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Characteristics of drinking events associated with heavy episodic drinking among adolescents in the United States



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ABSTRACT

Purpose: To examine associations between characteristics of drinking events and the quantity of alcohol consumed by adolescents in the United States.

Methods: Analyses relied on 2011–2015 data from the National Survey on Drug Use and Health (NSDUH). The study sample included 8110 adolescents, ages 12–17 years old, who drank alcohol in the past 30 days. A logistic regression model, weighted for national estimation, was constructed to examine factors associated with heavy episodic drinking (HED; 5+ drinks for males, 4+ drinks for females) during the underage drinker's most recent drinking event. These models were adjusted for study year and individual characteristics, including past year drinking frequency, age of drinking onset, and demographic variables.

Results: Buying alcohol off-premise or from another person and being given alcohol from non-parent social sources were associated with greater odds of HED compared to being given alcohol by one of their parents. Drinking alcohol at someone else's house or multiple locations were associated with heavier alcohol consumption compared to drinking at one's own home. Being older and an earlier age of alcohol onset were associated with greater odds of HED.

Conclusions: This study identifies contextual factors associated with HED by adolescents. Compared to global association studies, the findings from these event-specific analyses provide strong evidence of the environmental conditions that contribute to HED in American adolescents. Although no level of alcohol consumption is safe for adolescents, knowledge of event-level risk factors can inform targeted interventions.

1. Introduction

Alcohol is the most common substance used by adolescents in the United States (U.S.), with approximately 11.5% of 12–17 year olds having consumed alcohol in the last 30 days (Center for Behavioral Health Statistics and Quality, 2015). Acute alcohol-related consequences include alcohol poisoning, injury, and violence (Centers for Disease Control and Prevention, 2016; World Health Organization, 2014). As greater quantities of alcohol are consumed, there is an increased likelihood of experiencing these acute consequences (World Health Organization, 2014). As a result, alcohol-related consequences are most often experienced by males who consume 5 or more drinks and females who consume 4 or more drinks during a single occasion (Centers for Disease Control and Prevention, 2016). This 5+/4+ threshold of alcohol consumption is referred to as *heavy episodic*

drinking (or HED) (Jackson, 2008). The current study examined associations between contextual factors and the odds of HED by adolescents during specific drinking events.

1.1. Adolescent drinking context: sources of alcohol

Adolescents procure alcohol through a variety of commercial and social sources. Commercial sources of alcohol for adolescents include grocery, convenience, and liquor stores as well as bars, restaurants, and nightclubs (Cremeens et al., 2009; Dent et al., 2005; Harrison et al., 2000; King et al., 2016; Paschall et al., 2007; Roberts et al., 2014; Wagenaar et al., 1993; Wagenaar et al., 1996). However, the most common sources of alcohol for 12–17-year-olds are social sources (Dent et al., 2005; Harrison et al., 2000; Jones and Caraballo, 2014; King et al., 2016; Siegel et al., 2011; Wagenaar et al., 1996). Social sources

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include adolescents' friends, parents, and other family members, as well as from their home and at parties (Dent et al., 2005; Fabian et al., 2008; Harrison et al., 2000; Hearst et al., 2007; Jackson et al., 2016; King et al., 2016; Komro et al., 2007; Mattick et al., 2017; Peeters et al., 2016; Siegel et al., 2011; Wagenaar et al., 1993; Wagenaar et al., 1996; Williams and Mulhall, 2005).

Although the varied sources of alcohol for adolescents have been well-studied, there is limited research examining whether alcohol source influences the frequency and/or quantity of alcohol consumed. Investigations examining these associations have concluded that the simple presence of alcohol in the home is associated with increased adolescent alcohol use (Komro et al., 2007; Peeters et al., 2016; Wagenaar et al., 1996). Furthermore, obtaining alcohol from non-parental sources (Mattick et al., 2017), including having someone else purchase alcohol for them (Creameens et al., 2009; Dent et al., 2005; Jones and Caraballo, 2014), has been associated with increased alcohol consumption. However, a major weakness of these studies is that they did not examine associations at the level of the drinking event. Thus, there is limited knowledge regarding whether specific alcohol sources contribute to HED or whether heavier drinkers are more likely to obtain alcohol from a wider variety of sources.

1.2. Adolescent drinking context: location of alcohol consumption

Underage drinkers consume alcohol at a variety of different locations, including private residences, parties, parks/parking lots, school, and in motor vehicles (Anderson and Brown, 2010; Degenhardt et al., 2015; Goncy and Mrug, 2013; King et al., 2016; Lipperman-Kreda et al., 2015; Mair et al., 2015; Mayer et al., 1998; McCabe et al., 2014; Siegel et al., 2011). Some studies show that adolescents who drank in certain locations (King et al., 2016; Lipperman-Kreda et al., 2015) or multiple locations (Anderson and Brown, 2010) drank alcohol more frequently or heavily in general. These studies, however, do not assess the quantity of alcohol consumed at each location. Thus, it is unclear whether heavier drinking actually occurs at these locations or whether drinking at these locations is an artifact of heavier or more frequent drinking. Although several studies have noted variations in the amount of alcohol consumed by college students in different environments (Paschall and Saltz, 2007; Harford et al., 2002; Demers et al., 2002; Clapp et al., 2006a, 2006b; Wei et al., 2010), few have examined this association among adolescents (Jackson et al., 2016; Jones-Webb et al., 1997; Mair et al., 2015). Findings from these studies generally indicate that drinking in peer contexts (Jackson et al., 2016), public settings (Jones-Webb et al., 1997), and at parties or homes where parents are not present (Mair et al., 2015) are associated with heavier drinking during that drinking event. However, these studies relied on non-probability samples, thereby raising questions about their external validity. As a result, it is unclear whether specific types of locations are associated with HED in the 12–17-year-old drinking population in the U.S.

Using a national probability sample of underage drinkers ($n = 8110$), the current study sought to examine the associations between contextual factors and HED. These analyses examined adolescents' most recent drinking event. Thus, self-report measures of alcohol source, drinking location, and quantity of alcohol consumed pertained to a specific drinking event.

2. Materials and methods

2.1. Data

National Survey on Drug Use and Health (NSDUH) data are the primary source for substance use estimates in the U.S. (<https://www.samhsa.gov/data/population-data-nsduh>). Data collection involves annual interviews with approximately 70,000 randomly selected participants ages 12 years and older in the U.S. This study relied on NSDUH data from 2011 through 2015 (<http://www.datafiles.samhsa.gov>).

2.2. Inclusion criteria

The study sample was comprised of adolescents 12–17 years old who had consumed alcohol within the last 30 days ($n = 9571$). The analytic dataset was restricted to cases with non-missing data on age, sex, race/ethnicity, age of drinking onset, number of days they consumed alcohol in the last year, perceived peer use of alcohol, three measures of perceived approval of alcohol use (friends', parents', and own), and past 30-day cigarette use. Complete information about their most recent drinking event also had to be reported, including: number of alcoholic beverages consumed, number of people with whom the participant was drinking, drinking location, and how the participant obtained the consumed alcohol. A total of 8110 cases (84.7%) remained for analyses.

2.3. Measures

2.3.1. Alcohol consumption

Heavy episodic drinking (HED) during their most recent drinking event was assessed by the survey question: "Please think about the last time you drank any alcoholic beverage. How many drinks did you have that time?" Responses were recoded dichotomously as ≥ 5 drinks for males and ≥ 4 drinks for females = 1 versus < 5 drinks for males and < 4 drinks for females = 0. These thresholds have been widely used in alcohol research to account for sex differences in intoxication that occur after consuming the same number of drinks (Jackson, 2008; Wechsler and Austin, 1998; Wechsler et al., 1994; Wechsler et al., 1995). HED was treated as the dependent variable in logistic regression analyses.

2.3.2. Contextual factors

The **source of the alcohol** they consumed was assessed by six questions, including: "How did you get the last alcoholic beverage that you drank?," "Who bought the alcoholic beverage for you?," and "At which of these places did you buy the last alcoholic beverage that you drank?" These questions and their responses were coded into the following 10 mutually exclusive, dichotomous variables (1 = yes, 0 = no): (1) bought the alcohol themselves from an off-premise retailer, (2) bought the alcohol themselves from an on-premise alcohol outlet, (3) bought the alcohol from another person, (4) was given the alcohol by their parent/guardian, (5) was given the alcohol by a family member 21 years or older, (6) was given the alcohol by someone 21 years or older who was not family member, (7) was given the alcohol by someone under 21 years of age, (8) took alcohol from their home, (9) took alcohol from another person's home, or (10) got the alcohol for free by some other means.

Drinking locations were assessed by the question: "Where did you drink alcoholic beverages this last time you drank?" Dichotomous variables (1 = yes, 0 = no) were created to distinguish individuals who drank at nine different locations. Some individuals drank at multiple locations; therefore, variables were not mutually exclusive. For the regression analyses, mutually exclusive dichotomous variables were created to distinguish individuals who drank alcohol at only one of the following locations during their most recent drinking event: (1) in a car or other vehicle ($n = 199$), (2) at their home ($n = 2077$), (3) at someone else's home ($n = 4209$), (4) at a park, on a beach or in a parking lot ($n = 271$), (5) in a restaurant, bar or club ($n = 159$), (6) at a concert or sports event ($n = 53$), (7) at school ($n = 38$), (8) at a party, wedding, or other celebrations ($n = 164$) and (9) other locations including hotels, cabins, vacation homes, dorm rooms, and outdoor locations ($n = 217$). Two additional dichotomous variables were created to distinguish individuals who consumed alcohol at two locations ($n = 505$) or three or more locations ($n = 218$).

Number of people accompanying participants while drinking was assessed using the question: "This last time you drank, were you alone or were you with one or more other people?" Possible response options

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