Introduction

- The consequences of adolescent alcohol or cannabis use include increased risks for negative health outcomes (e.g., increased morbidity and mortality) and negative social consequences (i.e., teen pregnancy, violence; Office of the Surgeon General, 2016).
- The combination of the two substances can create adverse effects (Starmer & Bird, 1984) including poorer performance on complex attention, processing speed, and visuospatial functioning tasks (Jacobs et al., 2015), increased likelihood of criminal justice involvement, and decreased likelihood of completing high school (Green et al., 2016).
- Stressful life events are associated with changes in typical patterns of substance use during adolescence (Chen & Jacobson, 2012).
- Negative affect is associated with both heavy alcohol use and greater frequency of use in adolescence (Colder & Chassin, 1997).
- More positive affect has been associated with a less substance use in adolescents (Will et al., 1999); however, Hussong and Hicks (2003) did not find a significant association between positive affect and substance use in high school juniors, suggesting potential differences that warrant further exploration.

Methods

- High school students ($N = 5,828$) completed questionnaires about their behaviors and substance use each semester beginning in the spring of their 9th grade (Time 1) through spring of their 12th grade (Time 7).
- Adolescent alcohol use was defined as the frequency of drinking alcohol in the past month. Alcohol scores showed good reliability across the seven time waves ($α = .88$).
- Cannabis use was defined as the frequency of smoking marijuana in the past 4 months. Cannabis scores showed good reliability across the seven time waves ($α = .88$).
- Scores for co-use of alcohol and cannabis were operationalized if a participant reported use for both substances, the average of the summed score was calculated as the co-use score in each wave.
- Affect was assessed using 20 items from the Positive and Negative Affect Schedule (Watson et al., 1988), with 10 items for each valence. Higher scores on each valence reflected more positive and negative affect. Affect scores showed increasing reliability across the seven time waves (positive affect, $α ≥ .88$; negative affect, $α ≥ .85$).
- Stress was measured with 13 items (Coddington, 1972) reflecting to what extent events happened to participants within the past year and had been bothering them (e.g., death of someone close). Higher scores reflected more stress. Stress scores showed increasing reliability across the seven time waves ($α ≥ .75$).

Analyses & Results

**Analyses**

- We conducted a longitudinal latent class analysis (LLCA) to identify classes of alcohol and cannabis co-use across the seven waves.
- A 3-class solution was chosen based upon several fit indices used in prior latent class analysis research (e.g., Feldman et al., 2009; Hryland & Latendresse, 2018) and extant literature/theory, parsimony, and interpretability when deciding on final classes before assigning individuals to latent classes of substance use (see Table 1).
- We conducted chi-square analyses to examine whether gender and race/ethnicity covariates differed between the latent classes of substance use, and multivariate analyses of variance (MANOVAs) to examine whether stress and affect differentiated among the latent classes of substance use (see Table 2).

**Results**

- The sample was split evenly by gender (51% male), and the majority of the students were either Mexican American (42%), non-Hispanic White American (27%), or African American (21%).
- There were three classes of co-use across the seven waves: no/low use (41%), increasing use (35%), and heavy use (24%).
- For heavy use, 77% of students reported co-use scores of either 3 (drinking and smoking three or more times in the past month) or 4 (six or more times drinking and 21 or more times smoking in the past four months).
- There were gender and race/ethnic differences in the latent classes. Female, African American and Mexican American students were more likely than males and non-Hispanic White students to be in the low and increasing use classes.
- There were significant class differences in stress and affect. Stress and negative affect were highest for students in the heavy use class, followed by the increasing use class, with the lowest scores in the no/low use class. Positive affect (excluding Time 1) was lowest among students in the heavy use class and highest in the increasing and low use classes.

**Discussion**

- Students in the largest latent class who reported “little to no use” in their freshman year maintained consistency of little to no use across their high school years.
- Our results demonstrate that 99% of students who reported either alcohol or cannabis use also reported co-use, and that almost a quarter of the sample were identified in the heavy use classification.
- As majority of high school students reported little to no use across the high school years, future attention should be given to those who co-use early, heavily, and consistently and those who report more stress and negative affect.

- As adolescent substance use is an ongoing, significant public health issue, it is important to identify ways to curb against early problematic behaviors.
- Current intervention efforts typically focus on one substance at a time (i.e., alcohol) or specific outcomes (i.e., deadly car crash from alcohol use; DuPont et al., 2018) and as our data show, co-use is far more common than a single use of one substance. Therefore, using a “no use” strategy to prevent adolescent substance and alcohol use would be beneficial (DuPont et al., 2018).