



# Appetitive and impulsive: Examining alcohol use via the motivational and self-control systems<sup>☆</sup>

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## ABSTRACT

This study examines how trait differences in the appetitive and defensive systems and how automatic, impulsive and deliberate, reflective responses to alcohol cues predict overall alcohol use. By utilizing a measure of trait motivational activation and measures of implicit and explicit attitudes toward alcohol that indicate the self-control system – impulsive vs. reflective – that determines behavior, this research demonstrates that higher trait appetitive system activity, ASA, and positive impulsive/implicit alcohol attitudes independently predict alcohol use, while trait defensive system activation, DSA, and explicit attitudes toward alcohol did not independently predict use.

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## 1. Introduction

In an effort to better understand individual differences in problematic substance use, research in social

psychology and substance use etiology offer a number of dual-process theories (Chaiken & Trope, 1999; Cox & Klinger, 1988; Epstein, 2013; Hofman, Friese, & Strack, 2009; Mukherjee, 2010; Petty & Cacioppo, 1986; Stacy, Newcomb, & Bentler, 1993; Wiers et al., 2007). A commonality among them is the distinction between two modes of information processing – one that relies on conscious, reflective processing and another that is characterized as preconscious, impulsive processing (Smith & DeCoster, 2000). Several dual-process approaches attempt to incorporate motivational or behavioral tendency components (Cox & Klinger, 2011; Hofman et al., 2009; Strack & Deutsch, 2004). However, many cognitive dual process models employed in substance use research do not fully address the role of the motivational systems in the cognitive processing of substance use cues. A distinct area of research explores how biologically based individual differences and their accompanying motivational system implications uniquely influence substance cue processing and substance use (Carver, 2006; Gray, 1981; Lang, Shin, & Lee, 2005; Zuckerman, 1994).

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The goal of this research is to better understand how the processing mode and response to alcohol cues – impulsive and quick or reflective and slow – and individual differences in motivational system activation – both appetitive and aversive – may independently or together predict variations in alcohol use in a college sample. This experiment measures impulsive responses to alcohol cues via an implicit attitude measure, reflective responses to alcohol via explicit attitude measure, and individual differences in motivational activation via the Motivational Activation Measure, MAM. The influence of these three individual differences on self-reported alcohol use is explored.

## 2. Background

### 2.1. Motivation

Two distinct motivational systems, one that supports seeking out that which is pleasurable and one which supports avoiding that which is harmful, have long been proposed as the underlying guides for human behavior (Cacioppo, Gardner, & Bernston, 1999; Elliot & Covington, 2001; James, 1890; Lang, Bradley, & Cuthbert, 1990). Past research investigates how both the appetitive, or approach, and aversive, or defensive, systems influence behavior and, specifically, substance use behavior. Some of this research examines individual differences in motivational system activation, while other research focuses on how these systems interact with individual goals, previous behavior, and characteristics. Other work investigates how individual traits related to, but distinct from motivational activation, influence substance use and dependence. Among the most studied of these are the sensation seeking personality trait (Zuckerman, 1994) and activation in the behavioral approach and inhibition systems (Carver, 2006; Gray, 1981).

Those examining how individual differences in approach and avoidance tendencies contribute to alcohol use often find that increased appetitive system reactivity is related to heavier alcohol use (Christiansen, Cole, Goudie, & Field, 2012; Kambouropoulos & Staiger, 2004). Some approaches suggest a more active appetitive system coupled with a somewhat underactive aversive system may increase substance use. For example, those with weaker punishment-avoidant tendencies and higher levels of behavioral disinhibition report heavier alcohol use than their more risk-averse counterparts (Cox & Blount, 1998; Finn, Kessler, & Hussong, 1994). In an update to the original reinforcement sensitivity theory, Gray and McNaughton (2003) propose different neurological underpinnings, but the importance of the behavioral inhibition system, BIS, remains intact. BIS is conceptualized to activate as a behavior guide when both the pure avoidance system, or the Fight-Flight-Freezing system, and pure approach system are activated (Gray & McNaughton, 2003). The behavioral approach system, BAS, activates in response to appetitive stimuli. Alcohol cues could be viewed as stimuli that elicit concurrent conflicting goals: Including feeling relaxed and positive after a small number of drinks, but wanting to avoid the consequences of drinking too much alcohol.

Theoretically, the BIS/BAS systems manage the relationship between motivational activation and behavior. They are implicated in substance use behaviors by numerous researchers. College students' substance use patterns, for example, are positively related to the BAS scale and negatively related to the BIS scale (Franken & Muris, 2006; Pardo, Aguilar, Molinuevo, & Torrubia, 2007). Likewise, sensation-seeking, believed to result from an overactive appetitive system and perhaps a weakly active avoidance system, is related to higher levels of substance use and addiction across populations (Stacey, Newcomb, & Bentler, 1993; Zuckerman, 1994).

Elliot and Thrash (2002; 2010) conceptualize approach and avoidance temperaments as basic personality dimensions. These personality dimensions are applicable across a wider range of biological structures and processes than BIS/BAS, but share the same motivational basis. Both temperaments are conceptualized as independent of one another and as general sensitivities toward valenced stimuli. Approach temperament is a predisposition toward positive or reward stimuli accompanied by a vigilance toward and affective reactivity, whereas avoidance temperament is a predisposition toward negative or punishment stimuli. Elliot and Thrash (2010) contend there are additional constructs related to basic personality, but argue that differences in approach and avoidance temperaments may underlie some of those constructs. Empirically, approach and avoidance temperaments are reliable over time and distinct from other personality and goal-related variables (Elliot & Thrash, 2002, 2010). Approach and avoidance temperaments are important constructs to a social cognitive approach to personality, but have not yet been fully explored as factors that predict or moderate substance use.

This study continues in these motivational approaches to personality traditions but uses a relatively new measure, the Motivation Activation Measure, or MAM (Lang & Yegiyen, 2011; Lang et al., 2005; Lang, Kurita, Rubenking, & Potter, 2011). MAM provides an indicator of individual differences in trait levels of motivational activation. While positive stimuli are believed to elicit appetitive system activation and negative stimuli are thought to elicit aversive system activation, the time course and degree of activation differs across individuals. MAM produces two variables, ASA, an indicator of the degree of activation in one's approach or appetitive system, and DSA, the degree of activation in one's defensive or aversive system. The measure is based on Lang's dimensional theory of emotion and Cacioppo's dual system motivation theory (Cacioppo & Gardner, 1999; Cacioppo et al., 1999; Lang et al., 1990). Both approach and avoidance temperaments and differences in ASA and DSA are viewed as biologically based traits that remain relatively stable across the lifespan. Motivational activation is measured via an indirect measure, the Motivational Activation Measure (Lang et al., 2005). MAM is a picture viewing and rating task that uses self-report emotional responses to stimuli which range across emotional space as indicators of the range of reactivity in the appetitive and aversive motivational systems.

This paper argues that motivationally relevant stimuli are attended to and processed differently as a function

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