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21st Birthday Drinking: Extremely Extreme

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Despite public recognition of the hazards of 21st birthday drinking, there is little empirical information concerning its prevalence, severity, and risk factors. Data from a sample of 2,518 college students suggest that 21st birthday drinking poses an extreme danger: (a) 4 of every 5 participants (83%) reported drinking to celebrate, (b) birthday drinkers indicated high levels of consumption, (c) 12% of birthday drinkers (men and women) reported consuming 21 drinks, and (d) about half of birthday drinkers exceeded their prior maximum number of drinks. Current problematic alcohol involvement and its typical correlates strongly predicted both the occurrence and severity of 21st birthday drinking. It is imperative that investigators consider a variety of potential interventions to minimize the harm associated with this rite of passage.

Keywords: 21st birthday, legal drinking age, alcohol use, college students

Drinking among young adults, particularly those in college, is an important public health issue (e.g., Hingson, Heeren, Winter, & Wechsler, 2005). From an array of risky collegiate drinking practices, hazardous drinking associated with the 21st birthday has emerged as a major concern for college administrators, student health service professionals, and public officials (e.g., American College Health Association, 2002). Furthermore, media reports have highlighted the problem by describing practices such as "21 for 21" and the "power hour" and by reporting the tragic deaths due to these risky practices (e.g., Zernike, 2005). Nevertheless, despite increased awareness of the problem, the prevalence and severity of and risk factors for 21st birthday drinking are not well characterized.

We have identified only three published studies on this topic (Neighbors, Oster-Aaland, Bergstrom, & Lewis, 2006; Neighbors, Spieker, Oster-Aaland, Lewis, & Bergstrom, 2005; Smith, Bogle, Talbott, Grant, & Castillo, 2006). These studies provided preliminary evidence that a majority of 21st birthday celebrants consume alcohol and that their drinking levels are alarmingly high; however, these findings are limited by ascertainment biases of unknown magnitude resulting from low participation rates,[1] and it is likely that the prevalence and severity of birthday drinking are underestimated in these studies.

In the present study we extend what is known about alcohol consumption on the 21st birthday by using data from a large prospective study of college drinking. Our first goal was to estimate the prevalence and severity of 21st birthday drinking in a large sample with high participation rates. In addition, our study examined the existence of the "21 for 21" phenomenon reported by the media. Our second goal was to examine risk factors associated with the occurrence and intensity of 21st birthday drinking. Although a range of possible variables could be considered, we elected to focus on those variables most consistently associated with drinking in college students (e.g., Jackson, Sher, & Park, 2006), including demographics, high-risk group affiliations (i.e., membership in fraternities or sororities), and substance use history. Although we anticipated that recent drinking patterns would be the strongest correlates of 21st birthday drinking, we were interested in the extent to which high-risk behaviors prior to college, such as early onset problematic alcohol use (e.g., Sartor, Lynskey, Heath, Jacob, & True, 2006) and conduct disorder symptoms (e.g., Sher, Grekin, & Williams, 2005), might predict drinking on a given occasion in college. We also sought to discover whether birthday drinking is associated with cigarette use because of the acute cross-tolerance of alcohol with nicotine that might facilitate drinking to extreme levels (Sher, Wood, Richardson, & Jackson, 2005).

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[1] Participation rates were 32% (n = 164 participants of N = 509 individuals solicited) in Neighbors et al. (2005), 11% (n = 119 of N = 1,059 solicited) in Neighbors et al. (2006), and 39% (n = 444 of N = 1,142 solicited) and 61% (n = 550 of N = 896 solicited) in Smith et al.'s (2006) two cohorts.

Table 1
The Prevalence of Drinking to Celebrate the 21st Birthday and the Number of Drinks Consumed Among Birthday Drinkers by Risk Factor, With Univariate and Multivariate Analyses

	Drinking to celebrate the 21st birthday			Number of drinks for birthday drinkers		
Risk factor	Percent drinking	Univariate OR (95% CI)[a]	Multivariate OR (95% CI)[b]	*M* drinks (*SD*; Q1−Q3)	Univariate analyses r[c]	Multivariate analysis β (*b*)[d]
Gender						
Female (1; n = 1,510)	85	1.4 (1.2, 1.8)	1.7 (1.3, 2.2)	11.4 (7.8; 5–19)	−.18***	−.15*** (−2.76)
Male (0; n = 1,008)	80			14.6 (9.0; 7–21)		
Race/ethnicity						
White, non-Hispanic (1; n = 2,280)	84	2.4 (1.8, 3.2)	2.0 (1.4, 3.1)	12.8 (8.5; 5–21)	.10***	.03 (0.80)
Other (0; n = 237)	69			9.8 (8.1; 3–15)		
College student status						
College student (1; n = 2,387)	83	1.3 (0.8, 2.0)	1.5 (0.8, 3.0)	12.6 (8.4; 5–21)	−.01	−.01 (−0.65)
Nonstudent (0; n = 121)	79			13.0 (9.0; 5–21)		
Greek status						
Member (1; n = 707)	90	2.4 (1.8, 3.1)	1.5 (1.1, 2.2)	16.9 (7.9;10–22)	.34***	.27*** (4.89)
Nonmember (0; n = 1,770)	80			10.6 (8.0; 4–15)		
Drunkenness						
At least once (1; n = 1,641)	90	6.4 (5.0, 8.1)	4.2 (3.1, 5.8)	13.6 (8.1; 6–21)	.36***	.22*** (5.12)
Never (0; n = 445)	57			5.1 (5.2; 1–7)		
Alcohol dependence (3+ symptoms)						
At 1+ waves (1; n = 560)	94	4.1 (2.9, 6.0)	1.8 (1.1, 2.8)	16.7 (8.1;10–22)	.36***	.21*** (3.88)
At no waves (0; n = 1,531)	78			10.3 (7.6; 4–16)		
Cigarette use in past 30 days						
3+ days (1; n = 370)	93	3.2 (2.1, 4.8)	1.3 (0.8, 2.2)	15.3 (8.2; 9–21)	.18***	.01 (0.14)
2 or fewer days (0; n = 1,668)	80			11.6 (8.3; 5–20)		
Illegal/illicit drug use						
Any use (1; n = 677)	90	2.4 (1.8, 3.2)	0.9 (0.6, 1.4)	14.7 (8.3; 8–21)	.23***	.02 (0.34)
No use (0; n = 1,318)	79			10.8 (7.9; 4–18)		
First full drink at age 14 or younger						
At 14 or younger (1; n = 857)	89	2.1 (1.7, 2.7)	1.2 (0.8, 1.7)	15.0 (8.3; 8–21)	.21***	.06* (1.08)
After 14 or never (0; n = 1,656)	79			11.2 (8.3; 4–18)		
First time drunk at age 16 or younger						
At 16 or younger (1; n = 1,190)	92	3.8 (3.0, 4.8)	1.6 (1.1, 2.3)	15.0 (8.3; 8–21)	.30***	.07** (1.22)
After 16 or never (0; n = 1,319)	75			9.9 (7.8; 3–15)		
Conduct problem before age 15						
Any problem (1; n = 619)	84	1.2 (0.9, 1.5)	0.9 (0.7, 1.3)	13.9 (8.6; 6–21)	.12***	.004 (0.07)
No problem (0; n = 1,540)	82			11.7 (8.3; 5–20)		
Variance accounted for			c = .76			Adjusted R^2 = .31

Note. Due to missing data, sample sizes differ across analyses. OR = odds ratio; CI = confidence interval; Q1 = 1st quartile; Q3 = 3rd quartile; β = standardized estimate; *b* = unstandardized estimate.
[a] ns = 1,995–2,518. [b] n = 1,692. [c] ns = 1,644–2,084. [d] n = 1,383.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Method

Participants

Data were drawn from a prospective study of 3,720 (54% female, 46% male; 90% non-Hispanic White, 10% other races/ethnicities) first-time college students at a large midwestern university (Sher & Rutledge, 2007). Participants completed a paper-and-pencil survey during their precollege summer (Wave 0; 2002) and a self-paced online survey (programmed by DatStat, Inc.; www.datstat.com) in the fall and spring semesters of the next 4 years (Waves 1–8; 2002–2006). Data for this study were obtained from 2,518 individuals (see Table 1) who had turned 21 and had provided data about drinking on their 21st birthday at Wave 6 and/or Wave 7 (these 2,518 individuals constituted approximately 68% of the baseline sample).[2] Women were more likely to be retained in the study than men (h = .40; Cohen, 1988); the effects of other variables on attrition were negligible to small (h ranged from .03 to .24 for non-Hispanic Whites, early onset of first drink, early onset of first time drunk, and precollege drunkenness). Participants gave informed consent (or assent), and procedures were approved by the institutional review board. Unless they declined further participation, all participants were contacted at each wave regardless of student status and current college attended. Compensation at Wave 0 was a $10 gift certificate; compensation at Waves 6 and 7 was $25 and entry in a drawing for ten $100 prizes.

[2] Of the N = 3,720 baseline participants, n = 26 participants had not yet reached their 21st birthday when the present data were collected and, therefore, could not contribute data about their 21st birthday. An additional n = 1,167 of the baseline participants provided data at neither Wave 6 nor Wave 7 (of these, n = 212 had actively refused participation and n = 955 were nonresponders at the two waves). Finally, the data of an additional n = 9 of the baseline participants were excluded because these individuals completed the 21st birthday items prior to their actual birthday.

Measures

21st birthday drinking. At Waves 6 and 7,[3] participants were asked "Did you celebrate your 21st birthday by drinking alcoholic beverages?" Those responding in the affirmative were asked to indicate how many drinks they had had and over what period of time. A *drink* was defined as a 12-oz can or bottle of beer or wine cooler, a 4-oz glass of wine, or a shot of liquor straight or in a mixed drink. For participants who provided data at both Waves 6 and 7, we used the Wave 6 data because of their proximity to the birthday event; thus, the present birthday data were obtained from 1,706 participants at Wave 6 and 812 participants at Wave 7.[4] There was high test–retest reliability for participants who provided birthday data at both waves.[5]

Demographic and background variables. We ascertained gender (1 = *female*; 0 = *male*) and race/ethnicity (1 = *non-Hispanic White*; 0 = *other*) at Wave 0. We ascertained college student status (1 = *student*; 0 = *nonstudent*) and Greek (fraternity/sorority) status (1 = *member*; 0 = *nonmember*) during the wave in which each participant turned 21. If this information was not available for the wave in question, the data for the most recently completed wave prior to the 21st birthday were used. In addition, three items assessed the participants' history of drinking and conduct problems, including (a) the early onset of first full drink (1 = *early onset* [i.e., first full drink at age 14 or younger]; 0 = *no early onset*), ascertained at Wave 0; (b) the early onset of first time drunk (1 = *early onset* [first got drunk at age 16 or younger]; 0 = *no early onset*), also ascertained at Wave 0; and (c) experiencing any 1 of 10 conduct disorder problems from the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; *DSM–IV*; American Psychiatric Association, 1994) before age 15 (1 = *at least one symptom reported*; 0 = *no symptoms reported*), ascertained at Wave 1.

Underage maximum number of drinks. We ascertained each participant's underage maximum drinks with an item about the maximum number of drinks consumed on a single occasion as reported in the most recently completed wave prior to the 21st birthday.

College substance use. We assessed drunkenness at each wave for the period between college matriculation and age 21 with participants' responses to an item about the frequency of getting drunk in the past 30 days (1 = *got drunk at least once in at least one wave prior to the 21st birthday*; 0 = *no report of drunkenness*). We assessed alcohol dependence symptoms between college matriculation and age 21 from responses at each wave to seven items regarding *DSM–IV* alcohol dependence symptoms in the past 3 months (Grekin & Sher, 2006; 1 = *reported three or more symptoms in at least one wave prior to age 21*; 0 = *reported two or fewer symptoms*). We assessed illegal/illicit drug use between college matriculation and age 21 with a set of items at each wave asking how often a number of illegal/illicit drugs were used in the past 30 days (1 = *any illegal/illicit drug use at any wave prior to age 21*; 0 = *no report of drug use*). We assessed whether participants had recently used cigarettes in the wave in which they turned 21 (1 = *used cigarettes on at least 3 days during the past 30 days*; 0 = *used cigarettes on no more than 2 days*).

Results

Prevalence and Severity of 21st Birthday Drinking

Descriptive information about the prevalence of drinking to celebrate the 21st birthday and the number of drinks consumed among birthday drinkers as a function of the studied risk factors is presented in Table 1. Drinking to celebrate the 21st birthday was highly prevalent, with more than 4 of every 5 participants (83%; $n = 2{,}084$) reporting that they drank to celebrate; interestingly, women were more likely to drink to celebrate than men. Moreover, those who drank consumed large amounts ($M = 12.61$ drinks, $SD = 8.46$), with male birthday drinkers consuming somewhat more drinks than did female birthday drinkers. It is noteworthy that 12% of both male and female birthday drinkers reported consuming exactly 21 drinks; furthermore, an additional 22% of male birthday drinkers and 12% of female birthday drinkers reported consuming more than 21 drinks. Figure 1 gives more detail on the number of drinks reported. As a supplemental analysis, we calculated drinkers' estimated blood alcohol content (eBAC) using Matthews and Miller's (1979) formula (see Hustad & Carey, 2005).[6] We found that 68% of female and 79% of male birthday drinkers had eBACs of 0.08 or higher (a level defined as a *binge* by the National Institute on Alcohol Abuse and Alcoholism, 2004) and that 35% of female and 49% of male birthday drinkers had

[3] We examined the number of days that had elapsed between the participants' 21st birthdays and their report of their 21st birthday drinking (days elapsed) and found that the number of days elapsed ranged from 0 to 762 days, with a mean of 163.89 days ($SD = 104.21$). This period was lengthy because some participants turned 21 many months prior to Waves 6 and 7, when we asked about the 21st birthday drinking; however, note that 2,405 participants (95.51%) provided information about their 21st birthday drinking within 1 year of their actual birthday. Product–moment correlations of the number of days elapsed with the 21st birthday drinking variables were negligible (i.e., with engaging in birthday drinking: men, $r = -.04$; women, $r = -.02$; with number of drinks consumed: men, $r = .02$; women, $r = .05$). Ancillary analyses in which we compared the data of those who reported 21st birthday data within 2 weeks of the day ($n = 96$) with the data of those who reported their birthday data 8 or more months later ($n = 455$) indicated that there were no significant differences between these two groups in either the occurrence of birthday drinking, odds ratio = 0.65 (95% CI = 0.35, 1.23), or the number of drinks consumed by birthday drinkers, $F(1, 448) = 3.14$, $p = .08$.

[4] Of the $n = 812$ participants whose birthday data had been provided at Wave 7, $n = 547$ were not 21 years old until Wave 7, and $n = 265$ were 21 or older at Wave 6 but did not provide birthday data until Wave 7.

[5] Among the 1,502 participants who provided data at both waves regarding whether they drank to celebrate their 21st birthday, 93% showed agreement across waves (kappa = .77). Among the 1,178 participants who reported at both waves that they drank to celebrate their 21st birthday, there was high agreement across waves for the number of drinks reported (r and intraclass correlation coefficient = .90; mean drinks at Wave 6 = 12.65, $SD = 8.23$; mean drinks at Wave 7 = 12.76, $SD = 8.10$).

[6] The Matthews and Miller (1979) formula is as follows: $eBAC = [(c/2) \times (GC/w)] - (\beta_{60} \times t)$, where BAC= blood alcohol concentration in grams per deciliter, c = number of standard drinks consumed, GC = gender constant (9.0 for females and 7.5 for males), w = weight in pounds, β_{60}= the metabolism rate of alcohol per hour, and t = time in hours since the first sip of alcohol to the time of assessment. We used $\beta_{60} = 0.017$, the average rate for the metabolism of alcohol per hour reported by the National Highway and Traffic Safety Administration (Hustad & Carey, 2005). Among the 2,084 birthday drinkers, there were 120 cases (less than 6%) in which this formula produced a negative eBAC (for participants who reported drinking a small number of drinks over an extended period of time). Although these individuals would be expected to have peak eBACs greater than zero, a zero eBAC probably accurately reflects the lower bound of their eBAC at the end of their drinking episode; thus, for these individuals we estimated their BAC at 0.00.

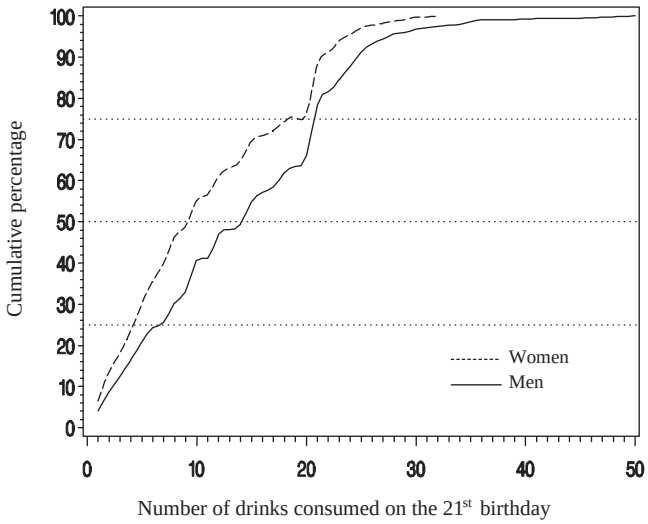

Figure 1. Cumulative percentage of number of drinks consumed on the 21st birthday as a function of gender.

eBACs of 0.26 or higher (a level associated with potential serious medical outcomes; Berger, 2000).[7]

A large proportion (48%) of birthday drinkers (51% among females and 43% among males) drank at a level that exceeded their underage maximum. A two-way analysis of variance with repeated measures revealed a significant interaction between gender and occasion, $F(1, 2018) = 54.96$, $p < .001$, such that female birthday drinkers reported consuming more for their 21st birthday ($M = 11.36$, $SD = 7.81$) than on their underage maximum drinking occasion ($M = 9.70$, $SD = 5.56$) and male birthday drinkers reported consuming more on their underage maximum drinking occasion ($M = 15.52$, $SD = 7.88$) than for their 21st birthday ($M = 14.58$, $SD = 9.03$).

A comparison of those who reported no underage drinks ($n = 163$) with those who reported at least one drink while underage ($n = 2{,}253$) indicated that a smaller percentage of underage abstainers (36%; $n = 58$) than underage drinkers (86%; $n = 1{,}947$) drank to celebrate, $\chi^2(1, N = 2{,}416) = 278.24$, $p < .001$. Underage abstainers reported fewer birthday drinks ($M = 3.90$, $SD = 5.47$) than did underage drinkers ($M = 12.87$, $SD = 8.37$), $t(2008) = 8.11$, $p < .001$, although approximately 20% of the underage abstainers reported five or more birthday drinks.

Risk Factors for 21st Birthday Drinking

As shown in Table 1, a set of univariate logistic regression analyses indicated that among the risk factors examined, having gotten drunk between college matriculation and age 21 was associated with the highest probability of drinking to celebrate the 21st birthday and that alcohol dependence symptoms, early onset of getting drunk, and current cigarette use also were associated with increased likelihoods of birthday drinking. A multiple logistic regression analysis examining the unique effects of individual risk factors (see Table 1) found that having previously gotten drunk was associated with the highest probability of birthday drinking, even when controlling for the other factors. A set of univariate analyses (see Table 1) predicting the number of drinks consumed by birthday drinkers indicated that all predictors except college student status were associated with the number of drinks reported, and a subsequent multivariate analysis indicated that having previously gotten drunk, being a member of a Greek organization, and having alcohol dependence symptoms remained the strongest predictors of the number of drinks consumed on the 21st birthday.[8] Also, note that being female was associated with having significantly fewer drinks on the 21st birthday.

Discussion

With a larger sample and a higher response rate than in previous studies, the present study better documented that 21st birthday drinking is a pervasive custom in which excessive consumption is the norm. The majority of the participants drank to celebrate the 21st birthday, and the majority of these drank at extreme levels. Additionally, we provide the first empirical evidence of "21 for 21" and report, surprisingly, that women engaged in this risky practice as often as did men, a finding which suggests that "21 for 21" may present a particular risk for women. We also found that 36% of those who had abstained until age 21 initiated drinking on their birthday and that although most of them reported just one or two drinks, about 20% of these previous abstainers reported drinking at high levels (five or more drinks).

There were individual differences in both the likelihood and the intensity of birthday drinking, with the correlates of excessive consumption mirroring those of hazardous drinking in college students in general (e.g., male gender, Greek involvement, prior substance use; Jackson, Sher, & Park, 2006). Such findings indicate that those at risk for "regular" high-risk drinking also are most at risk for 21st birthday excess; however, it is important to be aware that many who typically are lighter drinkers also drink at hazardous levels on the 21st birthday. It is noteworthy that drinking behavior on this single occasion is so predictable ($c = .76$ for predicting whether drinking occurred; adjusted $R^2 = .31$ for predicting the number of drinks), given the difficulty of predicting behavior on a single occasion from individual difference variables (Epstein, 1979).

Implications for Intervention

One would be hard pressed to point to other situations where such a large percentage of people expose themselves so predict-

[7] There were 233 cases (about 11%) in which the eBAC was over 0.50. An analysis in which we eliminated these extreme cases indicated that eBAC levels among birthday drinkers remained high. Specifically, we found that 64% of female and 75% of male birthday drinkers had eBACs of 0.08 or higher (as opposed to 68% and 79%, respectively, when all data were included) and that 28% of female and 42% of male birthday drinkers had eBACs of 0.26 or higher (as opposed to 35% and 49%, respectively, when all data were included).

[8] Note that we also estimated all univariate and multivariate models with interactions between the risk factors and gender; however, we found only 2 (out of 30 possible) significant interactions in the univariate analyses and no significant interactions in the multivariate models. The two significant interactions in the univariate models were that men with any alcohol dependence symptoms between college matriculation and age 21 ($b = -1.95$, $\beta = -.09$, $p = .02$) and men with any conduct problems prior to age 15 ($b = -1.83$, $\beta = -.08$, $p = .04$) tended to drink a greater number of drinks on their 21st birthday than did women with those characteristics. Given the scant evidence for moderation by gender, we report models without interactions.

ably to such a potentially serious health hazard. It is this combination of prevalence, severity, and predictability that makes the 21st birthday celebration a clear target for public health interventions. It is unfortunate that the only existing intervention, the birthday card intervention (McCue, Greenamyer, Atkin, & Martell, 2006), has been found ineffective (Smith et al., 2006), and it is clear that other interventions must be explored.

Given the similarity of the predictors of 21st birthday drinking to those of risky drinking in general, interventions shown to be effective with general risky drinking (e.g., Brief Alcohol Screening and Intervention for College Students (BASICS); Dimeff, Baer, Kivlahan, & Marlatt, 1999) may prove effective in reducing 21st birthday excess. The risk for excessive 21st birthday drinking, however, is not restricted to those with a history of problematic drinking, and therefore broader approaches such as social norms marketing (DeJong et al., 2006; but see Toomey, Lenk, & Wagenaar, 2007) or alternative birthday celebrations warrant further study. In addition, larger community-based environmental interventions such as dramshop liability laws and server/manager training should be considered (Toomey et al., 2007). Further, it is important to provide more public education about caring for seriously intoxicated people. Finally, any situation in which drinking leads to contact with health care specialists should be regarded as a potential "teachable moment" ripe for intervention by those specialists (Barnett et al., 2002). It is probable that no single approach to intervention will reduce the risk posed by the 21st birthday, and therefore the solution to the problem of extreme 21st birthday drinking likely lies in a multistrategy approach (Toomey et al., 2007).

Limitations and Future Directions

First, the conclusions that may be drawn from the present study are limited by the fact that the data were obtained from a single campus. Considering that the characteristics of the study university (i.e., large Greek and athletic systems, midwestern location, and predominantly non-Hispanic White students) are associated with heavy drinking rates (Presley, Meilman, & Leichliter, 2002), it is possible that a random, multicampus sample would provide evidence that 21st birthday drinking is less prevalent and/or less severe at other types of institutions. Second, conclusions also are limited by the retrospective, self-report nature of the data. Regarding lifetime maximum, previous studies (e.g., Jacob, Seilhamer, Bargeil, & Howell, 2006) consistently showed good to excellent reliability across various indexes of self-reported lifetime drinking. Given the youth (i.e., a shortened period of retrospection) and high intellectual functioning (as required by college entrance) of our participants, we would expect high reliability for the measure of lifetime maximum drinks. Regarding the 21st birthday drinking variables, our analyses indicated high reliability across Waves 6 (spring semester) and 7 (fall semester). Future studies, nevertheless, would benefit from employing methodologies that capture 21st birthday behavior as it occurs (e.g., using electronic diaries). Lastly, we have no direct information about health-related or other consequences (e.g., injury, drunk driving, risky/unwanted sexual behavior, assault) resulting from 21st birthday drinking, although an overwhelming proportion of birthday drinkers drank at levels associated with an increased risk of injury and medical problems (see Vinson, Maclure, Reidinger, & Smith, 2003). Future research should seek to characterize the consequences of 21st birthday drinking and to determine how these consequences compare with the consequences of other heavy drinking occasions. The consequences of 21st birthday drinking may be ameliorated due to more protective environmental contexts or may be exacerbated due to the greater involvement of less experienced drinkers. Given the exceptionally hazardous drinking behavior that takes place on the 21st birthday, however, it is imperative that we acknowledge the danger posed by the 21st birthday and that we intensify our search for solutions.

References

American College Health Association. (2002). *Healthy campus 2010: Making it happen.* Baltimore: Author.

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.

Barnett, N. P., Lebeau Craven, R., O'Leary, T. A., Colby, S. M., Wollard, R., Rohsenow, D. J., et al. (2002). Predictors of motivation to change after medical treatment for drinking-related events in adolescents. *Psychology of Addictive Behaviors, 16,* 106–112.

Berger, T. (2000). Nervous system. In G. Zernig, A. Saria, M. Kurz, & S. S. O'Malley (Eds.), *Handbook of alcoholism* (pp. 173–181). New York: CRC Press.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Erlbaum.

DeJong, W., Schneider, S. K., Towvim, L. G., Murphy, M. J., Doerr, E. E., Simonsen, N. R., et al. (2006). A multisite randomized trial of social norms marketing campaigns to reduce college student drinking. *Journal of Studies on Alcohol, 67,* 868–879.

Dimeff, L. A., Baer, J. S., Kivlahan, D. R., & Marlatt, G. A. (1999). *Brief Alcohol Screening and Intervention for College Students (BASICS): A harm reduction approach.* New York: Guilford Press.

Epstein, S. (1979). The stability of behavior: I. On predicting most of the people much of the time. *Journal of Personality and Social Psychology, 37,* 1097–1126.

Grekin, E. R., & Sher, K. J. (2006). Alcohol dependence symptoms among college freshmen: Prevalence, stability and person–environment interactions. *Experimental Clinical Psychopharmacology, 14,* 329–338.

Hingson, R., Heeren, T., Winter, M., & Wechsler, H. (2005). Magnitude of alcohol-related mortality and morbidity among U.S. college students ages 18–24: Changes from 1998 to 2001. *Annual Review of Public Health, 26,* 259–279.

Hustad, J. T. P., & Carey, K. B. (2005). Using calculations to estimate blood alcohol concentrations for naturally occurring drinking episodes: A validity study. *Journal of Studies on Alcohol, 66,* 130–138.

Jackson, K. M., Sher, K. J., & Park, A. (2006). Drinking among college students: Consumption and consequences. In M. Galanter (Ed.), *Recent developments in alcoholism: Research on alcohol problems in adolescents and young adults* (2nd ed., Vol. 17, pp. 85–117). New York: Springer.

Jacob, T., Seilhamer, R. A., Bargeil, K., & Howell, D. N. (2006). Reliability of lifetime drinking history among alcohol dependent men. *Psychology of Addictive Behaviors, 20,* 333–337.

Matthews, D. B., & Miller, W. R. (1979). Estimating blood alcohol concentration: Two computer programs and their applications in therapy and research. *Addictive Behaviors, 4,* 55–60.

McCue, C., Greenamyer, J., Atkin, C., & Martell, D. (2006). Reaction to "Celebration intoxication: An evaluation of 21st birthday alcohol consumption." *Journal of American College Health, 54,* 305–306.

National Institute on Alcohol Abuse and Alcoholism. (2004, Winter). NIAAA newsletter. Retrieved from http://pubs.niaaa.nih.gov/publications/Newsletter/winter2004/Newsletter_Number3.htm#council

Neighbors, C., Oster-Aaland, L., Bergstrom, R. L., & Lewis, M. A. (2006). Event- and context-specific normative misperceptions and high-risk

drinking: 21st birthday celebrations and football tailgating. *Journal of Studies on Alcohol, 67,* 282–289.

Neighbors, C., Spieker, C. J., Oster-Aaland, L., Lewis, M. A., & Bergstrom, R. L. (2005). Celebration intoxication: An evaluation of 21st birthday alcohol consumption. *Journal of American College Health, 54,* 76–80.

Presley, C. A., Meilman, P. W., & Leichliter, J. S. (2002). College factors that influence drinking. *Journal of Studies on Alcohol, Supplement No. 14,* 82–90.

Sartor, C. E., Lynskey, M. T., Heath, A. C., Jacob, T., & True, W. (2006). The role of childhood risk factors in initiation of alcohol use and progression to alcohol dependence. *Addiction, 102,* 216–225.

Sher, K. J., Grekin, E. F., & Williams, N. A. (2005). The development of alcohol use disorders. *Annual Review of Clinical Psychology, 1,* 493–523.

Sher, K. J., & Rutledge, P. C. (2007). Heavy drinking across the transition to college: Predicting first-semester heavy drinking from precollege variables. *Addictive Behaviors, 32,* 819–835.

Sher, K. J., Wood, M. D., Richardson, A. E., & Jackson, K. M. (2005). Subjective effects of alcohol: I. Effects of the drink and drinking context. In M. Earleywine (Ed.), *Mind altering drugs: Scientific evidence for subjective experience* (pp. 86–134). New York: Oxford University Press.

Smith, B. H., Bogle, K. E., Talbott, L., Grant, R., & Castillo, H. (2006). A randomized study of four cards designed to prevent problems during college students' 21st birthday celebrations. *Journal of Studies on Alcohol, 67,* 607–615.

Toomey, T. L., Lenk, K. M., & Wagenaar, A. C. (2007). Environmental policies to reduce college drinking: An update of research findings. *Journal of Studies on Alcohol and Drugs, 68,* 208–219.

Vinson, D. C., Maclure, M., Reidinger, C., & Smith, G. S. (2003). A population-based case-crossover and case-control study of alcohol and the risk of injury. *Journal of Studies on Alcohol, 64,* 358–366.

Zernike, K. (2005, March 12). Drinking game can be a deadly rite of passage. *New York Times.* Retrieved from http://www.nytimes.com/2005/03/12/education/12power.html

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Call for Papers: Special Section on "Smoking Cessation: Innovative Treatments and Understudied Populations"

Despite advances in pharmacological treatment, smoking cessation rates remain relatively stagnant. This may be because the development and testing of theory-based behavioral treatments has stalled or because certain segments of the population have not been targeted for intervention. *The Journal of Consulting and Clinical Psychology* is requesting submissions of empirical papers that focus on either testing innovative treatment approaches for smoking cessation or testing smoking cessation interventions in understudied populations. Manuscripts that focus on innovative treatments may include, but are not limited to, behavioral therapy, cognitive behavioral therapy, combined pharmacological and behavioral therapies, and theory-based therapies that have been tested in other fields but have not yet been applied to smoking cessation. Manuscripts that focus on understudied populations may include, but are not limited to, targeting different cultures, ethnicities, ages, and medical and psychiatric comorbidities. Preference will be given to papers with a clearly articulated theoretical foundation and clinical implications. The goal of this special section is to present cutting-edge research on smoking and to stimulate the field to produce innovative theory-based treatments and address the needs of understudied and undertreated smokers.

The deadline for submissions of manuscripts is **January 5, 2009**. The anticipated publication date is February 2010. Papers that do not meet the deadline will be considered as "regular" submissions to this journal.

All submissions should be entered through the main submission portal for the journal (www.apa.org/journals/ccp). Authors should indicate in their accompanying cover letter that the paper is to be considered for the special section on "Smoking Cessation: Innovative Treatments and Understudied Populations." All submitted papers must be in APA format and conform to all the submission guidelines for this journal (see www.apa.org/journals/ccp/submission.html); papers that do not follow the guidelines may be returned without review.

Questions or inquiries regarding the special section should be directed to the section editor, Dr. Belinda Borrelli (Belinda_Borrelli@Brown.edu).