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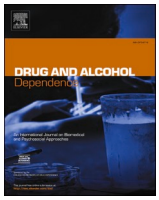

Trajectories of alcohol use and problems during the COVID-19 pandemic: The role of social stressors and drinking motives for men and women

Joan S. Tucker [a,*], Anthony Rodriguez [b], Harold D. Green Jr. [c], Michael S. Pollard [a]

[a] RAND Corporation, 1776 Main Street, PO Box 2138, Santa Monica, CA 90407-2138, USA
[b] RAND Corporation, 20 Park Plaza, Suite 920, Boston, MA 02116, USA
[c] Indiana University School of Public Health-Bloomington, 1025 E. 7th Street, Suite 111, Bloomington, IN 47405 USA

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ABSTRACT

Introduction: Increased alcohol use coinciding with onset of the COVID-19 pandemic, particularly among women, has been documented among U.S. adults. This study examines trajectories of alcohol use and alcohol problems over a 9-month period during the pandemic, the extent to which these trajectories are predicted by social stress and drinking motives, and whether results differ for women and men.

Methods: Data come from three online surveys of a nationally representative sample of U.S. adults ages 30–80 conducted in May-July 2020, October-November 2020, and March 2021. The analytic sample consists of N = 1118 who initially reported any past year alcohol use. The early-COVID survey assessed demographics, social stressors, and drinking motives. All three surveys assessed average drinks per day in past month and drinking-related problems.

Results: Alcohol use declined for men, but remained stable for women. Alcohol problems increased for both sexes, especially for men. Level of alcohol use was associated with loneliness and social demands for men, and drinking motives for both sexes, with changes in use related to loneliness and social demands for men. Level of alcohol problems was associated with loneliness for women and drinking motives for both sexes, with changes in problems related to drinking motives for women. Interactions of social stress with drinking motives were not found.

Conclusions: Sex differences in alcohol use and alcohol problems during the pandemic—as well as their associations with indicators of social stress and drinking motives—highlight the importance of tailoring prevention and treatment efforts for men and women.

1. Introduction

Early in the COVID-19 pandemic, public health experts expressed concern about a potential crisis due to increased alcohol use (e.g., Clay and Parker, 2020), with the World Health Organization (2020) issuing a fact sheet addressing myths about the protective effects of drinking against COVID-19 transmission and warning against excessive alcohol use. In the U.S., alcohol sales increased sharply, with a 55% increase over a one week period during March 2020 (Bremner, 2020). Early survey data also lent support for concern about increased pandemic-related drinking. In a nationally representative sample of U.S. adults ages 30–80 from the RAND American Life Panel (ALP), there was a significant 14% increase overall, and 19% increase among women, in the frequency of past month alcohol use from pre-pandemic (April-June, 2019) to the early months of the pandemic (May-June, 2020) (Pollard et al., 2020). Among women, there was also a significant increase of 39% in alcohol problems (Pollard et al., 2020). While increases in drinking during the early stages of the pandemic have now been documented across several studies (Capasso et al., 2021; Graupensperger et al., 2021), little is known about adults' longer-term trajectories of alcohol use as the pandemic progressed over time. Key questions include whether alcohol use and problems have further increased since the early months of the pandemic, what early-pandemic factors predicted changes in adults' drinking behavior, and whether these patterns differ for men and women.

* Corresponding author.
E-mail address: jtucker@rand.org (J.S. Tucker).

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1.1. Social stressors and alcohol use

The COVID-19 outbreak led to unprecedented changes in the social lives of U.S. adults. Mitigation strategies to reduce the spread of COVID-19 such as social distancing and mandatory stay-at-home orders (Moreland et al., 2020) limited face-to-face interactions with friends, who can be an important source of social support during stressful times. Family relationships also changed during the pandemic, including increased caregiving obligations due to children attending school at home, tending to sick loved ones, and other factors (Beach et al., 2021; Lee et al., 2021). Such caregiving responsibilities fell disproportionately on women (Giurge et al., 2021; Zamarro and Prados, 2021) and were associated with greater symptoms of anxiety and depression (Russell et al., 2020). Intimate relationships were affected during the pandemic as well, with one longitudinal study finding that relationship satisfaction deteriorated during the early stages of the pandemic for adults who were in relationships with more conflict and less positive coping (although satisfaction improved among those in better functioning relationships; Williamson, 2020). It is important to understand the extent to which such social stressors experienced early in the pandemic are associated with adults' trajectories of alcohol use and problems during the pandemic – and whether these associations differ for men and women. This study significantly extends prior work by examining both self-report indicators of social stress (e.g., loneliness, excessive demands from others, dissatisfaction with support), as well as social network indicators of social stress (e.g., network fragmentation, proportion of network members who hassle or create problems for you) during the early phase of the pandemic. Complementing the self-report data with social network data in this context is both innovative and important, given the relevance of social networks to understanding and reducing substance use and related problems (Valente et al., 2004).

1.2. Motivations to drink and alcohol use

Motivational theories of alcohol use propose that people have different reasons for consuming alcohol and these motivations for drinking have important implications for understanding drinking behavior and predicting future alcohol-related problems (Cooper et al., 2016). Past research on both young people and older adults indicates that these motives include coping motives (drinking to attenuate negative emotions, such as to cheer up or forget one's problems) and social motives (drinking to obtain positive social outcomes, such as to be more sociable or enjoy social gathering) (Cooper et al., 2016; Gilson et al., 2013). A recent meta-analysis of 229 studies, the vast majority being cross-sectional, found that both types of motives were positively and significantly associated with drinking frequency, quantity, and problems (Bresin and Mekawi, 2021). Recent work has shown the relevance of drinking motives for alcohol use during COVID-19 pandemic as well. For example, a cross-sectional survey of 1951 college students found that coping motives were associated with higher alcohol consumption in general, but social motives were associated with higher consumption only among lighter drinkers (and associated with lower consumption among heavier drinkers; Bollen et al., 2021).

Drinking motives are sometimes conceptualized as a mediator of associations between stress and alcohol use, and this has been the case for studies conducted during the COVID-19 pandemic. For example, a cross-sectional survey of 833 adult drinkers found that those who perceived lower environmental reward after the implementation of COVID-related social distancing restrictions tended to report heavier alcohol use, an association that was mediated through coping motives for drinking (McPhee et al., 2020). Similarly, a cross-sectional survey of 320 adult drinkers who reported on their experiences during the first month of the COVID-19 emergency response found that lower social connectedness and living with a child under age 18 were associated with increased alcohol use through coping motives (Wardell et al., 2020). However, there is also emerging evidence that drinking motives may moderate the strength of the association between certain types of stress and alcohol use. For example, a study of adults with comorbid PTSD and alcohol disorder found that a positive association between increased PTSD symptom severity and increased alcohol use on the same day was significantly more pronounced among adults with high coping motives (Simpson et al., 2014). To the best of our knowledge, the present study is the first to examine whether associations between social stressors experienced early in the COVID-19 pandemic and adults' trajectories of alcohol use and problems may be stronger or weaker depending upon one's motives for drinking.

1.3. The present study

Building on research indicating an initial increase in the frequency of alcohol use during the early months of the pandemic in a nationally representative sample of U.S. adults (Pollard et al., 2020), the first aim of this study was to examine continuing trends in alcohol use and related problems over a 9-month period during the pandemic among adults who initially reported any past year alcohol use. Second, we examined what early-pandemic factors predicted initial level and changes in adults' alcohol use and problems over time, with a particular focus on indicators of social stress, which included both indicators of perceived social stress and indicators based on personal network data. We expected that individuals reporting greater loneliness, social demands, and dissatisfaction with support - as well as those with more fragmented and higher conflict personal networks - during the early stages of the pandemic would have an initially higher level of, and greater change in, their alcohol use and alcohol problems. Third, we examined whether drinking motives moderated associations between social stress and alcohol trajectories. While we hypothesized that these associations would be stronger for those with higher coping motives, we did not have a priori hypotheses regarding the moderating role of social motives. Given that sex differences have been found in both alcohol use (Pollard et al., 2020) and certain social stresses (Giurge et al., 2021; Zamarro and Prados, 2021) during the pandemic, analyses were stratified by sex in order to explore possible sex differences in these associations.

2. Methods

2.1. Participants and procedures

As part of a larger, ongoing study, a random sample of 2615 adults (ages 30–80) from the RAND ALP (Pollard and Baird, 2017) were invited to participate, with the intention of closing the survey once 1700 surveys were completed. The ALP is a nationally representative Internet panel of over 5000 U.S. adults who were age 18 or older at recruitment into the panel. ALP members are recruited into the panel via probability-based sampling methods, either sampled by random digit dial (landline and cell phone) or address-based sampling, and surveys are completed on the Confirmit platform via logging in to their ALP member portal (participants can only complete a survey one time). The survey included personal and network assessment modules, and was closed after six weeks in the field (April 29-June 9, 2019) with 1771 completions of both modules. Participants were resurveyed three times during the COVID-19 pandemic: May 28-July 13, 2020 (n = 1537); October 13-November 30, 2020 (n = 1470), and March 9–26, 2021 (n = 1335). The analytic sample for the present analyses (N = 1118) excludes individuals who did not complete the first COVID-19 survey (n = 234), those who reported not drinking in the past year on the first COVID-19 survey (n = 331), and those who did not complete one of the two subsequent COVID-19 surveys (n = 81). Participants provided informed consent and were compensated for survey participation. Study materials and procedures were approved by RAND's institutional review board. Sample characteristics can be found in Table 1.

Table 1
Descriptive information on main study variables, total sample and by sex (weighted).

Characteristics at T1	Total (n = 1118) M (SD) or % (n)	Females (weighted n = 582) M (SD) or % (n)	Males (weighted n = 537) M (SD) or % (n)
Female	52.0% (n = 582)	n/a	n/a
Hispanic	18.0% (n = 202)	18.9% (n = 110)	17.1% (n = 92)
Non-Hispanic White	65.0% (n = 727)	64.4% (n = 374)	65.7% (n = 353)
Non-Hispanic Black	11.5% (n = 128)	12.2% (n = 71)	10.7% (n = 57)
Multi-ethnic/other	5.5% (n = 61)	4.5% (n = 26)	6.5% (n = 35)
Cohabitating with partner	65.6% (n = 734)	60.8% (n = 354)	70.9% (n = 380)
Age (years)	53.86 (13.48)	54.02 (13.67)	53.68 (13.27)
Income (in $10,000)	83.99 (56.77)	78.11 (57.56)	90.36 (55.26)
Social stress: self-report (T1)			
Loneliness	4.60 (1.78)	4.76 (1.82)	4.43 (1.71)
Demands	2.27 (0.92)	2.21 (0.96)	2.33 (0.87)
Dissatisfaction with support	8.90 (3.22)	8.83 (3.02)	8.96 (3.42)
Social stress: network (T1)			
Network fragmentation	0.20 (0.30)	0.20 (0.30)	0.20 (0.30)
Network conflict	0.08 (0.15)	0.08 (0.15)	0.07 (0.16)
Drinking motives (T1)			
Coping motives	5.83 (2.59)	5.83 (2.62)	5.84 (2.57)
Social motives	10.57 (3.83)	10.38 (3.75)	10.78 (3.90)
Drinks per day, past month			
T1 (early-COVID)	0.72 (1.13)	0.57 (1.02)	0.88 (1.22)
T2 (mid-COVID)	0.69 (1.21)	0.66 (1.31)	0.73 (1.11)
T3 (late-COVID)	0.66 (1.13)	0.63 (1.20)	0.70 (1.05)
Alcohol problems			
T1 (early-COVID)	0.51 (1.71)	0.41 (1.38)	0.62 (2.00)
T2 (mid-COVID)	0.85 (2.23)	0.64 (1.76)	1.07 (2.61)
T3 (late-COVID)	0.83 (2.17)	0.61 (1.68)	1.05 (2.55)

Note. The weighted percent of participants in our analytic sample who reported past month binge drinking at T1 is 22.6% (males: 26.0%; females: 19.4%).

Table 2
Parameter estimates predicting average number of drinks per day in past month intercept and slope from T1 (early-pandemic) characteristics.

Characteristic at T1	Males (weighted n = 582) Intercept	Slope	Females (weighted n = 537) Intercept	Slope
Age (years)	0.007	0.003	0.005	0.000
Hispanic (vs. White)	-0.081	-0.001	-0.020	-0.012
Black (vs. White)	-0.573*	0.053	0.046	-0.011
Multi-ethnic/other (vs. White)	-0.242	-0.053	-0.010	-0.084
Household income (in $10,000)	0.001	0.001	0.001	-0.001
Cohabitating with partner (vs. not)	-0.440*	0.032	0.038	0.059
Loneliness	-0.178‡	0.058*	0.000	-0.007
Demands	0.225*	-0.100*	0.005	-0.064
Dissatisfaction with support	0.046	-0.015	0.012	0.000
Network fragmentation	-0.513	0.038	-0.089	-0.002
Network conflict	-0.376	0.070	-0.233	0.138
Coping motives for drinking	0.157‡	-0.038	0.083‡	-0.02
Social motives for drinking	0.040*	-0.011	0.042‡	-0.001

Notes. Model fit: $\chi^2 = 39.455$, df = 28, RMSEA = 0.028, CFI = 0.978, SRMR= 0.031. White is the reference group for race/ethnic comparisons. ‡ $p < 0.001$. * $p < 0.05$.

Table 3
Parameter estimates predicting alcohol problems intercept and slope from T1 (early-pandemic) characteristics.

Characteristic at T1	Males (weighted n = 582) Intercept	Slope	Females (weighted n = 537) Intercept	Slope
Age (years)	-0.015	-0.002	-0.009*	0.002
Hispanic (vs. White)	0.274	-0.190	-0.316	-0.058
Black (vs. White)	0.235	0.373	-0.407*	0.051
Multi-ethnic/other (vs. White)	-0.911*	0.520	-0.282	-0.009
Household income (in $10,000)	0.000	0.002	-0.001	0.001
Cohabitating with partner (vs. not)	-0.094	-0.243	-0.123	0.115
Loneliness	-0.015	-0.067	0.125†	0.003
Demands	0.013	0.003	0.076	-0.018
Dissatisfaction with support	0.031	0.013	-0.034	0.008
Network fragmentation	0.772	-0.362	0.040	0.045
Network conflict	-0.646	0.373	0.003	0.163
Coping motives for drinking	0.272*	0.042	0.160‡	-0.010
Social motives for drinking	-0.029	0.024	0.021	0.028*

Notes. Model fit: $\chi^2 = 33.237$, df = 28, RMSEA = 0.019, CFI = 0.991, SRMR= 0.027. White is the reference group for race/ethnic comparisons. ‡ $p < 0.001$. † $p < 0.01$. * $p < 0.05$. # $p < 0.10$.

2.2. Measures

2.2.1. Background covariates

Analyses were stratified by sex (male/female) and controlled for demographic characteristics that may be associated with alcohol use and/or social stress: age, race/ethnicity (Hispanic, non-Hispanic White, non-Hispanic Black, multi-ethnic/other), household income, and cohabitation status (married or cohabitating vs. not).

2.2.2. Alcohol variables

These variables focused on typical alcohol use and problems experienced from alcohol use. Typical alcohol use was assessed as the average number of drinks consumed per day in the past 30 days [(number of drinking days X number of drinks typically consumed on drinking days)/30]. Alcohol problems was assessed with the Short Inventory of Problems (SIP-2 L; Miller et al., 1995), which asks whether 15 adverse consequences of alcohol use were experienced in the past three months (e.g., "I have taken foolish risks when I have been drinking"), with the number of endorsed items summed to create a total score.

2.2.3. Perceived social stress

We used three measures of social stress from the first survey conducted during the pandemic. Loneliness was assessed with the 3-item UCLA Loneliness Scale (Hughes et al., 2004; α = 84). Social demands was assessed with one item (Krause, 1999): "Thinking back over the past 3 months, how often have the people in your life made too many demands on you" (1 =*never* to 4 =*very often*). Satisfaction with support from friends and family was assessed with four items (Stokes, 1983): "How satisfied are you with the assistance you get from your friends [family] in daily activities such as helping you with chores, giving you information, etc." and "How satisfied are you with the emotional support you get from your friends [family] such as feeling cared about, discussing personal problems." Items were rated on a scale from 1 =*very satisfied* to 5 =*very dissatisfied* and summed, such that higher scores indicated greater dissatisfaction with support (α = 0.84). Correlations among these three measures ranged from r = 0.48 to r = 0.74.

2.2.4. Network indicators of social stress

Participants were asked to name up to 10 people ("alters") they interacted most often with in the past six months, were asked a series of questions about each alter, and were also asked whether each unique pair of network members knew and interacted with each other ("ties") (Green et al., 2013). We derived two network indicators of social stress: network fragmentation (i.e., the proportion of the network comprised of

"isolates", defined as alters who did not have ties with anyone else in the network; Tracy et al., 2016) and network conflict (i.e., the proportion of the network comprised of alters "who hassled you, caused you problems, or made life difficult" in the past 3 months; Perry and Pescosolido, 2015).

2.2.5. Drinking motives

We used a 12-item version of the three-dimensional Drinking Motives Questionnaire (DMQ; Cooper et al., 1992) which has been validated in older adults (Gilson et al., 2013). For the purposes of these analyses, we focused on the four items assessing coping motives (to forget worries, because you feel more self-confident, because it helps when depressed/nervous, to cheer up when in a bad mood; $\alpha = 0.86$) and the five items assessing social motives (as a way to celebrate, what friends do when they get together, to be sociable, customary on special occasions, makes social gatherings more enjoyable; $\alpha = 0.87$). Participants were asked to rate how frequently their own drinking is motivated by each of these reasons on a scale from 1 =*almost never/never* to 4 =*almost always/always*.

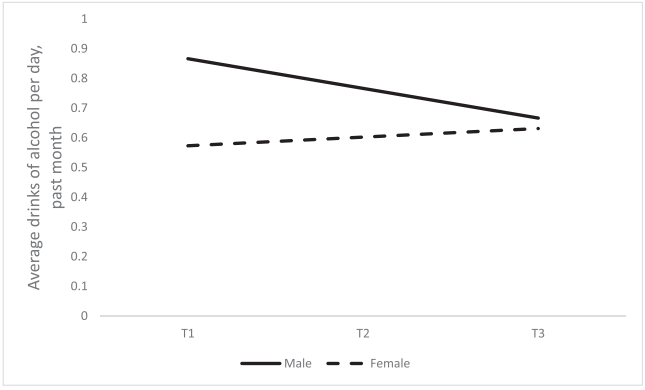
2.3. Analytic plan

To examine trajectories of alcohol use and alcohol problems we estimated separate latent growth models (LGM) for each outcome in a structural equation modeling framework, using Mplus version 8 (Muthén and Muthén, 2017). We used robust full information maximum likelihood which can accommodate missing data, handle non-normality, and provide unbiased and consistent estimates as well as model fit indices. In latent growth modeling, the model intercept represents the predicted value of the outcome (i.e., alcohol use, alcohol problems) when the predictor is equal to zero and thus represents a baseline level. The slope represents the change in level of alcohol use/problems over time. For all alcohol use and problem LGMs, we simultaneously estimated models for males and females separately using a multigroup LGM approach. To determine if intercepts and slopes were statistically different between males and females we tested them using a Wald test. For each of the two outcomes, we then examined social stress and drinking motives as predictors of the intercept and slope. We then tested for interactions between social stress and drinking motives as predictors of the intercept and slope. All models controlled for age, race/ethnicity, income, and cohabitation status and were evaluated using conventional model fit criteria (χ^2, RMSEA $\leq$. 08, CFI $\geq$0.95, SRMR $\leq$.08; Hu and Bentler, 1999). Analyses include survey weights in order to make the demographic distributions of the sample as representative of the U.S. population as possible (Pollard and Baird, 2017).

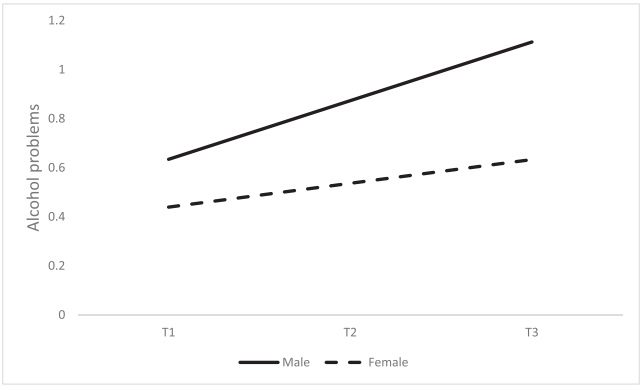
3. Results

3.1. Trajectories of alcohol use and problems

The first two LGMs examined intercept and slope for alcohol use and alcohol problems, each model including separate estimates for males and females. Model fit was excellent for alcohol use (χ^2 =2.42, df=2, RMSEA=0.02, CFI=1.00, SRMR=0.016); and good for alcohol problems (χ^2 =9.27, df = 2, RMSEA=0.08, CFI=0.95). Males reported greater average number of drinks per day (b=0.866, $p < .001$) than females (b=0.573, $p < 0.001$) at baseline ($\chi^2 = 8.28$, df=1, $p = 0.004$). That said, males had a significant decline in alcohol use over the pandemic (b=−0.10, $p = 0.002$) whereas females' alcohol use did not significantly change (b=0.029, $p = .369$) (Fig. 1a). In terms of alcohol problems, both males (b=0.634, $p < 0.001$) and females (b=0.439, $p < 0.001$) reported initial alcohol problems at baseline; however, there was not a significant sex difference (χ^2 =1.24, df=1, p = 0.266). For slope, both men (b=0.239, $p < 0.001$) and women (b=0.097, $p = 0.003$) increased in their reported alcohol problems over time during the pandemic; however, males showed a steeper increase (χ^2 = 4.59, df=1, p = 0.032) (Fig. 1b).



(a)



(b)

Fig. 1. Trajectories of alcohol use and alcohol problems for men and women across early-, mid-, and late-pandemic surveys.

3.2. Predictors of alcohol use intercept and slope (Table 2)

3.2.1. Results for men

Less loneliness, greater social demands, and stronger coping and social motives for drinking predicted an initial higher average level of alcohol use for men. Further, more loneliness and lower social demands predicted a less steep decline in alcohol use over time. There were no significant interactions between indicators of social stress and drinking motives in predicting alcohol use for men (results not shown).

3.2.2. Results for women

We did not find statistically significant effects for any of the social stress variables in predicting the average level of alcohol use (intercept) and the change in the level of alcohol use (slope) for women. Women with stronger coping motives and stronger social motives for drinking had initial higher average levels of alcohol use; however, drinking motives did not predict change in women's level of alcohol use over time. Similar to results for men, there were no significant interactions between indicators of social stress and drinking motives in predicting alcohol use for women (results not shown).

3.3. Predictors of alcohol problems intercept and slope (Table 3)

3.3.1. Results for men

Stronger coping motives for drinking predicted an initial higher average level of alcohol problems for men. However, neither indicators of social stress nor drinking motives predicted change in men's level of alcohol problems over time. There were no significant interactions

between indicators of social stress and drinking motives in predicting alcohol problems for men (results not shown).

3.3.2. Results for women

Women with greater loneliness and stronger coping motives for drinking had initial higher average levels of alcohol problems. In terms of changes in drinking problems over time, women with higher social motives for drinking reported increases in their alcohol problems over time. Similar to results for men, there were no significant interactions between indicators of social stress and drinking motives in predicting alcohol problems for women (results not shown).

4. Discussion

4.1. Patterns of alcohol use and problems during the pandemic

Significant increases in alcohol use during the early months of the pandemic have been documented across several studies (e.g., Capasso et al., 2021; Graupensperger et al., 2021), including our prior research which found a particularly pronounced increase in frequency of drinking days and binge drinking days, as well as problems due to alcohol use, among women from pre-pandemic to early-pandemic (Pollard et al., 2020). The present study extends this work by examining trajectories of alcohol use and related problems over a 9-month period during the pandemic, among those who initially reported any past year alcohol use. Overall, men's alcohol use tended to be higher than women's during the pandemic; however, alcohol use decreased steadily for men over the 9-month period, whereas it remained fairly stable for women. By the third assessment during the pandemic, men and women were similar in their average number of drinks per day. The trajectory of alcohol-related problems during the pandemic showed a very different pattern, with both men and women reporting increases in negative consequences from their drinking as the pandemic went on. For men, this finding is particularly striking in that their steady increase in alcohol-related problems during the pandemic was occurring in the context of a steady decline in the amount they were drinking. Together, results from this study point to the importance of examining multiple indicators of alcohol use to understand the full impact of the pandemic on drinking behavior among U.S. adults, as well as a need for more fine-grained analysis to understand the interplay of these drinking indicators. For example, it may be the case that men were cutting back on their alcohol use over time because they were increasingly experiencing negative consequences from drinking. Another interpretation is that men perceived their drinking to be more problematic over time, as their responsibilities within the home (e.g., caregiving) and concerns outside the home (e.g., job security) increased during the pandemic.

4.2. The role of social stressors in alcohol use during the pandemic

We expected that some types of social stressors adults were experiencing early in the pandemic might have an adverse effect on alcohol use and problems during the course of the pandemic. Of the indicators of social stress examined, loneliness emerged as the most relevant to alcohol use during the pandemic. While a recent meta-analysis of longitudinal studies concluded that loneliness did not significantly increase after COVID-19 stay-at-home orders were implemented (Prati and Mancini, 2021), our results suggest that feeling lonely during the pandemic nonetheless was relevant to certain aspects of alcohol use and for certain subgroups. For example, women who were lonelier early in the pandemic reported an initial higher level of alcohol problems, whereas men who were lonelier early in the pandemic reported an initial lower level of alcohol use. While the finding for men was not necessarily expected, it might be the case that men tended to drink with others (if only virtually) early in the pandemic and thus those who felt more isolated or disconnected from others tended to drink less often. However, when examining changes in alcohol use over time, men who were lonelier early in the pandemic showed a less steep decline in their alcohol use over time. These results suggest that loneliness played a different role in influencing alcohol use early in the pandemic compared to over time for men, and may have had an early effect on alcohol--related problems for women. As such, mitigation strategies to address adults' feelings of loneliness early in the pandemic, perhaps based on cognitive behavioral therapy approaches that have been found effective in reducing loneliness (Masi et al., 2011) may have had long-term beneficial effects on adults' drinking behavior during the pandemic.

The only other indicator of social stress relevant to alcohol use in this study was experiencing too many demands from others. As was the case for loneliness, results differed for men and women in the association of social demands with alcohol use. Men who reported greater demands from others early in the pandemic had an initial higher average level of alcohol use, but steeper decreases in their use over time. The decline in men's drinking may be due to the necessity of cutting back in order to continue meeting the demands they faced, or because it got easier to meet these demands over time without using alcohol. In contrast, women's experiences of demands from others early in the pandemic were not associated with their alcohol use or problems. This may be because women generally carry a heavier load than men in terms of childcare and household chores (Parker and Wang, 2013), a pattern that continued during the pandemic (Giurge et al., 2021; Zamarro and Prados, 2021). If women are more accustomed to dealing with demands from others, experiencing excessive social demands early in the pandemic may have had less of an impact on their drinking than it did for men.

4.3. Do drinking motives moderate associations between social stress and alcohol use?

Results from this study indicate that, for both men and women, stronger coping and social motives for drinking early in the pandemic predicted an initial higher average level of alcohol use, whereas only stronger coping motives predicted an initial higher average level of alcohol problems. This is consistent with results from a recent meta-analysis which found that both coping and social motives for drinking were positively associated with drinking; however, drinking for coping reasons was the stronger predictor of drinking problems (Bresin and Mekawi, 2021). Further, for women, higher social motives for drinking early in the pandemic predicted an increase in their alcohol problems over time. These results suggest that efforts to increase adults' awareness of why they are drinking, and encourage healthier alternatives to increase coping or social enhancement, may be useful in curbing alcohol use and problems during the ongoing pandemic (for example, see Wurdak et al., 2016). Some recent studies conducted during the COVID-19 pandemic have shown that drinking motives mediate associations between stressors and alcohol use (Bollen et al., 2021; McPhee et al., 2020; Wardell et al., 2020), although none have examined the potential moderating role of drinking motives. For example, associations of loneliness or excessive social demands with increasing alcohol use may be particularly strong among those who report greater coping motives for drinking. However, we did not find this to be the case. The difference between our results and, for example, the Simpson et al. (2014) study that found evidence of a moderating role of drinking motives may be due to a variety of factors such as historical context (e.g., during COVID-19 pandemic vs. pre-pandemic), type of stressor (e.g., social stress vs. stress from trauma), or sample characteristics (e.g., representative sample of adults vs. adults with comorbid PTSD and alcohol disorder). Nonetheless, our results provide little evidence that associations between social stressors during the pandemic and drinking behavior differ for adults who drink for coping or social enhancement reasons.

4.4. Study limitations and future directions

Results from this study should be interpreted in light of several limitations. For example, it is important to keep in mind that results are based on a sample of 30–80 year olds and thus may not generalize to younger adults. Given that experiences with the pandemic have differed for younger and older adults (Schaeffer and Rainie, 2020), studies focusing on social stress, drinking motives, and alcohol use among young adults are needed. Other limitations include having only three time points for the trajectory models, and thus other types of associations (e.g., quadratic) could not be examined, and there may be seasonality influences on alcohol use that are not accounted for. Further, the surveys did not include explicit checks for random responding; however, time-to-completion checks were conducted to identify possible speeders. Finally, the pandemic has now continued well after our final pandemic assessment occurred and has evolved in important ways (e.g., widespread availability of the vaccine in the US; growing concern about new variants). While this study can shed light on how early-pandemic social stress and drinking motives were associated with alcohol use over a critical 9-month period, continued research that captures subsequent phases of the pandemic, as well as examines changes in social stress and drinking motives, is needed to fully understand their impact on adults' alcohol use and related problems.

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CRediT authorship contribution statement

Joan Tucker: Led the design of the study, Wrote the first draft of the manuscript. **Anthony Rodriguez, Harold Green, Michael Pollard**: Contributed to the design of the study. **Anthony Rodriguez**: Conducted the analyses. All authors contributed to and have approved the final manuscript.

Conflicts of Interest

No conflict declared.

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