Direct and Indirect Effects of Impulsivity Traits on Drinking and Driving in Young Adults

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ABSTRACT. Objective: Impulsivity is strongly associated with alcohol-related risk-taking behavior, and this association has been found to be mediated by alcohol cognitions. The current study expanded this literature by comparing the relative association of distinct impulsivity traits with a specific risky behavior—drinking and driving. We then tested whether drinking-and-driving expectancies uniquely mediated this relation over and above other cognitions about alcohol and drinking and driving. **Method:** College student drivers (n = 816; 53.6% women) completed a paper-and-pencil survey in small groups. Self-report measures assessed alcohol use, impulsivity traits, alcohol expectancies, drinking-and-driving cognitions (i.e., expectancies, attitudes, beliefs), and drinking and driving. **Results:** Although all impulsivity traits were correlated with drinking and driving, only urgency uniquely contributed to drinking and driving. Indirect effect tests indicated that drinking-and-driving convenience expectancies partially mediated this association as well as that between (lack of) perseverance and drinking and driving. These results remained significant after controlling for alcohol expectancies and other drinking-and-driving cognitions. **Conclusions:** These findings highlight the importance of distinguishing among impulsivity traits to improve theoretical models of the processes by which personality leads to specific alcohol-related consequences. In addition, results extend previous research by providing evidence for the unique importance of expectancies regarding the convenience of drinking and driving over and above more global alcohol expectancies and other drinking-and-driving cognitions. (*J. Stud. Alcohol Drugs, 73,* 794–803, 2012)

DRINKING AND DRIVING CONTINUES TO BE a serious public health problem, particularly for young adults. Approximately one third of the traffic fatalities in the United States in 2009 involved a driver with a blood alcohol concentration at or above .08%, and the percentage of legally intoxicated drivers in fatal crashes was highest for drivers ages 21–24 years (National Highway Traffic Safety Administration, 2011). College students are at increased risk for drinking and driving when compared with same-age youth (Hingson et al., 2005; Paschall, 2003). More than a third (35.5%) of college student drivers reported driving after drinking in the past month, and 13.3% admitted to driving after consuming more than five drinks (Wechsler et al., 2003).

The high costs of drinking and driving highlight the importance of identifying factors that put young adults at risk for this behavior. Individual differences in personality and learning have been shown to predict engagement in drinking and driving (Ames et al., 2002; Bingham et al., 2007) and the persistence of this behavior despite negative consequences (e.g., arrest, accident; Nochajski and Stasiewicz, 2006). In the present study, the potential influence of impulsivity traits and drinking-and-driving cognitions on drinking and driving was examined. We sought to identify specific impulsivity traits uniquely associated with drinking and driving. Further, we examined a mediation model in which impulsivity traits contribute to drinking and driving through drinking-and-driving–specific cognitions (i.e., expectancies, attitudes, beliefs).

Impulsivity, alcohol-related behavior, and drinking and driving

Impulsivity is one of the most widely studied personality predictors of heavy alcohol consumption, alcohol-related problems, and alcohol use disorders (Dick et al., 2010; Lejuez et al., 2010; Sher et al., 1999; Verdejo-García et al., 2008). However, there is no well-agreed-upon definition of this personality domain. The term *impulsivity* has referred to behavioral disinhibition, poor self-control, lack of deliberation, deficits in self-discipline, excitement seeking, novelty seeking, psychoticism, venturesomeness, and delay discounting (de Wit, 2009; Depue and Collins, 1999; Miller et al., 2003; Reynolds et al., 2006). Although these impulsivity-related constructs may be conceptually similar, factor analytic studies of self-report and behavioral measures of impulsivity have found important distinctions among them (Cyders et al., 2007; Meda et al., 2009; Reynolds et al., 2006).

Whiteside and Lynam's (2001) UPPS model is particularly useful because it places four impulsivity traits along dimensions of the well-established Five Factor Model (NEO Personality Inventory–Revised [NEO-PI-R]; Costa and McCrae, 1992). *Urgency* is an emotion-based disposition

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to rash action similar to the NEO-PI-R impulsivity facet of neuroticism. *(Lack of) planning* is the tendency to act without thinking ahead, similar to the NEO-PI-R deliberation facet of conscientiousness. *(Lack of) perseverance* is a deficit in the ability to stay focused on a task despite boredom, similar to the NEO-PI-R self-discipline facet of conscientiousness. *Sensation seeking* is the tendency to seek out novel experiences or thrill seeking, similar to the NEO-PI-R excitement-seeking facet of extraversion. Significant zero-order correlations have been observed between these impulsivity traits and several types of risky behavior, including binge eating, purging, frequency and quantity of alcohol consumption, alcohol-related problems, pathological gambling, antisocial and borderline personality traits, illegal drug use, and risky sex (Claes et al., 2005; Cyders et al., 2009; Cyders and Smith, 2008; Fischer and Smith, 2008; Miller et al., 2003; Zapolski et al., 2009).

There is a growing body of evidence to suggest that these impulsivity traits differentially predict distinct risk behaviors, such as problem drinking, binge eating, and gambling (Fischer and Smith, 2008). When multiple impulsivity traits are considered together, urgency has been shown to be uniquely predictive of heavy alcohol use and negative consequences (Magid and Colder, 2007; Smith et al., 2007). In contrast, sensation seeking has been found to be uniquely associated with alcohol use but not problem levels or consequences (Cyders et al., 2009; Fischer and Smith, 2008; Magid and Colder, 2007; Smith et al., 2007). Outcomes for (lack of) planning and (lack of) perseverance have been less consistent (Fischer and Smith, 2008; Magid and Colder, 2007; Smith et al., 2007; Whiteside et al., 2005).

Although the broad domain of impulsivity has been shown to predict drinking and driving (Ames et al., 2002; Ryb et al., 2006) and drinking-and-driving recidivism (McMillen et al., 1992), previous research has not directly tested which specific impulsivity traits uniquely contribute to drinking and driving. Considered individually, sensation seeking is the most widely studied and well-validated predictor of drinking-and-driving behavior and convictions (see Jonah, 1997, for a review; see also Zuckerman, 1994). The relative influence of disaggregated impulsivity traits on drinking and driving and potential mechanisms by which specific traits may lead to this risk behavior are yet to be explored.

Impulsivity and cognitive risk for drinking and driving

Impulsivity traits directly contribute to risky drinking behavior, and there is a growing body of evidence to suggest that these traits also influence behavior indirectly, through the development of alcohol-related cognitions (Anderson et al., 2003; McCarthy et al., 2001a, 2001b; Smith and Anderson, 2001). According to the acquired preparedness model, personality traits bias the learning process by which individuals develop expectations and attitudes about alcohol-related behaviors. Specifically, impulsivity traits are thought to influence the development of overly positive expectancies, attitudes, and beliefs about alcohol use, which then influence alcohol consumption and related risky behaviors (Smith and Anderson, 2001). Recent longitudinal tests of this model have found the influence of impulsivity traits on alcohol use and alcohol-related problems to be mediated by positive alcohol expectancies (Corbin et al., 2011; Settles et al., 2010). Similarly, cognitive factors (i.e., expectancies, attitudes, beliefs) may mediate the association of impulsivity traits and drinking and driving.

Several cognitive factors increase the risk of drinking and driving. For instance, lower perceived dangerousness and higher perceived peer acceptance of drinking and driving are associated with engagement in the behavior and predict drinking and driving longitudinally (McCarthy and Pedersen, 2009; Turrisi et al., 1997). Based on evidence that perceived rewards are important contributors to drinking-and-driving risk (Greening and Stoppelbein, 2000), McCarthy et al. (2006) developed a measure of drinking-and-driving–specific positive outcome expectancies (Positive Expectancies for Drinking and Driving in Youth [PEDD-Y]), which has been shown to predict engagement in drinking and driving.

Factor analyses identified four subscales of the PEDD-Y: convenience, control, avoiding consequences, and excitement seeking. McCarthy et al. (2006) found that individuals with greater endorsement of convenience, control, and avoiding consequences expectancies rated drinking and driving as less dangerous and the consequences less likely. In addition, convenience and avoiding consequences expectancies were uniquely associated with more frequent drinking and driving over and above gender, typical frequency and quantity of alcohol consumption, and other cognitive variables, including perceived dangerousness and normative beliefs. However, only convenience expectancies (e.g., "Drinking and driving allows you to go home and sleep in your own bed," "Drinking and driving is faster than having to wait for a ride") predicted drinking and driving over and above the other drinking-and-driving expectancies.

Present study

Recent research has highlighted the importance of disaggregating impulsivity into component traits to improve the prediction of specific risk behaviors. In the present study, the unique contributions of several impulsivity traits to drinking and driving were examined, as were the unique contributions of positive outcome expectancies for drinking and driving. If the acquired preparedness model extends to drinking and driving, these positive expectancies should both predict drinking and driving and mediate the association of impulsivity traits and drinking and driving. Therefore, path models in which these expectancies mediated the association of impulsivity traits and drinking and driving were also ex-

amined. Finally, positive outcome expectancies for drinking and driving were tested simultaneously with other potential cognitive mediators (i.e., general positive alcohol expectancies, perceived dangerousness, normative beliefs, perceived negative consequences) to examine the content specificity of these effects.

The unique influence of impulsivity traits on risk for drinking and driving has not been previously evaluated. Urgency is the only impulsivity trait shown to uniquely predict heavy alcohol use and related negative consequences. Therefore, we hypothesized that individuals high in urgency may also be at increased risk for drinking and driving, over and above the influence of other impulsivity traits. Previous findings also suggest that, in particular, individuals who regard drinking and driving as more convenient than other options are more likely to drink and drive. Therefore, convenience expectancies were hypothesized to be uniquely associated with drinking and driving. Convenience expectancies were also hypothesized to uniquely mediate the association of urgency and drinking and driving over and above other positive outcome expectancies for drinking and driving, general positive alcohol outcome expectancies, and other cognitive factors.

Method

Participants and procedure

Participants (N = 966) were students enrolled in introductory psychology classes at the University of Missouri. Analyses included only those students who reported access to a car or driving at least once in the past month (n = 816; 84.7%). Approximately half of these students were women (53.6%), and the majority were White (89.3%) and non-Hispanic (96.8%). This was a convenience sample that included mostly college freshmen (77.9%) or sophomores (12.7%), and therefore most of the students were younger than age 21 (97.0%; M_{age} = 18.9; SD = 1.1). Paper-and-pencil questionnaires were completed in groups of approximately 30 students. Participants received partial course credit for participating in the study. Written informed consent was obtained, and procedures for this study were approved by the University of Missouri Institutional Review Board.

Measures

Demographic information. Participants provided demographic information, including age, gender (men = 1, women = 0), race, ethnicity, and year in school. Participants also reported whether they currently had access to a car or drove at least once in the past month.

Alcohol use. The Drinking Styles Questionnaire (Smith et al., 1995) was used to assess participants' typical frequency and quantity of alcohol consumption. Forced choice response options for typical frequency ranged from 1 (*never drinking alcohol*) to 6 (*drinking almost daily*). For typical quantity, response options ranged from 1 (*drinking no alcohol*) to 5 (*drinking more than nine drinks at a time*). This measure has demonstrated good reliability and validity in college-age samples (McCarthy et al., 2001b).

Alcohol expectancies. The 68-item version of the Alcohol Expectancy Questionnaire (AEQ; Goldman et al., 1997) was used to assess participants' expectancies about the positive effects of alcohol use. Participants responded to each item using a 5-point Likert-style scale ranging from *disagree strongly* to *agree strongly.* Research has found the AEQ to be related to quantity and frequency of consumption and alcohol-related problems (Goldman et al., 1999). The AEQ has been found to have six factors (i.e., positive global changes, sexual enhancement, social and physical pleasure, social assertiveness, relaxation, and arousal/aggression), with a single higher order factor (Goldman et al., 1997). For the present study, participants' responses were aggregated to create a mean AEQ score (α = .97).

Drinking-and-driving expectancies. The PEDD-Y (McCarthy et al., 2006) was used to assess participants' drinking-and-driving expectancies. The PEDD-Y has 29 items, which have been found to load onto four factors: convenience (16 items), control (5 items), avoiding consequences (4 items), and excitement seeking (4 items). Participants indicated the degree to which they endorse each expectancy item on 5-point Likert scales ranging from *disagree strongly* to *agree strongly.* The PEDD-Y subscales have been found to be associated with drinking-and-driving frequency as well as with other drinking-and-driving cognitions (e.g., attitudes, normative beliefs; McCarthy et al., 2006). The internal consistency reliabilities (α's) in the present sample were .97, .81, .84, and .88 for convenience, control, avoiding consequences, and control, respectively.

Impulsivity traits. Impulsivity traits were assessed with the UPPS Impulsive Behavior Scale (Whiteside and Lynam, 2001). The UPPS scale was designed to assess four impulsivity traits: urgency, (lack of) planning, (lack of) perseverance, and sensation seeking. Participants responded with a 4-point Likert-style scale ranging from *disagree strongly* to *agree strongly.* This measure has been demonstrated to be a valid predictor of alcohol use as well as alcohol-related problems (Smith et al., 2007; Whiteside and Lynam, 2003; Whiteside et al., 2005). The internal consistency reliabilities (α's) in the present sample were .86, .91, .82, and .90 for urgency, (lack of) planning, (lack of) perseverance, and sensation seeking, respectively.

Perceived dangerousness. Perceived dangerousness of drinking and driving was assessed with three questions, which asked participants to indicate how dangerous they believe it is to drive after consuming one drink, three drinks, and five or more drinks within a 2-hour timeframe. Participants responded using a 4-point Likert scale ranging from

not at all dangerous to *very dangerous.* These questions have been found to load onto a single factor that is negatively correlated with drinking-and-driving behavior (Grube and Voas, 1996). In the present study, scores on these items were aggregated to create a total mean score ($\alpha = .84$).

Normative beliefs. Normative beliefs about drinking and driving were assessed through a single question about perceived disapproval from friends regarding drinking and driving. Participants were asked to specify how many (0–3) of their three closest friends would disapprove of drinking and driving (Grube and Voas, 1996).

Perceived negative consequences. Participants indicated what they believed to be the likelihood that a driver at their age would experience certain consequences from driving while intoxicated. The consequences assessed were being stopped by police, being breath tested, being arrested, and having an accident. Participants rated the likelihood of these consequences on 4-point Likert scales ranging from *not very likely* to *very likely.* Responses to these items were aggregated to create a total mean score ($\alpha = .87$).

Drinking and driving. Participants indicated how often they drive after drinking alcohol (i.e., drinking-and-driving frequency) and how much alcohol they usually drink at one time before driving (i.e., drinking-and-driving quantity). Forced choice response options for drinking-and-driving frequency ranged from 0 (*never driving after drinking alcohol* [*more than a sip or a taste*]) to 5 (*driving after drinking alcohol almost daily*). Response options for drinking-and-driving quantity ranged from 0 (*never driving after drinking alcohol*) to 4 (*driving after drinking "a lot" of alcohol* [*more than nine beers or drinks*]).

Analytic strategy

Following the recommendations set forth by MacKinnon et al. (2002), a significant direct effect from a predictor to a mediator (Path A) and from a mediator to an outcome variable (Path B) are required for mediation, but the direct effect from the predictor to the outcome variable (Path C) does not need to be significant. As a preliminary step, bivariate correlations between study variables were examined. Only predictors (UPPS traits) with significant associations with mediators (PEDD-Y expectancies) and mediators with significant associations with outcomes (drinking-and-driving frequency and quantity) were included in subsequent regression analyses.

A set of hierarchical regression models tested whether UPPS traits uniquely contributed to PEDD-Y expectancies. Models predicted PEDD-Y expectancies from gender, drinking frequency, and drinking quantity (Step 1) and all UPPS traits (Step 2). A second set of hierarchical regression models tested whether UPPS traits and PEDD-Y expectancies uniquely contributed to drinking-and-driving behavior. Models predicted drinking-and-driving frequency and quantity from gender, drinking frequency, and drinking quantity (Step 1), all UPPS traits (Step 2), and all PEDD-Y subscales (Step 3).

Tests of mediation (indirect effects tests) were conducted using Mplus version 6.12 (Muthén and Muthén, 2011). Any predictors (UPPS traits) with significant unique associations with mediators (PEDD-Y expectancies) and any mediators (PEDD-Y expectancies) with significant unique associations with outcomes (drinking-and-driving frequency or quantity) were included in the indirect effects tests. The product of coefficients method was used to calculate the indirect effect estimates, and the multivariate delta method was used to calculate their respective standard errors. The estimates of the indirect effects were divided by their standard errors to yield a z statistic, which was compared with critical values from the standard normal distribution. A significant indirect effect (z) is indicative of at least partial mediation. As MacKinnon et al. (2004) recommend, confidence limits for the z statistics were obtained using bias-corrected bootstrap resampling methods.

Results

Descriptive statistics

Table 1 presents descriptive statistics for demographic and alcohol use variables stratified by gender. Compared

TABLE 1. Descriptive statistics for alcohol use and drinking-and-driving variables stratified by gender

Variable	Men (n = 377) %	Women (n = 437) %	χ^2
Drinking frequency			22.96***
Never had a drink of alcohol	5.3	7.6	
1, 2, 3, or 4 times in life	4.8	6.9	
3 or 4 times per year	6.7	6.7	
Once a month	15.5	22.8	
Once or twice a week	63.7	55.5	
Almost daily	4.0	0.5	
Drinking quantity			103.87***
Does not drink alcohol	7.0	9.0	
≤1 drink	6.2	7.8	
2–3 drinks	15.5	32.6	
4–8 drinks	44.8	47.4	
≥9 drinks	26.5	3.2	
Drinking-and-driving frequency			37.66***
Never driven after drinking	24.4	36.6	
1, 2, 3, or 4 times in life	26.3	34.3	
3 or 4 times per year	18.5	11.0	
Once a month	21.2	13.7	
Once or twice a week	9.1	4.3	
Almost daily	0.5	0.0	
Drinking-and-driving quantity			57.61***
Never driven after drinking	24.4	36.5	
≤1 drink	16.1	24.8	
2–3 drinks	28.7	27.8	
4–8 drinks	25.7	10.1	
≥9 drinks	5.1	0.9	

***$p < .001$.

TABLE 2. Correlations of impulsivity traits, positive outcome drinking-and-driving expectancies, and drinking-and-driving frequency and quantity

	Expectancy subscales				Drinking and driving	
Variable	CONV	CONT	AC	ES	Frequency	Quantity
Impulsivity traits						
Urgency	.21***	.17***	.18***	.11**	.23***	.25***
Planning (lack)	.11**	.11**	.10**	.01	.20***	.23***
Perseverance (lack)	.20***	.18***	.16***	.06	.19***	.21***
Sensation seeking	.12**	.05	.08*	.03	.16***	.20***
Drinking behavior						
Frequency	.19***	.03	.13***	-.17***	.51***	.51***
Quantity	.26***	.09**	.19***	-.08*	.51***	.57***
Drinking and driving						
Frequency	.47***	.23***	.35***	-.03	–	.81***
Quantity	.44***	.23***	.34***	-.02	.81***	–
M	2.76	1.91	3.22	2.62	1.38	1.40
(*SD*)	(1.16)	(0.84)	(1.17)	(1.06)	(1.27)	(1.17)

Notes: CONV = convenience; CONT = control; AC = avoiding consequences; ES = excitement seeking.
*$p < .05$; **$p < .01$; ***$p < .001$.

with college women, college men reported a greater drinking frequency, $\chi^2(5) = 22.96$, $p < .001$, and quantity, $\chi^2(4) = 103.87$, $p < .001$. Men also reported a greater frequency and quantity of drinking and driving than women, $\chi^2(5) = 37.66$, $p < .001$, and $\chi^2(4) = 57.61$, $p < .001$, respectively. Typical frequency and quantity of drinking were strongly related to drinking-and-driving frequency and quantity (*r*s ranged from .51 to .57, *p*s < .001; Table 2).

Gender differences were also present for all drinking-and-driving expectancies (PEDD-Y subscales). Men were more likely to hold more positive drinking-and-driving expectancies, convenience: $t(811) = 6.01$, $p < .001$, $d = 0.42$; control: $t(809) = 6.65$, $p < .001$, $d = 0.47$; avoiding consequences: $t(806) = 3.71$, $p < .001$, $d = 0.26$; excitement seeking: $t(810) = 3.09$, $p = .002$, $d = 0.22$. Men were also significantly higher in sensation seeking, $t(812) = 6.34$, $p < .001$, $d = 0.45$. No gender differences were observed for urgency, (lack of) planning, or (lack of) perseverance.

Table 2 presents bivariate correlations between UPPS traits, PEDD-Y expectancies, frequency and quantity of drinking, and frequency and quantity of drinking and driving. All UPPS traits were significantly associated with drinking-and-driving frequency and quantity (*r*s from .16 to .25, *p*s < .001). These traits were also consistently associated with all subscales of the PEDD-Y, with the exception of excitement seeking. The excitement-seeking subscale was associated with urgency ($r = .11$, $p = .002$) but no other UPPS traits. The PEDD-Y subscales of convenience, control, and avoiding consequences were also associated with drinking-and-driving frequency and quantity (*r*s from .23 to .47, *p*s < .001), but excitement seeking was not associated with drinking-and-driving frequency or quantity. Given that the PEDD-Y excitement-seeking subscale was not associated with drinking and driving, this subscale was excluded from further analyses.

Unique associations among UPPS traits, PEDD-Y expectancies, and drinking and driving

The first three data columns of Table 3 present results of hierarchical regression models predicting PEDD-Y expectancies from UPPS traits and covariates. In the initial regression models (Step 1), gender and drinking patterns accounted for 9% of the variance in convenience expectancies, 6% of the variance in control expectancies, and 4% of the variance in avoiding-consequences expectancies. The addition of UPPS traits to this model significantly aided prediction of PEDD-Y expectancies (convenience: $\Delta R^2 = .04$, $p < .001$; control: $\Delta R^2 = .04$, $p < .001$; avoiding consequences: $\Delta R^2 = .03$, $p < .001$). UPPS traits and covariates accounted for 13% of the variance in convenience expectancies, 10% of the variance in control expectancies, and 7% of the variance in avoiding consequences expectancies. Urgency and (lack of) perseverance were uniquely associated with convenience expectancies (urgency: $\beta = .25$, $p = .001$; perseverance: $\beta = .32$, $p < .001$), control (urgency: $\beta = .23$, $p = .003$; perseverance: $\beta = .27$, $p = .003$), and avoiding consequences expectancies (urgency: $\beta = .22$, $p = .006$; perseverance: $\beta = .24$, $p = .007$).

The final two data columns of Table 3 present results of hierarchical regression models predicting drinking-and-driving behavior from UPPS traits, PEDD-Y expectancies, and covariates. Initially, gender and typical drinking patterns accounted for 30% of the variance in drinking-and-driving frequency and 35% of the variance in drinking-and-driving quantity. The addition of UPPS traits to the models significantly aided prediction of drinking-and-driving behavior (frequency: $\Delta R^2 = .02$, $p = .002$; quantity: $\Delta R^2 = .02$, $p < .001$). Urgency was the only UPPS trait uniquely associated with drinking-and-driving behavior (frequency: $\beta = .17$, $p = .015$, and quantity: $\beta = .16$, $p = .02$). The addition of PEDD-Y subscales significantly aided prediction of drinking-and-

TABLE 3. Hierarchical regression analyses predicting drinking-and-driving expectancies and drinking-and-driving behaviors from personality, cognition, and control variables

	Drinking-and-driving expectancies			Drinking and driving	
Variable	CONV	CONT	AC	FREQ	QUANT
Step 1: Covariates[a]					
ΔR^2	*.09***	*.06***	*.04***	*.30***	*.35***
Step 2: UPPS traits					
Urgency	.25**	.23**	.22**	.17*	.16*
Planning (lack of)	-.11	.03	-.07	.07	.10
Perseverance (lack of)	.32***	.27**	.24**	.09	.12
Sensation seeking	.11	.02	.07	-.02	.03
ΔR^2	*.04***	*.04***	*.03***	*.02***	*.02***
Total R^2	*.13***	*.10***	*.07***	*.32***	*.37***
Step 3: PEDD-Y expectancies					
Convenience	.35***	.26***			
Control	-.03	-.01			
Avoiding consequences	-.04	-.01			
ΔR^2				*.11***	*.07***
Total R^2				*.42***	*.44***

Notes: Standardized regression coefficients (βs) are reported in plain text. R^2 values are presented in *italicized* text. CONV = convenience; CONT = control; AC = avoiding consequences; FREQ = frequency; QUANT = quantity; UPPS = UPPS Impulsive Behavior Scale; PEDD-Y = Positive Expectancies for Drinking and Driving in Youth. [a]Covariates included gender, drinking frequency, and drinking quantity.
*$p < .05$; **$p < .01$; ***$p < .001$.

driving behavior over and above gender, typical drinking patterns, and UPPS traits (frequency: $\Delta R^2 = .11$, $p < .001$; quantity: $\Delta R^2 = .07$, $p < .001$). Convenience expectancies were the only PEDD-Y subscale uniquely associated with drinking-and-driving behavior (frequency: $\beta = .35$, $p < .001$; quantity: $\beta = .26$, $p < .001$). The final models accounted for 42% of the variance in drinking-and-driving frequency and 44% of the variance in drinking-and-driving quantity.

Mediation pathways through drinking-and-driving expectancies

We specified a mediation model that included direct paths from urgency and (lack of) perseverance to drinking-and-driving frequency and quantity, as well as indirect paths from these variables through convenience expectancies to drinking-and-driving frequency and quantity (Figure 1).

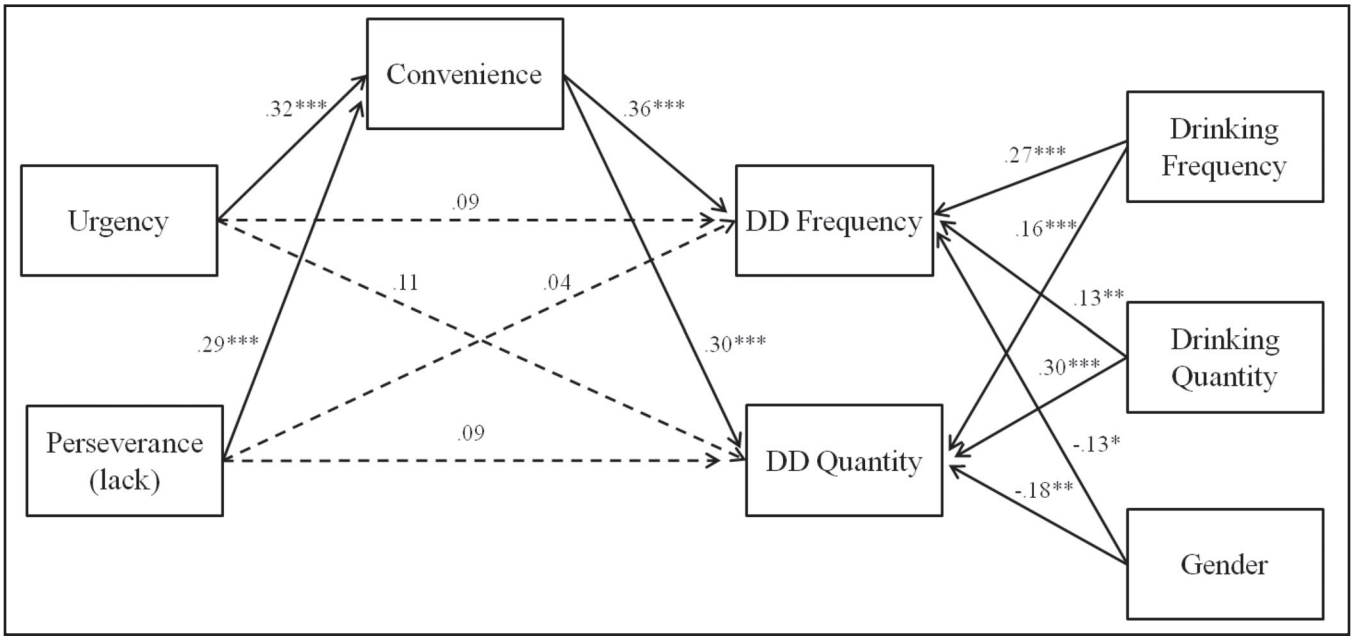

FIGURE 1. A depiction of the mediation model tested for impulsivity traits, convenience expectancies, covariates, and drinking-and-driving behaviors. Standardized path coefficients are reported. Nonsignificant paths are denoted by dashed lines. DD = drinking and driving.
*$p < .05$, **$p < .01$, ***$p < .001$.

TABLE 4. Indirect effect estimates for tests of unique mediation through convenience drinking-and-driving expectancies

	Drinking-and-driving frequency			Drinking-and-driving quantity		
Variable	β	(*SE*)	[95% CI]	β	(*SE*)	[95% CI]
Urgency						
Convenience expectancies	.09***	(.02)	[.04, .13]	.07**	(.02)	[.03, .11]
Alcohol expectancies	.02	(.02)	[-.03, .06]	.03	(.03)	[-.02, .08]
Perceived danger	.05**	(.02)	[.01, .08]	.06**	(.02)	[.02, .10]
Normative beliefs	.07**	(.02)	[.03, .11]	.05**	(.02)	[.02, .08]
Negative consequences	.00	(.01)	[-.01, .01]	.00	(.00)	[-.01, .01]
Sum of indirect effects	.22***	(.05)	[.12, .31]	.20***	(.04)	[.12, .28]
Perseverance (lack)						
Convenience expectancies	.08**	(.02)	[.03, .12]	.06**	(.02)	[.02, .10]
Alcohol expectancies	.00	(.01)	[-.01, .02]	.01	(.01)	[-.01, .02]
Perceived danger	.06**	(.02)	[.02, .09]	.07**	(.02)	[.02, .11]
Normative beliefs	.05**	(.02)	[.01, .09]	.04**	(.02)	[.01, .07]
Negative consequences	.03	(.02)	[.00, .07]	.02	(.02)	[-.02, .05]
Sum of indirect effects	.22***	(.05)	[.13, .31]	.19***	(.04)	[.11, .27]

Notes: Parameter estimates were divided by *SE*s to calculate a *z* test of the significance of indirect effects. β = standardized parameter estimate; 95% CI = confidence intervals estimated by bias-corrected bootstrap with 5,000 resamplings.
**$p < .01$; ***$p < .001$.

Direct paths from gender and typical drinking variables to drinking-and-driving outcomes were also included.

Convenience expectancies partially mediated the association between impulsivity traits and drinking and driving. Significant indirect paths from urgency through convenience expectancies to drinking-and-driving frequency and quantity were observed (frequency: β = .12, 95% CI [.06, .17], $z = 3.92$, $p < .001$; quantity: β = .10, 95% CI [.05, .14], $z = 3.80$, $p < .001$). In addition, indirect paths from (lack of) perseverance through convenience expectancies to drinking-and-driving frequency and quantity were significant (frequency: β = .10, 95% CI [.05, .16], $z = 3.46$, $p = .001$; quantity: β = .09, 95% CI [.04, .13], $z = 3.41$, $p = .001$). Path coefficients for this model are presented in Figure 1.

Next, general positive alcohol outcome expectancies and other cognition variables were added to the model to test whether convenience expectancies would uniquely mediate the association between impulsivity traits and drinking and driving. Indirect paths through perceived dangerousness, normative beliefs about drinking and driving, perceived negative consequences, and positive alcohol expectancies were added to the mediation model. The indirect effects from urgency through PEDD-Y convenience expectancies to drinking-and-driving frequency and quantity remained significant (frequency: β = .09, 95% CI [.04, .13], $z = 3.73$, $p < .001$; quantity: β = .07, 95% CI [.03, .11], $z = 3.39$, $p = .001$) (Table 4). Similarly, indirect effects from (lack of) perseverance through convenience expectancies to drinking-and-driving frequency and quantity remained significant (frequency: β = .08, 95% CI [.03, .12], $z = 3.29$, $p = .001$; quantity: β = .06, 95% CI [.02, .10], $z = 3.13$, $p = .002$). Of the other cognitive mediators, significant indirect effects were observed for all mediation paths through perceived dangerousness and normative beliefs (Table 4). In contrast, indirect effects were not significant for general alcohol outcome expectancies or perceived negative consequences (Table 4).

Discussion

Drinking and driving is a major public health problem, particularly for young adults. Recent research has demonstrated the importance of disaggregating impulsivity traits to improve the prediction of alcohol use and alcohol-related consequences (Cyders et al., 2007, 2009; Magid and Colder, 2007; Settles et al., 2010; Smith et al., 2007). The current study sought to increase our understanding of how these traits contribute to drinking and driving. Results suggest that, of the UPPS impulsivity traits, only urgency has a unique association with drinking-and-driving behavior. Although cross-sectional, results also found support for a mediation pathway for both urgency and (lack of) perseverance through drinking-and-driving outcome expectancies.

Previous research has shown that urgency is uniquely associated with heavy alcohol use and problems (Cyders et al., 2009; Magid and Colder, 2007; Smith et al., 2007; Xiao et al., 2009). The present study expanded on this work, finding that urgency made a unique contribution to drinking-and-driving behavior, over and above gender and typical drinking, whereas other impulsivity traits did not. These results suggest that youth high in urgency are more likely to make decisions to drive while intoxicated. In addition, the unique contribution of urgency suggests that youth high in urgency may be at greater risk for drinking and driving than individuals who may be otherwise impulsive, such as high sensation seekers.

In the drinking-and-driving literature, the majority of research has focused on sensation seeking, and the influence of other specific impulsivity traits has not been assessed. In the present study, the association between sensation seeking and drinking and driving was no longer significant when other impulsivity traits were considered. Previous studies have found that sensation seeking is related to alcohol use but not uniquely associated with alcohol-related negative consequences (Fischer and Smith, 2008; Magid and Colder, 2007; Smith et al., 2007). How often young adults drive after drinking, as well as how much alcohol is consumed before driving, may be more strongly influenced by a lack of emotional control (urgency) than by thrill seeking (sensation seeking). Cyders et al. (2009) have proposed that high sensation seekers' search for stimulating circumstances (e.g., parties) can promote increased alcohol use but not necessarily greater risky decision making while intoxicated. In contrast, individuals high in urgency may lack the emotional control to inhibit impulsive decision making when intoxicated, increasing the likelihood of engaging in risky behavior such as drinking and driving. The present findings highlight the importance of distinguishing among impulsivity traits to improve theoretical models of the processes by which personality leads to different risky behaviors (Smith et al., 2007, 2009).

It is important to note the limitations of our study with regard to the assessment of impulsivity traits. Although the current study highlights the importance of negative urgency, recent work has identified a fifth impulsivity trait—positive urgency—which is the disposition to act rashly in response to extreme positive mood (Cyders and Smith, 2007; Cyders et al., 2007). There is some evidence that positive urgency may be a stronger predictor of the development of positive alcohol expectancies, whereas negative urgency may be a stronger predictor of the development of coping motives (Settles et al., 2010). It follows that positive urgency may contribute to the development of positive drinking-and-driving expectancies. Because positive urgency was not assessed in this study, we could not test whether individuals with high levels of positive urgency have more positive expectancies about drinking and driving compared with individuals with high levels of the other four impulsivity traits.

At a broader level, because personality is assessed through self-report of behaviors, it is unclear whether the trait predicts the behavior or whether the behavior is a simple manifestation of the trait (Dick et al., 2010). To defend a theoretical model in which impulsivity influences risky behaviors, impulsivity must be observed before the onset of the behavior. Longitudinal studies of impulsive personality and alcohol use have shown that indications of behavioral disinhibition before drinking onset (age 11) predicted drinking onset by age 14 (McGue et al., 2001) and that negative and positive urgency at the start of college predicted drinking levels at the end of the first year (Settles et al., 2010). Although the present study indicates that expectancies mediate the association of impulsivity traits and drinking and driving, longitudinal studies such as these are necessary to directly test the directionality of the current findings.

Although urgency was the most consistent personality predictor of drinking and driving, convenience expectancies had the strongest association with drinking and driving over and above the other drinking-and-driving cognitions. The current results and earlier results from our laboratory (McCarthy et al., 2006) suggest that, for young adults, the perceived benefits of drinking and driving influence drinking-and-driving decisions more than the anticipated negative consequences. Improving our understanding of the association between the perceived benefits of drinking and driving and engagement in drinking-and-driving behavior can improve prevention/intervention efforts. Alternative transportation programs (National Highway Traffic Safety Administration, 2009) have been developed to reduce drinking and driving by providing intoxicated individuals a safe ride home. Our results suggest that increasing the convenience of these drinking-and-driving alternatives or emphasizing the inconvenience of negative consequences of drinking and driving may be a particularly effective strategy to reduce this behavior.

A unique aspect of the present study is the focus on integrating personality characteristics and learning processes in determining drinking and driving. According to the acquired preparedness model, personality traits influence risky decisions by affecting the learning process (Settles et al., 2010; Zapolski et al., 2009). We found support for this model when examining drinking and driving: Convenience expectancies were a significant (partial) mediator of the relation between impulsivity traits and drinking and driving. Furthermore, convenience expectancies mediated this relation even while accounting for several other potential mediators, including general positive alcohol expectancies. These findings highlight the importance of examining drinking-and-driving–specific expectancies.

Although (lack of) perseverance was not directly associated with drinking-and-driving behavior, we found evidence for an indirect pathway to drinking and driving involving convenience expectancies. This finding highlights the possibility that for individuals low in perseverance, convenience expectancies play an integral role in drinking-and-driving behavior. Lack of perseverance reflects an inability to maintain focus on a boring or difficult task that requires resistance to distracting stimuli (Whiteside et al., 2005). Drinkers low in perseverance may have difficulty waiting for alternative transportation and instead choose the immediate and more convenient option of driving themselves home. Although further research is necessary to understand the implications of these findings, they provide initial support for convenience-oriented prevention approaches.

The present research highlights the relative importance of urgency and convenience expectancies in drinking-and-driving behavior. Further, a specific pathway from impulsivity traits through convenience expectancies to drinking and driving was found. Taken together, these findings suggest one potential risk pathway to drinking and driving and expand the acquired preparedness model to drinking and driving. Further research is necessary, both developmentally (in adolescence when individuals begin to drive and experiment with alcohol use) and longitudinally, to determine whether impulsivity traits and positive drinking-and-driving expectancies are an appropriate target for prevention and intervention strategies in youth and young adults.

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