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ORIGINAL ARTICLE



Associations Between U.S. High-School Student and Parental Job Loss During the COVID-19 Pandemic and Student Substance Use: Adolescent Behaviors and Experiences Survey (ABES), 2021

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ABSTRACT

Background: Job loss among both adults and adolescents increased markedly early in the COVID-19 pandemic. While parental job loss has been associated with the adverse effects, including adolescent substance use, no research is available on the effects of adolescent job loss on substance use.

Methods: Analyses of Adolescent Behaviors and Experiences Survey (ABES) data from January to June 2021 were conducted to assess associations between parent and student pre-pandemic employment status and pandemic-era job loss and adolescent substance use behaviors. Cigarette, electronic vapor product (EVP), alcohol, and drug use were examined in a nationally representative sample of 7,705 U.S. high-school students.

Results: Compared to students who did not lose their job during the pandemic, students reporting job loss had significantly elevated prevalences of current EVP use (29.9% vs. 19.7%), drinking more alcohol during the pandemic (25.3% vs. 16.7%), and current marijuana use (25.8% vs. 15.6%). Additionally, parental job loss was significantly associated with all substance use behaviors.

Conclusions: Higher levels of substance use associated with student and parental job loss, as well as parental unemployment, indicate that care may be needed for those students experiencing these losses. School-based intervention and prevention programs, including job loss supports for students, could be useful.

KEYWORDS

Employment status; job loss; COVID-19 pandemic; adolescent health; tobacco and electronic vapor product (EVP) use; alcohol use; drug use



Introduction

Adolescents were at-risk for poor mental health and substance use prior to the COVID-19 pandemic. Data from the 2019 Youth Risk Behavior Survey (YRBS), a cross-sectional, national survey of U.S. high-school students, revealed that approximately 37% experienced persistent feelings of sadness or hopelessness; 19% seriously considered attempting suicide; and 20% were bullied at school (Centers for Disease Control and Prevention, 2023). In addition, approximately 21.7% of students reported current marijuana use, 29.2% reported current alcohol use, and 7.2% reported prescription opioid misuse (Jones et al., 2020).

Pandemic-related disruptions to adolescents' daily lives, including schooling, family dynamics, work, and social activities heightened this vulnerability. The disruptions adversely affected their health and well-being, with studies finding increases in the number of mentally unhealthy days and depression and anxiety symptoms (Hertz et al., 2022; Panchal et al., 2023; Temple et al., 2022; Wang et al., 2021). COVID-19 led to business closures and reduced hours, resulting in layoffs and increased unemployment (Smith et al., 2021). Adolescents were not immune to these job

losses (Inanc, 2020). However, research describing the possible effects of job loss during the COVID-19 pandemic on adolescent health behaviors, including substance use, is limited. A systematic review examining substance use among youth during the COVID-19 pandemic revealed that most studies reported decreases in prevalence of substance use among adolescents. These decreases were attributed to reduced accessibility to substances and limited peer group interactions where substance use is likely to occur as a result of business closures, remote schooling, and restrictions to social interactions (Layman et al., 2022). Only a few of these studies considered the potential impact of parental job loss during the COVID-19 pandemic on adolescent substance use, and none of the studies examined adolescent job loss during the COVID-19 pandemic as a risk factor for substance use.

Pre-pandemic research has indicated a potential link between adolescent employment status and substance use (Lee et al., 2015; Osilla et al., 2013; Unger et al., 2004; Valois et al., 1999). Among a cohort of predominantly African-American students, researchers found that increasing time spent working for pay was associated with current tobacco use, and those students who worked more than 10 h

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per week were more likely to initiate tobacco use earlier than their peers (Ramchand et al., 2007). Other studies found that working more than 10 hours per week was predictive of heavy drinking among U.S. adolescents (Paschall et al., 2004), and working either full time or part time was associated with increased the odds of binge alcohol and heavy alcohol use among students aged 12–17 years (Wu et al., 2003). No study to date has examined the possible effects of adolescent job loss on substance use.

Several studies of adolescents have found associations between stress, including finance-related stress, and changes in substance use early in the COVID-19 pandemic including both increases and decreases in alcohol, cigarette and electronic vapor product (EVP), and drug use (Chaffee et al., 2024; Clendennen et al., 2021; Hoots et al., 2023; Kreslake et al., 2021; Layman et al., 2022; Temple et al., 2022). U.S. adolescents whose families experienced material hardship during May–August, 2020, including job loss of any household member, were more likely to report past 30-day substance use compared to pre-pandemic (during 2018, 2019, or January 2020) (Pelham et al., 2021). Sustained or increased marijuana, e-cigarette, and cigarette use attributed to COVID-19-related stressors was reported by more than 75% of participants of a 2020 study and higher levels of perceived stress were associated with a statistically significant increase in marijuana use (Clendennen et al., 2021). Negative changes in self-reported family financial situation from before to during the COVID-19 pandemic were associated with increased likelihood of alcohol consumption among Texas adolescents (Temple et al., 2022).

The Adolescent Behaviors and Experiences Survey (ABES) presents an opportunity to look at associations between student and parental pre-pandemic employment status and job loss during the COVID-19 pandemic and adolescent substance use behaviors, including cigarette smoking, EVP use, alcohol use, and drug use. ABES was conducted by the Centers for Disease Control and Prevention (CDC) from January through June 2021 to collect nationally representative data on the potential effects of the COVID-19 pandemic on U.S. high-school students' health-related experiences and behaviors. Prior research using ABES data has examined student mental health, perceived racism, and other adverse experiences (Jones et al., 2023; Krause et al., 2022; Mpofu et al., 2022). Additionally, Brener et al. (2022) previously examined substance use through analyses of the ABES data but did not include the student or parental employment status variables in their study. The current study builds on previous work with the ABES data, and the results provide insight into the effects that job loss (both parental and adolescent) may have on adolescent health and well-being.

Methods

Data

As described previously (Rico et al., 2022), ABES was a one-time survey conducted by the CDC from January through June of 2021 to collect nationally representative data

on U.S. high-school students' behaviors and experiences from the beginning of the COVID-19 pandemic through the interview date (henceforth, "during the pandemic"). To obtain a representative sample of 9th through 12th-grade students from public and private schools in the 50 United States and District of Columbia, the survey utilized a stratified, three-stage cluster sample design. Survey weights were created to account for nonresponse and oversampling of Black and Hispanic students (Centers for Disease Control & Prevention, 2023; Rico et al., 2022). The ABES study protocol was reviewed and approved by institutional review boards at the CDC and ICF International, CDC's survey contractor (see 45 C.F.R. part 46; 21 C. F. R. part 56).

The ABES questionnaire, available in English and Spanish, included 110 questions. Of the 110 total questions, 81 were adapted from the YRBS, a survey which has undergone cognitive, validity, and reliability testing (Mpofu et al., 2023; Rico et al., 2022). Additional questions were included in ABES that were designed to assess pandemic-specific issues. Student participation was voluntary and anonymous. Parental permission was required for students to complete the survey. An online video and corresponding survey instructions were provided to all respondents prior to taking the survey. Students completed the survey online using a login and secure URL that was provided by their teacher.

Measures of interest

Student employment status was obtained from the survey question, "During the COVID-19 pandemic, did you lose your paying job even for a short amount of time?" Responses included, "I did not have a paying job before the COVID-19 pandemic started," "Yes," and "No." This single question allowed classification of student employment status into three mutually exclusive categories: Student had no job before pandemic; student lost job during the COVID-19 pandemic; and student retained (henceforth, did not lose) job during the COVID-19 pandemic. Parental employment status was obtained from the survey question, "During the COVID-19 pandemic, did a parent or other adult in your home lose their job even for a short amount of time?" Responses included, "My parents and other adults in my home did not have jobs before the COVID-19 pandemic started," "Yes," and "No". Classification of parental employment status mirrored that for student employment status. The measure referencing "parent(s) or other household adults" is, henceforth, referred to as "parent" or "parental" for the purpose of brevity.

A combined student and parental employment status variable was created to examine the following parent/student dyads as single categories (unweighted percentage of respondents in that category): 1) parent had no job before the COVID-19 pandemic (3.7%); 2) parent and student both lost jobs during the COVID-19 pandemic (4.0%); 3) parent lost job and student did not lose job during the COVID-19 pandemic (5.2%); 4) parent lost job and student had no job before the COVID-19 pandemic (18.3%); 5) parent did not lose job and student lost job during the COVID-19

Table 1. Variables, questions, and analytic coding for tobacco and electronic vapor products, alcohol, and other substance use. Adolescent Behaviors and Experiences (ABES), United States, January–June, 2021.

Variable	Question	Analytic coding
Cigarette smoking/vaping		
Current cigarette smoking	During the past 30 days, on how many days did you smoke cigarettes?	≥1 day versus 0 days
Current electronic vapor product use	During the past 30 days, on how many days did you use an electronic vapor product?	≥1 day versus 0 days
Alcohol use		
Current alcohol use	During the past 30 days, on how many days did you have at least one drink of alcohol?	≥1 day versus 0 days
Drank more alcohol during the COVID-19 pandemic	Do you agree or disagree that you drank more alcohol during the COVID-19 pandemic than before it started?	Strongly agree or agree versus not sure, disagree, or strongly disagree
Other substance use		
Current marijuana use	During the past 30 days, on how many days did you use marijuana?	≥1 day versus 0 days
Current prescription opioid misuse	During the past 30 days, how many times have you taken prescription pain medication without a doctor's prescription or differently than how a doctor told you to use it?	≥1 day versus 0 days
Used more drugs during the COVID-19 pandemic	Do you agree or disagree that you used drugs more during the COVID-19 pandemic than before it started? (Count using marijuana, synthetic marijuana, cocaine, prescription pain medicine without a doctor's prescription, and other illegal drugs)	Strongly agree or agree versus not sure, disagree, or strongly disagree

pandemic (4.7%); 6) parent did not lose job and student had no job before the COVID-19 pandemic (38.5%); and 7) parent and student did not lose jobs during the COVID-19 pandemic (25.5%). Due to insufficient sample size, students reporting their parent had no job prior to the COVID-19 pandemic were combined into a single category, regardless of student job experience.

The study included seven substance use variables: 1) current cigarette smoking; 2) current EVP use; 3) current alcohol use; 4) drinking more alcohol during the COVID-19 pandemic; 5) current marijuana use; 6) current prescription opioid misuse; and 7) using more drugs during the COVID-19 pandemic. Table 1 provides the substance use variables analyzed in the study, including the corresponding ABES questions and subsequent analytic coding. The analytic coding was established in a previous substance use-related study that included analyses of ABES data (Brener et al., 2022).

Sociodemographic variables of interest included sex (coded as male or female), race and ethnicity (White, non-Hispanic; Black, non-Hispanic; other or multi-race, non-Hispanic; Hispanic), grade level (9th; 10th; 11th; or 12th grade), and sexual identity (heterosexual; lesbian, gay, or bisexual [henceforth LGB]; and other or questioning). While other variables such as household income, student geographic location, and parental substance use are likely relevant, they could not be included in our analyses because they were not ascertained by the survey.

Analyses

SAS-callable SUDAAN, version 11.0.1, was used to conduct the study analyses. To account for ABES complex survey design, weight, strata, and primary sampling unit variables were included in all analyses. The total sample size was 7,705 respondents. In relation to the independent variables of interest, 7,176 respondents provided their own employment status during the COVID-19 pandemic and 7,179

respondents provided parental employment status during the COVID-19 pandemic. Student employment status was missing for 529 and parental employment for 526 respondents.

Weighted, unadjusted prevalence results were produced for both student employment status and parental employment status by sociodemographic and substance use variables of interest *via* SAS PROC SURVEYFREQ. After the descriptive analyses were run, the model-building process took place with sex, race/ethnicity, grade level, and sexual identity identified *a priori* as potential confounders. Forward selection was used, and the following models were run: 1) sex; 2) sex and race/ethnicity; 3) sex, race/ethnicity, and grade level; 4) sex, race/ethnicity, and sexual identity; and 5) sex, race/ethnicity, grade level, and sexual identity. Variable retention in the model was based primarily on whether the results changed by 10% or more with the addition of a variable. *p* value from corresponding *F*-tests produced for each model were also considered. Sex, race/ethnicity, and grade level were retained as confounders in the final models for student employment status and parental employment status. Based on these final models, adjusted prevalence ratios (aPRs) and weighted, unadjusted prevalences were produced *via* PROC RLOGIST. Prevalences with non-overlapping 95% confidence intervals (CIs) were considered to have statistically significant differences and aPRs with CIs excluding 1.0 were considered to be statistically significant.

Results

Among U.S. high-school students in 2021, 9.0% reported job loss and 59.8% reported not working before the COVID-19 pandemic (Table 2). Reported parental job loss during the COVID-19 pandemic was 27.4% and the reported parental unemployment prior to the COVID-19 pandemic was 3.7%. White, non-Hispanic students were most likely to report job loss during the COVID-19 pandemic (10.3%), while Black, non-Hispanic students were most likely to report parental job loss (5.0%). Student job loss increased with increasing

Table 2. Weighted prevalences of student and parental job loss during the COVID-19 pandemic by sociodemographic characteristics of the study population. Adolescent Behaviors and Experiences (ABES), United States, January–June, 2021.

Characteristics	Unweighted sample	Weighted % in study population (95% CI)	Student employment status*		Parent employment status*	
			% Not working before the COVID-19 pandemic (95% CI)	% Reporting job loss during the COVID-19 pandemic (95% CI)	% Reporting parent not working before the COVID-19 pandemic (95% CI)	% Reporting parental job loss during the COVID-19 pandemic (95% CI)
All	7,705	–	59.8 (56.5–63.1)	9.0 (7.6–10.3)	3.7 (3.0–4.4)	27.4 (25.1–29.8)
Sex						
Female	3,999	50.4 (46.9–53.9)	61.8 (58.0–65.7)	9.7 (8.1–11.3)	2.8 (2.1–3.6)	30.4 (27.9–32.9)
Male	3,678	49.6 (46.1–53.1)	57.5 (53.7–61.3)	8.1 (6.2–10.0)	4.5 (3.6–5.5)	24.4 (21.8–27.1)
Race/ethnicity						
White, non-Hispanic	3,461	49.8 (41.5–58.1)	53.6 (50.3–56.8)	10.3 (8.3–12.3)	3.5 (2.6–4.5)	23.6 (21.1–26.0)
Black, non-Hispanic	1,189	12.9 (8.8–16.9)	59.1 (53.0–65.3)	9.6 (6.9–12.4)	5.0 (3.0–7.0)	23.6 (20.0–27.3)
Other or multi-race, non-Hispanic**	944	11.9 (7.7–16.2)	67.4 (61.7–73.2)	7.4 (5.2–9.5)	4.1 (2.1–6.1)	28.5 (23.2–33.8)
Hispanic	2,038	25.4 (19.6–31.2)	68.5 (64.4–72.6)	6.9 (5.0–8.8)	3.3 (1.9–4.7)	36.7 (32.6–40.8)
Grade level						
9th Grade	2,144	26.7 (23.9–29.5)	72.3 (68.7–75.9)	3.5 (2.3–4.7)	4.1 (3.0–5.3)	27.9 (23.4–32.3)
10th Grade	1,949	25.5 (23.0–27.9)	66.4 (62.4–70.4)	5.8 (4.5–7.0)	3.0 (1.8–4.2)	28.1 (25.4–30.8)
11th Grade	1,858	24.3 (22.3–26.3)	55.4 (49.6–61.2)	8.3 (6.2–10.3)	3.6 (2.3–4.9)	26.5 (23.1–29.8)
12th Grade	1,731	23.6 (21.1–26.0)	43.4 (39.8–47.1)	19.0 (16.4–21.7)	4.1 (2.7–5.5)	27.1 (23.8–30.5)
Sexual identity						
Heterosexual	5,539	76.1 (74.1–78.0)	57.6 (53.9–61.3)	9.2 (7.7–10.8)	3.7 (2.9–4.5)	25.6 (23.1–28.1)
Gay, lesbian, or bisexual	977	12.9 (11.7–14.2)	65.1 (60.4–69.9)	9.1 (6.7–11.4)	3.6 (1.9–5.3)	33.6 (28.0–39.2)
Other or questioning	648	9.3 (8.2–10.3)	71.7 (65.9–77.5)	7.5 (4.0–11.0)	3.1 (1.5–4.8)	33.8 (28.7–39.0)

Abbreviations: CI=Confidence Interval.

*Denominator includes all students who responded to the question, regardless of whether they or their parents were employed prior to the COVID-19 pandemic.

**Other or multi-race, non-Hispanic includes American Indian/Alaska Native, Asian, native Hawaiian/Pacific Islander, and non-Hispanic multiracial.

Table 3. Weighted prevalences of substance use behaviors by sociodemographic characteristics of the study population. Adolescent Behaviors and Experiences (ABES), United States, January–June, 2021.

Characteristics	Current cigarette smoking (95% CI)	Current electronic vapor product use (95% CI)	Current alcohol use (95% CI)	Drank more alcohol during the COVID-19 pandemic (95% CI)	Current marijuana use (95% CI)	Current Prescription Opioid Misuse (95% CI)	Used More Drugs During the COVID-19 Pandemic (95% CI)
All	3.3 (2.3–4.3)	15.4 (12.9–17.9)	19.5 (16.7–22.2)	14.7 (12.9–16.4)	12.8 (11.0–14.6)	4.3 (3.5–5.1)	12.1 (10.7–13.6)
Sex							
Female	3.0 (1.9–4.2)	16.8 (13.0–20.5)	22.4 (18.2–26.7)	14.0 (11.5–16.4)	12.7 (10.0–15.3)	5.4 (4.3–6.4)	11.9 (9.8–14.0)
Male	3.6 (2.4–4.7)	13.9 (11.7–16.1)	16.4 (14.2–18.5)	15.4 (13.5–17.3)	12.9 (11.1–14.7)	3.2 (2.1–4.2)	12.4 (10.9–13.9)
Race/ethnicity							
White, non-Hispanic	4.9 (3.4–6.3)	20.3 (17.0–23.7)	23.5 (19.1–28.0)	17.1 (14.4–19.7)	14.0 (11.7–16.3)	4.3 (3.0–5.5)	13.3 (10.9–15.8)
Black, non-Hispanic	0.9 (0.04–1.7)	10.6 (8.2–13.0)	11.0 (8.3–13.6)	9.2 (6.2–12.3)	13.6 (10.1–17.1)	4.1 (2.7–5.6)	14.2 (10.6–17.9)
Other or multi-race, non-Hispanic**	2.7 (0.9–4.5)	12.3 (8.5–16.1)	18.6 (14.9–22.2)	15.4 (13.2–17.6)	13.6 (9.5–17.7)	4.0 (2.6–5.3)	11.4 (8.6–14.2)
Hispanic	1.8 (1.0–2.6)	9.7 (6.9–12.5)	16.5 (12.6–20.4)	12.1 (9.6–14.5)	9.9 (6.9–12.9)	4.6 (3.4–5.8)	9.1 (7.2–11.1)
Grade level							
9th Grade	2.7 (1.4–4.0)	13.3 (9.5–17.0)	12.9 (9.5–16.2)	11.0 (8.3–13.6)	9.4 (6.6–12.3)	5.3 (4.1–6.6)	8.9 (6.9–10.8)
10th Grade	2.5 (1.3–3.6)	12.3 (9.4–15.3)	17.1 (13.7–20.6)	13.8 (11.0–16.7)	10.5 (8.0–12.9)	4.2 (3.0–5.5)	10.6 (8.2–13.0)
11th Grade	3.5 (2.3–4.8)	16.1 (12.8–19.4)	21.7 (17.9–25.4)	15.4 (12.6–18.1)	13.4 (11.1–15.7)	4.0 (2.6–5.4)	13.1 (10.5–15.6)
12th Grade	4.5 (2.1–6.9)	20.4 (17.1–23.6)	27.2 (23.6–30.7)	19.0 (15.7–22.2)	18.4 (15.6–21.2)	3.6 (2.4–4.7)	16.6 (14.2–18.9)
Sexual identity							
Heterosexual	2.9 (2.0–3.7)	14.7 (11.9–17.4)	18.8 (15.4–22.3)	14.1 (11.9–16.3)	12.0 (10.2–13.7)	3.8 (2.9–4.6)	11.2 (9.4–12.9)
Gay, lesbian, or bisexual	6.2 (3.0–9.4)	20.9 (16.4–25.4)	26.4 (21.8–31.1)	18.8 (15.3–22.3)	18.5 (14.4–22.6)	6.8 (4.9–8.8)	18.0 (14.7–21.3)
Other or questioning	3.3 (1.5–5.1)	16.1 (11.7–20.6)	20.1 (14.5–25.8)	12.1 (8.6–15.6)	12.1 (8.8–15.4)	5.4 (3.4–7.5)	11.4 (7.8–15.0)

Abbreviations: CI=Confidence interval.

**Other or multi-race, non-Hispanic includes American Indian/Alaska Native, Asian, Native Hawaiian/Pacific Islander, and non-Hispanic multiracial.

grade level. Heterosexual (9.2%) and LGB (9.1%) students had similar job loss prevalences, although LGB students were less likely to be employed during the pandemic.

The most common substance use behavior among students was current alcohol use (19.5%) and the least common was current cigarette smoking (3.3%) (Table 3). Female students were significantly more likely than male students to report current alcohol use (22.4% vs. 16.4%) and current opioid prescription misuse (5.4% vs. 3.2%). White, non-Hispanic students were significantly more likely to

report current EVP use (20.3%) compared to Black, non-Hispanic (10.6%); other or multi-race, non-Hispanic (12.3%); or Hispanic (9.7%) race and ethnicity groups. The prevalence for most substance use behaviors increased with increasing grade level. Current cigarette smoking and vaping were similar for 9th and 10th graders but were higher among 11th graders and the highest among 12th graders. The major exception to these trends was exception of current prescription opioid misuse, which was most common among 9th-grade students (5.3%) and lowest among 12th

Table 4. Weighted prevalences and adjusted* prevalence ratios (aPRs) of substance use behaviors by student employment status during the COVID-19 pandemic†. Adolescent Behaviors and Experiences (ABES), United States, January–June, 2021.

	Student had no paying job before the pandemic		Student lost job during the pandemic		Student did not lose job during the pandemic	
	Unadjusted (%) (95% CI)	aPR (95% CI)	Unadjusted (%) (95% CI)	aPR (95% CI)	Unadjusted (%) (95% CI)	aPR (95% CI)
Cigarette use/vaping						
Current cigarette smoking	2.1 (1.3–2.8)	<i>0.60 (0.43–0.85)</i>	5.5 (2.7–8.3)	1.03 (0.66–1.59)	4.9 (3.2–6.7)	REF
Current electronic vapor product use	10.9 (8.9–12.8)	<i>0.61 (0.51–0.72)</i>	29.9 (23.3–36.5)	<i>1.43 (1.15–1.76)</i>	19.7 (16.5–22.9)	REF
Alcohol use						
Current alcohol use	14.9 (12.7–17.1)	<i>0.65 (0.56–0.75)</i>	34.6 (28.7–40.6)	<i>1.27 (1.05–1.55)</i>	24.9 (20.9–28.9)	REF
Drank more alcohol during the COVID-19 pandemic	12.0 (10.2–13.7)	<i>0.78 (0.66–0.93)</i>	25.3 (20.8–29.9)	<i>1.43 (1.14–1.80)</i>	16.7 (14.0–19.4)	REF
Other substance use						
Current marijuana use	8.9 (7.4–10.4)	<i>0.62 (0.52–0.75)</i>	25.8 (20.2–31.4)	<i>1.51 (1.20–1.90)</i>	15.6 (13.4–17.8)	REF
Current prescription opioid misuse	3.9 (3.1–4.7)	<i>0.78 (0.57–1.06)</i>	6.6 (4.0–9.1)	1.51 (0.93–2.47)	4.4 (3.5–5.4)	REF
Used more drugs during the COVID-19 pandemic	9.1 (7.8–10.3)	<i>0.70 (0.58–0.85)</i>	24.6 (20.0–29.3)	<i>1.65 (1.30–2.09)</i>	14.3 (12.1–16.5)	REF

Abbreviations: CI=Confidence interval; aPR=Adjusted prevalence ratio; REF=Reference group.

Italicization indicates an aPR that is significant based on CI not containing 1.0.

*Adjusted for sex, race/ethnicity, and grade level.

†Derived from the question, “During the COVID-19 pandemic, did you lose your paying job even for a short amount of time? Answer options were: 1) “I did not have a job before the COVID-19 pandemic started”, 2) “Yes”, 3) “No.”

graders (3.6%), although confidence intervals for all grades overlapped. LGB students reported higher prevalences for each substance use behavior than heterosexual and other or questioning students. For the drug use measures, the prevalences for LGB students were significantly higher than those for heterosexual students.

Student pre-pandemic employment status and job loss during the pandemic were associated with differences in use of most substances except for current cigarette smoking and current opioid misuse (Table 4). Among students who reported job loss during the pandemic, the unadjusted prevalences for all substance use behaviors were higher than among students who did not lose their job during the pandemic and students who had no job prior to the pandemic (Table 4). The prevalences for current EVP use (29.9%), drinking more alcohol during the pandemic (25.3%), current marijuana use (25.8%), and using more drugs during the pandemic were significantly elevated among students who reported job loss compared to students who did not lose their job during the pandemic and students who had no job prior to the pandemic. Similar to the prevalences, the aPRs for students reporting job loss during the pandemic were significantly elevated compared to students who did not lose their job during the pandemic for current EVP use (1.43; 95% CI: 1.15–1.76), current alcohol use (1.27; 95% CI: 1.05–1.55), drinking more alcohol during the pandemic (1.43; 95% CI: 1.14–1.80), current marijuana use (1.51; 95% CI: 1.20–1.90), and using more drugs during the pandemic (1.65; 95% CI: 1.30–2.09). Students who had no paying job reported significantly less substance use than students who did not lose a job during the pandemic except current opioid misuse, with aPRs below 1.0 for almost every substance use behavior.

Parental employment experience was also associated with differences in prevalence of student substance use measures. Students who reported their parent had no job prior to the pandemic had the highest unadjusted prevalences for current cigarette smoking (6.3%), current EVP use (19.1%), drinking more alcohol during the pandemic (21.4%), current

prescription opioid misuse (9.5%), and using more drugs during the pandemic (22.3%) (Table 5). In addition, the aPRs for students whose parents had no job prior to the pandemic were significantly elevated for each of the substance use behaviors except for current alcohol and marijuana use; the highest aPRs were current prescription opioid misuse (2.79; 95% CI: 1.61–4.84) and current cigarette smoking (2.44; 95% CI: 1.22–4.89) in comparison with those students whose parents did not lose a job during the pandemic.

Students who reported their parent lost their job during the pandemic had the highest prevalence for current alcohol use (24%) and current marijuana use (15.5%) (Table 5). The aPRs were significantly elevated for each substance use behavior among students whose parent lost a job compared to those who retained their jobs, with current cigarette smoking (1.63; 95% CI: 1.08–2.46); current EVP use (1.46; 95% CI: 1.23–1.74); current prescription opioid misuse (1.45; 95% CI: 1.06–1.99); and current marijuana use (1.44; 95% CI: 1.24–1.67) having the highest aPRs.

For the parent/student employment dyads, students reporting both parent and student job loss during the pandemic had the highest prevalences for current EVP use (34.2%), current alcohol use (36.2%), and current marijuana use (27.7%) (Table 6). Students who reported they lost their job but their parent did not lose a job had the highest prevalences of drinking more alcohol (26.0%) and using more drugs (26.8%) during the pandemic. Students who had no job prior to the pandemic and whose parent retained their job had the lowest prevalences for every substance use variable.

The aPRs for every substance use variable except current prescription opioid use were significantly elevated for students reporting both they and their parent lost jobs in comparison with the reference group of students who reported both they and their parent retained their jobs (Table 6). For dyads in which both parent and student both lost jobs, the highest aPR was for current EVP use (1.95; 95% CI: 1.49–2.56). For dyads in which the parent lost their job, but the

Table 5. Weighted prevalences and adjusted* prevalence ratios (aPRs) of substance use behaviors by parental employment status during the COVID-19 pandemic†. Adolescent Behaviors and Experiences (ABES), United States, January–June, 2021.

	Parent had no paying job before the pandemic		Parent lost job during the pandemic		Parent did not lose job during the pandemic	
	Unadjusted (%) (95% CI)	aPR (95% CI)	Unadjusted (%) (95% CI)	aPR (95% CI)	Unadjusted (%) (95% CI)	aPR (95% CI)
Cigarette use/vaping						
Current cigarette smoking	6.3 (1.6–11.0)	2.44 (1.22–4.89)	4.1 (2.5–5.7)	1.63 (1.08–2.46)	2.8 (1.8–3.8)	REF
Current electronic vapor product use	19.1 (12.6–25.6)	1.43 (1.01–2.02)	18.8 (14.5–23.0)	1.46 (1.23–1.74)	13.7 (11.5–16.0)	REF
Alcohol use						
Current alcohol use	18.3 (11.2–25.5)	1.04 (0.74–1.48)	24.0 (20.2–27.7)	1.35 (1.20–1.51)	18.1 (15.4–20.8)	REF
Drank more alcohol during the COVID-19 pandemic	21.4 (14.2–28.7)	1.68 (1.23–2.31)	16.9 (14.3–19.5)	1.32 (1.12–1.57)	13.3 (11.4–15.3)	REF
Other substance use						
Current marijuana use	14.2 (8.7–19.8)	1.28 (0.85–1.91)	15.5 (12.5–18.6)	1.44 (1.24–1.67)	11.3 (9.7–12.9)	REF
Current prescription opioid misuse	9.5 (4.6–14.5)	2.79 (1.61–4.84)	5.4 (3.8–7.1)	1.45 (1.06–1.99)	3.6 (2.9–4.2)	REF
Used more drugs during the COVID-19 pandemic	22.3 (14.3–30.3)	2.09 (1.47–2.96)	13.9 (11.2–16.5)	1.35 (1.09–1.68)	10.9 (9.4–12.4)	REF

Abbreviations: CI=Confidence Interval; aPR=Adjusted Prevalence Ratio; REF=Reference Group.

Italization indicates an aPR that is significant based on CI not containing 1.0.

*Adjusted for sex, race/ethnicity, and grade level.

†Derived from the question, “During the COVID-19 pandemic, did a parent or other adult in your home lose their job even for a short amount of time? Answer options were: 1) “My parents and other adults in my home did not have jobs before the COVID-19 pandemic started”; 2) “Yes”; 3) “No.”

Table 6. Weighted prevalences and adjusted* prevalence ratios (aPRs) of substance use behaviors by combined student and parental employment status during the COVID-19 pandemic†. Adolescent Behaviors and Experiences (ABES), United States, January–June, 2021.

	Parent had no job before the pandemic Prevalence (%) (95% CI) aPR (95% CI)	Parent and student lost job during pandemic Prevalence (%) (95% CI) aPR (95% CI)	Parent lost job and student did not lose job during pandemic Prevalence (%) (95% CI) aPR (95% CI)	Parent lost job during pandemic and student had no job before pandemic Prevalence (%) (95% CI) aPR (95% CI)	Parent did not lose job and student lost job during pandemic Prevalence (%) (95% CI) aPR (95% CI)	Parent did not lose job during pandemic and student had no job before pandemic Prevalence (%) (95% CI) aPR (95% CI)	Parent and student did not lose jobs during pandemic Prevalence (%) (95% CI) aPR (95% CI)
Cigarette use/vaping							
Current cigarette smoking	6.3 (1.6–11.0) 1.78 (0.82–3.89)	7.4 (2.3–12.5) 1.87 (1.07–3.28)	8.4 (3.7–13.1) 2.10 (1.15–3.81)	2.2 (1.0–3.4) 0.65 (0.36–1.18)	4.0 (1.4–6.7) 0.89 (0.41–1.93)	1.8 (1.0–2.6) 0.50 (0.31–0.81)	4.1 (2.6–5.6) REF
Current electronic vapor product use	19.1 (12.6–25.6) 1.15 (0.78–1.70)	34.2 (24.4–44.0) 1.95 (1.49–2.56)	27.6 (19.9–35.3) 1.59 (1.21–2.09)	13.1 (9.7–16.5) 0.84 (0.66–1.08)	25.8 (18.2–33.3) 1.28 (0.94–1.73)	9.6 (7.7–11.6) 0.60 (0.48–0.73)	17.8 (14.6–21.1) REF
Alcohol use							
Current alcohol use	18.3 (11.2–25.5) 0.84 (0.56–1.26)	36.2 (26.9–45.5) 1.48 (1.14–1.93)	32.0 (25.6–38.4) 1.34 (1.05–1.71)	19.3 (15.5–23.1) 0.90 (0.74–1.10)	32.3 (24.9–39.8) 1.22 (0.94–1.58)	13.0 (10.9–15.0) 0.61 (0.51–0.73)	23.4 (19.1–27.7) REF
Drank more alcohol during the COVID-19 pandemic	21.4 (14.2–28.7) 1.44 (1.02–2.05)	25.1 (18.8–31.5) 1.54 (1.13–2.09)	18.7 (13.7–23.7) 1.16 (0.84–1.61)	14.6 (11.4–17.8) 1.02 (0.81–1.28)	26.0 (19.4–32.6) 1.51 (1.12–2.04)	9.9 (8.1–11.8) 0.67 (0.54–0.82)	16.2 (13.5–18.8) REF
Other substance use							
Current marijuana use	14.2 (8.7–19.8) 1.08 (0.71–1.64)	27.7 (19.3–36.0) 1.95 (1.45–2.62)	22.5 (16.1–28.9) 1.67 (1.23–2.25)	10.9 (8.4–13.5) 0.89 (0.68–1.15)	24.7 (19.6–29.9) 1.58 (1.16–2.17)	7.9 (6.5–9.2) 0.62 (0.50–0.78)	13.9 (11.7–16.1) REF
Current prescription opioid misuse	9.5 (4.6–14.5) 2.68 (1.40–5.14)	5.7 (2.0–9.4) 1.64 (0.89–3.05)	7.4 (3.8–11.1) 2.13 (1.16–3.92)	4.8 (3.1–6.6) 1.16 (0.76–1.79)	6.4 (3.6–9.3) 1.84 (0.96–3.53)	3.3 (2.4–4.1) 0.85 (0.58–1.25)	3.5 (2.8–4.2) REF
Used more drugs during the COVID-19 pandemic	22.3 (14.3–30.3) 1.82 (1.28–2.60)	22.6 (15.7–29.6) 1.76 (1.27–2.44)	19.2 (12.0–26.4) 1.53 (1.10–2.14)	10.4 (8.4–12.5) 0.91 (0.69–1.21)	26.8 (21.0–32.6) 1.94 (1.43–2.63)	7.4 (5.8–8.9) 0.63 (0.49–0.79)	13.0 (11.1–14.9) REF

Abbreviations: CI=Confidence Interval; aPR=Adjusted Prevalence Ratio; REF=Reference Group.

Italization indicates an aPR that is significant based on CI not containing 1.0.

*Adjusted for sex, race/ethnicity, and grade level.

†Derived from the questions: “During the COVID-19 pandemic, did you lose your paying job even for a short amount of time? Answer options were: 1) “I did not have a job before the COVID-19 pandemic started”; 2) “Yes”; 3) “No” and “During the COVID-19 pandemic, did a parent or other adult in your home lose their job even for a short amount of time? Answer options were: 1) “My parents and other adults in my home did not have jobs before the COVID-19 pandemic started”; 2) “Yes”; 3) “No.”

student retained their job, aPRs for each substance use measure except increased alcohol use during the pandemic were significantly elevated. The highest aPR in these dyads was

for current cigarette smoking (2.10; 95% CI: 1.15–3.81). The lowest levels of substance use were reported by students who had no job prior to the pandemic and whose parent retained

their job; aPRs for each substance use measure were below 1.0 for this group.

Discussion

Both student and parental job loss during the pandemic, as well as parental unemployment prior to the pandemic, were associated with elevated levels of reported substance use. When student and parental employment status were considered together, dyads in which both lost jobs and those in which the parent lost the job and the student retained the job had the highest prevalences for multiple substance use metrics: current cigarette smoking, EVP use, alcohol use, and marijuana use. Substance use was also elevated, although to a lesser extent, among dyads in which the parent was unemployed before the pandemic and those in which the parent retained their job but the student lost their job. While, in general, parental job loss had the larger effect on most substance use measures, student job loss was also associated with increased substance use. Parental and student job loss during the first 18 months of the COVID-19 pandemic both appear to have been risk factors for adolescent substance use.

Current cigarette smoking and EVP use were elevated among those students reporting parental unemployment prior to the pandemic or parental job loss (with or without student job loss) during the pandemic. Stress, anxiety, and other mental health outcomes have been previously associated with increased use or risk of cigarette smoking and EVP use among adolescents (Becker et al., 2021; Kwon et al., 2018; Low et al., 2012). A study of Southern California middle-school students found that the specific stressor of job loss for a household member was a statistically significant risk factor for cigarette smoking (Unger et al., 2004).

Lower socioeconomic status (SES) has also been associated with higher usage rates of e-cigarettes, blunts (cigars filled with marijuana), and cigarettes among high-school students in a previous longitudinal study (Simon et al., 2017). In addition to stress and SES, having at least one parent who smokes has been found to substantially increase the risk that their children will become smokers or EVP users (Han & Son, 2022; Leonardi-Bee et al., 2011; Peterson et al., 2006). Vulnerable adults, including those who were economically disadvantaged or unemployed during the COVID-19 pandemic, were found to increase their cigarettes per day compared to pre-pandemic (Wiley et al., 2023). The elevated cigarette and EVP use observed among students in the current study whose parents were unemployed before or lost jobs during the pandemic may reflect the context of increased parental smoking.

The prevalence and changes in prevalence of drug use varied by substance but was generally lowest among dyads in which the parent and student did not lose jobs during pandemic (including dyads in which the student had no job before the pandemic). The highest prevalence of increased drug use during the COVID-19 pandemic was reported by students who lost a job but whose parent retained their job but was also high among dyads where the parent was unemployed or both student and parent lost jobs. Prevalence of current marijuana was the highest among the last group.

The prevalence of current prescription opioid misuse was the highest among students whose parents were unemployed before the pandemic, followed by dyads in which the parent but not the student lost a job. As with cigarette and EVP use, family SES measures have been examined in conjunction with adolescent drug use. Lower parental education has been linked to increased likelihood of adolescent drug use compared to higher parental education (Bello et al., 2019; Peters et al., 2018). Other U.S. studies have also found that SES based on multiple indicators (parental or family income, parental occupation, parental education) is associated with adolescent substance use, with lower SES associated with increased cannabis consumption (Daniel et al., 2009; Duncan et al., 1997; Jeynes, 2002). Few, if any of these studies, considered employment status or job loss of the parent or the adolescent. Familial conflict as defined by the Family Environment Scale was significantly associated with substance use disorders in a longitudinal study (Skeer et al., 2009). Parental job loss during the COVID-19 pandemic has previously been linked to increased parent-child conflict, particularly in families that are more economically vulnerable (Kalil et al., 2020; Wang et al., 2021; 2024;).

Our study contributes the new finding that student drug use was elevated among students who lost a job while their parent retained their job. This finding may reflect conditions specific to the COVID-19 pandemic and these dyads, such as more unsupervised time alone, while the parent was working due to school closures and student job loss; parental monitoring has been noted as a preventative factor in adolescent substance use in other research (Kuntsche & Kuntsche, 2016; Pelham et al., 2024). Ultimately, there is likely a complex, multi-factorial relationship between adolescent substance use and student job loss, parental unemployment or job loss, SES, time available to parents to supervise children, family economic security, parent-child conflict, and other variables not measured in this dataset. Exploration of emergent and increasing drug use in the context of a longitudinal dataset with more information about these topics, during a less economically chaotic time period, could help elucidate the mechanisms behind our findings.

Current alcohol use and drinking more during the pandemic were associated with both student and parental job loss in our study. These findings are consistent with a recent COVID-19 related longitudinal study of Texas adolescents, which found that family financial instability, including job loss of an immediate family member, was linked to increases in poor mental health symptoms and alcohol use among students (Temple et al., 2022). Among a longitudinal sample of U.S. adults, job loss was associated with increased alcohol consumption, with men and women both reporting significant increases in daily alcohol consumption (Popovici & French, 2013). The same study found that both unemployed men and women reported more binge drinking days and increased odds of being diagnosed with an alcohol abuse or dependence condition (Popovici & French, 2013); similarly, parental unemployment was associated with increased alcohol use during the COVID-19 pandemic (though not current alcohol use) by students in our study.

Limitations

The final response rate for ABES, including both school and student response, was 18.1% (Centers for Disease Control & Prevention, 2023; Rico et al., 2022). Causality and directionality of results cannot be determined because ABES was a cross-sectional survey (Rico et al., 2022). Specifically, whether parents, students, or dyads who experienced job loss had higher prevalences of substance use before that job loss cannot be determined. While the survey elicited the age at initiation of smoking, the timing of initiation or increased use of most substances, as well as the timing of job loss, are unknown. There is potential for nonresponse bias due to the low survey response rate (18.1%) and for social desirability or response bias, given the sensitive nature of the topic. During the study period, there may have been changes to instructional model of school (e.g., shifting from in-person to virtual or vice versa), and this could have affected respondents' answers to certain questions.

Aside from student and parental job loss during the pandemic, the ABES survey did not include any questions related to work or occupational safety and health issues. The survey is missing relevant contextual information about family or household income, student's reason for working, hours worked per week, reason for job loss, student's geographic location, etc., and this is likely to influence the interpretation of some results related to job loss. The survey did not obtain any information related to parental tobacco, EVP, alcohol, or other substance use, and parental substance use is a risk factor for adolescent substance use (Nawi et al., 2021; Rusby et al., 2018). Finally, the forward selection method used in the described analyses may have led to bias, although backward selection yielded similar results.

Conclusions

In this study, parental job loss and unemployment, as well as student job loss, were associated with elevated prevalences of substance use, as well as reported increased use during the COVID-19 pandemic. This finding may indicate that stress among the adolescents who experience job loss leads to an increase in substance use, similar to studies that linked unemployment and job loss in young adults aged 22–33 years to increased substance use (Lee et al., 2015). The findings from the current study are also reflective of the disruptions of the early COVID-19 pandemic, a unique and uncertain time. Adolescents dealt with disruptions to school, minimized peer group social interactions, and changes to family dynamics. Examining parental and student job loss in conjunction with substance use outside the context of a public health emergency could help elucidate the effects of both parental and student employment status and job loss. If findings are similar to those during the COVID-19 pandemic, increasing awareness of school and community health professionals about the effects of job loss could improve the direction of mental health and economic resources to families experiencing these job losses. School-based prevention and intervention programs have been effective at reducing substance use among adolescents (Das et al., 2016) and inclusion of job loss support may

improve this effectiveness. Additional resources may help reduce adolescent substance use.

Disclosure statement

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Data availability statement

The data that support the findings of this study are openly available on the Centers for Disease Control and Prevention's website at <https://www.cdc.gov/healthyyouth/data/abes/data.htm>.

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