Published in final edited form as:

Soc Personal Psychol Compass. 2010 September ; 4(9): 767–782. doi:10.1111/j.1751-9004.2010.00296.x.

The Multiple, Distinct Ways that Personality Contributes to Alcohol Use Disorders

Andrew K. Littlefield and Kenneth J. Sher

Department of Psychological Sciences, University of Missouri-Columbia and the Midwest Alcoholism Research Center, Columbia, Missouri.

Andrew K. Littlefield: littlefielda@missouri.edu

Abstract

There is little question of whether personality is associated with problematic alcohol involvement (such as alcohol use disorders; AUDs); it clearly is. However, the question remains: *how* or *why* is personality related to risky drinking and AUDs? To address this question, theoretical models have been posited regarding the causal effects of personality on alcohol use and related problems. In this article, several of these models are summarized and reviewed. Future research directions are discussed, including possible frameworks that serve to integrate various models of the personality-AUD relation.

Keywords

personality; alcohol use disorders; drinking motives

Does personality relate to pathological alcohol use? This question has long been a focus of substance use researchers and clinicians. Though the identification of an “addictive personality” (i.e., a specific configuration of personality characteristics linked to addictive behaviors) has largely been abandoned, numerous studies demonstrate links between specific personality traits and problematic alcohol involvement. More specifically, though traits related to impulsivity/disinhibition appear to demonstrate the most robust and consistent relation with alcohol involvement, all Five-Factor traits (i.e., openness to experience, conscientiousness, extraversion, agreeableness, neuroticism) have been shown to correspond, with varying degrees of consistency, to alcohol use and outcomes (see Sher, Bartholow, & Vieth [1999] for a review of papers linking personality to alcohol use disorders [AUDs] and Malouff, Thorsteinsson, Rooke, & Schutte [2007] for a recent meta-analysis that suggests, among Five-Factor traits, only conscientiousness, agreeableness, and neuroticism are significantly linked to alcohol involvement, and Trull & Sher [1994] for an alternative analytic approach involving personality and AUDs). Thus, the question of whether personality is associated with problematic alcohol involvement (such as alcohol use disorders; AUDs) can be clearly answered: yes!

What remains to be addressed is *how* or *why* personality relates to risky drinking and AUDs. Understanding the mechanisms of how broad personality traits such as neuroticism influence mental and physical health has recently been identified as “top priority for research” (Lahey, 2009), and the relation between personality and AUDs is no exception. Though personality and AUDs could be, logically, linked in a variety of ways (e.g., personality could influence

AUDs, AUDs could influence personality, both could be influenced by a third-variable; see Sher et al., 1999), numerous theoretical models focusing on causal effects of personality on alcohol use and related problems have been posited and examined. Below, we summarize several of these models and selectively review relevant empirical findings. We then close by discussing future research directions, including possible frameworks that serve to integrate various models of the personality-AUD relation.

Deviance Proneness

Rather than suggesting that problematic alcohol use is the result of psychological or psychobiological risk factors, the deviance proneness model (Sher et al., 1999) posits that substance use represents a facet of a broad pattern of deviant behaviors that are thought to begin in childhood as a result of deficient socialization and genetic vulnerability. These deficits are not specific to substance use but also are associated with a number of other problematic outcomes, including association with deviant peers, childhood achievement problems, and delinquent behaviors. For example, Cooper, Wood, Orcutt, and Albino (2003) demonstrated that the relations among educational underachievement, delinquent behavior, substance use, and sexual behavior could be adequately modeled as a single higher order factor and that avoidance coping and impulsivity were risk factors for engaging in these behaviors. Factor analytic models also suggest that alcohol dependence, reverse-scored constraint (a construct related to impulsivity), drug dependence, conduct disorder, and antisocial behavior appear to be well represented by an “externalizing” factor (i.e., latent variable), providing evidence that both personality and substance use should be viewed along the same externalizing continuum (see Krueger et al., 2002; Krueger, Markon, Patrick, & Iacono, 2005). Rather than indicating deficient socialization processes per se, these models suggest that the overlap between alcohol dependence, constraint, and other externalizing behaviors is due largely to genetic factors (see *Genetic Diathesis* section below) and, to a lesser extent, environmental influences (Krueger et al., 2002).

There are a number of alternative, though not incompatible, theories regarding the role of personality in the deviance proneness model. For example, long-term socialization processes such as those created through parents and community institutions (e.g., schools) are thought to be influenced by personality (see Sher et al., 1999). Conversely, other theories hypothesize that “risky” personality characteristics act proximally to influence problematic substance use through impulsive decision-making styles. Thus, under the deviance proneness model, personality could influence substance use both distally (e.g., through peer group norms) and proximally (e.g., “risky” decision making).

Genetic Diathesis

Though the idea that the genetic diathesis, or risk, for AUDs might be mediated by personality was first proposed by Cloninger (1987), the genetic correlation between personality and AUDs was first demonstrated by Slutske et al. (2002). Using data from over three-thousand twin pairs, Slutske et al. found that genetic variance in behavioral undercontrol (i.e., traits related to impulsiveness, novelty seeking, nonconformity, and aggressiveness; Sher, 1991) accounted for approximately 40% of the genetic variation in alcohol dependence. Conversely, genetic variation in negative emotionality only accounted for a modest (though significant) 4% of genetic variation in alcohol dependence in men, and failed to significantly account for a significant portion of alcohol dependence in women. The finding that genetic influences contributing to behavioral undercontrol substantially overlap with the genetic diathesis of AUDs suggests that common genetic factors of both impulsive personality configurations and AUDs may be identified (see *Integrating Developmental Models of Alcohol, Personality, and Relevant Mediators* section below). It also suggests that

part of the genetic influence on the development of AUDs is not specific to alcohol use disorders and likely shared by a number of externalizing behavior problems including other substance use disorders (Kendler, Prescott, Myers, & Neale, 2003; Krueger et al., 2002; Krueger et al., 2005).

Pharmacological Vulnerability

Broadly, the pharmacological vulnerability model (Sher, 1991) proposes that individuals have differential responses to acute and/or chronic effects of alcohol; that is, some individuals may be more or less sensitive to either positive or negative reinforcement or to punishing effects of alcohol (see Sher et al., 1999, for more details). This general notion that variation in personality predicts vulnerability to certain alcohol effects has been around for more than 80 years (Cleckley, 1982; MacDougall, 1929). These individual differences in response to alcohol are thought to be relevant to the development of AUDs.

Some evidence suggests individual differences in personality moderate individual responses to alcohol. Laboratory studies examining individual differences in the stress-dampening effects of alcohol (Levenson, Oyama, & Meek, 1987; Sher & Levenson, 1982) found that individuals characterized by outgoing, aggressive, impulsive, and antisocial characteristics had pronounced stress-response-dampening effects from alcohol, suggesting that these individuals may find alcohol consumption to be especially reinforcing. Similarly, individuals high in anxiety sensitivity, a “cognitive, individual difference variable characterized by a fear of arousal-related bodily sensations such as dizziness, trembling, and racing heartbeat” (Stewart & Kushner, 2001, p. 775), also demonstrate marked anxiolytic effects to alcohol (e.g., Conrod, Pihl, & Vassileva, 1998; MacDonald, Baker, Stewart, & Skinner, 2000; Stewart & Pihl, 1994; see Stewart & Kushner, 2001; Stewart, Samoluk, & MacDonald, 1999).

Further, diagnosis of AUDs (especially alcohol abuse) is determined, in part, by the consequences that follow consumption. Traits ranging from empathy (Giancola, 2003) to those related to hostility (Giancola, 2002a; 2002b) are associated with experimentally provoked alcohol-related aggression. Importantly, these findings demonstrate that, independent of the link between personality and the “reinforcing” or “punishing” effects of alcohol, personality also appears to influence the nature of drunken comportment.

Despite these findings, several shortcomings regarding personality as a moderator of the pharmacological effects of alcohol (at least regarding response to stress) should be noted. Laboratory-based findings have been inconsistent (e.g., Sher, & Walitzer, 1986; see Sher & Wood, 2005) and there is a lack of laboratory studies that used structured and empirically verified measures of personality (e.g., Five-Factor measures of personality; Costa & McCrae, 1992). Thus, integrating these initial findings into contemporary models of personality is somewhat difficult. Recent research using within-person, process-oriented methodology (e.g., daily-diary data) and five-factor measures of personality (e.g., NEO-PI-R; Costa & McCrae, 1992) has also produced inconsistent findings regarding personality as a moderator of the alcohol-stress relationship. For example, Armeli et al. (2003) hypothesized that the stress-response dampening effects of alcohol should be stronger for participants high in neuroticism, extraversion, and self-consciousness. Though there was some support for these hypotheses involving extraversion and self-consciousness, results were inconsistent across the five moods assessed in the study (i.e., sad, nervous, relaxed, happy, and angry). Thus, though pharmacological vulnerability models of personality are conceptually important, empirical support for these models has been somewhat inconsistent.

Personality and Environmental Selection

As noted by Park, Sher, Krull, and Wood (2009), individuals tend to self-select into environments that are compatible with their own character or personality. This so-called *selection* process (Buss, 1987; see also Caspi & Bem, 1990; Plomin, DeFries, & Loehlin, 1977; Scarr & McCartney, 1983) is evidenced in several areas of human behaviors (e.g., peer relationships; Caspi, Roberts, & Shiner, 2005). Notably, since individuals are inclined to act on the basis of their existing characteristics, selection processes based on personality may be especially likely during transitional periods that present a host of choices (Caspi & Bem, 1990).

For example, in a prospective study of over 3,000 undergraduates, Park et al. (2009) found that individuals high on impulsivity/novelty seeking appeared to select into Greek societies (i.e., college fraternities/sororities) because of the heavy drinking environment associated with these organizations. Park et al. (2009) also found that individuals high in extraversion selected into the Greek system despite not being particularly heavy drinkers prior to college. Thus, extraverted students may participate in the Greek system to meet their higher activity/social needs as means to enhance positive emotions. Notably, Greek membership places members at risk for heavy drinking, regardless of motives, and thus remains a robust environmental risk factor for problematic alcohol involvement. Overall, these findings suggest that personality also contributes to AUDs through self-selection into risky group memberships that, in turn, appear to increase problematic drinking behaviors through later socialization processes.

Affect Regulation

Individuals appear to be motivated to use substances for various reasons, including the regulation of both positive and negative emotions. Based on the work of previous theorists (Cox & Klinger, 1988, 1990), Cooper (1994) developed and validated a four-factor model for drinking motivations. This model characterized drinking motives along two underlying dimensions reflecting source (internal or external) and the valence (positive or negative) of the results an individual hopes to attain by drinking. Crossing these two dimensions constructs four motivational classes: (a) intrinsic, positive reinforcement (“enhancement”), (b) extrinsic, positive reinforcement for social rewards (“social”), (c) intrinsic, negative reinforcement (“coping”), and (d) extrinsic, negative reinforcement to avoid social disapproval (“conformity”).

Since personality traits are thought to influence the motivation of behavior in general, they are also expected to relate to specific alcohol related motivations, especially motives that are directly related to internal affect regulation (i.e., enhancement and coping). Several theorists have suggested that motivations act as a proximal influence on substance use through which more distal factors, such as personality, are mediated (e.g., Cooper, Frone, Russell, & Mudar, 1995; Cox & Klinger, 1988, 1990; Kuntsche, von Fisher, & Gmel, 2008; Stewart & Devine, 2000; see Sher et al., 1999). Providing empirical support for this notion, Kuntsche, Knibbe, Gmel, and Engels (2006) reviewed over 80 scientific papers concerning drinking motives of people aged 10–25 and concluded there was a robust positive relation between neuroticism (Cooper, Agocha, & Sheldon, 2000; Kuntsche et al., 2008; Stewart & Devine, 2000; Stewart, Loughlin, & Rhyno, 2001) and coping motives (i.e., drinking to alleviate negative emotional states). Enhancement motives (i.e., drinking to enhance positive emotional state) have been primarily linked to low inhibitory control (e.g., Colder & O’Connor, 2002), sensation-seeking (e.g., Comeau, Stewart, & Loba, 2001; Cooper et al., 1995), impulsivity (e.g., Cooper, Agocha, & Sheldon, 2000), and extraversion (e.g., Kuntsche et al., 2006).

Further, coping and enhancement motives exhibit robust relationships with alcohol involvement and have been shown to mediate the influence of personality on alcohol outcomes (e.g., Cooper et al., 1995; see Kuntsche, Knibbe, Gmel, & Engels 2005; Kuntsche et al., 2006). As reviewed by Kuntsche et al. (2005), enhancement motives appear to be related to heavy drinking (Carey, 1993; Cooper, Russell, Skinner, & Windle, 1992; Read, Wood, Kahler, Maddock, & Palfai, 2003; Schulenberg, Wadsworth, O'Malley, Bachman, & Johnston, 1996) whereas coping motives appear to be related to both heavy drinking and alcohol-related problems (Carpenter & Hasin, 1999; Cooper et al., 1995; Cooper, Russell, & George, 1988; Holahan et al., 2001; Holahan, et al., 2003; McNally et al., 2003; Simons, Correia, & Carey, 2000; Windle & Windle, 1996; but see also Cooper et al., 2008).

Despite these findings, several issues concerning the relation between personality and motives should be highlighted. First, personality traits do not necessarily account for a high proportion of variance in drinking motives. For example, the relation between sensation seeking and enhancement motives appears to be modest (e.g., $r=.20$; Cooper et al, 1995; $r=.18$; Comeau et al., 2001). Second, results of several studies suggest that the influence of personality on alcohol involvement remains even when accounting for drinking motives, implying that other mechanisms (such as those described throughout this article) are important mediators of the personality-alcohol involvement relation. Third, to some degree, there is a lack of specificity between personality traits and motives. Though the review by Kuntsche et al. (2006) concluded that adolescents and young adults that drink for enhancement rather than coping motives tend to be impulsive, impulsivity exhibited similar correlations with enhancement ($r=.19$) and coping ($r=.21$) motives in the Cooper et al. (2000) study. Indeed, noting that individuals high in impulsivity may engage in risky behaviors associated with immediate rewards that can be positively or negatively reinforcing, Cooper et al. (2000) posited that impulsivity may be linked with both enhancement and coping motives (a notion recently supported by developmental findings in Littlefield, Sher, & Wood, 2010; see *Developmental Models of Personality-Alcohol Relation* below). Further, impulsivity failed to be a significant predictor of enhancement motives when neuroticism and extraversion were taken into account, suggesting the relation between impulsivity and enhancement motives is at least partially accounted for by other personality traits (see Cooper et al., 2000; Kuntsche et al., 2006).

Notably, other models suggest that personality traits may influence the use of alcohol to regulate affect. For example, according to the self-awareness model of alcohol (Hull, 1987), painful affective states are mediated by a state of self-awareness. Thus, by interrupting psychological mechanisms that relate to self-awareness, alcohol is thought to reduce distress. Individuals with high private self-consciousness (i.e., the corresponding trait of the state of self-awareness) are considered to be particularly susceptible to experience negative affect when exposed to negative information about the self and thus may be more likely to seek relief through substances (e.g., alcohol) that attenuate negative affect produced by self-awareness processes. Consistent with this notion, Park, Sher, & Krull (2006) found that sorority members (who may experience higher levels of emotional distress and engage in heavy drinking as a coping strategy; see Park et al., 2006) increased their drinking as private self-consciousness increased.

Developmental Models of Personality-Alcohol Relation

The distinction between prealcoholic personality traits and clinical personality traits proposed by Gordon Barnes (1979) was a critical one in the history of research on personality and AUDs. Barnes noted that many traits associated with clinical alcoholism (at that time typically assessed via the Minnesota Multiphasic Personality Inventory [MMPI]; Hathaway & McKinley, 1940) tended to change over the course of recovery and often

differed from traits identified in prospective studies (e.g., Jones, 1968; Jones, 1971) and follow-back studies (e.g., Hoffman, Loper, & Kammeier, 1974). As noted by Sher et al., (1999), there is now a strong database demonstrating significant prediction of future alcohol (and other drug) problems, especially traits related to behavioral disinhibition and, to a lesser extent, neuroticism.

However, it is only recently that individual differences in developmental changes in personality and changes in problematic alcohol involvement have been empirically linked. Though personality traits are traditionally thought to be stable internal dispositions (McCrae et al., 2000; but see also Costa & McCrae, 2006), several studies suggest that specific personality traits exhibit systematic patterns of marked mean-level change, especially during emerging (roughly ages 18–25; see Arnett, 2000) and young adulthood (Caspi, Roberts, & Shiner, 2005; McCrae et al., 1999; Roberts, Walton, & Viechtbauer, 2006).

The normative changes in these traits tend towards configurations of personality that reflect greater emotional stability, self-control, risk avoidance, and agreeableness as people reach adulthood. This normative tendency towards maturity, which has been labeled the *maturity principle* (Caspi et al., 2005), is thought to be linked to marriage, parenthood, and other adult role transitions (e.g., Roberts et al., 2006; Roberts & Mroczek, 2008).

Interestingly, marked developmental changes in problematic alcohol involvement also occur in this same timeframe. The “maturing out” (Winick, 1962) of problematic alcohol involvement is characterized by the peak prevalence of alcohol use and problems in the early twenties before declining as individuals grow older (e.g., Bachman et al., 2002; Fillmore, 1988; Jessor, Donovan, & Costa, 1991; Yamaguchi & Kandel, 1985; see O’Malley, 2004–2005). As with personality, these developmental changes in heavy drinking and AUDs are thought to be influenced by the acquisition of adult roles (O’Malley, 2004–2005). Notably, a number of studies suggest that adult role transitions (and/or satisfaction in adult roles and relationships) are linked to both declines in problematic alcohol involvement (e.g., Bachman et al., 2002; Bachman, Wadsworth, O’Malley, Johnston, & Schulenberg, 1997; Kearns-Bodkin & Leonard, 2005; Leonard & Rothbard, 1999; Gotham, Sher, & Wood, 2003) and changes in personality that suggest maturity (e.g., increased emotional stability; Neyer & Lehnart, 2007; Roberts & Chapman, 2000; Roberts, Helson, & Klohnen, 2002; Robins, Caspi, & Moffitt, 2002; Scollen & Diener, 2006; see Roberts & Mroczek, 2008).

Further, empirical evidence suggests variability in the developmental course of both alcohol involvement and personality, such that some individuals do not reduce problematic alcohol use (e.g., Fillmore, 1988) or make normative and ostensibly adaptive changes in personality (e.g., Johnson, Hicks, McGue, & Iacono, 2007; Jones & Meredith, 1996; Robins et al., 2001). Littlefield, Sher, and Wood (2009) recently found that changes in neuroticism and impulsivity corresponded with changes in alcohol problems from ages 18–35, such that individuals who exhibited sharper declines in neuroticism and impulsivity across this period also tended to make steeper decreases in alcohol problems. Moreover, these changes remained significant when accounting for the influence of adult role statuses (i.e., marriage and parenthood). In the same sample and across the same time span, Littlefield, Sher, and Steinley (in press) demonstrated that distinct impulsivity trajectory groups exhibited differential changes in alcohol involvement (especially from ages 18–25), such that a trajectory group characterized by significant decreases in impulsivity from ages 18–25 was more likely to undergo significant decreases in a variety of alcohol-related indices (including consumption and consequence measures) across this period of time compared to other trajectory groups. Providing a more refined picture of the dynamic relation between impulsivity and alcohol involvement, findings from this recent work suggest that individuals

high and comparatively stable in impulsivity are especially susceptible to maintain elevated levels of problematic alcohol involvement during emerging adulthood. Further, though the data were still correlational in nature and thus causal relations between impulsivity and alcohol cannot be completely determined, the patterns of covariation among these constructs suggests that alcohol use appears to be a trailing (i.e., a consequence of) indicator of impulsivity development (as opposed to leading, etiologic predictors of developmental course; see Littlefield et al., in 2010; Sher Gotham, & Watson, 2004).

Further, it appears that developmental changes in drinking motives, specifically coping motives, may be an important mechanism through which changes in both neuroticism and impulsivity relate to changes in alcohol problems. Littlefield, Sher, and Wood (2010) recently showed that changes in neuroticism and impulsivity also related to changes in coping motives, such that individuals that decreased in these respective personality constructs also tended to show more pronounced decreases in coping motives, which in turn predicted steeper decreases in alcohol problems. Overall, these findings suggest that the relation between changes in personality and alcohol problems are largely mediated by changes in coping motives and that these constructs should be considered together in a developmental framework (see *Integrating Developmental Models of Alcohol, Personality, and Relevant Mediators* section below).

Synthesizing Models of the Personality-Alcohol Relation

In sum, there are a number of theoretical models with varying degrees of empirical support that attempt to address the question of how or why personality relates to problematic drinking and AUDs. An illustration of these multiple pathways is provided in Figure 1. As noted elsewhere (e.g., Sher & Littlefield, 2008), these models are neither exhaustive nor mutually exclusive. For example, an individual with relatively high levels of impulsivity/behavioral disinhibition could hypothetically: 1) display a range of externalizing behaviors during childhood that may overlap with personality through common genetic factors (genetic diathesis); 2) affiliate with deviant peer groups that have access to alcohol during adolescence (deviance proneness); 3) subjectively enjoy drinking because the effects of alcohol are especially rewarding by reducing stress (pharmacological vulnerability); 4) later self-select into a Greek organization during college that tolerates (or promotes) heavy drinking (environmental selection); 5) become increasingly involved in a heavy drinking lifestyle that includes using alcohol to increase positive moods and/or decreases negative moods (affect regulation); 6) experience developmental changes after college, including transitions to adult roles of marriage and parenthood, undergoing decreases in impulsivity/behavioral disinhibition, and exhibiting substantial reductions in heavy alcohol use (developmental). Importantly, this example and the model displayed in Figure 1 do not demonstrate the only ways that personality may relate to problematic alcohol use but rather illustrate the multiple pathways in which personality may influence AUDs across the lifespan. Indeed, none, one, or several of the pathways described above may contribute to the development of an AUD for a given individual and none of these pathways are mutually exclusive. Further, some risk factors may also interact to predict personality and AUDs (e.g., gene-environment interactions; see *Integrating Developmental Models of Alcohol, Personality, and Relevant Mediators* section below).

Implications and Future Directions

Several personality constructs have been linked to AUDs, especially constructs related to impulsivity/behavioral inhibition. Personality appears to influence alcohol use and misuse through a number of non-mutually exclusive pathways. Below, clinical implications of the personality-alcohol relation are discussed, as well as possible future directions for research.

Clinical Implications

Research documenting the relation between personality and alcohol problems has important implications regarding both assessment and treatment of AUDs. For example, Littlefield et al. (2009) suggest that their research documenting that changes in personality correspond with changes in alcohol problems implies that individuals that exhibit changes in both problematic drinking behaviors and personality may have undergone significant and beneficial change. Conversely, individuals that evidence changes in drinking behaviors but not personality may signify an elevated risk for relapse or sustained risk for associated problem behaviors.

Regarding treatment, alcohol interventions could employ strategies to reduce personality traits and corresponding motives for alcohol use that are linked to drinking (Littlefield et al., 2009; Littlefield et al., in press). For example, based on evidence that suggests corresponding changes between neuroticism and work satisfaction, researchers have recently proposed career counseling as a possible intervention to decrease neuroticism (Scollon & Diener, 2006). Other interventions ranging from cognitive skills programs to exercise regimes (Baumeister, Gailliot, DeWall, & Oaten, 2006) may lead to self-regulation and, therefore, decreases in impulsivity. Conrod et al. (2000) designed treatments customized to individuals with different substance use motivations associated with various dimension of personality, and empirical evidence suggests this approach has merit (especially for individuals high in sensation seeking; see Conrod, Castellanos, & Mackie, 2008). As coping motives appear to be an especially important mediator of the personality-alcohol relation, treatments targeting coping skills (see Marlatt & Witkiewitz, 2009; Witkiewitz & Marlatt, 2004) may also result in reductions in alcohol problems.

Using Refined Measures of Personality and Mediators of the Personality-Alcohol Relation

The majority of studies examining the link between personality and AUDs use broadband measures of personality rather than lower-order structures or facets of personality. However, recent research suggests specific facets of personality may differentially relate to alcohol use and misuse. Whiteside and Lynam (2001) employed factor analyses to identify four distinct personality facets related with impulsive-like behavior: sensation seeking, lack of planning, lack of persistence, and urgency (acting rashly when distressed). More recent evidence suggests that urgency can be broken up into positive and negative components (Cyders et al., 2007). These facets appear to account for different aspects of drinking related behaviors (e.g., urgency traits predict drinking problems, sensation seeking predicts drinking frequency; see Dick et al., 2010; Smith et al., 2007). Additionally, recent research using an updated measure of drinking motives that distinguishes between drinking to cope with depression (coping-depression) and drinking to cope with anxiety (coping-anxiety) suggests that coping-depression and coping-anxiety motives are differentially related to alcohol use and alcohol problems (see Grant, Stewart, O'Connor, Blackwell, & Conrod, 2007). However, it has yet to be documented how these more refined measures of drinking motives relate to personality, including facets of broad personality traits. Future research examining the relations between personality and AUDs (especially developmental relations) and potential mediators of this link would benefit from personality measures considered at the facet level as well as more refined measures of drinking motives.

Using Various Measures of Personality

An overwhelming majority of studies that examine the link between personality and AUDs use self-report measures of personality. However, there are several drawbacks to self-report questionnaires (e.g., people may not view themselves realistically or understand how their behaviors affects other people; see Klonksy, Oltsmann, & Turkheimer, 2002). Further, correspondence between self- and informant-reports of personality is modest at best (e.g.,

Oltmanns, Turkheimer, & Strauss, 1998), suggesting informant reports provide additional information that cannot be obtained by self-report alone. Thus, future studies examining the AUD-personality link would benefit from the use of multi-informant data. Though gathering this additional information may be perceived as excessively time-consuming or expensive, several researchers have provided practical and effective suggestions on how to obtain such data (see Achenbach, Krukowski, Dumenci, & Ivanova, 2005; Vazire, 2006).

Behavioral measures that may be useful intermediate phenotypes between “personality” and neurological functioning should also be considered. Miyake et al. (2000) factor analyzed behavioral measures of executive functioning and identified specific subtypes of this construct, including facets related to impulsivity (also see Dougherty, Mathias, Marsh, & Jaspar, 2005). More specifically, Dick et al. (2010) recently noted that laboratory tasks thought to measure prepotent response inhibition (i.e., the ability to suppress automatic thoughts) such as go/no-go tasks (Marczinski & Fillmore, 2003) may relate to urgency facets of the UPPS-P impulsivity scale (Cyders et al., 2007; Lynam, Smith, Whiteside, & Cyders, 2006). Further, the lack of perseverance facet of the UPPS-P may relate to laboratory tasks such as word naming tasks (Kane, Hasher, Stoltzfus, Zacks, & Connelly, 1994) thought to measure the resistance to distractor interference (i.e., avoiding interference from task-irrelevant information; Friedman & Miyake, 2004). Lack of perseverance may also relate to tasks measuring resistance to proactive interference (i.e., resisting memory invasive information that was previously relevant to the current task; Friedman & Miyake, 2004) such as cued recall tasks (Tolan & Tehan, 1999; see Dick et al., 2010). Preliminary evidence indeed suggests that behavioral tasks related to prepotent response inhibition correlate with negative urgency whereas behavioral measures of interference relate to lack of perseverance (see Gay, Rochat, Billeux, D’Acemont, & Van der Linden, 2008). Experimental paradigms involving evoked potentials and computer game models have also been suggested as potential personality assessments that “go beyond” self-report questionnaires (see Ebstein, 2006).

Integrating Developmental Models of Alcohol, Personality, and Relevant Mediators

As documented above, personality relates to AUDs through a variety of ways that most likely overlap. Further, individual differences in normative personality change have recently been linked to the developmental course of alcohol problems. Thus, a potentially profitable line of research includes examining common factors of personality, alcohol use and misuse, and likely mediators of the personality-alcohol relation (e.g., drinking motives) from an integrative, developmental framework. As noted above, there is substantial genetic covariation between the broad construct of behavioral undercontrol and AUDs (Slutske et al., 2002). Though results have been inconsistent (suggesting possible environmental/developmental interactions; South & Krueger, 2008), several potential genetic factors of personality have also been identified and reviewed (see Ebstein, 2006; Ebstein & Israel, 2009), including genotypes related to the functioning of dopamine and serotonin neurotransmitters thought to be relevant to variation in alcohol involvement (see Ducci & Goldman, 2008; Goldman et al., 2005; van der Zwaluw & Engels, 2009). Initial evidence suggests that motives for alcohol use may also be linked to similar genetic factors. Drinking motives involving coping with negative moods appear to be, especially in females, heritable (Agrawal et al., 2008; Prescott, Cross, Kuhn, Horn, & Kendler, 2004) and a substantial portion of genetic variation in AUDs appears to overlap with drinking to manage mood states (Prescott et al., 2004). Notably, the extent to which genetic variance in drinking motives: a) overlap with genetic variance in theoretically related personality constructs; or b) account for the genetic covariance between personality and alcohol has yet to be documented. However, the extant findings suggest that variance in personality (especially constructs related to behavioral undercontrol), AUDs, and motives for alcohol use are at

least partially explained by common genetic factors. Future research should further elucidate genetic factors that relate to these constructs.

Along with examining genetic factors, environmental influences, as well as potential interactions between genetic and environmental influences (i.e., gene-environment interactions; GXE), should also be explored. Though GXE involving personality have only just begun to be investigated, the two published studies to date suggest GXE involving alcohol relevant genetic factors (i.e., dopamine) and alcohol relevant environmental risk factors (i.e., negative childhood family environments, parental alcohol use) influence novelty seeking (Keltikangas-Järvinen, Raikonen, Ekelund, & Peltonen, 2004; Lahti et al., 2005). Further, a specific genetic serotonin polymorphism has been shown to influence the link between life stress and drinking (Covalut et al., 2006; Kaufman et al., 2007; Nilsson et al., 2005). Taken together, these findings suggest that a logical next step in understanding how and why personality relates to AUDs will be to integrate personality, AUDs, and drinking motives into a developmental framework in which changes in these constructs are viewed in the context of each other as well as in the context of related genetic factors, life-stage specific environments, and the interplay between genetic and environmental influences.

Acknowledgments

Preparation of this article was supported by National Institute on Alcohol Abuse and Alcoholism Grants T32 AA13526, R01 AA13987, R37 AA07231 and KO5 AA017242 to Kenneth J. Sher and P50 AA11998 to Andrew Heath. We gratefully acknowledge Julia A. Martinez and Amelia E. Talley for their insightful comments on a previous version of this article. Also, we thank the staff of the Alcohol, Health, and Behavior and IMPACTS projects for their data collection and management.

References

- Achenbach TM, Krukowski RA, Dumenci L, Ivanova MY. Assessment of adult psychopathology: Meta-analyses and implications of cross-informant correlations. *Psychological Bulletin*. 2005; 131:361–382. [PubMed: 15869333]
- Agrawal A, Dick DM, Bucholz KK, Madden PAF, Cooper ML, Sher KJ, Heath AC. Drinking expectancies and motives: A genetic study of young adult women. *Addiction (Abingdon, England)*. 2008; 103:194–204.
- Armeli S, Tennen H, Todd M, Carney MA, Mohr C, Affleck G, Hromi A. A daily process examination of the stress-response dampening effects of alcohol consumption. *Psychology of Addictive Behaviors*. 2003; 17:266–276. [PubMed: 14640822]
- Arnett JJ. Emerging adulthood: A theory of development from the late teens through the twenties. *American Psychologist*. 2000; 55:469–480. [PubMed: 10842426]
- Bachman, JG.; O'Malley, PM.; Schulenberg, JE.; Johnston, LD.; Bryant, AL.; Merline, AC. The decline of substance use in young adulthood: Changes in social activities, roles, and beliefs. Mahwah, NJ: Erlbaum; 2002.
- Bachman, JG.; Wadsworth, KN.; O'Malley, PM.; Johnston, LD.; Schulenberg, JE. Smoking, drinking, and drug use in young adulthood: The impacts of new freedoms and new responsibilities. Mahwah, NJ: Erlbaum; 1997.
- Barnes GE. The alcoholic personality: A reanalysis of the literature. *Journal of Studies on Alcohol*. 1979; 40:571–633. [PubMed: 385996]
- Baumeister RF, Gailliot M, DeWall CN, Oaten M. Self-regulation and personality: How interventions increase regulatory success, and how depletion moderates the effects of traits on behavior. *Journal of Personality*. 2006; 74:1773–1801. [PubMed: 17083666]
- Buss DM. Selection, evocation and manipulation. *Journal of Personality and Social Psychology*. 1987; 53:1214–1221. [PubMed: 3320336]
- Carey KB. Situational determinants of heavy drinking among college students. *Journal of Counseling Psychology*. 1993; 40:217–220.

- Carpenter KM, Hasin DS. Drinking to cope with negative affect and DSM-IV alcohol use disorders: A test of three alternative explanations. *Journal of Studies on Alcohol*. 1999; 60:694–704. [PubMed: 10487740]
- Caspi, A.; Bem, DJ. Personality continuity and change across the life course. In: Pervin, L., editor. *Handbook of personality: Theory and research*. New York: Guilford Press; 1990. p. 549-575.
- Caspi A, Roberts BW, Shiner RL. Personality development: Stability and change. *Annual Review of Psychology*. 2005; 56:453–484.
- Cleckley, HM. *The Mask of Sanity*. 6th ed.. Plume; 1982.
- Cloninger CR. Neurogenetic adaptive mechanisms in alcoholism. *Science*. 1987; 236:410–416. [PubMed: 2882604]
- Colder CR, O'Connor R. Attention biases and disinhibited behavior as predictors of alcohol use and enhancement reasons for drinking. *Psychology of Addictive Behaviors*. 2002; 16:325–332. [PubMed: 12503905]
- Comeau MN, Stewart SH, Loba P. The relations of anxiety sensitivity, trait anxiety, and sensation seeking to adolescents' motivations for alcohol, cigarette, and marijuana use. *Addictive Behaviors*. 2001; 26:803–825. [PubMed: 11768546]
- Conrod PJ, Castellanos N, Mackie C. Personality-targeted interventions delay the growth of adolescent drinking and binge drinking. *Journal of Child Psychology and Psychiatry*. 2008; 49:181–190. [PubMed: 18211277]
- Conrod PJ, Stewart SH, Pihl RO, Côté S, Fontaine V, Dongier M. Efficacy of brief coping skills interventions that match different personality profiles of female substance abusers. *Psychology of Addictive Behaviors*. 2000; 14:231–242. [PubMed: 10998949]
- Cooper ML. Motivations for alcohol use among adolescents: Development and validation of a four-factor-model. *Psychological Assessments*. 1994; 6:117–128.
- Cooper ML, Agocha VB, Sheldon MS. A motivational perspective on risky behaviors: The role of personality and affect regulatory processes. *Journal of Personality*. 2000; 68:1059–1088. [PubMed: 11130732]
- Cooper ML, Frone MR, Russell M, Mudar P. Drinking to regulate positive and negative emotions: A motivational model of alcohol use. *Journal of Personality and Social Psychology*. 1995; 69:990–1005. [PubMed: 7473043]
- Cooper ML, Krull JL, Agocha VB, Flanagan ME, Orcutt HK, Grabe SD, Kurt H, Jackson M. Motivational pathways to alcohol use and abuse among Black and White adolescents. *Journal of Abnormal Psychology*. 2008; 117:485–501. [PubMed: 18729604]
- Cooper ML, Russell M, George WH. Coping, expectancies, and alcohol abuse: A test of social learning formulations. *Journal of Abnormal Psychology*. 1988; 92:218–230. [PubMed: 3385075]
- Cooper ML, Russell M, Skinner JB, Windle M. Development and validation of a three-dimensional measure of drinking motives. *Psychological Assessment*. 1992; 4:123–132.
- Cooper ML, Wood PK, Orcutt HK, Albino A. Personality and the predisposition to engage in risky or problem behaviors during adolescence. *Journal of Personality and Social Psychology*. 2003; 84:390–410. [PubMed: 12585812]
- Costa, PT.; McCrae, RR. *The NEO Personality Inventory professional manual*. Odessa, FL: Psychological Assessment Resources; 1992.
- Costa PT Jr. McCrae RR. Age changes in personality and their origins: Comment on Roberts, Walton, and Viechtbauer (2006). *Psychological Bulletin*. 2006; 132:28–30.
- Covault J, Tennen H, Armeli S, Conner TS, Herman AI, Cillessen AH, et al. Interactive effects of the serotonin transporter 5-HTTLPR polymorphism and stressful life events on college student drinking and drug use. *Biological Psychiatry*. 2006; 61:609–616. [PubMed: 16920076]
- Cox WM, Klinger E. A motivational model of alcohol use. *Journal of Abnormal Psychology*. 1988; 97:168–180. [PubMed: 3290306]
- Cox, WM.; Klinger, E. *Why People Drink: Parameters of alcohol as a reinforcer*. New York: Gardner; 1990. Incentive motivation, affective change and alcohol use: A model; p. 291-314.
- Cyders MA, Smith GT, Spillane NS, Fischer S, Annus AM, Peterson C. Integration of impulsivity and positive mood to predict risky behavior: Development and validation of a measure of positive urgency. *Psychological Assessment*. 2007; 19:107–118. [PubMed: 17371126]

- Dick DM, Smith G, Olausson P, Mitchell SH, Leeman RF, O'Malley SS, Sher KJ. Understanding the construct of impulsivity and its relationship to alcohol use disorders. *Addiction Biology*. 2010; 15:217–226. [PubMed: 20148781]
- Dougherty DM, Mathias CW, Marsh DM, Jagar AA. Laboratory behavioral measures of impulsivity. *Behavior Research Methods*. 2005; 37:82–90. [PubMed: 16097347]
- Ducci F, Goldman D. Genetic approaches to addiction: Genes and alcohol. *Addiction (Abingdon, England)*. 2008; 103:1414–1428.
- Ebstein R. The molecular genetic architecture of human personality: Beyond self-report questionnaires. *Molecular Psychiatry*. 2006; 11:427–445. [PubMed: 16534505]
- Ebstein, R.; Israel, S. *Handbook of Behavior Genetics*. New York: Springer; 2009. Molecular genetics of personality: How our genes can bring us to a better understanding of why we act the way we do; p. 239-250.
- Fillmore, KM. *Alcohol use across the life course*. Toronto, Ontario, Canada: Alcoholism and Drug Addiction Research Foundation; 1988.
- Friedman NP, Miyake A. The relations among inhibition and interference control functions: A latent-variable analysis. *Journal of Experimental Psychology: General*. 2004; 133:101–135. [PubMed: 14979754]
- Gay P, Rochat L, Billeux J, D'Acremont M, Van der Linden M. Heterogeneous inhibition processes involved in different facets of self-reported impulsivity: Evidence from a community sample. *Acta Psychologica*. 2008; 3:332–339. [PubMed: 18851842]
- Giancola PR. Alcohol-related aggression during the college years: Theories, risk factors, and policy implications. *Journal of Studies on Alcohol*. 2002a; 14:129–139.
- Giancola PR. Alcohol-related aggression in men and women: The influence of dispositional aggressivity. *Journal of Studies on Alcohol*. 2002b; 63:696–708. [PubMed: 12529070]
- Giancola PR. The moderating effects of dispositional empathy on alcohol-related aggression in men and women. *Journal of Abnormal Psychology*. 2003; 112(2):275–281. [PubMed: 12784837]
- Goldman D, Oroszi G, Ducci F. The genetics of addictions: Uncovering the genes. *Nature Reviews Genetics*. 2005; 6:521–532.
- Gotham HJ, Sher KJ, Wood PK. Alcohol involvement and developmental task completion during young adulthood. *Journal of Studies on Alcohol*. 2003; 64:32–42. [PubMed: 12608481]
- Grant VV, Stewart SH, O'Connor RM, Blackwell E, Conrod PJ. Psychometric evaluation of the five-factor Modified Drinking Motives Questionnaire-Revised in undergraduates. *Addictive Behaviors*. 2007; 32:2611–2632. [PubMed: 17716823]
- Hathaway, SR.; McKinley, JC. *The MMPI manual*. New York: Psychological Corporation; 1940.
- Hoffman H, Loper R, Kammeier M. Identifying future alcoholics with the MMPI alcoholism scales. *Quarterly Journal of Studies on Alcohol*. 1974; 35:490–498. [PubMed: 4154478]
- Holahan CJ, Moos RH, Holahan CK, Cronkite RC, Randall PK. Drinking to cope, emotional distress and alcohol use and abuse: A ten-year model. *Journal of Studies on Alcohol*. 2001; 62:190–198. [PubMed: 11327185]
- Holahan CJ, Moos RH, Holahan CK, Cronkite RC, Randall PK. Drinking to cope and alcohol use and abuse in unipolar depression: A 10-year model. *Journal of Abnormal Psychology*. 2003; 112:159–165. [PubMed: 12653424]
- Hull, JG. Self-awareness model. In: Blane, HT.; Leonard, KE., editors. *Psychological Theories of Drinking and Alcoholism*. New York: Guilford Press; 1987. p. 272-301.
- Jessor, R.; Donovan, JE.; Costa, FM. *Beyond adolescence: Problem behavior and young adult development*. New York: Cambridge University Press; 1991.
- Johnson W, Hicks B, McGue M, Iacono WG. Most of the girls are alright, but some aren't: Personality trajectory groups from ages 14 to 24 and some associations with outcomes. *Journal of Personality and Social Psychology*. 2007; 93:266–284. [PubMed: 17645399]
- Jones MC. Personality correlates and antecedents of drinking patterns in adult males. *Journal of Consulting and Clinical Psychology*. 1968; 32:2–12. [PubMed: 5649201]
- Jones MC. Personality correlates and antecedents of drinking patterns in women. *Journal of Consulting and Clinical Psychology*. 1971; 36:61–69. [PubMed: 5100695]

- Jones CJ, Meredith W. Patterns of personality change across the life span. *Psychology and Aging*. 1996; 11:57–65. [PubMed: 8726370]
- Kane MJ, Hasher L, Stoltzfus ER, Zacks RT, Connelly SL. Inhibitory attentional mechanisms and aging. *Psychology and Aging*. 1994; 9:103–112. [PubMed: 8185857]
- Kaufman J, Yang B-Z, Douglas-Palumber H, Crouse-Artus M, Lipschitz D, Krystal J, Gelernter J. Genetic and environmental predictors of early alcohol use. *Biological Psychiatry*. 2007; 61:1228–1234. [PubMed: 17123474]
- Kearns-Bodkin JN, Leonard KE. Alcohol involvement and marital quality in the early years of marriage: A longitudinal growth curve analysis. *Alcoholism: Clinical and Experimental Research*. 2005; 29:2123–2134.
- Keltikangas-Järvinen L, Raikkonen K, Ekelund J, Peltonen L. Nature vs. nurture in novelty seeking. *Molecular Psychiatry*. 2004; 9:308–311. [PubMed: 14569271]
- Kendler KS, Prescott CA, Myers J, Neale MC. The structure of genetic and environmental risk factors for common psychiatric and substance use disorders in men and women. *Archives of General Psychiatry*. 2003; 60:929–937. [PubMed: 12963675]
- klonsky ED, Oltmanns TF, Turkheimer E. Informant reports of personality disorder: Relation to self-reports and future research directions. *Clinical Psychology: Science and Practice*. 2002; 9:300–311.
- Krueger RF, Hicks BM, Patrick CJ, Carlson SR, Iacono WG, McGue M. Etiologic connections among substance dependence, antisocial behavior, and personality: Modeling the externalizing spectrum. *Journal of Abnormal Psychology*. 2002; 111:411–424. [PubMed: 12150417]
- Krueger RF, Markon KE, Patrick CJ, Iacono WG. Externalizing psychopathology in adulthood: A dimensional-spectrum conceptualization and its implications for DSM-V. *Journal of Abnormal Psychology*. 2005; 114:537–550. [PubMed: 16351376]
- Kuntsche EN, Knibbe R, Gmel G, Engels R. Why do young people drink? A review of drinking motives. *Clinical Psychology Review*. 2005; 25:841–861. [PubMed: 16095785]
- Kuntsche E, Knibbe R, Gmel G, Engels R. Who drinks and why? A review of socio-demographic, personality, and contextual issues behind the drinking motives in young people. *Psychology of Addictive Behaviors*. 2006; 31:1844–1857.
- Kuntsche EN, von Fischer M, Gmel G. Personality factors and alcohol use: A mediator analysis of drinking motives. *Personality and Individual Differences*. 2008; 45:796–800.
- Lahey B. Public health significance of neuroticism. *American Psychologist*. 2009; 64:241–256. [PubMed: 19449983]
- Lahti J, Raikkonen K, Ekelund J, Peltonen L, Raitakari OT, Keltikangas-Järvinen L. Novelty seeking: Interaction between parental alcohol use and dopamine D4 receptor gene exon III polymorphism over 17 years. *Psychiatric Genetics*. 2005; 15:133–139. [PubMed: 15900228]
- Leonard KE, Rothbard JC. Alcohol and the marriage effect. *Journal of Studies on Alcohol*. 1999; 13:139–146.
- Levenson RW, Oyama ON, Meek PS. Greater reinforcement from alcohol for those at risk: Parental risk, personality risk, and sex. *Journal of Abnormal Psychology*. 1987; 96(3):242–253. [PubMed: 3680764]
- Littlefield AK, Sher KJ, Wood PK. Is 'maturing out' of problematic alcohol involvement related to personality change? *Journal of Abnormal Psychology*. 2009; 118:360–374. [PubMed: 19413410]
- Littlefield AK, Sher KJ, Steinley D. Developmental Trajectories of Impulsivity and their Association with Alcohol Use and Related Outcomes during Emerging and Young Adulthood I. *Alcohol: Clinical and Experimental Research*. in press.
- Littlefield AK, Sher KJ, Wood PK. Do Changes in Drinking Motives Mediate the Relation between Personality Change and “Maturing Out” of Problem Drinking? *Journal of Abnormal Psychology*. 2010; 119:93–105. [PubMed: 20141246]
- Lynam, DR.; Smith, GT.; Whiteside, SP.; Cyders, MA. The UPPS-P: Assessing five personality pathways to impulsive behavior (Technical Report). West Lafayette: Purdue University; 2006.
- MacDonald AB, Baker JM, Stewart SH, Skinner M. Effects of alcohol on the response to hyperventilation of participants high and low in anxiety sensitivity. *Alcoholism: Clinical and Experimental Research*. 2000; 24:1656–1665.

- Malouff J, Thorsteinsson E, Rooke S, Schutte N. Alcohol involvement and the five factor model of personality: A meta-analysis. *Journal of Drug Education*. 2007; 37:277–294. [PubMed: 18047183]
- Marczinski CA, Fillmore MT. Preresponse cues reduce the impairing effects of alcohol on the execution and suppression of responses. *Experimental and Clinical Psychopharmacology*. 2003; 11:110–117. [PubMed: 12622349]
- Marlatt, GA.; Witkiewitz, K. Addictive behaviors: New readings on etiology, prevention, and treatment. Washington, DC: US: American Psychological Association; 2009.
- McCrae RR, Costa PT Jr, Lima MP, Simoes A, Ostendorf F, Angleitner A, et al. Age differences in personality across the adult life span: Parallels in five countries. *Developmental Psychology*. 1999; 35:466–477. [PubMed: 10082017]
- McCrae RR, Costa PT Jr, Ostendorf F, Angleitner A, Hrebickova M, Avia MD, et al. Nature over nurture: Temperament, personality, and life span development. *Journal of Personality and Social Psychology*. 2000; 78:173–186. [PubMed: 10653513]
- McDougall W. The chemical theory of temperament applied to introversion and extroversion. *Journal of Abnormal and Social Psychology*. 1929; 24:293–309.
- McNally AM, Palfai TP, Levine RV, Moore BM. Attachment dimensions and drinking-related problems among young adults. The mediational role of coping motives. *Addictive Behaviors*. 2003; 28:1115–1127. [PubMed: 12834654]
- Miyake A, Friedman NP, Emerson MJ, Witzki AH, Howerter A, Wager T. The unity and diversity of executive functions and their contributions to complex "frontal lobe" tasks: A latent variable analysis. *Cognitive Psychology*. 2000; 41:49–100. [PubMed: 10945922]
- Neyer FJ, Lehnart J. Relationships matter in personality development: Evidence from an 8-year longitudinal study across young adulthood. *Journal of Personality*. 2007; 75:535–568. [PubMed: 17489891]
- Nilsson KW, Sjöberg RL, Damberg M, Alm PO, Ohrvik J, Leppert J, et al. Role of the serotonin transporter gene and family function in adolescent alcohol consumption. *Alcoholism: Clinical and Experimental Research*. 2005; 29:564–570.
- Oltmanns TF, Turkheimer E, Strauss ME. Peer assessment of personality traits and pathology. *Assessment*. 1998; 5:53–65. [PubMed: 9458342]
- O'Malley P. Maturing out of problematic alcohol use. *Alcohol Research and Health*. 2004/2005; 28:202–204.
- Park A, Sher KJ, Krull J. Individual differences in the Greek effect on risky drinking: The role of self-consciousness. *Psychology of Addictive Behaviors*. 2006; 20:85–90. [PubMed: 16536670]
- Park A, Sher KJ, Krull JL, Wood PK. Dual mechanisms underlying accentuation of risky drinking via fraternity/sorority affiliation: The role of personality, peer norms, and alcohol availability. *Journal of Abnormal Psychology*. 2009; 118:241–245. [PubMed: 19413401]
- Plomin R, DeFries JC, Loehlin JC. Genotype-environment interaction and correlation in the analysis of human behavior. *Psychological Bulletin*. 1977; 84:309–322. [PubMed: 557211]
- Prescott CA, Cross RJ, Kuhn JW, Horn JL, Kendler KS. Is risk for alcoholism mediated by individual differences in drinking motivations? *Alcoholism: Clinical and Experimental Research*. 2004; 28:29–39.
- Read JP, Wood MD, Kahler CW, Maddock JE, Palfai T. Examining the role of drinking motives in college student alcohol use and problems. *Psychology of Addictive Behavior*. 2003; 17:13–23.
- Roberts BW, Chapman CN. Change in the dispositional well-being and its relation to role quality: A 30-year longitudinal study. *Journal of Research in Personality*. 2000; 34:26–41.
- Roberts BW, Helson R, Klohnen EC. Personality development and growth in women across 30 years: Three perspectives. *Journal of Personality*. 2002; 70:79–102. [PubMed: 11908537]
- Robins RW, Caspi A, Moffitt TE. It's not just who you're with, it's who you are: Personality and relationship experiences across multiple relationships. *Journal of Personality*. 2002; 70:925–964. [PubMed: 12498360]
- Roberts BW, Mroczek DK. Personality trait stability and change. *Current Directions in Psychological Science*. 2008; 17:31–35. [PubMed: 19756219]

- Roberts BW, Walton KE, Viechtbauer W. Patterns of mean-level change in personality traits across the life course: A meta-analysis of longitudinal studies. *Psychological Bulletin*. 2006; 132:1–25. [PubMed: 16435954]
- Robins RW, Fraley RC, Roberts BW, Trzesniewski KH. A longitudinal study of personality change in young adulthood. *Journal of Personality*. 2001; 69:617–640. [PubMed: 11497032]
- Scarr S, McCartney J. How people make their own environment: A theory of genotype greater than environmental effects. *Child Development*. 1983; 54:424–435. [PubMed: 6683622]
- Schulenberg J, Wadsworth KN, O'Malley PM, Bachman JG, Johnston LD. Adolescent risk factors for binge drinking during the transition to young adulthood: variable- and pattern-centered approaches to change. *Developmental Psychology*. 1996; 32:659–674.
- Scollon CN, Diener E. Love, work, and changes in extraversion and neuroticism over time. *Journal of Personality and Social Psychology*. 2006; 91:1152–1165. [PubMed: 17144771]
- Sher, KJ. *Children of alcoholics: A critical appraisal of theory and research*. Chicago: University of Chicago Press; 1991. A volume in the John D. and Catherine T. MacArthur Foundation Series on Mental Health and Development.
- Sher KJ, Gotham HJ, Watson A. Trajectories of dynamic predictors of disorder: Their meanings and implications. *Development and Psychopathology*. 2004; 16:825–856. [PubMed: 15704817]
- Sher KJ, Levenson RW. Risk for alcoholism and individual differences in the stress-response-dampening effect of alcohol. *Journal of Abnormal Psychology*. 1982; 91(5):350–367. [PubMed: 7142573]
- Sher, KJ.; Littlefield, A. Risk factors for substance use, abuse, and dependence: Personality. In: Korsmeyer, Pamela; Kranzler, Henry, editors. *Encyclopedia of Drugs, Alcohol, and Addictive Behavior*. 3rd edition. Vol. 3. New York: Macmillan; 2008. p. 407–413. Reference
- Sher, KJ.; Trull, TJ.; Bartholow, B.; Vieth, A. Personality and alcoholism: Issues, methods, and etiological processes. In: Blane, H.; Leonard, K., editors. *Psychological theories of drinking and alcoholism*. 2nd edition. New York: Plenum; 1999. p. 55–105.
- Sher KJ, Walitzer KS. Individual differences in the stress-response-dampening effect of alcohol: A dose-response study. *Journal of Abnormal Psychology*. 1986; 95(2):159–167. [PubMed: 3711440]
- Sher, KJ.; Wood, MD. Subjective Effects of Alcohol II: Individual Differences. In: Earleywine, M., editor. *Mind Altering Drugs: Scientific Evidence for Subjective Experience*. New York: Oxford; 2005. p. 135–153.
- Simons J, Correia CJ, Carey KB. A comparison of motives for marijuana and alcohol use among experienced users. *Addictive Behaviors*. 2000; 25:153–160. [PubMed: 10708331]
- Slutske WS, Heath AC, Madden PAF, Bucholz KK, Statham DJ, Martin NG. Personality and the genetic risk for alcohol dependence. *Journal of Abnormal Psychology*. 2002; 111:124–133. [PubMed: 11871377]
- Smith GT, Fischer S, Cyders MA, Annus AM, Spillane NS, McCarthy DM. On the validity and utility of discriminating among impulsivity-like traits. *Assessment*. 2007; 14:155–170. [PubMed: 17504888]
- South SC, Krueger RF. An Interactionist Perspective on Genetic and Environmental Contributions to Personality. *Social and Personality Psychology Compass*. 2008; 2:929–948.
- Stewart SH, Devine H. Relations between personality and drinking motives in young adults. *Personality and Individual Differences*. 2000; 29:495–511.
- Stewart SH, Kushner MG. Introduction to the special issue on anxiety sensitivity and addictive behaviors. *Addictive Behaviors*. 2001; 26:775–785. [PubMed: 11768544]
- Stewart SH, Pihl RO. The effects of alcohol administration on psychophysiological and subjective-emotional responses to aversive stimulation in anxiety sensitive women. *Psychology of Addictive Behavior*. 1994; 8:29–42.
- Stewart SH, Loughlin HL, Rhyno E. Internal drinking motives mediate personality domain-drinking relations in young adults. *Personality and Individual Differences*. 2001; 30:271–286.
- Stewart, SH.; Samoluk, SB.; MacDonald, AB. Anxiety sensitivity and substance use and abuse. In: Taylor, S., editor. *Anxiety Sensitivity: Theory, Research and Treatment of the Fear of Anxiety*. Mahwah, New Jersey: Lawrence Erlbaum Associates; 1999. p. 287–319.

- Trull TJ, Sher KJ. Relationship between the five-factor model of personality and Axis I disorders in a nonclinical sample. *Journal of Abnormal Psychology*. 1994; 103:350–3602. [PubMed: 8040504]
- van der Zwaluw CS, Engels RC. Gene-environment interactions and alcohol use and dependence: Current status and future challenges. *Addiction*. 2009; 104:907–914. [PubMed: 19466917]
- Vazire S. Informant reports: A cheap, fast, and easy method for personality assessment. *Journal of Research in Personality*. 2006; 40:472–481.
- Whiteside SP, Lynam DR. The five factor model and impulsivity: Using a structural model of personality to understand impulsivity. *Personality and Individual Differences*. 2001; 30:669–689.
- Windle M, Windle RC. Coping strategies, drinking motives, and stressful life events among middle adolescents: Associations with emotional and behavioral problems and with academic functioning. *Journal of Abnormal Psychology*. 1996; 105:551–560. [PubMed: 8952188]
- Winick C. Maturing out of narcotic addiction. *Bulletin on Narcotics*. 1962; 14:1–7.
- Witkiewitz K, Marlatt GA. Relapse prevention for alcohol and drug problems: That was Zen, this is Tao. *American Psychologist*. 2004; 59(4):224–235. [PubMed: 15149263]
- Yamaguchi K, Kandel D. On the resolution of role incompatibility: Life event history analysis of family roles and marijuana use. *American Journal of Sociology*. 1985; 90:1284–1325.

Biographies

Andrew K. Littlefield is a doctoral student in clinical psychology at the University of Missouri-Columbia. In 2005, he received a B.A. in Psychology and B.S in Business at the University of Missouri-Columbia. In 2008, he received a M.A in psychology. Broadly, Mr. Littlefield's research interests include developmental changes in alcohol involvement and how these changes relate to other biological and psychosocial variables of interest, including personality development, changes in drinking motives, the acquisition of adult roles, and how the development and co-development of these constructs relate to genetic and other environmental factors.

Kenneth J. Sher, Ph.D is a Curators' Professor at the University of Missouri-Columbia. Dr. Sher received a B.A. in Psychology from Antioch College in 1975 and his Ph.D. from Indiana University in 1981. More detailed information regarding Dr. Sher's biography can be found at <http://web.missouri.edu/~sherk/bioII.htm>. Dr. Sher's research interests are broad but primarily focus on the etiology and course of substance use disorders (particularly alcohol dependence) across the lifespan.

Figure 1. Multiple pathways linking personality to problematic drinking and AUDs

Note this model is not exhaustive and the multiple pathways depicted are not mutually exclusive and the engagement of multiple risk processes likely increase risk. Though not shown, it is assumed that genetic and early environmental factors also influence the distal constructs depicted above.