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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 to 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

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Conflict of Interest

No conflict declared.

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Contributors

Andrew Lac designed the study, collected the data, wrote the method and results sections. Candice Donaldson wrote the literature review and discussion sections. Both authors edited the entire manuscript and approved of the final version.

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.

Keywords

drinking motives; alcohol; predictive validity; confirmatory factor analysis; bifactor analysis

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), whereas 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) and has not detected a positive association of 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 by identifying the particular combination of the five motive factors (general, social, enhancement, coping, conformity motives) 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 it may help 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 five motive factors to problematic consequences were presumed to be mediated by drinking behaviors. Thus, 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 longitudinal dataset for this study 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 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 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, $t(595) = 6.60$ $p < .05$, but both cohorts were not systematically disparate on gender, $\chi^2(1) = 2.35$, $p > .05$, or race, $\chi^2(4) = 2.35$, $p > .05$.

2.3 Measures

2.3.1 T1 Drinking Motives—The DMQ-R (Cooper, 1994) instructions asked participants to endorse reasons for consuming alcohol. The four factors were social motives ($\alpha = .92$), enhancement motives ($\alpha = .89$), conformity motives ($\alpha = .90$), and coping motives ($\alpha = .91$). The list of items is presented in Figure 1. Response options ranged from 1 (*almost never/never*) to 5 (*almost always/always*).

2.3.2 T2 Alcohol Use—The Daily Drinking Questionnaire (Collins et al., 1985) assessed alcohol consumption. Prior research using the instrument has demonstrated desirable test reliabilities and validities (Kenney et al., 2013; Neighbors et al., 2006). Instructions stated, "Consider a typical week during the past month. How much alcohol, on average (measured in number of drinks), do you drink on each day of the typical week?" Participants responded to seven parallel items corresponding to each day of the week (e.g., "On a typical Monday, I have ____ drinks"). Open-ended quantitative responses were entered. The items were summed ($\alpha = .89$) to obtain an index of number of typical drinks per week in the past month.

2.3.3 T2 Alcohol Problems—The Rutgers Alcohol Problem Index (White and Labouvie, 1989), validated in nonclinical and clinical samples (White et al., 1988), consists of 23 items that assess detrimental consequences of alcohol use. Instructions stated, "How many times did the following things happen to you while you were drinking or because of your alcohol use in the past 30 days?" Example items included "Missed a day (or part of a day) of school or work," "Passed out or fainted suddenly," and "Had a fight, argument or bad feeling with a friend." Responses ranged from 0 (*never*) to 5 (*5 or more times*). A summed index represented alcohol problems ($\alpha = .98$).

2.4. Analytic Plan

Analyses were specified with the EQS 6.3 software (Bentler, 2006). Interpretation adhered to the two-step strategy for testing and interpreting structural equation models (Anderson and Gerbing, 1988). First, confirmatory factor analysis (CFA) was performed to scrutinize the measurement component (factor loadings). Second, structural equation modeling (SEM) was conducted to evaluate the structural component (predictive paths connecting drinking motives, alcohol use, and problems).

Analyses involving the four-factor structure were specified as follows. In the CFA, consistent with the DMQ-R postulations of Cooper (1994), each item was permitted to load on its corresponding latent factor (social, enhancement, conformity, or coping motives), and these subscales were set to be intercorrelated. In the SEM, all four factors were specified to

be intercorrelated and to longitudinally anticipate alcohol use and problems. Moreover, alcohol was stipulated to contribute to problems in this predictive model.

Next, analyses premised on the five-factor (bifactor) structure were pursued. In the bifactor CFA, adhering to Lac and Donaldson (2016), each item was permitted to double load on one corresponding specific motives factor (social, enhancement, conformity, or coping) and the general motives factor. In bifactor analysis, covariations involving the specific factors are accounted for by the general factor and are therefore presumed to be orthogonal (Chen et al., 2012; Reise, 2012; Reise et al., 2007). In the SEM, all five motive factors were stipulated to anticipate alcohol use and problems, with alcohol use contributing to problems.

Essentially, the two predictive models proposed that alcohol consumption served to mediate the connections from motives to problems. Thus, tests of indirect effects were performed (Preacher and Hayes, 2008) using specifications of 2000 bootstrap samples and 90% bias corrected confidence levels (Efron, 1987) for structural equation models (Arbuckle, 2013). An indirect effect attaining statistically significance would disclose that the mediational pathway was evidenced beyond chance.

Skewness (Tabachnick and Fidell, 2013) for the measures ranged from 0.33 to 3.37. Thus, following recommendations for skewed variables in structural equation models (Hoyle, 2012), analyses were estimated with the robust maximum-likelihood, to automatically correct fit indices and *p*-values based on the extent of multivariate nonnormality (Bentler and Dijkstra, 1985; Satorra and Bentler, 1994).

Five robust fit indices were interpreted. A nonsignificant chi-square test is desired but tends to incorrectly reject models with non-small sample sizes (Bollen, 1989). The Comparative Fit Index (CFI) and Non-Normed Fit Index (NNFI; also known as TLI) range from 0.00 to 1.00, with higher values, preferably above .90, indicative of better fit (Tabachnick and Fidell, 2013; Ullman and Bentler, 2003). The Root Mean-Square Error of Approximation (RMSEA) furnishes appropriate information about model quality, creates confidence intervals, and is adequately sensitive in detecting model misspecifications (MacCallum and Austin, 2000). Values below .05 indicate close fit, values between .05 and .08 denote fair fit, those between .08 and .10 show mediocre fit, and values above .10 reveal poor fit (MacCallum et al., 1996). The Akaike information criterion (AIC) balances the goodness of fit and the number of estimated parameters with a lower value signifying a superior model (Bentler, 2006; Ullman and Bentler, 2003).

3. Results

3.1. Descriptive Data

Drinking motive subscale means were 2.66 (*SD* = 1.14) for social, 2.36 (*SD* = 1.09) for enhancement, 1.53 (*SD* = 0.75) for conformity, and 2.00 (*SD* = 1.05) for coping. Participants averaged 5.28 (*SD* = 8.42) drinks per week in the past month and 6.86 (*SD* = 16.76) on the problems index.

3.2. Four-Factor Structure: Confirmatory Factor Analysis

The four-factor structure was subjected to CFA. This measurement manifestation rendered acceptable fit, $\chi^2 = 541.83$, $df = 164$, $p < .05$. CFI = .92, NNFI = .91, RMSEA = .075 (95% CI: .068 to .082), AIC = 213.84. Figure 1 details the factor loadings and interfactor correlations. Item loadings adequately captured their respective factors in ranging from .61 to .92. Interfactor correlations ranged from .31 to .81.

3.3. Four-Factor Structure: Structural Equation Model

The four factors in longitudinally predicting alcohol use and problems in a SEM were estimated. The model produced acceptable fit indices, $\chi^2 = 602.89$, $df = 196$, $p < .05$. CFI = .91, NNFI = .90, RMSEA = .071 (95% CI: .064 to .077), AIC = 210.89. Figure 2 displays the estimates. Lower social motives, higher enhancement motives, and higher coping motives uniquely anticipated alcohol use. Lower social motives, higher conformity motives, higher coping motives, and greater alcohol use each uniquely predicted alcohol problems.

Tests of indirect effects corroborated the mediational processes from motives to use to problems (Figure 2). Alcohol use served as a significant mediator of each connection of social motives to alcohol problems, $p < .05$, and enhancement motives to problems, $p < .05$, and coping motives to problems, $p < .05$.

3.4. Five-Factor (Bifactor) Structure: Confirmatory Factor Analysis

The CFA based on the five-factor structure was estimated next. The model furnished good fit indices, $\chi^2 = 411.07$, $df = 150$, $p < .05$. CFI = .95, NNFI = .93, RMSEA = .065 (95% CI: .057 to .072), AIC = 110.07. Figure 3 presents the loadings and interfactor correlations. The item loadings for the four specific motive factors became attenuated after controlling for general motives (compare Figures 1 and 3), as expected upon inclusion of the general factor. The significant item loadings for the specific motives ranged from .21 to .77, and general motives ranged from .20 to .83 (Figure 3). The only nonsignificant item (“Because it’s exciting”) operated on enhancement motives. All items were retained to scrutinize the properties of the entire instrument.

The scaled (robust) chi-square difference test (Bentler and Satorra, 2010; Satorra and Bentler, 2001) between the two confirmatory factor analyses revealed that the five-factor structure rendered a statistically significant improvement over the four-factor structure, $p < .001$. Furthermore, the CFI, NNFI, RMSEA, and AIC all yielded better fit indices for the five-factor compared to four-factor measurement model.

3.5. Five-Factor (Bifactor) Structure: Structural Equation Model

The five extracted factors to explain alcohol use and problems rendered desirable fit indices, $\chi^2 = 470.99$, $df = 180$, $p < .05$. CFI = .94, NNFI = .92, RMSEA = .063 (95% CI: .056 to .069), AIC = 111.00. Figure 4 details the coefficients. Lower social motives, higher enhancement motives, higher coping motives, and higher general motives anticipated alcohol use. Lower social motives, higher conformity motives, higher coping motives, higher general motives, and greater alcohol intake contributed to alcohol problems.

The indirect effects from motives to use to problems (Figure 4) were tested. Alcohol use mediated the traversal of paths from social motives to problems, $p < .05$, enhancement motives to problems, $p < .05$, and coping motives to problems, $p < .05$. Furthermore, the indirect effect from general motives to alcohol use to alcohol problems was supported, $p < .05$.

4. Discussion

The DMQ-R (Cooper, 1994) has been conventionally tested and represented in the literature as a four-factor structure. A later revaluation of the DMQ-R examined the plausibility of competing structures and determined that the bifactor embodiment of alcohol motives (a general motive factor and four specific motive factors) optimally embodied the data (Lac and Donaldson, 2016). The present research extends prior work on DMQ-R alternative factor structures by scrutinizing and comparing the predictive validity of both four-factor and five-factor (bifactor) paradigms on alcohol use and problems with the objective of refining theoretical ideas.

Although past DMQ-R research has evaluated the measurement structures of the single-factor model (Cooper, 1994), four-factor model (Cooper, 1994), and bifactor model that concurrently embodied general and specific motives (Lac and Donaldson, 2016), the preset study is the first to longitudinally demonstrate the predictive validity of an overarching drinking motive beyond the four specific drinking reasons. This investigation found that both four-factor and five-factor (bifactor) structures yielded adequate fit, but the latter manifestation rendered superior fit indices. The same set of motive factors in both the four-factor and five-factor models emerged as significant in predicting alcohol use and problems. However, the bifactor model additionally revealed that general motivation incrementally predicted both alcohol use and problems.

Supporting past cross-sectional research testing the association of enhancement motives and alcohol outcomes (Crutzen et al., 2013; Kuntsche and Cooper, 2010; Read et al., 2003), this study found that positive internally-driven reasoning contributed to greater consumption. Previous research also supports that higher coping motives relate to both alcohol use (Crutzen et al., 2013) and problems (Mackinnon et al., 2014).

Examining the connections of the externally driven motives and alcohol use in the present study, consumption to conform and social reasons both anticipated greater alcohol problems. Past research testing the relations of conformity motives and alcohol outcomes yielded mixed findings. Although some investigations show a negative association between conformity motives and alcohol use (Kuntsche et al., 2006; Schelleman-Offermans et al., 2011), a positive link has also been documented for this motive factor with both drinking (Kuntsche and Labhart, 2013) and problems (Young et al., 2015). Furthermore, the current study found that social motives were associated with decreased alcohol intake and alcohol problems. Past cross-sectional investigations support that social motives are associated with reduced drinking in college students (Karwacki and Bradley, 1996) and fewer alcohol problems in young adults (Labouvie and Bates, 2002) and adolescents (Gmel et al., 2012). Thus, the present study's sample of adults that drink for a wide range of social reasons may

do so as a necessity in social contexts and therefore may drink less and encounter fewer problems compared to those motivated by other reasons (Kuntsche et al., 2005).

Internal factors such as negative mood may predispose people to certain drinking motives (Arbeau et al., 2011) that prompt pursuing situations and environments congruent with their internal states and therefore explain why adults might be prone to drink for internal reasons (i.e., enhancement or coping) and adolescents and college students for external reasons (i.e., social and conformity). However, adults might also find themselves in social situations that can foster external reasons for drinking. As an example, a person might enter a situation with no preexisting intention of consuming alcohol but end up deciding to partake in drinking for social or conformity purposes. Thus, external drinking motivations might rely on individual differences as well as be triggered by situational and social circumstances (O'Hara et al., 2015).

The bifactor model scrutinized in this study has important implications for the future assessment of alcohol motives. The bifactor CFA indicated that one item failed to significantly load onto the enhancement motives subscale (i.e., "Because it's exciting"), a result similar to that of Lac and Donaldson's (2016) bifactor CFA showing that that two items ("Because it's exciting" and "To get high") non-significantly loaded onto the enhancement motives factor after accounting for general motives. Future efforts might consider revising the nonsignificant item of enhancement motives (Chen et al., 2012). Take, for instance, research showing that if items capturing the reasons of drinking to get drunk (e.g., "I like the feeling of being drunk") were incorporated in the enhancement motive factor, this dimension becomes more strongly associated with greater drinking (Carpenter and Hasin, 1998; Kuntsche et al., 2005).

Usually, DMQ-R research operationalizes coping motives as a single construct (Kuntsche et al., 2005), but an alternative version and factor structure of the instrument has subdivided coping motives into two subscales: coping with anxiety and coping with depression (Grant et al., 2007). Some have proposed that statistically separating anxiety and depression forms of coping motives furnishes useful applications (Grant et al., 2009; Mezquita et al., 2011), whereas others have instead found that a single coping motives subscale explained more variance in the prediction of alcohol outcomes (Bravo and Pearson, 2017). The dichotomization of coping motives could not be further tested in the current investigation as the 20-item version of the DMQ-R (Cooper, 1994) does not cleanly separate the content of items into anxiety and depression factors like the alternative 28-item version (Grant et al., 2007). However, this competing classification system should be pursued in future bifactor investigations to test the statistical credibility of a six-factor model embodied by general, social, enhancement, conformity, anxiety-coping, and depression-coping motives.

The global motive factor for consuming alcohol was a relatively consistent predictor of alcohol outcomes. One potential explanation is that general motivation to drink reflects an overall genetic predisposition for alcohol dependence and addiction (Hopfer et al., 2005; Preuss et al., 2013), whereas the specific motives for consumption might be activated by more specific contextual factors (Kairouz et al., 2002; O'Hara et al., 2015). The interpretation of this general factor warrants additional scrutiny and research.

A recent review by Cooper et al. (2016) suggests that more conceptually precise and narrow categorizations of motives tend to be more useful than interpreting a general motivational factor alone. However, this theoretical position did not put forth the practicality of a dual-process paradigm that *simultaneously* incorporated the general motives alongside the specific motives. The statistical emergence of a superordinate factor, over and beyond the specific factors, has important implications. For example, clinicians assessing alcohol motives might rely on a total score from the DMQ-R as a preliminary and coarse starting point for identifying those at risk of developing alcohol problems or treating those with existing problems. Once such individuals have been isolated based on the overall disposition for alcohol motivational pursuits, more nuanced and tailored intervention approaches might then be administered based on the precise motives that are subsequently identified (Coffman et al., 2007). In others words, once an individual's general motive score has been understood, prevention and treatment efforts might then focus on targeting specific motive constructs discovered to longitudinally anticipate alcohol use in our study. This practice might be incorporated into client-focused psychotherapeutic interventions such as motivational interviewing (Bein et al., 1993; Miller and Rollnick, 2012) and choice theory (Glasser, 2010), in which clinicians might encourage clients to ponder and discuss the overall reasons for choosing to personally engage in alcohol use to build rapport before the deeper contemplation of specific reasons in subsequent sessions.

As tailored health campaigns are more effective compared to a generic one-size-fits-all approach (Hirsh et al., 2012), researchers could assess the drinking motives of a cohort prior to implementing messages and strategies designed to curtail alcohol intake and consequences. For instance, enhancement drinkers might be presented with information regarding alternative approaches to spend leisure time that do not involve alcohol as a means for feeling good, whereas coping drinkers might be shown healthier ways of managing stress and fostering relaxation (Wurdak et al., 2016).

Results of the current study should be interpreted in the context of potential limitations. Longitudinal alcohol observations spaced closer together provide more valid results (Collins and Graham, 2002). Thus, the present study applied a four-week time lag between observations, so conclusions might not be generalizable to other time intervals, but should be examined in future investigations. Consistent with the motivational model of drinking positing that alcohol reasons serve as antecedents of drinking behavioral outcomes (Cox and Klinger, 1988), the current study assessed motives in T1 and usage in T2. A future research possibility is to measure and statistically control for consumption at both assessment intervals. However, previous research has evidenced strong correlations involving test-retest assessments of alcohol behaviors (Dollinger and Malmquist, 2009; Kerr et al., 2002), so such a predictive model might render multicollinearity artifacts in multivariate analyses (Tabachnick and Fidell, 2013). The self-report measures of alcohol use might also present a limitation, as this modality of assessment is susceptible to recall bias and retrospective misestimating of drinking behaviors. Future investigations might implement multi-method approaches with varying time lags to corroborate the current findings.

5.0 Conclusions

In conclusion, findings establish the bifactor model to be practical in the assessment and interpretation of the multifaceted DMQ-R (Cooper, 1994) and supported that the general motivation to consume alcohol longitudinally predicted alcohol use and problems beyond the four specific motives. Further applications of the bifactor paradigm of alcohol motivations is encouraged and warranted. Future investigations should employ a bifactor model of drinking motives to examine at-risk drinkers and risk associations with other types of alcohol beliefs and outcomes.

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Highlights

- The five-factor (bifactor) was superior to the four-factor model in confirmatory factor analysis (CFA)
- The same set of motive factors was longitudinally predictive in both models.
- General motives also explained usage and problems in the bifactor model.
- The incremental predictive validity of general motives was supported.

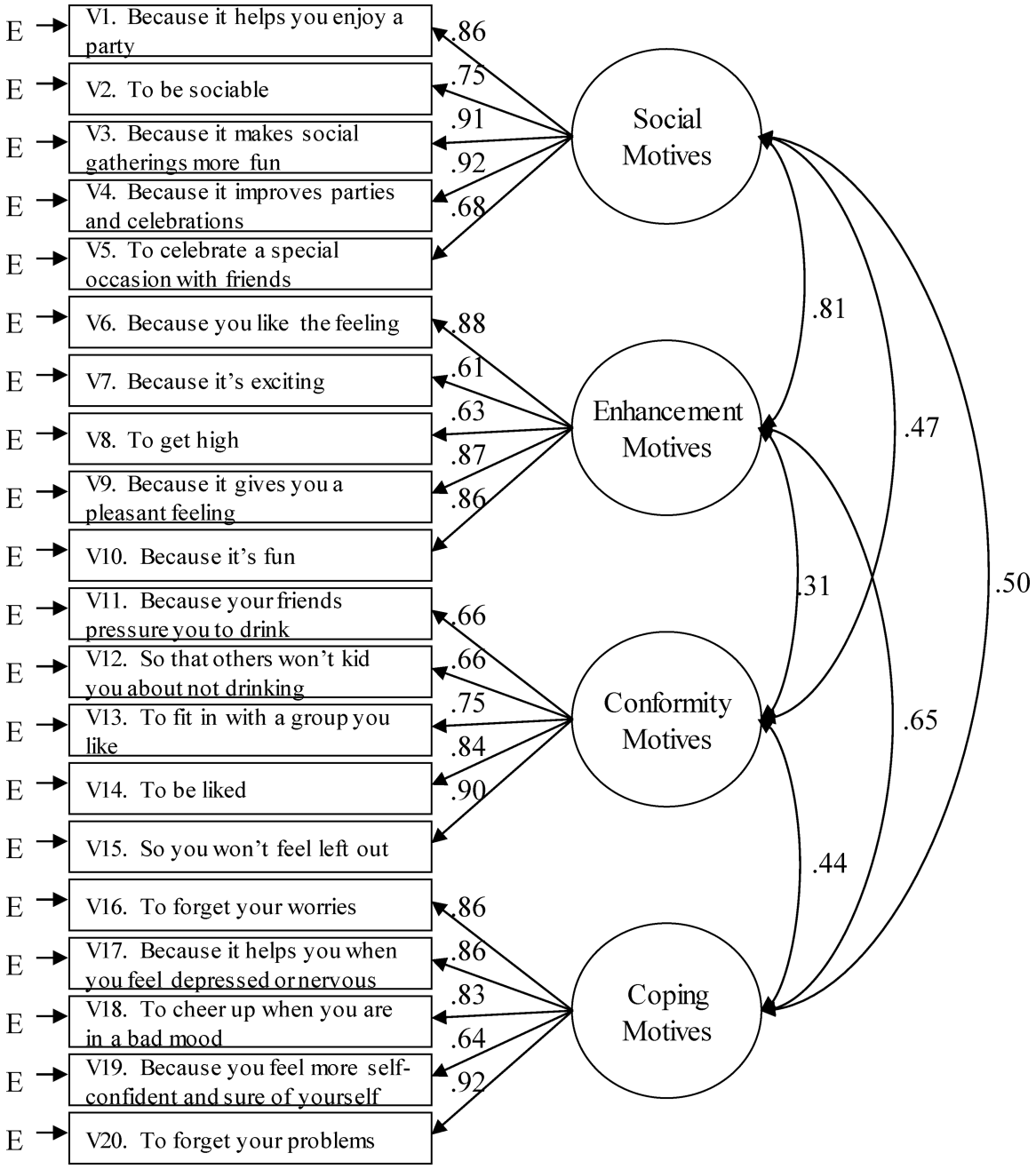

Fig 1.

Four-factor structure: confirmatory factor analysis. Standardized coefficients are presented. E = error. All paths are significant, $p < .05$.

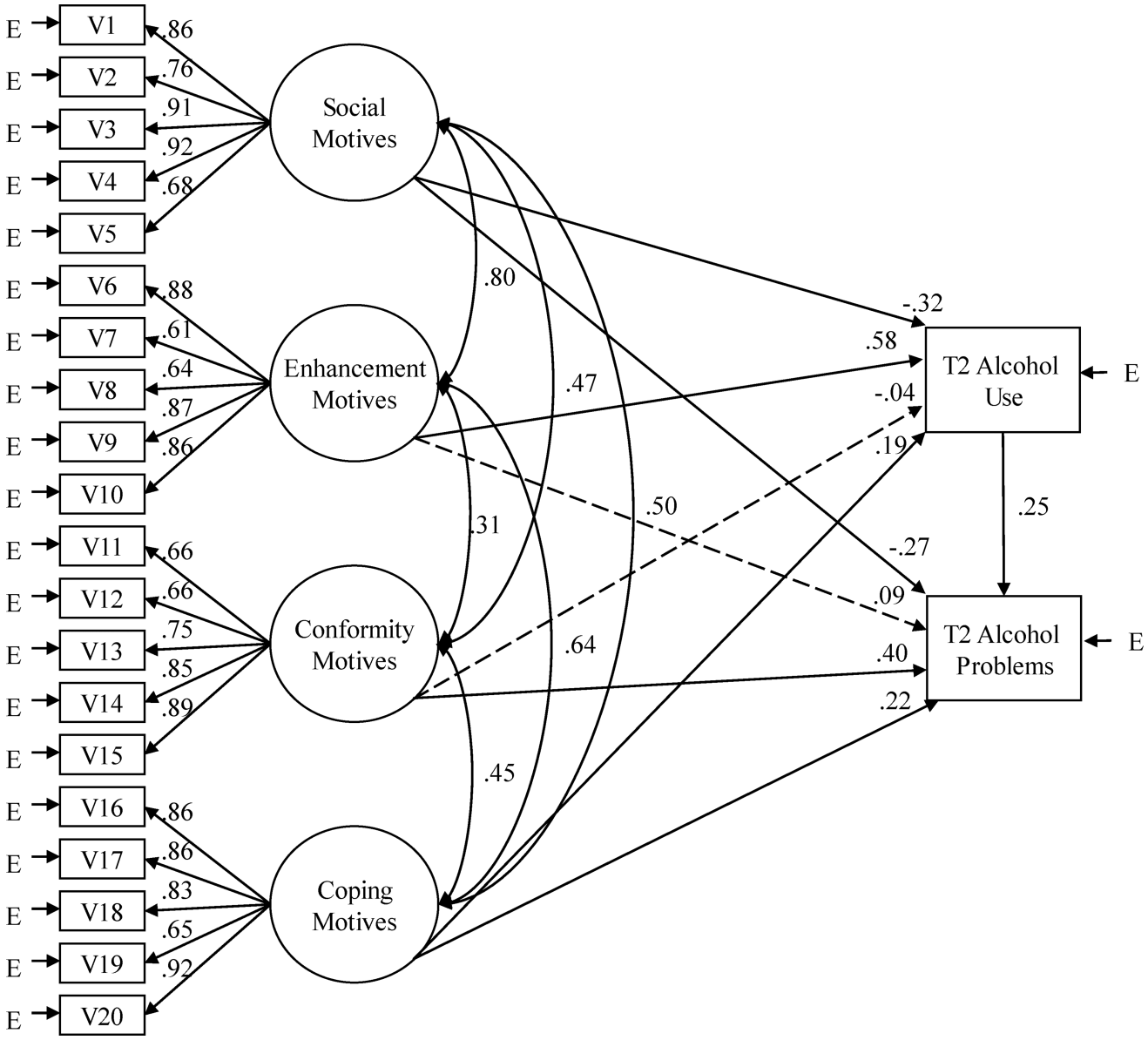

Fig 2.

Four-factor structure: Structural equation model. Standardized coefficients are presented. E = error. Bold paths are significant, $p < .05$.

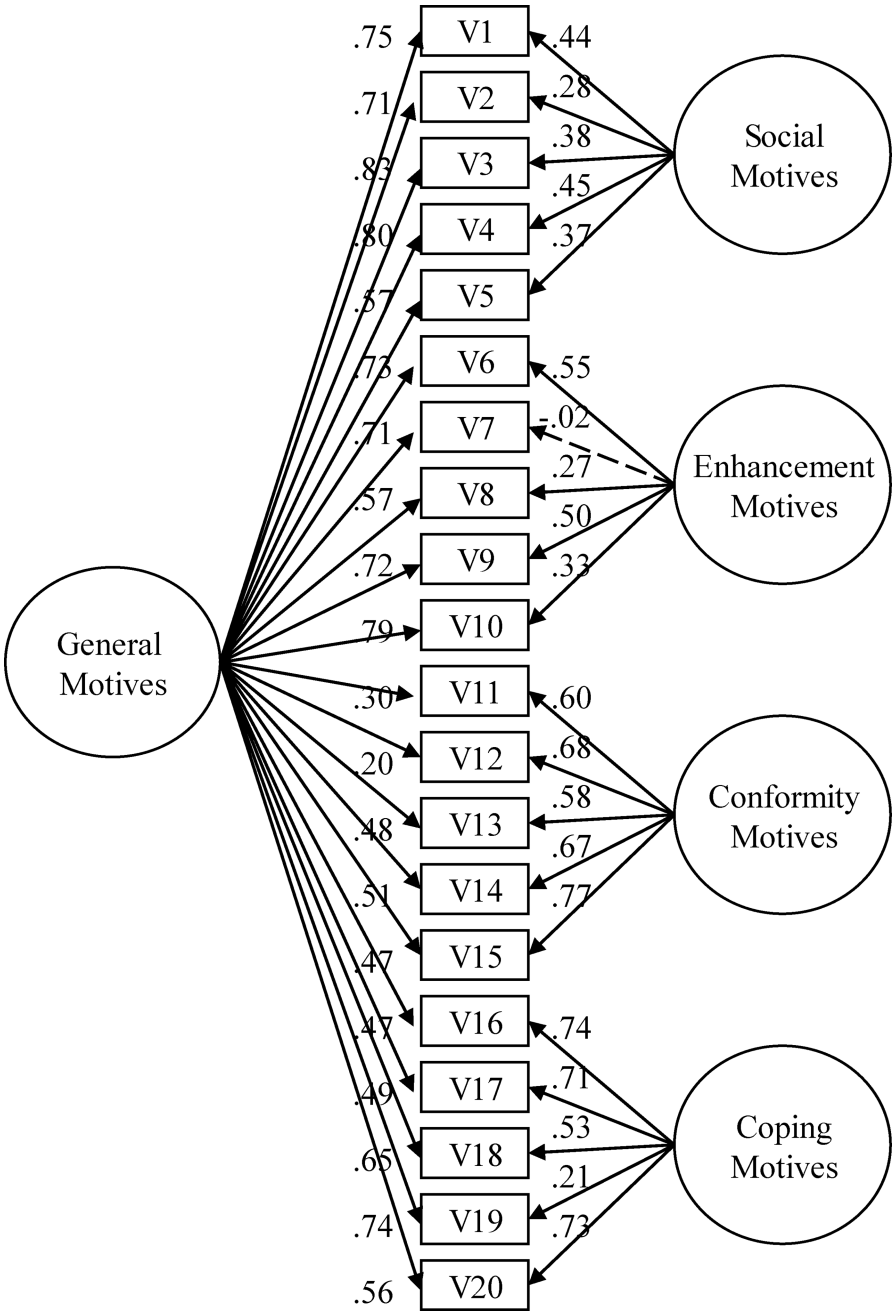

Fig 3.

Five-factor structure: confirmatory factor analysis. Measurement errors of the 20 items for drinking motives were estimated but not displayed for clarity. Standardized coefficients are presented. Bold paths are significant, $p < .05$.

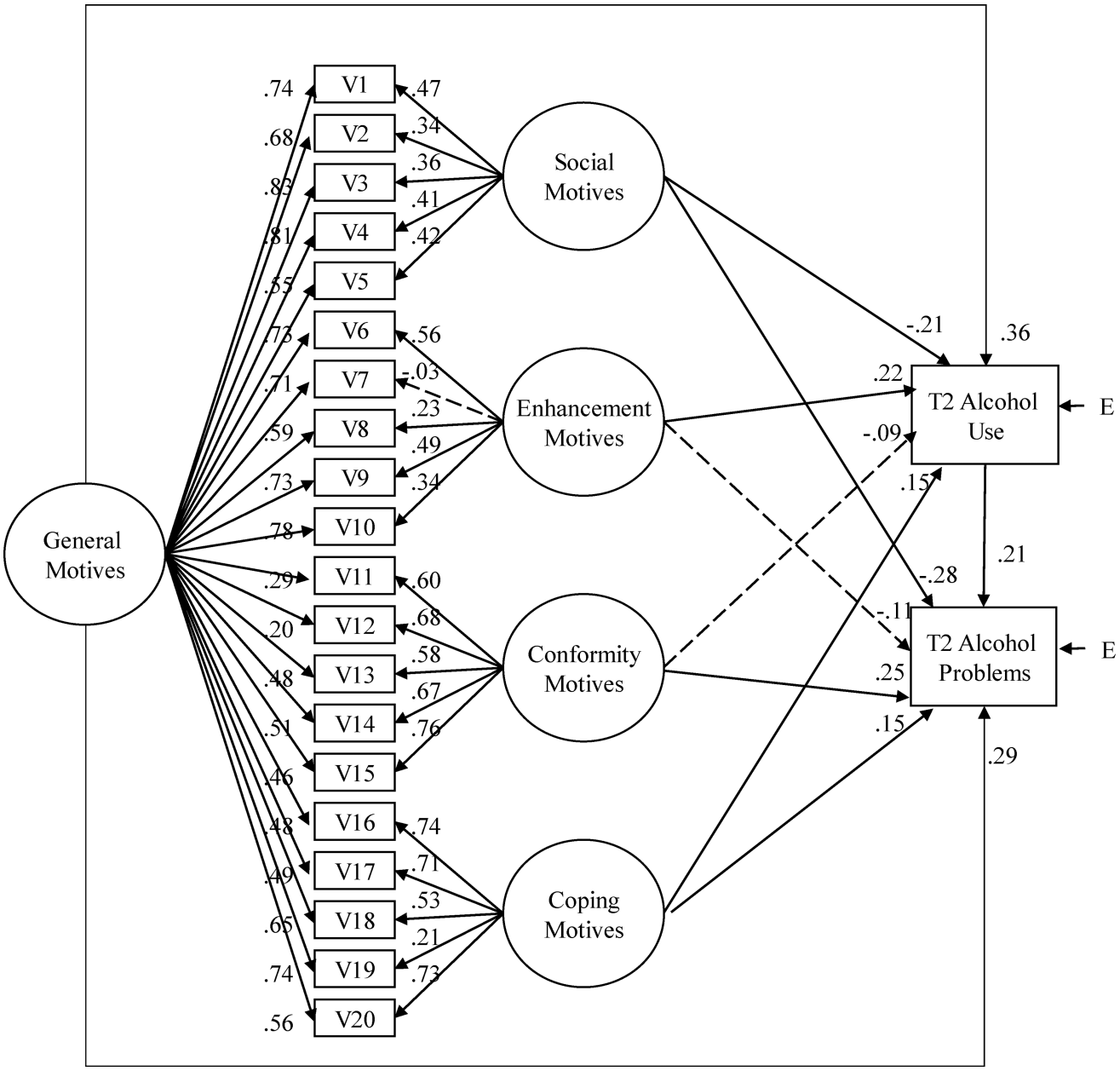

Fig 4.

Five-factor structure: structural equation model. Measurement errors of the 20 items for drinking motives were estimated but not displayed for clarity. Standardized coefficients are presented. Bold paths are significant, $p < .05$.