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Increases in Risky Drinking During the COVID-19 Pandemic Assessed via Longitudinal Cohort Design: Associations With Racial Tensions, Financial Distress, Psychological Distress and Virus-Related Fears

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Abstract

Background: The COVID-19 pandemic has created disruptions to daily life resulting in wide-spread unemployment and psychological distress. Recent studies have reported high rates of alcohol use during this time; however, longitudinal data remain scarce and factors associated with increases in high-risk drinking observed over time are unknown.
Aims: The current study examined changes in high-risk drinking patterns across four 7-day observation periods, prior to and following a university wide campus closure. Additionally, factors associated with changes in alcohol use patterns were examined including financial distress, psychological distress, impact of racial tensions and virus-related fears.
Method: Students ($N = 1001$) in the Midwestern USA completed repeated assessments between March and June 2020. Each survey included a timeline follow-back measure of alcohol use. Pandemic-related distress spanning several factors was assessed at the final follow-up.
Results: Risky drinking patterns increased significantly over time. Overall, psychological distress and impact of racial tensions were associated with higher rates of risky drinking, whereas COVID-19-related fears were associated with lower rates. However, only financial-related distress was associated with an increase in risky drinking patterns over time.
Conclusions: Increased risky drinking patterns observed in the current study may signal problems that are likely to persist even after the direct impact of the COVID-19 pandemic on daily life ends. Individuals experiencing financial distress may represent a particularly high-risk group. Interventions targeting the cross-section of job loss, financial stress and problematic alcohol use will be important to identify.

INTRODUCTION

The World Health Organization classified COVID-19 as a global pandemic on 11 March 2020 (Organization WH, 2020). Public health efforts to reduce the spread of the virus included closing schools and businesses and enacting social distancing policies as well as stay-at-home orders. The sudden onset of changes to daily

life, fears about the implications of the virus on personal health, employment and general uncertainty about the future led to observed increases in psychological distress (Aylie *et al.*, 2020; Filgueiras and Stults-Kolehmainen, 2020; Smith *et al.*, 2020). These necessary public health measures also included negative consequences such as limiting access to in-person social contact, mental health facilities and physical health facilities as well as impeding individual livelihoods; all of which are essential healthy coping mechanisms during times of increased distress (Helliwell and Putnam, 2004; Penedo and Dahn, 2005; Diener and Ryan, 2009). Thus, the COVID-19 pandemic created an environment in which unhealthy coping mechanisms, such as problematic alcohol use, were likely to increase. Previous reports have linked exposure to catastrophic societal events and natural disasters to increased alcohol use (Morita *et al.*, 2015; Locke *et al.*, 2020). Indeed, many reports have now demonstrated that alcohol use has increased significantly since the beginning of the COVID-19 pandemic (Ahmed *et al.*, 2020; Clay *et al.*, 2020; Dumas *et al.*, 2020; Grigoletto *et al.*, 2020; Kim *et al.*, 2020; Lechner *et al.*, 2020; Neill *et al.*, 2020; Pollard *et al.*, 2020; Stanton *et al.*, 2020; Tran *et al.*, 2020; Vanderbruggen *et al.*, 2020; Wardell *et al.*, 2020).

Several recent studies have reported changes in alcohol use during the COVID-19 pandemic. Generally, studies report an increase in alcohol use documented via cross-sectional design (Ahmed *et al.*, 2020; Clay *et al.*, 2020; Dumas *et al.*, 2020; Kim *et al.*, 2020; Lechner *et al.*, 2020; Neill *et al.*, 2020; Stanton *et al.*, 2020; Tran *et al.*, 2020; Vanderbruggen *et al.*, 2020; Wardell *et al.*, 2020). Three longitudinal studies have reported on alcohol use prior to and during the COVID-19 pandemic. A study examining changes in wastewater reported 'decreased' alcohol consumption after self-isolation measures were enforced in the district (Bade *et al.*, 2020), whereas two other longitudinal studies reported results in-line with 'increases' observed in cross-section. A national cohort study in the USA reported increases in alcohol consumption from assessments completed in April 2019 to April 2020 (Pollard *et al.*, 2020), and a second study reported increased emergency room visits due to alcohol intoxication documented via chart review prior to and during the pandemic (Grigoletto *et al.*, 2020). In addition to examining changes in alcohol use several studies have examined factors associated with those changes including alcohol-related coping motives (Wardell *et al.*, 2020), inhibitory control (Clay *et al.*, 2020), symptoms of anxiety or depression (Dumas *et al.*, 2020; Lechner *et al.*, 2020; Neill *et al.*, 2020; Rodriguez *et al.*, 2020; Stanton *et al.*, 2020; Tran *et al.*, 2020; Wardell *et al.*, 2020), social connectedness (Lechner *et al.*, 2020; Wardell *et al.*, 2020) and loss of job or income (Neill *et al.*, 2020; Vanderbruggen *et al.*, 2020; Wardell *et al.*, 2020), all documented in cross-sectional analysis. While at least two studies demonstrate longitudinally assessed increases in alcohol use following the COVID-19 pandemic, these studies did not examine associations between increased drinking and psychological or behavioral factors (Grigoletto *et al.*, 2020; Pollard *et al.*, 2020).

The current manuscript aimed to expand upon previous studies by examining alcohol use at multiple timepoints in order to examine longitudinal changes in drinking among a sample of college students during the initial months of the COVID-19 pandemic. Furthermore, the current study aimed to examine changes in high-risk drinking patterns that have been linked to increased likelihood of developing an Alcohol Use Disorder (Greenfield *et al.*, 2014; Olsson *et al.*, 2016; Tavolacci *et al.*, 2019). Previous research has shown that considering both maximum drinks per drinking day and total number of drinks per week are important determinants of risk for developing alcohol-related problems (Greenfield *et al.*, 2014), leading institutions such as

the National Institute on Alcohol Abuse and Alcoholism (NIAAA) to recommend against drinking beyond these limits (defined in measurements). Documenting changes in these high-risk drinking patterns may provide valuable information on the resources needed to address problems caused by the pandemic that may persist even after its initial effects on daily life end. Lastly, this study examined the association between changes in risky drinking and several factors attributed specifically to the COVID-19 pandemic as well as the impact of racial tensions during this time. Primary aims included (a) examining changes in risky drinking patterns across four 7-day reporting periods between 3 March 2020 and 2 June 2020 and (b) examining if changes in risky drinking were related to four factors reported at the third follow-up period including (i) COVID-19-related financial loss, (ii) psychological distress caused by COVID-19, (iii) COVID-19-related fears and (iv) racial tensions amid the pandemic. In addition to COVID-19-related factors, we assessed the association between changes in drinking patterns and the impact of racial tension due to increasing concerns regarding racial issues in the USA. At the time of this study, many societal events including several high-profile cases of police violence against Black Americans (Nicole Dungca *et al.*, 2020) led to widespread protests against racial inequity and systemic racism. We hypothesized (a) significant increases in risky drinking across the assessment periods and (b) positive associations between increased risky drinking and (i) COVID-19-related financial loss and (ii) psychological distress caused by COVID-19. Due to the lack of reporting in the literature on alcohol use during the pandemic in relation to the last two factors explored, (iii) virus-related fears and (iv) racial tensions, we did not form a priori hypotheses on the direction of these associations. Lastly, we included two exploratory models examining the relationship between financial loss and changes in risky drinking patterns, and psychological distress and changes in risky drinking patterns as a function of gender, based on previous observations that distress-related alcohol consumption may be more prominent in women (Rodriguez *et al.*, 2020).

METHODS

Participants and procedure

Participants were 1001 students at a large public university in Northeast Ohio who completed three surveys between March and June 2020. Participants were recruited through email to participate in the study that consisted of self-report measures and retrospective timeline follow-back (TLFB) assessment of alcohol use. Participants completed the wave 1 assessment between 26 March and 6 April; wave 2 assessment was completed between 29 April and 10 May and wave 3 assessment was completed between 3 June and 14 June. Wave 1 included a retrospective timeline follow back assessment of alcohol use in the week prior to and the week immediately following university campus closure due the COVID-19 pandemic. Campus closure occurred on 10 March 2020 and included a student ban on entrance to all academic buildings and transition to remote teaching. Waves 2 and 3 assessed alcohol use via retrospective timeline follow back in the week prior to completion at each timepoint, respectively. The initial recruitment email was sent on 26 March 2020 to all students who were currently enrolled in spring semester ($N = 33,280$). A total of 4276 students (response rate = 12.8%) responded to the wave 1 survey, and 3653 completed all outcome items assessed in the current study. Wave 2 and 3 surveys were only sent to those who responded to the wave 1 survey; of those, 1766 students (41.3%) completed the wave 2 survey and 1390 students (32.5%) completed the third survey.

Only students completing all three surveys ($n = 1001$) are included in the current analysis. In order to assess sensitivity to missing data, a series of analyses were conducted for participants completing only wave 1, waves 1 and 2 and waves 1 and 3. Results from these sensitivity analyses were in the same direction and significance level as the main results reported (see Supplementary Tables for results of sensitivity analysis). The final sample was 83.1% females, 84.1% non-Hispanic whites, and the mean age was 25.66 (SD = 8.66) years. Demographics reported by the University registrar at the time of study initiation were 63.4% females, 75.6% non-Hispanic whites; thus, the current sample is skewed in assessing a greater proportion of females and non-white Caucasians. Participants were told their responses would be confidential and that the purpose of the survey was to present a broad picture of student wellness. As an incentive, participants were given the opportunity to enter a drawing to win gift cards ranging from $20 to $100 at each of the three assessment points.

Measures

Alcohol use (completed in waves 1–3) In order to provide insight to changes in drinking patterns that could affect risk level for developing an Alcohol Use Disorder or increase risk of chronic disease, the NIAAA definition for exceeding low-risk drinking was utilized as the primary outcome variable. As defined by NIAAA, for women, low-risk drinking is no more than three standard drinks (SDs) on any single day and no more than seven SDs per week. For men, it is defined as no more than four SDs on any single day and no more than 14 SDs per week (NIAAA, 2017). Two variables were computed for each gender assigned at birth, based on these limits— one for exceeding daily limits and one for exceeding weekly limits. Those variables were collapsed into one binary variable indicating that the participant had exceeded either daily or weekly drinking limits in the given assessment week (0 = not exceeded, 1 = exceeded). Patterns of drinking used to form the primary outcome variable were garnered via the TLFB (Sobell *et al.*, 1996), a well-validated calendar assisted measure. Unfortunately, this classification method does not account for gender identification outside of cisgender. A notation on the need to improve classification methods for risky drinking based on drinking patterns for individuals identifying as non-cisgender or in transition is included in the discussion.

Financial distress due to COVID-19 (completed at wave 3) Three items assessed financial distress specifically related to the COVID-19 pandemic (Conway *et al.*, 2020). Each item (e.g. 'The coronavirus (COVID-19) has impacted me negatively from a financial point of view' and 'I have lost job-related income due to the coronavirus') was rated on a 7-point Likert-type scale ranging from 1 (strongly disagree) to 7 (strongly agree). The total score was calculated by summing three items and showed good reliability in this sample (Cronbach's alpha = 0.818).

Psychological distress due to COVID-19 (completed at wave 3) Three items assessed psychological distress specifically related to the COVID-19 pandemic (Conway *et al.*, 2020). Each item (e.g. 'I have become depressed because of the coronavirus (COVID-19)' and 'The coronavirus outbreak has impacted my psychological health negatively') was rated on a 7-point Likert-type scale ranging from 1 (strongly disagree) to 7 (strongly agree). The total score was calculated by summing the three items and showed good reliability in this sample (Cronbach's alpha = 0.850).

Coronavirus-related fears (completed at wave 3) Three items assessed general and health related fears associated with the COVID-19 pandemic (Conway *et al.*, 2020). Each item (e.g. 'I am stressed around other people because I worry I'll catch the coronavirus (COVID-19)' and 'I am afraid of the coronavirus') was rated on a 7-point Likert-type scale ranging from 1 (strongly disagree) to 7 (strongly agree). The total score was calculated by summing the three items and showed good reliability in this sample (Cronbach's alpha = 0.881).

Impact of racial tensions and distress (completed at wave 3) Two items were created by the authors to assess the impact of current racial tensions amid the pandemic. The assessment period followed soon after the death of George Floyd on 25 May, 2020, which dominated media coverage and prompted protests around the USA. Each item specifically references the death of George Floyd (i.e. 'Current racial tensions related to the death of George Floyd have impacted me negatively' and 'Current racial tensions related to the death of George Floyd have caused a lot of anxiety/stress for me') and was rated on a 7-point Likert-type scale ranging from 1 (strongly disagree) to 7 (strongly agree). The total score was calculated by summing the two items and showed good reliability in this sample (Cronbach's alpha = 0.869).

Analytic strategy

Generalized estimating equations (GEE) were used to examine alcohol consumption reported across the four 7-day assessment periods, with a binomial distribution, logit link and exchangeable working correlation matrix specified. First, the main effect of time (0, 1, 2, 3) on drinking outcome (0 = did not exceed limit, 1 = exceeded limit) was modeled. Next, the main effects of the four independent variables were added to the model. The independent variables were the scales detailed in the measurement section: (a) financial distress, (b) psychological distress, (c) coronavirus-related fears and (d) impact of racial tension. Finally, a model (Table 2) containing the main effects of each independent variable as well as the four two-way interactions between each variable and time was added in order to examine associations between changes in drinking patterns and each variable. Two exploratory models examined the effect of gender on the relationship between psychological and financial distress and risky drinking patterns, with hypotheses formed based on previously published research (Rodriguez *et al.*, 2020). These models included all variables in the final model as well as a three-way interaction between gender, psychological or financial distress (each modeled separately) and time. Covariates were selected a priori based on the extant alcohol use literature and included race: [White (0), Asian (1), Black (2), multiracial (3) or other (4)]; age, gender: [male (0) female (1)]; living environment: [with parent (0), my home/apartment (1), other (2)]. Due to very small cell sizes for two racial groups (American Indian or Alaskan Native and Native Hawaiian), these groups could not be included in inferential analyses. For reporting within the correlation table, race and living environment were recoded into binary variables (race: white = 0, nonwhite = 1; living situation: with parents = 0, my home/apt/other = 1). Risky drinking across weeks was split into two variables (risky drinking in the 7-day observation period prior to the pandemic-related school closure: 0 = did not exceed low-risk limit, 1 = exceeded limits) and a second variable combining the three 7-day observation periods following the closure of the campus (0 = did not exceed at any point during the 3 weeks, 1 = exceeded limits in at least 1 week) for the correlation table.

Table 1. Descriptives and zero-order correlations

Scale	M/N	SD/(%)	1	2	3	4	5	6	7	8	9
			Correlations full sample ($n = 1001$)								
(1) Age	25.8	8.9									
(2) Sex (female)	832	83.2%	−0.073								
(3) Race binary (nonwhite)	158	15.8%	0.036	−0.025							
(4) Living environment (home/apt)	495	49.5%	.451**	−0.063	0.073*						
(5) COVID financial	12.03	5.83	−0.148**	0.090**	0.025	−0.077*					
(6) COVID psychological distress	12.64	5.03	−0.139**	0.171**	−0.034	−0.092**	0.332**				
(7) COVID fear	9.89	5.00	0.041	0.129**	0.036	0.029	0.133**	0.417**			
(8) COVID racial tension	8.41	3.72	−0.064*	0.162**	0.096**	0.005	0.163**	0.394**	0.426**		
(9) Risky drinking prior to closure	85	8.5%	−0.042	−0.016	−0.063*	0.014	−0.020	0.078*	−0.037	0.053	
(10) Risky drinking after closure	233	23.3%	−0.012	0.045	−0.090**	0.059	0.074*	0.076*	−0.015	0.050	0.392**

*Denotes $P < 0.05$,

**Denotes $P < 0.01$.

RESULTS

Bivariate correlations, means and standard deviations for all variables included in analyses are listed in Table 1; descriptive reporting for groups (e.g. race, living situation) contained within collapsed variables in Table 1 follows. In the week prior to campus closure, 8.5% ($n = 85$) participants reported drinking patterns that exceeded low risk drinking guidelines. That percentage was higher (12.6%, $n = 126$) in the week following campus closure and remained higher at each follow-up assessment (11.9%, $n = 119$; and 12.1%, $n = 121$), respectively. The majority of the sample identified as white (84.2%) and also included individuals identifying as Asian (3.0%), Black or African American (3.5%), multiracial (2.9%), Native Hawaiian (0.1%) or a racial group not listed (6.3%). A slight majority of the sample reported living at their home or apartment (49.5%), followed by those who were living with their parent(s) or guardian (48.8%) or other living environment (1.6%) following campus closure.

The main effect of time on risky drinking was significant; risky drinking increased following the baseline assessment period [$b = 0.452$, 95% confidence interval (CI) = 0.218, 0.685, $P < 0.001$] and remained at an increased level at each of the follow-up assessments ($b = 0.395$, 95% CI = 0.144, 0.645, $P = 0.002$; $b = 0.404$, 95% CI = 0.165, 0.643, $P = 0.001$) (Supplemental Table 1). Changes in risky drinking after the baseline assessment (between the second, third and fourth 7-day observation periods) were nonsignificant. Significant main effects (examined prior to the final model that included interaction terms) indicated that higher psychological distress associated with COVID-19, and higher impact of racial tensions since the pandemic were associated with increased likelihood of risky drinking overall ($b = 0.039$, 95% CI = 0.003, 0.074, $P = 0.031$) and ($b = 0.049$, 95% CI = 0.004, 0.094, $P = 0.032$), respectively (Supplemental Table 1). Conversely, endorsement of fears related to the COVID-19 virus was associated with less risky drinking overall ($b = −0.047$, 95% CI = −0.079, −0.016, $P = 0.003$). The final model, which included all four two-way interactions between independent variables and time, demonstrated that only financial distress since the COVID-19 pandemic was associated with increased risky drinking over time ($b = 0.020$, 95% CI = 0.006, 0.035, $P = 0.006$) (Table 2). Exploratory analyses examining differences in gender in terms of the association between financial distress, psychological distress and changes in risky drinking did not reveal significant effects (b = −0.010, 95% CI = −0.042, 0.022, $P = 0.556$) and ($b = −0.013$, 95% CI = −0.022, 0.047, $P = 0.472$), respectively.

DISCUSSION

In this longitudinal study of alcohol consumption assessed at four time points from 4 March 2020 through 2 June 2020, we observed a significant increase in risky drinking patterns. Risky drinking increased in the week following campus closure and remained significantly elevated in the two follow-up assessment periods. Additionally, we observed several factors to be associated with risky drinking overall, including psychological distress, fears related to COVID-19 and impact of racial tensions. However, only loss of income or employment-related distress due to the pandemic was associated with an increase in risky drinking across the four reporting periods.

The current results align with some but not all findings reported in previous studies examining factors related to alcohol use during the COVID-19 pandemic. Specifically, several studies reported associations between alcohol use during the pandemic and depressive symptoms or broader indices of psychological distress (Dumas *et al.*, 2020; Lechner *et al.*, 2020; Neill *et al.*, 2020; Rodriguez *et al.*, 2020; Stanton *et al.*, 2020; Tran *et al.*, 2020; Wardell *et al.*, 2020). The current study observed an association between psychological distress due to the pandemic and risky drinking overall but did not find an association between changes in risky drinking over time related with this factor. Discrepancies may be due to differences in the assessment of psychological distress, measurement of alcohol use and study design. Specifically, the current study asked questions directly related to changes in depressive symptoms or psychological well-being related to the pandemic, whereas most previous studies have focused on assessing psychological symptoms in general. Additionally, this is the first study, to our knowledge, to examine factors associated with changes in patterns of risky drinking at multiple timepoints during the COVID-19 pandemic, other indices of alcohol use or cross-sectional assessment may produce different results. The general finding of higher levels of risky drinking overall being associated with psychological distress is in line with past literature examining the relationships between these variables (e.g. Bott *et al.*, 2005). Current findings regarding the association between financial or employment-related distress and increased alcohol use are in line with reporting in several previous studies (Neill *et al.*, 2020; Vanderbruggen *et al.*, 2020; Wardell *et al.*, 2020). The current findings expand the literature by demonstrating this association within a longitudinal cohort design and specifically in relation to changes in risky drinking patterns rather than other indices of alcohol use. Additionally, this is the first study, to our knowledge, to document an association between the impact of racial tensions and increased risky drinking overall during

Table 2. GEEs: factors associated with risky drinking across four timepoints

Parameter	b	Std. error	Lower (95%Wald CI)	Upper (95% Wald CI)	P
Intercept	−2.52	0.514	−3.53	−1.51	0.000
Age	−0.008	0.009	−0.027	0.011	0.393
Time (week)	−0.028	0.130	−0.283	0.226	0.827
Gender (female)	0.018	0.211	−0.395	0.432	0.931
Race (referent = white)					
Asian	−0.820	0.540	−1.87	0.230	0.129
Black or African American	−1.83	0.652	−3.11	−0.551	0.005
Multiracial	−0.110	0.418	−0.930	0.709	0.791
Another race	−0.521	0.385	−1.27	0.235	0.177
Living (referent = w/parent or guardian)					
At my home/apt	0.452	0.168	0.123	0.782	0.007
Other	−0.071	0.527	−1.11	0.963	0.893
Financial distress	−0.045	0.023	−0.090	0.001	0.055
Psychological distress	0.084	0.029	0.026	0.143	0.005
COVID-19 fear	−0.064	0.025	−0.114	−0.015	0.011
Racial tension	0.038	0.036	−0.033	0.108	0.298
Financial distress by time	0.020	0.007	0.006	0.035	0.006
Psychological distress by time	−0.016	0.008	−0.034	0.001	0.064
COVID-19 fear by time	0.006	0.008	−0.010	0.022	0.472
Racial tension by time	0.005	0.011	−0.017	0.027	0.651

the COVID-19 pandemic. While we did not observe an association between racial tension and changes in risky drinking patterns over time, this finding should be explored in future studies, particularly given limitations of the current sample. Specifically, the ability to examine associations between racial tension and changes in risky drinking among black participants was significantly limited due to small sample size for the group (3.5%, *n* = 35). In general, black participants were less likely to demonstrate risky drinking patterns as compared with white participants (*b* = −1.88, *P* = 0.006) and reported higher impact of racial tension (mean difference = 3.06, *P* < 0.001) as compared with white participants. This general finding that black participants drank less than their white counterparts aligns with previous research conducted prior to the 2020 pandemic (Zapolski *et al.*, 2014). Future studies designed to examine coping mechanisms associated with racial tension and adequately powered to examine racial group differences will provide highly valuable contributions to the literature.

This study has limitations that are important to consider when interpreting results. The degree that the present findings may generalize to other populations and or events is limited by several factors. Data for the current study were collected from university students, during the COVID-19 pandemic. Different populations as well as events that are different from the COVID-19 pandemic may produce different results. It is important to note that while the analysis included changes in patterns of high-risk drinking previously associated with increased risk for Alcohol Use Disorder, the current results are not capable of providing information on changes in actual risk. Additionally, although the measure of psychological distress used in the current analysis specified distress related to the pandemic, it is also likely tapping into general psychological distress. Disentangling these sources of distress would require assessment of psychological functioning prior to the campus closure, which we do not have for this sample. Moreover, all measurements associated with changes in alcohol use were assessed at the third wave only. Research examining changes in both alcohol use and changes in these measurements over

time would significantly improve the study design. The response rate (12.9%) and high percentage of female Caucasian students limits the generalizability of these results despite covariation for gender and race. It is also important to consider the potential influence of seasonal variation and or secular trends in drinking behavior that are not accounted for within the current study. Future research is needed to continue to track and monitor alcohol use as the pandemic progresses as well as examine the utility of remote technologies to deliver empirically supported strategies for alcohol use reduction (e.g. Riper *et al.*, 2011). As noted, studies that include samples capable of providing adequate power to detect differences between majority and minority groups on several factors examined in the current study will provide crucial contributions to the literature in this area. This study was also limited in that it relied on assessing drinking patterns as assessed by gender assigned at birth. This method only allows for classification of drinking risk for cisgender individuals. Additionally, the main outcome variable was assessed via retrospective timeline follow-back self-report; while this method has been well validated, it is subject to limitations inherent to self-report measures.

In conclusion, the current study presents novel information on changes in risky drinking patterns during the COVID-19 pandemic. Examining changes in drinking associated with increased risk of developing an Alcohol Use Disorder provides valuable information for universities and other public health institutions to use in preparation for addressing long-term consequences of the pandemic. Whereas the current results do not include a clinical assessment of Alcohol Use Disorder, they may provide a more sensitive assessment of changes in drinking that could lead to functional impairments if they are not adequately addressed. Additionally, these findings suggest that individuals experiencing financial distress may represent a particularly high-risk group. Given the current unprecedented levels of unemployment in the USA caused by the pandemic (Allegretto and Liedtke, 2020; Organization IL, 2020), it will be imperative to identify interventions that consider the cross-section of job loss, financial stress and problematic alcohol use.

SUPPLEMENTARY MATERIAL

Supplementary material is available at *Alcohol and Alcoholism* online.

CONFLICT OF INTEREST STATEMENT

None declared.

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