



## Personality and substance use in midlife: Conscientiousness as a moderator and the effects of trait change

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### ABSTRACT

Personality traits predict substance use in adolescence, but less is known about prospective substance use in middle age and beyond. Moreover, there is growing interest in how personality change and the multiplicative effects among personality traits relate to substance use. Participants included approximately 4000 adults aged 25–74 who participated in two waves of the Midlife in the US (MIDUS) study. Higher levels of neuroticism, extraversion, openness, and lower levels of conscientiousness and agreeableness predicted longitudinal substance use. Increases in neuroticism and openness predicted increased substance use while increases in conscientiousness and agreeableness predicted decreased substance use. Higher levels of conscientiousness moderated two of the other trait main effects. Personality, trait change, and interactions among traits reliably forecasted 10-year substance-use behaviors.

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### 1. Introduction

Personality traits have emerged as critical predictors of various substance-use behaviors including the use of cigarettes, alcohol, and illicit drugs (Bogg & Roberts, 2004; Hampson & Friedman, 2008). These substances are leading risk factors for poor health and earlier mortality (McGinnis & Foege, 1993). Although there is rich empirical support linking personality traits to substance-use behaviors, most investigations concentrate on only one personality trait (usually conscientiousness) and typically do not examine interactions among traits. The current study sought to further investigate the association between each of the Big Five personality traits and three distinct substance-use behaviors (i.e., smoking, drinking, and drug use) by utilizing the prospective design of the Midlife in the US (MIDUS) survey. We also tested whether conscientiousness moderated any effects of the other Big Five traits with substance use since high levels of conscientiousness may play a particularly important self-regulatory role in terms of health-damaging behaviors. Lastly, we tested if personality change would predict long-term substance use above baseline level of each

personality trait. Our overall goal was to provide a clearer understanding of how multiple aspects of personality prospectively predicts 10-year substance use in a large national sample of adults.

#### 1.1. Personality and substance use: The evidence

The evidence connecting conscientiousness with substance use is larger and more compelling than for any other personality trait. Booth-Kewley and Vickers (1994) were among the first to document the robust effect of individuals high in conscientiousness refraining from detrimental substance use. Since then, investigations utilizing diverse samples have demonstrated a strong and clear connection between conscientiousness and substance-use behaviors (Kashdan, Vetter, & Collins, 2005; Malouff, Thorsteinsson, Rooke, & Schutte, 2007; Malouff, Thorsteinsson, & Schutte, 2006; Terracciano, Löckenhoff, Crum, Bienvu, & Costa, 2008). In fact, a meta-analysis of 194 studies confirmed that conscientiousness-related traits were negatively associated with many different health behaviors, including tobacco use, excessive alcohol use, and drug use (Bogg & Roberts, 2004).

Conscientiousness effects appear to retain their predictive power even over extensive longitudinal periods. Teacher ratings of childhood conscientiousness predicted many unhealthy behaviors such as smoking and drinking at midlife in the Terman Life Cycle Study, a sample followed for over 70 years (Friedman et al., 1995). Specifically, those children labeled as less conscientious

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were more likely to become smokers and consume greater quantities of alcohol in adulthood. Similarly, a 24-year study of children from the Czech Republic found that lower levels of conscientiousness measured in childhood predicted higher drinking quantity and smoking in middle-age (Kubicka, Matejcek, Dytrych, & Roth, 2001). Longitudinal findings from the 40-year Hawaii Personality and Health cohort of 963 elementary school children also revealed similar findings regarding the effect of conscientiousness (Hampson, Goldberg, Vogt, & Dubanoski, 2006).

Neuroticism also has clear associations with substance use with neurotic individuals being more likely to smoke cigarettes and smoke a greater quantity of cigarettes (Malouff et al., 2006; Mroczek, Spiro, & Turiano, 2009; Munafò, Zetteler, & Clark, 2007; Rausch, Nicholson, Lamke, & Matloff, 1990). Those higher in neuroticism are also more likely to abuse alcohol (Grekin, Sher, & Wood, 2006; Larkins & Sher, 2006; Malouff et al., 2007; Terracciano et al., 2008). Longitudinally, findings from the Hawaii Personality and Health cohort provide evidence that children rated lower in emotional stability (high neuroticism) predicted greater alcohol use some 40 years later in middle age (Hampson et al., 2006). The overall domain of neuroticism and underlying facets such as negative affect also have positive relations with marijuana, cocaine, and heroin use (Hopwood et al., 2007; Kashdan et al., 2005).

Much of the empirical evidence connecting agreeableness to substance use concentrates on two underlying facets: hostility and aggression. Hostility and aggression measured in childhood, adolescence, and young adulthood are each associated with higher levels of alcohol, tobacco, and marijuana use (Caspi et al., 1997; Gerrard, Gibbons, Stock, Houlihan, & Dykstra, 2006; Hampson, Andrews, & Barckley, 2007; Raikkonen & Keltikangas-Jarvinen, 1991; Terracciano et al., 2008); importantly, these findings have been confirmed by meta-analyses (Malouff et al., 2006, 2007). In fact, findings appear robust using longitudinal study designs—lower levels of childhood agreeableness predicted adulthood smoking among females in the Hawaii Personality and Health cohort study (Hampson et al., 2006) and hostility among college students predicts smoking some 20 years later for both sexes (Siegler, Peterson, Barefoot, & Williams, 1992).

The relationship between extraversion and substance use is less clear (Hampson, 2008), but there is some indication that higher levels are associated with smoking and alcohol use. For example, a meta-analysis of 25 studies from 1972 to 2001 indicated higher levels of extraversion were associated with being a smoker (Munafò et al., 2007). However, this effect may depend on smoking prevalence in the country of origin studied. Malouff and colleagues (2006) found that higher levels of extraversion was associated with smoking in studies completed in Japan and Spain (where smoking rates were much higher), but not in studies completed in the US and Canada. In terms of alcohol use, teachers' ratings of extraversion in childhood were associated with higher consumption levels in middle age (Hampson et al., 2006; Tucker et al., 1995), and numerous studies have linked higher levels of extraversion in adolescence and early adulthood with excessive alcohol intake (Allsopp, 1986; Martsh & Miller, 1997). Part of the inconsistency in associations between extraversion and substance use may be attributable to the large number of studies that use adolescent or college-aged respondents—the very ages when exploration of substances such as tobacco, alcohol and drugs is most common (Johnston, O'Malley, & Bachman, 2001). Lastly, although the empirical literature on openness is sparse, there is some indication that marijuana users score higher on openness measures (Terracciano et al., 2008).

Thus far, empirical evidence has been presented regarding the role of personality trait *level* as a predictor of substance use. However, there is mounting evidence that personality *change* may also be an important predictor of substance use. Emerging evidence suggests there are interindividual differences in personality change

throughout adulthood (Mroczek & Spiro, 2007; Roberts, Walton, & Viechtbauer, 2006; Small, Hertzog, Hultsch, & Dixon, 2003). Although a large proportion of individuals remain stable on personality, others either increase or decrease in certain traits. Trait change is important to examine because accumulating evidence demonstrates that personality trait change alters substance-use behaviors/problems (Hampson, Tidesley, Andrews, Luyckx, & Mroczek, 2010; Littlefield, Sher, & Wood, 2009, 2010) and health outcomes (Mroczek & Spiro, 2007; Turiano et al., 2012). Given this emerging body of evidence, it is essential that prospective studies include measures of personality as well as personality change in order to clearly elucidate whether neither, either, or both predict substance use later in life.

Based on prior empirical evidence, we hypothesize that the individuals possessing the greatest likelihood of smoking tobacco, drinking alcohol in larger quantities, endorsing alcohol problems, or using illicit substances will be low in conscientiousness, high in neuroticism, and/or low in agreeableness. Moreover, increases in neuroticism and openness, and decreases in conscientiousness will increase the likelihood of engaging in detrimental substance-use behavior. Given the mixed and limited findings regarding extraversion and openness in midlife, our hypotheses are exploratory. Yet, understanding how these traits and trait change relate directly to future substance use is only part of the picture. It is equally important to understand whether and how traits interact with one another to further increase (or decrease) the likelihood of substance use.

### 1.2. Multiplicative effects among personality traits

Although there are many investigations of Big Five main effects on substance-use outcomes, far fewer have considered interactions among personality traits. This oversight is troubling as Hampson (2008) have argued that an exclusive focus on main effects may mask multiplicative or synergistic associations between traits. Personality factors may interact in ways that lead certain individuals to become prone to engaging in health-damaging substance-use behaviors. Moreover, consideration of interactions can potentially illuminate the important phenomenon of buffering effects. Personality traits may buffer one another in their effect on substance use in that a risk factor such as low agreeableness or high neuroticism may be mitigated by a protective factor such as high conscientiousness.

Indeed, a handful of recent studies focusing on smoking indicate that trait interactions are important and collectively point toward the special role of conscientiousness. For example, Terracciano and Costa (2004) found that adults scoring both low in conscientiousness and high in neuroticism were about three times more likely to be current smokers than those characterized by high conscientiousness and high neuroticism. Hong and Paunonen (2009) found that college undergraduates characterized by both low conscientiousness and agreeableness were most likely to smoke. Vollrath and Torgersen (2002) considered various combinations of extraversion, neuroticism, and conscientiousness, but found that the particular combination of high neuroticism and low conscientiousness was most associated with smoking. This combination of traits was also related to higher self-reports of drunkenness, elevated rates of drunk driving, and higher levels of marijuana use when compared to other personality combinations. Earlier investigations into neuroticism and the Eysenckian dimension of psychoticism parallel these findings. Specifically, a combination of high psychoticism (combination of low conscientiousness and agreeableness) and high neuroticism was predictive of heavier drinking (Allsopp, 1986; Kjaerheim, Mykletum, & Halvorsen, 1996; Patton, Barnes, & Murray, 1997). These studies hint at the special role that high conscientiousness may play in buffering the detrimental effects of other trait levels (e.g., high neuroticism, low agreeableness) on substance use. How-

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