)</td>
</tr>
<tr>
<td>... so you won’t feel left out?</td>
<td>.10</td>
<td>-.09</td>
<td>.69 (2.30/1.27)</td>
</tr>
</tbody>
</table>

Note. Response options for the DMQ-R are: 1 = Never; 2 = Almost never; 3 = Some of the time; 4 = About half of the time; 5 = Most of the time; 6 = Almost always.

Table 2: Model fit for all CFAs

| Model (factor: items) | \(
\chi^2/df
\) | CFI | RMSEA | SRMR |
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Study 1: Subsample 2.1 (n = 218)</td>
<td>4:20 (original)</td>
<td>2.68</td>
<td>.89</td>
<td>.09 (.08−−.10)</td>
</tr>
<tr>
<td>3:20 (based on EFA)</td>
<td>2.74</td>
<td>.88</td>
<td>.09 (.08−−.10)</td>
<td>.0886</td>
</tr>
<tr>
<td>3:16 (based on CFA)</td>
<td>2.10</td>
<td>.94</td>
<td>.07 (.06−−.09)</td>
<td>.0611</td>
</tr>
<tr>
<td>Study 1: Subsample 2.2 (n = 219)</td>
<td>3:16</td>
<td>2.40</td>
<td>.93</td>
<td>.08 (.07−−.09)</td>
</tr>
<tr>
<td>4:20 (Original)</td>
<td>2.89</td>
<td>.86</td>
<td>.09 (.08−−.10)</td>
<td>.0889</td>
</tr>
<tr>
<td>Study 2 (N = 344)</td>
<td>3:16</td>
<td>2.19</td>
<td>.96</td>
<td>.06 (.05−−.07)</td>
</tr>
<tr>
<td>4:20 (Original)</td>
<td>3.05</td>
<td>.90</td>
<td>.08 (.07−−.09)</td>
<td>.0863</td>
</tr>
</tbody>
</table>

Notes. For subsample 2.1 in Study 1, three models were assessed. For subsample 2.2, Study 1, and Study 2, a single model (three-factors, 16-items) was assessed. Items deleted through examination of modification indices: Positive: “How often do you drink because you like the feeling?” / ... to get high?” / ... because it gives you a pleasant feeling?”; Coping: “How often do you drink because you feel more self-confident or sure of yourself?” The \(
\chi^2/df
\) figure for Study 2 was outside the convention norm for acceptable fit (> 3; Bollen, 1989, as cited in Schweizer, 2010, p. 2).

The three motives identified for the 16-item DMQ-R have different numbers of items; thus, scores on each motive were standardized (i.e., total scores were divided by the number of subscale items so that all scores could range between the response format [i.e., 1–6]). Subsamples 2.1 and 2.2 were combined, and a series of paired samples \(t\)-tests, stratified by gender, revealed that male participants were more likely to report consuming alcohol for Positive motives versus Coping \((p < .001)\) or for Conformity \((p < .001)\) motives but did not report drinking for Coping more so than for Conformity \((p = .454)\). Females also reported drinking more for Positive motives than for Coping \((p < .001)\) or for Conformity \((p < .001)\) motives; however, contrary to their male counterparts, females’ Coping scores were significantly higher than their Conformity scores \((p < .005)\).

**Construct Validity**

A multivariate analysis of variance (MANOVA) was conducted, with gender differences noted on two of the...
three DMQ-R subscales: males reported drinking more for Conformity motives ($M = 10.58$, $SD = 4.45$) and for Positive motives ($M = 28.89$, $SD = 7.86$) than did females (Conformity: $M = 9.33$, $SD = 4.15$, $F[1, 415] = 8.05, p < .01$, $d = .29$; Positive: $M = 26.80$, $SD = 7.98$, $F[1, 415] = 6.48, p < .05$, $d = .26$). Positive correlations also were noted between scores on the DMQ-R subscales and various indicators of drinking behavior (see Table 5). For example, scores on the “Positive Motives” subscale correlated positively with each measure of alcohol consumption ($r$s ranging from .31 [YAC] to .49 [USDC] among males, and .39 [BDM] to .54 [USDC] among females), although as indicated, drinking for Conformity among females was not correlated with drink indicants.

### Discussion

Exploratory and confirmatory factor analyses of the DMQ-R suggest that a three-factor, 16-item model of drinking motives may be an improvement on the original four-factor, 20-item model when distributed to an Irish (i.e., English-speaking European) sample. The resultant factors were labeled: Positive motives (seven items), Coping motives (four items), and Conformity motives (five items). Scale score reliability coefficients were good for all subscales. Finally, for both male and female participants, scores on the subscales assessing Positive and Coping motives correlated significantly with average consumption of alcohol (measured monthly and yearly) and binge-drinking behavior. Given the incremental nature of psychometric testing, a second study was conducted to determine whether the refined version of the DMQ-R would continue to evidence satisfactory model fit and scale score reliability.

### Study 2

The central aims of this study were threefold. First, the “fit” of the three-factor 16-item version of the DMQ-R, identified in Study 1, was tested using confirmatory factor analysis (CFA). Second, the scale score reliabilities of the Positive motives, Coping motives, and Conformity motives subscales of the DMQ-R were investigated. Third, and finally, the relationship between each of the three motives and self-reported binge-drinking in the past year was examined.

### Method

#### Participants

Three hundred forty-four participants were recruited from two large universities in Western Ireland. The sample consisted of 80 males (23%) and 264 females (77%), between the ages of 17 and 57 (40.74, $SD = 4.31$). No additional demographic information was collected.

#### Measures

**Risky Episodic Drinking (i.e., Binge-Drinking: Ramstedt & Hope, 2005)** Participants were asked about the frequency of binge-drinking in the previous 12 months (BDY). Details about this measure are given in Study 1.

**Drinking Motives Questionnaire–Revised (DMQ-R: Cooper, 1994)** Details about this measure are given in Study 1.

### Procedure

Questionnaires were made available online through university mailing lists. Prospective respondents were
informed that participation was strictly voluntary and that any items could be omitted without penalty or consequence. The protocol was approved by the Research Ethics Committee affiliated with the senior author’s home institution.

Results

Confirmatory Factor Analysis

The fit statistics for the 3:16 DMQ-R demonstrated either good (CFI = .96; SRMR = .05) or acceptable fit (RMSEA = .06; $\chi^2/df = 2.18$). Again, this version was superior to the original 4:20 model (see Table 2). Inspection of the modification indices did not identify any items that should be deleted for the purpose of improving model fit.

Scale Score Reliability and Descriptive Statistics

Alpha coefficients for the 3:16 DMQ-R subscales were good (as between .79 and .91: see Table 3). As noted with Study 1, paired samples t-tests, stratified by gender (Table 4), revealed that males reported drinking more for Positive motives than for Coping ($p < .001$) or Conformity ($p < .001$) motives, while scores on the Coping and Conformity subscales did not differ significantly. While females also reported drinking more for Positive motives than for Coping ($p < .001$) or Conformity ($p < .001$), as with Study 1, and contrary to their male counterparts, females’ Coping scores were significantly higher than their Conformity scores ($p < .01$).

Relationship Between Motives and Binge-Drinking

Multiple regression analysis (Enter method) was conducted for the purpose of examining the associations between self-reported binge-drinking, and the Positive, Coping, and Conformity Motives assessed by the 3:16 version of the DMQ-R. The $F$ statistic for the final model was statistically significant, $F(3, 314) = 18.03, p < .001$, adjusted $R^2 = .14$. Inspection of the standardized beta coefficients revealed that two of the three motives were significant predictors of binge-drinking: Coping motives ($\beta = .14, t = 2.46, p < .05$) and Positive motives ($\beta = .32, t = 5.53, p < .01$). Thus, higher levels of risky drinking were associated with endorsing the beliefs that alcohol consumption possesses benefits and assists with coping. The squared semi-partial correlations for these two motives were (in order): .02 and .08.9

Discussion

The findings from Study 2 attest to the robustness of the three-factor, 16-item DMQ-R. Fit statistics were excellent; scale score reliability coefficients were satisfactory; and multiple regression analysis indicated that stronger endorsement of Positive and Coping motives was significantly associated with risky episodic drinking.

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9 To assess whether the removal of four items and one factor compromised the explanatory power of the DMQ-R, regression analyses were conducted using the original four-factor, 20-item measure. No substantive differences emerged in terms of significant predictors and proportion of variance accounted for by the model (e.g., in Study 1 [Sample 2, $n = 437$], Social, Enhancement, and Coping motives were statistically significant predictor variables in the final model. The squared semi-partial correlations for these motives were (in order): .02, .04, and .02).

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Table 5. Correlations between DMQ-R subscales, and drink indicants, stratified by gender (Study 1)

<table>
<thead>
<tr>
<th>Scale</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Positive motives (7 items)</td>
<td>–</td>
<td>.45**</td>
<td>.33**</td>
<td>.64**</td>
<td>.43**</td>
<td>.40**</td>
<td>.39**</td>
</tr>
<tr>
<td>2.</td>
<td>Coping motives (4 items)</td>
<td>.49**</td>
<td>–</td>
<td>.45**</td>
<td>.34**</td>
<td>.35**</td>
<td>.26**</td>
<td>.32**</td>
</tr>
<tr>
<td>3.</td>
<td>Conformity motives (5 items)</td>
<td>.43**</td>
<td>.55**</td>
<td>–</td>
<td>.11</td>
<td>.11</td>
<td>.09</td>
<td>.09</td>
</tr>
<tr>
<td>4.</td>
<td>USDC</td>
<td>.49**</td>
<td>.25*</td>
<td>.16</td>
<td>–</td>
<td>.61**</td>
<td>.61**</td>
<td>.43**</td>
</tr>
<tr>
<td>5.</td>
<td>YAC</td>
<td>.31**</td>
<td>.19*</td>
<td>.19**</td>
<td>.56**</td>
<td>–</td>
<td>.84**</td>
<td>.68**</td>
</tr>
<tr>
<td>6.</td>
<td>MAC</td>
<td>.38**</td>
<td>.23*</td>
<td>.25**</td>
<td>.50**</td>
<td>.72**</td>
<td>–</td>
<td>.68**</td>
</tr>
<tr>
<td>7.</td>
<td>BDM</td>
<td>.38**</td>
<td>.18*</td>
<td>.27**</td>
<td>.21*</td>
<td>.39**</td>
<td>.53**</td>
<td>–</td>
</tr>
<tr>
<td>8.</td>
<td>BDY</td>
<td>.34**</td>
<td>.33**</td>
<td>.29**</td>
<td>.28**</td>
<td>.61**</td>
<td>.51**</td>
<td>.58**</td>
</tr>
</tbody>
</table>

Notes. USDC = usual amount of standard drink consumption (n = 421); Y/MAC = Yearly/monthly alcohol consumption (n = 419/414, respectively); BDY/M = binge drinking occasions in previous year/month (398/395 respectively). Correlations, stratified by gender (male sample below the diagonal). *p < .05; **p < .01.

General Discussion

To date, this study is the first to investigate the psychometric properties of the 20-item version of the DMQ-R when distributed to persons residing in Ireland. As such, it represents an important step in examining motives for alcohol consumption among residents of a country that appear to possess a unique relationship with alcohol and are categorized as heavy drinking (Bloomfield, Stockwell, Gmel, & Rehn, 2003).

Cross-cultural research, often psychometric in nature, is predicated on the view that findings from one context or culture cannot be a priori assumed to be applicable within another cultural context (see Byrne et al., 2009). Assessments of suitability and psychometric integrity are paramount even among cultures that speak the same language. For example, Sanson-Fisher and Perkins (1998) describe the steps involved in ensuring the SF-36 Health Survey, a measure developed within the United States of America, was suitable for use in Australia. The authors tested the reliability and dimensionality of the measure to gauge whether these properties mapped on to those noted with American samples. This type of work underscores the importance of adopting an emic approach vis-à-vis psychometric testing.

The need to examine dimensionality within different cultural groups is made more pressing given that revised iterations of scales, such as the recently developed short form of the DMQ-R (DMQ-R-SF: E. Kuntsche & Kuntsche, 2009), emerge to meet the demands of mass-testing and are often presupposed to have psychometric integrity (e.g., the DMQ-R-SF has been used in the pan-European Health Behaviours of School Children studies [E. Kuntsche et al., 2014]). The factor structure identified in the current study may have implications for the short-form scale as well as the longer version (e.g., two of the three items appearing in the Enhancement subscale of the DMQ-R-SF were not retained in our factor analyses).

Our studies possess two important limitations that warrant discussion. First, a small number of validation measures were used (i.e., we focused on indicators of alcohol consumption). To better determine the psychometric integrity of the three-factor, 16-item DMQ-R, future studies should seek to incorporate a greater number of discriminant and convergent measures. For example, examination of personality domains has been shown to predict drinking motives and thus would be a useful avenue of future investigation (e.g., low emotional stability predicting Coping motives, while Enhancement motives were predicted by high extraversion and low conscientiousness: Theakston, Stewart, Dawson, Knowlden-Loewen, & Lehman, 2004). Another study might be examining the 3:16 model in the context of how drinking motives mediate the established relation between elevated anxiety sensitivity (AS) and increased alcohol use in college students. A wider focus on constructs such as AS may also help to explain for some of the gender differences identified in this study and others (e.g., high AS women’s greater drinking behavior was largely explained by their elevated Coping Motives, while heightened Conformity Motives explained the increased drinking behavior of high AS men: Stewart, Loughlin, & Rhyno, 2001, p. 157; Van Damme et al., 2013). Perhaps as a way to assess the reconfigured DMQ-R’s known-groups validity, examination within other European nations – representing different drinking profiles – could be conducted. It is possible that the four-factor approach is suitable for so-called “wet”

10Recent findings using confirmatory factor analysis (CFA) suggest that the four-factor structure of the DMQ-R-SF offers good fit for the data in studies on Irish and UK adolescents (ages 11–19: E. Kuntsche et al., 2014). Whether this structure applies to slightly older participants (i.e., those enrolled in university) is not currently known.
countries (i.e., countries where drinking is embedded in daily life such as mealtime: e.g., Switzerland and France) as opposed to “dry” countries (i.e., countries where alcohol consumption is not as common during everyday activities; there is restricted access; and, though abstinence is more common, when drinking occurs it is more likely to result in intoxication: e.g., Ireland and England – see Bloomfield et al., 2003).

Second, the average age of the samples was 20 to 21 years; thus, the respondents denote a rather young cohort, or an age at which drinking tends to be more frequent, heavier, and associated with more problems (see Engs, 2002; Engs, Hanson, & Diebold, 1996). Assessment of motives to drink among older individuals (i.e., > 29 [the age when riskier drinking tends to decline: Ramstedt & Hope, 2005]), and from members of the general population represent a useful line of future inquiry. Finally, assessment of drink-related motives in the current study operated within the parameters of the DMQ-R. It is entirely possible that other motives, not captured by this instrument, may be equally (or more) relevant to Irish people. Qualitative studies using personal interviews and/or focus groups may identify other reasons underlying Irish men and women’s motivation to drink.

Conclusion

In a sample of Irish respondents, a three-factor, 16-item version of the DMQ-R (consisting of Coping, Conformity, and Positive motives) fit the data better than the commonly used four-factor, 20-item DMQ-R. Direct comparison of the two versions in terms of their ability to account for variance in risky drinking behavior did not suggest that the removal of one factor and four items attenuated the explanatory power of the measure. In relation to motives for alcohol consumption, our research suggests that respondents sampled from heavy drinking nations in Europe (specifically, Ireland) may differ from those in North America, or from European nations traditionally reporting lighter levels of alcohol consumption (e.g., Switzerland). Such findings underscore the need to adopt an emic approach when determining a measure’s psychometric integrity.

References


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