



## Does one day of drinking matter? 21st birthday drinking predicts subsequent drinking and consequences☆



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### HIGHLIGHTS

- Examines impact of 21st birthday drinking (BD) on subsequent drinking and problems
- Regression analysis revealed higher 21st BD had subsequent higher peak drinking.
- Higher 21st BD had increased likelihood of and number of consequences in year.
- Less baseline peak drinks had strongest effect of 21st BD on subsequent consumption.

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### ABSTRACT

**Objective:** There has been ample research on college student risks and consequences related to 21st Birthday Drinking. To date, no studies we are aware of have examined how 21st birthday drinking impacts subsequent drinking and related consequences. This study evaluates the effect of a single night of drinking on peak drinking, heavy drinking, and negative consequences over 12 months following the event. Furthermore, we examine if typical drinking behavior prior to 21st birthday moderates the relationship between the event drinking and subsequent use.

**Method:** Participants included 599 college students (46% male) who intended to consume at least five/four drinks (men/women respectively) on their 21st birthday. Screening and baseline assessments were completed approximately four weeks before turning 21. A follow-up assessment was completed approximately one week after students' birthdays and every 3 months for one year thereafter.

**Results:** Those who drank more on their 21st birthday, also reported higher peak consumption, increased likelihood of consequences, and increased number of consequences throughout the year. Additionally, baseline peak drinking moderated the relationship such that those who drank less at peak occasion prior to turning 21 showed the strongest effects of 21st BD drinking on subsequent consumption.

**Conclusions:** 21st BD drinking could impact subsequent choices and problems related to alcohol. Interventions are warranted and implications discussed.

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## 1. Introduction

Heavy drinking among young adult college students is prevalent and problematic (Fromme & Quinn, 2012; Hingson & White, 2012; Johnston, O'Malley, Bachman, & Schulenberg, 2013; O'Malley & Johnston, 2002; Schulenberg & Patrick, 2012). Recent data show nearly 40% of college students drink heavily, that is consuming five or more drinks in a row

(4 for women) in the prior two-week period (Johnston et al., 2013), and experience a number of alcohol-related consequences, including but not limited to increased college drop-out, poor academic performance, unwanted and/or regretted sex, and injuries (Hingson, Heeren, Winter, & Wechsler, 2005; Hingson & White, 2012). Further, there is growing literature on event-specific drinking demonstrating that college students drink heavily during known periods of risk, such as tailgating, Spring Break, holidays (e.g., New Year's, Halloween), and in particular during their 21st birthday celebrations (Brister, Sher, & Fromme, 2011; Neighbors et al., 2011; Neighbors, Foster, Fossos, & Lewis, 2012; Neal & Fromme 2007; Lee, Lewis, & Neighbors, 2009; Lefkowitz, Patrick, Morgan, Bezemer, & Vasilenko, 2012; Patrick, Morgan, Maggs, & Lefkowitz, 2011). Furthermore, students experience more adverse consequences during these specific occasions than on typical occasions

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(Brister et al., 2011; Lee et al., 2009; Lewis, Lindgren, Fossos, Neighbors, & Oster-Aaland, 2009; Lewis, Patrick, Lee, Kaysen, Mittman, Neighbors, 2012; Wetherill & Fromme, 2009). Studying etiology and prevention of event-specific drinking allows us to better understand when and how to prevent or reduce harm associated with these events, however it is unclear to what extent these events may be the impetus for changes (i.e., increases or decreases) in future drinking behavior. The present study focuses on alcohol use during 21st birthday celebrations and the association with alcohol use during the next year. No research to our knowledge has looked at whether a single event of drinking increases risk beyond the event. Understanding longer term implications of specific events will impact prevention and intervention efforts.

### 1.1. 21st birthday drinking

The legal drinking age in the United States is 21, and thus turning 21 is seen as a legal rite of passage. Many students who might have not tried alcohol before, can now legally do so. Thus the 21st birthday celebration becomes a perfect event for looking at the impact of drinking on this day and implications for subsequent drinking. The recognition of high risk drinking associated with 21st birthday celebrations has received wide attention in both media (with highly publicized deaths of students such as Brad McCue) and research (Brister et al., 2011; Lewis et al., 2008, 2012; Neighbors, Lee, Lewis, Fossos, & Walter, 2009; Neighbors et al., 2011, Neighbors, Foster et al., 2012; Neighbors, Lee et al., 2012; Patrick, Neighbors, & Lee, 2012). Up to 90% of college students report drinking on their 21st birthday, students reach an average BAC of 0.186 (Neighbors, Spieker, Oster-Aaland, Lewis, & Bergstrom, 2005; Neighbors et al., 2011) on this occasion, and the majority (68%) of students drink more than they intended (Brister, Wetherill, & Fromme, 2010). Of those who do drink, up to 12% report drinking 21 or more drinks (Rutledge, Park, & Sher, 2008). A higher proportion of students consume alcohol on 21st birthdays and reach higher estimated BACs than on any other specific event (e.g., New Years, Spring Break, etc.; Neighbors et al., 2011). Rates of alcohol-related consequences for 21st birthday drinking such as vomiting, hangovers, and blackouts range from 30 to 50% (Lewis et al., 2009; Wetherill & Fromme, 2009), and students at greatest risk for experiencing negative consequences on 21st birthdays are those who typically do not drink heavily (Lewis et al., 2009). Thus, research has documented the need to study 21st birthday drinking and develop methods to prevent or reduce associated risks (Neighbors, Lee et al., 2012).

Despite the growing body of research surrounding specific high-risk drinking events, 21st birthday is defined as a cultural marker for drinking, and we have yet to show that heavy drinking associated with a single occasion or event is associated with subsequent drinking and risk. Developmental psychologists disagree about how maturation occurs (continuously over time or with sudden events shifting trajectories), and understanding the role of 21st birthday drinking can help answer some interesting questions. Does more drinking on one's 21st birthday put them on a path toward riskier behavior or is it merely a selection effect (where only those who were already heavier drinkers drink more on their 21st birthdays)? Do light drinkers or non-drinkers face greater risks as a result of drinking more on their 21st birthdays? If high-risk drinking during a single event is shown to impact future drinking and consequences, focusing on etiology and prevention of event-specific drinking, will become essential in minimizing consequences associated with the events.

### 1.2. The present study

The present study examined the potential longer-term impact of 21st birthday drinking on peak drinking and negative consequences over the course of a year following the 21st birthday. We will examine if heavier 21st birthday drinking will be associated with heavier peak drinking and negative consequences over the course of the year

following turning 21 when controlling for typical peak drinks and negative consequences prior to turning 21. Further, we will explore the relationship between 21st birthday drinking and subsequent drinking behavior (i.e., peak drinks and negative consequences) and whether this relationship will be moderated by typical drinking behavior prior to turning 21 (i.e., peak drinks and negative consequences).

## 2. Method

### 2.1. Procedures

Between December 2008 and December 2009 enrolled students at a large public northwestern university who were about to turn 21 ( $N = 3043$ ) were e-mailed and mailed invitations to participate in a brief on-line screening survey within 4 weeks prior to their 21st BD. The survey included demographic questions, plans/intentions for the week of their BD—including drinking intentions and typical drinking behaviors and related consequences, as well as other relevant psychosocial measures. Of the 1558 (51.2%) who completed the screening assessment, demographic characteristics included 68.1% White, 15.9% Asian, 7.7% Multi-Ethnic, 8.3% other and 53.9% women. These were representative of the population on campus.

A key inclusion criteria for the longitudinal study was intending to consume at least 4 (for women) or 5 (for men) drinks on a single occasion during their 21st BD celebrations. A total of 642 screened participants met criteria (41.2%) and of these 599 (93.3%) completed a baseline assessment, and were randomly assigned to one of 6 groups (5 interventions and an assessment only control). Detailed descriptions of the sampling methods, main outcomes, and intervention descriptions are found in Neighbors, Lee et al. (2012). Intervention condition was controlled for in the current analyses.

### 2.2. Post-birthday follow-up assessments

One-week after the 21st BD, participants received an invitation email and letter to complete the Post-BD follow-up on-line survey. The survey contained questions about the BD celebration(s) taking place during the week of the 21st BD — including one's own drinking and related consequences. The response rate was 97.5% ( $N = 584$ ). On-line follow-up assessments took place with participants at 3, 6, 9, and 12 months after the BD. Participation rates ranged from 94.7% at 3-month follow-up to 80.3% at 12-month follow-up. These surveys did not ask birthday specific questions, but were oriented around assessing long-term intervention effects on typical drinking and associated consequences. Participants were paid \$10 for completing the screening assessment and \$30 for the baseline and each subsequent assessment.

### 2.3. Measures

Measures included in the present analyses focused on evaluating long-term effects on drinking patterns over the year following the 21st birthday. Each measure was administered at baseline, 1-week post-BD, and at each of the 3-, 6-, 9-, and 12-months follow-ups. Intervention condition (coded 1 for intervention and 0 for control) and gender (coded 1 for males and 0 for females) were controlled for in the analyses.

#### 2.3.1. Typical drinking

The Daily Drinking Questionnaire (DDQ; Collins et al., 1985; Dimeff, Baer, Kivlahan, & Marlatt, 1999) was used to assess the typical number of standard drinks participants reported consuming on each day of a typical week in the past 3-months. Responses for all seven days of the week were summed to create the total average number of weekly drinks consumed. The Quantity/Frequency Questionnaire (QF; Dimeff et al., 1999; Marlatt et al., 1998) was used to assess peak drinking by asking participants to report the highest number of standard drinks

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