



## Do individuals higher in impulsivity drink more impulsively? A pilot study within a high risk sample of young adults



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### HIGHLIGHTS

- This study examined the mechanisms of the impulsivity–intention relation for alcohol.
- This study utilized a daily diary design with advanced statistical analyses.
- Facets of impulsivity had an indirect effect on alcohol use through intentions to drink.
- Impulsive individuals did not engage in unplanned drinking as hypothesized.

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### ABSTRACT

Extant literature has established a strong relation between individual differences in “impulsivity” and alcohol consumption. However, the relation between “impulsivity,” intentions-to-drink, and alcohol consumption has remained understudied. As a part of a larger study, 77 participants (60.5% female, 76.3% White,  $M$  age = 20.8) completed 10 days of daily diary reports regarding their intention to use alcohol and alcohol consumption. Hierarchical linear modeling (HLM) was used to estimate within-person relations between intentions-to-drink and subsequent alcohol use. All models were adjusted for participant age, biological sex, and day of the week. Results showed a strong positive association between daily intention to consume alcohol and self-reported alcohol use ( $\beta = 0.50, p < 0.01$ ). Importantly, tests of interactions indicated that individuals higher in impulsivity were not significantly more likely to engage in unplanned drinking. Multilevel mediation analyses indicated significant indirect effects between impulsivity-like constructs, including positive urgency, lack-of-planning, and self-report delay discounting, and reported daily alcohol consumption via higher overall (i.e., between-person) levels of intentions-to-drink; that is, individuals who reported higher levels of these impulsivity-related constructs were more likely to intend to drink across the 10-days and, in turn, consumed more alcohol. Findings from the study suggest that treatment providers could address drinking intentions among individuals higher in impulsivity and work to establish potential replacement behaviors to reduce alcohol consumption in this population.

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### 1. Introduction

Decades of research have examined the epidemiology of heavy drinking (and alcohol use disorders [AUDs]) across the lifespan, with several lines of evidence indicating that pathological alcohol involvement is largely a developmental disorder of young adulthood (e.g., Grant et al., 2015, Sher & Gotham, 1999; see Littlefield & Sher, 2010, for a review). Importantly, various measures of impulsivity-related

constructs have also been linked to alcohol outcomes in this population, and there are a number of processes and mechanisms that may account for the impulsivity–alcohol relation (see Littlefield, Stevens, & Sher, 2014).

Impulsivity has been conceptualized and operationalized in a variety of ways (see Evenden, 1999; King et al., 2014), including with self-report assessments as well as neurobehavioral tasks. The UPPS-P formulation of impulsivity (Lynam, Smith, Whiteside, & Cyders, 2006) describes five facets of impulsivity: 1) *sensation seeking*, or the tendency to seek out new and thrilling experiences; 2) *lack-of-planning*, or the tendency to act without thinking; 3) *lack-of-perseverance*, or the inability to remain focused on a task; 4) *positive urgency*, or the tendency to act rashly when experiencing extremely positive emotion; and 5) *negative urgency*, or the tendency to act rashly in response to distress. Further, delay

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discounting, or the preference for smaller, immediate rewards over larger, delayed rewards, is a type of impulsivity that has been assessed using both self-report instruments and neurobehavioral tasks (see Hamilton, Littlefield, et al., 2015b, for a review).

As recently reviewed by the International Society for Research on Impulsivity, lab-based tasks have also been developed to assess so-called rapid-response impulsivity (RRI) – “a tendency toward immediate action that occurs with diminished forethought and is out of context with the present demands of the environment” (pp. 168, Hamilton, Mitchell, et al., 2015a). RRI tasks appear to measure two neurobiologically and conceptually distinct types of RRI: refraining from action initiation (as assessed by Immediate Memory Task [Dougherty, Marsh, & Mathias, 2002]) versus failure to stop a prepotent action (as assessed by Go-Stop Impulsivity Paradigm [Dougherty, Mathias, Marsh, & Jagar, 2005]). Performance on the aforementioned tasks has been linked to pathological alcohol use (see Hamilton, Mitchell, et al., 2015a).

Despite that the extant literature indicates impulsivity-like constructs are relevant to alcohol involvement at the between-person level (see Littlefield et al., 2014), there has been little focus on the extent to which these constructs increase the likelihood of unplanned drinking episodes for a given individual across time. Impaired control, defined as the “breakdown of an intention to limit [alcohol] consumption in a particular situation” (Heather, Tebbutt, Mattick, & Zamir, 1993, p. 701), has been identified as a key feature of pathological alcohol involvement and is a current AUD symptom in the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; DSM-5; see American Psychiatric Association, 2013). However, several criticisms of the DSM-5 conceptualization of impaired control have been proffered (see Martin, Chung, & Lagenbacher, 2008), indicating that more ecologically-valid measures of impaired control (e.g., within-person assessments of intentions-to-drink vs. drinking behavior) should be utilized within the alcohol literature.

Impulsivity-related constructs may contribute to unplanned drinking through two different mechanisms. On one hand, individuals higher in certain impulsivity-related constructs may be more likely to drink despite no prior intention; that is, impulsivity may moderate the intention-drinking relation. Alternatively, higher levels of impulsivity-related constructs may simply reflect a greater propensity for individuals to consume alcohol. This latter notion would be supported by results indicating that individuals' higher in levels of impulsivity are more likely to intend to drink, in general, which in turn predicts subsequent alcohol consumption.

Two research questions were tested using daily-diary data, spanning 10 days, among a high-risk sample of young adults: 1) do impulsivity-like constructs moderate the relation between individuals' intentions-to-drink and daily alcohol consumption (Research Question 1), and 2) do individuals' aggregate intentions-to-drink mediate the relation between impulsivity-like constructs and daily alcohol consumption (Research Question 2). Rather than assessing impaired control with a cross-sectional, self-report instrument, we sought to examine a more ecologically-valid measure of “impaired control,” reflecting the breakdown of reported behavioral intentions (i.e., consuming more alcohol than intended) across time. Additionally, we utilized various assessments of multiple impulsivity-related constructs that span both self-report and behavioral methodologies. More specifically, the facets of the UPPS-P, self-reported delay discounting from the Monetary Choice Questionnaire (MCQ), and three computer-based neurobehavioral measures of impulsivity were assessed.

Considering the heterogeneous nature of impulsivity, some types may serve to moderate the link between intentions-to-drink and subsequent drinking behaviors. Alternatively, intentions-to-drink may mediate the relation between various impulsivity types and drinking behaviors. Given the exploratory nature of this pilot study, all impulsivity-like constructs were tested in all moderation (Research Question

#1) and mediation (Research Question #2) models. Further, with regard to the mediational models, it was important to test whether, when examining daily alcohol consumption, impulsivity was associated with higher daily fluctuations in intentions (referred to as a 2-1-1 model), or if impulsivity was related to higher aggregate intentions to drink across days (referred to as a 2-2-1 model; Krull & MacKinnon, 2001). The rationale for testing both types of mediation was based on a general lack of information in the extant literature examining impulsivity, intentions, and alcohol consumption. Although largely exploratory in nature, a limited number of preliminary, directed hypotheses are proffered based on extant findings or the operationalization of the construct itself.

### 1.1. Research Question #1

Because individuals higher in the impulsivity facet labeled lack-of-planning should, ostensibly, have a weaker link between their intentions and behavior across domains, we hypothesized that lack-of-planning will moderate relations between individuals' intentions-to-drink and daily alcohol use. Similarly, failure to inhibit a prepotent action (as assessed via Go-Stop paradigm) may also act as a moderator of unintended alcohol use (Marsh, Dougherty, Mathias, Moeller, & Hicks, 2002).

### 1.2. Research Question #2

We hypothesized those higher in delay discounting (assessed behaviorally and by self-report) will reliably express greater fluctuations in (i.e., 2-1-1) or greater overall (i.e., 2-2-1) intentions-to-drink, reflecting the preference for more immediate rewards (i.e., alcohol consumption) over potential long-term consequences from use. This notion is conceptually supported by a preference for immediate rewards being reflective of greater intentions to consume alcohol, rather than intending to engage in behavior for anticipated long-term rewards (e.g., Kirby, Petry, & Bickel, 1999). No a priori hypotheses were made for response initiation, lack-of-perseverance, sensation seeking, or urgency (positive or negative).

## 2. Methods

### 2.1. Participants

Seventy-seven participants (60.5% female, 76.3% White, 26.3% Hispanic/Latino, 93.42% enrolled in college,  $M$  age = 20.8,  $SD$  = 1.9) were recruited for this study from a large, southwestern community. To meet the larger aims of data collection, inclusion criteria included age restrictions (i.e., 18–25) and endorsement of at least one binge-drinking episode and one unprotected sexual encounter (vaginal or anal) in the 30 days prior. All study procedures were approved by the affiliated university's Institutional Review Board, and all participants were reimbursed for their time. See Table 1 for daily percentages of alcohol consumption.

### 2.2. Study protocol

Eligible participants completed baseline and follow-up measures in a laboratory setting. Upon completion of the baseline visit, participants initiated a 10-day diary phase, for which reports were completed online. Participants were emailed links to the assessment every day at 7:30 am, and the survey closed at 2:00 pm each day. An average of 8.1 ( $SD$  = 2.4; range: 0–10) daily diary reports were completed by each participant.

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