



## Unique and interactive effects of impulsivity facets on reckless driving and driving under the influence in a high-risk young adult sample



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### ABSTRACT

Risky driving behaviors are disproportionately high among young adults and impulsivity is a robust risk factor. Recent conceptualizations have proposed multidimensional facets of impulsivity comprised of negative urgency, premeditation, perseverance, sensation seeking, and positive urgency (UPPS-P model). Prior studies have found these facets are associated with risky driving behaviors in college student samples, but no prior studies have examined these facets in clinical samples. This study examined the unique and interactive effects of UPPS-P impulsivity facets on past-year risky driving behaviors in a sample of high-risk young adults (ages 18–30 years) with a history of substance use and antisocial behavior and their siblings ( $n = 1100$ ). Multilevel Poisson regressions indicated that sensation seeking and negative urgency were uniquely and positively associated with both frequency of past-year reckless driving and driving under the influence. Moreover, lack of premeditation was uniquely and positively associated with reckless driving, whereas lack of perseverance was uniquely and positively associated with driving under the influence. Furthermore, lack of premeditation moderated and strengthened the positive association between sensation seeking and driving under the influence. These study findings suggest that assessing multiple facets of trait impulsivity could facilitate targeted prevention efforts among young adults with a history of externalizing psychopathology.

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### 1. Introduction

Young adults engage in more risky driving behaviors than individuals from other age groups (Blincoe et al., 2002; NHTSA, 2015; Pearson, Murphy, & Doane, 2013). Nearly 14% of all 2013 traffic fatalities in the U.S. involved young adults between 15 and 24 years of age (NHTSA, 2015). Notably, road traffic accidents are the leading cause of death among young adults between 15 and 29 years old (WHO, 2016). The high rate of fatal car accidents among young adults can be attributed to numerous factors, including failure to use safety restraints, engagement in secondary tasks, inattentiveness, speeding, and personality factors (Bachoo, Bhagwanjee, & Govender, 2013; Blincoe et al., 2002; Ehsani et al., 2015; Simons-Morton, Guo, Klauer, Ehsani, & Pradhan, 2014; NHTSA, 2015).

#### 1.1. Externalizing psychopathology, impulsivity, and driving behaviors

Trait impulsivity has been conceptualized as a common underlying etiological pathway to several externalizing problems, including disruptive behavior disorders, various types of substance use, and antisocial behaviors (Beauchaine & McNulty, 2013; Krueger et al., 2002). Although risky driving behaviors are not typically considered as a part of the externalizing spectrum, emerging studies indicate that risky driving behaviors co-occur with other problem behaviors such as substance use and antisocial behaviors (Luk et al., 2016; Vassallo et al., 2008). Indeed, young adults with a history of externalizing psychopathology are an especially at-risk population for risky driving. For instance, emergency department patients who had conduct disorder before age 15 years were more likely to engage in hostile driving, reckless driving, and intoxicated driving (McDonald, Sommers, & Fargo, 2014). Adolescent substance use is also a strong predictor of risky driving and intoxicated driving (Bingham & Shope, 2004; Li, Brady, & Chen, 2013). Independent of substance use disorder, epidemiologic data suggest a positive association

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between antisocial personality disorder and reckless driving among U.S. adults (Vaughn et al., 2011).

Because risky driving can result in serious consequences such as injury and death, the identification of risk factors is critical to guide targeted prevention approaches for risk driving among young adults. One robust factor underlying risky driving in this population is impulsivity (Iversen & Rundmo, 2002; Pearson et al., 2013; Pérez-Moreno, Hernández-Lloreda, Gallego-Largo, & Castellanos, 2015). Among college students, impulsivity is associated with speeding and aggressive driving (Dahlen & White, 2006; Hong & Paunonen, 2009). In a longitudinal study, impulsivity level at age 18 years predicted dangerous driving behaviors at age 21 years (Caspi et al., 1997). In a driving simulation study, college students with higher impulsivity demonstrated more risky driving behaviors across multiple simulated driving scenarios (Hinea, Ingrama, & Glendonb, 2015).

### 1.2. The UPPS-P impulsivity model and risky driving

Impulsivity has been conceptualized as a multidimensional trait comprising of interrelated yet distinct facets. Using factor analytic methodologies, Whiteside and Lynam (2001) proposed the UPPS impulsivity model comprised of four distinct facets: (1) *Urgency*, which refers to a tendency to act rashly in the face of strong negative emotions; (2) *lack of Premeditation*, which refers to a tendency to act rashly without regards to consequences; (3) *lack of Perseverance*, which refers to an inability to remain with a task until completion; and (4) *Sensation seeking*, which refers to a tendency to seek excitement. In a later conceptualization, urgency was further divided into two facets, with *negative urgency* referring to the original urgency facet and (5) *Positive urgency* referring to a tendency to act rashly in the face of strong positive emotions (Cyders et al., 2007).

Using college student samples, three prior studies have examined the associations between impulsivity facets and several indices of risky driving, including frequency and quantity of drinking and driving, driving errors, driving lapses, driving violations, and number of traffic citations (Bachoo et al., 2013; Pearson et al., 2013; Treloar, Morris, Pedersen, & McCarthy, 2012). Across these studies, impulsivity facets were weakly to moderately associated with risky driving behaviors. In the two studies that did not include positive urgency, Treloar et al. (2012) found that negative urgency was the only impulsivity facet that contributed to drinking and driving, whereas Bachoo et al. (2013) found both lack of premeditation and negative urgency were significantly associated with self-reported risky driving. In the one study that included positive urgency, Pearson et al. (2013) found that positive urgency was the most consistent predictor of risky driving behaviors.

Collectively, these prior studies of college students did not consistently identify which facet(s) of impulsivity is/are the most unique and robust predictor(s) of risky driving among young adults. In addition, these studies did not consider whether impulsivity facets interact to influence risky driving behaviors. McCabe, Louie, and King (2015) theorized that young adulthood is characterized by “developmental asymmetry,” wherein high sensation seeking is paired with an impulse control system that is not yet fully developed. In support of this theory, these authors found that lack of premeditation strengthened the association between sensation seeking and multiple substance use outcomes, including alcohol-related consequences, substance use, and substance-related problems. This interaction effect was not found for antisocial behaviors, suggesting that the moderating effect may be specific to substance-related outcomes, although other risky behaviors were not examined.

No prior studies have examined whether the associations between impulsivity facets and risky driving behaviors observed among college students are generalizable to high-risk clinical samples, nor did they test the “developmental asymmetry” hypothesis proposed by McCabe et al. (2015) in relation to risky driving behaviors. The refinement of prevention strategies involving impulsivity assessment is predicated

on stable associations between impulsivity and risk behaviors across samples with varying risk levels, and such evidence for driving behaviors is not currently available in the literature. Therefore, the goal of the current study was to examine the unique and interactive associations between impulsivity facets and risky driving behaviors in a clinical sample of high-risk young adults, including probands with a history of adolescent substance use and conduct problems and their siblings.

### 1.3. The current study

In this study, we first examined the unique associations between UPPS-P impulsivity facets and two risky driving outcomes, reckless driving and driving under the influence. We then tested whether lack of premeditation moderated the associations between other impulsivity facets and risky driving behaviors. Based on prior studies of college students, we hypothesized that sensation seeking and urgency facets would be the most robust correlates of both risky driving behaviors. We also hypothesized that lack of premeditation would strengthen the associations between sensation seeking, negative urgency, positive urgency and risky driving behaviors.

## 2. Method

### 2.1. Participants

Data were drawn from a multisite longitudinal study on the genetics of antisocial drug dependence (Derringer et al., 2015; Melroy et al., 2014). Probands in Denver and San Diego were originally identified via (1) residential or outpatient treatment programs or (2) involvement with the criminal justice system or special schools and had to have one or more lifetime substance dependence symptom and at least one conduct disorder symptom. Siblings of probands were also recruited to participate in the study. At the time of original recruitment, probands were between 13 and 19 years old, while their siblings were between 18 and 39 years old. A follow-up assessment, which included self-reported measures of impulsivity and risky driving behaviors, was conducted approximately six years after the original assessment. As the UPPS-P impulsivity scale was not administered at baseline assessment, the present study used only data collected at this follow-up assessment; furthermore, we restricted our study sample to “young adult” participants who were between 18 and 30 years of age ( $n = 1100$ ) at the follow-up assessment. This sample was 62% male and 52% non-Hispanic white and had an average age of 23.5 years ( $SD = 2.51$ ). Subject recruitment and study procedures were approved by the Institutional Review Boards of the participating universities.

### 2.2. Measures

#### 2.2.1. Multidimensional impulsivity

An investigator-adapted version of the UPPS-P scale, which consists of 35 items, was used to measure the five facets of impulsivity (Lynam, Smith, Whiteside, & Cyders, 2006; Whiteside & Lynam, 2001). This adapted version was used because our data collection pre-dated the development and validation of the newer 20-item short UPPS-P version (Cyders, Littlefield, Coffey, & Karyadi, 2014). Premeditation was measured using 8 items, such as “My thinking is usually careful and purposeful” and “Before making up my mind, I consider all advantages and disadvantages” ( $\alpha = 0.80$ ). Perseverance was measured using 6 items, such as “I finish what I start” and “Once I get going on something I hate to stop” ( $\alpha = 0.67$ ). Sensation seeking was measured using 7 items, such as “I quite enjoy taking risks” and “I would enjoy the sensation of skiing very fast down a high mountain slope” ( $\alpha = 0.77$ ). Negative urgency was measured using 7 items, such as “When I am upset I often act without thinking” and “In the heat of an argument, I will often say things I later regret” ( $\alpha = 0.82$ ). Positive urgency was measured using 7 items, such as “When I am very happy, I feel like it is ok

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