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# Motivational factors and negative affectivity as predictors of alcohol craving



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## ABSTRACT

Craving is thought to play an important role in alcohol use disorders. The recent inclusion of “craving” as a formal diagnostic symptom calls for further investigation of this subjective phenomenon with multiple dimensions. Considering that alcohol-dependent patients compensate negative physical/emotional states with alcohol, the aim of this study is to investigate alcohol craving and its correlation with drinking measures and affective personality dimensions. A sample of 135 alcohol-dependent patients (104 males and 31 females) was collected from a clinical setting. Subjects self-rated their cravings (Penn Alcohol Craving Scale) and the stage of change. Several personality scales were also administered. Craving was related to drinking *status*, abstinence time, age, and taking steps. After controlling for these conditions, psychological characteristics related to low self-concept, neuroticism, cyclothymic affective temperament, depression, and hostility were found to be predictors of craving in sober alcohol-dependent patients. Our results support craving as a component of the phenomenology of alcohol dependence and highlight the presence of unpleasant feelings as predictors of craving in sober alcohol-dependent patients without co-occurring psychiatric conditions. The predisposition to experience negative emotions may induce a stronger craving response and increase the likelihood of a first drink and a subsequent loss of control.

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## 1. Introduction

During the past decades, there has been a progressive paradigm shift in the diagnosis of addiction, moving from withdrawal signs to loss of control over behavior and craving. Craving, defined as a strong desire/urge to use a specific substance (APA, 2013), is proposed to be a major factor in the maintenance of alcohol use disorders (AUDs) and possibly in relapse. The recent inclusion of “craving for substances” in DSM 5 as a new criterion (APA, 2013) has led to increased interest in using criteria that are subjective by nature, in experience and in clinical judgment.

Craving usually occurs during the first months of alcohol abstinence. Its frequency and intensity then tend to decrease, although complete disappearance is rare (Addolorato et al., 2005). Although patients' reactions to ethanol stimuli (cue reactivity paradigm of craving) in laboratory studies have been well documented (Kaplan et al., 1985), the understanding of craving in the clinical context remains controversial, particularly in terms of the

association between alcohol craving and the prospective relapse risk (Heinz et al., 2010). Although some studies support the contribution of craving to abstinence violation (O'Malley et al., 1992; Volpicelli et al., 1992; Bottlender and Soyka, 2004), others have often not found a positive correlation between subjective, or conscious, alcohol craving and relapse (Grüsser et al., 2004; Kiefer et al., 2005). One explanation for these mixed results may be that reactions such as conscious craving to alcohol and alcohol-associated cues differ with respect to different levels of description (subjective, motor, and physiological responses), even if these reactions manifest at the same time point after cue exposure (Heinz et al., 2010). Indeed, the measurement of craving has certain limitations (Tiffany and Wray, 2012), mostly with self-reports, because some alcohol-dependent patients deny their subjective inner experience or are simply not aware of it. Due to the habitual nature of long-term alcoholism, alcohol dependents may not always be highly aware of the precise nature of their cognitive experiences, which could be almost automatically self-regulating (Kavanagh et al., 2004). Tiffany (1990) suggests that craving only becomes conscious when the automatic process of alcohol consumption is really stopped.

Research has previously explored several variables related to craving. In general, the literature systematizes the biopsychosocial

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predictors of alcohol craving in two areas: factors associated with alcoholism severity and related psychopathology. A large body of research has reported the association between alcohol craving and alcohol intake, the severity of alcohol dependence, recurrent detoxifications, withdrawal symptoms, gender, nicotine dependence, anxiety, depression, and impulsivity (Malcolm et al., 2000; Hertling et al., 2005; Tavares et al., 2005; Yoon et al., 2006; Wroński et al., 2007; Boykoff et al., 2010; Chakravorty et al., 2010; Joos et al., 2013; Murphy et al., 2014; Pombo et al., 2014a). Nevertheless, these predictors resulted from a context of a heterogeneous drinking status of the samples. Some patients were assessed in periods before beginning outpatient medical detoxification, that is, when they were “actively drinking” (Malcolm et al., 2000; Yoon et al., 2006; Chakravorty et al., 2010), whereas others were only recruited when “sober” (Tavares et al., 2005; Joos et al., 2013). As current alcohol-related variables such as heavy drinking days, drinking days and alcohol intake have been shown to be related to craving (Malcolm et al., 2000; Yoon et al., 2006), we can assume variations in craving when patients were assessed in different patterns or periods of drinking. The aforementioned empirical evidence is in line the comprehensive motivational model of craving proposed by Breiner et al. (1999), in which craving is viewed as a component of the mental processes that influence drinking behavior. Craving is defined, at least in part, by the ambivalence associated with the decision-making process (cognitive conflict). Breiner et al. (1999) also argued that historical factors (e.g., sociocultural environment), expectancies (e.g., expected consequences), current factors (e.g., drinking pattern or withdrawal syndrome), motivations (e.g., struggling with the choice between drinking and not drinking), and other associations may promote the desire to consume alcohol.

Individuals may be motivated to drink because of differential sensitivities to the rewarding outcomes of alcohol (Wilkie and Stewart, 2005). Robinson and Berridge (1993) distinguished between hedonic or pleasant drug effects (“liking”) and the craving for such a positive effect (“wanting”). They suggested that the motivation to use alcohol (and drugs) is due to the over-attribution of incentive salience to alcohol and alcohol-related stimuli. According to this model (incentive sensitization theory), craving is defined as pathologically intense feelings of wanting, which can be produced when incentive salience (or core “wanting”) is translated into conscious awareness. Repeated alcohol use produces sensitization of the brain system, which leads to increased “wanting,” in turn leading to excessive control of an individual’s behavior by alcohol-related incentive stimuli. In that sense, alcohol addiction is described as an excessive “wanting” problem. Craving is managed by a sensitized neural system (mesocorticolimbic dopamine and related systems) that normally functions to attribute incentive salience to reward cues. Mesolimbic sensitization in alcohol-dependent patients gives rise to a state where alcohol and their related cues become increasingly “wanted” to the point where they are irrationally craved.

Other authors have argued that craving is an affective state that reflects the activation of motivational and drug-acquisitive systems that are associated with specific subjective, behavioral, physiological, and cognitive correlates (Sayette et al., 2003; Szasz et al., 2012). Koob and Volkow (2010) suggested a neural involvement of the emotional circuit in pathological craving. This is supported by evidence from the study by Lee et al. (2013), who identified the prefrontal lobe–inferior parietal lobe–limbic circuit as a neural substrate of emotion involvement in pathological alcohol craving. Thus, we posit that certain affective personality traits could interact with the way patients experience craving. This is further supplemented by evidence from laboratory and clinical studies linking alcohol craving, mood disturbances, and the risk of relapse (Cooney et al., 1997; Boykoff et al., 2010). It is commonly

recognized that alcohol-dependent patients are particularly vulnerable to resist the urge to drink in high-risk situations involving intrapsychic unpleasant emotions or interpersonal conflictivity (Brown et al., 1995; Breese et al., 2005), especially those diagnosed with a comorbid psychiatric disorder (Westerberg, 2000; Chakravorty et al., 2010). Indeed, comprehensive evaluations of relapse situations have demonstrated that negative situation triggers play a critical role in alcohol consumption (re)engagement. Drinkers may be more susceptible to consuming alcohol if they believe alcohol to be an efficient means of dealing with negative emotions and facilitating a more affirmative social behavior (Lowman et al., 1996; Pombo et al., 2014b). Although several studies have examined the effects of negative emotions on craving (Johnson and Fromme, 1994; Cooney et al., 1997; Zilberman et al., 2003; Castro et al., 2007; Connolly et al., 2013), few studies have investigated the role of affective components of personality in predicting craving. Temperament is commonly viewed as the deriving biological part of personality. Affective temperaments such as hyperthymic, irritable, anxious, cyclothymic, and depressive are proposed to represent prevailing mood states that could predispose individuals to psychiatric disorders, especially bipolar disorder (Akiskal and Akiskal, 2005). A growing body of evidence has linked specific affective temperamental traits to AUDs, namely cyclothymia, a temperamental disposition characterized by an erratic mood instability with biphasic shifts from an “up” phase to a “low” phase. In further studies, this temperamental trait has been suggested to play an important role in the early onset of AUDs (Vyssoki et al., 2011). Recently, a study designed to measure the impact of cyclothymia on the phenotypic expression of alcohol dependence (Pombo et al., 2013) pointed to the link between craving and the cyclothymia trait. However, given the preliminary nature of this result, additional analyses are needed.

Other temperamental traits often associated with vulnerability to alcohol abuse are also acknowledged to influence craving in alcohol-dependent patients, for instance, neuroticism and introversion (McCusker and Brown, 1991) and novelty seeking (Zilberman et al., 2003). According to Tavares et al. (2005), individuals with high novelty seeking may be particularly vulnerable to craving as they lack the ability to postpone gratification, especially under “unfavorable” emotional states. Recent evidence suggests that the level of an individual’s self-esteem could be important for the understanding of drug craving (Chen and Ye, 2013).

In summary, the prognostic potential of craving may be enhanced by identifying the conditions under which craving is more strongly associated with alcohol use (Tiffany and Wray, 2012). With “craving” being included as a diagnostic criterion in DSM 5 (APA, 2013), understanding craving during treatment has become imperative especially due to its association with relapse in the beginning of recovery. The present study was designed to determine whether drinking and personality-related variables are relevant predictors of craving in a clinical setting. Although several forms of predictors (biological, environmental, and psychological) may act together to evoke craving, we hypothesized that craving would be significantly associated with patients’ clinical status during treatment, specifically drinking behavior and motivation to change. Patients who tend to experience negative emotional states are expected to report higher levels of craving (due to sensitized internal mechanisms).

## 2. Methods

### 2.1. Participants and procedure

A correlational and comparative study was designed to assess the clinical and psychological covariates of alcohol craving. The

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