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Motivational Typologies of Drinkers: Do Enhancement and Coping Drinkers Form Two Distinct Groups?

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Abstract

Aims—This study used a person-centered approach to test whether drinking motive typologies could be identified.

Design—Longitudinal study of college students within the Intensive Multivariate Prospective Alcohol College-Transitions (IMPACTS) dataset.

Setting—University campus in the USA.

Participants—University students (baseline n reporting alcohol motives = 2158; baseline age = 18.60 years old).

Measurements—The Drinking Motives Questionnaire-Revised (DMQ-R; Cooper, 1994).

Findings—Using Steinley and Brusco's cluster analysis approach (based on the theoretical ratio expected between the within sum of squares and the total sum of squares when the data are divided into two clusters when no cluster structure is present; the cutoff for the ratio is .25 for uniform [multivariate uniform] distributions and .36 for normal [multivariare normal] distributions), we examined whether there was evidence for distinct clusters of individuals that differed on their overall level of motives to drink. We tested the fit of a one-group (cluster) solution compared to multi-cluster solutions. Both cross-sectionally and prospectively, the data could not be partitioned into two or more clusters (regardless if the cutoff assuming a multivariate uniform distribution [i.e., .25] or the more liberal multivariate normal distribution [i.e., .36] was used). These findings showed that enhancement and coping drinkers do not form two distinct groups but rather these motives exist on a continuum such that individuals who are high in one internal motive tend to be high in the other motive.

Conclusions—Coping and enhancement drinkers do not form two distinct groups. Variable-centered approaches to drinking motives may be a better alternative to classifying all drinkers as either enhancement or coping drinkers for both clinical and research endeavors.

Keywords

drinking motives; drinking motive questionnaire; person-centered

Declaration of Interest

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Introduction

Affect regulation models suggest that alcohol is used to enhance positive moods (i.e., enhancement motives) and dampen negative moods (i.e., coping motives; see [1] for a recent discussion). Further, these models hypothesize that individual differences in internal drinking motives should predict alcohol use and alcohol-related outcomes. Indeed, existing literature demonstrates a consistent relation between internal motives to drink and both alcohol consumption and consequences (see [2,3]).

Although these internal motivational factors have been shown to be psychometrically distinct in numerous studies spanning various developmental stages and racial/ethnic groups (e.g., [4, 5]), attempts to distinguish enhancement and coping *drinkers* (i.e., person-centered approaches) have been less compelling. Extreme group designs, such as median splits (e.g., [4]), extreme-score cutoffs (e.g., [6]), or standardized scores (i.e., using participants who scored at least one standard deviation above the sample mean on either enhancement or coping motives and who had the highest z-score on that respective subscale relative to the other subscales; e.g., [7, 8, 9, 10]), have been the most common approaches employed. Notably, these types of approaches only classify a subset of individuals as enhancement or coping drinkers. For example, Goldstein and Flett[6] determined that only 38.4% of their sample were "internally motivated drinkers" (i.e., at least one standard deviation above the mean on either enhancement or coping measures) although out of this subsample 21% were classified as "coping+enhancement" drinkers (i.e., one standard deviation above in both enhancement and coping motives). Using the same protocol as Stewart et al., Wilkie and Stewart[10] found that 16% of their undergraduate sample could be classified as either enhancement or coping drinkers (i.e., at least one standard deviation above the mean on enhancement or coping motives).

Although these approaches identify only a subsample of individuals as enhancement or coping drinkers, Kuntsche, Knibbe, Engels, and Gmel[11] concluded that "it is clear from the literature that enhancement and coping drinkers form two distinct groups (Cooper et al., 1995; Stewart, Hall, Wilkie, & Birch, 2002)" (p. 47). Based on this conclusion, these authors developed a scoring method for Cooper's Drinking Motive Questionnaire – Revised (DMQ-R) [12] that allows clinicians to classify *all* individuals with recent heavy drinking (i.e., five or more drinks in a row in the past 30 days) as either enhancement or coping drinkers by using the highest standardized score for either enhancement or coping motives (without the requirement for the standardized score to be one standard deviation above the mean[11]).

To provide empirical support for their scoring method, the authors conducted three two-group *k*-means cluster analyses. The first two analyses (which used raw or normed motives scores) found two groups that differed on overall level of motives (i.e., one group was higher on all motives, including the external social and conformity motives, compared to the other group). The third analysis used normed scores that subtracted the summary score of all enhancement and coping items. Findings from this analysis suggested an enhancement vs. coping motives solution (i.e., one group was significantly higher in enhancement and social motives and lower in coping and conformity motives compared to the other group). Results from this third analysis were highlighted by the authors who subsequently showed high concordance between this solution and the groups derived from the scoring procedure described above. Based on their findings, the authors suggest their scoring approach allows clinicians to determine whether a client is an enhancement or coping drinker in order to facilitate tailored interventions depending on the client's categorization.

Other person-centered approaches such as latent class analysis ([13, 14]) have been used to identify homogenous groups of individuals with similar motives. Unlike Kuntsche et al.[11],

Coffman et al.[13] did not limit their analyses to a two-class solution and subsequently found four profiles of drinking motivation best fit the data drawn from the Monitoring the Future survey. Although Coffman et al. used a binary measure of motives, their motive assessments had items that were very similar (and sometimes identical) to the items used to measure enhancement (e.g., drink to "get high", drink to have a "good time") and coping (e.g., drink to "get away from problems") in the DMQ-R. Coffman et al. found the class labeled "Multi-reasoners" reported the highest endorsement of both enhancement and coping items. These findings differ from the findings highlighted by Kuntsche et al. (i.e., enhancement vs. coping two-group solution; note that other solutions that did not adjust for total motivation failed to identify enhancement vs. coping clusters). In Coffman et al., the highest item response probabilities for the item drink "to get high" (identical in wording to an item used to measure enhancement motives in the DMQ-R) and the item drink to "get away from problems" (similar to the DMQ-R coping item drink "to forget about your problems") were found among the adolescents in the Multi-reasoners group. This group reported the riskiest drinking behaviors compared to the other motive groups. Mackie et al. [14] also used binary measures of motives that including enhancement items (e.g., "I drink until I feel high.") and coping items (e.g., "I drink when I feel bad."). These authors reported that a four-group solution best fit their data. Notably, the authors found evidence for an "enhancement/social" class (i.e., individuals who endorsed enhancement and social motives to drink but not coping motives) and a "coping/social" class (i.e., individuals who endorsed coping and social motives as well as enhancement motives but to a lesser extent compared to the "enhancement/social" class). Similar to Coffman et al.'s Multi-reasoners group, the majority of individuals in the coping/social class endorsed all motives for drinking and displayed the highest rates of alcohol use and problematic behaviors.

Despite the conclusions that enhancement and coping drinkers form two distinct groups, the limited empirical, person-centered approaches on drinking motives tend not to produce this distinction. Further, methods to dichotomize data, which are by far the most common practice in the literature to distinguish enhancement and coping drinkers (typically using median splits and extreme group approaches), have been extensively criticized (see [15, 16, 17]). More specifically, MacCallum et al. [16] note that

> Perhaps the most common defense of dichotomization is that there actually exist distinct groups of individuals on the variable in question, that a dichotomized measure more appropriately represents those groups, and that analyses should be conducted in terms of group differences rather than individual differences (p. 33).

The authors discuss at length various shortcomings in dichotomization, noting that even though latent classes could be identified reliability identified in a given set of data, "…the groups resulting from dichotomization may bear little or no resemblance to those latent classes. Dichotomization assumes that the number of taxons [real groups] is two and does not allow for the possibility that there are more than two" (p. 35) and summarize by noting "…even if a researcher believes that there exist distinct groups or types of individuals… dichotomization is not a useful technique. It is based on untenable assumptions and defines arbitrary classes that are unlikely to have much empirical validity" (p 35). As Preacher et al. [17] discuss in detail, extreme group approaches are problematic for several reasons, such as causing severely biased estimates, especially in ANOVA designs that are commonly applied to enhancement-coping dichotomies (e.g., [7, 8, 9, 10]).

MacCallum et al.[16] note that methods that dichotomize individuals into groups (e.g., Kuntsche et al.'s [11] *k-means* approach) do not allow for the possibility that there are more than two groups; we note that these approaches also do not allow for the possibility for the latent class structure to be represented by *one* group (i.e., a single distribution among variables). Until recently, researchers have examined which multi-group solution best fit the

data (e.g., [13, 14]) without testing whether a one-group (cluster) solution better fit the data than a multi-group solution. However, Steinley and Brusco[18] recently outlined an approach to determine whether more than one group (cluster) is found among a set of variables. In a simulation of 162,500 data sets that contained no cluster structure (i.e., there was a single distribution among variables), the critical value involved in the screening process outlined by the authors never resulted in mistakenly partitioning a single distribution into multiple clusters. Further, this approach demonstrated high accuracy for identifying the number of clusters in simulated data that contained multiple cluster solutions (see [18] for technical details).

In sum, researchers have attempted to classify drinkers based on theoretical notions that assume drinkers can be categorized into distinct groups that differ in their internal alcohol-use motives. However, the vast majority of these attempts have used methodology which has been demonstrated to be biased. Further, the very few approaches that have not forced two-group drinking motive solutions (i.e., [13, 14]) did not use the DMQ-R (which is considered to be the "ideal instrument" for measuring drinking motives[5]) in their analyses or test whether a one-group solution fit the data better than a multi-group solution. To address these limitations, we used person-centered approaches to identify motive groups that showed similar endorsement of drinking motives as measured by the DMQ-R in a large, prospective sample of college students. Using Steinley and Brusco's[18] approach, we examined whether there was evidence for distinct clusters of individuals that differed on their overall level of enhancement and coping motives to drink.

Methods

Participants and Procedure

Participants were 3,720 individuals who completed a precollege survey in the summer prior to matriculation (88.0% of the original precollege sampling frame) within the IMPACTS (Intensive Multivariate Prospective Alcohol College-Transitions Study) sample. This sample is described in detail in Sher & Rutledge [19]. More briefly, IMPACTS is a longitudinal study starting at the fall semester of 2002, in which first-time college students who were enrolled at a large Midwestern University were recruited for participation and completed an online survey every semester through their fourth year. At Wave 1 (i.e., fall semester of the Freshman year), 60.96% of the participants were female, 90.38% were White, non-Hispanic ethnicity, and 18.60 (SD = 0.35) years old. A substantial proportion of this sample engaged in heavy drinking (consuming 5+ drinks on one or more occasions within the past 30 days) and frequent heavy drinking (consuming 5+ drinks on one or more occasions within the past two weeks). Specifically, rates of past 30 day heavy drinking ranged from 54–61% across the college years, and rates of heavy drinking within the past two weeks ranged from 43%–50%.

For the current study, only drinking motives from Waves 1, 3, 5, and 7 (corresponding to fall semester of the Freshman, Sophmore, Junior, and Senior year of college, respectively) were analyzed (see description immediately below); thus, only individuals who reported consuming alcohol were included in the current study. Given that we analyzed data both cross-sectionally and longitudinally, the number of participants across analyses ranged from 1,081 to 2,158 (see Table 2 for *N*s for each analysis).

Measure

Drinking Motives—Enhancement, coping, social, and conformity motives were assessed using the DMQ-R[12]. This scale has been described in detail elsewhere and been shown to be reliable across different samples (e.g., [5]).

Statistical Methods

Steinley and Brusco[18] outlined a method to distinguish between one-cluster (i.e., a single distribution among a set of variables) versus more than one cluster. Briefly, a testing procedure was developed that is based on the theoretical ratio expected between the within sum of squares and the total sum of squares when the data are divided into two clusters when, in fact, no cluster structure is present. The cutoff for this ratio depends on the distributional assumptions of the data (i.e., .25 for uniform [multivariate uniform] distributions; .36 for normal [multivariate normal] distributions; see Appendices A and B of Steinley & Brusco for more details). Thus, to conclude that there is more than one cluster in the data, the ratio of within sum of squares to total sum of squares for a two-cluster solution must be less than the aforementioned cutoffs. If it is determined that at least two clusters exist then one can begin to identify which multi-cluster solution best fits the data.

We applied the cluster analysis methodology outlined in Steinley and Brusco[18] both using cross-sectional and longitudinal data. More specifically, to be consistent with all previous person-centered approaches, all four motives were examined for potential cluster solutions at Waves 1, 3, 5, and 7 of the study. Additionally, all four motives were examined across the four waves of data. Given the focus on distinguishing coping and enhancement drinkers, parallel analyses were conducted to those described immediately above, but only using coping and enhancement motives, resulting in ten total models (see Table 2). That is, there were eight cross-sectional analyses (involving all four motives at each wave as well as just coping and enhancement motives at each wave) and two longitudinal analyses (with one set of analyses involving the four motives at each of the four waves [sixteen variables] and the other involving coping and enhancement at each of the four waves [eight variables]. All analyses were conducted in Matlab version 7.1.0.124[20] using listwise deletion. Of the eight cross-sectional analyses, over 99% of the participants who provided data on at least one motive provided data on all four motives at the respective waves. For the two longitudinal analyses, 1081 participants (50.16% of the 2155 individuals who reported on all four motives at Freshman year) reported on all four motives across all waves. The most common pattern of missing comprised of individuals who provided data at Freshman year and subsequently provided no other data (n = 339; 31.56% of all missing data).

Results

Correlations, means, and standard deviations for DMQ-R motives scales from Freshman to Senior year are shown in Table 1.

Results from the clusterability analyses are shown in Table 2. Please note that we used the cutoff for the multivariate normal distribution as this distributional assumption is common in cluster analysis. In addition, we also used the cutoff for the multivariate uniform distribution, which is known to be susceptible to false positive cluster structures (see [18]). As shown in Table 2, regardless if we used the cutoff assuming a multivariate uniform distribution (i.e., .25) or the more liberal multivariate normal distribution (i.e., .36), we found no evidence for more than one cluster in any of our analyses. Furthermore, we found no evidence for more than one cluster in a series of supplementary analyses in data that involved the alternative scoring method described in Kuntsche et al.[11], adjusted for potential outliers, or included only heavier drinking participants. Additionally, latent profile analysis (conducted in Mplus version 6.0; Muthén and Muthén, 1998–2010) on the four motive variables among individuals who binge drank at least once a month at freshman year using data a) across all four years of college (N=1,951) and b) from senior year (N=1,282) were conducted. These analyses did not suggest a two class coping vs. enhancement solution best fit the data; rather, a six-class solution was found to best fit both the longitudinal and cross-sectional data (using BIC, AIC, and bLRT; we did not test beyond a six-class solution

because of increasingly small groups). For the longitudinal data, only one class (that included roughly 19% of the sample) was slightly above average in enhancement motives and slightly below average in coping motives; there were no classes that were above the mean on coping and below the mean for enhancement. For the cross-sectional data, there were no classes that identified a group of individuals who are above the mean on enhancement and below the mean on coping (and vice versa). Although we interpret these findings with great caution given the results of a clusterability analysis, these findings do not suggest coping and enhancement drinkers form two distinct groups.

Discussion

Although enhancement and coping motives are typically thought to represent phenomenologically distinct behaviors to the extent that enhancement and coping drinkers form two mutually-exclusive groups, the current analyses suggest that the data could not be partitioned into two or more clusters. Moreover, although we used listwise deletion and our longitudinal analyses had substantial attrition, the data could not be partitioned into two or more clusters when using both cross-sectional and prospective data. These findings suggest that enhancement and coping motives may be best viewed as dimensional variables that covary such that individuals who are high in one internal motive tend to be high in the other motive. Notably, our results do not suggest that individuals do not vary on drinking motives or that at least some individuals may have higher enhancement motives to drink compared to coping (and vice versa). Rather, our analyses strongly suggest that enhancement and coping drinkers do not form *two distinct groups* (at least in our large, longitudinal sample of college students) but rather drinking motives may be best viewed as continuous (i.e., dimensional) constructs that tend to covary within individuals. Given our current findings, research and clinical efforts may be better served by variable-centered approaches that tap individual variability in various motives to drank rather than forcing individuals to be classified into either/or dichotomies. Although the generalizability of our findings is limited given that our sample was relatively race homogenous and comprised of college students, we note samples with similar characteristics have been used to create dichotomies of enhancement vs. coping drinkers (e.g., [6, 7, 8, 9, 10]).

Based on the enhancement vs. coping distinction presumed in the literature, several researchers have recommended specialized prevention strategies and targeted interventions based on specific motives (e.g., [9, 11]). However, our findings suggest that prevention and intervention efforts might be better served by considering the overall level of internal motives rather than focusing on the motive type. Although our results differed from Coffman et al.[13] (who did not test for clusterability), this conclusion is in line with their results showing that adolescent who had the highest frequency of nearly all motives (regardless of enhancement-or coping-type motives) also demonstrated the riskiest drinking behaviors. Given that individuals with the most problematic alcohol involvement will tend to endorse numerous motives for drinking and the lack of evidence that coping- and enhancement-motivated drinkers form two distinct groups, we believe the most effective interventions will include strategies to address various motivations to drink rather than be tailored to coping or enhancement motives. However, randomized controlled trials involving various treatment and control groups (e.g., treatment targeted specifically to coping or enhancement vs. treatment addressing various motives to drink vs. generalized treatment with no specified focus on drinking motives) are needed to provide stronger tests of these competing hypotheses.

In addition to being, to our knowledge, one of the largest studies to evaluate a person-centered approach using DMQ-R measures, another benefit of our current study is that it disseminates a new methodology (i.e., [18]; the procedure is available as m files within the

Matlab environment or as *R* code from Douglas Steinley on request). Although this methodology has been established within the statistical literature, it has yet to be widely utilized by researchers interested in person-centered taxonomies. Given that psychologists have long been interested in determining the extent to which constructs are best viewed as dimensional or categorical entities (see [21] for a classic discussion), we strongly believe the field would be strengthened by adopting this methodology to empirically test theories that presume real and distinct clusters of individuals. By disseminating this methodology, we are promoting a closer connection between what is considered to be "better practice" within the statistical methodology literature and "actual practice" within the field.

Although we found no evidence for the existence of discrete motivational subtypes of drinkers in our large sample of college-age drinkers, it is possible that such subtypes could exist in clinical samples or in nonclinical samples comprised of individuals who are at other developmental stages or in different phases of their drinking careers. However, though we understand the potential utility of classifying individuals into coping vs. enhancement typologies for both clinical and theoretical efforts, our current data simply do not appear to support the validity of this "either/or" classification system.

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Table 1

Correlations, means, and standard deviations for DMQ-R motives scales from Freshman to Senior year (Maximum likelihood $N = 2953$)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Freshman Social	1.00															
2. Freshman Cope	0.41*	1.00														
3. Freshman Enhancement	0.68*	0.41*	1.00													
4. Freshman Conformity	0.15*	0.37*	0.17*	1.00												
5. Sophomore Social	0.51*	0.25*	0.42*	0.12*	1.00											
6. Sophomore Cope	0.28*	0.48*	0.27*	0.14*	0.44*	1.00										
7. Sophomore Enhancement	0.45*	0.25*	0.58*	0.08*	0.66*	0.47*	1.00									
8. Sophomore Conformity	0.12*	0.16*	0.05	0.42*	0.15*	0.34*	0.20*	1.00								
9. Junior Social	0.40*	0.19*	0.32*	0.08*	0.53*	0.26*	0.43*	0.06*	1.00							
10. Junior Cope	0.23*	0.42*	0.23*	0.14*	0.28*	0.53*	0.28*	0.19*	0.41*	1.00						
11. Junior Enhancement	0.37*	0.20*	0.48*	0.02	0.47*	0.28*	0.61*	0.02	0.65*	0.46*	1.00					
12. Junior Conformity	0.06*	0.15*	0.03	0.33*	0.08*	0.18*	0.08*	0.39*	0.17*	0.38*	0.22*	1.00				
13. Senior Social	0.40*	0.14*	0.32*	0.08*	0.48*	0.22*	0.38*	0.07*	0.56*	0.26*	0.47*	0.10*	1.00			
14. Senior Cope	0.21*	0.37*	0.22*	0.16*	0.27*	0.51*	0.26*	0.19*	0.29*	0.55*	0.33*	0.24*	0.43*	1.00		
15. Senior Enhancement	0.37*	0.17*	0.50*	0.05	0.44*	0.24*	0.56*	0.04	0.48*	0.30*	0.65*	0.09*	0.67*	0.46*	1.00	
16. Senior Conformity	0.10*	0.20*	0.05*	0.34*	0.11*	0.21*	0.07*	0.41*	0.14*	0.28*	0.11*	0.48*	0.13*	0.44*	0.22*	1.00
Means	3.03	2.03	2.77	1.41	3.08	2.05	2.74	1.4	3.07	1.99	2.66	1.4	3.03	1.94	2.63	1.4
Standard Deviations	0.75	0.88	0.80	0.68	0.75	0.87	0.77	0.65	0.72	0.86	0.79	0.62	0.75	0.85	0.79	0.63

Note. DMQ-R = Drinking Motive Questionnaire-Revised.

* = $p < .05$.

Table 2

Assessing the appropriateness of more than one cluster for enhancement, coping, social, and conformity motives using the lower bound for the sum-of-squares error criterion

	All four motives (*N*)	**Enhancement and Coping motives (*N*)**
Freshman Year	0.65 (2,155)	0.53 (2,158)
Sophmore Year	0.63 (1,788)	0.50 (1,789)
Junior Year	0.62 (1,949)	0.50 (1,951)
Senior Year	0.63 (2,074)	0.51 (2,077)
Across all Years	0.76 (1,081)	0.69 (1,084)

Note. Across all years = longitudinal analyses involving sixteen motives variables (four motives at four waves). Cutoff for evidence of more than one cluster, <0.25 for multivariate uniform distributions, <0.36 for multivariate normal distributions. All analyses used listwise deletion.