Using latent transition analysis to compare effects of residency status on alcohol-related consequences during the first two years of college

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HIGHLIGHTS

- Four statuses were identified that distinguished students' alcohol-related consequences.
- Most students transitioned into a different status by the fall of their second year.
- Moving out of on-campus housing was associated with transitioning to higher risk status.
- Moving into Greek housing had strongest effects.

ARTICLE INFO

ABSTRACT

The current study examined two research aims: (1) Identify latent statuses of college students who share common patterns of single or repeated experiences with distinct types of negative alcohol-related consequences during the first two years of college; and (2) Examine how changes in students' living arrangements were associated with transitions in the consequence statuses. Using a sample of college student drinkers (N = 1706), four latent statuses were identified that distinguished among distinct combinations of single and repeated experiences across the multiple consequence subtypes: *No Consequences, Physical Non-Repeaters, Multiple Consequences,* and *Multiple Consequences Repeaters*. Students who remained in on-campus living spaces were most likely to belong to lower-risk statuses at T1, and remain in those statuses at T2. We found that moving into Greek housing had strongest effects among students who started in the *No Consequences* status, while students who moved to off-campus housing were most likely to remain in the *Multiple Consequences* status. Given that students who moved out of on-campus residences were more likely to transition into high-risk statuses, interventions that target students who intend to move to off-campus or fraternity housing should be implemented during the first year of college.

1. Introduction

Rates of risky alcohol behaviors by college students continue to exceed rates of their non-college attending peers (Johnston, O'Malley, Bachman, Schulenberg, & Miech, 2016). Such use is associated with a range of negative alcohol-related consequences, including health problems and sexual assault (Hingson et al., 2009). Continued effort to understand the factors that contribute to college students' alcohol use and related problems thus remains a public health priority. This study examines associations between changes in residential status and alcohol-related consequences during the first two years of college. Most

previous examinations of residential status have focused on the transition from high school to college, and demonstrate this first-year transition (typically from their family home to on-campus living spaces) is associated with increased rates of heavy drinking (Harford, Wechsler, & Muthén, 2002; White et al., 2006). Selection effects have also been noted, such that high school students who regularly consume alcohol tend to select living arrangements in college that facilitate alcohol use, such as a suite-style vs. standard dormitory room (Fromme et al., 2008; Willoughby & Carroll, 2009).

Less understood is how socialization and selection effects influence alcohol use after the first year of college, when many students move to

other types of living spaces, such as Greek or off-campus houses. Studies confirm affiliation with a Greek organization is an important risk factor for high-risk alcohol use (Borsari, Hustad, & Capone, 2009; Larimer, Anderson, Baer, & Marlatt, 2000; Page & O'Hegarty, 2006) and that residence in Greek housing may be a risk factor, over and above affiliation (Park et al., 2009; Wechsler et al., 2009). In contrast, few studies have examined the effects of moving from on-campus to off-campus living spaces. Fewer still have directly compared the effects of these two alternatives. Recently, Simons-Morton and colleagues (2016) observed increases in alcohol use among first-year students who moved into on-campus housing but not among those who moved to off-campus living spaces. However, the study combined students who moved into residence halls with students who moved into Greek houses and was unable to determine if the observed differences were due to living in on-campus spaces or living in Greek housing. It is also unclear if these differences were sustained after the first year of college.

We used latent transition analysis (LTA) to address these questions. Prior research has used similar methods to identify patterns of college student drinking behaviors (Beseler, Taylor, Kraemer, & Leeman, 2012; Cleveland et al., 2013; O'Connor & Colder, 2005); however, few have applied these methods to students' alcohol-related consequences. Using the cross-sectional variant of LTA (latent class analysis, LCA), Rinker et al. (2016) identified four latent classes of first-year students based on negative alcohol-related consequences (*No Problems*, *Academic Problems*, *Injured Self*, and *Severe Problems*). These authors reported that students who intended to join a Greek organization were more likely to belong to each of the three problem classes, relative to the *No Problems* class.

We extend previous research by examining a wider range of consequences, including physical consequences (e.g., nausea) that are relatively common among college students as well as less commonly experienced consequences (e.g., tolerance-related consequences). We also build on previous research that confirms students' variability with respect to frequency, repetition, and diversity of experienced alcohol-related consequences across the first two years of college (Mallett et al., 2011). The first aim used LTA to identify subgroups of students who share common patterns of experiences with multiple types of negative alcohol-related consequences during the fall of the first year (T1) and the fall of the second year (T2) of college. The second aim examined how changes in students' living arrangements were associated with transitions in the consequence subgroups.

2. Materials and Methods

2.1. Recruitment Procedures

As part of a larger study, 4,000 first-semester students were randomly selected from the university registrar's database at a large, public northeastern university. The current study utilized data from the baseline survey during fall semester of participants' freshman year (T1) and a follow-up survey in the fall of the sophomore year (T2). At T1, 67.3% (N = 2690) of invited participants elected to participate. Because the goal of the larger study was to assess traditional aged college students' alcohol consequences, only participants between ages 18-19 and who reported consuming at least one drink prior to baseline were invited to complete the follow-up assessment. Of those who completed the T1 assessment, 75.2% (n = 2024) met these participation criteria. Retention from T1 to T2 was 87.4% (N = 1768). No differences were observed between those who completed both assessments and those who completed only the first assessment. Students received $25 for completing the T1 survey, $30 for completing the T2 survey, and a $5 bonus for each survey they completed within 5 days of receiving the email invitation. Study procedures were approved by the university's Institutional Review Board.

Policies at the university required, with few exceptions, first-year students to live in on-campus residence halls. We thus excluded 32

students who reported other living arrangements at T1. Of the remaining 1992 students, 1742 (87.45%) reported their living arrangement at T2. Very few reported either "living with parents" (N = 28, 1.61%) or "other" (N = 8, 0.46%) at T2 and were excluded from the analyses. Thus, the analysis sample consisted of 1706 students who all reported on-campus living arrangements at T1, and at T2 belonged to one of three groups: (1) remained in on-campus residence halls (N = 672, 39.39%); (2) moved to a fraternity or sorority house (N = 157, 9.20%); or (3) moved to an off-campus apartment or house (N = 877, 51.41%). The mean age at T1 was 18.18 (*SD* = 0.39) years, and the majority identified as female (57.2%), Caucasian (87.4%), and heterosexual (98.0%). At T1, participants reported an average of 10.60 (*SD* = 8.41) drinks per week.

2.2. Measures

Alcohol-related consequences were assessed using subscales derived from the Young Adult Alcohol Consequences Questionnaire (YAACQ; Read et al., 2006) and the Young Adult Alcohol Problems Screening Test (YAAPST; Hurlbut & Sher, 1992; Larimer et al., 1999). Participants indicated how many times they had experienced each consequence during the current semester on an 8-point scale from "*1 time*" (1) to "*40 or more times*" (8), with an option for "*never*" (0). Items were grouped within seven distinct subscales, using the following criteria: (1) the content of each item was conceptually consistent with the subscale category, (2) the item was endorsed by at least 5% of the sample, and (3) the item did not weaken the internal consistency of the subscale (i.e., α > .70; items significantly correlated; see Mallett et al., 2015). The *physiological* consequences subscale (α = .72) included four items such as vomiting or having a hangover. *Social* consequences (α = .80) were measured with three items including "I have become rude, obnoxious, or insulting." Three items assessed *sexual* consequences (α = .73), for example, being pressured to have sex with someone because of being too drunk to prevent it. The *academic* subscale (r = .79) included two items (missing/skipping a class, or having academic work suffer due to drinking). *Tolerance* consequences included two items, "I needed larger amounts of alcohol to feel any effect" and "I found it difficult to limit how much I drank" (r = 0.46). Single items were used to capture *legal* ("I have received a citation because of drinking or other drunken behavior") and *impulse control* ("When drinking, I have done impulsive things that I later regretted") consequences.

Typical drinking was assessed using the Daily Drinking Questionnaire (DDQ; Collins et al., 1985), which asked participants to indicate how many drinks they consumed on each day of a typical week. Responses were summed to indicate the number of drinks one typically consumed each week. *Heavy drinking* was assessed using a single item from the Quantity, Frequency, Peak scale (QFP; Dimeff, 1999). Participants indicated how many times, in the past 30 days, they had been drunk or very high from alcohol. Response options were as follows: *0* = Never, *1* = 1-2 times, *2* = 3-4 times, *3* = 5-6 times, *4* = 7-8 times, *5* = 9+ times.

2.3. Analytic Strategy

We used LTA to identify common patterns of experiencing consequences, and transitions of these patterns between T1 and T2. All consequence items exhibited skewed distributions. Thus, the subscales were recoded to differentiate students who (1) did not experience any consequences within each subscale; (2) experienced at least one particular consequence within that subscale but only one time (i.e., not repeated); and (3) experienced repeated consequences (2 or more times) for at least one particular consequence within that subscale. These trichotomous variables were used as indicators of the LTA model. We used relative measures of fit (AIC and BIC), parsimony, and model interpretability to determine the optimal number of statuses (Collins & Lanza, 2010). Analyses were conducted using PROC LTA (Lanza et al.,