Full Length Article

Comparing the predictive validity of the four-factor and five-factor (bifactor) measurement structures of the drinking motives questionnaire

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ABSTRACT

Introduction: The Drinking Motives Questionnaire (DMQ-R) is the most widely administered instrument to assess reasons for consuming alcohol and is conventionally premised on a four-factor structure. Recent research instead reveals that a bifactor measurement model of five motive factors (one general and four specific) represents a superior psychometric embodiment of the scale. The current study evaluated and compared the predictive validity of the four-factor and five-factor models of drinking motives in longitudinally explaining alcohol use and problems.
Methods: Adult participants ($N = 413$; age range = 18–79 years) completed measures of drinking motives (Time 1) and alcohol use and problems one month later (Time 2).
Results: Confirmatory factor analyses corroborated the four-factor (social, enhancement, conformity, and coping motives) and five-factor (each item double loading on general motives and a specific motives factor) measurement structures, but the latter rendered stronger fit indices. Structural equation models revealed that lower social motives, higher enhancement motives, and higher coping motives prospectively contributed to alcohol use. Furthermore, lower social motives, higher conformity motives, higher coping motives, and greater alcohol use contributed to alcohol problems.
Discussion: The same set of paths emerged as significantly predictive in both models, but general motives additionally explained alcohol use and problems in the five-factor model. The incremental contribution of general motives (beyond the specific motives) on alcohol intake and detrimental consequences supports the predictive validity of the drinking reasons paradigm embodied by the inclusion of a global factor.

1. Introduction

Alcohol consumption can produce problematic consequences including compromised work productivity (Rehm et al., 2009), distressing withdrawal symptoms (Hashimoto and Wiren, 2008), behavioral disinhibition and negative emotions (Hicks et al., 2012), and memory impairment and blackouts (Wilhite and Fromme, 2015). Drinking motives, or reasons for consuming alcohol, are important proximal determinants of the amount of alcohol consumed (Cox and Klinger, 1988). People might drink to celebrate and enhance social situations (social motives), derive pleasure and have fun (enhancement motives), avoid interpersonal rejection (conformity motives), or alleviate stress and anxiety (coping motives). Research devoted to scrutinizing the measurement and predictive properties of scales assessing drinking reasons is crucial to identifying and understanding risk antecedents to curtail alcohol usage and problems.

1.1. Drinking motives

The Drinking Motives Questionnaire-Revised (DMQ-R; Cooper, 1994) is the most widely adopted psychometric assessment of reasons for consuming alcohol (Kuntsche et al., 2005). The original DMQ (Cooper et al., 1992) was conceptually premised on a motivational framework for alcohol intake (Cox and Klinger, 1988) and developed to assess the extent that people drink to reduce negative affect and enhance positive affect. The revised DMQ-R (Cooper, 1994) was based on the paradigm that two theoretical dimensions capture motives to drink: valence (drinking to increase positive affect or reduce negative affect) and source (drinking to increase external or internal rewards). Cooper (1994) crossed these two dimensions to generate items and applied confirmatory factor analysis to validate a four-factor measurement structure: social motives (positive and external), enhancement motives (positive and internal), conformity motives (negative and external), and coping motives (negative and internal).

Investigations applying the DMQ-R (Cooper, 1994) have sought to identify the motive factors (after controlling for all other motives) related to alcohol consumption and consequences in cross-sectional (Cooper, 1994; Gmel et al., 2012; Roos et al., 2014) and longitudinal (Crutzen et al., 2013; Schelleman-Offermans et al., 2011; Young et al., 2015) research. Studies tend to show that the internally driven motives (enhancement and coping) are associated with greater alcohol use and problems (Cooper, 1994; Crutzen et al., 2013; Kuntsche et al., 2005, 2006; Young et al., 2015). The connections involving the externally reinforced motives (social and conformity) and alcohol outcomes appear to be less clear. Cross-sectional designs have documented positive (Cooper, 1994), negative (Gmel et al., 2012), and nonsignificant relations involving social motives and alcohol use (Merrill and Read, 2010; Németh et al., 2011; Roos et al., 2014), and social motives have been argued to be connected with greater drinking related problems (Clerkin and Barnett, 2012). Conformity motives have been negatively associated with greater frequency of alcohol use (Kuntsche et al., 2006; Schelleman-Offermans et al., 2011), but longitudinal research has shown no significant connection involving conformity motives and alcohol use (Crutzen et al., 2013) or has detected positive and negative associations based on gender involving conformity reasons and greater intake (Kuntsche and Labhart, 2013).

A recent study (Lac and Donaldson, 2016) reevaluated the measurement structure of the DMQ-R and tested several theoretically competing models using confirmatory factor analyses, including various first-order, higher-order, and bifactor models. The bifactor model represented concurrently by a general motive factor and four specific motive factors (social, enhancement, conformity, coping) produced the strongest fit indices and was statistically superior to the traditional four-factor embodiment of the DMQ-R. Given that this general construct was ascertained to be statistically and conceptually distinct from the specific constructs in a bifactor model (Chen et al., 2012; Gonzalez and MacKinnon, 2016; Reise et al., 2007), the theoretical interpretation and implication of this paradigm is that people psychologically possess a general drinking motive that simultaneously operates with their specific drinking motives. The extracted factors from the bifactor model determined that general drinking motives contributed beyond the specific motivations to greater alcohol use in the cross-sectional analysis.

1.2. Current study

The current study extends the cross-sectional research of Lac and Donaldson (2016) by testing the predictive validities of the theoretically competing four-factor and five-factor (bifactor) paradigms of the DMQ-R in explaining alcohol use and problems. The present investigation is the first to test the five constructs from the bifactor embodiment of the DMQ-R in a longitudinal design. Another novel contribution of the current research is that prospective connections involving the bifactor model with alcohol problems have not been examined previously. Moreover, the study sought to compare and contrast the predictive efficacy of factors extracted from the four-factor versus five-factor model on alcohol use and problems. Considering that one of these measurement models incorporates an omnibus construct, the comparison of the two predictive models shall permit evaluation of the extent that the general motive statistically competes with the specific motives in uniquely explaining drinking outcomes. Findings are expected to furnish insights in identifying the particular combination of the five motive factors (general, social, enhancement, coping, conformity) that serve as risk antecedents of alcohol use and problems.

Theoretically, the implementation of a bifactor approach takes into account the multidimensionality of alcohol motives while recognizing the existence of an overarching general drive to drink, and may help to resolve conflicting findings in the existing literature (Chen et al., 2012; Gonzalez and MacKinnon, 2016; Reise et al., 2010; Reise et al., 2007). For instance, some of the explanatory pathways in the literature

premised exclusively on the four-factor model may no longer be significant after controlling for the variance attributed to the global motivation factor. In terms of scale refinement applications, bifactor models are informative in developing and scrutinizing the multidimensional DMQ-R, as the magnitude of the factor loadings on the general and specific factors can guide item revision (Chen et al., 2012). For example, if individual items predominantly load on the general factor and display weak factor loadings on the specific factors, items or factors could be eliminated or refined. In regard to clinical applications, findings from current research are expected to have assessment implications, as identification of the valence of the general alcohol motive factor provides a starting point before targeting specific types of motives for individuals susceptible to developing alcohol related problems.

Two sets of statistical tests were conducted. Confirmatory factor analyses separately tested the four- and five-factor models of the DMQ-R. The instrument was hypothesized to produce satisfactory fit for both measurement models, but the five-factor paradigm premised on general and specific motives was posited to produce superior fit indices (Cooper, 1994; Lac and Donaldson, 2016). Next, structural equation models tested the extracted latent factors in longitudinally predicting alcohol use and problematic consequences. The proposed predictive processes from the motive factors to problematic consequences were presumed to be mediated by drinking behaviors. Tests of indirect effects evaluated the plausibility of alcohol use in statistically mediating the pathways from drinking reasons to problems.

2. Methods

2.1. Participants

Respondents ($N = 413$) ranged in age from 18 to 79 years old ($M = 36.39$, $SD = 13.00$). Gender composition included 42.6% male and 57.4% female. Racial distribution was 84.0% White, 6.3% Black, 3.9% Asian, 2.9% Latino, and 2.9% multiracial. The dataset has not been previously published and represented a different sample from the cross-sectional dataset of the Lac and Donaldson (2016) study.

2.2. Procedure

Amazon's Mechanical Turk (MTurk), a crowdsourcing website that permits the general public to select and participate in a variety of tasks (including research studies), served as the recruitment source (Crano et al., 2015). MTurk participants tend to be more demographically representative and heterogeneous (Buhrmester et al., 2011; Goodman et al., 2013) and data have been found to be as reliable and valid (Rand, 2012) as data collected from typical college samples. Qualification filters permitted only those residing in the United States, 18 years of age and over, and attaining least a 90% rating on previously completed MTurk tasks to participate. Participants received nominal compensation. An IRB approved the research protocols.

Respondents completed web-based measures at baseline (T1) and at the follow-up assessment four weeks later (T2). Initial round participants were invited to participate again by running Perl scripts designed for MTurk panel designs as described in Berinsky et al. (2012). T1 assessed drinking motives, and T2 assessed alcohol use and problems. During each administration, participants electronically provided informed consent and received instructional clarification that the questions concern alcoholic beverages (e.g., beer, wine, wine cooler, shot of liquor, cocktail). Of the 599 participants completing measures in at least one assessment, the final sample ($N = 413$) completed measures in both intervals. Completers tended to be older than non-completers, $t(595) = 6.60$ $p < 0.05$, but both cohorts were not systematically disparate on gender, $\chi^2(1) = 2.35$, $p > 0.05$, and race, $\chi^2(4) = 2.35$, $p > 0.05$.