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*=1,100). 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., 2000; NHTSA, 2015; Pearson et al., 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 et al., 2013; Blincoe et al., 2000; Ehsani et al., 2015; Simons-Morton et al., 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, 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 et al., 2015). Adolescent substance use is also a strong predictor of risky driving and intoxicated driving (Bingham & Shope, 2004; Li et al., 2013). Independent of substance use disorder, epidemiologic data suggests a positive association 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 et al., 2015). Among college students, impulsivity is associated with speeding and aggressive driving (Dahlen & White, 2006; Hong & Panunonen, 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 et al., 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, et al., 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 et al. (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 18–30 years of age ($n = 1,100$) 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 (Whiteside & Lynam, 2001; Lynam et al., 2006). 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 et al., 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" (α = .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" (α = .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" (α = .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" (α = .82). Positive urgency was measured using 7 items, such as "When I am very happy, I feel like it is ok to give in to cravings or overindulge" and "I am surprised at the things I do while in a

great mood" (α = .81). For all items, response options ranged from 0 (Strongly Disagree) to 4 (Strongly Agree). Premeditation and perseverance were reverse coded to represent lack of premeditation and lack of perseverance. Facet scores were derived by averaging responses to the items in each domain.

2.2.2. Risky Driving Behaviors—Participants responded to two self-report items measuring past-year reckless driving and driving under the influence. These two items were: "In the past year, have you taken chances when driving a car, motorcycle, or other vehicle— like speeding through city streets or driving recklessly?" and "In the past year, have you driven a car, motorcycle, boat or other vehicle when you were high or drowsy on alcohol or drugs?" Response options for these two items ranged from 0 (Never) to 4 (Very Often).

2.3. Statistical Analyses

Descriptive analyses were conducted using SPSS (version 21), and multivariate regression models were conducted using MPlus (version 7.31; Muthén & Muthén, 1998–2012). Because probands and siblings were nested within families, multilevel modeling was utilized to explicitly disaggregate variance between-families and within-family (Raudenbush & Bryk, 2002). The most basic expansion of a fixed-effects regression model to a multilevel model is to allow the intercept term to vary randomly over families (Curran & Bauer, 2007). This parameterization implies that the regression slopes remain fixed (i.e. are invariant over families), but the intercept term does not. The Level-1 model is given as:

$$y_{ij} = \beta_{0j} + \beta_1 x_{1ij} + r_{ij}$$

where i represents individual and j represents family, and the Level-2 model is:

$$\beta_{0j} = \gamma_{00} + u_{0j}$$

The random intercept (denoted β_{0j}) is thus expressed as an additive function of a grand mean (γ_{00}) and a family-level deviation from this mean (u_{0j}).

In addition, Poisson regression was used to model the non-normal distribution of these positively skewed outcomes. A series of 2-level Poisson regression models with random intercepts and fixed slopes were evaluated in three steps for each outcome separately. First, covariates (proband/sibling status, age, gender, and race/ethnicity) and impulsivity facets were simultaneously included in one model to test the unique main effects of impulsivity dimensions on each risky driving behavior. Second, we tested our moderation hypotheses by including interaction terms between lack of premeditation and the other four impulsivity dimensions after centering all the impulsivity facets. Third, a final trimmed model was tested to ensure that the key findings were not attributable to potential suppression effects. Specifically, referencing the recommendations by Hosmer, Lemeshow, and Sturdivant (2013), covariates with $p > 0.25$ in the initial multivariate model were dropped from the final trimmed model. Moreover, all nonsignificant ($p > 0.05$) interaction terms in the second multivariate model were dropped. In case of significant interaction effects, the corresponding main effects were retained in the final trimmed model regardless of level of

significance in the initial multivariate model. Follow-up moderation analyses were conducted using the graphical Johnson-Neyman technique in MPlus (Johnson & Neyman, 1936) as outlined by Clavel (2015).

3. Results

Descriptive statistics and bivariate correlations of the study variables are presented in Table 1. All five impulsivity dimensions had positive correlations with both reckless driving and driving under the influence in the past year. Furthermore, the impulsivity dimensions were all positively correlated with each other, except for sensation seeking which had a negative correlation with lack of perseveration and was uncorrelated with lack of premeditation.

Multilevel Poisson regression results are presented in Tables 2 and 3. In the final trimmed models, male gender (rate ratio [RR] = 1.30, p = 0.002), lack of premeditation (RR = 1.23, p = 0.010), sensation seeking (RR = 1.42, p < 0.001), and negative urgency (RR = 1.23, p < 0.001) were independently and positively associated with past-year reckless driving; none of the interactions between impulsivity dimensions and lack of premeditation predicted this outcome. Male gender (RR = 1.37, p = 0.001), lack of perseverance (RR = 1.32, p = 0.003), sensation seeking (RR = 1.31, p < 0.001), and negative urgency (RR = 1.15, p = 0.036) were independently and positively associated with past-year driving under the influence. In addition, a significant interaction between lack of premeditation and sensation seeking (RR = 1.33, p = 0.006) was found and is illustrated in Figure 1. This graph illustrates that the association between sensation seeking and frequency of past-year driving under the influence gets stronger and stronger at higher levels of lack of premeditation. The association between sensation seeking on past-year driving under the influence is significant for individuals who score about 1 standard deviation (0.50) below the mean or higher on lack of premeditation (visually, this is the point at which the lower confidence band intersects the x-axis); approximately 88% of the sample scored in this range on lack of premeditation.

It should be noted that the fixed effects in the final models were significant even after accounting for between-family variation on these behaviors (random intercept variance RR = 1.21 for both reckless driving and driving under the influence). In general, the intraclass correlations (ICC = .13 for reckless driving; ICC = .14 for driving under the influence) were small, as was the average cluster size (~1.80 individuals/family). However, by disaggregating variance across both the individual and family level, we have increased confidence in the findings that facets of impulsivity are uniquely associated with risky driving in this sample of high-risk individuals and their siblings.

4. Discussion

This is the first study to examine both the unique and interactive effects of the UPPS-P impulsivity facets on risky driving behaviors in a clinical sample. Prior studies conducted among college student samples have found inconsistent associations between impulsivity facets and risky driving behaviors (Bachoo et al., 2013; Pearson et al., 2013; Treloar et al., 2012). In the current study, all five impulsivity facets were significantly correlated with risky

driving outcomes, suggesting that impulsivity may relate more consistently with risky driving among high-risk young adults. These findings could imply a one-factor impulsivity model, reflecting that the shared variance in different impulsivity facets may represent a common etiological pathway to both risk driving behaviors. In multivariate analyses controlling for covariates and other impulsivity dimensions, sensation seeking and negative urgency were the two impulsivity facets significantly associated with both reckless driving and driving under the influence in the past year. This suggests that individuals who enjoy seeking novel experiences and exhibit rash actions when experiencing negative emotions are more likely to engage in both types of risky driving behaviors. Overall, these findings reinforce the notion that personality characteristics are important correlates of risky driving behaviors (Constantinou et al., 2011), and extend past research by disaggregating the effects of different facets of impulsivity in relation to risky driving behaviors.

The inclusion of reckless driving and driving under the influence in the current study allowed us to probe whether associations with impulsivity dimensions differed based on whether or not substance use was involved in the driving behavior. Consistent with findings reported by Bachoo et al. (2013), negative urgency was independently associated with self-reported reckless driving in this high-risk sample. Importantly, this may be reflective of an overlap between risky driving measurements utilized in the present study and in the Bachoo et al. (2013) study; for instance, measures utilized in both studies included taking chances and speeding as part of the conceptualization of risky driving. Contrary to our hypothesis, lack of premeditation did not enhance the positive associations of negative urgency or other impulsivity facets with reckless driving, although it had a direct positive effect on reckless driving. These findings suggest that the ability to pause and think before acting confer direct protection against reckless driving and did not buffer against the influence of mood-related impulsive urges on driving recklessly.

In their study of college student drivers, Treloar et al. (2012) found that negative urgency was the only impulsivity facet that was uniquely associated with drinking and driving behavior. In our study of high-risk young adults, we partially replicated this finding as we found that negative urgency, sensation seeking, and lack of perseverance all had a unique and positive association with driving under the influence in the past year. Sensation seeking, which was the most consistent correlate of driving under the influence across all models, may represent a risk factor particularly relevant for individuals with a history of externalizing psychopathology because substance users tend to score higher on sensation seeking and report increased risk for motor vehicle crashes (Dunlop & Romer, 2010; Wills et al., 1994). In terms of perseverance, Treloar et al. (2012) identified drinking-and-driving convenience expectancies as a mediator of the association between lack of perseverance and drinking and driving among college students. It is possible that lack of perseverance is relevant to driving under the influence among young adults because formulating and arranging alternative transportation methods requires persistence and planning, which tap into the perseverance facet of impulsivity.

We tested the "developmental asymmetry" hypothesis in relation to risky driving and found a significant interaction between lack of premeditation and sensation seeking on past-year driving under the influence. McCabe et al. (2015) found that premeditation enhanced the

associations between sensation seeking and multiple substance use behaviors, but this interaction did not extend to predict antisocial behaviors. Our findings are similar to McCabe et al. (2015) in that the premeditation by sensation seeking interaction was only significant for driving under the influence, but not for reckless driving (which is not explicitly related to substance use). Taken together, these findings further refine our understanding of the applicability of the "developmental asymmetry" hypothesis to different risk taking behaviors by showing that it appears most relevant to substance-related behaviors. Moving forward, elucidating the mechanisms underlying this interaction, such as identifying risky driving related cognitions and motivations, could inform prevention and intervention efforts for high-risk young adults.

This study has several limitations. First, as the UPPS-P impulsivity measure was not administered at study baseline, we utilized cross-sectional data at follow-up which limited causal inferences. Second, the measurement of risky driving behaviors was based on retrospective self-reported items, which may be influenced by participants' current mood, recent experiences, or response styles. Relatedly, while self-reported risky driving measures are highly correlated with naturalistic measures (Taubman – Ben-Ari et al., 2016), participants may have difficulty reporting past-year risky driving retrospectively. Third, our measure of risky driving relied on two single items. Yet, these items broadly mapped onto risky driving behaviors that were directly related and unrelated to substance use, which allowed us to compare and contrast their associations with various impulsivity facets. To extend our current findings, future research utilizing objective, naturalistic measures of driving behaviors is recommended.

The current findings have important implications for the prevention of risky driving behaviors among high-risk young adults. Broadly, these results support possible utility of the UPPS-P impulsivity measure as a clinical or screening tool to identify individuals who might be at elevated risk for risky driving behaviors. While additional research is needed to ascertain the incremental validity of using the UPPS-P scale to predict risky driving behaviors over and above self-report of risky driving behaviors, utilizing the UPPS-P impulsivity measure with patients with substance use problems may be particularly useful as information about distinct impulsivity facets may alert clinicians to potential risky driving behaviors. Building on a large body of research indicating the critical role of personality factors on risky driving, tailored interventions based on history of externalizing psychopathology and these impulsivity facets may be warranted to optimize prevention and intervention efforts for risky driving behaviors among high-risk young adults.

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Highlights

- Examined the impulsivity-risky driving relations among a high-risk young adult sample.

- Sensation seeking and negative urgency were uniquely and positively associated with both risky driving outcomes.

- Lack of premeditation was uniquely associated with more frequent reckless driving.

- Lack of perseverance was uniquely associated with more frequent driving under the influence.

- Lack of premeditation strengthened the positive association between sensation seeking and driving under the influence.
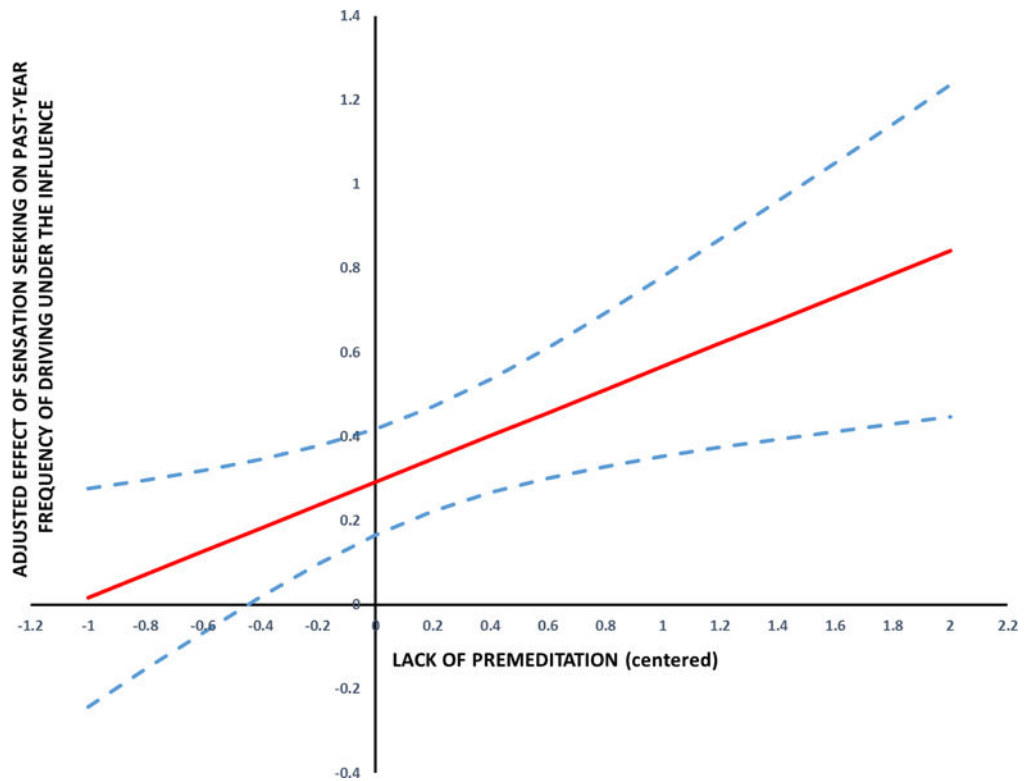
Figure 1.
Johnson-Neyman plot. The solid line represents values of the adjusted effect of sensation seeking on past-year frequency of driving under the influence (controlling for all variables in the Final Model 3) across all observed values of lack of premeditation (centered). The curved dashed lines represent the 95% confidence bands around the adjusted effect of sensation seeking on past-year frequency of driving under the influence.

Table 1

Descriptive data and bivariate correlations for UPPS-P facets and risky driving outcomes ($n = 1,100$)

	1.	2.	3.	4.	5.	6.	7.	Mean (sd)	Range	Skewness	Kurtosis
1. Lack of Premeditation	1.00	**.50**	−.03	**.30**	**.24**	**.14**	**.13**	1.83 (.50)	1.00–4.00		
2. Lack of Perseverance		1.00	**−.12**	**.30**	**.25**	**.09**	**.13**	1.76 (.49)	1.00–3.33		
3. Sensation seeking			1.00	**.17**	**.35**	**.22**	**.17**	2.82 (.67)	1.00–4.00		
4. Negative urgency				1.00	**.64**	**.17**	**.14**	2.33 (.66)	1.00–4.00		
5. Positive urgency					1.00	**.20**	**.16**	2.10 (.63)	1.00–4.00		
6. Past-year reckless driving						1.00	**.48**	.81 (1.00)	0–4	1.12	0.61
7. Past-year driving under the influence							1.00	.68 (.91)	0–4	1.29	1.18

Note. All $p < 0.001$ are highlighted in **bold**.

Table 2

Multilevel Poisson regression models on past-year reckless driving (n = 1,100)

	Model 1: Main Effects			Model 2: Moderator			Model 3: Final Trimmed Model		
	RR	[95% CI]	p	RR	[95% CI]	p	RR	[95% CI]	p
WITHIN-FAMILY									
Proband	0.89	[0.77–1.02]	.100	0.90	[0.78–1.03]	.123	0.88	[0.77–1.02]	.088
Age	1.00	[0.97–1.03]	.884	1.00	[0.97–1.03]	.886	—	—	—
Male	**1.29**	**[1.08–1.53]**	**.004**	**1.29**	**[1.08–1.53]**	**.004**	**1.30**	**[1.10–1.54]**	**.002**
Non-Hispanic White	1.07	[0.92–1.26]	.382	1.07	[0.91–1.25]	.439	—	—	—
(Lack of) Premeditation	**1.23**	**[1.05–1.44]**	**.011**	1.17	[0.98–1.39]	.078	**1.23**	**[1.05–1.44]**	**.010**
(Lack of) Perseverance	1.12	[0.94–1.33]	.203	1.17	[0.98–1.39]	.092	1.13	[0.95–1.34]	.172
Sensation seeking	**1.40**	**[1.22–1.60]**	**.000**	**1.40**	**[1.22–1.60]**	**.000**	**1.42**	**[1.25–1.62]**	**.000**
Negative urgency	**1.20**	**[1.03–1.39]**	**.017**	**1.21**	**[1.04–1.41]**	**.014**	**1.23**	**[1.10–1.38]**	**.000**
Positive urgency	1.06	[0.90–1.24]	.504	1.04	[0.88–1.23]	.620	—	—	—
Premed*Perseverance	—	—	—	0.78	[0.60–1.01]	.059	—	—	—
Premed*Sensation seeking	—	—	—	0.95	[0.76–1.20]	.679	—	—	—
Premed*Negative urgency	—	—	—	1.02	[0.79–1.33]	.875	—	—	—
Premed*Positive urgency	—	—	—	1.23	[0.92–1.63]	.159	—	—	—
BETWEEN-FAMILY									
Random Intercept Mean	0.58	[0.28–1.18]	.132	0.59	[0.29–1.19]	.141	**0.63**	**[0.54–0.73]**	**.000**
Random Intercept Variance	**1.19**	**[1.09–1.31]**	**.000**	**1.19**	**[1.08–1.31]**	**.000**	**1.19**	**[1.09–1.31]**	**.000**

Note. Coefficients in bold are significant at p<.05. RR = rate ratio; Premed = Premeditation; [95% CI] = 95% confidence interval.

Table 3

Multilevel Poisson regression models on past-year driving under the influence ($n = 1,100$)

	Model 1: Main Effects			Model 2: Moderator			Model 3: Final Trimmed Model		
	RR	[95% CI]	p	RR	[95% CI]	p	RR	[95% CI]	p
WITHIN-FAMILY									
Proband	1.07	[0.92–1.24]	.371	1.07	[0.93–1.24]	.344	—	—	—
Age	1.03	[1.00–1.06]	.080	1.03	[1.00–1.06]	.083	1.03	[0.99–1.06]	.098
Male	**1.32**	**[1.09–1.60]**	**.004**	**1.34**	**[1.11–1.62]**	**.003**	**1.37**	**[1.14–1.65]**	**.001**
Non-Hispanic White	1.05	[0.89–1.24]	.583	1.05	[0.89–1.24]	.559	—	—	—
(Lack of) Premeditation	1.17	[0.99–1.39]	.060	1.09	[0.91–1.30]	.369	1.10	[0.92–1.31]	.308
(Lack of) Perseverance	**1.29**	**[1.07–1.55]**	**.006**	**1.31**	**[1.08–1.58]**	**.006**	**1.32**	**[1.10–1.58]**	**.003**
Sensation seeking	**1.31**	**[1.13–1.52]**	**.000**	**1.28**	**[1.11–1.49]**	**.001**	**1.31**	**[1.14–1.51]**	**.000**
Negative urgency	1.12	[0.95–1.31]	.185	1.12	[0.95–1.32]	.180	**1.15**	**[1.01–1.32]**	**.036**
Positive urgency	1.04	[0.88–1.23]	.633	1.04	[0.88–1.23]	.631	—	—	—
Premed*Perseverance	—	—	—	1.05	[0.78–1.40]	.756	—	—	—
Premed*Sensation seeking	—	—	—	**1.34**	**[1.06–1.70]**	**.014**	**1.33**	**[1.09–1.62]**	**.006**
Premed*Negative urgency	—	—	—	1.08	[0.82–1.42]	.573	—	—	—
Premed*Positive urgency	—	—	—	0.94	[0.71–1.25]	.658	—	—	—
BETWEEN-FAMILY									
Random Intercept Mean	**0.24**	**[0.09–0.52]**	**.000**	**0.24**	**[0.11–0.51]**	**.000**	**0.27**	**[0.13–0.56]**	**.000**
Random Intercept Variance	**1.19**	**[1.05–1.32]**	**.001**	**1.19**	**[1.07–1.32]**	**.001**	**1.19**	**[1.07–1.32]**	**.000**

Note. Coefficients in bold are significant at p<.05. RR = rate ratio; Premed = Premeditation; [95% CI] = 95% confidence interval.