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### **Motivational Models of Substance Use: A Review of Theory and Research on Motives for Using Alcohol, Marijuana, and Tobacco**

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The Oxford Handbook of Substance Use Disorders, Volume 1 (*Forthcoming*)

*Edited by Kenneth J. Sher*

Online Publication Date: Apr  
2015

Subject: Psychology, Clinical Psychology  
DOI: 10.1093/oxfordhb/9780199381678.013.017

#### **[−] Abstract and Keywords**

This chapter uses Cox and Klinger's motivational model of alcohol use as a framework for reviewing research on motives for using alcohol, marijuana, and tobacco. Results of this review provide strong support for key premises underpinning this model in the alcohol literature, including that people drink alcohol to manage internal feeling states and to obtain valued social outcomes. Importantly, these motives may provide a final common pathway to alcohol use through which the influences of more distal variables are mediated. The research literature on motives for marijuana use revealed important similarities in the nature of motives underlying use and in the unique patterns of use and use-related consequences associated with specific motives. Research on tobacco use motives showed few similarities, with tobacco use being more habitual, automatic, and largely motivated by withdrawal cues, at least among more experienced and dependent users.

Keywords: Drinking motives, alcohol use motives, marijuana use motives, tobacco use motives, personality, mood, situational cues

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#### **Introduction and Overview**

Why do people drink alcohol or use other substances? This question lies at the heart of the motivational perspective on substance use. The word "motivation" is derived from the Latin word *movere*, meaning "to move." Hence, it is based on the metaphor of motion and connotes movement toward the attainment of a desired end state (or goal) or away from an undesired one (Geen, 1995).

The question of what end states or goals motivate substance use has been a central focus of research in this area, along with the corollary that the nature of substance use behaviors themselves are shaped in unique and theoretically meaningful ways by the underlying needs and desires they serve. Indeed, a key assumption of the motivational perspective is that substance use behaviors motivated by different needs (e.g., to escape a negative mood or share a convivial experience with a friend) are psychologically distinct and, as a result, are driven by different underlying dispositions and need states, cued by unique situations or environmental circumstances, characterized by qualitatively different styles of behaving and feeling, and ultimately resulting in distinct consequences.

These notions are appealing for both theoretical and practical reasons. Theoretically, they imply that behavior motivated by different underlying needs is controlled and maintained by distinct etiological processes, either at the level of the person (e.g., among individuals who use a substance for a single, predominant reason) or within a person across time and situations. In this sense, the motivational perspective can be seen as a meta-theoretical "umbrella" under which multiple etiologic models of substance use are nested. From a pragmatic point of view, this perspective also raises the possibility of tailoring treatment and intervention efforts to the specific processes that underlie use for different users.

This chapter seeks to review both theory and research on substance use motives and is divided into three major sections: (1) an overview of relevant theoretical models, suppositions, and hypotheses; (2) a review of the literature organized around five premises underpinning the motivational approach; and (3) a summary of conceptual and methodological issues along with recommendations for addressing these concerns.

This review is selective in several important ways. First, as alluded to earlier, we focus on the subset of studies that bear directly on the validity of one or more of the key premises underpinning the motivational approach. Second, we focus primarily on motives for alcohol use. Although we also consider motives for marijuana and tobacco use, research on these substances is examined primarily in terms of similarities to and differences from alcohol use motives. Finally, this review focuses on explicit or self-attributed motives—that is, on people’s explanations for their own substance use behavior and on the consequences of those explanations.

### **Theoretical Background**

In this first section, we provide an overview of Cox and Klinger’s (1988; 1990; 2004) motivational model of alcohol use as it applies more broadly to a range of substances. We then discuss the nature of specific substance use motives and the major dimensions thought to underlie and give rise to these motives. We conclude this section by identifying five key premises that we believe underpin and define the motivational approach.

### **Cox and Klinger’s Incentive Motivation Model**

Cox and Klinger (1988; 1990; 2004) proposed what has become the most widely known and influential motivational model of alcohol use. Although it was initially developed to explain alcohol use, we believe that it is sufficiently general to provide a useful framework for understanding motivations for use of diverse substances, and this chapter examines the plausibility of that supposition.

Cox and Klinger argue that people’s lives are organized around the pursuit and enjoyment of incentives, defined as the joint operation of a need within the person and a condition in the environment with the potential to satisfy that need (Geen, 1995). According to Cox and Klinger, a person’s motivation to use a substance can be seen as a complex product of the incentives he or she associates with using that substance, along with incentives available in other life arenas. A person thus decides to use a substance as a function of anticipated positive affective consequences and whether these are thought to outweigh those of not consuming the substance. In short, expected affective changes—increases in positive feelings or decreases in negative ones—are thought to drive decisions regarding substance use in a more or less rational manner.

Building on these ideas, Cox and Klinger (1988) proposed a model in which the decision to use a substance is embedded in the context of one’s life and experiences. They identify a range of factors thought to shape an individual’s expectations regarding the effects of using a substance, including a complex of historical and background factors such as biochemical reactivity to alcohol, personality characteristics, and the sociocultural context. Current incentives that represent either more or less attractive options than substance use also shape an individual’s expectations, along with situational factors, defined as the immediate context in which a person is located when the decision is made to use a substance. Such factors include the physical setting (e.g., being in a bar or at home), availability of the substance, whether alone or with people, and if with people, the extent to which these individuals support and encourage versus disapprove of and discourage the use of a particular substance.

Current promoting and inhibiting factors along with the totality of one’s reinforcement history are represented and processed internally, leading to a set of cognitive expectancies or beliefs about the effects of consuming a particular substance. Expectancies concern both the immediate and long-term effects of substance use, as well as direct (pharmacological) and indirect (instrumental, mostly social) effects. Indirect or instrumental effects refer to expectations that drinking or using a substance will facilitate (or interfere) with the enjoyment of nonchemical, positive incentives (e.g., bonding with a friend) or with nonchemical, negative incentives (e.g., avoiding social disapproval). Thus, one generally holds a complex set of expectancies regarding both the positive and negative pharmacological and nonpharmacological (mostly social) effects of using a given substance, and it is the balance of these expectations that tips the decision toward or away from substance use.

Finally, Cox and Klinger contend that the decision to use is just that—a decision. Although neither entirely rational

nor entirely conscious, substance use decisions involve both rational and emotional components (e.g., Loewenstein, Weber, Hsee, & Welch, 2001) and may occur more or less outside of awareness for different people, at different times, or for different substances. To sum up, Cox and Klinger contend that substance use can be usefully understood as a strategic behavior in which people choose to use a substance based on the anticipated affective changes produced by using the substance relative to those produced by alternative behaviors.

### **A Theoretical Typology of Motives**

Although motivational theorists typically posit a circumscribed set of basic motives or needs that energize, direct, and select human behavior, no consensus exists on the exact nature and number of these motives. Nevertheless, two distinctions are common across a wide array of motivational theories and, according to Cox and Klinger (1988; 1990), are particularly relevant to understanding emotionally driven behaviors like substance use. These include the degree to which the behavior (1) is motivated by a desire to avoid a negative incentive versus pursue a positive one and (2) is internally focused or directed toward oneself versus externally focused or directed toward socially significant others.

### **Approach Versus Avoidance**

The most fundamental distinction concerns the nature of behaviors that involve the pursuit of positive or pleasurable incentives (approach or appetitive behaviors) versus those that involve avoidance of or escape from negative or painful ones (avoidance or aversive behaviors). According to Gray (1970; 1987), approach and avoidance behaviors are regulated by two neurologically distinct motivational systems. The behavior inhibition system (BIS) regulates avoidance motivation, causes movement away from undesired outcomes (avoidance behavior), and controls the experience of negative emotions. In contrast, the behavior activation system (BAS) regulates approach motivation, causes movement toward goals (approach behavior), and controls the experience of positive emotions. Gray further hypothesized that individuals differ in a stable, trait-like manner in the relative sensitivity of the BIS and BAS. Consistent with this hypothesis, individuals high in BIS are hypersensitive to threat and punishment cues. As a result, high-BIS individuals are prone to experience negative affect and respond in fearful or avoidant ways. Conversely, individuals high in BAS are especially responsive to reward cues and consequently are predisposed to experience positive affect and seek rewards (Carver & White, 1994; Larsen & Ketelaar, 1991). Indeed, high levels of neuroticism and extroversion are thought to derive from overactive BIS and BAS systems, respectively (Gray, 1970; Larsen & Ketelaar, 1991). Consistent with Cox and Klinger's theorizing, this distinction suggests that people use substances to pursue positive outcomes, such as increased excitement and pleasurable sensations, or to avoid negative ones, such as rejection by one's drug-using peers.

### **Self Versus Other**

The second distinction concerns the extent to which the source of the goal or incentive is internal or self-focused versus external and social in nature. This distinction is akin to distinctions between agentic and communal goals (Bakan, 1966), exploratory versus attachment goals (Bowlby, 1970), and autonomy/competence versus relatedness goals (Skinner & Wellborn, 1994). Self-focused goals are assumed to derive primarily from agentic, identity, or autonomy/competence needs and include the use of substances to manage both negative and positive emotions. According to McAdams (1984), managing one's emotions represents an agentic striving to the extent that it involves mastery and control of one's emotional experience. In contrast, other-focused goals are thought to be motivated by attachment or communal needs (as defined by Bakan, 1966), such as drinking, using drugs, or smoking to enhance one's connections to others, or by a desire to gain or maintain approval from socially significant others (e.g., drinking to fit in with one's peers). Although some theorists categorize approval-seeking motives as agentic or self-focused on the assumption that they are driven by a concern for attaining or maintaining one's group status (McAdams, 1984), Cooper (1994) classified such motives as other-focused or social in nature because of their primary orientation toward outcomes controlled by others. Thus, although both types of motives can be pursued in an interpersonal context, and both can be seen as ultimately originating from a desire to manage one's emotions either by direct manipulation of feeling states or indirectly by obtaining a valued outcome from a socially significant other, these motive types nevertheless differ in the degree to which the outcomes sought are primarily intra- versus interpersonal.

## Four Categories of Motives

The two dimensions can be crossed to yield four categories of motives: (1) self-focused approach motivations, such as drinking, smoking, or using other drugs to enhance physical or emotional pleasure or for excitement (i.e., enhancement motives); (2) self-focused avoidance motives, such as drinking, smoking, or using other drugs to cope with threats to self-esteem or to avoid or minimize negative emotions (i.e., coping motives); (3) social approach motives, such as drinking, smoking, or using other drugs as a way to bond with others or improve social gatherings (i.e., social/affiliative motives); and (4) social avoidance motives, such as drinking, smoking, or using other drugs to avoid social censure or gain other's approval (i.e., approval or conformity motives). As reviewed in detail later, substantial evidence supports the existence of the four theoretically predicted motives, as well as the motivational approach more broadly.

## A Review of Evidence Supporting Key Assumptions of the Motivational Approach

Drawing on the theorizing just presented, five key premises or assumptions can be identified that form the basis of motivational models of substance use. These are listed in Table 1 and are used as a framework for organizing the present review.

Table 1. Key premises underpinning the motivational approach

**Premise 1:** People use substances to alter affective states, either directly through their (largely internal) pharmacological effects or indirectly through their effects on other valued (primarily social) outcomes.

**Premise 2:** Individuals hold beliefs about the effects of substances, and these beliefs in turn shape the motives or purposes for which an individual is likely to use a given substance.

**Premise 3:** People choose, although the choice may be neither entirely conscious nor entirely rationale, whether and how much to use a given substance in order to attain affectively laden, valued outcomes.

**Premise 4:** Substance use motivated by different needs or serving different functions represents psychologically distinct behaviors that are characterized by unique patterns of antecedents and correlates and by unique patterns of use and use-related consequences.

**Premise 5:** Motives provide the final common pathway to substance use through which the influences of more distal variables are mediated.

## Premise 1: People Use Substances to Alter Affective States

People use substances to alter affective states, either directly through their (largely internal) pharmacological effects or indirectly through their effects on other valued (primarily social) outcomes. The pharmacological effects and phenomenological experience of using alcohol, marijuana, and tobacco are similar in important regards. All produce feelings of euphoria and stimulation and promote relaxation and reduce tensions (see Earleywine, 2005, for a review). Moreover, all three substances are commonly consumed in social situations and can therefore serve a variety of social functions (see Moos, 2006, for a review). Consequently, all three substances have the potential to directly or indirectly (as described earlier) alter affective experience in pleasant and rewarding ways, suggesting that all three substances could plausibly subserve both internal affect regulation goals and social goals. However, do they? In this section, we review evidence indicating that people do indeed use substances for the reasons described in Cox and Klinger's model and, moreover, that these reasons are among the most important reasons people cite for using substances.

## Do People Report Using Substances for the Reasons Implied by Cox and Klinger’s Model?

As previously described, Cox and Klinger’s model implies the existence of four broad motives or motive types. However, as shown in Table 2, it was not until 1994, with the publication of the Drinking Motives Questionnaire–Revised (DMQ-R; Cooper, 1994), that a single measure was developed to assess all four motives implied by Cox and Klinger’s model. In a series of studies, Cooper (1994) documented the existence of the four factors across three different samples using both exploratory and confirmatory factor analyses. In addition, using data from a large and representative sample of adolescents, she was able to show that the four-factor structure fit the data equally well among key subgroups, including light and heavy drinkers, males and females, blacks and whites, and younger and older adolescents. These findings have since been replicated in multiple studies across diverse samples, including Swiss and Canadian adolescents (Kuntsche, Knibbe, Gmel, & Engels, 2006; Kuntsche, Stewart, & Cooper, 2008), and US (MacLean & Lecci, 2000), Brazilian (Hauck-Filho, Teixeira, & Cooper, 2012, Hungarian, and Spanish (Németh et al., 2011) college students, thus enhancing confidence in the four-factor structure.

Table 2. Dimensions assessed by widely used or recently developed substance use motive measures

Measure	Positive Reinforcement		Negative Reinforcement		Other Constructs
	Self	Social	Self	Social	
Alcohol Use					
Mulford & Miller, 1960	–	Social	Coping	–	
Cahalan et al., 1967	–	Social	Coping	–	
Polich & Orvis, 1979	–	Social	Coping	–	
DMQ, Cooper et al, 1992	Enhancement	Social	Coping	–	
DMQ-R, Cooper, 1994	Enhancement	Social	Coping	Conformity	
Cronin, 1997	Mood Enhancement	Social Camaraderie	Tension Reduction	–	
Grant et al., 2007	Enhancement	Social	Coping-Anxiety	Conformity	
			Coping-Depression		
Marijuana Use					

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Newcomb et al., 1988	Enhance Creativity & Positive Affect <sup>a</sup>	Social Cohesion <sup>b</sup>	Reduce Negative Affect	Social Cohesion <sup>b</sup>	
			Quell Addiction		
MMM, Simons et al., 1998	Enhancement Expansion	Social	Coping	Conformity	
Comeau et al., 2001	Enhancement	Social	Coping	Conformity	
Lee et al., 2009	Enjoyment Altered Perception Experimentation Sleep <sup>d</sup>	Celebration	Coping Boredom Social Anxiety <sup>c</sup> Sleep <sup>d</sup>	Conformity	Availability Presence of Alcohol Relative Low Risk
Tobacco Use					
Ikard et al., 1969	Pleasure		Negative Affect Reduction		Habitual
	Stimulation		Addictive		–
	Sensorimotor	–	–	–	–
Russell et al., 1974	Indulgent	Psychosocial <sup>e</sup>	Addictive	Psychosocial <sup>e</sup>	Automatic
	Stimulation	–	–	–	–
	Sensorimotor	–	–	–	–
Gilbert et al., 2000	Pleasure	–	Negative Affect Reduction <sup>f</sup>		–
	Cognitive Enhancement		Weight/Appetite Control		–
Comeau et al., 2001	Enhancement	Social	Coping	Conformity	–
Piper et al., 2004	Positive Reinforcement		Negative Reinforcement		Automaticity
	Cognitive Enhancement		Craving		Behavior Choice–Melioration

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	Taste/Sensory Properties		Weight Control		Affiliative Attachment (to smoking)
					Social-Environmental Goals
					Cue Exposure
					Loss of Control
					Tolerance

Complete references for measurement articles are provided in the reference list and are denoted by a superscript “a.”

(<sup>a</sup>) Newcomb and colleagues enhancement factor, despite its name, included only one item clearly tapping enhancement (i.e., “to enjoy what I am doing more”). Instead, most items assessed smoking to expand awareness or insight (e.g., “to know oneself better,” “to understand things differently”).

(<sup>b</sup>) Newcomb and colleagues social cohesion factor included both positively and negatively reinforced social motives.

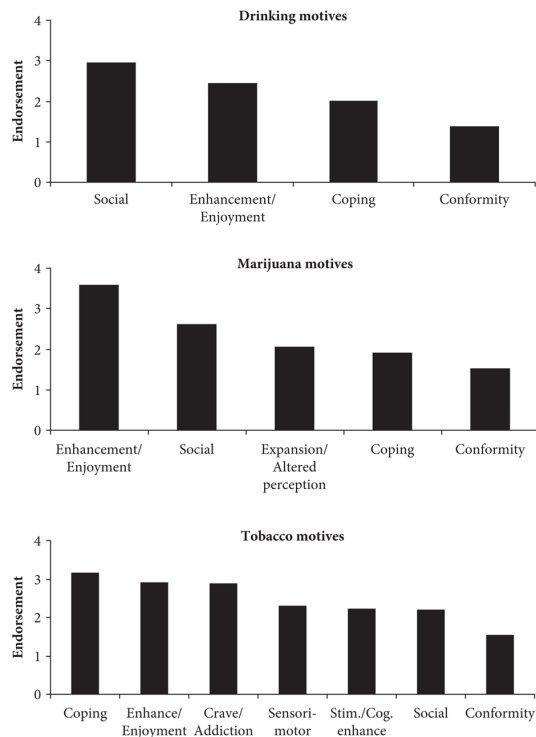
(<sup>c</sup>) Items in Lee et al.’s social anxiety scale do not explicitly reference social situations and include items commonly included in coping motive scales (e.g., “to make you feel more confident” or “because it relaxes you in an insecure situation”).

(<sup>d</sup>) Lee et al.’s sleep scale includes both positive and negative reinforcement items (e.g., “it helps make napping easier and more enjoyable” vs. “because you are having sleep problems”), thus could not be unambiguously placed into a single motive category.

(<sup>e</sup>) The majority of items on the psychosocial scale are similar to the social anxiety subscale in Lee et al.’s marijuana motives measure except that items include specific social references (e.g., “While smoking I feel more confident with others”). However, in addition, one item clearly assesses a social approach motive (“I smoke for the pleasure of offering and accepting a cigarette from others”), and one item has no manifest motivational content (“I smoke more when I am with other people”).

(<sup>f</sup>) The Negative Affect Reduction scale consists of four subscales assessing anxiety reduction, anger reduction, depression reduction, and impulse control.

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*Figure 1*. Rates of endorsement of most frequently identified motives for use across three substances. Top panel. Alcohol use motives. Middle Panel. Marijuana use motives. Bottom Panel. Tobacco use motives. Note. Means from each study were weighted by the square root of the corresponding sample size to determine the average across all studies. All response scales were converted to a 1 to 7 metric where 7 equals high rates of use for that reason and 1 equal low rates of use for that reason.

Although psychometric analyses provide evidence for the validity of the four motives predicted by Cox and Klinger's model, such data do not inform us about the absolute or relative importance of the four motives. To address this issue, we updated an earlier analysis examining mean rates of endorsements of the four motives (see Kuntsche, Knibbe, Gmel, & Engels, 2005) to include responses from more than 13,000 individuals. As Figure 1 (top panel) shows, approach motives for drinking (both social and enhancement) are more strongly endorsed than either avoidance motive (coping, conformity). Indeed, the rank order of endorsement portrayed in this graph—social followed by enhancement, coping, and conformity—has been highly consistent across studies and subgroups, including male and female drinkers (Cooper, 1994; Stewart, Zeitlin, & Samoluk, 1996); adolescents (Cooper, 1994), college students (Lewis et al., 2008; Neighbors, Larimer, Geisner, & Knee, 2004; Stewart et al., 1996), and adults (Cooper, Russell, Skinner, & Windle, 1992; Crutzen & Kuntsche, 2013); different racial and ethnic groups within a country (Cooper, 1994; Cooper et al., 1992; Nagoshi, Nakata, Sasano, & Mark, 1994); and across different countries, including the United States, Canada, Switzerland, England, Iceland, Argentina, Hungary, Spain, and Brazil (Field & Powell, 2007; Hauck-Filho et al., 2012; Jerez & Coviello, 1998; Kuntsche, Stewart et al., 2008; Németh et al., 2011; Rafnsson, Jonsson, & Windle, 2006).

According to the data in Figure 1, however, people drink on average just over half the time for even the most commonly endorsed motive. Although motives may combine across time and situations to account for the majority of all drinking behavior, these data nonetheless raise questions about whether other important motives in addition to those identified by Cox and Klinger need to be considered.

Studies using open-ended methods in which people are asked to report on the main reasons they use alcohol provide one means of answering this question. Of six studies we found using this approach, five of them identified all four motives implied by Cox and Klinger's model (Alvarez & del Rio, 1994; Kloep, Hendry, Ingebrigtsen, Glendinning, & Espnes, 2001; Lo & Globetti, 2000; Palmqvist, Martikainen, & Rauste von Wright, 2003; Pavis, Cunningham-Burley, & Amos, 1997), and the sixth identified all but conformity motives (Van Wersch & Walker, 2009). Moreover, the failure to identify conformity motives in this latter study is unsurprising, given that the authors examined heavy drinking among adults, whereas conformity motives are associated with light drinking and are



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more commonly endorsed by early adolescents and novice drinkers (Cooper, 1994).

Two large-scale studies (Kairouz, Gliksman, Demers, & Adlaf, 2002; Mihic, Wells, Graham, Tremblay, & Demers, 2009) lend additional support to the centrality of the four motives implied by Cox and Klinger's model. Across the two studies, nearly 11,000 Canadian college students were asked to choose from a large list of reasons (including reasons that did not fit into Cox and Klinger's model) "the most important" reason they drank on several recent drinking occasions. As shown in Table 3, the overwhelming majority of responses in the Kairouz et al. study fit into one of the four motive categories identified by Cox and Klinger's model, whereas in the Mihic et al. study all responses fit into three of the four motive categories. Only conformity motives, the least strongly endorsed motive in past research (see Figure 1, top panel), were not identified in the latter study. Furthermore, social and enhancement motives were selected across the two studies as the primary reasons for drinking far more commonly than either coping or conformity motives, thus replicating the pattern observed in studies using close-ended assessments.

Table 3. Most important reasons for drinking on recent drinking occasions chosen by Canadian undergraduate students

	<b>Social (%)</b>	<b>Enhancement (%)</b>	<b>Coping (%)</b>	<b>Conformity (%)</b>	<b>Other (%)</b>
Kairouz et al., 2002					
To be sociable/polite <sup>a</sup>	17%				
To celebrate	21%				
(Total social motives)	(38%)				
Enjoy taste/enhance meal		25%			
To feel good		6%			
To get drunk		8%			
(Total enhancement motives)		(39%)			
To relax <sup>b</sup>			8%		
To forget worries <sup>b</sup>			2%		
To feel less shy <sup>b</sup>			2%		
(Total coping motives)			(12%)		
To comply with others				6%	
Other reasons					5%
Mihic et al., 2009					
Social reasons <sup>a</sup>	53%				

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To get drunk	8%			
Enjoy taste/enhance meal/other <sup>c</sup>	28%			
(Total enhancement motives)	(36%)			
Coping <sup>b</sup>		11%		

Kairouz et al. (2002) used data from 6,598 students who reported on 25,347 drinking occasions that occurred within the past 3 months. Mihic et al. (2009) used data from 4,336 students who reported on 13,008 drinking episodes that occurred in the past month.

(<sup>a</sup>) Motives collapsed into social reasons category in Mihic et al. study

(<sup>b</sup>) Motives collapsed into coping motives category in Mihic et al. study

(<sup>c</sup>) Percent selecting “other” motives was not reported separately

Although these studies provide independent support for Cox and Klinger’s two-dimensional model, they also point to additional motives not specifically identified by their model. Drinking to enjoy the taste or to enhance or accompany food, dubbed the epicurean motive, was the most frequently cited motive not explicitly included in Cox and Klinger’s model (see Table 3). Although this could be considered a subtype of enhancement motivation, Kairouz and colleagues presented evidence that epicurean motives are associated with light, infrequent, and nonproblematic consumption, a pattern that distinguishes it from other forms of enhancement that are associated with heavier consumption (e.g., Cooper, 1994). Additional motives have also been identified among adolescents, including drinking to find out what the experience is like (experimentation motives; Lo & Globetti, 2000; Palmqvist et al., 2003) and drinking to assert one’s independence or to feel more mature (identity motives; Kloep et al., 2001). Thus, although Cox and Klinger’s model appears to identify the most broadly applicable and important motives, additional motives may underlie drinking in some circumstances or among certain groups.<sup>1</sup>

### Do Similar Motives Underlie Marijuana and Tobacco Use?

Although, as previously described, alcohol, marijuana and tobacco share certain effects in common, the pharmacological and phenomenological experience of using these substances nevertheless differs in ways that might lead to unique motives for use. For example, nicotine (the primary psychoactive substance in cigarettes and other tobacco products) does not produce disabling states of intoxication like alcohol or marijuana, making it possible to smoke tobacco for a range of purposes and in situations where both alcohol and marijuana use would be contraindicated. Unlike alcohol and marijuana, nicotine also improves working memory and concentration and suppresses appetite (see Baker, Brandon, & Chassin, 2004; Miyata & Yanagita, 2001, for reviews). It is also much more addictive than either alcohol or marijuana, with 30–50% of all smokers meeting criteria for dependence (Anthony, Warner, & Kessler, 1994; Grant, Hasin, Chou, Stinson, & Dawson, 2004) compared to only 14% of drinkers (National Survey on Drug Use and Health; Substance Abuse and Mental Health Services Administration [SAMHSA], 2009) and 9% of marijuana users (Anthony et al., 1994; Budney, Roffman, Stephens, & Walker, 2007). Moreover, because nicotine is rapidly absorbed and processed in the body, withdrawal symptoms are quick to set in (typically within two hours of smoking the last cigarette; Baker et al., 2004; Miyata & Yanagita, 2001), leading to more repetitive and habitual use of tobacco than either marijuana or alcohol. Marijuana, in contrast, possesses distinctive hallucinogenic properties, owing to its main psychoactive ingredient,  $\delta$ -tetrahydrocannabinol (THC). These effects most commonly include an altered sense of time and altered perceptions of color, sound, and taste (National Institute on Drug Abuse, 2006). Thus, although we expect overlap in the primary motives for use, intrinsic differences in the psychoactive properties of alcohol, marijuana, and tobacco suggest that each substance may also have unique uses.

### Marijuana Use Motives

At least four different measures of motives for marijuana use have been published (Comeau, Stewart, & Loba, 2001; Lee, Neighbors, Hendershot, & Grossbard, 2009; Lee, Neighbors, & Woods, 2007; Newcomb, Chou, Bentler, & Huba, 1988; Simons, Correia, Carey, & Borsari, 1998). The specific motives measured by each are summarized in the middle panel of Table 2, organized (based on an analysis of item content) into the motive categories defined by Cox and Klinger's two-dimensional model. As shown, the majority of these scales can be placed into this framework, although there is more heterogeneity in scale content than was observed for alcohol use motive measures.

The major difference from Cox and Klinger's model is the inclusion, in all but Comeau et al.'s measure, which was directly adapted from the DMQ-R (Cooper, 1994), of one or more scales to assess the use of marijuana to expand awareness, increase openness to new experiences, or enhance creativity. Although such factors can be considered alternate forms of self-focused approach motives (similar to enhancement motives), they appear to represent a unique motive subtype that stems from marijuana's hallucinogenic properties. Lee et al.'s measure also includes an experimentation subscale, which we have provisionally listed as a type of self-focused approach motive similar to expansion in that it involves a desire to have a new or novel experience. However, it is unclear which aspect of the experience appeals to individuals who endorse experimentation motives. For example, a novice user might endorse experimentation items because he or she is drawn to marijuana's reputed mind-expanding qualities or its stress-reducing qualities. Thus, we would expect experimentation motives to reflect a heterogeneous range of underlying motivations for use, and as such it might not function in the same way as other self-focused approach motives.

Lee et al.'s measure also includes multiple forms of self-focused avoidance motives, such as using marijuana to avoid or alleviate boredom and to cope with feelings of insecurity that typically arise in social settings (hence the name "social anxiety," even though the scale does not explicitly reference social situations). However, this measure has been used in only two studies conducted by the same team of investigators (Lee et al., 2007; 2009), and correlations among the motive subscales were not reported in either paper. Thus, it is too soon to know whether these distinctions provide unique or largely overlapping information.

Figure 1 (middle panel) shows the average rates of endorsement (based on responses from 860 individuals) of the five motives most commonly included in existing marijuana motive measures. Similar to the pattern observed for alcohol motives, approach motives for marijuana use are more strongly endorsed than avoidance motives. Endorsement rates for expansion motives (which we classified as a self-focused, approach motive) were intermediate, falling between enhancement and social motives on the high end and the two avoidance motives on the low end. In contrast to the pattern observed for alcohol motives, however, enhancement motives for marijuana use were more strongly endorsed than social motives, perhaps owing to marijuana's particular psychoactive properties, which can induce mild paranoia and social discomfort (Reilly, Didcott, Swift, & Hall, 1998).

Despite strong similarities in the content of marijuana and alcohol use motive measures, several purported motives included in Lee and colleagues' measure do not fit into Cox and Klinger's schema. Careful examination of their content, however, suggests that they do not assess motives per se. For example, the "availability" and "alcohol" scales describe environmental cues to use, cues that might indeed arouse drug-seeking motivations but are not in and of themselves motives. That is, neither marijuana availability nor the presence of alcohol describes an incentive (or desired end state) that the individual hopes to achieve by using marijuana. Although the "relative low risk" scale could be considered an avoidance motive (viz., using marijuana to avoid more serious consequences associated with other ways of getting high), presumably a more primary motive would also have to be in play. That is, an individual who wanted to use a substance to achieve some desirable end state might well consider the relative risk of achieving that state by drinking, for example, instead of smoking marijuana, but in the absence of a primary goal, one would be unlikely to use marijuana solely because it is less risky than another substance.

### Tobacco Use Motives

The bottom panel of Table 2 presents a list of the most widely used smoking motives measures along with several recently developed ones that appear particularly promising. The specific motives assessed by each measure are again summarized in terms of the four motive categories defined by Cox and Klinger's two-dimensional framework.

Examination of these data reveals several patterns that are distinct from those observed for either alcohol or marijuana motives. First, self-focused motives appear to dominate these measures, whereas social motives are relatively less important. In fact, only one of the measures developed specifically to assess tobacco motives (Russell, Peto, & Patel, 1974) even includes a social scale (labeled “psychosocial” motives). Second, all of the measures (except for Comeau et al.’s adaptation of the DMQ-R) include factors assessing the habitual or automatic nature of smoking behavior, as well as smoking to reduce craving and withdrawal symptoms (i.e., addictive symptoms). The presence of these factors likely reflects both the rapidity with which nicotine is metabolized in the body and its highly addictive nature (Baker et al., 2004). The presence of an automaticity factor also raises the possibility that tobacco use is under less intentional control than either marijuana or alcohol use and, by extension, that conscious motives may play a smaller role in tobacco use than either marijuana or alcohol use. Also unique to these measures are motive subscales assessing smoking for sensorimotor reasons (e.g., “to have something to do with my hands”) and for stimulation or cognitive enhancement (e.g., “when I really need to concentrate”). Although neither motive is explicitly represented by Cox and Klinger’s model, they can nevertheless be viewed as subtypes of self-focused, positive reinforcement motives.

Figure 1 (bottom panel) summarizes information from more than 3,600 individuals on levels of endorsement of the motives most commonly included in tobacco use motive measures. As shown, the profile of motives differs markedly from that observed for either alcohol or marijuana use, with avoidance motives playing a much larger role and social motives a smaller one compared to either alcohol or marijuana use. Although it is possible that the low endorsement rates of social motives reflect the increasing marginalization and stigmatization of smoking, social motives appear to have always played a more minor role, at least in so far as their omission from the original smoking motives measure suggests (see Table 2). Finally, we note the presence of several factors in the WISDM-68 (Piper et al., 2004) that do not fit neatly within Cox and Klinger’s two-dimensional model. A careful examination of the content of these scales, however, suggests that they do not assess motive constructs in the sense we have defined them here, but rather cues for smoking (e.g., the presence of others who smoke) or dependence symptoms (e.g., requiring more and more to achieve the same effect).

### Summary of Premise 1

On the whole, the existing evidence strongly supports Cox and Klinger’s model, suggesting that the four motive types implied by their model represent the most important motives underlying alcohol use, at least during adolescence (11–17 years) and emerging adulthood (18–25 years; Arnett, 2004), the two developmental periods most commonly studied in existing research. Moreover, although the data point to the existence of other motives that might contribute to alcohol use, these motives appear to relate primarily to patterns of light, nonproblematic use (epicurean motives) or to specific developmental stages (identity motives) or stages of use (experimentation motives).

The existing evidence also supports the relevance of Cox and Klinger’s model for understanding motivations that underpin marijuana use. However, in addition to motives explicitly identified by Cox and Klinger’s model, people report smoking marijuana to expand their awareness or to experience reality differently, a motivation presumably rooted in THC’s hallucinogenic properties. Although expansion can be seen as a self-focused approach motive, it is nevertheless factorially distinct from the type of enhancement motive measured by the DMQ-R and thus may contribute uniquely to the prediction of marijuana use. In contrast, the utility of Cox and Klinger’s model for understanding tobacco use is less clear. Presumably owing to nicotine’s highly addictive properties, both negative reinforcement processes and habit appear to play a greater role, and social motives a lesser role, in accounting for tobacco use.

### Premise 2: Individuals Hold Beliefs About the Effects of Substances That in Turn Shape Motives for Use

In this section, we consider the extent to which the most common expectancies map onto the affective and social domains implied by Cox and Klinger’s two-dimensional model. We then examine the overlap between expectancies and motives for use, focusing specifically on the idea that unique patterns of associations should exist between individual expectancies and corresponding motives. Finally, we consider evidence relevant to the assumption that expectancies precede and cause motives rather than the reverse. Although most of the existing evidence is correlational in nature and thus cannot directly support causal inference, it is nevertheless possible to assess the

plausibility of this argument with correlational data. If, as Cox and Klinger have argued, expectancies activate motives in the presence of relevant incentives and motives in turn prompt use, then motives but not expectancies should directly predict substance use outcomes net of the other's effect.

### **What Are Expectancies and How Do They Differ from Motives?**

Expectancies refer to beliefs about the positive and negative behavioral, emotional, and cognitive effects of using a given substance (Baer, 2002; Quigley & Marlatt, 1996), whereas motives refer to the actual (self-reported) use of a given substance in order to achieve a desired effect or outcome (Cooper, 1994; Cox & Klinger, 1988; 1990). Thus, although expectancies may be either positive (e.g., drinking facilitates social interaction) or negative (e.g., drinking makes me do stupid things) in content, people use substances primarily if not exclusively to obtain positive outcomes. This suggests that expectancies can serve both protective and facilitative roles vis-à-vis substance use (Leigh, 1989), whereas motives for use should be associated primarily with greater substance use (Cooper, 1994; Cooper et al., 1992). These considerations also suggest that the content of positive, but not negative, expectancies should map onto motives for use.<sup>2</sup>

Consistent with this assumption, we argue that the nature of one's beliefs about the likely positive consequences of using a particular substance defines a range of potential uses for that substance. For example, individuals who believe that drinking is an effective way to alleviate dysphoric mood states may choose to drink to alleviate such states (see Cooper, Frone, Russell, & Mudar, 1995; Cooper, Russell, & George, 1988). However, simply holding a particular belief (e.g., that alcohol effectively reduces negative affect) does not automatically mean that an individual will drink to obtain that effect. The effect may not be highly valued, the individual may have other preferred means of achieving the effect, or may realize that drinking for that reason has offsetting costs. In the reverse, however, people who do not hold a particular belief about the effects of using a given substance (e.g., that nicotine increases concentration) are unlikely to use the substance to achieve that effect (e.g., smoke to increase concentration).

Leigh (1990) provided evidence of this asymmetry in a series of analyses comparing rates of endorsement of specific alcohol expectancies and corresponding motives. She showed that the vast majority of individuals held congruent expectancies and motives when the expectancy that drinking enhances sexual experience was cross-tabulated with motives for using alcohol to enhance sexual experience—that is, people either did not hold the expectancy and did not drink for that reason, or they held the expectancy and drank for that reason. Importantly, however, those who fell in the off-diagonal cells were vastly more likely to hold the belief and not drink for that reason than they were to drink for that reason and not hold the belief. Kuntsche and colleagues (Kuntsche, Knibbe, Engels, & Gmel, 2007; Kuntsche, Wiers, Janssen, & Gmel, 2010) made a similar argument in pointing out that endorsement levels for expectancies are typically higher than endorsement of the corresponding motives (when scale ranges are equated), suggesting again that people can believe that using a substance produces a particular effect without using it for that purpose, whereas the reverse is unlikely to hold true.

Finally, evidence from a recent twin study provides further support for the distinctiveness of expectancy and motive constructs (Agrawal et al., 2008). In this study, familial similarity in expectancies was explained by shared family environment, whereas similarity in coping, social, and conformity (but not enhancement) motives was explained primarily by genetic influences, thus indicating that expectancies and motives are differentially rooted in one's social learning history versus one's biological makeup. Together, these data suggest that expectancies and motives are conceptually and empirically distinct and should therefore be operationalized in distinct ways.

### **What Specific Expectancies Do People Hold About Substance Use and How Are They Related to Motives for Substance Use?**

#### **Alcohol Use Expectancies**

Despite the fact that a number of different alcohol outcome expectancy measures have been published (e.g., Brown, Christiansen, & Goldman, 1987; Brown, Goldman, Inn, & Anderson, 1980; Fromme & d'Amico, 2000; Leigh & Stacy, 1993; Rohsenow, 1983; Young & Knight, 1989), there is considerable overlap in their content, particularly regarding the expected positive effects of consumption. For example, most measures include scales assessing some combination of beliefs that drinking facilitates social interactions, increases fun, enhances positive mood

states, increases sexual interest, improves sexual experience, decreases inhibitions, promotes relaxation, relieves boredom, and reduces tension. The structure of these scales has been criticized, however, for a lack of discriminant validity (e.g., Leigh, 1989; Leigh & Stacy, 1993), suggesting that a more parsimonious factor structure may underlie existing measures. To examine this possibility, Vik and colleagues (Vik, Carrello, & Nathan, 1999) used confirmatory factor analysis to test a more parsimonious factor structure for the most widely used expectancy measure, the Alcohol Expectancy Questionnaire (AEQ; Brown et al., 1980). Results revealed four factors that were hypothesized to derive from two underlying dimensions—positive versus negative reinforcement and social versus intrapersonal effects. In other words, the higher order factor structure of the AEQ mapped perfectly in this study onto the four-factor structure implied by Cox and Klinger's model.

The more important question for this review, however, is whether expectancies show unique and specific associations with corresponding motives for use. Cooper and colleagues (1995) tested this notion using data from two large community samples, one of adolescents and one of adults. In both samples, theoretically consistent and specific associations were found: expectancies for socioemotional enhancement strongly predicted enhancement but not coping motives, whereas expectancies for tension reduction strongly predicted coping but not enhancement motives. Similar results were reported by Read and colleagues (Read, Wood, Kahler, Maddock, & Palfai, 2003) using data from a convenience sample of college students: tension reduction expectancies more strongly predicted coping motives than either enhancement or social motives ( $\beta = .74$  vs.  $.31$  and  $.12$ , respectively), whereas expectancies for social lubrication more strongly predicted social than enhancement motives ( $\beta = .42$  vs.  $.21$ ) and did not significantly predict coping motives.

Kuntsche, Wiers, Janssen, and Gmel (2010) also examined associations between expectancies and corresponding motives using data from a nationally representative sample of Swiss adolescent drinkers and found that the best predictor for a particular motive dimension was, in all cases, the corresponding expectancy dimension (e.g., expectancies for social facilitation most strongly predicted social motives). Partial regression coefficients (controlling for the remaining three expectancies) for each corresponding expectancy–motive effect ranged from  $\beta = .30$  to  $\beta = .48$ . Moreover, only two significant, nonpredicted expectancy–motive effects emerged, and both were smaller than the corresponding predicted effects: social expectancies predicted enhancement motives ( $\beta = .27$ ), and enhancement expectancies predicted social motives ( $\beta = .19$ ), perhaps because both enhancement and socially motivated drinking typically occur in social settings (e.g., at parties). In sum, existing evidence supports the notion of specific and unique associations between expectancies and corresponding motives.

Finally, if expectancies activate motives (in the presence of relevant incentives) and motives in turn lead to drinking, as Cox and Klinger have argued, then motives should mediate expectancy effects on drinking. Consistent with this hypothesis, Cooper and colleagues (1995), using data from the two previously described samples, provided evidence consistent with complete mediation of tension reduction expectancies on alcohol use and abuse by coping motives and with complete mediation of social facilitation expectancy effects by enhancement motives (see Catanzaro & Laurent, 2004; Laurent, Catanzaro, & Callan, 1997, for replications; see also Read et al., 2003). Kuntsche and colleagues (2007), using data from a large and representative sample of Swiss high school students, also showed specific and complete (in all but one case) mediation of expectancy effects on alcohol use: effects of tension reduction expectancies were mediated by coping motives, expectancies for improved mood and cognitive/motor ability were mediated by enhancement motives, and expectancies for enhanced social behavior were mediated by social motives.

### Marijuana Use Expectancies

In contrast to the clear and compelling evidence linking alcohol expectancies and corresponding motives for use, the content of marijuana expectancy measures only partially overlaps the content of marijuana motive measures. Indeed, the most widely used and well-validated measure of marijuana expectancies, the Marijuana Effect Expectancy Questionnaire (MEEQ; Schafer & Brown, 1991; see also Aarons, Brown, Stice, & Coe, 2001), assesses four positive expectancies, only two of which map directly onto marijuana motives: expectancies for relaxation and tension reduction correspond to coping motives, and expectancies for perceptual and cognitive enhancement correspond to expansion motives. The remaining MEEQ scales assess expectancies for social and sexual facilitation, which appear to share elements in common with both social and enhancement motives and for reduction of craving and withdrawal symptoms, which corresponds to Newcomb and colleagues' (1988) Quell Addiction motive scale, a motive that is not represented in other marijuana motives measures (see Table 2). Thus,

extant expectancy measures fail to conceptualize independent internal and social approach motives and also do not include expectancies related to conformity motives.

We found no study that explicitly linked expectancies with corresponding motives for use or that tested mediation of expectancy effects on marijuana use by corresponding motives. Although Simons and colleagues (2005) appear to have tested such a mediation model, their expectancy measure assessed an individual's belief in his or her own ability to effectively regulate an internal negative mood state, not the belief that smoking marijuana is an effective way to alleviate distress.

### Tobacco Use Expectancies

The most widely used measure of smoking expectancies is the Smoking Consequences Questionnaire (SCQ; Brandon & Baker, 1991) and its derivatives (Copeland, Brandon, & Quinn, 1995; Myers, MacPherson, McCarthy, & Brown, 2003). The SCQ and its short form both include expectancy scales that directly correspond to specific smoking motives: expectancies of positive and negative reinforcement, respectively, map onto enhancement and coping motives for smoking; expectancies for sensorimotor manipulation map onto sensorimotor motives; and expectancies for appetite-weight control map onto the WISDM-68 weight control motive. An alternate form of this measure, the SCQ-A (Copeland et al., 1995), assesses expectancies for social facilitation, which maps directly onto social motives for tobacco use. Absent from all tobacco use expectancy measures, however, are expectancies that map onto conformity and performance enhancement (e.g., improved concentration) motives.

Finally, we also found no studies that examined links between tobacco-specific expectancies and corresponding motives or that tested mediation of expectancy effects on smoking behavior by motives for use. Brandon and colleagues (Brandon, Wetter, & Baker, 1996) examined smoking expectancies in relation to the strength of generalized smoking motivation (i.e., smoking urge) but did not assess specific motives for smoking.

### Summary of Premise 2

Existing evidence strongly supports our second premise in the alcohol domain. Consistent with Cox and Klinger's model, people do indeed hold beliefs that alcohol can be used to regulate both positive and negative affect and to attain important social outcomes. Furthermore, people who endorse particular beliefs about the effects of alcohol are disproportionately likely to drink to attain those ends. Finally, and perhaps most importantly, research consistently shows that motives mediate the effects of relevant expectancies on use, thus supporting the assumption that beliefs activate (presumably in the presence of relevant incentives) the motivated use of alcohol aimed at attaining specific desired end states.

In contrast, the content of tobacco and especially marijuana use expectancy measures failed to reveal a close fit with the content of corresponding motive measures. Whether this reflects a failure to identify important expected effects in existing expectancy measures, the inclusion of motives in existing motive measures that are relatively unimportant, or an actual dissociation between beliefs and corresponding motives is not known. We also found no empirical tests of theoretically driven mediation hypotheses about the nature of associations between specific tobacco or marijuana expectancies, motives, and use-related outcomes.

### Premise 3: People Choose Whether and How Much to Use to Attain Affectively Laden, Valued Outcomes

The point that people may "choose," although the choice may be neither entirely conscious nor entirely rational, whether and how much to use a given substance in order to attain affectively laden, valued outcomes, although central to motivational approaches, is not addressed separately in this chapter, but rather as an integral part of the review. Indeed, we maintain that all data showing that people's explicit motives and intentions predict patterns of substance use in theoretically meaningful ways serve to reinforce and validate this premise.

### Premise 4: Substance Use Motivated by Different Needs or Serving Different Functions Represents Psychologically Distinct Behaviors Characterized by Unique Patterns of Antecedents/Correlates, Patterns of Use, and Use-Related Consequences

## Motivational Models of Substance Use

Extant data indicate that people who are strongly motivated to drink for any reason drink more, drink more often, and as a result have more drinking problems (e.g., Cooper, 1994; Cooper et al., 1992; Kuntsche et al., 2005). Motivational approaches, however, advance the novel and intuitively appealing notion that the particular reason why a person drinks matters. That is, drinking by individuals who drink similar amounts yet drink for different reasons should be driven by different underlying processes associated with unique dispositional profiles and lead to distinct consequences. In essence, motivational models assert that drinking behavior motivated by different needs or serving different purposes represents functionally distinct behavior. Consequently, drinking behavior cannot be understood as a unitary phenomenon but rather must be viewed as a class of related behaviors distinguished by the underlying motives or needs they serve.

Four questions relevant to this notion are addressed in the following sections: are drinking motives associated with (1) characteristic and distinct dispositional profiles, (2) unique settings or situational cues, (3) unique emotional antecedents, or (4) particular patterns of use and use-related consequences? Finally, we also consider whether theoretically meaningful and distinct patterns have been observed for different marijuana and tobacco use motives.

Data pertinent to questions 1 and 4 are summarized in tabular form. Weighted (by the square root of N) mean correlations (*r*) and standardized  $\beta$  weights are presented for each of the four motives in both tables. In the majority of cases, regression models from which the  $\beta$ 's were taken controlled for the remaining three motives and thus represent the unique contribution of each motive. For this reason,  $\beta$ 's are typically smaller than the corresponding *r*'s. Weighted (by the square root of N) mean standard deviations (SDs) are also presented for both parameter estimates. In cases in which a value was originally reported as nonsignificant but an exact value was not provided, we assumed the value was 0 for the purposes of our calculations. Because this downwardly biases the estimates of *r* and  $\beta$  and inflates estimates of the SD, the number of nonsignificant unreported effects is also noted for each estimate, thus allowing the reader to gauge the degree of bias in each estimate. Table 4 presents motive associations with personality measures and Table 5 with alcohol-related outcomes. In Table 4, mean values are presented for specific personality measures as well as for the higher order traits identified by the Big Five (see John, Naumann, & Soto, 2008, for a review). In addition, results for interpersonal traits are separated out because we expect them to show unique relationships to both external (i.e., socially focused) motives.

Table 4. Summary of trait correlates of drinking motives

	Enhance		Social		Coping		Conformity	
	r	$\beta$	r	$\beta$	r	$\beta$	r	$\beta$
	Neuroticism and Allied Traits							
<b>Average Weighted Mean + SD</b>	.11 ± .08	.00+.09	.12 ± .08	.04 ± .07	.32 ± .09	.19 ± .14	.20 ± .08	.03 ± .09
Total # of effects/# unreported <i>ns</i> effects	35/0	21/11	26/0	9/5	45/0	27/4	13/0	8/1
N	14,272	13,677	7,813	2,723	19,081	15,090	3,174	2,181
<b>Neuroticism</b>								
Weighted Mean + SD	.10 ± .06	.02 ± .12	.17 ± .09	.03 ± .07	.38 ± .09	.38 ± .09	.24 ± .03	.00 ± .00
Total # of effects/# unreported <i>ns</i> effects	8/0	7/2	5/0	4/2	12/0	7/0	2/0	2/0
N	2,612	5,427	1,225	1,188	4,254	2,227	410	410



## Motivational Models of Substance Use

N	3,612	5,427	1,325	1,188	4,354	3,337	410	410
<b>Punishment Sensitivity</b>								
Weighted Mean + SD	.04	–	.08	–	.26	–	.30	–
Total # of effects/# unreported <i>ns</i> effects	1/0	–	1/0	–	1/0	–	1/0	–
N	533	–	533	–	533	–	533	–
<b>Global Negative Affect</b>								
Weighted Mean + SD	.09 ± .10	.00 ± .00	.25	.00	.26 ± .11	.14 ± .01	–	–
Total # of effects/# unreported <i>ns</i> effects	3/0	3/3	1/0	1/1	3/0	3/0	–	–
N	972	1,816	137	388	972	1,816	–	–
<b>Composite Daily Negative Affect</b>								
Weighted Mean + SD	.13 ± .06	–	.12 ± .06	–	.26 ± .09	–	.19	–
Total # of effects/# unreported <i>ns</i> effects	4/0	–	4/0	–	5/0	–	1/0	–
N	1,247	–	1,247	–	1,344	–	122	–
<b>Emotional Instability</b>								
Weighted Mean + SD	.00	-.03 ± .03	.04	.04	.27	.24 ± .02	.06	-.10
Total # of effects/# unreported <i>ns</i> effects	1/0	2/1	1/0	1/0	1/0	2/0	1/0	1/0
N	581	1,312	581	581	581	1,312	581	581
<b>Depression</b>								
Weighted Mean + SD	.11 ± .01	.00 ± .00	.15 ± .05	–	.35 ± .05	.16 ± .02	.30	–
Total # of effects/# unreported <i>ns</i> effects	4/0	2/2	2/0	–	4/0	2/0	1/0	–
N	2,587	1,966	621	–	2,587	1,966	91	–
<b>Suicidal Ideation</b>								

## Motivational Models of Substance Use

Weighted Mean + SD	.14	–	.11	–	.39	–	.24	–
Total # of effects/# unreported <i>ns</i> effects	1/0	–	1/0	–	1/0	–	1/0	–
N	91	–	91	–	91	–	91	–
<b>Trait Anxiety</b>								
Weighted Mean + SD	.04 ± .03	.01	.05 ± .07	–	.33 ± .04	.15 ± .10	.13	-.03
Total # of effects/# unreported <i>ns</i> effects	3/0	1/0	3/0	–	4/0	3/1	1/0	1/0
N	1,108	312	1,108	–	1,840	1,310	312	312
<b>Anxiety Sensitivity</b>								
Weighted Mean + SD	.04 ± .09	-.10 ± .09	.03 ± .06	.00	.32 ± .10	-.01 ± .00	.21 ± .07	.18 ± .01
Total # of effects/# unreported <i>ns</i> effects	4/0	2/1	3/0	1/1	4/0	3/1	2/0	2/0
N	898	494	760	182	898	494	494	494
<b>Self-Esteem (reverse scored)/Contingent Self-Esteem</b>								
Weighted Mean + SD	.24 ± .03	.19	.21 ± .01	.18	.23 ± .10	.29	.17 ± .01	.13
Total # of effects/# unreported <i>ns</i> effects	2/0	1/0	2/0	1/0	2/0	1/0	2/0	1/0
N	358	202	358	202	358	202	358	202
<b>Avoidance Coping/Experiential Avoidance</b>								
Weighted Mean + SD	.20 ± .05	.04 ± .08	.14 ± .04	.00	.30 ± .08	.12 ± .11	.21	.00
Total # of effects/# unreported <i>ns</i> effects	4/0	3/2	3/0	1/1	8/0	6/2	1/0	1/1
N	2,285	2,148	1,052	182	5,523	4,653	182	182
<b>Interpersonal Traits</b>								
<b>Average Social/Attach Anxiety</b>								
Weighted Mean + SD	.07 ± .07	.08 ± .06	.14 ± .06	.18 ± .01	.25 ± .10	.24 ± .06	.24 ± .00	.29 ± .03

## Motivational Models of Substance Use

	.07	.06	.06		.10	.06	.09	.03
Total # of effects/# unreported <i>ns</i> effects	6/1	2/1	6/0	2/0	8/0	3/0	5/0	2/0
N	1,914	909	1,914	909	2,368	1,121	1,621	909
<b>Social Fear/Anxiety</b>								
Weighted Mean + SD	.07 ± .09	–	.14 ± .08	–	.22 ± .13	–	.18 ± .09	–
Total # of effects/# unreported <i>ns</i> effects	4/1	–	4/0	–	4/0	–	3/0	–
N	1,005	–	1,005	–	1,005	–	712	–
<b>Attachment Anxiety</b>								
Weighted Mean + SD	.07 ± .00	.08 ± .06	.14 ± .01	.18 ± .00	.27 ± .06	.24 ± .06	.31 ± .00	.29 ± .03
Total # of effects/# unreported <i>ns</i> effects	2/0	2/1	2/0	2/0	4/0	3/0	2/0	2/0
N	909	909	909	909	1,363	1,121	909	909
<b>Average Social/Attach Avoid</b>								
Weighted Mean+SD	.02 ± .04	.00 ± .00	.06 ± .06	-.06 ± .04	.19 ± .10	.07 ± .05	.17 ± .06	.00 ± .00
Total # of effects/# unreported <i>ns</i> effects	4/0	2/1	4/0	2/1	6/0	2/1	4/0	2/2
N	1,382	909	1,382	909	1,836	909	1,382	909
<b>Social Avoidance</b>								
Weighted Mean + SD	.02 ± .04	–	.13 ± .01	–	.25 ± .02	–	.19 ± .02	–
Total # of effects/# unreported <i>ns</i> effects	2/0	–	2/0	–	2/0	–	2/0	–
N	473	–	473	–	473	–	473	–
<b>Attachment Avoidance</b>								
Weighted Mean + SD	.01 ± .04	.00 ± .00	.00 ± .00	-.06 ± .04	.16 ± .12	.07 ± .05	.16 ± .09	.00 ± .00
Total # of effects/#	2/0	2/1	2/0	2/1	4/0	2/1	2/0	2/2

## Motivational Models of Substance Use

unreported <i>ns</i> effects								
N	909	909	909	909	1,363	909	909	909
<b>Extraversion and Allied Traits</b>								
<b>Average Weighted Mean+SD</b>	.15 ± .11	.16 ± .12	.14 ± .11	.07 ± .13	-.02 ± .14	.01 ± .08	.00 ± .16	-.04 ± .03
Total # of effects/# unreported <i>ns</i> effects	16/1	13/1	11/0	6/3	18/0	13/8	7/0	5/3
N	6,994	7,181	3,086	1,775	7,191	9,271	2,268	1,613
<b>Extraversion</b>								
Weighted Mean + SD	.13 ± .08	.16 ± .09	.11 ± .09	.07 ± .16	-.13 ± .07	-.03 ± .10	-.13 ± .07	-.03 ± .03
Total # of effects/# unreported <i>ns</i> effects	4/0	5/0	4/0	4/2	5/0	5/2	3/0	3/2
N	1,077	1,077	1,077	1,077	1,177	3,167	991	991
<b>Reward Sensitivity</b>								
Weighted Mean + SD	.22	–	.25	–	.25	–	.27	–
Total # of effects/# unreported <i>ns</i> effects	1/0	–	1/0	–	1/0	–	1/0	–
N	533	–	533	–	533	–	533	–
<b>Global Positive Affect</b>								
Weighted Mean + SD	-.02 ± .03	.00 ± .00	–	–	-.16 ± .04	.00 ± .00	–	–
Total # of effects/# unreported <i>ns</i> effects	2/1	2/1	–	–	2/0	2/2	–	–
N	1,098	1,691	–	–	1,098	1,691	–	–
<b>Composite Daily Positive Affect</b>								
Weighted Mean + SD	.06 ± .09	–	.06 ± .09	–	-.15 ± .03	–	-.07	–
Total # of effects/# unreported <i>ns</i> effects	3/0	–	3/0	–	4/0	–	1/0	–
N	717	–	717	–	814	–	122	–

<b>Excitement Seeking/Sensation Seeking</b>								
Weighted Mean + SD	.23 ± .07	.20 ± .10	.21 ± .09	.07 ± .07	.10 ± .03	.01 ± .03	.03 ± .06	-.05 ± .05
Total # of effects/# unreported <i>ns</i> effects	5/0	5/0	3/0	2/1	5/0	5/4	2/0	2/1
N	1,903	2,747	759	6,98	1,903	2,747	622	622
<b>Assertiveness/Surgency</b>								
Weighted Mean + SD	.24	.25	–	–	.06	.15	–	–
Total # of effects/# unreported <i>ns</i> effects	1/0	1/0	–	–	1/0	1/0	–	–
N	1,666	1,666	–	–	1,666	1,666	–	–
<b>Conscientiousness and Allied Traits</b>								
<b>Average Weighted Mean + SD</b>	-.18 ± .09	-.08 ± .11	-.12 ± .11	-.02 ± .09	-.16 ± .07	-.06 ± .09	-.09 ± .06	-.03 ± .04
Total # of effects/# unreported <i>ns</i> effects	8/0	8/3	7/0	5/2	11/0	10/3	4/0	4/3
N	4,228	4,873	2,812	1,993	7,343	7,255	1,301	1,301
<b>Conscientiousness</b>								
Weighted Mean + SD	-.19 ± .11	-.16 ± .12	-.11 ± .11	.02 ± .05	-.16 ± .05	-.01 ± .07	-.09 ± .07	-.04 ± .04
Total # of effects/# unreported <i>ns</i> effects	5/0	4/0	5/0	4/2	5/0	4/1	3/0	3/2
N	1,769	1,683	1,769	1,683	1,769	1,683	991	991
<b>Impulsivity (reverse scored)</b>								
Weighted Mean + SD	-.18 ± .04	-.01 ± .02	-.24	-.18	-.18 ± .07	-.09 ± .12	-.09	.00
Total # of effects/# unreported <i>ns</i> effects	3/0	4/3	1/0	1/0	3/0	4/2	1/0	1/1
N	2,459	3,190	310	310	2,459	3,190	310	310
<b>Active Coping (reverse scored)</b>								
Weighted Mean + SD	–	–	-.07	–	-.15 ±	-.06 ±	–	–

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					.08	.00		
Total # of effects/# unreported <i>ns</i> effects	–	–	1/0	–	3/0	2/0	–	–
N	–	–	733	–	3,115	2,382	–	–
<b>Agreeableness</b>								
<b>Average Weighted Mean + SD</b>	-.07 ± .06	-.06 ± .08	-.03 ± .03	.04 ± .07	-.18 ± .08	-.10 ± .09	-.10 ± .05	-.00 ± .00
Total # of effects/# unreported <i>ns</i> effects	5/0	5/1	5/0	5/2	5/0	5/1	3/0	3/2
N	1,769	1,769	1,769	1,769	1,769	1,769	991	991
<b>Openness and Allied Traits</b>								
<b>Average Weighted Mean + SD</b>	.07 ± .05	.05 ± .07	.01 ± .02	-.06 ± .06	-.04 ± .05	.01 ± .03	-.12 ± .06	-.05 ± .01
Total # of effects/# unreported <i>ns</i> effects	5/0	4/1	5/0	3/2	5/0	4/1	4/0	4/2
N	1,389	1,303	1,389	991	1,389	1,303	1,303	1,303
<b>Openness</b>								
Weighted Mean + SD	.07 ± .04	.03 ± .03	.03 ± .02	.00 ± .00	-.01 ± .04	.03 ± .03	-.08 ± .00	.00 ± .00
Total # of effects/# unreported <i>ns</i> effects	3/0	2/1	3/0	2/2	3/0	2/1	2/0	2/2
N	496	410	496	410	496	410	410	410
<b>Intellect/Imagination</b>								
Weighted Mean + SD	.12	.14	-.01	-.13	-.10	.00	-.21	-.11
Total # of effects/# unreported <i>ns</i> effects	1/0	1/0	1/0	1/0	1/0	1/0	1/0	1/0
N	581	581	581	581	581	581	581	581
<b>Novelty Seeking</b>								
Weighted Mean + SD	.00	-.03	-.02	–	-.04	-.02	-.07	-.03
Total # of effects/# unreported <i>ns</i> effects	1/0	1/0	1/0	–	1/0	1/0	1/0	1/0

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N	312	312	312	–	312	312	312	312
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Mean correlations (*r*'s), mean  $\beta$  weights, and associated standard deviations (SDs) were weighted by the square root of *N*. For purposes of computing means and SDs, a value of 0 was assumed whenever an effect was reported as *ns* and the exact parameter was not provided. Inclusion of 0s has the effect of attenuating mean estimates and inflating SD estimates. Studies providing data used in Table 4 are denoted in the reference list by a superscripted "b."

Table 5. Summary of drinking motive: alcohol outcome effects

	Enhance		Social		Coping		Conformity	
	<i>r</i>	$\beta$	<i>r</i>	$\beta$	<i>r</i>	<i>B</i>	<i>R</i>	$\beta$
Usual Alcohol Use/Quantity Frequency								
Weighted Mean + SD	.49 + .13	.30 + .10	.42 + .15	.17 + .12	.30 + .09	.11 + .06	.09 + .06	-.07 + .04
Range reported values	.29, .63	.15, .53	.17, .60	.09, .45	.13, .40	.09, .23	.12, .17	-.14, - .03
Total # of effects/ # unreported values <i>ns</i> effects	9/0	13/0	10/0	14/3	10/0	14/4	7/3	10/1
N	10,809	24,491	12,060	25,744	12,060	25,963	9,502	22,042
Heavy/Binge Drinking								
Weighted Mean + SD	.51 + .10	.38 + .08	.40 + .13	.05 + .05	.36 + .07	.16 + .06	.15 + .01	-.03 + .04
Range	.28, .62	.23, .63	.14, .51	.06, .18	.23, .42	.13, .25	.12, .16	-.11, .02
Total # of effects/ # unreported values <i>ns</i> effects	5/0	8/0	4/0	7/3	5/0	8/1	3/0	6/2
N	9306	19,403	7640	17,737	9306	19,403	6,863	16,121
Drinking Related Problems								
Weighted Mean + SD	.36 + .10	.11 + .08	.31 + .16	.03 + .09	.36 + .16	.23 + .10	.27 + .04	.06 + .05
Range	.18, .52	.02, .25	.10, .54	-.09, .30	-.11, .54	.08, .45	.22, .36	-.02, .12

Total # of effects/ # unreported values <i>ns</i> effects	8/0	9/2	8/1	9/5	10/0	14/0	5/0	7/1
N	11,354	20,137	10,975	19,845	13,338	24,145	8,214	16,939

N's for studies included in the present table ranged from 390 to 5,779. Mean correlations (*r*'s), mean  $\beta$  weights, and associated standard deviations (SDs) were weighted by the square root of N. For purposes of computing means and SDs, a value of 0 was assumed whenever an effect was reported as *ns* and the exact parameter was not provided. Inclusion of 0s generally has the effect of attenuating mean estimates and inflating SD estimates. However, the downward bias associated with the estimation of mean values should be relatively small given that studies represented in the present analyses (average sample size = 2,396) had sufficient power to detect small effects. Studies providing data used in Table 5 are denoted in the reference list by a superscripted "c."

### Are Different Drinking Motives Uniquely Associated with Certain Traits or Dispositions?

People who use substances for avoidant reasons are, by definition, trying to escape, minimize, or avoid aversive states or anticipated negative outcomes, such as generalized negative mood states, feelings of insecurity or inadequacy, or rejection by socially significant others. Accordingly, individuals high in neuroticism—a Big Five trait characterized by high levels of anxiety, depression, and hostility; emotional lability; insecurity (i.e., low self-esteem); self-consciousness; vulnerability; and sensitivity to criticism (John et al., 2008)—should be prone to drink as a way to avoid or deal with the anticipation or experience of negative moods and events.

As shown in Table 4, ample research supports this expectation. The average *r* across forty-five reported effects was .32, with mean *r*'s for specific measures ranging from .23 (for reverse scored measures of self-esteem and for global negative affect) to .39 (for suicidal ideation). The average  $\beta$  across twenty-seven effects was .20. Associations of similar magnitude were observed for the social anxiety cluster, presumably owing to its overlap with neuroticism. Of note, coping motives also exhibited the largest associations of the four motives (at both the univariate and multivariate levels) with the experiential and social avoidance clusters, although the magnitude of these effects were nevertheless modest. Overall then, the data indicate that coping motives are consistently related to neuroticism and its constituent elements, and indeed that these associations are the largest among the four motives at both the zero-order and multivariate levels. In the only exception to this rule, low self-esteem, was correlated at a similar modest level with all four motives.

People who use substances for approach reasons are, by definition, seeking a positive or rewarding outcome, be that a closer connection with a friend or loved one or a pleasurable and exciting experience. Accordingly, individuals who are high on extraversion—a Big Five trait characterized by high levels of positive emotionality, gregariousness, dominance, assertiveness, adventuresomeness, and sensation-seeking (John et al., 2008)—should be predisposed to seek positive affective rewards and thus be more likely to drink to obtain those rewards. Consistent with this expectation, enhancement motives exhibited the strongest and most consistent pattern of positive associations with extraversion relative to the other three motives, especially at the multivariate level. As careful examination of the associations in Table 4 will reveal, however, enhancement motives were more strongly associated with some facets of extraversion (viz., reward sensitivity, excitement seeking, and surgency) than others (viz., measures of positive emotions). This pattern is consistent with Cooper et al.'s (1995) contention that positive mood states do not reliably precipitate drinking to enhance; that, instead, the predisposition to seek positive rewards (or the desire to experience them) drives enhancement-motivated drinking.

Drinking motivated by coping and enhancement motives is construed as an effort to regulate negative and positive mood states, respectively. Accordingly, people who chronically use alcohol to cope or enhance may do so because they lack other more adaptive ways to regulate their emotions. Consistent with this interpretation, both coping and enhancement motives were linked to low levels of conscientiousness, a Big Five trait characterized by self-discipline, self-control, thoughtful deliberation, order, achievement striving, competence, and dutifulness (John et al., 2008). However, these associations were modest at the zero-order level and substantially attenuated by controlling for other motives, suggesting that lack of conscientiousness and undercontrol may contribute to all



forms of drinking motivation but that these effects are relatively modest in magnitude.

The lack of robust associations is consistent with Cooper and colleague's (2000) argument that impulsive individuals who have difficulty controlling their thoughts and behaviors (Revelle, 1997) are especially susceptible to the immediately reinforcing properties of a risky behavioral choice like drinking, whether that choice is negatively or positively reinforced. For example, impulsive extraverts might be particularly responsive to reward cues and thus more likely to drink to enhance, whereas impulsive neurotics might be especially responsive to punishment cues and thus more likely to drink to cope. Consistent with this notion, impulsivity did not directly predict either coping or enhancement motives in Cooper and colleagues' data, but rather interacted with predispositions to experience negative and positive emotions to predict coping and enhancement motives, respectively. Such findings suggest that impulsivity facilitates or disinhibits prepotent responses, rather than directly causing people to drink to cope or enhance.

Recent evidence using newly developed measures of impulsivity that distinguish impulsive responding to negative versus positive emotions lends further support to this idea. The tendency to act rashly when upset or distressed, called *negative urgency*, was shown to predict higher levels of coping (but not enhancement) motives, whereas the tendency to act rashly in response to positive affect, called *positive urgency*, predicted higher levels of enhancement (but not coping) motives (Anestis, Selby, & Joiner, 2007; Cyders & Smith, 2007).

Although less is known about the personality correlates of social and especially conformity motives, what is known suggests a pattern of weak and inconsistent associations. Indeed, examination of the data in Table 4 shows that most of the significant associations for both motives occur at the zero-order level and that when other motives are controlled these associations tend to disappear. As shown in Table 4, however, the most distinctive associations apparent for both social and conformity motives are the modest positive associations with measures of social and attachment anxiety. In addition, conformity motives (but no other motive) exhibited positive associations at both the univariate and multivariate levels with anxiety sensitivity, a trait characterized by the belief that anxiety-related sensations lead to negative consequences, including social embarrassment. Also consistent with this pattern, Stewart and Devine (2000) showed that self-consciousness (a socially evoked negative emotion) was the only facet of neuroticism that was uniquely associated with conformity motives.

Finally, only a small number of studies have examined agreeableness (characterized by humility, trust, cooperation, sympathy, and low hostility) or openness (characterized by curiosity, imagination, creativity, insightfulness, and openness to experience) in relation to drinking motives, a fact that could reflect the lack of strong theory linking either trait to specific drinking motives. As shown in Table 4, both traits were on the whole weakly or unrelated to drinking motives. In the only possible exceptions to this pattern, we found modest negative associations between agreeableness and coping motives, and between openness and conformity motives.

### **Are Different Drinking Motives Uniquely Linked to Drinking in Specific Situations?**

Clear differences are expected in the settings and circumstances that trigger drinking to cope versus drinking for social reasons. For example, those who drink for social approach reasons should drink primarily (if not exclusively) in social settings in which positive social rewards are available and salient. Consistent with this expectation, social motives have been positively linked with drinking at parties and with groups of mixed- and same-sex friends and negatively associated with drinking at home, drinking alone, and (among adolescents) drinking with one's family (Cooper, 1994; Cooper et al., 1992). Drinking to conform should also be disproportionately likely to take place in social settings, as these are the venues in which people encounter peer pressure to drink and experience heightened concerns about social rejection. Consistent with these notions, conformity motives have been positively linked to drinking at parties and negatively related to drinking at home (Cooper, 1994).

In contrast, drinking to cope is thought to be driven by a need to escape or cope with the experience of negative emotions, which might arise from a variety of sources or causes. However, because people tend to withdraw when experiencing negative emotions, particularly depressive ones (Anderson & Harvey, 1988), they might be expected to drink alone or in more solitary settings when drinking to cope. Consistent with this analysis, coping motives have been positively linked with drinking at home and drinking alone and negatively linked to drinking in social celebratory settings like parties (Cooper, 1994; Cooper et al., 1992; see also Kuntsche, Knibbe, Engels, & Gmel, 2010). Daily diary reports collected over a 30-day period have also shown that individuals with strong (vs. weak) coping motives drink significantly more often at home and alone (Mohr et al., 2001). Such findings are consistent

with the idea that people who drink to cope are involved in an internally focused activity that need not involve others and, indeed, might be more effectively carried out alone.

Expectations are less straightforward, however, for enhancement motives. Because social relationships and interactions are among the most potent sources of human reward (Reis, Collins, & Berscheid, 2000), individuals seeking to enhance the quality of their emotional experiences may drink predominantly in social settings even though the focus of enhancement-motivated drinking is internal. At the same time, pleasant experiences and emotions are not isomorphic with social experiences. Thus, we might expect individuals who drink to enhance to drink across a range of settings in which pleasant experiences might occur. Consistent with this notion, drinking to enhance has been positively linked to drinking in some social settings (e.g., drinking with same-sex friends, in friends' homes, or in bars), but unrelated to drinking in others (e.g., with one's partner, alone, with mixed-sex friends; see Cooper, 1994; Cooper et al., 1992; Kuntsche et al., 2010). Thus, there appears to be a looser association between enhancement-motivated drinking and specific drinking locations.

Although we know of only one diary study to directly examine how motives relate to drinking locations (Mohr et al., 2001), several diary studies provide indirect support for the idea that drinking locations vary as a function of drinking motives. For example, Mohr and colleagues (Mohr, Armeli, Tennen, & Todd, 2010) showed that anger, sadness, nervousness, hostility, shame, and guilt experienced earlier in the day were consistently and positively associated with drinking at home later that same day but were inconsistently and weakly associated with drinking away from home (see also Mohr et al., 2005). Also compatible with these findings, time with friends (presumably a positive experience) and positive interpersonal events have been shown to predict drinking away from home more strongly than drinking at home (Mohr et al., 2001; 2005). Such findings are consistent with the idea that people are more likely to drink at home or alone when drinking to cope and more likely to drink away from home when seeking to enhance positive emotional experiences.

### **Are Different Drinking Motives Uniquely Associated with Specific Emotional Antecedents?**

The immediate antecedents to drinking should also differ as a function of drinking motives. Drinking motivated by coping and conformity goals is viewed as *reactive* to the experience of global or specific negative mood states, or to perceived pressure to drink or feared or felt rejection. In contrast, approach-motivated drinking is viewed as *appetitive* in nature. It should be directed toward achieving a desired end state, not reacting to an existing one. As such, neither social nor enhancement-motivated drinking should be uniquely or strongly tied to the prior experience or expression of a particular emotional state. Of course, this doesn't mean that prior emotions or emotion-laden events couldn't activate an appetitive goal that would in turn prompt drinking, only that approach-motivated drinking could also occur in the absence of clear-cut precipitating events or emotions.

Unfortunately, empirical evidence directly examining these assumptions is limited. Although diary studies clearly indicate that people drink in response to both negative and positive mood states (Armeli, Dehart, Tennen, Todd, & Affleck, 2007; Mohr et al., 2005; Park, Armeli, & Tennen, 2004; Simons, Gaher, Oliver, Bush, & Palmer, 2005; Steptoe & Wardle, 1999; Todd, Armeli, & Tennen, 2009), such data do not directly test whether alcohol use following a good or bad mood is motivated by a desire to up-regulate a positive mood or down-regulate a negative one. In addition, laboratory studies have shown that coping and enhancement-motivated drinkers are differentially sensitive to alcohol-related information following exposure to negative and positive affective experiences, respectively (e.g., Birch et al., 2004; Colder, 2001; Field & Powell, 2007; Field & Quigley, 2009; Stewart, Hall, Wilkie, & Birch, 2002; however, see Birch et al., 2008; Colder & O'Connor, 2002; Grant & Stewart, 2007, for mixed results). Although such evidence suggests that negative and positive affective stimuli serve as specific, discriminative cues to individuals who drink primarily for coping or enhancement purposes, they also do not directly test whether people who drink for these reasons are differentially likely to drink following exposure to relevant mood states.

Todd and colleagues (Todd et al., 2005) provided one of the most thorough tests of this hypothesis for coping motives. Using daily reports of stress, mood, and drinking obtained over the course of twenty-one days from a sample of heavy drinkers, they found that high (vs. low) coping-motive drinkers rated their mood as significantly more negative at the time of the first drink each day. High coping-motive drinkers were also more likely to identify drinking as a mechanism they used to cope with the most stressful event of the day. Coping motives also interacted with prior mood states to predict later drinking such that negative mood and events were positively

related to alcohol outcomes among high coping-motive drinkers, but negatively related among their low coping-motive counterparts. Coping motives also interacted with positive moods such that both happy and relaxed moods were significantly positively associated with drinking among low coping-motive drinkers, but not among their high coping-motive counterparts. Although only about half of the interactions tested were significant, these data are nevertheless consistent with the idea that drinking among individuals who are high versus low in coping motives is cued by different antecedent emotions.

Other studies, however, have failed to find the expected coping motive  $\times$  mood interactions (e.g., Carney, Armeli, Tennen, Affleck, & O'Neil, 2000; Park et al., 2004; Todd, Armeli, Tennen, Carney, & Affleck, 2003; see Grant, Stewart, & Mohr, 2009, for a review). Moreover, even among studies finding significant interactions, the shape of the interaction has sometimes failed to conform to theoretical prediction (see Armeli, Todd, & Mohr, 2005, for a review), revealing instead a pattern in which high coping-motive drinkers drink more than their low-coping counterparts regardless of negative mood states, whereas those low in coping motives actually decrease their drinking on high (vs. low) negative-emotion days. Even though the expected positive association between negative mood and drinking was not observed among high coping-motive drinkers in these particular studies, the observed pattern nevertheless points to a distinctive and presumptively maladaptive use of alcohol in the face of negative circumstances among individuals high in coping motives.

To our knowledge, only two diary studies have examined antecedent mood states and alcohol use in relation to social, enhancement, and conformity motives (Grant et al., 2009; Mohr et al., 2005). Unfortunately, a complex and inconsistent pattern of results was revealed across the two studies in which the nature of the mood  $\rightarrow$  drinking associations varied as a function of the specific motive tested, the type of affect examined, and drinking location. However, such complexities are not surprising for enhancement motives to the extent that one can seek enjoyment in a range of settings, as previously discussed. Weak findings for conformity motives are also not surprising given that the most theoretically relevant antecedents—perceived pressure to drink or concern about interpersonal rejection—were not assessed in either study.

### **Are Different Drinking Motives Associated with Unique Patterns of Use and Abuse?**

In general, we expect drinking motivated by avoidance goals to be more risky and less adaptive than substance use motivated by approach goals. This prediction rests on several key features of avoidance-motivated behaviors. First, efforts to avoid a feared outcome or escape an aversive one inevitably draw attention to negative possibilities and realities. Negative attentional biases, in turn, have been linked to biased search and recall of negative information and a tendency to interpret neutral or ambiguous events in a negative light (Elliot, Gable, & Mapes, 2006). Consequently, people who are primarily motivated by avoidance goals should behave in unproductive ways while drinking or using other substances (e.g., by interpreting an innocuous remark as an insult) that create or exacerbate problems and difficulties. Second, negative stimuli versus equally intense positive ones have been shown to exert a stronger pull on one's attention and to engender a stronger emotional and behavioral response (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001; Carver & Scheier, 1998). Such findings suggest that individuals who drink to escape or avoid painful situations may face especially strong impulses to drink, impulses that could override consideration of contravening longer term consequences. The experience of negative emotions has also been shown to increase the attractiveness of immediate relief (Baumeister & Scher, 1988; see also Loewenstein et al., 2001), thereby further undermining the ability to dispassionately weigh the immediate benefits versus potential long-term costs of drinking. Finally, although avoidance goals provide something to move away from, they fail to provide clear guidelines for moving forward. Consequently, individuals focused on avoiding undesired outcomes (rather than seeking positive ones) lack effective structures for regulating their behavior in line with long-term values and goals (Carver & Scheier, 1998). For all these reasons, individuals who drink primarily to avoid negative outcomes are more likely to behave in counterproductive ways while under the influence, thus engendering more negative consequences and, ultimately, further pressure to drink to deal with aversive emotional experiences.

Externally focused motives (social, conformity), relative to their internally focused counterparts (enhancement, coping), should also be less risky. This contention rests in part on the idea that externally focused drinking is more likely to occur in social settings, and use in social settings (vs. alone) is consistently associated with more benign consequences (e.g., Christiansen, Vik, & Jarchow, 2002; Gonzalez, Collins, & Bradizza, 2009). In addition, alcohol (or other substance) use driven by internal versus external needs should be relatively more stable across time and

situations, suggesting that problematic use tied to internal need states may be more chronic and resistant to change than use controlled primarily by external or situational contingencies.

Together, these considerations suggest that drinking motivated by internal avoidance goals (i.e., coping motives) should be associated with the poorest outcomes, whereas use motivated by external approach goals (i.e., social motives) should be the least risky. This is not to say that negative consequences can't occur to those who drink primarily for approach or external (social) reasons. On the contrary, all substance use carries risk of negative consequences. Nevertheless, use motivated by external or approach reasons should *on average* be associated with less harmful patterns of use and use-related consequences.

Table 5 summarizes results from twenty-eight large-sample studies ( $N$ 's  $\geq 390$ ) that reported associations (correlations,  $\beta$  weights, or both) between drinking motives and one or more of the following indicators of alcohol use and abuse: usual alcohol use, heavy or binge drinking (typically defined as drinking five or more drinks on a single occasion or drinking to intoxication), and alcohol-related problems. As shown in Table 5 and consistent with the above arguments, social motives were associated with the most benign pattern of use and coping motives with the most maladaptive, at least in terms of unique associations with drinking problems. More specifically, social motives were moderately associated with typical patterns of alcohol consumption (top panel;  $\beta = .17$ ), once the effects of other motives were controlled, and essentially unrelated to heavy/binge drinking (middle panel) and to problem drinking (bottom panel), again, once the effects of other motives were controlled. In contrast, coping motives revealed the opposite pattern, showing a weak unique relationship to alcohol use but the strongest unique association with drinking problems. Indeed, fourteen of fourteen studies reporting partial regression coefficients linking coping motives to drinking problems were significant.

Although most of the data summarized in Table 5 are cross-sectional, coping motives have been consistently linked to drinking problems in longitudinal and prospective studies where assessment of motives clearly preceded alcohol outcomes in time. For example, Cooper and colleagues (2008) showed that individuals who were high versus low in coping motives during adolescence reported significantly more drinking problems 15 years later. Prior coping motives also predicted steeper increases in drinking problems from wave to wave, even after controlling for prior drinking problems. Holahan and colleagues (Holahan, Moos, Holahan, Cronkite, & Randall, 2001) obtained similar results in a community sample of adults, showing that initial levels of coping motives predicted drinking problems 10 years later and that baseline motives predicted steeper increases in problems from wave to wave. In this study, coping motives also moderated the association between negative emotions (viz., anxiety and depression) and drinking problems such that negative emotions were more strongly linked to drinking problems among those who were high (vs. low) on coping motives at baseline (see Holahan, Moos, Holahan, Cronkite, & Randall, 2003, for a replication in a different sample). Finally, coping motives have also been shown to predict the onset of problems among initially problem-free medical students over the first year of medical school (Richman, Flaherty, & Pyskoty, 1992) and to predict (in interaction with a family history of alcoholism) the transition from "at-risk" status to dependence over a 10-year period (Beseler, Aharonovich, Keyes, & Hasin, 2008; see Carpenter & Hasin, 1998; 1999, for similar results). Thus, the evidence linking coping motives to drinking problems is quite strong on the whole.

Based on our earlier discussion, we expected enhancement and conformity motives to fall somewhere between the two extremes represented by social motives on the more benign end and coping motives on the more pernicious end. This pattern is evident for enhancement motives and has been observed in cross-sectional, longitudinal (e.g., Cooper et al., 2008; Tragemer, Sher, Trull, & Park, 2007), and short-term prospective designs (Kuntsche & Cooper, 2010). As shown in Table 5, enhancement motives are more strongly related at the multivariate level to both usual and heavy consumption than any other motive, yet less reliably and less strongly related to drinking problems than coping motives. This pattern can be at least partly understood in light of evidence showing that the effects of enhancement motives on drinking problems are largely indirectly mediated via consumption, whereas effects for coping motives on drinking problems are both direct (i.e., they tend to remain even after controlling for consumption) and indirect via consumption (see Cooper, 1994; Cooper et al., 1992; 1995; Johnson, Sheets, & Kristeller, 2008; Kassel, Jackson, & Unrod, 2000; Magid, MacLean, & Colder, 2007; Molnar, Sadava, DeCourville, & Perrier, 2010; Simons, Gaher, Correia, et al., 2005; however, see Mihic et al., 2009, for an exception). Such findings indicate that drinking to enhance leads to adverse alcohol-related consequences as a result of the higher amounts of alcohol consumed, whereas drinking to cope poses excess risk of adverse consequences over and above what can be explained by amount consumed. The fact that coping motives contribute to drinking problems over and

above the effects of consumption provides strong support for the theoretically derived expectation that drinking to cope is a particularly maladaptive behavior.

In contrast to the clear pattern of results shown for enhancement motives, results for conformity motives are weak and inconsistent, particularly at the multivariate level. As shown in Table 5, conformity motives were negatively (although weakly) related to alcohol use, a finding that was recently replicated using a diary method (Grant et al., 2009). Despite this negative association, conformity motives were positively (although again weakly) related to drinking problems. Not surprisingly, given the negative association between conformity motives and alcohol use, the positive association with drinking problems was stronger in studies that controlled for consumption (mean weighted  $\beta = .10$ ) than in those that did not (mean weighted  $\beta = .04$ ). Thus, although the effects were small, the overall pattern of results for conformity motives is nevertheless consistent with the idea that drinking for avoidance reasons is maladaptive and puts one at elevated risk for adverse consequences that cannot be directly attributed to quantity of consumption per se.

### Motives for Marijuana Use

Only a small number of studies have examined the personality correlates of marijuana motives, and none of these included measures of the Big Five. Nevertheless, a pattern largely consistent with findings reported in the alcohol literature has emerged for marijuana coping motives. In particular, coping motives for marijuana use have been positively linked to trait measures of negative affect (Zvolensky et al., 2009) and social anxiety (Buckner, Bonn-Miller, Zvolensky, & Schmidt, 2007), as well as to recent symptoms of depression and general anxiety (Johnson, Bonn-Miller, Leyro, & Zvolensky, 2009). Coping motives have also been negatively associated with distress tolerance (Zvolensky et al., 2009) and expectancies for negative mood regulation (Simons, Gaher, Correia, et al., 2005). Although exceptions have been reported (e.g., Buckner et al., 2007; Comeau et al., 2001), the overall pattern of results suggests that individuals who use marijuana to cope experience more intense negative emotions and lack confidence in their ability to cope with these emotions.

Results examining personality correlates of other motives, however, paint a less clear picture. Whereas several studies have revealed theoretically consistent associations between smoking to conform and elevated levels of trait negative affect (Zvolensky et al., 2009), anxiety sensitivity (Buckner et al., 2007; Comeau et al., 2001; Zvolensky et al., 2009), and social anxiety (Buckner et al., 2007), other studies have failed to find significant associations with these or similar measures (see Bonn-Miller, Zvolensky, & Bernstein, 2007; Comeau et al., 2001; Zvolensky et al., 2009). Although only a small number of studies have been conducted, reliable personality correlates also have not been found for marijuana approach motives, including social, enhancement, and expansion motives (Bonn-Miller et al., 2007; Buckner et al., 2007; Comeau et al., 2001; Simons, Gaher, Correia, et al., 2005; Zvolensky et al., 2009).

Unfortunately, we found no studies examining the settings or situations in which people are likely to use marijuana for different reasons. Nor did we find any diary or other studies using intensive longitudinal designs examining the immediate emotional antecedents to smoking marijuana for different reasons.

Finally, associations of marijuana motives with frequency of marijuana use closely replicate those observed for drinking motives. For example, smoking for social reasons has been positively linked with marijuana use at the zero-order level (Bonn-Miller et al., 2007; Buckner et al., 2007) but is less strongly related or unrelated once the effects of other motives are controlled (Lee et al., 2009; Simons et al., 1998). Marijuana conformity motives are also unrelated (Lee et al., 2009; Simons et al., 1998; Simons, Gaher, Correia, et al., 2005; Zvolensky et al., 2009) or negatively related (Bonn-Miller et al., 2007; Buckner et al., 2007) to use at the zero-order level, as well as after controlling for the effects of other motives (Lee et al., 2009; Simons et al., 1998). Also consistent with findings in the alcohol literature, both coping and enhancement motives are associated with more frequent marijuana use (Bonn-Miller et al., 2007; Buckner et al., 2007; Johnson, Bonn-Miller et al., 2009; Simons et al., 1998), with the effects being stronger and more reliable for enhancement than for coping motives (Simons et al., 1998; Simons, Gaher, Correia, et al., 2005).

Likewise, the pattern of results linking coping and enhancement motives to use-related problems is similar to that observed in the alcohol literature. For example, marijuana coping motives have been shown to both directly and indirectly (via use) predict higher levels of problems (Simons, Gaher, Correia, et al., 2005), thus exactly replicating findings for alcohol coping motives. In contrast but also similar to patterns observed in the alcohol literature,

enhancement motives have been shown to indirectly (via frequency of use), but not directly, predict problematic use (Simons et al., 1998; Simons, Gaher, Correia, et al., 2005). Indeed, in one study, enhancement motives were significantly negatively related to problems after frequency of use and other motives were controlled (Lee et al., 2009).

We found only two studies testing links between social and conformity motives and use-related problems, and their findings were mixed. Consistent with theory and evidence in the alcohol literature, Lee et al. (2009) found that social motives were unrelated to problem use, whereas Simons and colleagues (1998) found that conformity motives were positively related to problem use, in both cases after controlling for frequency of use and other motives. However, the opposite pattern was observed for the other motive in each study: social motives predicted a significant increase in problems independent of other motives and frequency of use in the Simons et al. study (1998), whereas conformity motives were unrelated to problems in the Lee et al. study (2009).

Finally, results for expansion motives appear similar to those for enhancement motives (see Bonn-Miller et al., 2007; Buckner et al., 2007; Lee et al., 2009; Simons et al., 1998), which would be expected if expansion motives are in fact a subtype of self-focused approach motives (see Table 1). More importantly, however, expansion motives have been shown to positively predict frequency of marijuana use above and beyond the effects of other motives, including enhancement (Lee et al., 2009; Simons et al., 1998), thus supporting its importance as an independent contributor to marijuana use.

### Motives for Tobacco Use

Similar to findings in both the alcohol and marijuana motive literatures, small but reliable associations have been observed between negative affect reduction (i.e., coping) motives for smoking and neuroticism-like traits. For example, neuroticism (Costa & McCrae, 1981; Joseph, Manafi, Iakovaki, & Cooper, study 1, 2003; Papakyriazi & Joseph, 1998), negative affectivity (Gregor, Zvolensky, Bernstein, Marshall, & Yartz, 2007), trait anxiety (Comeau et al., 2001), and depressive symptomatology (Joseph et al., study 2, 2003; see also Carton, Jouvent, & Widlocher, 1994) have been positively linked to negative affect reduction (i.e., coping) motives for tobacco use. Recent studies have also linked high anxiety sensitivity to coping motives (e.g., Brown, Kahler, Zvolensky, Lejuez, & Ramsey, 2001; Comeau et al., 2001; Gregor et al., 2007; Zvolensky et al., 2009; see Battista et al., 2008, for similar results), as well as high neuroticism to anxiety reduction motives (although not to the motive to reduce other negative affects; Gilbert, Sharpe, Ramanaiah, Detwiler, & Anderson, 2000). Finally, smoking for weight/appetite control has also been positively linked to neuroticism (Gilbert et al., 2000), a pattern consistent with our categorization of this as a negative reinforcement motive (see Table 1).

Findings have been less consistent for approach motives. On the one hand, extraversion has been positively linked with stimulation motives for smoking (Eysenck & Eaves, 1980; Stanaway & Watson, 1981) and negatively linked with relaxation motives (Eysenck & Eaves, 1980). High (vs. low) pleasure-motivated smokers have also been shown to exhibit stronger dopaminergic responses to a laboratory challenge task, a pattern indicative of high reward sensitivity (Netter, Toll, Lujic, Reuter, & Hennig, 2002). Contrary to theory, however, Comeau and colleagues (2001) failed to find significant associations between approach motives for tobacco use and either sensation seeking or novelty seeking. Likewise, other researchers have failed to find associations between extraversion and approach smoking motives such as enjoyment and cognitive/sensory stimulation (Costa & McCrae, 1981; Papakyriazi & Joseph, 1998). Still others have shown a lack of specificity in trait-motive associations. For example, Joseph and colleagues (2003) found that neuroticism was positively associated with smoking for both avoidance and approach motives.

Similar to findings reported in the alcohol literature, results from both laboratory and diary studies indicate that people experience stronger urges and are more likely to smoke following exposure to aversive stimuli and the experience of negative emotions (Ditre & Brandon, 2008; Ikard & Tomkins, 1973; see Kassel, Stroud, & Paronis, 2003, for a review), as well as following positive stimuli and the experience of positive emotions (Cox, Tiffany, & Christen, 2001; Ikard & Tomkins, 1973; Tiffany & Drobles, 1990). Although these data are consistent with the notion of dual affect regulation pathways for smoking, other studies fail to corroborate these findings and instead point to craving and the urge to smoke as the most important precipitants of smoking behavior (Shiffman, Paty, Gwaltney, & Dang, 2004; Shiffman et al., 2002). A potential resolution of these conflicting results has been proposed by Piasecki and colleagues (Piasecki, Richardson, & Smith, 2007). They argue that, among regular smokers, physiological

adaptations to nicotine and associative learning have eroded stimulus control, culminating in a dependent state in which smoking is routinized and triggered by cues related to withdrawal. As a result, smoking becomes dissociated from other situational cues or antecedents. In contrast, they argue, smoking remains responsive to varying and specific situational cues among less experienced, nondependent smokers.

In a study designed to test these ideas, Piasecki and colleagues had fifty college student smokers (including thirty-three daily smokers and twenty dependent smokers) carry handheld computers for fourteen days and report on their motives for smoking immediately prior to each smoking event. Cross-group comparisons revealed, as hypothesized, that both daily (vs. occasional) and dependent (vs. nondependent) smokers cited craving and habit more frequently as primary reasons for smoking. In contrast, but also as hypothesized, coping with negative emotions and opportunities to socialize were more commonly cited by occasional and nondependent smokers. Nevertheless, craving and habit were the most frequently cited motives even among occasional and nondependent smokers.

Despite the prepotence of withdrawal processes and the relatively automatic nature of smoking implied by these findings, negative affect reduction motives have been shown to predict relapse following quit attempts. For example, O'Connell and Shiffman (1988) found that relapsers at twelve months post-cessation had significantly higher negative affect reduction motives prior to treatment and were more likely to have relapsed in negative affect situations. Similarly, Niaura and colleagues (1989) found that smoking to reduce negative affect reliably predicted withdrawal symptoms and urges to smoke at one and two weeks post-quit and that nicotine gum reduced negative affect reduction motives during week two, suggesting that this reduction was instrumental in maintaining abstinence. These positive results notwithstanding, the most robust and reliable results to emerge from studies of self-reported smoking motives point to craving, psychological addiction, and habit as the primary processes that underlie and drive tobacco use (see Shiffman, 1993, for a review).

### Summary of Premise 4

Although both anomalous and null results have been reported in the literature on drinking motives, the weight of evidence indicates that different drinking motives are embedded in distinct etiologic networks and that the nature of these networks can be understood with respect to the dimensions hypothesized by Cox and Klinger to underlie and give rise to the individual motives. The data are especially clear for alcohol-related coping and enhancement motives, indicating that drinking to cope and drinking to enhance are uniquely tied to negative and positive emotion pathways, respectively; that drinking to enhance is associated with a pattern of heavy consumption, presumably reflecting the appetitive nature of drinking to enhance and the desire to experience specific pleasant sensations associated with being "buzzed," whereas drinking to cope is uniquely associated with adverse outcomes independent of any indirect effect it might exert via consumption. In contrast, drinking for social and conformity reasons is associated with patterns of light to moderate drinking mostly in social settings. Moreover, consistent with the idea that drinking to conform and drinking for social reasons are primarily controlled by external (social) contingencies, both motives showed a unique pattern of associations with socially relevant dispositions. Despite the relatively benign pattern of drinking-related effects observed for social motives, they were nevertheless modestly associated with social anxiety and low self-esteem, suggesting that even socially motivated drinking is driven to some extent by social discomfort and insecurity. Conformity motives were also associated with low self-esteem, social anxiety, and anxiety sensitivity, a unique combination that appears to predispose those who are high in conformity motives to drink in social settings as a way to gain social approval. Finally, drinking to conform (but not drinking for social reasons) has been shown to predict drinking problems over and above its indirect effect via consumption, a finding that is consistent with the contention that drinking for avoidant reasons predisposes to poor decision making while drinking.

Although many fewer studies have examined motives for marijuana use, the weight of the evidence nevertheless supports the psychological distinctiveness of use motivated by different underlying goals and suggests that the nature of these distinctive patterns can be understood in terms of Cox and Klinger's two-dimensional model. This pattern was particularly clear for marijuana coping motives, which were uniquely tied to the experience and regulation of negative emotions and directly predicted marijuana problems despite an inconsistent association with frequency of use. Also consistent with findings in the alcohol literature, social and conformity motives were linked to patterns of light use, whereas internal approach motives (especially enhancement) were associated with heavy use, although they did not directly predict use-related problems. Other findings linking motives to personality and

external motives to use-related problems were more equivocal. Finally, the data also indicate that expansion motives, a substance-specific motive presumably reflecting marijuana's mildly hallucinogenic properties, predict marijuana use over and above the effects of other motives, including enhancement, its theoretically most closely linked motive.

Research on tobacco use motives presents a starkly different picture. Although some data suggest that tobacco coping motives are associated with the experience and expression of negative emotions, most studies suggest that smoking is habitual, automatic, and largely motivated by withdrawal cues. Such findings not only call into question the utility of motivational approaches that assume more conscious control than may be associated with smoking behavior, but also suggest greater diversity in the processes that motivate behavior. Nevertheless, as Piasecki and colleagues (2007) have argued, explicit motives may play a more important role among light and occasional smokers.

### **Premise 5: Motives Provide the Final Common Pathway to Substance Use Through Which Influences of More Distal Variables Are Mediated**

This final section reviews studies testing whether motives mediate the effects of theoretically prior variables on substance use outcomes. To the extent that this contention is supported, it suggests that motives provide a crucial, proximal point of theoretical and pragmatic leverage—leverage not only for understanding what drives substance use, but also for intervening to reduce problematic use.

Logical conditions necessary to establish mediation include establishing that the putative causal effect (e.g., neuroticism) predicts both motives and the substance use outcome, that motives predict the outcome, and finally that the previously significant effect of the putative causal factor is no longer significant (in the case of complete mediation) or is attenuated but still significant (in the case of partial mediation) after controlling for motives.<sup>3</sup> In reviewing evidence related to Premise 2, we showed that drinking motives consistently and for the most part completely mediate the effects of corresponding alcohol expectancies on alcohol use outcomes, a pattern of findings that is consistent with the contention that motives provide the final common pathway. The following sections therefore focus on studies testing whether the effects of trait-like measures of affective tendencies and personality characteristics on substance use and abuse are mediated by relevant motives for use.

### **Do Drinking Motives Mediate the Effects of Theoretically Prior Traits and Dispositions on Alcohol Outcomes?**

The overwhelming majority of studies examining mediation by alcohol motives have focused on coping motives and in particular whether coping motives mediate the effects of neuroticism or specific negative affects on alcohol use and abuse. Results of these studies provide evidence consistent with the premise that coping motives mediate these effects, either partially or completely. For example, coping motives were found to completely (Cooper et al., 2000; Hussong, 2003) or partially (Kuntsche, von Fischer, & Gmel., 2008) mediate the effects of neuroticism on alcohol consumption, as well as completely mediate the effects of negative affect (Cooper et al., 1995), anxiety sensitivity (Stewart, Zvolensky, & Eifert, 2001), and suicidal thoughts (Gonzalez et al., 2009) on consumption. Coping motives were also shown to partially mediate the effects of depression (Peirce, Frone, Russell, & Cooper, 1994) and generalized anxiety (Goldsmith, Tran, Smith, & Howe, 2009) on consumption.

Research shows similar results for drinking problems. For example, coping motives completely mediated the effects of negative affect, affect lability, and suicidal thoughts on problems in several different studies (Cooper et al., 1995; Gonzalez et al., 2009; Read et al., 2003; Simons, Gaher, Correia, et al., 2005) and partially mediated the effects of neuroticism on drinking problems in two other studies (Cooper et al., 2000; Stewart, Loughlin, & Rhyno, 2001). Partial mediation by coping motives has also been reported for the effects of depression (Gonzales et al., 2009; Young-Wolff, Kendler, Sintov, & Prescott, 2009), generalized anxiety (Goldsmith et al., 2009), and stressful or traumatic experiences (Grayson & Nolen-Hoeksema, 2005; Peirce et al., 1994) on drinking problems. Finally, coping motives have been shown to either partially (Molnar et al., 2010) or completely (McNally, Palfai, Levine, & Moore, 2003) mediate the effects of diverse constructs reflecting low self-esteem and feelings of insecurity (such as attachment anxiety) on drinking problems (see Lecci, Maclean, & Croteau, 2002; Moeller & Crocker, 2009; Peirce et al., 1994, for related results).



Enhancement motives have also been shown to mediate the effects of theoretically relevant traits like extraversion on alcohol use. For example, enhancement fully mediated the effects of extraversion on both typical patterns of use and heavy drinking (Hussong, 2003; Kuntsche, von Fischer et al., 2008), as well as partially (Magid et al., 2007) or fully (Cooper et al., 1995; 2000; Read et al., 2003; Simons, Gaher, Correia, et al., 2005) mediated the effects of surgency and sensation seeking (lower order facets of extraversion) on measures of typical use or heavy drinking.

In contrast, results of mediation tests involving conscientiousness-linked traits such as impulsivity have produced mixed results. Although enhancement partially (Kuntsche, von Fischer et al., 2008) or completely (Stewart, Loughlin et al., 2001) mediated the effects of conscientiousness on alcohol use and heavy drinking in two different samples, it failed to mediate the effects of impulsivity in two other studies (Cooper et al., 2000; Simons, Gaher, Correia, et al., 2005). Coping motives also partially mediated the effects of conscientiousness on measures of alcohol use (Kuntsche, von Fischer et al., 2008) and drinking problems (Magid et al., 2007) in two studies, but failed to mediate the effects of impulsivity on either alcohol use or abuse in two additional studies (Cooper et al., 2000; Simons, Gaher, Correia, et al., 2005). As previously discussed, however, the mixed results are in line with the lack of clear theoretical expectations regarding associations between motives and impulsivity or undercontrol.

Finally, a small number of studies provide evidence that conformity motives mediate the effects of theoretically prior variables on alcohol-related outcomes. For example, conformity motives (in conjunction with coping motives) have been shown to completely mediate the effects of anxiety sensitivity (Stewart, Zvolensky et al., 2001) and to partially mediate the effects of attachment anxiety (Molnar et al., 2010) on drinking problems. In contrast, although several studies have shown mediation of theoretically prior variables on alcohol outcomes by social motives (e.g., Galen & Rogers, 2004; Hussong, 2003; Lecci, MacLean, & Croteau, 2002), studies that control for the effects of other motives typically fail to reveal independent mediation by social motives (e.g., Johnson et al., 2008; Molnar et al., 2010; Read et al., 2003).

Although mediation models assume a temporal order among the presumed cause, mediator, and outcome, all of the aforementioned tests relied on cross-sectional data that do not permit clear causal inference. Unfortunately, we are aware of only two longitudinal studies to test mediation by motives. Tragesser et al. (2007; Tragesser, Trull, Sher, & Park, 2008) showed that enhancement (but not coping) motives mediated relations between antisocial-impulsive personality traits and several alcohol outcomes from age 18 to 21, and from age 29 to 34. Littlefield and colleagues (Littlefield, Sher, & Wood, 2010) also reported a longitudinal test of mediation, showing that changes in coping motives (but not changes in enhancement) mediated the relationship between changes in neuroticism and impulsivity, on the one hand, and changes in alcohol problems, on the other, over a 16-year period. However, these authors examined only contemporaneous change and thus did not impose a temporal order on their data.

### **Do Motives for Marijuana and Tobacco Use Mediate the Effects of Prior Traits or Dispositions on Use and Abuse?**

#### **Marijuana Motives**

We found only one study that tested a mediational model using marijuana motives. Simons and colleagues (2005) estimated a model in which negative mood regulation (NMR) expectancies, affect lability, and negative affect were hypothesized to indirectly affect the frequency of use and use-related problems via coping motives for marijuana use, whereas positive affect and sensation seeking were hypothesized to affect use and use-related outcomes via enhancement motives. Results were consistent with mediation for NMR expectancies: people who believed that they could cope with negative moods were less likely to drink to cope and this in turn explained why they drank less and had fewer drinking problems. However, none of the remaining personality variables predicted either coping or enhancement motives for marijuana use. Simons and colleagues also included impulsivity in their model. Consistent with their expectation and with results from several alcohol studies (e.g., Cooper et al., 2000; Simons, Gaher, Oliver, et al., 2005), impulsivity directly predicted marijuana problems but did not predict either motive for use.

#### **Tobacco Motives**

To our knowledge, only one study has directly tested the mediating role of smoking motives. In a recent cross-

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sectional study of a treatment-seeking sample of adult smokers, Johnson and colleagues (Johnson, Stewart, Zvolensky, & Steeves, 2009) found that coping motives completely mediated the association between anxious arousal and smoking rate. However, coping motives also mediated the reverse association between smoking rate and anxious arousal, thus rendering unclear in which direction causality flowed or whether it was reciprocal.

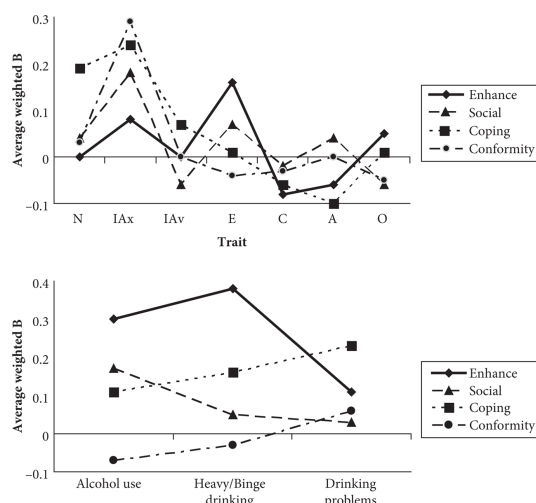
### Summary of Premise 5

Consistent with Cox and Klinger's model, existing evidence (although predominantly cross-sectional) provides strong support for the notion that coping motives mediate negative emotion pathways to use and abuse and that enhancement motives mediate positive emotion pathways. Although the subject of less empirical scrutiny, existing evidence also provides preliminary support for the idea that conformity motives may mediate the effects of social insecurities or anxieties on alcohol-related outcomes. In contrast, results are mixed for conscientiousness and associated traits, with some studies showing that enhancement motives mediate associations with alcohol use and abuse, others showing that coping motives mediate these links, and still others showing no mediation by either motive. Finally, we found only a single test of mediation by either marijuana or tobacco motives on use-related outcomes. Thus, although each study yielded some supportive evidence, clear conclusions cannot be drawn at this time about mediation by either marijuana or tobacco use motives.

Despite the generally supportive nature of findings for coping and enhancement motives for alcohol use, many of the studies documenting mediation by motives reveal only partial mediation. Such results run counter to a strict interpretation of Cox and Klinger's model, which implies complete mediation. The failure to find consistent and complete mediation by motives could reflect the effects of uncorrected measurement error, which is known to downwardly bias the estimation of mediation effects (Baumrind, 1983). Alternatively, such findings could indicate that motives are not *the* final common pathway, as Cox and Klinger contend, but rather one of several potentially important pathways.

### Discussion

Based on this review of the literature, we conclude that the data strongly support the basic premises on which Cox and Klinger's motivational model rests. The evidence clearly indicates that people use alcohol to regulate the quality and intensity of their emotional experience and to obtain important social outcomes, contentions central to Cox and Klinger's model. Although people report drinking to achieve other ends, the motives identified by Cox and Klinger and operationalized by Cooper's DMQ-R appear to be the most important motivational forces driving alcohol use. Indeed, other motives identified in the literature can be seen as specific instantiations of a broader class of motives identified by Cox and Klinger's model (e.g., epicurean motives as a subtype of internal approach motives); are relevant only during certain life stages (e.g., identity motives during adolescence) or stages of use (e.g., experimentation motives during onset of use); and are characterized by patterns of light, infrequent, and generally nonproblematic use (e.g., the epicurean motive) or with some combination of the above.



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Figure 2 . Profiles of personality -- motive associations (top panel) and motive – alcohol-related outcome

associations (bottom panel). Note. The data in the top panel are taken from Table 4 and the data in the bottom panel are taken from Table 5. N = Neuroticism; IAx = Interpersonal Anxiety; IAv = Interpersonal Avoidance; E = Extraversion; C = Conscientiousness; A = Agreeableness; O = Openness to Experience.

Also central to Cox and Klinger's model, the data strongly support the idea that drinking motivated by different needs represents distinct pathways to use and abuse. As the data summarized in Figure 2 visually portray, different motivations were associated with distinct profiles of predispositions, unique settings and situational antecedents, and distinctive patterns of use and abuse. This is not to say that contrary findings have never been observed, but rather that the overall pattern of findings is distinctive for each of the four motives. Finally, motives also appear to play an important proximal role in accounting for use and abuse, as Cox and Klinger hypothesized, mediating at least in part the influences of multiple theoretically (and presumably causally) prior factors.

This review not only supports a theoretically and conceptually coherent account of motivational processes in drinking behavior, but also documents a pattern of reliable motive effects on important alcohol outcomes that are moderate in magnitude, robust across populations (including adolescents, college students, emerging adults, adults) and countries (most notably, the United States, Canada, and Switzerland), as well as influential over time (e.g., Beseler et al., 2008; Cooper et al., 2008; Holahan et al., 2001) and across important life stages (e.g., from adolescence or emerging adulthood into young adulthood; Cooper et al., 2008; Littlefield et al., 2010). In short, the existing data indicate that motives for use play an important role in accounting for alcohol use behaviors and that Cox and Klinger's model provides a coherent framework for understanding these influences.

With regard to other substances, our review revealed more similarities than differences for marijuana use, but more differences than similarities for tobacco use. This pattern of findings suggests that Cox and Klinger's model may provide more traction for understanding marijuana than tobacco use. Similarities across substances notwithstanding, the literature points to potentially important differences in the content and relative importance of specific motives for marijuana and especially for tobacco use (see, e.g., Figure 1), differences that doubtless derive from the unique pharmacological and phenomenological properties of each drug. Such findings point to the limitations of overgeneralizing theoretical or measurement models from one substance to another without careful consideration of the unique psychoactive properties of each substance and the types of distinct uses these properties might enable. For example, recent work by Tragesser (personal communication, April 15, 2010) identified an overlapping set of motives for opioid use that include coping, social, and enhancement, as well as a unique pain relief motive, presumably stemming from opioids' analgesic properties.

### Caveats and Limitations of the Literature

Despite what we consider to be strong overall support, these conclusions must be tempered by several considerations. First, most data derive from studies using cross-sectional, retrospective, self-report methods, making the literature as a whole subject to important limitations. Chief among these are the inability to draw clear causal inferences about the direction of effects, potential inaccuracies and distortions owing to a host of well-documented random and systematic errors associated with retrospective self-reports (Schwarz, 1999), and possible inflation of associations due to mono-method bias. Fortunately, converging evidence from studies using alternative methods at least partly mitigates these concerns.

For example, although only a small number of longitudinal studies have been conducted, they nevertheless provide converging evidence that coping motives predispose to problem drinking and that enhancement motives predispose to heavy use (e.g., Beseler et al., 2008; Cooper et al., 2008; Holahan et al., 2001; 2003; Littlefield et al., 2010). Unfortunately, even fewer longitudinal studies have examined social or conformity motives, and they provide inconsistent evidence (cf., Bradizza, Reifman, & Barnes, 1999; Read et al., 2003; Schelleman-Offermans, Kuntsche, & Knibbe, 2011). Thus, it remains unclear whether cross-sectional findings pertaining to these motives will be borne out longitudinally. Moreover, we are aware of only one study that controlled for prior alcohol use when testing the effects of theoretically prior variables such as personality or expectancies on motives (Cooper et al., 2000). Thus, the possibility of reverse causal, reciprocal, and third-variable associations remains largely unaddressed.

Despite overreliance in the literature on self-report methodologies, laboratory studies show that self-report motive measures relate to non-self-report indices in theoretically meaningful ways (e.g., Birch et al., 2004; Colder, 2001;

Field & Powell, 2007; Field & Quigley, 2009; Kuntsche & Kuendig, 2012; Stewart et al., 2002), thus serving to increase confidence that patterns of results observed in the larger literature are not due solely to shared method variance. Strong support for the validity of conclusions drawn from the literature as a whole is also provided by randomized control trials that show the strongest impact of interventions that are targeted to specific underlying motivational dynamics among those who are dispositionally predisposed to drink for that reason (e.g., interventions targeting enhancement-motivated drinking among those who are high in sensation seeking; Conrod, Castellanos, & Mackie, 2008). Corroborating evidence from studies using intensive longitudinal designs that collect reports in near real-time (e.g., Grant, Stewart, O'Connor, Blackwell, & Conrod, 2007; Kuntsche & Cooper, 2010; Mohr et al., 2005; Simons, Gaher, Oliver, et al., 2005; Todd et al., 2005; 2009) also mitigate concerns that patterns of associations observed by retrospective reports reflect broad heuristics or generalized beliefs about drinking behavior rather than actual experience. Nevertheless, results of studies using alternative methods do not uniformly conform to results of the literature using global, retrospective self-reports. Thus, developing a more in-depth understanding of why findings sometimes diverge remains an important issue for future research, as discussed more fully later.

A second important limitation is the narrow and unrepresentative nature of the samples on which the overwhelming majority of research has been conducted. Indeed, college students have been the most frequently studied group, followed closely by adolescents. Although these groups are undeniably important populations to study, their overrepresentation in the literature means that we know almost nothing about how motivational processes shape drinking behavior among individuals older than 21 years of age. Although Cooper and colleagues' (Cooper, 1994; Cooper et al., 1992; 1995) work using both adolescent and adult samples revealed remarkable similarities in the processes studied, much remains to be understood about whether and, if so, how the importance of motives shift over the course of development. The fact that the social and legal contexts in which minors and adults drink vary dramatically coupled with well-documented shifts in people's goals and values as they age (Charles & Carstensen, 2010) supports the possibility at least that the importance of specific motives and the nature of those motivational processes also change with age.

An additional limitation is that samples used in past research (including European ones) have been overwhelmingly white. Consequently, we know little about how motivational processes play out among nonwhite drinkers. However, recent research documenting significant and substantial differences in how coping and enhancement motives influence drinking behavior among black and white drinkers (Cooper et al., 2008) cautions us against assuming that processes observed among white drinkers will automatically generalize to their nonwhite counterparts.

Most studies have also used unselected samples of drinkers, only a small percentage of whom are dependent. As a result, we know little about motivational processes among individuals who meet diagnostic criteria for impairment and dependence. Given evidence that self-report motives for tobacco use are more predictive among occasional and nondependent smokers than among their regular and dependent counterparts, it seems reasonable to question whether findings from the drinking and marijuana motives literature will generalize to populations of dependent users. Interestingly, however, results from the four studies we found using alcohol treatment samples (Galen, Henderson, & Coovert, 2001; Henderson & Galen, 2003; Kushner, Thuras, Abrams, Brekke, & Stritar, 2001; Molnar et al., 2010) indicate not only that drinking motives have predictive utility in clinical samples, but also that many of the patterns linking motives to alcohol outcomes are similar across dependent and nondependent users. Nevertheless, firm conclusions about the nature of motivational processes underpinning use among dependent individuals must await further research with appropriate samples. In short, these considerations point to a number of important gaps in the literature and indicate that the literature as a whole would be strengthened by the use of more diverse samples and methods.

A final limitation applies primarily to the literatures on marijuana and tobacco use motives. We note that recently introduced motive measures have blurred what we believe are important distinctions between motives and related constructs. For example, although expectancies and motives tap distinct constructs and may even have unique genetic underpinnings (Agrawal et al., 2008), recent motive measures unfortunately blur this distinction. Consider, for example, the following items from the WISDM Inventory of Smoking Dependence Motives (Piper et al., 2004): "Smoking helps me stay focused," and "I smoke when I really need to concentrate." The two items, although obviously related, differ in important ways. The former espouses a belief about the effect of smoking (i.e., an expectancy), whereas the latter implies that the individual values that particular effect of smoking, sees smoking as an effective and acceptable behavior for achieving that effect, and, furthermore, actually smokes to obtain that particular effect. Thus, although we would expect the two items to be correlated (owing to the fact that people who

smoke to obtain the effect should first believe that smoking provides the effect), we argue that even in the face of substantial correlation, theoretical clarity (if nothing else) mandates that the two items be distinguished. Similarly, the distinction between cues to use and motives has also been blurred. For example, availability of marijuana (included as a motive for use in Lee et al.'s, 2007, measure) clearly provides an opportunity to pursue a particular goal by using marijuana, and indeed might even activate or cue a particular motive for use. But it is not a motive per se. Neither cues nor expectancies represent desired end states or goals to be achieved through substance use, which we and other theorists (e.g., Geen, 1995) regard as the essential core of the motivational construct.<sup>4</sup> In short, we strongly encourage researchers to preserve the essential core of the motivational construct when devising items intended to assess motives.

### Outstanding Issues and Directions for Future Research

One of the most interesting and important issues plaguing this body of work concerns discrepancies that have emerged across different methods, in particular the failure of some studies using diary or other intensive longitudinal design methods to replicate straightforward predictions based on theory and results from the bulk of the literature using global retrospective, self-report measures. The issue is complex, however, because there are many possible reasons why results from studies using these two approaches might not converge. The simplest interpretation is that intensive longitudinal design studies provide valid information whereas global retrospective assessments using longer recall periods, to the extent that they diverge from the intensive design studies, do not. Indeed, this is more or less the conclusion drawn by critics of the tobacco motives literature nearly two decades ago (e.g., Shiffman, 1993; Tate, Schmitz, & Stanton, 1991). However, for several reasons, we would argue that this interpretation is overly simplistic.

One important reason why results might legitimately diverge is that studies using intensive longitudinal designs focus on within-person processes, whereas retrospective, self-report studies focus on between-person processes. This means that the two types of studies address different questions, concerning in the former case how a person varies from moment to moment or situation to situation, and in the latter case how people differ from one another. Given that these are different questions, there is no reason why they should necessarily yield the same answer. A second (and closely related) difference that might also contribute to observed discrepancies between the two methods is that studies using global self-report motive measures focus primarily on dispositional or trait-like motives (i.e., the motives that typically underlie our behavior), whereas intensive longitudinal design studies seek to understand deviations from or variations around an individual's typical or average experience. As work by Fleeson (2001) clearly documents, trait measures reliably describe how we behave, feel, or think *on average* across many situations, even though we do not behave, feel, and think in exactly the same manner across all situations. In fact, his work shows that behavior enacted across situations forms a distribution that can be reliably and accurately characterized by measures of central tendency (the mean) and dispersion (the standard deviation). In terms of the issue at hand, Fleeson's characterization suggests that global retrospective self-report motive measures focus on central tendencies (i.e., an individual's average or typical motivations), whereas intensive longitudinal design studies focus primarily on the spread (i.e., the variability in behavior from situation to situation). This analogy makes clear in yet another way how these two methods address distinct questions and why discrepant results between studies using these approaches do not necessarily invalidate either approach.

Fleeson's conceptualization helps us put into perspective yet another issue. Although global self-report measures should accurately predict the average level of a given behavior across many situational reports, one would not automatically expect them to predict behavior on every occasion. After all, behaviors form a *distribution* across situations. Thus, although we would expect a person who self-reports drinking to cope with negative affect to be more likely, on average, to drink following the experience of negative affect, we would not expect him or her to drink every time negative affect is experienced. And given that intense negative affect and drinking occasions are both relatively rare occurrences, it is perhaps not surprising that diary and other intensive longitudinal design studies—often having no more than three or four drinking days per individual and even fewer days characterized by high levels of negative affect (see Mohr et al., 2010)—might fail to show meaningful patterns of within-person associations between theoretically relevant cues such as negative affect and drinking behavior. Many more instances of both relatively rare occurrences may be required to reliably demonstrate the theoretically expected associations between specific cues and drinking behavior.

Although there are good reasons why results using global retrospective assessments over longer recall periods and intensive longitudinal design studies may not align, demonstrating theoretically predicted patterns of associations at the within-person level nevertheless remains a crucial goal for future research given that theoretical processes specified by motivational models occur largely at the within-person, not the between-person, level. To this end, we applaud the thoughtful and methodologically sophisticated work of Tennen and his colleagues who have begun to explore novel hypotheses about when and how self-report motives, situational antecedents such as mood, and drinking behavior should be related. For example, they have shown that high (vs. low) coping-motivated drinkers drink earlier in the day (Todd et al., 2009) and earlier in the week when the time leading up to that point is characterized by high (vs. low) levels of negative mood states (Armeli, Todd, Conner, & Tennen, 2008; see also Hussong, 2007). Such findings suggest that time-to-drink may be a more sensitive indicator of negative-mood-induced drinking than whether an individual drinks or how much he or she drinks. Mohr and colleagues (2005) have further shown that coping motives more reliably moderate the mood → drinking association when drinking at home is analyzed separately from drinking away from home, thus suggesting that our understanding of motivated drinking behavior must be expanded to include contextual factors (cf., Kairouz et al., 2002). Several studies also raise the possibility that positive and negative affect regulation processes interact in complex ways (e.g., Armeli, Conner, Cullum, & Tennen, 2010; Mohr et al., 2001) and thus must be considered jointly rather than independently. Finally, there is some evidence that theoretically predicted results are more likely to emerge when the specificity of motive measures are closely matched to antecedent mood states (see Grant et al., 2009), as described more fully later. Thus, a great many complexities likely characterize the day-to-day associations among mood, drinking behavior, and self-report motive measures, a complexity that must be embraced if we are to make significant strides toward fully understanding motivated drinking behavior.

Whereas this review focused on the four motives implied by Cox and Klinger's model, motives have been conceived both more broadly and more narrowly. For example, some researchers have composited social and enhancement motives to form a single approach motive factor (e.g., Armeli et al., 2008; 2010; Engels, Wiers, Lemmers, & Overbeek, 2005; Park et al., 2004) or composited coping and conformity motives to form a single avoidance motive factor (e.g., Engels et al., 2005; Lewis et al., 2008). Still others have used all four motives to form a general motivation-to-drink factor (e.g., Lewis, Phillippi, & Neighbors, 2007; Urban, Kokonyei, & Demetrovics, 2008). Conversely, as shown in Tables 1 and 2, some researchers subdivided rather than aggregated motive content—for example, differentiating internal avoidance (i.e., coping) motives into coping with anxiety and coping with depression (Grant et al., 2007) and internal approach motives into drinking to enhance the quality of one's emotional experience and drinking to enhance one's gustatory pleasure or culinary experience (cf., Alvarez & del Rio, 1994; Kairouz et al., 2002).

As these examples illustrate, motives can be conceptualized on at least four levels of generality—from subtypes of the four motive categories implied by Cox and Klinger's model at the most narrow level to an overall motivation to drink at the broadest level. The question then becomes, is one level better than another? According to Cronbach and Gleser (1957), maximum utility can be seen as a compromise between achieving breadth (i.e., bandwidth) versus accuracy (i.e., fidelity). On the one hand, subordinate categories have high fidelity and diagnostic value because they include highly similar exemplars (e.g., drinking to cope with anxious feelings). On the other hand, more inclusive categories apply to a wider range of instances (e.g., drinking to cope with the full range of all possible negative feelings).

Work on the relative utility of personality descriptors that vary in breadth (e.g., charitable, generous, kind, and good) suggests that descriptors at an intermediate level of abstraction (in the prior example, generous or kind) convey the most useful information (Cantor & Kihlstrom, 1987; John, Hampson, & Goldberg, 1991). Extrapolating from this work suggests that categorizing motives at the level of the two dimensions identified by Cox and Klinger (approach vs. avoidant; self vs. internal), or by the four motive categories captured by crossing the two dimensions, likely represent the optimal levels of categorization. In contrast, the most superordinate (a general motivation to drink factor) and subordinate levels (e.g., coping with specific negative affects) may prove less useful for most purposes.

Others have argued, however, that predictive validity will be optimized when the specificity of the predictor and outcome are matched (e.g., Hogan & Roberts, 1996). Indeed, a mismatch between specificity of the motive measure and the drinking behavior under study may be one reason why studies using intensive longitudinal designs often fail to reveal the predicted moderating effects between self-report measures of (general) coping

motives and specific negative mood states. Consistent with this possibility, Grant and colleagues (2009) recently showed that drinking to cope with anxiety moderated the association between anxious (but not depressed) mood and later drinking in the theoretically predicted manner, whereas drinking to cope with depression moderated the association with depression (but not anxiety) and later drinking. Thus, more nuanced motive measures may prove particularly important when the goal is to understand drinking in specific situations or in response to specific situational antecedents. In the reverse direction, however, we believe that the superordinate level of aggregation rarely if ever represents the optimal trade-off between bandwidth and fidelity due to the heterogeneity of motivational dynamics represented.

This review also reveals a relative neglect of external/social motives. This is true not only empirically (in particular for conformity motives), but also theoretically. Whereas we have relatively well-developed models of drinking prompted by positive and negative mood regulation goals (e.g., Cooper et al., 1995), we lack carefully developed, theoretically grounded models of socially motivated use. This is particularly important given that most people report drinking for social reasons. Although the overall pattern of results suggests that social approach motives are linked with moderate, nonrisky drinking and that social avoidance motives exert relatively small effects, we suspect that these motives may play more influential roles during certain developmental periods or stages of use, in certain contexts, or among some subgroups of users.

For example, individuals who drink primarily for social reasons should be particularly vulnerable to social norms for drinking and thus at increased risk for the development of heavy and/or problematic patterns of use when embedded in a heavy drinking subculture (e.g., in a fraternity house). Consistent with this expectation, Lee and colleagues (Lee, Geisner et al., 2007) showed that social approach motives interacted with drinking-related norms to predict both alcohol use and abuse among college student drinkers, such that those who drank for social reasons and were embedded in a heavy drinking subculture drank the most and experienced the most problems.

Although a number of studies have shown that various forms of social anxiety and distress predict drinking to conform (see Table 4), to the best of our knowledge, no study has tested the possibility that socially anxious individuals who drink to conform are particularly likely to drink, or to drink excessively, in the face of peer pressure. Indeed, such a dynamic might account for isolated instances of heavy drinking that lead to adverse outcomes and as such could explain why people who drink to conform report elevated levels of drinking problems despite drinking less than their peers.

Broadly speaking, we expect that useful models of socially motivated drinking will need to do a much better job of integrating situational and contextual factors than existing motivational models have done because social motives are, by definition, driven by the anticipation of rewards and punishments in the social environment. Thus, future research will need to more carefully conceptualize and operationalize the meaningful features of the social environment itself, as well as more fully delineate how these features combine with an individual's own preferred styles of behaving, beliefs, or expectancies and goals to shape drinking behavior both globally and in specific situations.

Another approach that we believe has been underutilized involves directly assessing motives on specific drinking occasions. Exclusive reliance on dispositional drinking motive measures implicitly assumes that individuals drink for the same reasons across all occasions. Yet available data suggest that this is not the case. Consider, for example, the data summarized in Table 3. The average student in Kairouz et al.'s study (2002) reported on 3.8 different drinking occasions. The fact that even the most frequently selected category of motives was selected less than 40% of the time implies that the average student chose three different motives across the 3.8 occasions. Although we are certain that some students were more stable in their choices across drinking occasions, the data unfortunately were not analyzed so as to directly address this issue. Nevertheless, we know that there is considerable within-person variability in alcohol use across occasions (e.g., Kairouz et al. reported that 50% of the variance in alcohol use reflected within-person variability across situations) and that within-person variability in motives reliably predicts within-person variability in drinking behavior (e.g., Kairouz et al., 2002; Mihic et al., 2009). Such data clearly indicate that motives vary from situation to situation in ways that are meaningful, not random. Thus, although we often talk about motives as fixed attributes of individuals, it is surely more complex than this. Although people do differ on average from one another in theoretically predictable ways, they also vary from situation to situation in their motives for use (cf., Fleeson, 2001). A better understanding of how motives vary within a person across situations is an important issue for future research and will require that both alcohol use and

motives for drinking be assessed in specific situations.

Finally, we note that few studies have directly compared motives for use across different substances (see Comeau et al., 2001; Simons, Gaher, Correia, et al., 2005; for exceptions). Such studies are important, however, because they enable direct tests of models that identify and estimate the contributions of common dynamics that underlie use across a range of substances from those that are unique to a given substance (cf., Cooper, Wood, Orcutt, & Albino, 2003). The parsing of similarities and differences in the motivational dynamics underlying use of different substances has important implications for prevention and intervention strategies: Similarities point to areas that can be targeted in universal intervention strategies, whereas differences point to areas best handled by substance-specific programming.

### Conclusion

This review provides strong support for the central tenets of Cox and Klinger's motivational model and further shows that self-reported motives for drinking predict consequential outcomes over periods of 10 years or more. At the same time, evidence from diary and other intensive longitudinal design studies indicates that the within-person processes implied by the theoretical model are more complex than the theory implies and that these complexities may not be well modeled at the between-person level using global, retrospective self-report motive measures. Although self-report motive measures cannot be dismissed as invalid because of their predictive utility vis-à-vis important real-world outcomes (e.g., Cooper et al., 2008; see Lucas & Baird, 2006), the lack of straightforward convergence between global self-report motive measures and many of the findings that have emerged from studies using intensive longitudinal designs raises important questions about what global self-report motive measures actually measure. One possible answer, offered by Plasecki and colleagues (2007), is that they tap the subjective importance of different reasons for use, not the actual frequency with which people use for these reasons. Alternatively, perhaps they are best understood as part of an individual's personal narrative—that is, as an attempt to understand and make sense of his or her substance use behavior in the larger context of his or her ongoing life. As such, the account need not be veridical in the sense of perfectly reflecting what transpires in daily life to be meaningful and important. Indeed, Wirtz and colleagues (Wirtz, Kruger, Napa-Scollon, & Diener, 2003) showed that people's global retrospective ratings of satisfaction with their most recent vacation predicted whether they wanted to return to that vacation spot again, not the daily ratings of satisfaction completed while they were on vacation (see Kahneman, Fredrickson, Schreiber, & Redelmeier, 1993, for similar findings). Thus, although daily ratings are often treated as the "gold standard" for global, self-report motive measures, it may instead be what we make of our experience that shapes our lives going forward.

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### Notes:

(<sup>1</sup>) It is interesting to note that none of the open-ended studies identified self-handicapping motives, a phenomenon in which individuals who feel insecure about their competence in certain situations consume alcohol in advance so that any future inadequacies in their performance can be attributed to intoxication rather than lack of ability (Berglas & Jones, 1978). The failure of this motive to appear in any of these studies is consistent with conclusions reached by Bordini and colleagues (Bordini, Tucker, Vuchinich, & Rudd, 1986) after nearly a decade of intensive research on the topic: use of alcohol as a self-handicapping strategy “may be limited as a general model of alcohol consumption” (p. 346).

(<sup>2</sup>) Some researchers have examined motives for not using, which would be expected to map onto negative expectancies. However, the present review does not address motives for not using.

(<sup>3</sup>) Although a more parsimonious statistical approach exists for establishing mediation (see Yuan & MacKinnon, 2009), we chose to articulate the individual relationships implied by the mediational model because this provides a more useful conceptual framework for reviewing the literature.

(<sup>4</sup>) It is worth noting that these concerns are less of an issue in the alcohol literature primarily because the most widely used alcohol motive (the DMQ and DMQ-R; see Kuntsche et al., 2005) and expectancy (the AEQ; Brown et al., 1987) measures maintain these distinctions.

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