



Patterns of high-intensity drinking among young adults in the United States: A repeated measures latent class analysis



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HIGHLIGHTS

- We found four latent classes of longitudinal patterns of drinking from 18 to 25/26.
- 16% had a long-term pattern of high-intensity drinking starting in high school.
- Other patterns of alcohol use did not include high-intensity drinking.
- Gender and race/ethnicity differentiate between patterns of use.

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ABSTRACT

Objective: Using a national sample of young adults, this study identified latent classes of alcohol use including high-intensity drinking (10+ drinks) from ages 18 to 25/26, and explored associations between time-invariant covariates measured at age 18 and class membership.

Method: Longitudinal data from the national Monitoring the Future study were available for 1078 individuals (51% female) first surveyed as 12th grade students in 2005–2008, and followed through modal age 25/26. Repeated measures latent class analysis was used to identify latent classes based on self-reported alcohol use: no past 30-day drinking, 1–9 drinks per occasion in the past 2 weeks, and 10+ drinks per occasion.

Results: Four latent classes of alcohol use from ages 18 to 25/26 were identified: (1) Non-Drinkers (21%); (2) Legal Non-High-Intensity Drinkers (23%); (3) Persistent Non-High-Intensity Drinkers (40%); and (4) High-Intensity Drinkers (16%). Membership in the High-Intensity Drinkers class was characterized by higher than average probabilities of high-intensity drinking at all ages, with the probability of high-intensity drinking increasing between ages 18 and 21/22. Both gender and race/ethnicity significantly differentiated class membership, whereas neither parental education (a proxy for socioeconomic status) nor college plans at 12th grade showed significant associations.

Conclusions: More than one in seven individuals who were seniors in high school experienced a long-term pattern of high-intensity drinking lasting into middle young adulthood. Young adult high-intensity drinking is often preceded by high-intensity drinking in high school, suggesting the importance of screening and prevention for high-intensity drinking during adolescence.

1. Introduction

Heavy drinking is associated with a broad range of adverse acute and long-term consequences, including fatal and non-fatal injuries, health problems, alcohol use disorders, and birth defects (National Institute on Alcohol Abuse and Alcoholism, 2016). High-quantity alcohol use has typically been defined as heavy episodic drinking,

operationalized as having 5 or more drinks on a given occasion (Johnston, O'Malley, Bachman, Schulenberg, & Miech, 2016; Wechsler & Nelson, 2001), or as gender-specific levels of 4 or more drinks for women and 5 or more drinks for men (National Institute on Alcohol Abuse and Alcoholism, 2004). However, the average number of drinks in a typical heavy episodic drinking occasion for young adults ages 18–24 has been estimated at > 9 (National Institute on Alcohol

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Abuse and Alcoholism, 2004). Recent calls in the literature suggest adding a cut-off for very high-risk drinking (Hingson & White, 2013; Patrick, 2016), referred to as high-intensity drinking and usually operationalized as having 10 or more drinks on a given occasion (i.e., twice the typical binge-drinking threshold) (Patrick, 2016). Individuals who report high-intensity drinking have been found to not only consume a larger quantity of alcohol on drinking occasions than individuals who drink below the 10+ level, but also to engage in 5+ drinking more frequently than those who do not report high-intensity drinking (Patrick, Terry-McElrath, Kloska, & Schulenberg, 2016). High-intensity drinking has been estimated to raise blood alcohol concentration (BAC) levels to at least four times the legal 0.08% limit (Hingson & White, 2013), resulting in severe and even life-threatening levels of impairment (National Institute on Alcohol Abuse and Alcoholism, 2015).

Studies have begun to provide data on both the prevalence and overall developmental trajectory of high-intensity drinking among older adolescents and young adults, largely using data from Monitoring the Future (Johnston et al., 2016). Using the same measure and similar nationally representative samples of high school seniors as used in the present study, an earlier study found that 10.5% reported high-intensity drinking (Patrick et al., 2013). A similar percentage (10.3%) of young adults aged 19/20 reported high-intensity drinking from 2006 to 2015 (Patrick & Terry-McElrath, 2016); prevalence was somewhat higher (12.4%) among young adults in their mid-20s (Terry-McElrath & Patrick, 2016). The normative developmental trajectory for high-intensity drinking was an increasing frequency from late adolescence to peak at age 21/22, and decreasing frequency thereafter (Patrick et al., 2016). However, the degree of variation in specific patterns of stability and change in high-intensity drinking across young adulthood has yet to be considered, as has been done extensively regarding heavy episodic drinking (summarized below). Understanding developmental patterns of high-intensity drinking across the transition to adulthood is important for both etiological and prevention advances, providing needed insights into the extent and predictors of, for example, persistent high-intensity drinking versus persistent drinking that is not high-intensity (Schulenberg & Maggs, 2002).

Sociodemographic differences in levels of high-risk alcohol use among high school students have been documented. Being male (vs. female), being white (vs. non-white), and having higher parental education (a proxy for family-of-origin socioeconomic status) are associated with significantly higher levels of high-risk alcohol use in 12th grade (Miech, Johnston, O'Malley, Bachman, & Schulenberg, 2016; Patrick et al., 2013, 2016). Sociodemographic differences in trajectories (or rates of change over time) in overall frequency of high-intensity drinking also have been identified. A steeper increase in frequency of high-intensity drinking from ages 18 to 21/22 was observed for males (vs. females) and individuals who attended a 4-year college full-time at age 19/20 (vs. others). A steeper rate of decrease from ages 21/22 to 25/26 was observed for college attenders (vs. others). Parental education was not significantly associated with the overall normative developmental trajectory of high-intensity drinking (Patrick et al., 2016). The above sociodemographic differences in baseline prevalence and trajectory change of high-intensity drinking are similar to those observed for overall alcohol use and for 5+ drinking in particular (Chassin, Hussong, & Beltran, 2009; Johnston et al., 2016; Maggs & Schulenberg, 2004; Park, Paul Mulye, Adams, Brindis, & Irwin, 2006; Patrick & Schulenberg, 2011; Patrick et al., 2016; Schulenberg & Maggs, 2002). The above research indicates that the risk for participation in high-intensity drinking is particularly high during early young adulthood, especially for males, whites, and those attending college. However, the extent to which these covariates may be associated with distinct within-person patterns of high-intensity drinking over time is unknown.

Use of growth mixture modeling has identified several specific sub-trajectories of alcohol use spanning adolescence and young adulthood.

The majority of such work has focused on developmental patterns of heavy episodic drinking. Results from such studies typically identify a relatively large consistently light or moderate user group, a smaller group of chronic heavy users, and then groups that evidence various patterns of either increasing or decreasing use over time (Chassin, Pitts, & Prost, 2002; Jackson, Sher, & Schulenberg, 2008; Maggs & Schulenberg, 2004; Nelson, Van Ryzin, & Dishion, 2015; Schulenberg, Wadsworth, O'Malley, Bachman, & Johnston, 1996). Gender, race/ethnicity, and college attendance have been associated with higher-risk drinking trajectories across studies. Being white and being male each increased the odds of being in a high-use or steep-escalation trajectory group (for a review see Maggs & Schulenberg, 2004; e.g., Nelson et al., 2015). In (2015), not attending college within two years of finishing high school was associated with early onset trajectories of alcohol use. These studies reveal heterogeneity in young adult drinking that is obscured by aggregate results. The importance of identifying such patterns lies in the resulting theoretical and intervention implications that emerge. Such potential benefits include estimating the probability of membership in subgroups that are at especially high risk for negative consequences and identifying risk factors that may differentiate between membership in subgroups characterized by use escalation or decline (Ellickson, Martino, & Collins, 2004). Research on heterogeneity in drinking patterns across young adulthood that include a high-intensity drinking cut-off, and the risk factors associated with membership in specific subgroups, has not been available to this point.

The current study aims to contribute to knowledge about high-risk drinking in young adulthood by identifying latent classes of early young adult alcohol use that include high-intensity drinking. Specifically, we empirically identify the number and prevalence of distinct patterns of stability and change over time within individuals using a trichotomous indicator of alcohol use (i.e., consuming no alcohol in the past 30 days, drinking but not engaging in 10+ drinking, or 10+ drinking) at each age from 18 through 25/26 using repeated measures latent class analysis (RMLCA; Lanza & Collins, 2006). Further, we explore associations between key time-invariant covariates measured at age 18 and class membership. Two research questions guided analyses: (1) How many unique latent classes of within-person alcohol use and high-intensity drinking from ages 18 to 25/26 can be empirically identified, and what percentage of the population is estimated to be in each class? (2) To what extent do gender, race/ethnicity, socioeconomic status, and college plans differentiate class membership?

2. Method

2.1. Data, setting, and study population

The study utilizes data from Monitoring the Future (MTF), a national cohort-sequential study. Detailed methodology is provided elsewhere (Bachman, Johnston, O'Malley, Schulenberg, & Miech, 2015; Johnston et al., 2016; Miech et al., 2016). Briefly, a nationally representative sample of approximately 15,000 12th graders (at modal age 18) from about 130 schools has been surveyed annually since 1975, yielding sequential cohorts. Students complete self-administered surveys, typically during a normal class period. A representative random subsample of about 2400 seniors is selected from each annual sample for longitudinal follow-up; substance users are oversampled (analyses include weights accounting for sampling procedures). Respondents are randomly divided with half of each cohort surveyed one year after graduation (modal age 19) and half surveyed two years after graduation (modal age 20). Participants are then surveyed every two years. Data from ages 18, 19/20, 21/22, 23/24, and 25/26 are included in the current analyses. Follow-up questionnaires are mailed in the spring with a modest monetary incentive. The University of Michigan Institutional Review Board approved the study.

The current analyses use an item on high-intensity drinking that was

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