

## Development and Validation of a Three-Dimensional Measure of Drinking Motives

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Despite consistent evidence that alcohol can be used to cope with negative emotions or to enhance positive emotions, research on drinking motives has focused primarily on coping and social motives. This article reports on the development of a 3-factor measure that also assesses enhancement motives. Using confirmatory factor analysis, we demonstrated that enhancement motives are empirically distinct from coping and social motives and that a correlated 3-factor model fits the data equally well across race and gender groups in a large representative sample. Each drinking motive was also shown to predict distinct aspects of alcohol use and abuse. Finally, interaction analyses suggested that coping and enhancement motives differ in the magnitude of their effects on drinking behavior across Blacks and Whites and that enhancement motives differ in their effects across men and women.

People differ widely in their reasons for drinking. Some drink primarily for ceremonial or social reasons, others to "get high," and still others to unwind and feel better after a difficult day. These differences are important because different drinking motives have been shown to predict distinct patterns of alcohol consumption and alcohol-related problems. For example, numerous studies indicate that individuals who drink to cope with negative emotions or feelings of personal deficiency are more likely to drink heavily, to drink alone, and to experience problems indicative of alcohol abuse than are those who drink primarily for social or affiliative motives (Cahalan & Cisin, 1968; Cutter & O'Farrell, 1984; Glynn, LoCastro, Hermos, & Bossé, 1983; Mulford & Miller, 1960; Parry, Cisin, Balter, Mellinger, & Manheimer, 1974; Snow & Wells-Parker, 1986). Moreover, coping motives have been shown to predict the experience of drinking problems, even after controlling for level of alcohol consumption (Cooper, Russell, & George, 1988; Polich & Orvis, 1979). Thus, problems associated with the use of alcohol to cope cannot be accounted for solely by the amount of alcohol consumed because such problems appear to stem also from the particular motivations underlying alcohol use.

Although research on drinking motives has focused primarily on coping and social motives, both theory and research suggest that individuals also drink to enhance positive experiences or emotions. Wills and Shiffman (1985) presented a model in

which individuals were hypothesized to use alcohol to regulate both positive and negative affect. According to this model, individuals may use alcohol to reduce negative affect when they are anxious or overaroused or to enhance positive affect when they are fatigued or underaroused. These propositions are consistent with evidence on the biphasic effects of alcohol, indicating that alcohol may act either to reduce negative affect or to increase positive affect, depending on the rate of consumption and on blood alcohol levels (see Russell & Mehrabian, 1975, for a review).

Survey research on alcohol expectancies also indicates widespread belief in alcohol's capacity to decrease negative emotions as well as to enhance positive emotions. Indeed, in the landmark expectancy research conducted by Brown et al. (1980), five of the six domains identified in open-ended interviews were expectancies for enhanced physical and emotional experience, whereas only one domain tapped an expectancy for decreased negative emotions (tension reduction). Subsequent research has confirmed the ubiquity of beliefs about both enhancement and relief effects of alcohol use across diverse populations (see Critchlow, 1986, and Leigh, 1989, for reviews of this literature).

Consistent with these findings, laboratory studies have demonstrated increased drinking in response to manipulations designed to elicit both negative and positive emotions. Drinking in an apparent attempt to cope with negative emotions has been demonstrated in response to a range of stressors, including heterosocial evaluation (Higgins & Marlatt, 1975), criticism (Marlatt, Kosturn, & Lang, 1975; Miller, Hersen, Eisler, & Hilsman, 1974), difficult or insoluble tasks (Hull & Young, 1983; Tucker, Vuchinich, Sobell, & Maisto, 1980), and public speaking (Strickler, Tomaszewski, Maxwell, & Suib, 1979). In contrast, a number of studies designed to investigate stress-induced drinking actually showed higher levels of consumption among control subjects exposed to pleasant or positive experimental conditions, including positive performance feedback (Pihl &

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Smith, 1983) and pleasant social or sexual manipulations (Gable, Noel, Keane, & Lisman, 1980; Holroyd, 1978; see Pihl & Smith, 1983, for a review).

Further evidence regarding the significance of positive emotion as a motive for drinking comes from studies of relapse among alcoholics. Although the majority of relapse incidents were precipitated by negative events and emotions, a significant minority occurred in response to social or celebratory events that were likely to induce positive affect (Marlatt & Gordon, 1980).

In sum, both theory and research suggest that alcohol may be used either to cope with negative affect or to enhance positive affect. Despite consistent evidence supporting the dual-affect regulatory functions that alcohol may serve, most research has focused on social and coping motives for alcohol use. Substantially less attention has been paid to enhancement motives, reflecting in part the lack of a brief, easily administered, reliable, and conceptually cohesive measure of drinking to enhance positive affect.

Several reliable, easily administered measures of drinking for coping and social motives were developed during the 1960s (e.g., Cahalan, Cisin, & Crossley, 1969; Mulford & Miller, 1960) and have been widely used in subsequent research on drinking motives. More recently, factor-analytic studies using larger and more diverse item pools have provided evidence of a third motive that closely resembles drinking to enhance positive affect (Beckwith, 1987; Connors, O'Farrell, Cutter, & Thompson, 1987; Cutter & O'Farrell, 1984; McCarty & Kaye, 1984; Newcomb, Chou, Bentler, & Huba, 1988; Snow & Wells-Parker, 1986). Unfortunately, scales derived from these analyses were constructed on a post-hoc basis, have not been cross-validated, and do not appear to measure a single underlying dimension (for a noteworthy exception, see Newcomb et al's, 1988, recent work with adolescents).

The current research was designed to address these concerns. First, we specified a three-dimensional model that includes enhancement motives for alcohol use. We then tested this model and evaluated its generalizability across gender and race by using confirmatory factor analysis. Evidence of discriminant relations between the three drinking motives and alcohol and drug use variables is provided.

## Method

### *Development of the Item Pool*

A pool of 21 items was developed by reviewing a number of previously published studies (Beckwith, 1987; Cahalan et al., 1969; Mulford & Miller, 1963; Polich & Orvis, 1979; Snow & Wells-Parker, 1986). Items independently judged by two trained graduate student raters as face valid indicators of the same drinking motive were retained, yielding 8 items each to assess social and enhancement motives. In addition, 5 of 6 coping-motive items used by Polich and Orvis (1979) also were retained. The resulting pool of 21 items was administered in random order to a convenience sample of 170 male and 146 female undergraduate students (ages 17 to 26 years). Items were factor-analyzed using both principal-axis (PAF) and principal-components (PC) extraction procedures, followed by varimax and oblique rotations. Although the magnitude of individual loadings varied across procedures, the number of factors and item content were invariant. Item selection was guided

primarily by results of the PAF procedure with oblique rotation because recent studies show that PAF reproduces the initial correlation matrix more reliably than does PC extraction (Snook & Gorsuch, 1989). Moreover, prior research has consistently indicated that drinking motives are intercorrelated, thereby supporting the use of oblique rotation procedures.

Results revealed three factors (accounting for 65% of the variance) with eigenvalues of greater than 1. Analysis of the item content of the factors indicated dimensions tapping social, coping, and enhancement motives. On the basis of these results, the five items that loaded most highly on each of the intended dimensions were retained (see Table 2 for items).

### *Sample and Procedure*

The resulting pool of 15 items was administered as part of a longitudinal follow-up study of a stratified random sample of household residents in Erie County, New York. Respondents were identified in a three-stage probability sample designed to yield roughly equal representation of Blacks and Whites across three educational levels (i.e., less than high school, high school, some college or more). Of the 1,933 respondents initially interviewed, 1,616 (84%) were reinterviewed 3 years later. Data for the present study were obtained from the subset of reinterviewed respondents who drank at least once during the past year ( $n = 1,206$ ). This subgroup was predominantly female (61%); about half were Black (52%) and half had completed at least some college (51%). Their average age was 43 years ( $SD = 14.8$ ).

Follow-up interviews were conducted in the spring and summer of 1989 by 20 professionally trained interviewers. Interviews took place in respondents' homes, using a highly structured interview schedule that required approximately 90 min to administer. Respondents were paid \$25 for participating.

### *Measures*

Respondents rated the frequency of drinking for each of the 15 reasons on a 1 to 4 scale on which 1 equals *almost never/never* and 4 equals *almost always*. In addition to the drinking motive items, a number of criterion measures were included to assess drug use, alcohol use, and alcohol-related problems over the past year.

Two general strategies were used to improve the distributional properties of the alcohol and drug use items that were highly skewed in the present sample. First, a number of open-ended items were collapsed at the point where the distribution trailed off. For example, fewer than 2% of the respondents reported usual alcohol consumption of greater than 7 drinks per occasion, although values as high as 24 were reported. Thus, values exceeding 7 drinks per day were collapsed to 7 drinks, thereby reducing skewness from 3.0 to 1.1. Second, drug use variables that had extremely low rates of endorsement were dichotomized (used vs. not used). Although both transformations in effect transform ratio-level data into ordinal data, a number of recent studies indicate that ordinal indexes perform as well as ratio- or interval-level indexes of substance use (see Hays, Widaman, DiMatteo, & Stacy, 1987, for a review). Moreover, as compared with logarithmic transformations, these strategies have the added advantage of retaining the inherent meaningfulness of the scales (i.e., 1 drink still equals 1 drink in the current scheme).

Usual quantity of alcohol consumed per drinking occasion (collapsed to 7 or more drinks), frequency of drinking (rated on a 1 to 8 scale, on which 1 = *less than one time a month* and 8 = *every day*), and frequency of drinking to intoxication (rated on a 0 to 8 scale, on which 0 = *never* and 8 = *5 times a week or more*) each were used as single-item indicators.

Respondents also were asked whether and how much drinking had

occurred during the past year in each of five different contexts: (a) alone at home, (b) with a spouse, partner, or date, (c) with a group of same-sex friends, (d) with a group of friends that included both sexes, and (e) at large parties or other more formal social gatherings. For each context in which drinking had occurred, they were asked whether they typically drank less than their self-reported usual, about the same amount, or more than their self-reported usual. Responses to the two-part question were combined to yield five ordinal indexes that ranged from 0 (*did not drink in that context*) to 4 (*typically drank more than their self-reported usual in that context*).

Using questions from the National Institute of Mental Health Diagnostic Interview Schedule (Robins, Helzer, Croughan, Williams, & Spitzer, 1981), respondents were asked whether they had experienced each of 17 symptoms during the past year. Following criteria of the *Diagnostic and Statistical Manual of Mental Disorders (DSM-III*; American Psychiatric Association, 1980), symptoms were grouped into three categories: (a) a pattern of pathological abuse (e.g., needing a drink before breakfast), (b) impairment of social or occupational functioning (e.g., having trouble on the job or at school because of drinking), and (c) evidence of tolerance or withdrawal (e.g., having the "shakes" after stopping or cutting down). A simple count of the number of symptoms reported in each category (collapsed to 0, 1, or 2 or more symptoms) was used.

Respondents also were asked whether they had used any of five different types of drugs during the past year (i.e., cocaine, stimulants, barbiturates, tranquilizers, marijuana) and, if so, how many times each had been used. Responses were dichotomized (used vs. not used) for all drugs except marijuana, which was more commonly used in this sample (14% of respondents had used marijuana at least once during the past year). Following Hays et al. (1987), dichotomized drug use variables were grouped into two categories: enhancers (comprising cocaine and stimulants) and dampeners (comprising tranquilizers and barbiturates). Thus, scores on each index could range from 0 (*used no drugs in this category*) to 2 (*used both drugs sharing similar drug action*). Frequency of smoking marijuana during the past year was assessed on an 8-point scale on which 0 = *not at all* and 8 = *every day or almost every day*.

Sociodemographic covariates included race, sex, age, education, and social desirability. Race and education were controlled because of the highly stratified sampling design used in the present study; sex and age were controlled because of documented differences in alcohol use and abuse as a function of these sociodemographic characteristics (Hilton, 1987). Socially desirable responding was assessed by a short form of the Marlowe-Crowne Social Desirability Scale (Strahan & Gerbasi, 1972) and was controlled because of its potential spurious relationship with both drinking motives and self-reported alcohol and drug use. Social desirability was significantly negatively correlated with all three drinking motives ( $-.14 < r < -.18$ ,  $p$  values  $< .001$ ) and with 10 of 14 alcohol-related criterion measures ( $-.08 < r < -.19$ ,  $p$  values  $< .01$ ).

### Overview of Analyses

Three phases of analyses were conducted. In the first phase, the hypothesized three-factor structure of the drinking motive items was examined using confirmatory factor-analytic techniques. In the second phase, the resulting best-fit model was examined for invariance across male ( $n = 466$ ) and female ( $n = 740$ ) respondents and across Blacks ( $n = 615$ ) and Whites ( $n = 569$ ). Twenty-two respondents who were neither Black nor White were excluded from all analyses involving cross-race comparisons. Finally, both hierarchical multivariate and univariate multiple regression analyses were conducted to assess the extent to which drinking motives independently predict alcohol and drug use and the extent to which these effects are invariant across race and gender.

## Results

### Confirmation of Factor Structure

Three alternative models were compared: (a) a single factor model, (b) a correlated two-factor model in which all enhancement motives were constrained to load on the Social Motives factor, and (c) a correlated three-factor model. The one-factor model tests the adequacy of a common factor model to account for the underlying structure of the data. The viability of this model is supported by the fact that most studies typically extract one large first factor and one or more additional factors of substantially smaller magnitude. The correlated two-factor model tests the adequacy of the more commonly used two-factor model to account for the underlying structure of the data. Finally, the correlated three-factor model tests the adequacy of the proposed model to account for the data and specifically tests whether adding an enhancement factor provides a significantly better fit to the data than does the more commonly used two-factor model.

All confirmatory factor-analytic procedures were conducted with the EQS structural equation modeling program (Bentler, 1989). Scaling metrics for the latent variables were fixed by setting factor variances to 1.0. Following procedures recommended by a number of authors (Cliff, 1983; Jöreskog & Sörbom, 1983; Mulaik et al., 1989), multiple fit indexes were used to evaluate the model's goodness of fit. Three fit indexes are reported for all analyses: the Normed Fit Index (NFI; Bentler & Bonett, 1980), the Comparative Fit Index (CFI; Bentler, 1989), and the standardized root mean square residual (RMR). Because each fit index has different limitations, consistency across indexes may be regarded as the most reliable indicator of goodness of fit (Mulaik et al., 1989). Both the NFI and CFI range in value from 0 to 1, with values of .90 or higher indicating a good fit (Bentler & Bonett, 1980). The RMR is the standardized average absolute difference between the original and reproduced matrixes (Marsh & Hocevar, 1985); relatively small values (e.g., .05, .06) indicate minimal discrepancies between original and reproduced matrixes. Values reported here are for off-diagonal elements only, which provide a more conservative estimate than do those including diagonal elements.

Goodness-of-fit indexes for the three models are summarized in Table 1. As indicated by the chi-square difference test, the correlated three-factor model fits the data significantly better than do either the one-factor model (Model 1 – Model 3,  $\Delta \chi^2[3] = 1,252.4$ ) or the correlated two-factor model (Model 2 –

Table 1  
Goodness-of-Fit Information for Alternative Factor Models

Model	$\chi^2$	df	NFI	CFI	RMR
1-factor model	1,878.8	90	.734	.743	.07
2-factor model	1,083.4	89	.847	.857	.06
3-factor model	626.4	87	.911	.923	.04

Note. NFI = Bentler-Bonett normed fit index; CFI = comparative fit index; RMR = standardized root mean square residual. For all models specified, the chi-square likelihood ratio test statistic was significant ( $p < .001$ ).

Model 3,  $\Delta \chi^2[2] = 457.0$ ). Finally, the three-factor model provided an acceptably good fit to the data as indicated by values in excess of .90 for both the NFI and CFI and a relatively small RMR.

Table 2 presents the factor loadings for the standardized and unstandardized solution, along with standard errors for the correlated three-factor model. All items loaded significantly on their hypothesized factors ( $t$  values = 16.0–33.4,  $p$  values < .001). Descriptive statistics are summarized in Table 3 for the resulting scales. These data suggest that the drinking motives scales are internally consistent and moderately intercorrelated, sharing from 22% to 46% overlapping variance.

### *Invariance Across Gender and Race*

To determine the extent to which the correlated three-factor model was invariant across gender and race groups, a series of within-group models was specified and independently tested among men and women and among Whites and Blacks. Information on goodness of fit for the within-group models is provided in Lines 1 and 2 of Tables 4 and 5 for gender and race comparisons, respectively. Analysis of the fit indexes suggests that the correlated three-factor model fits well for both men and women and for Whites and Blacks. Values for NFI and CFI ranged from .88 to .94 for all within-group models, and the RMRs were uniformly small (.04 to .05).

In addition to the within-group models, two simultaneous

between-group models were specified. First, a model was tested in which a common factor pattern was specified across gender and race groups, but the magnitude of factor loadings was allowed to vary. Goodness-of-fit information for this model is provided in Line 3 of Tables 4 and 5. Values for the NFI and CFI of .90 or higher, combined with the relatively small RMRs, indicate that the specified three-factor model provided an equally good fit to the data across men and women and Whites and Blacks.

A factor-loading equivalent model was then tested in which both the factor pattern and factor loadings were constrained to equivalence across groups (Line 4, Tables 4 and 5). Examination of the fit indexes for this model indicated that the factor-loading equivalent model also provided a reasonably good fit to the data across gender groups (Table 4). Values for the NFI and CFI ranged from .89 to .92, and RMRs were acceptably small (.06 for both men and women). Nonetheless, the chi-square difference test ( $\Delta \chi^2[15] = 44.5$ ), was significant at  $p < .001$ , suggesting that the assumption of complete factor loading invariance was not supported in a strictly statistical sense.

Examination of modification indexes (using the La Grange multiplier test) showed that, although the absolute magnitude of differences in unstandardized factor loadings was small (only two exceeded .10), equality constraints on three enhancement items had to be relaxed to achieve a nonsignificant chi-square difference statistic,  $\Delta \chi^2(12) = 18.2$ ,  $p > .10$ .

These analyses indicate a partially homogeneous, partially

Table 2

*Standardized/Unstandardized Factor Loadings and Standard Errors for the Hypothesized Three-Factor Model*

Item	Social motives			Coping motives			Enhancement motives		
	Standardized	Unstandardized	SE	Standardized	Unstandardized	SE	Standardized	Unstandardized	SE
As a way to celebrate	.49	.41	.026						
Because it is what most of your friends do when you get together	.62	.53	.024						
To be sociable	.66	.49	.022						
Because it is customary on special occasions	.63	.51	.023						
Because it makes a social gathering more enjoyable	.73	.55	.021						
To relax				.54	.38	.021			
To forget your worries				.75	.36	.013			
Because you feel more self-confident or sure of yourself				.57	.25	.012			
Because it helps when you feel depressed or nervous				.82	.44	.014			
To cheer up when you're in a bad mood				.75	.42	.015			
Because you like the feeling							.77	.55	.019
Because it's exciting							.62	.29	.013
To get high							.69	.40	.015
Because it's fun							.73	.54	.019
Because it makes you feel good							.83	.61	.018

Note. All factor loadings are significant at  $p < .001$ .

Table 3  
Scale Statistics and Factor Correlations

Scale	<i>M</i>	<i>SD</i>	$\alpha$	Factor correlations		
				1	2	3
1. Social motives	1.97	.57	.77	—	.47	.68
2. Coping motives	1.31	.41	.81		—	.66
3. Enhancement motives	1.45	.52	.85			—

Note. Means, standard deviations, and coefficients alpha are based on scale scores derived from manifest variables; intercorrelations are among latent factors.

heterogeneous solution, with both Social Motives and Coping Motives factors meeting the strict statistical assumptions of complete factor loading invariance across gender groups. In contrast, factor loadings were only partially invariant for items composing the Enhancement Motives factor. Nonetheless, all items loaded significantly on the Enhancement Motives factor among both men and women (*t* values = 9.4–20.0 and 13.7–26.7 for men and women, respectively, *p* values < .001). Moreover, internal consistency was comparable across male and female respondents ( $\alpha$  = .85 and .84, respectively).

Across Blacks and Whites, values for the NFI and CFI together with somewhat higher RMRs (.07 and .09 for Blacks and Whites, respectively) suggest that the assumption of complete factor loading invariance may not be warranted. Examination of modification indexes showed that the absolute magnitude of differences in the unstandardized factor loadings across groups ranged from .00 to .24, with only three differences exceeding .10. Nonetheless, a total of 10 equality constraints on items across all three factors had to be released to achieve a nonsignificant chi-square difference statistic,  $\chi^2(5) = 8.5$ , *p* > .05.

Despite the lack of complete factor-loading invariance, all items loaded significantly on their respective factors in both racial groups (*t* values = 13.3–23.4 among Blacks and 9.0–23.5 among Whites, *p* values < .001). Moreover, items composing

Table 4  
Goodness-of-Fit Information for Between- and Within-Gender Groups: Three-Factor Correlated Model of Drinking Motives

Model specified	$\chi^2$	<i>df</i>	NFI	CFI	RMR	
					M	W
1. Men ( <i>n</i> = 466)	280.4	87	.89	.92	.04	—
2. Women ( <i>n</i> = 740)	447.7	87	.90	.92	—	.05
3. Model sum	728.1	174	.90	.92	.04	.05
4. Simultaneous group model	772.6	189	.89	.92	.06	.06
$\chi^2$ difference	44.5	15	—	—	—	—

Note. NFI = Bentler Bonett Normed Fit Index; CFI = Comparative Fit Index; RMR = standardized root mean square residual; M = men; W = women. RMRs for the between-groups models are reported separately for men and women. For all models specified, the chi-square likelihood ratio test statistic was significant (*p* < .001).

Table 5  
Goodness-of-Fit Information for Between- and Within-Racial Groups: Three-Factor Correlated Model of Drinking Motives

Model specified	$\chi^2$	<i>df</i>	NFI	CFI	RMR	
					Whites	Blacks
1. Whites ( <i>n</i> = 569)	396.0	87	.88	.91	.05	—
2. Blacks ( <i>n</i> = 615)	303.5	87	.92	.94	—	.04
3. Model sum	699.5	174	.90	.92	.05	.04
4. Simultaneous group model	847.3	189	.88	.91	.09	.07
$\chi^2$ difference	147.8	15	—	—	—	—

Note. NFI = Bentler Bonett Normed Fit Index; CFI = Comparative Fit Index; RMR = standardized root mean square residual. RMRs for the between-groups models are reported separately for Whites and Blacks. For all models specified, the chi-square likelihood ratio test statistic was significant (*p* < .001).

each of the three factors formed comparably reliable scales across both racial groups. Internal consistency estimates of reliability (coefficients alpha) were .80 to .81 for Coping Motives, .84 to .86 for Enhancement Motives, and .76 for Social Motives in both groups.

In light of substantial similarities across both gender and race groups and the generally inconsequential effects of weighting on the relationships of composite variables to other variables (Wainer, 1978), we conclude that differences of this magnitude are unlikely to be of practical or substantive significance and that differential weighting across groups is not warranted.

#### Mean Differences in Drinking Motives Across Race and Gender

Given near equivalence of factor structure across groups, mean differences in drinking motives can be meaningfully compared. A two-way Race  $\times$  Gender multivariate analysis of covariance was conducted, followed by two-way univariate analyses of covariance to probe significant effects. Results revealed no significant Race  $\times$  Gender interactions (*MV F* < 1.0, *p* > .50). However, significant multivariate main effects were obtained for both race and gender after controlling for age, education, and social desirability effects. Covariate-adjusted means are summarized for both race and gender groups in Table 6. As shown in Table 6, men reported more frequent drinking for each of the three motives—results that are consistent with the heavier levels of consumption typically documented among men. Race effects were somewhat more complex; Whites reported stronger social motives, whereas Blacks reported somewhat stronger coping motives. It is important to note, however, that although these differences were statistically significant, all effects were relatively small in magnitude.

#### Drinking Motives as Predictors of Alcohol and Drug Use

Both univariate and multivariate multiple regression analyses (MRA) were used to assess the extent to which drinking motives independently predicted alcohol and drug use and,

Table 6  
*Covariate-Adjusted Unweighted Means for Three Drinking Motives Among Race and Gender Subgroups*

Groups	Social motives		Coping motives		Enhancement motives	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Gender						
Male	2.066	.58**	1.364	.43**	1.556	.56**
Female	1.920	.57	1.276	.40	1.377	.48
$\eta^2$	.017		.011		.032	
Race						
White	2.064	.60**	1.275	.36*	1.429	.49
Black	1.889	.54	1.348	.45	1.468	.55
$\eta^2$	.022		.008		.001	

Note. Gender means are adjusted for race, age, education, and social desirability; race means are adjusted for gender, age, education, and social desirability. Multivariate *F* for gender: (3, 1186) = 13.7,  $p < .001$ . Multivariate *F* for race: (3, 1175) = 20.7,  $p < .001$ .

\*  $p < .01$ . \*\*  $p < .001$ .

more important, the extent to which each motive was associated with a unique pattern of alcohol and drug use. To control for Type I errors due to overlap among the dependent variables, four multivariate MRAs were conducted using the following dependent variable sets: (a) Alcohol Use, indicated by quantity and frequency of usual consumption and frequency of drinking to intoxication; (b) Alcohol Abuse, indicated by symptoms of occupational and social impairment, pathological consumption, and tolerance and withdrawal; (c) Drinking Situations, indicated by alcohol use when alone, with one's partner or a date, with same-sex friends, with groups of friends that include both sexes, and at parties; and (d) Drug Use, indicated by the use of dampeners, enhancers, and marijuana. For each analysis, race, sex, age, education, and social desirability were entered on the first step. On a second step, all three drinking motives were entered as a block. Significant multivariate *F*s were obtained for the second step in all four analyses (see note, Table 7), thereby justifying more careful examination of the effects of each drinking motive by using univariate multiple regression analyses.

A series of 14 univariate MRAs was conducted in which race, sex, age, education, and social desirability were entered on the first step, followed by the set of drinking motives on the second step. As shown in Table 7, the set of three drinking motives accounted for 15% to 26% of the variance in each of the alcohol use indicators. Results for the individual motives (standardized beta weights) indicate that enhancement motives were the single strongest independent predictor of quantity and frequency of alcohol use and of frequency of drinking to intoxication, although both social and coping motives also made significant independent contributions. Indeed, calculation of squared semipartial correlations for enhancement motives revealed that enhancement motives uniquely accounted for between 4.5% and 5.5% of the variance in each of these indicators of alcohol use, compared with less than 1% and about 3.5%, respectively, for social and coping motives.

Drinking motives also accounted for substantial variation in

indicators of alcohol abuse, ranging from 8% to 14% of the variance. Examining the individual beta weights indicated that coping motives were the strongest independent predictor of all three drinking problem indexes. However, enhancement motives also independently predicted two of the three symptoms (social and occupational impairment and pathological consumption), though less strongly than coping motives. In contrast, social motives did not predict the occurrence of drinking problems despite the fact that they independently predicted alcohol consumption.

To control for the confound between drinking problems and amount of alcohol consumed, these analyses were reestimated, adding average number of drinks per day (during the past year) to the first step. Results showed that coping motives continued to predict all three indicators of alcohol problems, almost as strongly as they did in the previous analyses when average consumption was not controlled. However, enhancement motives no longer predicted impairment ( $\beta = .04$ ,  $p > .10$ ), and its effect on pathological consumption was substantially attenuated ( $\beta =$

Table 7  
*Multiple Regression Analyses Predicting Alcohol and Drug Use From Three Drinking Motives*

Dependent variables	$\Delta R^2$	Drinking motives		
		$\beta$ Social	$\beta$ Coping	$\beta$ Enhancement
Alcohol Use <sup>a</sup>				
EQ. 1. Frequency	.262***	.10***	.24***	.30***
EQ. 2. Quantity	.149***	.09**	.04	.33***
EQ. 3. Drunk	.218***	.06*	.19***	.32***
Alcohol Abuse <sup>b</sup>				
EQ. 4. Impairment	.116***	.02	.28***	.10**
EQ. 5. Pathological consumption	.139***	.00	.27***	.17***
EQ. 6. Tolerance & withdrawal	.078***	.02	.25***	.05
Drinking Situations <sup>c</sup>				
EQ. 7. Alone	.121***	-.07*	.35***	.05
EQ. 8. Partner	.025***	.06	.09**	.05
EQ. 9. Same-sex friends	.086***	.20***	.00	.15***
EQ. 10. Mixed-sex friends	.050***	.24***	.00	.00
EQ. 11. Parties	.042***	.23***	.00	-.04
Drug Use <sup>d</sup>				
EQ. 12. Dampeners	.029***	-.01	.18***	.00
EQ. 13. Enhancers	.053***	.04	.09**	.15***
EQ. 14. Marijuana	.033***	.00	-.01	.20***

Note. All analyses were controlled for sex, age, race, education, and social desirability.

<sup>a</sup> Multivariate  $F(9, 3537) = 65.0$ ,  $p < .001$ , for set of three dependent variables taken from second step with three drinking motives as independent variable set. <sup>b</sup> Multivariate  $F(9, 3558) = 27.7$ ,  $p < .001$ , for set of three dependent variables taken from second step with three drinking motives as independent variable set. <sup>c</sup> Multivariate  $F(15, 3546) = 24.0$ ,  $p < .001$ , for set of five dependent variables taken from second step with three drinking motives as independent variable set. <sup>d</sup> Multivariate  $F(9, 3558) = 12.2$ ,  $p < .001$ , for set of three dependent variables taken from second step with three drinking motives as independent variable set.

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

.09,  $p < .05$ ), suggesting that the primary contribution of enhancement motives to abuse symptoms is indirect by way of its influence on alcohol consumption per se.

The block of drinking motives also significantly predicted the use of alcohol in specific contexts or situations. Both social and enhancement motives were related to drinking in social contexts: Enhancement motives positively predicted drinking with same-sex friends, whereas social motives positively predicted drinking in all three social situations and negatively predicted drinking alone. In contrast, coping motives positively predicted drinking alone and with one's partner, spouse, or date but did not predict drinking in other social situations. Furthermore, results were not changed appreciably by controlling for usual alcohol consumption or by using dichotomous (any drinking vs. no drinking in each situation) versions of these outcome variables.

Finally, drinking motives predicted each of the drug use variables. As can be seen from the individual beta weights, social motives did not predict drug use. However, coping motives predicted the use of dampeners and enhancers, whereas enhancement motives predicted the use of both enhancers and marijuana. Results were unchanged by controlling for usual alcohol consumption, except that coping motives no longer predicted use of enhancers ( $\beta = .06$ ,  $p > .05$ ).

In sum, each of the three motives was independently predictive of multiple aspects of drinking and drug use behavior, and each was associated with a unique pattern of alcohol and drug use.

#### *Differential Effects of Drinking Motives Among Race and Gender Groups*

To determine whether the effects of drinking motives significantly differed by race and gender, both univariate and multivariate regression procedures were used to test Motive  $\times$  Race and Motive  $\times$  Gender interactions. To control for Type I errors due to overlap among the dependent variables, four multivariate MRAs were conducted using the sets of alcohol use, alcohol abuse, drinking situation, and drug use variables described above. For each dependent variable set, sociodemographic covariates, social desirability, and main effects for the three drinking motives were entered on the first step, followed by a block of two-way Race  $\times$  Motive and Gender  $\times$  Motive interactions on Step 2, and three-way Race  $\times$  Gender  $\times$  Motive interactions on the final step. To reduce multicollinearity among interaction terms and their constituent variables, all variables were centered (i.e., deviated from their means) before the interactions were computed and tested (Jaccard, Turrisi, & Wan, 1990).

Results showed that none of the multivariate (or univariate) effects was significant for the block of three-way interactions, suggesting that the effects of drinking motives on alcohol outcomes do not differ across the four Race  $\times$  Gender subgroups. In contrast, significant multivariate  $F$ s were obtained for all four blocks of two-way interactions (see Table 8).

Because the multivariate tests were significant, 14 univariate multiple regression analyses were conducted to explore more fully the pattern of significant univariate interaction effects. As shown in Table 8, 10 of 14 blocks of two-way interactions were significant at  $p < .05$ . Examination of the individual interaction

beta weights within these blocks revealed that significant effects occurred primarily for coping and enhancement motives, with only one significant interaction involving social motives.

Examination of the individual interaction betas showed that the effects of coping motives differed across both racial and gender groups. As shown in Table 8, 6 of 14 Race  $\times$  Coping Motive interactions were significant ( $p < .05$ ), and 1 additional interaction was marginally significant ( $p < .10$ ). Significant effects were probed following procedures described by Cohen and Cohen (1983), in which separate regression lines were generated from the overall regression equation to describe the relationship between a given drinking motive and criterion variable among the relevant race or gender subgroups. Plotting the interactions revealed that six of the Coping  $\times$  Race interactions were in a consistent direction. Coping motives were more strongly related among Blacks than among Whites to the frequency of drinking to intoxication, abuse symptoms, and the use of both enhancers and dampeners. For example, the slope of the line relating coping motives to impairment symptoms was .74 among Blacks and .58 among Whites. The single exception to this pattern suggested that coping motives were more strongly related to alcohol use at parties and other formal occasions among Whites ( $b = .51$ ) than among Blacks ( $b = .09$ ).

Three of 14 Gender  $\times$  Coping Motive interactions also were significant. However, as indicated by the sign of the interaction betas, the form of the interactions was not consistent. Coping motives were more strongly related to the frequency of getting drunk and to enhancer use among women, whereas they were more strongly related to impairment symptoms among men.

The effects of enhancement motives on alcohol and drug use also were moderated by race and gender. Six of 14 Race  $\times$  Enhancement Motive interactions were significant ( $p < .05$ ) or marginally significant ( $p < .10$ ). Moreover, plotting the interactions revealed that all effects were consistent in form. Enhancement motives were more strongly related to outcomes among Whites than among Blacks. For example, the slope of the line relating enhancement motives to symptoms of pathological consumption was .63 among Whites and .48 among Blacks.

Finally, 5 of 14 Gender  $\times$  Enhancement Motive interactions were significant ( $p < .05$ ) or marginally significant ( $p < .10$ ). Four of these interactions were in the same direction, indicating that enhancement motives were more strongly predictive of alcohol and marijuana use among men than among women. For example, the slope of the line relating enhancement motives to the frequency of drinking to intoxication was 2.3 among men versus 1.4 among women. The Gender  $\times$  Enhancement Motive interaction predicting tolerance and withdrawal symptoms appeared to be confounded by drinking habits, however, in that controlling for usual quantity-frequency of alcohol use substantially attenuated this effect ( $\beta = -.19$ ,  $p > .20$ ). Note, however, that all remaining Race  $\times$  Motive and Gender  $\times$  Motive interaction effects were unchanged by controlling for usual alcohol consumption.

In sum, analysis of interaction effects revealed a consistent pattern of Race  $\times$  Motive interaction effects; coping motives were generally more predictive among Blacks, whereas enhancement motives were more predictive among Whites. Although gender significantly interacted with both coping and enhancement motives, the pattern of effects was both weaker and less

Table 8  
Summary of Two-Way Race  $\times$  Motive and Gender  $\times$  Motive Interactions

Dependent variables	$\Delta R^2$	Gender			Race		
		$\beta$ Social	$\beta$ Coping	$\beta$ Enhancement	$\beta$ Social	$\beta$ Coping	$\beta$ Enhancement
Alcohol Use <sup>a</sup>							
EQ. 1. Frequency	.006	-.04	.05	-.05	-.05	-.20	-.17
EQ. 2. Quantity	.008*	.00	.02	-.30*	.08	.06	-.27†
EQ. 3. Drunk	.022***	-.23†	.44***	-.56***	-.09	.26†	-.08
Alcohol Abuse <sup>b</sup>							
EQ. 4. Impairment	-.043***	.01	-.62***	-.19	.02	.55***	.11
EQ. 5. Pathological consumption	.016***	-.01	-.17	-.17	-.01	.63***	-.41*
EQ. 6. Tolerance & withdrawal	.025***	-.24	.05	-.33*	-.18	.62***	.04
Drinking Situations <sup>c</sup>							
EQ. 7. Alone	.012**	-.15	.07	.26†	-.23	.14	-.31†
EQ. 8. Partner	.002	-.01	.02	.13	.08	.05	-.07
EQ. 9. Same-sex friends	.004	-.13	-.04	-.08	.11	.07	-.22
EQ. 10. Mixed-sex friends	.004	.12	-.12	-.00	.19	-.06	-.29†
EQ. 11. Parties	.014**	.18	-.12	.00	-.30*	-.37*	.06
Drug Use <sup>d</sup>							
EQ. 12. Dampeners	.017**	.14	.25	.00	.00	.60***	-.47**
EQ. 13. Enhancers	.018***	.02	.37*	-.07	.07	.59***	-.47**
EQ. 14. Marijuana	.010*	-.13	.16	-.27†	.25†	.13	-.05

Note. All analyses were controlled for sex, age, race, education, and social desirability and main effects for drinking motives.

<sup>a</sup> Multivariate  $F(18, 3483) = 3.37, p < .001$ , for set of three dependent variables taken from second step (after entering covariates and main effects for drinking motives) with the set of Motive  $\times$  Sex and Motive  $\times$  Race interactions as independent variables. <sup>b</sup> Multivariate  $F(18, 3504) = 5.35, p < .001$ , for set of three dependent variables taken from second step with the set of Motive  $\times$  Sex and Motive  $\times$  Race interactions as independent variables. <sup>c</sup> Multivariate  $F(30, 5830) = 1.64, p < .05$ , for set of five dependent variables taken from second step with the set of Motive  $\times$  Sex and Motive  $\times$  Race interactions as independent variables. <sup>d</sup> Multivariate  $F(18, 3504) = 2.90, p < .001$  for set of three dependent variables taken from second step with the set of Motive  $\times$  Sex and Motive  $\times$  Race interactions as independent variables.

†  $p < .10$ ; \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$ .

consistent. Enhancement motives did, however, appear to be more strongly predictive of heavy drinking among men than among women.

## Discussion and Conclusions

We developed and tested a three-dimensional measure of drinking motives. As expected, confirmatory factor analyses indicated that drinking to enhance positive affect constitutes a third factor, distinct from coping and social motives. Moreover, the correlated three-factor model provided an equally good fit to the data across gender and race groups. More stringent assumptions of factor loading equivalence were, however, only partially supported. Factor loading equivalence was demonstrated across gender groups for both coping and social motives, whereas factor loadings were highly similar but not statistically invariant for enhancement motives. Likewise, across racial groups, factor loadings were generally comparable but not invariant in a strict statistical sense for any of the three motive dimensions. These differences notwithstanding, all scales demonstrated adequate-to-high reliability across racial and gender

groups, suggesting that they form meaningful, internally consistent composites across all groups.

The validity of the basic, correlated three-factor model was further reinforced by the fact that each drinking motive was associated with a unique pattern of alcohol and drug use and drinking-related outcomes, despite substantial overlap among drinking motives. In particular, enhancement motives were strongly associated with a pattern of frequent, heavy drinking, uniquely accounting for about 5% of the variance in each of several indicators of alcohol use. In contrast, coping motives were associated with frequent but not substantially heavier drinking. For example, by generating predicted means from the regression equation, we estimate that each standard deviation increase in coping motives is associated with an increase of .17 of a standard drink (containing 1 oz of alcohol) compared with an increase of .99 of a standard drink for a corresponding increase in enhancement motives. Despite heavier consumption associated with enhancement motives, coping motives were more strongly predictive of symptoms of abusive drinking. Indeed, only coping motives significantly predicted both social and occupational dysfunction and tolerance and withdrawal symptoms after controlling for usual alcohol consumption.



Each of the drinking motives also was associated with a unique profile of context-dependent drinking behavior. Both enhancement and social motives were associated with drinking in social contexts, whereas coping motives were associated with drinking alone or, to a lesser extent, with one's partner. Finally, enhancement motives were associated with use of marijuana and enhancers (both cocaine and stimulants), whereas coping motives were associated with use of dampeners (both barbiturates and tranquilizers). Social motives, on the other hand, were not predictive of drug use independent of coping and enhancement motives.

Collectively, these data suggest that individuals who drink primarily to enhance positive affect are likely to drink more heavily than those who drink to regulate negative affect, despite the fact that they appear less likely to report problems indicative of serious or prolonged abusive drinking. They are more likely to drink in convivial settings, particularly with same-sex friends, and they appear more likely to use drugs that promote euphoric feelings than to use drugs that tranquilize or sedate dysphoric feelings. In contrast, social motives appear to be more normative, as indicated by higher mean levels of endorsement across all race and gender groups. Moreover, although they are related to increased alcohol consumption, social motives are not related to drug use or to problematic alcohol use, as has been previously reported (e.g., Polich & Orvis, 1979).

Analysis of drinking motive effects across gender and racial groups suggests that the effects of social motives but not coping and enhancement motives were invariant across race and gender groups. Coping motives were consistently more strongly related to drug use and to alcohol-related problems among Blacks, whereas enhancement motives were more strongly related to these outcomes among Whites. These findings coupled with a small but significant mean difference in coping motives suggest that coping motives may be both more common among Blacks and a more potent etiologic factor in accounting for problematic alcohol and drug use. Conversely, enhancement-motivated drinking, though not necessarily more common, may be a more potent causal factor among Whites. Caution must be exercised, however, in interpreting these differential relationships because of the generally small magnitude of these differences and the lack of complete factor loading invariance across racial groups.

The key finding that enhancement motives relative to coping motives were more strongly associated with heavy drinking yet less strongly associated with symptomatic or abusive drinking appears paradoxical. One plausible interpretation of these differences is that individuals who drink to cope with negative emotions are less capable of exercising volitional control over their drinking than are individuals who drink to enhance positive emotions. This analysis is consistent with evidence from a number of laboratory studies suggesting that the experience of negative emotions has stronger motivational consequences than does the experience of positive or neutral ones (see Carver & Scheier, 1990, and Srull & Wyer, 1986, for supporting evidence). Hypothetically, then, individuals who rely on alcohol to cope with negative emotions may become more psychologically dependent on alcohol, requiring alcohol to cope with the negative emotions generated by a wide range of inescapable frustrations encountered in daily life. Because of this dependence,

they may be more likely to drink in inauspicious circumstances or situations and to continue to drink despite the occurrence of problems related to their alcohol use. In contrast, individuals who use alcohol to enhance positive emotions may retain greater personal control over their drinking, deciding when and under what circumstances it is appropriate to drink, especially to drink heavily.

Further, it seems likely that individuals who use alcohol to regulate negative emotions, by virtue of their propensity to drink alone, are subject to fewer external social-normative constraints on their drinking. In the absence of pressures to conform to appropriate norms for drinking, individuals who drink to cope may engage in more deviant or self-destructive patterns of alcohol use than they otherwise would if given feedback regarding their behavior. Thus, individuals who drink primarily to cope with negative emotions may suffer disproportionately more severe consequences as a result of the relative lack of both internal and external controls over their drinking.

More research will be required to test these ideas. For the present, however, our data support the commonsensible notion that drinking occurs to enhance positive feelings and experiences as well as to relieve stress or be sociable. More generally, these data lend credence to a motivational perspective on alcohol use and underscore the utility of this perspective for understanding the patterns and consequences of alcohol use in the general population.

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