Associations between binge drinking frequency and tobacco use among young adults

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HIGHLIGHTS

- We examined smoking characteristics across binge drinking groups in young adults.
- Self-identifying as a social smoker was associated with any binge drinking.
- Other tobacco use characteristics differed by frequency of binge drinking
- High rate of smoking while binge drinking regardless of frequency (85.7% ± 32.9%)

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ABSTRACT

Tobacco use is greater among young adults who binge drink; yet there is limited research on tobacco use characteristics among different types of binge drinkers based on frequency. We aimed to characterize this relationship among young adults (18–25 years old) who used both substances in the past month (smoked ≥1 cigarette, and drank ≥1 alcoholic beverage) using an anonymous online survey. Participants (N = 1405, 65.0% male) were grouped based on binge drinking frequency and compared for tobacco use characteristics and demographics using bivariate analyses and multinomial logistic regression. Binge drinking frequency groups were: non-binge drinkers who consumed alcohol (0 days; 27.5%); occasional (1–3 days; 37.9%); intermediate (4–8 days; 21.9%); and frequent (9 + days; 12.7%) binge drinkers. Comparing each binge drinking group to non-binge drinkers: Both occasional and frequent binge drinkers smoked more cigarettes per day (p = 0.001; p = 0.002); frequent binge drinkers reported greater temptations to smoke in positive affective/social situations (p = 0.02); intermediate binge drinkers were less likely to have a tobacco abstinence goal (p = 0.03) but more likely to have made a serious tobacco quit attempt; all of the binge groups were more likely to be social smokers (all p < 0.01). Overall, we also found a high rate of smoking on binge drinking days. Individuals smoked cigarettes on 85.7% ± 32.9% of days they binge drank. Extent of binge drinking (not just prevalence) is an important factor influencing smoking characteristics in young adults.

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1. Introduction

Tobacco use is the leading cause of premature death and has been linked to 6 million deaths per year worldwide (WHO, 2013). Binge drinking (defined as four or more drinks for women and five or more drinks for men on an occasion) is involved in half of all alcohol related deaths (Kerr, Mulia, & Zemore, 2014). Young adults are an important target for public health efforts given that this age group has the highest rates of both cigarette smoking and binge drinking. In 2013, 37.0% of

young adults reported smoking tobacco, and 37.9% reported binge drinking at least once in the past 30 days (SAMHSA, 2013). Of particular concern, binge drinking and cigarette smoking commonly co-occur in this population (53.1% of heavy alcohol users aged 12 or over smoked cigarettes in the past month; SAMHSA, 2013). This co-use compounds health and social risks (Bobo & Husten, 2000; Harrison, Desai, & McKee, 2008; Harrison & McKee, 2008, 2011; Jiang & Ling, 2013, Jiang, Lee, & Ling, 2014).

It has been well established that tobacco and alcohol use are associated (for review see McKee & Weinberger, 2013). This is clearly a complex relationship influenced by both social and pharmacological factors. Previous research indicates that the prevalence of cigarette smoking is highest among young adults who drink heavily or frequently binge drink (Harrison & McKee, 2011; Weitzman & Chen, 2005). Our study

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sought to further characterize this relationship by identifying tobacco use characteristics associated with different frequencies of binge drinking among young adults who use both substances.

Frequency of binge drinking may also be associated with unique profiles of social and situational factors that lead to temptations to smoke cigarettes. Self-identifying as a social smoker or using cigarettes in social situations is associated with smoking while drinking (Jiang, Lee, & Ling, 2014; Nichter, Carkoglu, & Lloyd-Richardson, 2010). Additionally, smoking temptations have previously been characterized into unique domains based on social situational factors where individuals are motivated to smoke (Velicer, DiClemente, Rossi, & Prochaska, 1990). Given the extent to which binge drinking and smoking co-occur in social situations for young adults (e.g., bars; Jiang, Lee, & Ling, 2014; Nichter et al., 2010), a goal of this work was to determine whether frequency of binge drinking was associated with differences in prevalence of social smoking or temptations to smoke in positive/affective situations.

Heavy alcohol consumption may be associated with both a decrease in desire to quit smoking and lower self-efficacy for quitting tobacco. Alcohol consumption has been negatively associated with quitting tobacco (Friend & Pagano, 2005; Hymowitz et al., 1997; Osler, Prescott, Godtfredsen, Hein, & Schnohr, 1999) and binge drinkers specifically were found be more likely to lapse during tobacco cessation attempts (Cook et al., 2012). Further, individuals who binge drink alcohol may be less ready to quit smoking cigarettes (Berg et al., 2012). However, little is known about whether readiness to quit smoking or having a goal of abstinence for tobacco are related to frequency of binge drinking among young adults who use both substances.

The current study used data collected from an anonymous online survey of young adults who had self-reported both past month smoking and alcohol use to: (1) Characterize and validate binge drinking frequency groups; (2) identify demographic and smoking characteristics associated with binge drinking frequency, including smoking frequency, smoking history, social smoking, quit history, nicotine dependence, temptations to smoke in high risk situations, and thoughts about tobacco abstinence; and (3) determine if the binge drinking frequency groups differed in cigarette smoking on binge and non-binge drinking days. Identifying sociodemographic and tobacco use characteristics that distinguish among specific frequencies of binge drinking is important to identify at risk populations and improve smoking cessation interventions among young adults who smoke and drink alcohol.

2. Methods

2.1. Participants and recruitment procedure

This study analyzed data from an anonymous, national cross-sectional survey study with online recruitment. Participants were young adults (18–25 years old) from the United States who were English literate and reported having smoked at least one cigarette in the past 30 days. Data were used for the present analysis if participants reported drinking alcohol at least once in the past month (n = 1405). Participants were recruited between April 2009 and December 2010 using three Internet-based methods described previously (Ramo, Hall, & Prochaska, 2010; Ramo & Prochaska, 2012b).

Participants who provided online University of California Institutional Review Board-approved consent and were eligible were invited to complete an online survey of tobacco and other substance use. Data were encrypted for added security protection. Participants were required to answer all questions before they could continue to the next page of the survey but could quit and return to the survey at any time. To prevent duplicate entries from the same person, computer Internet Protocol addresses were tracked; only one entry was allowed from a single computer. Eligibility checks excluded respondents who (a) had discrepant data on similar demographic questions or grossly discrepant data on substance use measures, (b) reported the same email address across multiple survey entries, or (c) had clearly invalid data (e.g., responding

'9' to all questions in the survey). Respondents found to be ineligible were excluded from analyses.

2.2. Measures

The measures used have been previously analyzed with anonymous online survey methods and demonstrated good reliability and validity with young adults (Ramo, Hall, & Prochaska, 2011; Ramo, Liu, & Prochaska, 2012). Sociodemographics assessed were gender, age, ethnicity, years of education, and annual household income.

2.3. Tobacco use measures

The Timeline Followback (TLFB) procedure was used to assess total cigarettes smoked each day in the past month (Brown et al., 1998) from which past month total cigarettes smoked, number of smoking days, average number of cigarettes smoked per day, and daily smoking status (yes/no; 30/30 days) were calculated. A smoking questionnaire (Hall et al., 2006) assessed participants' total years of smoking and number of past year 24-h quit attempts (dichotomized due to skew; yes/no). Time to first cigarette upon waking (<30 min or >30 min) was used as a measure of dependence (Baker et al., 2007).

Participants were asked "Are you a social smoker" (yes/no), a measure found to be an inclusive and a widely endorsed definition of social smoking for young adults (Lisha, Delucchi, Ling, & Ramo, 2014; Song & Ling, 2011). Participants also completed a smoking temptation measure consisting of three domains: positive affective situations (e.g. "with friends at a party" or "when I am happy and celebrating"), negative affective situations (e.g. "when I am angry about something"); and habitual/craving situations (e.g. "when I realize I have not smoked for a while") based on Velicer et al., 1990.

Readiness to quit smoking cigarettes was measured using the Smoking Stages of Changes Questionnaire (Prochaska & DiClemente, 1983), categorizing participants into one of three pre-action stages of change: (a) Precontemplation – no intention to quit smoking within the next 6 months, (b) Contemplation – intention to quit smoking within the next sixth months but no 24-h quit attempts in the past year, and (d) Preparation – intention to quit within the next month and a 24-h quit attempt in the past year. Abstinence goal was assessed using a single-item with seven answer choices, categorized as complete abstinence or non-abstinence (e.g., no change, an intermediate or reduction goal; Hall et al., 2006).

2.4. Alcohol use measures

Past month alcohol use was assessed with the TLFB, with participants reporting the number of alcoholic drinks consumed on each day in the past 30 days (Sobell & Sobell, 1996). TLFB data were used to generate the total number of drinks in the past 30 days, the number of days drinking any alcohol in the past 30 days, the average number of drinks per drinking day, the number of past month binge drinking days (5 or more drinks for men, 4 or more drinks for women), and the greatest number of drinks in a day. Age of first alcoholic drink was determined by asking participants: "How old were you the first time you had a drink of an alcoholic beverage".

2.5. Tobacco and alcohol co-use

TLFB data were used to generate the percent of binge drinking days that participants smoked cigarettes, and the percent of total past month cigarettes that were smoked on days participants binge drank alcohol.

2.6. Data analysis

Individuals were divided into 4 groups based on binge drinking frequency: (a) non-binge drinkers; (b) occasional binge drinkers