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Validation of a Nine-Dimensional Measure of Drinking Motives for Use in Clinical Applications: The Desired Effects of Drinking Scale

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Abstract

The Desired Effects of Drinking (DEOD) is a 36-item, 9-subscale, self-report measure assessing reasons for drinking, concerning three general motives for alcohol use: Coping, Social, and Enhancement. These subscales include Negative Feelings, Self-esteem, Relief, Positive Feelings, Social Facilitation, Assertion, Drug Effects, Sexual Enhancement, and Mental effects. As part of the COMBINE study, scores from the nine DEOD subscales, along with additional information about alcohol consumption and consequences, were incorporated into personalized client feedback as part of a motivational enhancement intervention and as a guide for the development of a plan for treatment and change. With responses from a clinical sample of 572 individuals seeking alcohol treatment, the 9-subscale structure of the instrument was substantiated through a second-order confirmatory factor analysis, revealing moderately large to large factor loadings and good indices of model fit. A third-order factor analysis indicated these nine subscales adequately represented the three drinking motives. It is suggested these three general motives for alcohol use, which may be more distinctly delineated into the nine dimensions reflected in the DEOD structure, can be used clinically to help plan appropriate interventions and facilitate behavior change.

Keywords

drinking motives; confirmatory factor analysis; concurrent validity; predictive validity

The functional significance of drinking, especially in the face of sometimes catastrophic consequences, has long been the subject of intensive scrutiny (e.g., Mulford & Miller, 1960; Riley et al., 1948). In one of the earliest studies of drinking motivations, which refers to drinking alcohol to achieve a valued end and which differs from alcohol-related expectancies (e.g., beliefs regarding the effects of alcohol) (Agrawal, et al., 2008), Riley and colleagues (1948) interviewed over two thousand individuals and asked them why they

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drank alcohol. They found the reasons clustered around social and “individual” motives and that frequent drinkers (i.e., daily drinkers) were much more apt to drink for individual than for social reasons. A variety of other terms for individual reasons for drinking have been coined over the years, including coping, immature, escape, or pathological reasons, and the basic results by Riley et al. (1948) have been replicated repeatedly (Beckman, 1980; Cahalan & Cisin, 1969; Engels et al., 2005; Farber et al., 1980; Glynn et al., 1983; Hessebrock et al., 1987; Jung, 1977; Mulford & Miller, 1960; Smith et al., 1993). Virtually all of the research in this area has found that people who drink for personal reasons consume more alcohol, have more alcohol-related problems, and are at greater risk for developing alcohol use disorders than people who drink primarily for socially oriented reasons (Carpenter & Hasin, 1998; Kassel et al., 2000; Prescott et al., 2004; Woldt & Bradley, 2002).

Until recently, most of the research in this area has either assumed or empirically demonstrated (see Farber et al., 1980) that reasons for drinking reliably fall into the two broad categories of motives: (1) coping motives associated with attempts to reduce or avoid negative emotional states, and (2) social motives that allow affiliations with others. More current work, however, has begun to explore whether there might be a third general category of important motivations for drinking revolving around drinking to increase or maintain positive mood states (Cooper et al., 1992; Stewart et al., 1996), although some research indicates enhancement motives and social motives overlap considerably in some populations, such as college student drinkers (Read et al., 2003). Other research using more comprehensive sets of reasons for drinking suggests that there may actually be more than three important categories of drinking motivations (see Kuntsche et al., 2005 for a review; MacLean, & Lecci, 2000; Simpson et al., 1996; Zywiak et al., 1996).

These recent developments in the motivation for drinking literature suggest there is ample room for growth and refinement. Most of the studies of drinking motivations have relied on very limited item pools and most of the psychometric work has been done on samples of college students and not on community or clinical samples (Cronin, 1997; Engels et al., 2005; Grant et al., 2007; Ham et al., 2007; Kairouz et al., 2002; MacLean & Lecci, 2000; Martens et al., 2008; O'Connor & Colder, 2005; Read et al., 2003; Stewart et al., 1996). In addition, the measures typically ask whether a given reason is or is not a motive for the individual to drink (i.e., scored dichotomously without a specific timeframe). Thus one important gap in the literature is information on recent reasons for drinking among alcohol dependent individuals seeking treatment. This is particularly important in light of evidence that relapse is more likely to occur when individuals have many reasons for drinking and few applicable alternative coping skills (Zywiak et al., 1996). A tool that helps clinicians and clients identify the functions alcohol has been serving for the individual would help clarify the specific coping deficits that need to be addressed to better insure resilience in the face of inevitable life stressors (see Donovan, 2003; Galen et al., 2001).

Recently the Desired Effects of Drinking (DEOD) scale (Simpson et al., 1996) has been used in such a clinical application (Miller, 2004). The DEOD represents a comprehensive measure to assess reasons for drinking anchored in a recent timeframe and allows the individual to indicate how frequently they drank for a specific reason (Simpson et al., 1996). The initial developmental version of the measure consisted of 107 items culled from over 200 items identified through a fairly exhaustive search of the literature (e.g., Horn et al., 1987; Petchers & Singer, 1987; Toscova et al., 1990). The original item set was subjected to basic psychometric analyses with a sample of college student drinkers and nine subscales were reliably identified (Simpson et al., 1996). Most of the subscales were found to have adequate internal reliabilities both with the college student sample and with subsequent clinical samples (Simpson, 2003). The measure was further refined through preliminary

exploratory factor analysis with a clinical sample of clients seeking alcohol treatment and a very similar factor structure was identified. The four most representative items for each of nine factors were retained, resulting in the 36-item Desired Effects of Drinking (DEOD) measure.

The DEOD was subsequently administered to 74% of the clients randomized to the Combined Behavioral Intervention (CBI; Miller, 2004; Longabaugh et al, 2005) groups in the COMBINE study, a multisite clinical trial evaluating combinations of pharmacotherapies and behavioral interventions of differing intensities (Anton et al., 2006). The measure was included in a battery of measures given during the first session for outpatient clients receiving CBI. Scores from the nine DEOD subscales, along with additional information about alcohol consumption and consequences, were incorporated into a personalized client feedback form that was used to provide a functional analysis of drinking, as part of the motivational enhancement component of CBI, and as a guide to developing a plan for treatment and change (Miller, 2004).

The inclusion of the DEOD in the COMBINE study represents an opportunity for further evaluation and refinement of the DEOD in a clinical sample of individuals seeking outpatient alcohol treatment. Confirmatory factor analysis was used to evaluate whether the nine original subscales were adequately represented by the data. In addition, the DEOD's concurrent validity with various measures collected at baseline of the COMBINE study and its predictive validity with respect to post-treatment measures of craving and drinking were also examined.

Method

Sample

Subjects included in the present analyses represent a subset of those involved in the COMBINE study (2003a, 2003b; Anton et al., 2006), a federally funded multi-site randomized controlled clinical trial comparing two medications (acamprosate and naltrexone) on their effectiveness in the reduction of alcohol intake and the prevention of relapse drinking. The overall COMBINE sample consisted of 1,383 adult participants who met the American Psychiatric Association's Diagnostic and Statistical Manual Fourth Edition (DSM-IV) criteria for alcohol dependence based on the Structured Clinical Interview for DSM-IV (First et al., 1995).

Subjects who acknowledged a desire to stop drinking were recruited by advertisements and from inpatient and outpatient clinical referrals at 11 participating study sites. Key inclusion criteria for entry into the COMBINE study were drinking a minimum of 14 drinks (females) or 21 drinks (males) on average per week over a 30-day period in the 90 days prior to the baseline screening; 2 or more heavy drinking days (4 drinks for females and 5 drinks for males) within 90 days prior to baseline screening; a zero breath alcohol level prior to signing the consent form or completing the baseline measures; abstinence of 4 consecutive days prior to randomization and absence of measurable alcohol withdrawal (i.e., scores < 8 on the revised Clinical Institute Withdrawal Assessment for Alcohol scale (CIWA-AR; Sullivan et al., 1989)) prior to randomization; and, the ability to speak and understand English

Exclusion criteria were current DSM-IV criteria for bipolar disorder, schizophrenia, or any other psychiatric disorder requiring medication; opioid dependence or abuse within 6 months prior to baseline; a current diagnosis of dependence on any drug except cannabis or nicotine; more than 7 days of inpatient treatment for a substance use disorder in the 30 days prior to randomization; planned participation in any pre-occurring alcohol treatment during the treatment phase of the study; or abstinence from alcohol for more than 21 consecutive

days prior to randomization. Participants also underwent a full physical exam, including blood and urine tests, to screen for pregnancy and significant medical disorders that would increase the potential risk of study treatment.

The DEOD was administered only to clients who were randomized to and received the Combined Behavioral Intervention (CBI), since it was used as a component part of the functional analysis and patient feedback procedures conducted clinically in CBI. The CBI integrated elements from the motivational enhancement, cognitive-behavioral, and twelve-step facilitation therapies from Project MATCH (Longabaugh et al., 2005). Results from the DEOD, collected during the first CBI session, were used to provide an individualized profile of important coping-oriented functions of drinking reported by the participant. This profile was then used in the treatment planning phase so that CBI modules could be selected to address the specific areas likely to be problematic for the individual when sober. Data used in the validation analyses were collected at baseline prior to randomization in the COMBINE study.

Of the 1,383 overall respondents from the COMBINE study, 776 received CBI; of those, DEOD data were available from 606 participants (not all 11 COMBINE study sites contributed data for this ancillary study) and 572 of these subjects had responses on all 36 items of the DEOD used in the analyses. Thus, 74% of those receiving CBI were included in the present psychometric analyses. This sample was 70.8% male, had a mean age of 44.5 (SD = 10.2), and a mean education of 14.5 years (SD = 2.7). The majority were non-Hispanic white (74.0%), with 13.4% Hispanic, 7.5% African American, and 5.1% either American Indian, Asian, multi-racial or of other ethnicity; 43.7% married or cohabiting, 27.1% single, 27.1% separated or divorced; and, 70.0% were currently working full or part time. Total annual incomes exceeded \$60,000 for 40.8%, were between \$30,000 and \$59,999 for another 32.3%, and 26.9% had annual incomes less than \$30,000. Over three-quarters of the sample (81.4%) had physiological dependence of alcohol as measured by the Structured Clinical Interview for DSM-III-R (SCID; Spritzer et al., 1992), 19.8% had previously been diagnosed with a mood disorder, and 8.5% had been diagnosed with OCD, severe anxiety, panic attacks or PTSD. Additionally, 49.2% of the sample reported having had some previous involvement in treatment for their alcohol problems.

Characteristics of participants with and without DEOD responses were compared to assess any differences that might affect the outcome and generalizability. Results indicated there was no difference in the proportions of males and females ($\chi^2(1) = 1.46, p = .23$), ethnicity ($\chi^2(6) = 7.0, p = .32$), marital status ($\chi^2(6) = 7.64, p = .27$), in employment ($\chi^2(6) = 5.68, p = .46$), annual income ($\chi^2(4) = 4.74, p = .31$), or age ($t(1381) = -0.04, p = .68$). Additionally, there was no difference in the proportions diagnosed with physiological dependence ($\chi^2(1) = .16, p = .68$), mood disorder ($\chi^2(1) = .46, p = .50$), or those diagnosed with OCD, severe anxiety, panic attacks or PTSD ($\chi^2(1) = .80, p = .37$). Nearly identical proportions of participants without (49.3%) and those with DEOD responses (49.2%) reported having had some previous involvement in treatment for alcohol problems.

Measures

Desired Effects of Drinking—The DEOD is a 36-item, self-report psychometric instrument with items requiring the respondent to indicate how frequently in the past 3 months they had consumed alcohol to achieve 36 different effects of drinking. Each item is rated on a 4-point Likert scale (0 = never, 1 = sometimes, 2 = frequently, 3 = always), with 4 items comprising each of 9 different subscales: Negative Feelings, Self-esteem, Relief, Positive Feelings, Social Facilitation, Assertion, Drug Effects, Sexual Enhancement, and Mental Effects.

Drinker Inventory of Consequences (DrInC; Miller et al., 1995)—The DrInC is a 50-item scale for participants to rate consequent events that drinkers sometimes experience. Items are rated on a 4-point Likert scale, ranging from 0 (never) to 3 (almost daily). There are 5 subscales (Impulsive Actions, Intrapersonal, Physical Consequences, Relationship Consequences, and Social Responsibilities) and a total Drinking Consequences score, which was used in this study.

Alcohol Dependence Scale (ADS; Skinner & Allen, 1982; Skinner & Horn, 1984)—The ADS is a 25-item, self-report measure designed to yield a continuous total score reflecting the degree to which alcohol dependence is present and its relative severity.

Perceived Stress Scale (PSS; Cohen et al., 1983)—The PSS is a brief, 4-item instrument for measuring the feelings and thoughts of stress during the preceding week. Each item is rated on a 5-point Likert scale ranging from 0 (never) to 4 (very often), yielding a total score of the participant's perception of stress.

Brief Symptom Inventory (BSI; Derogatis, 1993)—The BSI is a list of 53 problems people sometimes experience, such as nervousness, feeling lonely or difficulty falling asleep. Respondents were asked to rate on a 5-point Likert scale (0 = never to 4 = extremely) the number that best describes how much the problem has distressed or bothered them in the preceding week. The BSI yields a total score of Global Severity and 9 subscale scores (Anxiety, Depression, Hostility, Interpersonal Sensitivity, Obsessive-compulsive, Paranoid Ideation, Phobic Anxiety, Psychoticism, and Somaticization). The normalized T-score of the BSI Global Severity Index was used in this study.

Form 90 (Miller, 1996; Miller & Del Boca, 1994)—In addition to these measures of alcohol involvement, a measure of the total number of drinks consumed referenced to the most recent 30 days of drinking out of the 90 day pre-baseline assessment window was derived from the Form 90, a calendar-based retrospective interview procedure that provides reliable estimates of a number of alcohol consumption parameters (Tonigan et al., 1997).

Obsessive Compulsive Drinking Scale (OCDS; Anton et al., 1995)—The OCDS is a 14-item questionnaire for characterizing and quantifying the obsessive and compulsive cognitive aspects of craving and heavy (alcoholic) drinking, such as drinking-related thoughts, urges to drink, and the ability to resist these thoughts and urges. The questionnaire inquires about drinking alcohol and attempts to control drinking in the preceding week, and each question is rated on a 5- or 6-point Likert scale, with response content specific to each question. The instrument yields a total OCDS score, and two subscales: Obsessive and Compulsive.

Data analytic procedures

To assess the factor structure of the DEOD, a second-order confirmatory factor analysis was conducted with the SAS software and the CALIS procedure (SAS, 2004). Due to nonnormality and problems with kurtosis of item-level distributions, an unweighted least squares (ULS) estimating procedure that allows for nonnormality and is asymptotically efficient (Browne, 1984) was used in the factor analysis. In addition, a third-order confirmatory factor analysis was conducted to demonstrate how well the nine DEOD subscales reflect the three dimensions of motives for drinking: Coping, Social, and Enhancement.

The overall fit of the models was assessed by values of the goodness-of-fit index (GFI), adjusted-goodness-of-fit index (AGFI), and the root-mean-square residual (RMSR). The

cutoff criteria for assessing model fit were based on the recommendations by Hu and Bentler (1999) and Marsh and Hau (1996): .90 for the GFI and AGFI, and .08 for the RMSR. The internal consistency reliability of each subscale and total DEOD was estimated with Cronbach's alpha coefficient (Cronbach, 1951). These particular indices of model fit were used due to the distributional characteristics of the data. That is, based on a 4-point Likert scale, the DEOD items deviated from normality, especially in terms of kurtosis, and alternative indices of model fit, such as the AIC, BIC, NFI, NNFI, because they are based on the χ^2 distribution and multivariate normality assumptions, would not provide correct assessment of model fit. Additionally, under ULS estimation, SAS only provides the GFI-based and RMR values, which have been used for decades in various version of the LISREL software (e.g., see Jöreskog & Sörbom, 1996 - 2001).

Concurrent validity of the scores calculated to reflect the 9 DEOD subscales, the 3 dimensions of motives for alcohol use and the total score was assessed by correlating these measures with the baseline responses to the DrInC, ADS, PSS, BSI, and total number of drinks consumed in the most recent 30-day pre-baseline period of drinking. We hypothesized that participants who reported greater desire to drink to achieve drug effects (i.e., Drug Effects subscale - get drunk or intoxicated, get over a hangover, to sleep, and to stop the shakes or tremors) would also report greater overall drinking consequences on the DrInC, greater alcohol dependence severity on the ADS, and greater number of drinks during the preceding 30 days as evidenced by significant correlations between these variables. In addition, we hypothesized that those who reported greater desire to drink for relief (Relief subscale), to abate negative feelings (Negative Feelings subscale), and to feel better about themselves (Self-Esteem subscale) would also report higher perceived stress on the PSS and greater overall psychiatric distress on the BSI. Exploratory analyses were also conducted with the other DEOD subscales to evaluate markers of alcohol involvement and psychiatric distress with which they are associated.

The validity of the DEOD total score for predicting future alcohol consumption and craving was assessed with a longitudinal linear regression model. Treatment effects (naltrexone or acamprosate medications, and placebo) and the baseline alcohol consumption or craving assessment were used as covariates in the model. Outcome measures for alcohol consumption included 4 post-treatment assessments from the FORM 90: the number of drinks per drinking day, percent days abstinent, percent heavy drinking days, and total number of drinks, each within a 4-week period. Craving was assessed by the OCDS Obsessive and Compulsive subscales. For each analysis, if the DEOD total score predicted future alcohol consumption or craving, a similar model was used to assess which DEOD subscales were contributing to this prediction.

Results

Descriptive indices of each of the 9 subscales and total DEOD scores are presented in Table 1. Possible scores range from 0 to 12 for each subscale, and from 0 to 108 for the total DEOD. With this sample, on average the consumption of alcohol was rated highest to achieve Positive Feelings (7.54) and Relief (6.08), and rated the lowest for Sexual Enhancement (1.95) and Assertion (1.72). Total DEOD scores ranged from 2 to 108, with a majority (75%) between the values of 19 and 54. Correlations among subscale scores range from low ($r = .22$ for Relief and Sexual Enhancement) to high ($r = .82$ for Negative Feelings and Self-esteem). Subscale score correlations with the total DEOD are moderate ($r = .57$, Sexual Enhancement) to high ($r = .85$, Negative Feelings), with an average subscale-total correlation of $r = .74$.

The results of the ULS second-order confirmatory measurement model and reliability estimates are presented in Table 2. The overall fit measures for this model are GFI = 0.95, AGFI = 0.94, and RMSR = 0.08, indicating a very good fit of the model to the data. The overall fit measures provide indices of overall match, but do not demonstrate how well the indicator variables (DEOD items) predict the subscale factors. This was assessed by values of the individual factor coefficients, which reflect the correlation between a factor and indicator variable. These values range from .41 to .90, with a mean of .72. The lowest values are for items representing the first-order factors (subscales) of Drug Effects (.41 to .59) and Positive Feelings (.51 to .66).

In addition to the coefficients of indicator variables to factors, these factors, which represent the 9 DEOD subscales, in turn have correlations with the second-order factor, or total DEOD, with coefficients ranging in value from .51 (Sexual Enhancement) to .98 (Negative Feelings), with an average of .82. Reliability estimates of internal consistency for each of the subscale scores are moderately good (.57, Drug Effects) to very good (.91, Sexual Enhancement), with a high (.94) overall reliability estimate for the total DEOD score. The correlations among the 9 first-order factors (subscales) are moderate ($r = .34$ for Social Facilitation and Sexual Enhancement) to high ($r = .87$ for Negative Feelings and Assertion), with an average $r = .61$ (see Table 3). In summary, the good fit of the model to the data and the factor coefficient values provide substantial support that the DEOD items adequately represent the assumed underlying factor structure. Additionally, the strong correlations of the subscale factors with the DEOD total factor substantiate calculation of a total score as appropriate.

The third-order confirmatory factor analysis (see Figure 1) indicated equally good fit of the model: GFI = .96, AGFI = .96, RMSR = .07. Factor loadings of the nine subscales with the three higher order dimensions of drinking motives are moderately high (.63) to very high (.99). The three underlying dimensions of drinking motives were highly related: Enhancement correlated .78 with Coping and .83 with Social motives; Coping correlated .65 with Social motives. Reliability estimates of the items representing the three dimensions of drinking motives are high: .85 for Enhancement, .91 for Coping, and .86 for Social reinforcement.

The results of the concurrent validity assessment are presented in Table 4 as correlations of the 9 DEOD subscales, the three dimensions of drinking motives, and the DEOD total score with the 2 measures of alcohol involvement, 2 measures of psychological stress or problems, and the participant's report of the total number of drinks in the past month. Although the majority of these values are statistically significant ($p < .05$), the level of association is generally low, ranging from .04 to .42. The lowest correlations were found with the DEOD Sexual Enhancement subscale and the 5 measures, with values ranging from .02 to .11. Reliability estimates of these measures were moderate to high: DrInC (.92), ADS (.85), PSS (.74), BSI (.96), OCDS Obsessive (.83) and OCDS Compulsive (.76).

In all models assessing the predictive validity of the DEOD total score and subscales scores on alcohol consumption and craving, statistical significance was due to the main effect only. That is, the DEOD total score interaction with the time effect was not statistically significant with any model.

Results of the predictive validity assessment indicated the DEOD total score significantly predicted 2 post-treatment alcohol consumption assessments: drinks per drinking day ($F_{1,441} = 9.20, p = .0026$) and percent days abstinent ($F_{1,559} = 12.64, p = .0004$). The DEOD total score did not significantly predict percent heavy drinking days ($F_{1,559} = 1.00, p = .3178$) and total number of drinks ($F_{1,562} = 0.33, p = .5679$). The DEOD subscales of Negative Feelings ($F_{1,441} = 8.64, p = .0035$), Positive Feelings ($F_{1,441} = 13.27, p = .0003$), and Drug Effects

($F_{1,441} = 14.56$, $p = .0002$) contributed to the prediction of drinks per drinking day. Negative Feelings ($F_{1,559} = 8.92$, $p = .0029$), Self-esteem ($F_{1,559} = 7.13$, $p = .0078$), Social Facilitation ($F_{1,559} = 10.69$, $p = .0011$), Assertion ($F_{1,559} = 13.96$, $p = .0002$), Sexual Enhancement ($F_{1,559} = 8.03$, $p = .0048$), and Mental ($F_{1,559} = 12.94$, $p = .0003$) each resulted in a significant prediction model for percent days abstinent.

Predictive validity of the DEOD total score and craving as measured by the OCDS indicated a statistically significant effect for the Obsessive subscale ($F_{1,551} = 8.57$, $p = .0036$) but not for Compulsive ($F_{1,551} = 0.22$, $p = .6355$). Specific DEOD subscales that significantly predicted future obsessive behavior as measured by the OCDS Obsessive subscale included Negative Feelings ($F_{1,551} = 15.25$, $p = .0001$), Self-esteem ($F_{1,551} = 12.61$, $p = .0004$), Relief ($F_{1,551} = 13.86$, $p = .0002$), and Drug Effects ($F_{1,551} = 12.39$, $p = .0005$).

Discussion

In this study, the second-order confirmatory factor analysis supported a nine-factor model and the coefficient values of each subscale factor with a single higher-order factor reinforces the scoring of a total score as originally conceptualized. Reliability estimates were moderately good to high in value. Although two subscales (Drug Effects and Positive Feelings) did not meet a frequently used general rule-of-thumb for the reliability of a psychometric instrument being a value of .70 or higher, it is important to note that all subscales are comprised of only 4 items and reliability estimates of .57 and .67 for these two subscales, respectively, may not be unacceptable values. The nine subscales in turn provide support for the three higher-order dimensions of Coping, Enhancement, and Social motives for alcohol use; all three of which provided high internal consistency reliability estimates.

Concurrent validity correlations are low to moderate in value. However, the pattern of correlations supports the content validity of a number of the DEOD subscales. Consistent with the hypotheses, the Drug Effects subscale, which measures factors such as the desire to get drunk, to get over a hangover, to sleep, and to stop the shakes or tremors, had the highest correlations of any subscale with negative drinking-related consequences on the DrInC ($r = .37$), severity of alcohol dependence on the ADS ($r = .42$), and with number of drinks consumed on the Form 90 ($r = .25$). Similarly, as hypothesized, the subscales that reflect a greater desire to drink for relief, to abate negative feelings, and to feel better about oneself had the highest overall associations with perceived stress and with overall psychiatric distress. These subscales also had high associations with negative drinking-related consequences. It is of note that these four subscales (Drug Effects, Relief, Negative Feelings, and Self-esteem) were found to define the underlying dimension of the Coping motive in the third-order confirmatory factor analysis. And, consistent with the validity analyses at the individual subscale level, the Coping motive factor was found to have the highest overall correlations with the measures of negative consequences, severity of dependence, alcohol consumption, perceived stress, and psychiatric symptomatology when compared to the Enhancement and Social reinforcement drinking motive factors.

The DEOD appears to be predictive of subsequent craving and aspects of drinking, regardless of which of the COMBINE treatments participants received. The overall DEOD total score was associated with post-treatment obsession with drinking as measured by the OCDS, suggesting that having more desired effects of drinking predicted a greater frequency and intensity of preoccupation with, thoughts about, and drive to consume alcohol. The pattern of the associations between the DEOD and drinking outcomes appeared initially to be somewhat inconsistent. Higher scores on the DEOD were positively related to both higher percent days of abstinence and to a larger number of drinks consumed on a drinking

day. This, however, may suggest that for individuals who have gone through treatment, having stronger baseline levels of desired effects of drinking may actually serve a relapse preventive function, thus increasing the amount of time abstaining from alcohol, but that if a slip does occur it is associated with an increased level of consumption.

To successfully treat excessive drinking, it is necessary to understand the antecedents and etiology of drinking behavior. In this regard, delineating the motivation for engaging in drinking is an important aspect of this endeavor. Theorists regard drinking motives as the final common pathway to alcohol use (Cooper, 1994; Cox & Klinger, 1988.) However, there appears to be a transition in the nature of drinking motives as one moves from adolescents and young adults, who may be predisposed toward alcohol problems, to older individuals who are alcohol dependent and seeking treatment. Initial drinking motives appear to be relatively general and undifferentiated and become more refined and gender-specific across time (Kuntsche et al., 2006). Further, Kuntsche et al. (2005) found that social motives were the most common reasons for drinking among young people; while coping motives were the least commonly endorsed, such motives were the most likely to be associated with heavy drinking and alcohol-related problems. In the present sample of alcohol dependent individuals seeking outpatient treatment, coping motives remain most highly associated with alcohol consumption and negative consequences but are now the most commonly and highly endorsed motives. In contrast to the findings with non-dependent, younger drinkers, social and enhancement motives are less prominent.

It appears that results from studies of drinking motives as etiological factors among adolescents and young adults, where most research has been conducted, may not generalize or be directly applicable to dependent drinkers in treatment. The present results suggest that the DEOD can serve this latter function. As employed in the COMBINE study, results from the DEOD were used as part of a behavioral analysis of drinking behavior and as part of client feedback in the motivational enhancement and treatment planning phases of the Combined Behavioral Intervention. Not only can clients be provided information about their global drinking motives (Coping, Enhancement, and Social reinforcement), they can also be given feedback about the specific elements within each of the nine DEOD subscales. This information, along with other aspects of drinking behavior, alcohol-related problems, and psychosocial stress can provide the basis for developing change plans (Donovan, 2003; Longabaugh et al., 2005). Consistent with the suggestions of Cox et al. (2007) that both cognitive and motivational factors are associated with drinking and must be taken into account in its subsequent reduction, individuals' drinking motives, as assessed by the DEOD, played a prominent roll in the cognitive-behavioral and motivational components of the COMBINE study's CBI.

The present study has a number of potential limitations, in large part related to its being bound by the design and assessment time frames of the parent COMBINE study. Two aspects of this are of note. First, the timing of the assessment of the DEOD and the other measures used in the analyses differed, with the DEOD being assessed at the first CBI session while the other measures were administered at baseline. Although the time between these two points was typically short, it might have contributed to slightly different perspectives and responses to the assessment instruments. Second, the timeframes of the assessment windows used in the instruments also differed. As an example, the ADS asks about the past 12 months, while the DEOD asks about the past 3 months and the PSS and BSI ask about stress and mood states in the prior week. The differences in the timeframes across these assessment windows may have contributed to the relatively low correlations across measures. A factor that might also have contributed to the lower correlations, although not a limitation of the study, is the role drinking motives play in relationship to drinking behavior and problems. It appears, at least in nonclinical samples, that such

motives may exert a stronger indirect than direct influence on drinking behavior, primarily as mediators between certain individual mood states such as anxiety or depression and alcohol consumption (e.g., Ham et al., 2009), but with stronger direct effects on alcohol-related problems (Carey & Cirreia, 1997). Martens and colleagues (Martens et al., 2008) also found that both negative affect and coping drinking motives moderated the relationship between alcohol use and alcohol-related problems. The strongest relationship between alcohol use and alcohol-related problems existed for individuals high in both negative affect and coping drinking motives. Such findings suggest the importance of targeting coping drinking motives and building coping skills, which is the role played by the DEOD in the context of the Combined Behavioral Intervention in the COMBINE study.

Our results suggest the DEOD is a psychometrically sound instrument for assessing drinking motives in a clinical sample of individuals seeking alcohol treatment. The results also indicate that individuals tend to drink for three general motives: coping to reduce or control negative affect, enhancement to increase positive affect and to socialize with others, and that the relative salience of these motives differs from that found in previous research with adolescents, college students, and young adults. These three general motives for alcohol use can be more distinctly delineated into the nine dimensions reflected in the DEOD structure and can be used clinically to help plan appropriate interventions and facilitate behavior change.

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Research Highlights

- The Desired Effects of Drinking (DEOD) is a 36-item, 9-subscale, self-report measure assessing reasons for drinking, concerning three general motives for alcohol use: Coping, Social, and Enhancement.
- These 9 subscales include Negative Feelings, Self-esteem, Relief, Positive Feelings, Social Facilitation, Assertion, Drug Effects, Sexual Enhancement, and Mental effects.
- As part of the COMBINE study, scores from the nine DEOD subscales, along with additional information about alcohol consumption and consequences, were incorporated into personalized client feedback as part of a motivational enhancement intervention and as a guide for the development of a plan for treatment and change.
- With responses from a clinical sample of 572 individuals seeking alcohol treatment, the 9-subscale structure of the instrument was substantiated through a second-order confirmatory factor analysis, revealing moderately large to large factor loadings and good indices of model fit.

Figure 1.
Results of Third-Order Confirmatory Measurement Model of the DEOD

Table 1

Descriptive Indices of the DEOD 9 Subscales and Total Score.

Subscales	Mean	SD
Negative Feelings (NF)	3.51	2.65
Self-esteem (SE)	3.97	3.03
Relief (R)	6.08	3.12
Positive Feelings (PF)	7.54	2.45
Social Facilitation (SF)	5.33	2.94
Assertion (A)	1.72	2.26
Drug Effects (DE)	4.01	2.52
Sexual Enhancement (S)	1.95	2.50
Mental (M)	2.32	2.51
Total DEOD	36.43	17.43

Correlations*								
	NF	SE	R	PF	SF	A	DE	S
SE	.82							
R	.78	.71						
PF	.48	.40	.51					
SF	.42	.38	.36	.61				
A	.64	.60	.49	.42	.49			
DE	.49	.45	.43	.41	.32	.45		
S	.32	.28	.22	.31	.46	.52	.26	
M	.51	.53	.38	.41	.45	.61	.43	.44
Total	.85	.81	.76	.69	.69	.79	.64	.57

* All p-values < .0001.

Table 2

Second-order Confirmatory Measurement Model Results – Factor Coefficients and Reliability Estimates (in parentheses).

<i>Item</i>	<i>Scale</i>	<i>Description</i>	95% CI	
9	Negative	Feel less depressed	.67	.60, .74
18	Feelings	Control my anger	.60	.53, .68
27	(.76)	Feel less shame	.69	.62, .76
36		Reduce fears	.73	.66, .80
10	Self-Esteem	Feel less disappointed in myself	.75	.69, .82
19	(.86)	Feel less angry with myself	.76	.69, .82
28		Feel more satisfied with myself	.79	.72, .85
37		Feel less guilty	.81	.75, .88
4	Relief	Relieve pressure or tension	.64	.58, .71
13	(.84)	Avoid thoughts/feelings associated with bad	.79	.72, .86
22		experiences	.78	.71, .84
31		Control painful memories of a bad experiences	.81	.75, .88
		Forget about problems		
3	Positive	Change my mood	.66	.60, .72
12	Feelings	Feel good	.62	.54, .69
21	(.67)	Celebrate	.53	.46, .61
30		To relax	.51	.44, .59
5	Social	Be sociable	.65	.64, .72
14	Facilitation	Feel more comfortable in social situations	.83	.77, .89
23	(.82)	Be able to meet people	.82	.76, .88
32		Have a good time	.61	.53, .68
7	Assertion	Feel more powerful	.74	.67, .81
16	(.78)	Feel brave and capable of fighting	.65	.58, .72
25		Be able to express anger	.65	.58, .72
34		Be able to find the courage to things that are risky	.73	.66, .80
6	Drug Effects	Get drunk or intoxicated	.41	.33, .49
15	(.57)	Get over a hangover	.59	.52, .66
24		To sleep	.52	.45, .60
33		Stop the shakes or tremors	.58	.50, .65
8	Sexual	Feel more romantic	.90	.84, .95
17	Enhancement	Be a better lover	.84	.78, .90
26	(.91)	Feel more sexually excited	.84	.78, .90
35		Enjoy sex more	.84	.78, .90
2	Mental	Feel more creative	.69	.60, .74
11	(.81)	Be more mentally alert	.76	.69, .83

<i>Item</i>	<i>Scale</i>	<i>Description</i>	95% CI	
20		Be able to think better	.77	.71, .80
29		Be able to work or concentrate	.78	.72, .85
<i>Subscales with DEOD Total</i>				
		Negative Feelings	.98	.96, 1.00
		Self-Esteem	.87	.81, .93
		Relief	.79	.72, .86
		Positive Feelings	.75	.69, .82
		Social Facilitation	.67	.60, .74
		Assertion	.88	.82, .94
		Drug Effects	.74	.67, .81
		Sexual Enhancement	.51	.43, .58
		Mental	.74	.68, .71

Indices of Model Fit: GFI = 0.95, AGFI = 0.94, RMSR = 0.08

Second-order Confirmatory Measurement Model Results - Correlations of Factors and (95% CI).

Table 3

First-order Factors (Subscales)							
	NF	SE	R	PF	SF	A	DE
SE	.85 (.83,.87)						
R	.77 (.73,.80)	.68 (.63,.72)					
PF	.74 (.70,.77)	.65 (.60,.69)	.59 (.53,.64)				
SF	.66 (.61,.70)	.58 (.52,.63)	.53 (.47,.59)	.51 (.45,.57)			
A	.87 (.85,.89)	.76 (.72,.79)	.69 (.64,.73)	.66 (.61,.70)	.59 (.53,.64)		
DE	.73 (.69,.77)	.64 (.59,.69)	.58 (.52,.63)	.56 (.50,.61)	.50 (.44,.56)	.65 (.60,.69)	
S	.50 (.44,.56)	.44 (.37,.50)	.40 (.33,.47)	.38 (.31,.45)	.34 (.27,.41)	.45 (.38,.51)	.37 (.30,.44)
M	.73 (.69,.77)	.64 (.59,.69)	.58 (.52,.63)	.56 (.50,.61)	.50 (.44,.56)	.65 (.60,.69)	.55 (.49,.60)
							.38 (.31,.45)

NF - Negative Feelings, SE – Self-esteem, R - Relief, PF - Positive Feelings, SF - Social Facilitation, A - Assertion, DE - Drug Effects, S - Sexual Enhancement, M - Mental

Table 4

Concurrent Validity of the DEOD.

<i>DEOD Subscales</i>	<i>Drinking Consequences</i>	<i>Total ADS</i>	<i>Perceived Stress Score</i>	<i>BSI Global Severity</i>	<i>Number of Drinks</i>
Negative Feelings (NF)	.35	.28	.23	.36	.10*
Self-esteem (SE)	.34	.24	.22	.33	.13**
Relief (R)	.31	.22	.22	.31	.07x
Positive Feelings (PF)	.18	.19	.10*	.18	.10*
Social Facilitation (SF)	.16***	.19	.04x	.15**	.10*
Assertion (A)	.29	.26	.14***	.20	.11**
Drug Effects (DE)	.37	.42	.12**	.29	.25
Sexual Enhancement (S)	.08x	.11*	.02x	.10x	.08*
Mental (M)	.22	.23	.11*	.19	.16***
<i>Motivation Dimensions</i>					
Enhancement	.29	.28	.14***	.23	.15***
Coping	.40	.33	.24	.38	.16***
Social Reinforcement	.14***	.18	.03x	.14***	.11**
Total DEOD	.36	.33	.19	.33	.17
Mean and (Standard Deviation)					
	47.74 (21.20)	16.69 (7.32)	5.63 (2.87)	60.68 (10.96)	269.48 (176.12)

Note: p-values are < .0001 for correlations in bold

x N.S.,

* < .05,

** < .01,

*** < .001.