

July 2021

Assessing Pandemic-Driven Changes in Alcohol Consumption

Final Report

Prepared for

National Institutes of Health (NIH)

National Institute on Alcohol Abuse and Alcoholism (NIAAA)

Gregory Bloss, Contracting Officer's Representative (COR), gregory.bloss@nih.gov

Jeremy White, Contracting Officer (CO), jeremy.white@nih.gov

Patty Bates, Information Systems Security Officer (ISSO), patty.bates@nih.gov

6700B, Bethesda Off Campus

Rockledge 6700

6700B Rockledge Drive

Bethesda, MD 20817

Prepared by

**Carolina Barbosa, William Dowd, Alan Barnosky,
and Katherine Karriker-Jaffe**

RTI International

3040 E. Cornwallis Road

Research Triangle Park, NC 27709

Contract Number GS-00F-354CA/75N94021F00006

RTI Project Number 0217815

RTI International is a trade name of Research Triangle Institute.
RTI and the RTI logo are U.S. registered trademarks of Research Triangle Institute.



This page intentionally left blank

Contents

Section	Page
Executive Summary	ES-1
1. Introduction	1-1
1.1 Pandemic Impacts on Risk Factors for Excessive Alcohol Use	1-2
1.2 Potential for Differential Impacts on Alcohol Use	1-3
1.3 Current Study.....	1-3
2. Methods	2-1
2.1 Data	2-1
2.2 Measures	2-2
2.2.1 Alcohol Consumption	2-2
2.2.2 Other Alcohol Measures.....	2-2
2.2.3 Mental Health	2-3
2.2.4 Other Survey Measures.....	2-3
2.2.5 Panel Measures.....	2-4
2.3 Sample.....	2-4
2.4 Analysis.....	2-5
3. Results	3-1
3.1 Descriptive Statistics	3-1
3.2 Changes in Drinking Outcomes for the Main Sample	3-7
3.3 Characteristics Associated with Harmful Drinking	3-8
3.4 Differences in Outcome Trajectories by Respondent Groups.....	3-11
3.5 Relationship between Drinks per Month and Mental Health Measures.....	3-19
4. Discussion	4-1
5. Conclusions	5-1
References	R-1
Appendices	
A Survey Instruments: Waves 1 and 2	A-1
B Characteristics of All Wave 2 Respondents	B-1
C Characteristics of Respondent Groups Defined by Drinking to Exceed Recommended Guidelines	C-1
D Adjusted Predicted Values by Group: All Wave 2 Respondents	D-1
E Charts of Alcohol Consumption Outcomes for the Analytic Sample of Respondents Who Reported Drinking in Any Month (“Main Sample”) and for All Wave 2 Respondents	E-1

Figures

Number		Page
2.1	Survey Measures.....	2-2
3.1	Changes in Alcohol Consumption Outcomes: Feb–Nov 2020	3-7
3.2	Changes in Alcohol Consumption Outcomes: Feb–Nov 2020, by Gender	3-15
3.3	Changes in Alcohol Consumption Outcomes: Feb–Nov 2020, by Race/Ethnicity ...	3-16
3.4	Changes in Alcohol Consumption Outcomes: Feb–Nov 2020, by Respondents with or without Children in the Household	3-17
3.5	Average Drinks per Month Consumed, by Gender and Racial/Ethnic Group	3-18
3.6	Average Drinks per Month Consumed, by Gender and Age of Youngest Child	3-19
3.7	Expected Number of Drinks Per Month by Coping Score, by Month	3-21
3.8	Expected Number of Drinks Per Month by Enhancement Score, by Month.....	3-22
3.9	Alcohol Consumption, by Mental Health Status and Drinking to Cope	3-23
3.10	Alcohol Consumption, by Mental Health Status and Drinking for Enhancement Motives	3-23

Tables

Number		Page
2.1	Characteristics Used for Analysis.....	2-6
3.1	Demographic and Baseline Socioeconomic Characteristics	3-1
3.2	Drinking Measures by Month.....	3-2
3.3	Other Measures.....	3-5
3.4	Multinomial Logit Estimates of Membership in Groups Defined by Exceeding Drinking Guidelines	3-9
3.5	Adjusted Predicted Values by Group	3-13
3.6	Contemporaneous Correlations among Drinking Motives and Mental Health Measures	3-20
3.7	Contemporaneous Correlations and Bivariate Regression Coefficients with Respect to Drinks per Month.....	3-20

Executive Summary

A survey sponsored by RTI International conducted in May 2020 showed overall increases in alcohol consumption, with women, people with minor children in the home, and Black Americans disproportionately increasing their drinking in the short term after COVID-19 started. The current NIAAA-sponsored study re-surveyed respondents in the first RTI survey, providing unique longitudinal data to address whether and for whom the early patterns of increased alcohol consumption have been sustained over the longer term. Among respondents drinking alcohol at some point between February and November 2020, we found that increases in alcohol consumption, including excessive consumption, were sustained from April to November 2020, overall and across several groups. Following, are selected findings:

- Compared with February 2020, average monthly consumption in April and November 2020 increased by 36% and 39%, respectively. Corresponding increases for the proportion exceeding drinking guidelines were 27% and 39%, and increases for binge drinking were 26% and 30%.
- Using the estimated 166,052,940 people aged 21 or older nationally who drank in 2019, this translates to an increase from February to November 2020 of 1 billion more drinks per month, with 14.6 million more people exceeding drinking guidelines, and 9 million more people binge drinking in November 2020 compared with February 2020.
- The proportion exceeding drinking guidelines between February and November 2020 increased by 54% for women and by 32% for men, with more women than men exceeding recommended drinking guidelines between April and November 2020.
- The proportion binge drinking between February and November 2020 increased by 42% for women and by 32% for men.
- The largest increases in consumption from February to November were for Black and Hispanic women (173% and 148%, respectively), Black men (173%), men of other races (209%), and women with children younger than age 5 (323%).
- The percentage of respondents with mental health issues who reported drinking to cope increased from 5% in February to 15% in November, and the percentage of those who drank for enhancement increased from 6% in February to 16.5% in November.

These results show the importance of monitoring alcohol consumption, with special attention to minority groups and people who may need extra support during crises, such as women with young children and people with mental health issues. It is also important to implement strategies to mitigate the consequences of increased drinking during the pandemic. Finally, following these survey respondents would permit us to assess their longer-term drinking patterns and the resulting consequences.

This page intentionally left blank

1. Introduction

The COVID-19 pandemic is an evolving global crisis causing medical, psychological, and sociological problems (Pfefferbaum & North, 2020). The physical distancing interventions and economic consequences of the pandemic have exacerbated a host of risk factors for excessive alcohol use and alcohol problems, such as increased stress due to job loss, parenting demands (Patrick et al., 2020), and worsening mental health (Hasin et al., 2007; Kessler et al., 1997; Swendsen & Merikangas, 2000). Indeed, there is evidence of pandemic-related increases in alcohol consumption in the United States (Barbosa et al., 2020a; Pollard et al., 2020), particularly in specific population subgroups (Ahlers-Schmidt et al., 2020; Avery et al., 2020; Biddle et al., 2020; Boehnke et al., 2020; Boschuetz et al., 2020; Chodkiewicz et al., 2020; Dumas et al., 2020; Emerson, 2020; Grossman et al., 2020a; Grossman et al., 2020b; Holingue et al., 2020; Knell et al., 2020; Lechner et al., 2020; Luk et al., 2020; Makhshvili et al., 2020; Neill et al., 2020; Niedzwiedz et al., 2021; Peterson et al., 2020; Rolland et al., 2020; Rossinot et al., 2020; Ryerson, 2020; Sallie et al., 2020; Sanchez et al., 2020; Sharma et al., 2020; Silczuk, 2020; Stanton et al., 2020; Tran et al., 2020a; Tran et al., 2020b; Wardell et al., 2020; Weerakoon et al., 2020). National sales data showed that off-premise alcoholic beverage sales in the United States increased considerably after the stay-at-home orders were implemented and many states started relaxing alcohol restrictions (U.S. Census Bureau, 2020).

Experience with previous outbreaks (Wu et al., 2008), natural disasters (Esterwood & Saeed, 2020; Moise & Ruiz, 2016; North et al., 2011), and terrorist attacks (Boscarino et al., 2006; Welch et al., 2014) shows sustained increases in alcohol consumption, binge drinking, and alcohol problems post-event. The scale and duration of the current pandemic are unmatched by those isolated events. If the COVID-19 pandemic is associated with sustained increases in alcohol consumption over time, it could exacerbate the already substantial physical, psychological, and social consequences of excessive alcohol use (Sacks et al., 2015; Shield et al., 2020). The current study addresses this high-priority concern.

Most studies to date on alcohol consumption during the pandemic are cross-sectional or rely on one data point collected during the pandemic. Longitudinal data collected during the pandemic are crucial to understand lasting changes in alcohol consumption during these unprecedented times. Early in the pandemic, our team conducted a nationally representative cross-sectional online survey of 993 adults aged 21 or older. We found that average drinks per day and excessive drinking (both drinking more than recommended limits and binge drinking) increased significantly by 35% and 24%, respectively, between February (before stay-at-home orders) and April (when stay-at-home orders were in place in many states) (Barbosa et al., 2020b). These differences were found for all sociodemographic subgroups assessed. For this study, we re-surveyed (Wave 2) the same individuals who responded to the previous survey (Wave 1), constructed a longitudinal

dataset, and conducted analyses of both survey waves to examine alcohol consumption and related behaviors at four time points: February and April 2020 as reported in Wave 1, and July and November 2020 as reported in Wave 2.

1.1 Pandemic Impacts on Risk Factors for Excessive Alcohol Use

The COVID-19 pandemic and related policies have exacerbated a host of risk factors for excessive alcohol use. U.S. residents experienced sudden loss of income and employment and an increase in time spent at home alone or with dependents, leading to increased stress (Patrick et al., 2020). Psychosocial distress is well recognized as a risk factor for increased alcohol consumption (Brown et al., 1995; Stanesby et al., 2019) and high-risk drinking patterns that can escalate to alcohol use disorder (AUD) over time (Grzywacz & Almeida, 2008; Sacco et al., 2014). For example, there is evidence of increased alcohol consumption for those who lost a job (Biddle et al., 2020; Killgore et al., 2021; Vanderbruggen et al., 2020) or income (Wardell et al., 2020; Zajacova et al., 2020) during the pandemic.

As the pandemic continues, families are experiencing increased stress due to reductions in childcare and reliance on online educational activities for older children (Patrick et al., 2020). We found that in the early phases of the pandemic, alcohol consumption increased more among respondents with children in the household than among those without children. Among respondents with children in the household, the number reporting binge drinking was 50% higher in April than in February (Barbosa et al., 2020b). It is important to assess whether this finding persists over time, because excessive alcohol use by caregivers is associated with aggression, domestic violence, child abuse, and neglect (Foran & O'Leary, 2008; Kaplan et al., 2017).

The burden of depressive symptoms associated with the pandemic is also high, and disproportionately so for those with lower social resources, lower economic resources, and greater exposure to stressors (e.g., job loss) (Ettman et al., 2020). Under such situations, individuals often increase alcohol intake to cope with emotional stress and chronic uncertainty (Esterwood & Saeed, 2020). Several studies report positive associations between depression (Capasso et al., 2021; Chodkiewicz et al., 2020; Dumas et al., 2020; Knell et al., 2020; Lechner et al., 2020; Luk et al., 2020; Makhshvili et al., 2020; McPhee et al., 2020; Sallie et al., 2020; Sharma et al., 2020; Stanton et al., 2020; Tran et al., 2020a; Tran et al., 2020b; Weerakoon et al., 2020) and anxiety (Avery et al., 2020; Lechner et al., 2020; Makhshvili et al., 2020; Sallie et al., 2020; Sharma et al., 2020; Stanton et al., 2020; Wang et al., 2020) with increases in alcohol consumption in the early phases of the pandemic. Thus, to build on prior research, we assess whether wage or employment loss, children in the household, depression, and anxiety are associated with sustained changes in drinking later in the pandemic period.

1.2 Potential for Differential Impacts on Alcohol Use

The strategies that have been put in place to reduce the public health impact of the virus have had an impact on the psychological well-being of all, especially those most susceptible to the negative effects of decreased social interactions and disruptions to work, school, and leisure activities. In addition to overall increases in alcohol consumption, our first survey showed that women and Black people reported the largest increases in consumption early in the pandemic (Barbosa et al., 2020b). The study by Pollard and colleagues (Pollard et al., 2020) similarly showed a 41% increase in days of heavy drinking for women from April to May 2019 compared with the same period a year later, and other studies have shown disproportionately large increases in alcohol consumption during the pandemic for women (Moise & Ruiz, 2016).

These early findings of differential negative impacts of the pandemic on women and Black people pose concerns, because there is other evidence of gender, race/ethnicity, and socioeconomic disparities in the impacts of excessive alcohol consumption (Witbrodt et al., 2014) and in impacts of economic crises on alcohol use (Jones-Webb et al., 2016). If these groups also have larger and sustained increases in alcohol consumption that are maintained farther into the pandemic (or beyond), alcohol-related disparities will increase. Women are more likely to use alcohol to cope with stress, depression, and anxiety (Peltier et al., 2019). In the past 2 decades, alcohol consumption and alcohol-related emergency department visits, hospitalizations, and deaths have increased markedly among women (White et al., 2020). The pandemic may exacerbate these troubling trends. Further, disproportionate impact of the pandemic on racial and ethnic minorities (Kim et al., 2020), together with larger increases in alcohol consumption, might compound existing disparities in consequences of excessive alcohol consumption (Zemore et al., 2018).

1.3 Current Study

In prior studies, including our own survey (Barbosa et al., 2020b), we have seen overall increases in alcohol consumption, and that women, people with minor children in the home, and Black Americans differentially increased their drinking in the short term after COVID-19 started. However, we do not know whether these patterns of increased alcohol consumption have been sustained over the longer term. Despite initial increases in consumption, some people may have reduced their heavy drinking once the likely length of the pandemic became more apparent. We might expect reductions in drinking later in the pandemic period among drinkers with higher socioeconomic status (SES) (based on theories of social patterning of healthy lifestyles (Cockerham et al., 2016; Gakidou et al., 2017) or among people with younger children as they realize there could be longer-term adverse impacts on their family. By contrast, others (perhaps Black Americans or people with lower SES) might be more likely to persist in heavy drinking given other factors such as stress from ongoing racial injustice and economic contraction. That is, later in the pandemic period, additional

factors beyond social isolation may prompt heavy drinking. We expect that those reporting drinking to cope or mental health problems would be at particularly high risk of sustained heavy drinking as the pandemic and other adverse social and economic conditions persisted. The current NIAAA-funded study re-surveyed respondents to our first RTI-funded survey, providing unique longitudinal data to address whether and for whom the early patterns of increased alcohol consumption have been sustained over the longer term.

2. Methods

2.1 Data

In May 2020, we sampled 993 American adults aged 21 or older from the Ipsos KnowledgePanel, a nationally representative online survey panel comprising more than 55,000 adults. Panel participants were recruited using an address-based sampling methodology (Fahimi & Kulp, 2009) from the U.S. Postal Service's Delivery Sequence File—a database with full coverage of all delivery points in the United States—and were provided with a free computing device and internet service (Ipsos KnowledgePanel, 2021). The Wave 1 survey collected information on alcohol consumption in February and April, depression and anxiety in February and April, history of alcohol-related problems (including receiving advice on reducing drinking and participating in treatment), and employment status in February and April (Barbosa et al., 2020b). In December 2020, for the current study, we conducted a second wave of data collection with respondents to Wave 1. Wave 2 included all Wave 1 questions and additional questions related to alcohol (e.g., motives for drinking), other substance use, pregnancy status, and experience with COVID-19 (i.e., whether the respondent or a loved one had a positive test or was hospitalized for COVID-19 and the impact of the pandemic on daily life) (RAND Corporation, n.d.). Of the original 993 Wave 1 participants, 792 (79.8%) completed the Wave 2 survey. Respondents who completed Wave 2 were offered an incentive valued at \$5 in the form of points redeemable for rewards from Ipsos.

In addition to the survey measures, we obtained de-identified demographic and socioeconomic data gathered by Ipsos as part of existing panel variables. Ipsos collects a broad set of profile variables—including demographic characteristics, SES, health status, and questions on lifestyle and interests—from panel participants and updates the information annually for active panelists. Ipsos provided weights after each wave, which we applied to produce nationally representative estimates. Survey weights are based on benchmarks from the U.S. Census Bureau's American Community Survey and the March Supplement of the Current Population Survey along several dimensions, including demographics (i.e., age, gender, race/ethnicity, and language spoken), location (i.e., census region and urbanicity), and SES (i.e., education, income, home ownership status, and household size). Final weights were produced by adjusting the panel weights for deviations from an equal probability selection method due to differential nonresponse and undercoverage, and outlier weights were trimmed and weights scaled, so they added to the total sample size (Ipsos KnowledgePanel, 2021). **Appendix A** contains the survey instruments for both waves.

2.2 Measures

The surveys collected data on alcohol consumption and included other questions related to alcohol, mental health, other drug use, pregnancy status, employment and school status, and experience with COVID-19. The specific questions are described in **Figure 2.1** and in the remainder of this section.

2.2.1 Alcohol Consumption

The surveys collected data on the quantity and frequency of alcohol consumption at four time points: February and April 2020 (Wave 1) and July and November 2020 (Wave 2). The surveys also asked respondents about the frequency in which they engaged in binge drinking—defined as drinking five or more drinks in a 2-hour period for men and four or more drinks in a 2-hour period for women (National Institute on Alcohol Abuse and Alcoholism (NIAAA), n.d.). We constructed three alcohol consumption outcome measures: (1) drinks per month, calculated as quantity times frequency, with an additional factor to account for maximum quantity and frequency of drinking that amount during the month (an approach used in other national surveys of drinking behavior) (National Institute on Alcohol Abuse and Alcoholism, 2014); (2) drinking in excess of recommended guidelines in a given month, a binary measure that identifies respondents who drank more than 3 drinks per day or more than 7 drinks per week for women and more than 4 drinks per day or more than 14 drinks per week for men; and (3) binge drinking, a binary measure that identifies respondents who engaged in binge drinking at least once during the month.

2.2.2 Other Alcohol Measures

The Wave 1 and 2 surveys included questions about whether the respondent had been advised to cut down drinking or had been offered information about treatment or self-help

Figure 2.1 Survey Measures

Measure	Before		2020			
	Feb	Feb ↔	Apr ↔	Jul ↔	Nov	
Alcohol Consumption						
Frequency						
Usual quantity						
Maximum quantity						
Frequency of maximum quantity						
Binge						
Other Alcohol						
Advised to cut down						
Treatment receipt						
Types consumed						
Locations						
Motives						
Purchases						
Mental Health						
PHQ-2						
GAD-2						
Other Drug Use						
Illicit substances						
Prescription drugs						
Co-use with alcohol						
Pregnancy Status						
Pregnancy status						
Employment and School						
Employment status						
Income changes						
Children attending school remotely						
COVID-19 Experiences						
Own experience						
Loved ones' experience						
Impact on daily life						

Solid cells denote measures collected in Wave 1 (May 2020); horizontal lines denote measures collected in Wave 2 (December 2020).

resources, and whether the respondent had ever engaged in AUD treatment or self-help. The Wave 1 survey asked about whether the respondent had these experiences in the past year, before the past year, or both, and the Wave 2 survey asked if these experiences had occurred since the Wave 1 survey. The purpose of these questions was to identify respondents with a possible history of problem drinking in lieu of a set of formal diagnostic questions, which could not be included due to survey constraints and concerns about response burden. The Wave 2 survey introduced several other measures, including questions about the types of alcohol consumed (beer, wine, spirits, or wine coolers/hard seltzers), the places where alcohol was consumed, and whether the respondent had made purchases of alcohol. These questions asked about February, July, and November.

Wave 2 also included items from the Drinking Motives Questionnaire-Revised (DMQ-R) to identify respondents' reasons for drinking in February, July, and November. The DMQ-R is a self-report measure of the frequency of drinking for 20 different reasons organized into 4 dimensions: enhancement, social, conformity, and coping motives (Cooper, 1994; Kuntsche et al., 2006). Our survey included the 10 items corresponding to the enhancement and coping motives. We scored each dimension by applying a value from 0 (for a response of "almost never/never" drinking for a particular reason) to 4 (for "almost always/always" drinking for a particular reason), then averaging the scores within each dimension. We also used dichotomous indicators of any endorsement of coping motives for drinking and (separately) of enhancement motives for drinking, using scores greater than 0.

2.2.3 Mental Health

Respondent mental health was measured in Wave 1 (February and April) and Wave 2 (November) using the Patient Health Questionnaire-2 (PHQ-2) and the Generalized Anxiety Disorder 2-item (GAD-2) (Delgado et al., 2012; Lowe et al., 2005). These are two-question screeners for depression and anxiety, respectively. Each item on the screener is scored from 0 (the respondent is "not at all" bothered by a particular depression or anxiety symptom) to 3 (the respondent is bothered by a particular symptom "nearly every day"). The scores for the two items on each screener are added, providing an overall score between 0 and 6. On the PHQ-2 and the GAD-2, a score of 3 or higher represents evidence of depression or anxiety, respectively. We defined a broader measure of mental distress to represent respondents who scored positive on the PHQ-2 or the GAD-2 (or both).

2.2.4 Other Survey Measures

The survey captured respondents' employment and school status in February and April (Wave 1) and in November (Wave 2). The Wave 2 survey included several additional measures not included in the Wave 1 survey. First, the Wave 2 survey included a question about the pregnancy status of women of childbearing age (e.g., ages 21–45) in February, April, July, and November. Other questions designed to evaluate the risk of fetal alcohol spectrum disorders by identifying women of childbearing age who could become pregnant

were included in the survey, but these could not be used for analysis due to an error in the skip logic for those questions. The Wave 2 survey also captured nonmedical use of other licit (e.g., prescription painkillers) and illicit (e.g., heroin) substances, including co-use with alcohol, in November. The Wave 2 survey asked respondents whether they had experienced changes in household income from before the pandemic (February) to November, and it captured the number of children overall and by age group in the household who were attending school or daycare less often or not at all in November due to the pandemic.

Finally, the Wave 2 survey asked several questions about respondents' experience with the pandemic. This included personal experience with periods of quarantine, COVID-19 infections, and hospitalizations, as well as similar events (i.e., COVID-19 infections, hospitalizations, and deaths) among the respondents' family or friends. The survey also assessed the pandemic's influence on the respondents' daily life using a six-item set of questions about the extent to which the pandemic prevented respondents from engaging in usual activities, with responses ranging from "not at all" to "totally" (RAND Corporation n.d.). Using an approach similar to that from an earlier study that used a similar set of questions on impacts of disasters (Parks et al., 2017), we created a single binary measure of impact on daily life by counting the number of activities in which respondents reported that the pandemic "very much" or "totally" prevented them from engaging. Respondents who reported that level of interruption for more than half of the activities (i.e., four or more) were defined as having their daily life significantly impacted by the pandemic.

2.2.5 Panel Measures

In addition to the measures specifically captured on the surveys, we obtained additional data collected by Ipsos. We obtained demographic characteristics (i.e., age, gender, race/ethnicity, and household composition), SES variables (i.e., marital status, educational attainment, and income), and respondents' county of residence (Federal Information Processing Standards [FIPS] code).

2.3 Sample

Out of 993 Wave 1 participants, 792 (79.76%) responded to the Wave 2 survey. Two respondents who reported drinking an average of 60 drinks per day in 1 or more months were removed, yielding a sample of 790. We compared the demographic characteristics, SES, and drinks per month reported between those who did (N=790) and did not (N=201) participate in Wave 2 and found that those who did respond were less likely to be female ($p<0.01$), more likely to have higher income ($p<0.01$), and more likely to be married ($p<0.01$). Differences in age, race/ethnicity, educational attainment, having children in the household, and drinks per month in February and April were not statistically significant between those who did and did not respond. To address differences between the two groups, we re-weighted the Wave 2 sample to be representative of the population with

respect to demographic and SES benchmarks from the American Community Survey and the Current Population Survey.

The main analysis sample for this report comprises Wave 2 respondents who reported drinking alcohol in at least one of the 4 months for which consumption was measured across the two waves. Of the 790 Wave 2 respondents, 557 (71%) reported drinking alcohol at least once during the study period. We compared the 557 respondents in our main sample with the 233 respondents who never reported drinking. There was a significant relationship between drinking and race/ethnicity ($p < 0.05$) and pre-pandemic household income ($p < 0.001$); people who reported drinking in at least 1 month were more likely to be White non-Hispanic or Hispanic and to have higher incomes. Differences in gender, age, educational attainment, having children in the household, and being married were not statistically significant between those who reported drinking and those who did not.

2.4 Analysis

First, we computed descriptive statistics composed of survey weighted means and standard deviations for continuous measures and proportions for binary or categorical measures. We present demographic characteristics of the sample and additional measures, including alcohol consumption measures over time, in tabular format (**Tables 3.1–3.3**) and in graphical format for the alcohol consumption measures (**Figure 3.1**). We tested for significant differences between February and all post-pandemic months using weighted t-tests.

Second, we separated our sample into eight groups based on harmful drinking (defined by drinking more than recommended guidelines) before and after the start of the pandemic. The groups were defined by whether the respondent exceeded recommended guidelines in February (yes or no) and by how many months after the start of the pandemic the respondent exceeded drinking guidelines (0, 1, 2, or 3). We produced descriptive statistics by group for key demographic, economic, health, and social characteristics (**Table 2.1**) and pre-pandemic socioeconomic status (i.e., educational attainment, marital status, and income). The descriptive statistics for all eight groups are in **Appendix C**. We used a multinomial logit model (**Table 3.4**) to identify key characteristics (i.e., a subset of characteristics in **Table 2.1**) associated with membership in a collapsed set of four groups: (1) never exceeded guidelines (reference outcome), (2) exceeded guidelines in February (i.e., exceeded before the pandemic; 92% of this group exceeded drinking guidelines at least once after the pandemic started), (3) did not exceed guidelines in February but exceeded guidelines in 1 month only after the pandemic started (i.e., April, July, or November; the “exceed 1 month” group), and (4) did not exceed guidelines in February but exceeded guidelines in 2 or more months after the pandemic started (i.e., the “exceed 2+ months” group).

Table 2.1 Characteristics Used for Analysis

Characteristics	Description
Demographic Characteristics	
Gender	Male, female
Age	Age groups: 21–34, 35–49, 50–64, 65+
Race/ethnicity	Race/ethnicity groups: White non-Hispanic, Black non-Hispanic, other race non-Hispanic, or Hispanic
Economic, Health, or Social Characteristics	
Children in household	At least one child (aged 17 or younger) living in the respondent’s household vs. no children in the household.
Ever unemployed	Reported being unemployed in at least 1 month when it was measured (i.e., February, April, or November) vs. never reported unemployment.
Ever PHQ+ or GAD+	Ever had a positive score (3 or higher) on the PHQ-2 or the GAD-2 in at least 1 month when it was measured (i.e., February, April, or November) vs. no positive mental health score.
Ever drinking to cope	Ever reported drinking for any reason related to coping in any month when it was measured (i.e., February, July, or November) vs. no report of coping motive.
Ever drinking for enhancement	Ever reported drinking for any reason related to enhancement in any month when it was measured (i.e., February, July, or November) vs. no report of enhancement motive.
Income drop Feb to Nov	Reported having lower household income in November compared with February vs. the same or higher income.
Direct health impact of COVID-19	Reported ever being quarantined, infected, and/or hospitalized for COVID-19 vs. none of these experiences.
Indirect health impact of COVID-19	Three levels: reported having a close friend or family member who experienced hospitalization and/or death from COVID-19 vs. having a close friend or family member who experienced quarantine or infection vs. none of these experiences.
Significant impact of COVID-19 on daily life	Reported that the COVID-19 pandemic “very much” or “totally” prevented them from engaging in at least 4 of 6 usual activities

Third, we examined how changes over time in our three main outcome measures—drinks per month, exceeding drinking guidelines, and binge drinking—interacted with the key characteristics in **Table 2.1**. We tested for significant differences between February and all post-pandemic months using weighted t-tests *within* subgroups defined by each characteristic. In addition, we used regression models to assess whether changes in alcohol consumption measures varied *between* complementary subgroups. For each outcome, we defined a sample of respondents who had complete data for the outcome in all 4 months to maintain consistent group composition. The number of respondents in the models ranged from 523 to 539 depending on the outcome and the characteristics included in the model.

The regression models tested for differences between groups in changes in each outcome from our pre-pandemic (February) measurement to our measurement in each subsequent month. Our base model is of the form described in equation 1:

$$y_{it} = \beta_0 + \beta_1 Month_t + \beta_2 Demog_i + \beta_3 [Month_t * Demog_i] + \beta_4 SES_i + \varepsilon_{it} \quad (1)$$

y_{it} is the outcome (e.g., drinks per month) for respondent i in month t (February, April, July, or November), $Month_t$ is a set of indicators for month, $Demog_i$ is a vector of individual demographic characteristics (i.e., age, gender, and race/ethnicity), $Month_t * Demog_i$ represents a vector of interactions between the month indicator and the individual-level demographic characteristics, and SES_i represents a vector of pre-pandemic socioeconomic characteristics (i.e., educational attainment, marital status, and income). The β terms are coefficients to be estimated, and ε_{it} represents an error term clustered at the individual level for estimation. The interactions (β_3) are the coefficients of interest and represent differences in the dependent variable between demographic groups relative to the reference month (February).

To test for different trajectories between groups defined by nondemographic characteristics (see **Table 2.1**), we added to equation 1 an additional characteristic ($Char_i$) and its interaction with time, as shown in equation 2:

$$y_{it} = \beta_0 + \beta_1 Month_t + \beta_2 Demog_i + \beta_3 [Month_t * Demog_i] + \beta_4 SES_i + \beta_5 Char_i + \beta_6 [Month_t * Char_i] + \varepsilon_{it} \quad (2)$$

For our continuous outcome (i.e., drinks per month), we estimated ordinary least squares regression models in the form of equations 1 and 2. For the binary outcomes (i.e., exceeding drinking guidelines and binge drinking), we estimated logit models. Survey weights were applied to all models. Finally, to test for differences in linear trends, we substituted a continuous measure of time coded as 0 for February through 9 for November into equations 1 and 2 for the vector of month indicators described earlier and re-estimated the models.

Using these models, for each of the groups defined by the demographic (e.g., men and women) and other characteristics included in the model, we calculated the predicted value of the outcome in each month with all other covariates held at their mean value, a standard approach often used when presenting model-adjusted values (Williams et al., 2018). For between-group comparisons, we used the regression-adjusted predictions rather than the unadjusted means for each subgroup to control for other differences that may exist between two subgroups (e.g., men and women) so that the values we present isolate differences attributable to a single characteristic. We present these model-adjusted values in tabular format (**Table 3.5**) and for select characteristics in graphical form (**Figures 3.2–3.4**). We also explored consumption for subgroups defined by the intersection of key characteristics in area plots (**Figures 3.5–3.6**).

Fourth, we examined contemporaneous relationships among key continuous measures, including motives (i.e., coping and enhancement scores) and mental health (i.e., PHQ-2 and GAD-2 scores) with drinks per month among respondents reporting alcohol consumption in each month. We computed Pearson correlation coefficients between these measures overall (i.e., pooling all months) and separately by month (**Table 3.6**). We tested the strength of the contemporaneous relationships between drinks per month and each of the motive and mental health measures overall and by month using a linear regression (equation 3) controlling for demographic and pre-pandemic socioeconomic characteristics (**Table 3.7**). Finally, we tested for differences in the relationship between drinks per month and the motive and mental health measures over time using a linear regression of the form described in equation 4.

$$dpm_{it} = \beta_0 + \beta_1 Measure_{it} + \beta_2 Control_i + \varepsilon_{it} \quad (3)$$

$$dpm_{it} = \beta_0 + \beta_1 Month_t + \beta_2 [Month_t * Measure_{it}] + \beta_3 Control_i + \varepsilon_{it} \quad (4)$$

In equations 3 and 4, dpm_{it} is drinks per month for individual i in month t , $Measure_{it}$ is one of the motives or mental health measures, $Control_i$ is a vector of pre-pandemic demographic and socioeconomic controls (i.e., age, gender, race/ethnicity, marital status, educational attainment, and household income), and ε_{it} represents an error term clustered at the individual level. In equation 4, $Month_t$ is a set of indicators for month, and $Month_t * Measure_{it}$ is an interaction between month and one of the motives or mental health measures. In equation 3, β_2 represents the change in drinks per month for a one-point change in the motive or mental health score. In equation 4, β_2 represents the same change associated with a one-point increase in the measure, but there is a different estimated incremental change for each month. Post-estimation tests between the levels of β_2 (i.e., testing whether the February slope—representing the relationship between the motive or mental health measure score and drinks per month in February—is significantly different from the November slope) describe changing contemporaneous relationships from month to month over the course of the pandemic. These month-specific relationships between alcohol consumption and drinking motives are plotted in **Figures 3.7–3.8**. Finally, we examined consumption in groups defined by mental health status and drinking motives in **Figures 3.9–3.10**.

3. Results

3.1 Descriptive Statistics

Table 3.1 presents the demographic and baseline characteristics of the main analysis sample that reported drinking in at least 1 of the survey months (N=557). The typical respondent was female (51.39%), White and non-Hispanic (62.83%), had at least some college education (64.33%), did not have children (73.74%), was married (55.98%), and had an annual income of at least \$50,000 (59.3%). About half of respondents (48.66%) were aged 50 or older.

In **Table 3.2**, we present drinking measures by month. The first panel shows responses across all observations from respondents who reported drinking in any of the survey months, whereas the second panel is limited to those respondents who reported any drinking during the respective month, and the third panel is limited to those who reported purchasing any alcohol during the respective month. Ns vary slightly within each panel because of item-level missing data.

Table 3.1 Demographic and Baseline Socioeconomic Characteristics

Characteristic	Percentage (N=557)
Female	51.39%
Age	
21–34	25.58%
35–49	25.75%
50–64	28.32%
65+	20.34%
Race	
White, non-Hispanic	62.83%
Black, non-Hispanic	9.73%
Other, non-Hispanic	7.88%
Hispanic	19.56%
Education	
No college	35.67%
Some college	29.90%
BA/BS	34.43%
Income	
<\$50,000	40.70%
\$50,000–\$100,000	37.46%
>\$100,000	21.84%
Has children	26.26%
Married	55.98%

Table 3.2 Drinking Measures by Month

Measure	Feb	Apr	Jul	Nov
Main analysis sample that reported drinking in at least 1 of the survey months				
Drank in month				
Yes	77.1%	75.8%	80.2%	87.6%
N	553	554	557	557
Drinks per month				
Mean	16.6	22.5	23.0	22.9
SD	(32.4)	(39.1)	(45.2)	(40.2)
N	549	549	553	553
Exceed drinking guidelines				
Yes	22.7%	28.8%	28.2%	31.5%
N	550	549	553	554
Binge drinking				
Yes	18.2%	22.9%	20.1%	23.6%
N	556	554	548	547
Reported drinking to cope in any month				
Yes		45.6%		
N		557		
Reported drinking for enhancement in any month				
Yes		79.1%		
N		557		
Conditional on any drinking in the respective month				
Drinks per month				
Mean	21.5	29.8	28.7	26.2
SD	(35.6)	(42.4)	(49.0)	(41.7)
N	435	425	457	490
Drinks per drinking day				
Mean	2.5	2.6	2.6	2.6
SD	(1.9)	(2.1)	(2.2)	(2.2)
N	435	425	457	490
Usual frequency (days/month)				
Mean	7.6	10.0	9.1	8.8
SD	(7.8)	(8.8)	(8.7)	(8.7)
N	439	430	461	494

(continued)

Table 3.2 Drinking Measures by Month (continued)

Measure	Feb	Apr	Jul	Nov
Usual quantity				
Mean	2.2	2.4	2.4	2.3
SD	(1.6)	(1.9)	(1.9)	(2.1)
N	436	425	457	491
Maximum drinks on a day				
0–2	54.5%	45.4%	49.8%	49.0%
3–4	25.2%	30.2%	28.6%	29.4%
5–7	13.2%	15.6%	12.6%	14.0%
8+	7.1%	8.7%	9.0%	7.7%
N	436	425	457	491
Exceed drinking guidelines				
Yes	29.5%	38.1%	35.2%	36.0%
N	436	425	457	491
Binge drinking				
Yes	23.7%	30.5%	25.2%	27.0%
N	438	427	452	484
Reported drinking to cope				
Yes	41.9%	n/a	44.4%	42.6%
N	356	n/a	458	482
Reported drinking for enhancement				
Yes	83.9%	n/a	84.0%	83.3%
N	357	n/a	456	487
Most common beverage				
Beer	33.8%	n/a	42.3%	32.4%
Liquor or spirits	22.9%	n/a	21.6%	24.5%
Wine (table wine or fortified wine)	38.2%	n/a	25.0%	35.8%
Wine cooler, hard seltzer, or malt liquor	5.1%	n/a	11.1%	7.3%
N	356	n/a	458	490
Most common venue				
At home (including yard)	70.9%	n/a	81.7%	81.4%
At someone else’s home (including yard)	10.8%	n/a	10.7%	10.5%
At a restaurant	12.6%	n/a	4.6%	5.8%
At a bar	3.1%	n/a	0.6%	1.5%
In a park	0.0%	n/a	0.3%	0.0%

(continued)

Table 3.2 Drinking Measures by Month (continued)

Measure	Feb	Apr	Jul	Nov
Somewhere else	2.6%	n/a	2.1%	0.8%
N	359	n/a	461	491
Conditional on purchasing alcohol in the respective month				
Purchases at a restaurant or bar to drink on the premises				
Yes	66.9%	n/a	38.4%	38.7%
N	290	n/a	360	366
Purchases from a restaurant or bar via delivery or takeout				
Yes	11.3%	n/a	9.7%	9.8%
N	290	n/a	360	366
Purchases inside a store				
Yes	71.5%	n/a	76.0%	69.5%
N	289	n/a	359	366
Purchases via curbside pickup or drive-through from any store				
Yes	5.9%	n/a	9.6%	9.0%
N	290	n/a	359	366
Purchases via delivery from any store or online vendor				
Yes	4.0%	n/a	6.0%	10.8%
N	290	n/a	359	364

n/a = Data were not collected for the measure in a particular month.

The first panel suggests that drinks per month and the proportion exceeding drinking guidelines increased in April and stayed at elevated levels afterward, whereas the proportion of binge drinking increased in April, decreased in July, then increased again in November. Several measures are repeated in the second panel, showing that after limiting to those respondents who reported any drinking in the respective month, a similar trend persists. The second panel also shows that wine and beer were the most common beverages consumed at all time points, although between 22% and 25% of the sample also indicated drinking spirits/liquor most often. Most drinkers reported drinking at home, and the proportion of those who drank at home increased after February. The final panel indicates that most respondents who purchased alcohol did so inside a store across all months and that the proportion of respondents who purchased alcohol at a restaurant or bar decreased after February.

Finally, **Table 3.3** shows additional alcohol and drug measures, as well as impacts of COVID-19. As of November 2021, a small group (9.1% of the full sample) had received advice to cut down on their drinking, and 5.1% had received treatment at some point over their lifetime. For drug use, 16.5% of the full sample reported any nonmedical substance use in November. Most respondents were employed in February (65.1%), but this proportion dropped over the survey period. Most respondents (65.6%) reported that their income had remained the same between February and November, but over 20% said their household income had decreased during this period. Of those with children, 55.1% reported that their children missed school or daycare in November due to COVID-19. Most respondents said they did not directly experience COVID-19 quarantine due to infection or suspected infection, infections, or hospitalizations or did not have a close friend or family member experience them, since the beginning of the pandemic. Descriptive statistics for the full sample of Wave 2 respondents are available in **Appendix B**.

Table 3.3 Other Measures

Measure	Percentage
Lifetime advice to cut down/information offered	
Yes	9.1%
N	552
Advice to cut down/information offered, May–Nov	
Yes	3.9%
N	553
Lifetime treatment	
Yes	5.1%
N	551
Treatment, May–Nov	
Yes	1.0%
N	553
Other nonmedical substance use in Nov	
Yes	16.5%
N	556
Pregnant during study period (among women aged 45 or younger)	
Yes	9.5%
N	92

(continued)

Table 3.3 Other Measures (continued)

Measure	Percentage
Employment, Feb	
Employed	65.1%
Unemployed	4.8%
Out of labor force	30.1%
N	553
Employment, Apr	
Employed	56.8%
Unemployed	8.0%
Out of labor force	35.2%
N	552
Employment, Nov	
Employed	58.6%
Unemployed	6.0%
Out of labor force	35.4%
N	557
Income change	
Yes; my household income was higher	13.1%
Yes; my household income was lower	21.3%
No; my household income was about the same	65.6%
N	554
Any children missing school/daycare in Nov (of those with children)	
Yes	55.1%
N	126
Any children aged 0–1 missing school/daycare in Nov (of those with children)	
Yes	0.0%
N	126
Any children aged 2–5 missing school/daycare in Nov (of those with children)	
Yes	9.4%
N	126
Any children aged 6–11 missing school/daycare in Nov (of those with children)	
Yes	28.1%
N	126
Any children aged 12–17 missing school/daycare in Nov (of those with children)	
Yes	35.4%
N	126

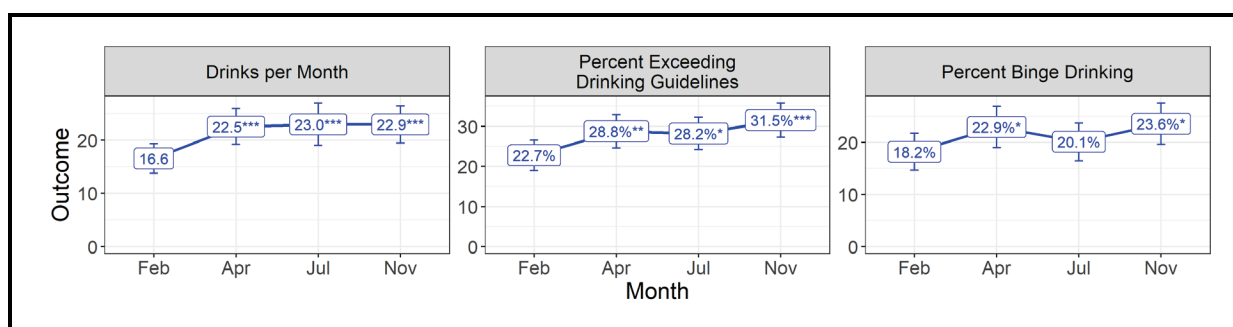
(continued)

Table 3.3 Other Measures (continued)

Measure	Percentage
Direct COVID-19 impact (quarantined due to infection, was infected or hospitalized)	
Yes	14.4%
N	555
Indirect COVID-19 impact (family/friend)	
None	60.3%
Someone close quarantined due to infection and/or was infected	26.1%
Someone close was hospitalized and/or died	13.5%
N	554
Significant impact on daily life due to COVID-19	
Yes	33.4%
N	548

3.2 Changes in Drinking Outcomes for the Main Sample

Figure 3.1 shows the weighted means for the three outcomes at each of the 4 months in which alcohol consumption was measured, for the main analysis sample that reported drinking in at least 1 of the survey months. The overall trajectory is characterized by a sustained increase in alcohol consumption and risky drinking behavior in the pandemic period. As shown in **Figure 3.1**, most of the outcomes are significantly higher in all 3 pandemic months (April, July, and November) relative to February.

Figure 3.1 Changes in Alcohol Consumption Outcomes: Feb–Nov 2020

Asterisks denote significant differences relative to February: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

3.3 Characteristics Associated with Harmful Drinking

Table 3.4 presents the multinomial logistic regression analysis that identifies characteristics associated with membership in the four groups defined by exceeding recommended drinking guidelines. The coefficients are presented as relative risk ratios (RRRs). A value greater than 1 represents a greater risk of a particular outcome relative to the reference outcome (never exceeded drinking guidelines), and a value less than 1 represents a lower risk.

The first comparison is between those who exceeded drinking guidelines in February (92% of those exceeded drinking guidelines at least once after the pandemic started) and those who never exceeded guidelines. Black respondents and non-Hispanic respondents of races other than Black and White (RRRs=0.13 and 0.32, respectively) were at lower risk than White respondents of exceeding drinking guidelines in February relative to those who never exceeded guidelines. Respondents in the middle income category (\$50,000–\$100,000) also were at lower risk than their lowest income counterparts (RRR=0.47) of exceeding drinking guidelines in February relative to those who never exceeded guidelines. On the other hand, having children in the household (RRR=2.09), drinking to cope (RRR=4.00), and drinking for enhancement (RRR=3.11) each was associated with a higher risk of exceeding drinking guidelines in February relative to never exceeding guidelines.

The second comparison is between the “exceed 1 month” group (i.e., those who did not exceed drinking guidelines in February but exceeded drinking guidelines in only 1 month after the onset of the pandemic) and those who never exceeded guidelines. Female respondents were at considerably higher risk than male respondents of being in the “exceed 1 month” group relative to those who never exceeded guidelines (RRR=4.42). Respondents with some college courses (RRR=0.27) or a bachelor’s degree (RRR=0.34) were at lower risk than those with no college to be in the “exceed 1 month” group relative to the never exceeding guidelines group. Drinking to cope was associated with higher risk of being in the “exceed 1 month” group (RRR=3.40).

The final comparison is between those in the “exceed 2+ months” group (i.e., those who did not exceed drinking guidelines in February but exceeded guidelines in 2 or 3 months after the onset of the pandemic) and those who never exceeded guidelines. Being married at baseline was associated with a lower risk of being in the “exceed 2+ months” group than being unmarried relative to never exceeding guidelines (RRR=0.415). Drinking to cope (RRR=2.34) and drinking for enhancement (RRR=22.69) were associated with a higher risk of being in the “exceed 2+ months” group relative to never exceeding guidelines.

Table 3.4 Multinomial Logit Estimates of Membership in Groups Defined by Exceeding Drinking Guidelines

Characteristic	Relative Risk Ratio
Never exceeded guidelines (reference outcome, N=297)	
Exceeded guidelines in February (N=123)	
Female (relative to male)	0.931
Age (relative to 21–34)	
35–49	1.153
50–64	1.349
65+	1.668
Race/ethnicity (relative to White, non-Hispanic)	
Black, non-Hispanic	0.128*
Other race, non-Hispanic	0.319*
Hispanic	0.644
Children in household (relative to no children in household)	2.087*
Baseline educational attainment (relative to no college)	
Some college	1.272
Bachelor’s degree or higher	1.000
Baseline Annual Household Income (relative to less than \$50,000)	
\$50,000–\$100,000	0.472*
\$100,000+	0.87
Married at baseline (relative to not married)	0.712
Ever unemployed (relative to never unemployed)	0.532
Ever positive PHQ-2 or GAD-2 (relative to no positive mental health screen)	1.175
Ever reported drinking to cope (relative to never drinking to cope)	3.996***
Ever reported drinking for enhancement (relative to never drinking for enhancement)	3.114**
Reported income drop from Feb to Nov (relative to no income drop)	1.213
Constant	0.111***
Did not exceed drinking guidelines in February; exceeded in 1 pandemic month (N=47)	
Female (relative to male)	4.419***
Age (relative to 21–34)	
35–49	1.459
50–64	0.919
65+	0.957

(continued)

Table 3.4 Multinomial Logit Estimates of Membership in Groups Defined by Exceeding Drinking Guidelines (continued)

Characteristic	Relative Risk Ratio
Race/ethnicity (relative to White, non-Hispanic)	
Black, non-Hispanic	1.452
Other race, non-Hispanic	1.476
Hispanic	1.233
Children in household (relative to no children in household)	1.314
Baseline educational attainment (relative to no college)	
Some college	0.268**
Bachelor's degree or higher	0.342*
Baseline annual household income (relative to less than \$50,000)	
\$50,000–\$100,000	1.08
\$100,000+	1.348
Married at baseline (relative to not married)	1.025
Ever unemployed (relative to never unemployed)	0.873
Ever positive PHQ-2 or GAD-2 (relative to no positive mental health screen)	0.767
Ever reported drinking to cope (relative to never drinking to cope)	3.396**
Ever reported drinking for enhancement (relative to never drinking for enhancement)	2.254
Reported income drop from Feb to Nov (relative to no income drop)	0.865
Constant	0.029***
Did not exceed drinking guidelines in February; exceeded in 2 or more pandemic months (N=54)	
Female (relative to male)	1.099
Age (relative to 21–34)	
35–49	1.011
50–64	1.108
65+	1.569
Race/ethnicity (relative to White, non-Hispanic)	
Black, non-Hispanic	0.891
Other race, non-Hispanic	0.293
Hispanic	0.676
Children in household (relative to no children in household)	1.734
Baseline educational attainment (relative to no college)	
Some college	1.175
Bachelor's degree or higher	0.728

(continued)

Table 3.4 Multinomial Logit Estimates of Membership in Groups Defined by Exceeding Drinking Guidelines (continued)

Characteristic	Relative Risk Ratio
Baseline annual household income (relative to less than \$50,000)	
\$50,000–\$100,000	0.429
\$100,000+	1.314
Married at baseline (relative to not married)	0.415*
Ever unemployed (relative to never unemployed)	0.814
Ever positive PHQ-2 or GAD-2 (relative to no positive mental health screen)	1.751
Ever reported drinking to cope (relative to never drinking to cope)	2.342*
Ever reported drinking for enhancement (relative to never drinking for enhancement)	22.694**
Reported income drop from Feb to Nov (relative to no income drop)	1.648
Constant	0.009***

Coefficients are presented as relative risk ratios. A value greater than 1 indicates that the characteristic is associated with a greater likelihood of being in each group compared with the reference outcome (never exceeded guidelines) relative to the reference category for that characteristic. N=521 (36 respondents from the main analysis sample with missing data on exceeding drinking guidelines or any of the model covariates were excluded).

Asterisks denote significance of coefficients: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

3.4 Differences in Outcome Trajectories by Respondent Groups

Table 3.5 presents adjusted predictions at the means by group and by month for each of the three outcomes for the main analysis sample, using equations 1 and 2 specified in the Methods section. For example, the first row indicates that the average female respondent drank 12.0 drinks in February and increased to 17.4 in April. The bold text in that cell indicates that the April value (17.4) is significantly different from the February value (12.0, $p < 0.05$). Significant differences between groups in changes in an outcome from February to any other month are indicated by shaded cells. For example, the change in the percentage exceeding drinking guidelines was significantly ($p < 0.05$) different for females (30.0%–20.3%=9.7%) compared with males (26.0%–23.1%=2.9%). Significant differences in trends between groups across all 4 months are denoted using superscripted letters on the row headers. The table representing all respondents is shown in **Appendix D**. **Table 3.5** shows statistically significant higher increases in consumption from February to November 2020 for those with a positive PHQ or GAD score compared with those without a positive screen. There were statistically significant higher increases in alcohol consumption for all post-pandemic months compared with February 2020 for those drinking to cope, and for July and November compared with February 2020 for those drinking for enhancement, compared with those not endorsing drinking motives in those months. There were no differential changes in drinking among respondents who reported pandemic-related reductions in income or other impacts of COVID-19 on loved ones, compared with those

who did not endorse those items; however, there were increases in consumption for those reporting a direct impact of COVID-19 on their health and/or a significant impact of COVID-19 on daily life in November 2020, compared with those who did not endorse those items.

Next, we present graphical representations of the data in **Table 3.5** for select characteristics to highlight groups with notable results. A complete set of figures for both the main sample of respondents who reported drinking at least once and the full set of Wave 2 respondents is available in **Appendix E. Figure 3.2** shows the adjusted predicted values plotted separately for women and men. Adjusted predictions increase after the pandemic for both groups, and the change in outcomes relative to February is not significantly different across groups except for exceeding drinking guidelines from February to April, when women's drinking increased more than men's. Also notable is the change in the proportion of women who exceeded recommended guidelines, which significantly increased ($p < 0.05$) by over 50% from February to November.

Table 3.5 Adjusted Predicted Values by Group

All	Drinks Consumed				Percentage Exceeding Drinking Guidelines				Percentage Binge Drinking			
	Feb	Apr	Jul	Nov	Feb	Apr	Jul	Nov	Feb	Apr	Jul	Nov
Gender												
Female	12.0	17.4^a	16.5	16.8^a	20.3%	30.0%^{a,b}	28.1%^a	31.3%^a	15.3%	22.1%^a	17.4%	21.8%
Male	21.8	27.5^a	28.7^a	29.1^a	23.1%	26.0% ^b	27.1%	30.6%^a	16.7%	19.1%	19.1%	22.1%
Age												
21–34	15.3	18.7	20.2	21.9	21.7%	28.8%	29.0%	34.2%^a	17.9%	23.0%	17.9%	27.2%
35–49	17.6	23.3^a	21.8^a	23.0^a	24.1%	31.2%	30.7%	33.5%	22.7%	28.3%	26.9%	27.0%
50–64	17.0	24.4^a	26.8^{a,b}	22.9^a	21.1%	25.8%	27.3%	26.4%	17.1%	18.9%	22.1%	21.4%
64+	17.1	22.5^a	19.8 ^b	23.3^a	19.3%	26.2%	22.8%	30.2%^a	7.9%	13.3%^a	8.3%	13.2%
Race/ethnicity*												
White, non-Hispanic	19.8	24.3^a	22.2	23.2^{a,b}	26.7%	29.9%	30.7% ^b	31.0% ^b	19.6%	22.7%	21.1%	22.7% ^b
Black, non-Hispanic	8.2	11.4	23.2^a	23.1^{a,b}	6.0%	14.3%^a	25.2%^{a,b}	36.5%^{a,b}	5.1%	9.5%	16.6%^a	29.0%^{a,b}
Other race, non-Hispanic	12.9	21.2^a	35.3	25.3	13.3%	21.1%	19.0%	19.9%	8.3%	11.4%	14.6%	14.0%
Hispanic	12.8	21.6^a	17.6^a	20.0	23.1%	34.0%^a	23.4%	33.2%	18.3%	27.2%	12.8%	20.3%
Children in household												
No	14.7	17.6^{a,b}	17.7^a	17.6 ^b	18.2%	24.2%^a	23.7%^a	27.6%^a	13.6%	17.4%	15.0%	18.9%
Yes	22.4	35.0^{a,b}	35.2^a	36.8^{a,b}	31.4%	38.7%	38.8%	40.2%	23.1%	30.4%	28.3%	31.0%
Ever unemployed												
No	17.7	23.1^a	23.5^a	22.3^a	22.3%	28.2%^a	28.2%^a	29.9%^a	16.2%	20.4%^a	18.6%	21.3%
Yes	9.8	16.8	14.0	27.4^a	17.0%	27.0%	23.4%	36.8%^a	14.4%	21.4%	14.3%	23.9%
Ever PHQ+ or GAD+ ^{†,§}												
No	17.3	22.2^a	20.8^a	19.8 ^b	20.2%	27.3%^a	27.8%^a	26.4%^a	15.5%	20.2%^a	17.5%	17.8%
Yes	15.8	23.1^a	26.6^a	29.7^{a,b}	25.3%	30.3%	27.9%	42.8%^a	18.2%	22.0%	19.8%	32.1%^a

(continued)

Table 3.5 Adjusted Predicted Values by Group (continued)

All	Drinks Consumed				Percentage Exceeding Drinking Guidelines				Percentage Binge Drinking			
	Feb	Apr	Jul	Nov	Feb	Apr	Jul	Nov	Feb	Apr	Jul	Nov
Ever drinking to cope [†]												
No	12.4	15.5^{a,b}	12.0 ^b	12.9	12.7%	18.3%^a	16.7%	18.9%^a	8.5%	12.1%	9.5%	11.0%
Yes	21.9	30.3^{a,b}	34.8^{a,b}	34.3^{a,b}	32.8%	39.8%	41.0%^a	45.6%^a	25.8%	31.6%	29.5%	36.0%^a
Ever drinking for enhancement ^{†,‡,§}												
No	6.9	11.0^a	4.5 ^b	5.9	8.4%	9.9%	5.0% ^b	6.3% ^b	5.6%	8.3%	2.6% ^b	4.0%
Yes	19.3	25.2^a	27.0^{a,b}	27.1^{a,b}	25.2%	32.8%^a	33.7%^{a,b}	37.4%^{a,b}	18.9%	24.1%^a	22.8% ^b	27.0%^a
Income drop in Feb–Nov [§]												
No	16.0	21.1^a	20.1^a	20.1^a	21.0%	26.8%^a	26.3%^a	28.0%^a	15.4%	19.8%^a	16.2%	18.7%
Yes	19.6	26.7^a	31.2^a	32.9^a	24.2%	32.7%	32.7%	42.3%^a	18.1%	23.7%	26.0%	34.6%^a
Direct health impact of COVID-19 [†]												
No	17.6	22.8^a	22.2^a	21.8^{a,b}	21.3%	26.4%^a	26.4%^a	28.6%^a	15.4%	19.6%^a	17.1%	20.1%
Yes	11.5	18.6^a	23.5^a	27.5^{a,b}	24.2%	36.0%	33.8%	43.9%^a	19.7%	27.3%	25.7%	31.9%
Indirect health impact of COVID-19												
No	17.1	22.3^a	19.9	21.5	23.5%	28.7%^a	27.1%	29.6%	17.2%	21.9%^a	17.1%	20.9%
Family/friend quarantined or infected	17.0	22.4^a	26.5^a	26.5^a	19.7%	25.0%	27.7%	30.4%^a	13.8%	17.6%	20.3%	20.4%
Family/friend hospitalized or died	14.7	21.8^a	25.5^a	19.6	17.5%	31.2%^a	30.1%^a	37.0%^a	14.6%	21.0%	20.1%	29.8%^a
Significant impact of COVID-19 on daily life [†]												
No	18.8	22.9^a	23.1	21.9 ^b	22.3%	28.1%^a	30.4%^a	32.4%^a	15.7%	20.0%^a	19.9%	22.0%^a
Yes	12.8	21.5^a	21.0^a	25.3^{a,b}	20.2%	27.6%	22.6%	28.9%	16.2%	21.5%	15.0%	22.3%

Values in the table are adjusted predictions at the means. Regression models used to produce them control for demographic characteristics and baseline socioeconomic status. Bold text (and superscript a) indicates significant ($p < 0.05$) differences *within a row* (e.g., among females) relative to February.

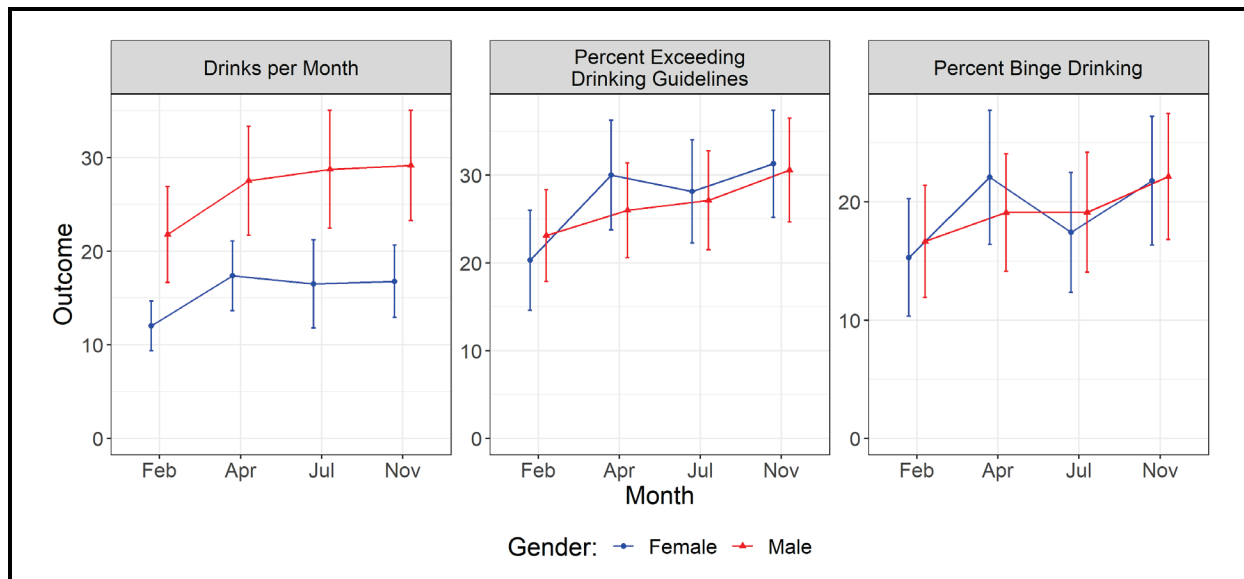
Shaded cells (and superscript b) represent significant ($p < 0.05$) differences between groups (e.g., between females and males) relative to February.

*Several racial/ethnic groups have significantly different changes from February and significantly different linear trends. Shaded cells represent significant differences between White, non-Hispanic and all other groups. See **Figure 3.3** for more details.

[†]Significant differences in linear trend for drinks consumed between groups ($p < 0.05$).

[‡]Significant differences in linear trend for exceeding drinking guidelines between groups ($p < 0.05$).

[§]Significant differences in linear trend for binge drinking between groups ($p < 0.05$).

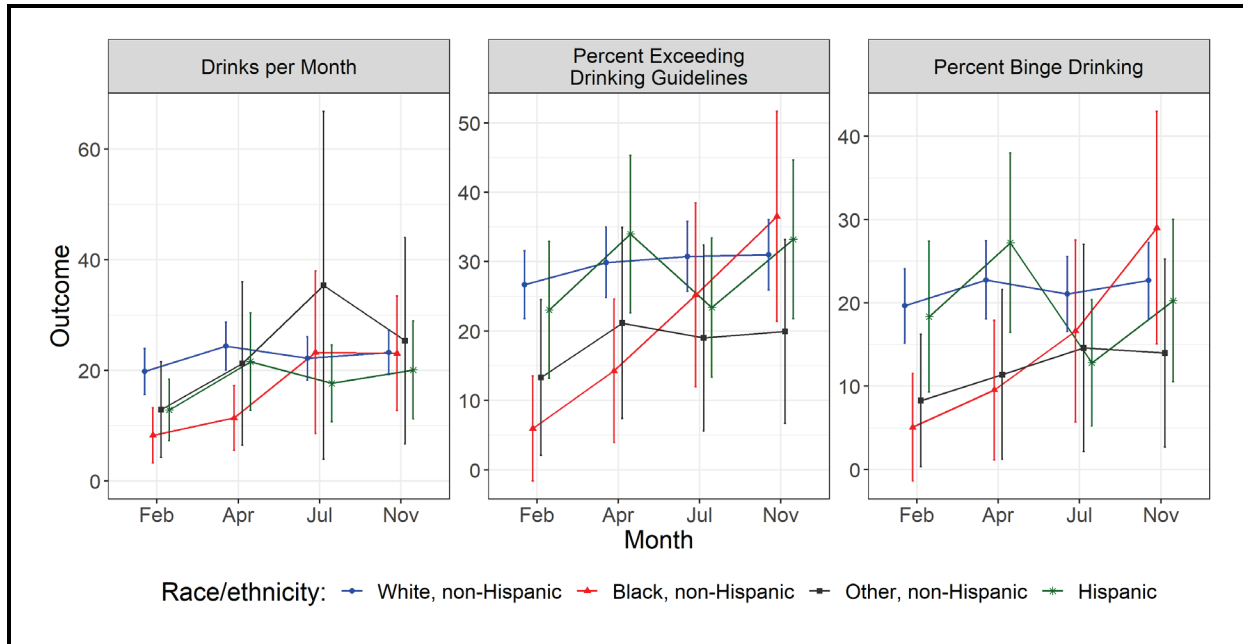
Figure 3.2 Changes in Alcohol Consumption Outcomes: Feb–Nov 2020, by Gender

Adjusted predictions by group. Models control for demographic characteristics and baseline socioeconomic status. The change in exceeding drinking guidelines from February to April is significantly different between groups ($p=0.048$)

Adjusted predicted values by race and ethnicity are shown in **Figure 3.3**. Increases in all outcomes for the Black, non-Hispanic population are notable, particularly for the binary outcomes. The percentage of Black respondents who exceeded drinking guidelines or engaged in binge drinking more than quintupled from February to November. Changes from February to July and November in the binary outcomes are significantly higher for Black respondents compared with White respondents (and from February to November for drinks per month), and linear trends in the binary outcomes are significantly different for Black respondents compared with all other respondent groups.

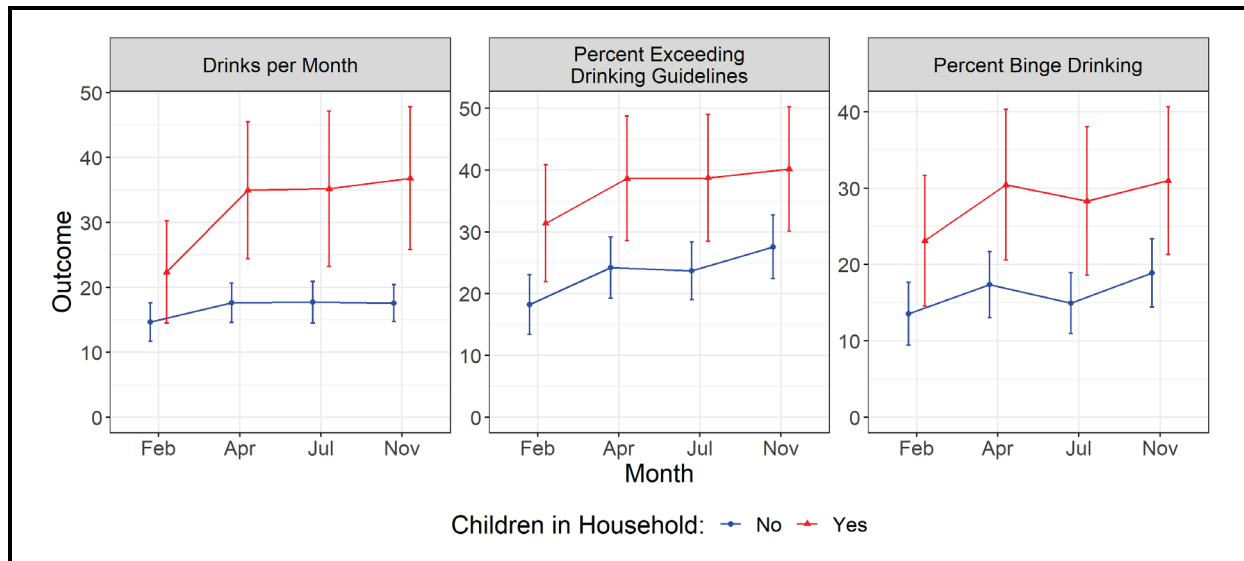
Figure 3.4 presents the adjusted predicted values for those who do and do not have children in the household. Alcohol consumption increased for both groups over time, but number of drinks per month increased significantly more for those with children from February to April and from February to November. Drinks per month among respondents with children in the household increased from 22.4 to 36.8 from February to November, with most of the observed increase happening between February and April (from 22.4 to 35.0 drinks per month).

Figure 3.3 Changes in Alcohol Consumption Outcomes: Feb–Nov 2020, by Race/Ethnicity



Adjusted predictions by group. Models control for demographic characteristics and baseline socioeconomic status. The change in drinks per month from February to November is significantly different between White and Black ($p=0.027$). The trend in drinks per month is significantly different between White and Black ($p=0.015$). The change in exceeding drinking guidelines from February to July is significantly different between White and Black ($p=0.020$) and between Black and Hispanic ($p=0.015$). The change in exceeding drinking guidelines from February to November is significantly different between White and Black ($p=0.003$), between Black and other racial/ethnic groups ($p=0.040$), and between Black and Hispanic ($p=0.021$). The trend in exceeding drinking guidelines is significantly different between White and Black ($p=0.000$), between Black and other racial/ethnic groups ($p=0.017$), and between Black and Hispanic ($p=0.004$). The change in binge drinking from February to July is significantly different between Black and Hispanic ($p=0.014$). The change in binge drinking from February to November is significantly different between White and Black ($p=0.006$) and between Black and Hispanic ($p=0.009$). The trend in binge drinking is significantly different between White and Black ($p=0.001$), between Black and other racial/ethnic groups ($p=0.036$), and between Black and Hispanic ($p=0.001$).

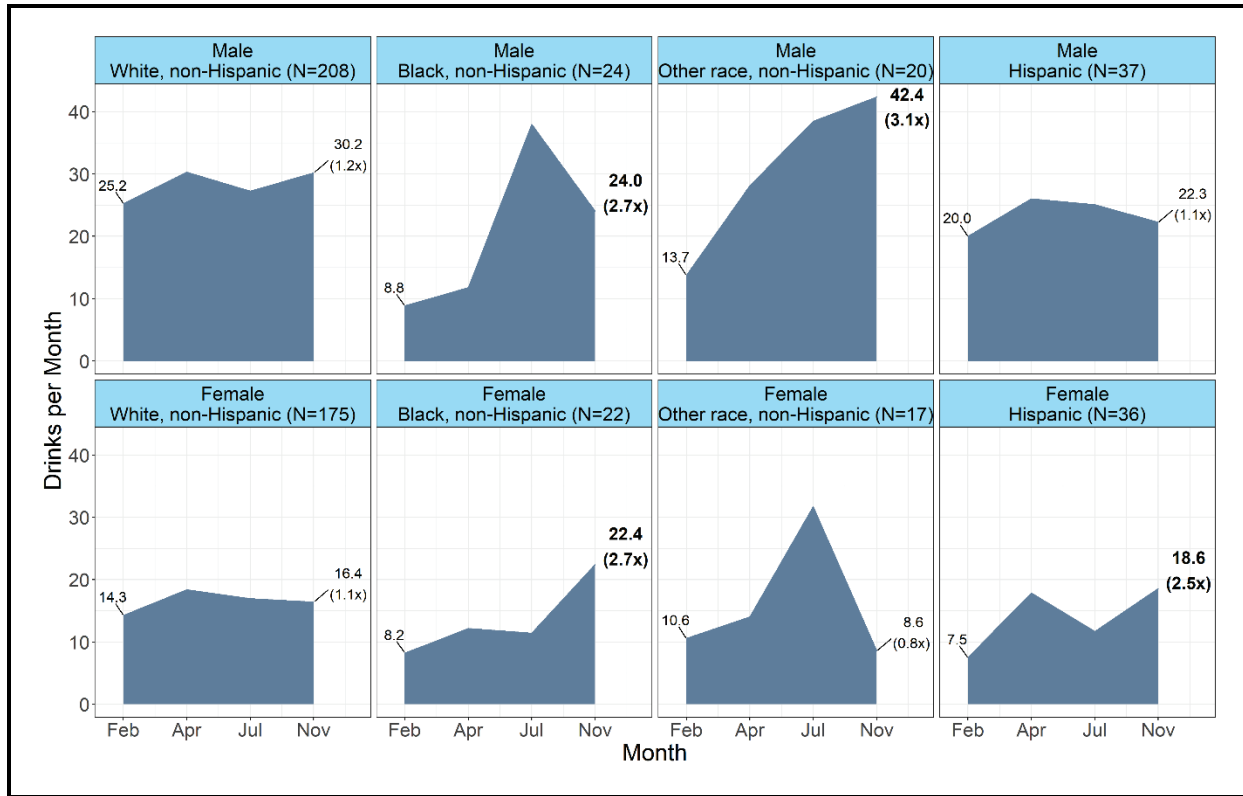
Figure 3.4 Changes in Alcohol Consumption Outcomes: Feb–Nov 2020, by Respondents with or without Children in the Household



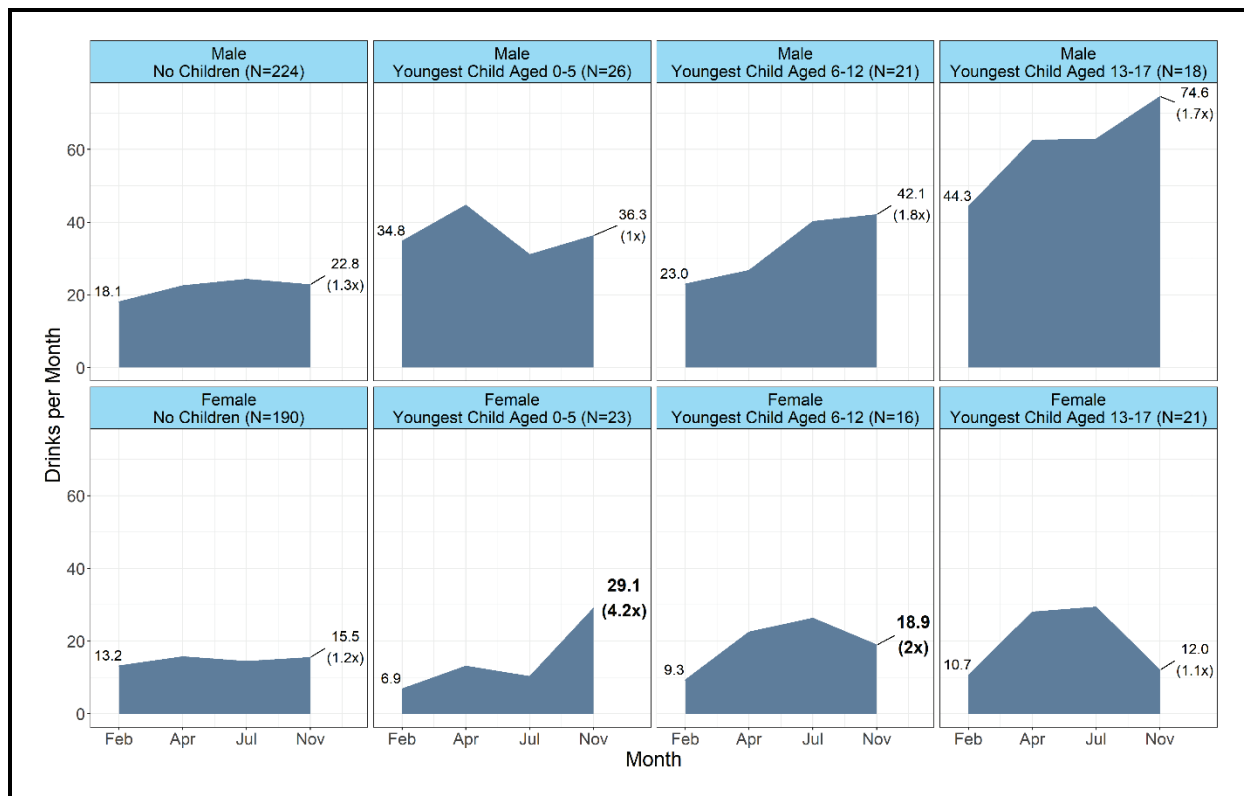
Adjusted predictions by group. Models control for demographic characteristics and baseline socioeconomic status. The change in drinks per month from February to April is significantly different between groups ($p=0.005$). The change in drinks per month from February to November is significantly different between groups ($p=0.014$).

Finally, we computed alcohol consumption by groups defined by the intersections of the key characteristics identified in **Figures 3.2–3.4**. We used area plots to show how groups defined by gender and race/ethnicity (**Figure 3.5**) and gender and family composition (defined as the age of the youngest child in the household; **Figure 3.6**) contributed to total consumption over time. **Figure 3.5** shows that average consumption among Black respondents (males and females) increased 2.7 times from February to November. Male non-Hispanic respondents of races other than White and Black and female Hispanic respondents also exhibited a large increase over the study period. To the contrary, average consumption among White respondents of both genders remained relatively flat. **Figure 3.6** shows that females whose youngest child was age 0–5 more than quadrupled their consumption from February to November, and females whose youngest child was age 6–12 drank twice as much in November compared with February. Males with children aged 6 or older nearly doubled their average consumption.

Figure 3.5 Average Drinks per Month Consumed, by Gender and Racial/Ethnic Group



Survey-weighted drinks over time for gender and racial/ethnic groups.

Figure 3.6 Average Drinks per Month Consumed, by Gender and Age of Youngest Child

Survey-weighted drinks over time for gender and household composition groups.

3.5 Relationship between Drinks per Month and Mental Health Measures

As shown in **Table 3.5**, those who reported drinking to cope or drinking for enhancement motives both had significantly larger increases in drinks per month after the onset of the pandemic than those who never drank for coping or enhancement over the study period. The table also shows that there was little or no significant relationship between having a positive PHQ-2 or GAD-2 score in the study period and changes in drinks per month over time. To further analyze these relationships, we examined contemporaneous relationships among these variables. First, **Table 3.6** presents Pearson correlation coefficients between the drinking motive and mental health measures for February and November, separately and for those 2 months pooled. (April and July were excluded because we did not collect motives in April and mental health measures in July.) **Table 3.6** shows that the correlation between coping and the PHQ-2 and GAD-2 scores increased from February to November 2021 ($r=0.53$ for both in November, representing a strong relationship) (Cohen, 1988).

Table 3.6 Contemporaneous Correlations among Drinking Motives and Mental Health Measures

Score	Coping Score			Enhancement Score			PHQ-2 Score		
	Feb and Nov	Feb	Nov	Feb and Nov	Feb	Nov	Feb and Nov	Feb	Nov
Enhancement score	0.42	0.45	0.42						
PHQ-2 score	0.47	0.33	0.53	0.21	0.20	0.25			
GAD-2 score	0.45	0.29	0.53	0.23	0.25	0.25	0.76	0.66	0.79

Values are Pearson correlation coefficients.

Table 3.7 examines the contemporaneous correlations and regression coefficients (β_2 from equation 3) between drinks consumed and each of the motives and mental health measures among respondents consuming alcohol in a given month. We found that drinks consumed had a weak positive correlation overall with coping and enhancement motives ($r=0.27$ and 0.23 , respectively). The associations were weak in February but strengthened in July and November, and the relationship between coping motives and drinks consumed increased to a moderate association ($r=0.37$) in July (Cohen, 1988). Conversely, we found negligible relationships between drinks consumed and both mental health measures. Regression coefficients from equation 3 indicate strong positive and significant associations between drinks consumed and both coping and enhancement scores (as large as 24.5 [$p<0.001$] and 14.8 [$p<0.001$] in July, respectively). The estimated change in drinks consumed associated with a 1-point increase in coping or enhancement score was much lower in February (7.4 and 5.1, respectively) compared with post-pandemic months (i.e., July [24.5 and 14.8, respectively] and November [16.6 and 14.3, respectively]).

Table 3.7 Contemporaneous Correlations and Bivariate Regression Coefficients with Respect to Drinks per Month

Measure	All Months		Feb		Apr		Jul		Nov	
	r	β	r	β	r	β	r	β	r	β
Coping score	0.27	17.2***	0.190	7.4*	-	-	0.37	24.5***	0.26	16.6***
Enhancement score	0.23	11.5***	0.11	5.1*	-	-	0.28	14.8***	0.28	14.3***
PHQ-2 score	0.09	3.0	0.08	2.6	0.01	0.8	-	-	0.13	4.7*
GAD-2 score	0.03	1.6	-0.03	-0.4	-0.07	-1.3	-	-	0.12	4.6*

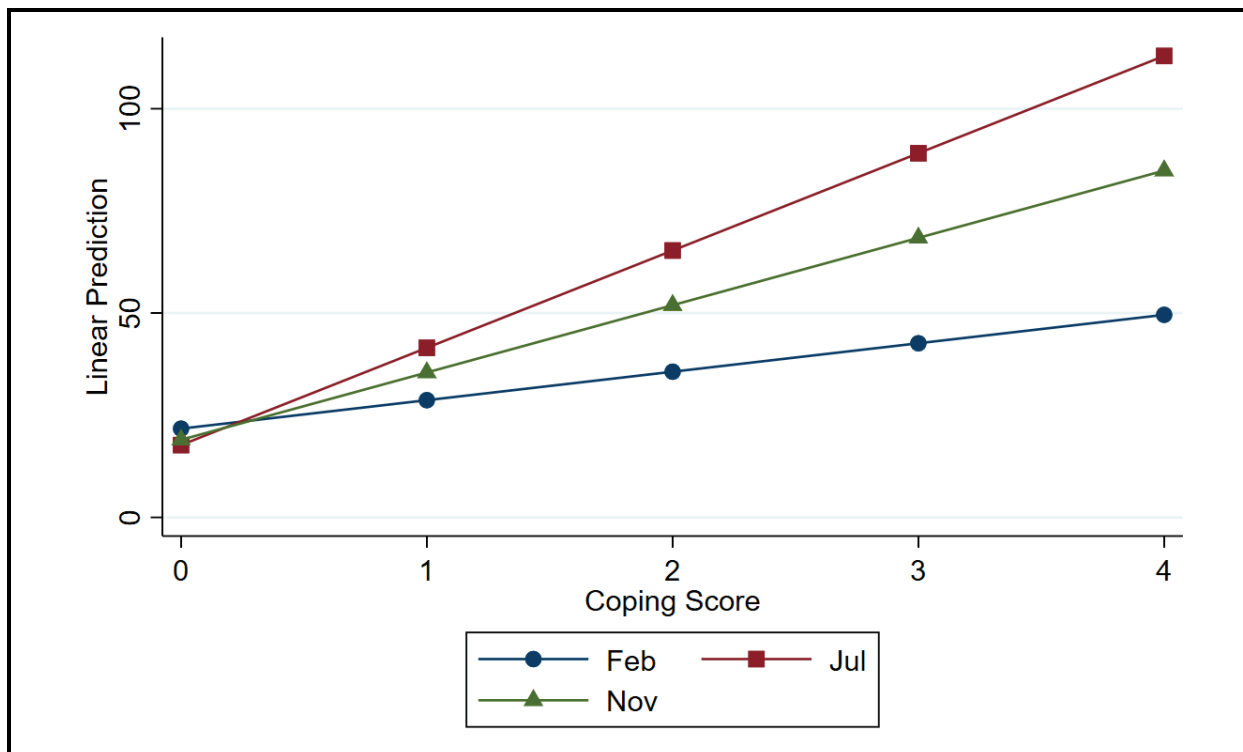
r =Pearson correlation; β =beta coefficient from regression model (i.e., a 1-point increase in the measure increases drinks consumed by β). The model controls for age, gender, race/ethnicity, marital status, educational attainment, and income.

Asterisks denote significance of beta coefficients: * $p<0.05$; ** $p<0.01$; *** $p<0.001$.

We used equation 4 to further explore changes in the relationships between motives for drinking and drinks consumed over time. **Figure 3.7** (coping) and **Figure 3.8** (enhancement) contain three lines, one each for February, July, and November. The lines

represent the estimated change in drinks per month for a 1-point increase in the motive score for that month only. The slopes of the lines are equal to the β_2 coefficients from equation 4. Tests for differences between those slopes indicate that the relationships between drinks per month and both coping and enhancement motives were significantly stronger in July ($p=0.012$ and $p=0.012$ for coping and enhancement, respectively) compared with February and for enhancement in November compared with February ($p=0.002$; $p=0.063$ for coping score).

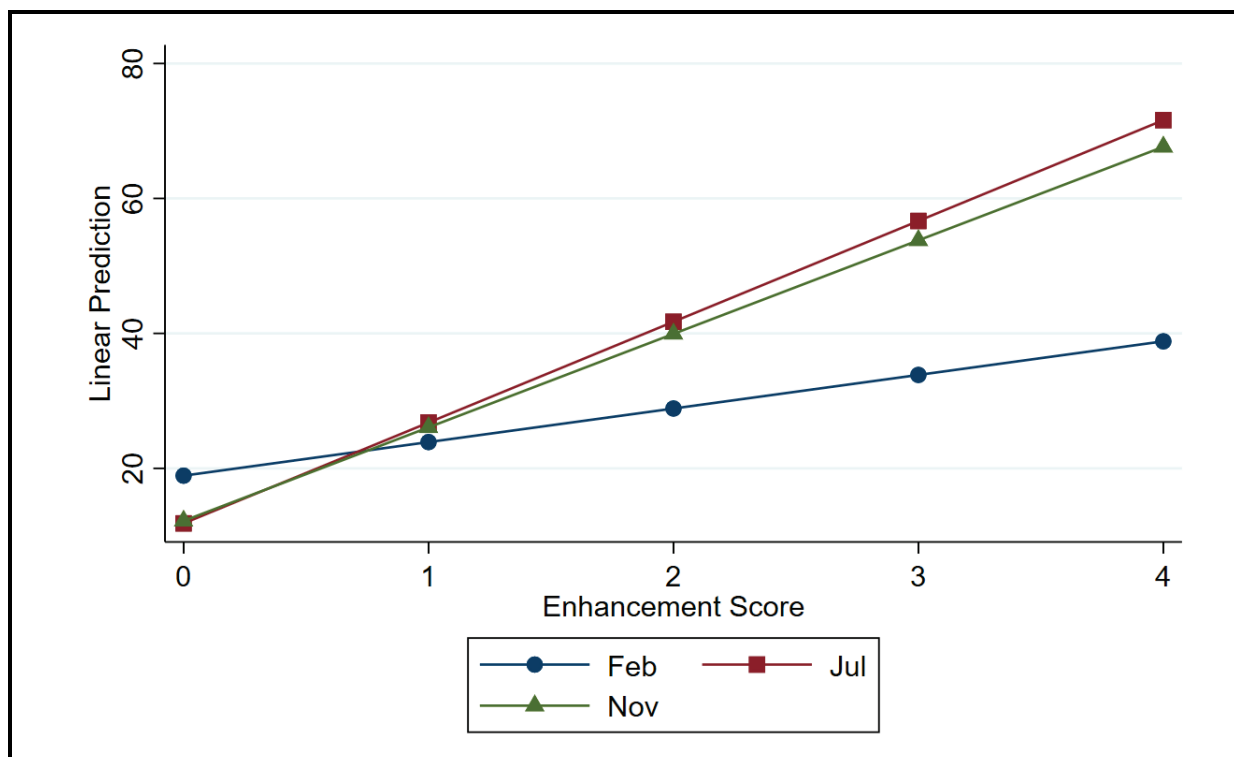
Figure 3.7 Expected Number of Drinks Per Month by Coping Score, by Month



N=1,286, coping slopes: Feb=6.963, Jul=23.804, Nov=12.468.

Slope differences: Feb vs. Jul=0.012, Feb vs. Nov=0.063, Jul vs. Nov=0.373.

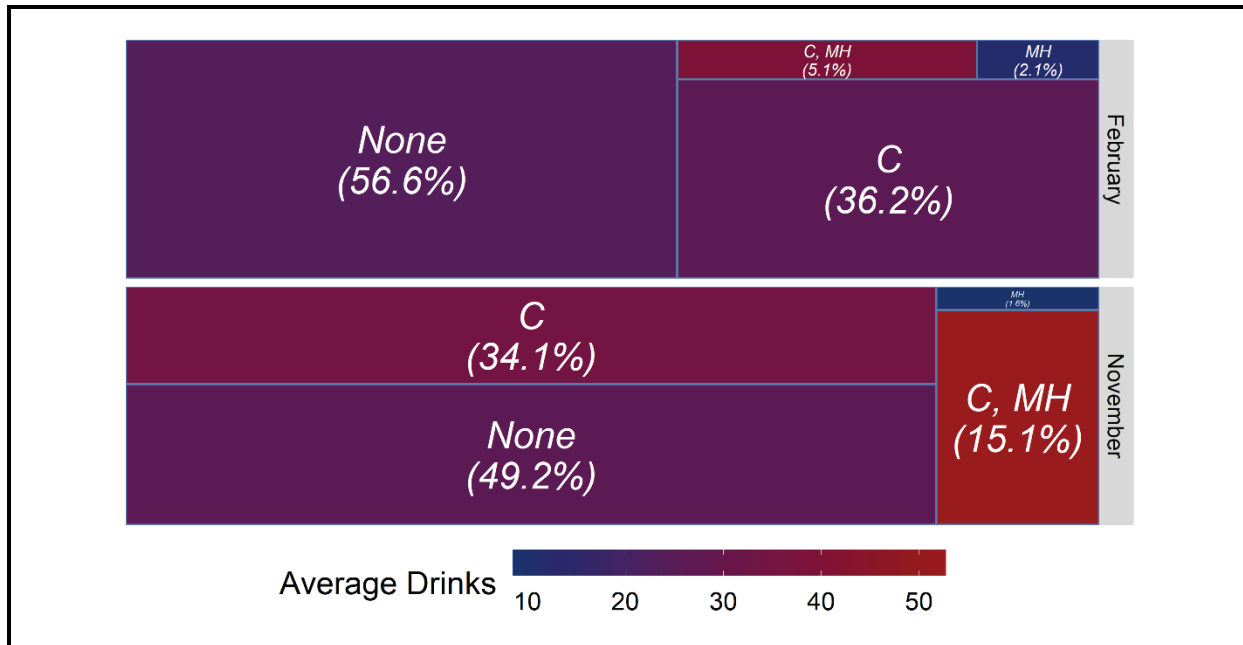
Figure 3.8 Expected Number of Drinks Per Month by Enhancement Score, by Month



N=1,291, enhancement slopes: Feb=4.978, Jul=14.940, Nov=13.859.
 Slope differences: Feb vs. Jul=0.012, Feb vs. Nov=0.002, Jul vs. Nov=0.820.

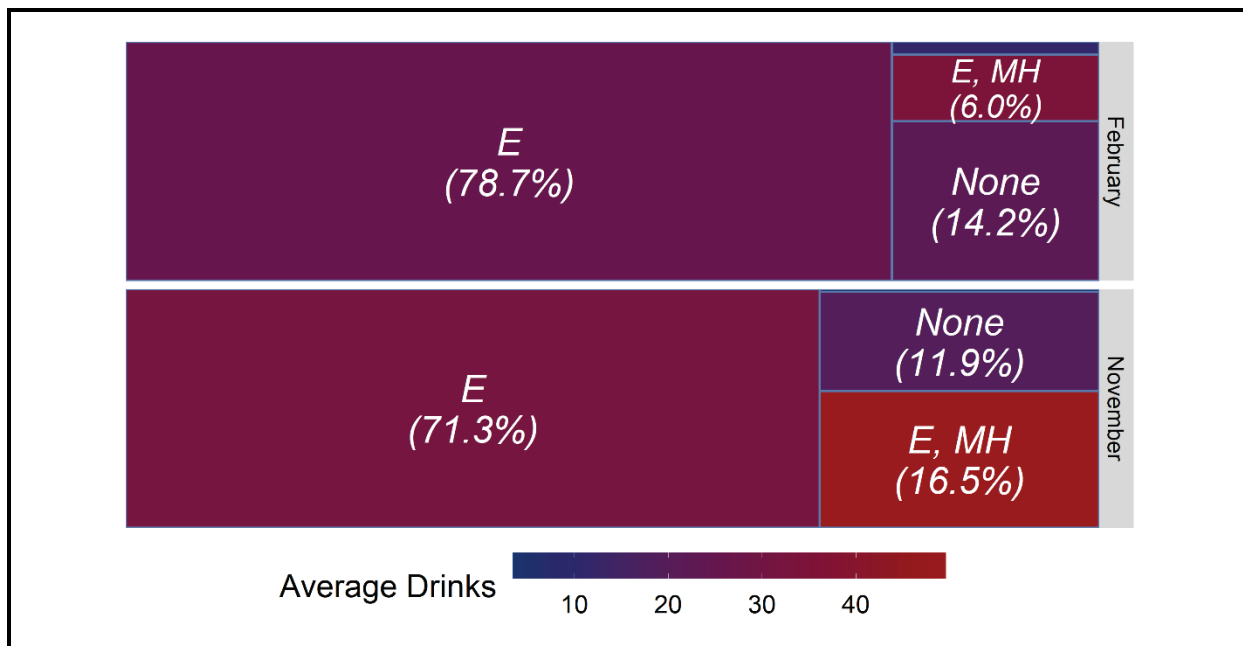
Finally, we examined alcohol consumption across the intersection of mental health status and drinking motives. **Figures 3.9** and **3.10** show how the prevalence of positive mental health screens (i.e., a score of 3 or more on the PHQ-2 and/or the GAD-2, represented by “MH” in the chart) and endorsement of coping and enhancement motives (represented by “C” and “E” in the chart, respectively), changed from February to November among people who reported drinking in both months. The figures also show how alcohol consumption differs among these groups. **Figure 3.9** shows that those who reported drinking to cope and who had a positive mental health screen (“C, MH” in the chart) increased from 5.1% of the sample in February to 15.1% in November. Average drinks per month among respondents with both characteristics increased from 39.2 in February to 52.6 in November. **Figure 3.10** shows a similar trend for enhancement: those who endorsed enhancement motives and who had a positive mental health screen (“E, MH”) increased from 6.0% of the sample in February to 16.5% in November, and average drinks among respondents with both characteristics increased from 34.9 in February to 49.5 in November.

Figure 3.9 Alcohol Consumption, by Mental Health Status and Drinking to Cope



Analysis is conditional on respondents reporting drinking in both months.

Figure 3.10 Alcohol Consumption, by Mental Health Status and Drinking for Enhancement Motives



Analysis is conditional on respondents reporting drinking in both months. In both tree maps, the size of the segment corresponding to PHQ-2 and/or GAD-2 (mental health only) is too small to be noticeable (1.1% of the sample in February and 0.4% of the sample in November).

This page intentionally left blank

4. Discussion

We previously showed overall increases in alcohol consumption in the early phase of the pandemic period and that women, people with minor children in the home, and Black Americans differentially increased their drinking in the short term after the COVID-19 pandemic started (comparing February and April 2020) (Barbosa et al., 2020b). These new longitudinal data confirm that these patterns of increased alcohol consumption, including increased excessive drinking and binge drinking, have been sustained over the longer term, through November 2020. Compared with February 2020, average monthly consumption in April and November 2020 increased by 36% and 39%, respectively. Corresponding increases for the proportion exceeding drinking guidelines were 27% and 39%, and increases for binge drinking were 26% and 30%. Using the estimated 166,052,940 people aged 21 or older nationally who drank in 2019 (Substance Abuse and Mental Health Services Administration, 2020), this translates to an increase from February 2020 to November 2020 of 1 billion more drinks per month, with 14.6 million more people exceeding drinking guidelines, and 9 million more people binge drinking in November 2020 compared with February 2020. An increase in drinking will add to the known disease burden associated with alcohol (Shield et al., 2020).

We found that higher income, higher educational attainment, and being married were protective of exceeding recommended drinking guidelines at some point during the study period, whereas having children in the household, drinking to cope, and drinking for enhancement had the opposite effect. We found that the percentage of Black respondents who exceeded drinking guidelines or engaged in binge drinking more than quintupled from February to November, and increases in the proportion drinking more than the recommended guidelines were higher for Black respondents than for White respondents. We found that alcohol consumption increased more for individuals with children in the household than for those without children, in particular for females whose youngest child was age 0–5 (who more than quadrupled their consumption from February to November). Other studies have also found that having children in the household was related to increased alcohol consumption during the early phases of the pandemic (Wardell et al., 2020), and we show that those relationships are sustained over the longer term.

We did not find differential changes in drinking among respondents who reported pandemic-related reductions in income or other impacts of COVID-19 on loved ones, but we found increases in consumption for those reporting a direct impact of COVID-19 on their health and/or a significant impact of COVID-19 on daily life in November 2020. We found that the association between alcohol consumption and drinking to cope strengthened after the onset of the pandemic and that there was a larger increase in alcohol consumption for those who reported drinking to cope and those who report drinking for enhancement. These results extend those of recent studies showing a relationship between drinking to cope and alcohol

consumption during the first months of the pandemic (McPhee et al., 2020; Prestigiacomo et al., 2021; Wardell et al., 2020). We also found an increase in respondents with mental health issues who reported drinking to cope or drinking for enhancement.

We did not observe reductions in consumption over time overall and for key subgroups, even as the likely length of the pandemic became apparent. Rather, these unique longitudinal data suggest that persistence of increased drinking was more common. This may be due to pandemic-related stress, as well as other factors such as distress from ongoing racial injustice and economic contraction that might prompt heavy drinking. Future studies should investigate the role of systemic racism and other types of discrimination in changes in alcohol use before and after the pandemic period to identify unique and synergistic effects of these stressors on minority groups. Additional longer-term research is needed to investigate whether elevations in drinking observed persist beyond November and whether there is a resultant increase in alcohol problems and AUD, particularly among groups at higher risk due to mental health problems commonly associated with AUD.

This is an important longitudinal study of the impacts of the COVID-19 pandemic on alcohol consumption over a 9-month period. In addition to being one of few longitudinal studies of alcohol consumption in the United States during the pandemic, another key strength of this study is that the results are weighted to be nationally representative, whereas most studies of alcohol consumption during the pandemic have used convenience samples of varying quality. Despite the strengths of this innovative study, there are some limitations to note. First, our estimates of alcohol consumption may underestimate total consumption, which is a well-known limitation of collecting self-reported data on substance use using surveys (Livingston & Callinan, 2015; Stockwell et al., 2004). This underestimation may be concentrated among people who drink at a low frequency (Stockwell et al., 2016). The survey data are representative of the U.S. civilian noninstitutionalized population; as such, we did not reach some specialized populations that have been disproportionately impacted by the pandemic (e.g., prison and homeless populations). This is an area to be addressed through targeted research. Second, our estimates of alcohol consumption are based on measurements taken at different times within the same calendar year, and we did not adjust our estimates for seasonal trends in alcohol use. Our findings indicate that the largest changes in alcohol consumption happened between February and April. Two published studies from the early 2000s report little change in self-reported alcohol consumption outcomes between February and April in a typical year and suggest that these 2 months are characterized by relatively low consumption (Carpenter, 2003; Cho et al., 2001). On the other hand, retail sales data show an increase in alcohol sales between February and April that averaged 10.7% in the 5 years before the pandemic (2015 to 2019) (FRED, n.d.). We chose not to use sales data to adjust our estimates because it is an imperfect proxy for consumption, but we note that part of the observed increases after February might be explained by ordinary seasonal trends. Finally, we recognize that we

have not exhausted all possible research questions that could be addressed using this rich data source, and we look forward to gaining more insights from additional analyses of these data.

This page intentionally left blank

5. Conclusions

There is an association between the COVID-19 pandemic and increases in alcohol consumption in the initial phases of the pandemic, and those increases have been sustained for up to 9 months after the initiation of the responses to the COVID-19 pandemic that began in March 2020. Increases in alcohol consumption and worsening of drinking patterns were larger for women and individuals with children in the household and were disproportionately larger for Black people. Further epidemiologic surveillance is needed to ascertain whether the increases in alcohol consumption observed in this study are maintained over a longer horizon, even as pandemic conditions recede.

This page intentionally left blank

References

- Ahlers-Schmidt, C. R., Hervey, A. M., Neil, T., Kuhlmann, S., & Kuhlmann, Z. (2020). Concerns of women regarding pregnancy and childbirth during the COVID-19 pandemic. *Patient Education and Counseling*, 103(12), 2578-2582. <https://doi.org/10.1016/j.pec.2020.09.031>
- Avery, A. R., Tsang, S., Seto, E. Y. W., & Duncan, G. E. (2020). Stress, anxiety, and change in alcohol use during the COVID-19 pandemic: findings among adult twin pairs. *Front Psychiatry*, 11, 571084. <https://doi.org/10.3389/fpsy.2020.571084>
- Barbosa, C., Bray, J. W., Dowd, W. N., Barnosky, A., & Wittenberg, E. (2020a). SF-6D utility scores for alcohol use disorder status and alcohol consumption risk levels in the US population. *Addiction*. <https://doi.org/10.1111/add.15224>
- Barbosa, C., Cowell, A. J., & Dowd, W. N. (2020b). Alcohol consumption in response to the COVID-19 pandemic in the United States. *Journal of Addiction Medicine*, Publish Ahead of Print. <https://doi.org/10.1097/ADM.0000000000000767>
- Biddle, N., Edwards, A., Ben, A., & Gray, M. (2020). Alcohol consumption during the COVID-19 period. ANU Centre for Social Research and Methods.
- Boehnke, K. F., McAfee, J., Ackerman, J. M., & Kruger, D. J. (2020). Medication and substance use increases among people using cannabis medically during the COVID-19 pandemic. *International Journal of Drug Policy*, 103053. <https://doi.org/10.1016/j.drugpo.2020.103053>
- Boscarino, J. A., Adams, R. E., & Galea, S. (2006). Alcohol use in New York after the terrorist attacks: a study of the effects of psychological trauma on drinking behavior. *Addictive Behaviors*, 31(4), 606-621. <https://doi.org/10.1016/j.addbeh.2005.05.035>
- Boschuetz, N., Cheng, S., Mei, L., & Loy, V. M. (2020). Changes in alcohol use patterns in the United States during COVID-19 pandemic. *Wmj*, 119(3), 171-176.
- Brown, S. A., Vik, P. W., Patterson, T. L., Grant, I., & Schuckit, M. A. (1995). Stress, vulnerability and adult alcohol relapse. *Journal of Studies on Alcohol*, 56(5), 538-545. <https://doi.org/10.15288/j.1995.56.538>
- Capasso, A., Jones, A. M., Ali, S. H., Foreman, J., Tozan, Y., & DiClemente, R. J. (2021). Increased alcohol use during the COVID-19 pandemic: The effect of mental health and age in a cross-sectional sample of social media users in the U.S. *Preventive Medicine*, 145, 106422. <https://doi.org/10.1016/j.ypmed.2021.106422>
- Carpenter, C. (2003). Seasonal variation in self-reports of recent alcohol consumption: racial and ethnic differences. *Journal of Studies on Alcohol*, 64(3), 415-418. <https://doi.org/10.15288/j.2003.64.415>
- Cho, Y. I., Johnson, T. P., & Fendrich, M. (2001). Monthly variations in self-reports of alcohol consumption. *Journal of Studies on Alcohol*, 62(2), 268-272. <https://doi.org/10.15288/j.2001.62.268>
- Chodkiewicz, J., Talarowska, M., Miniszewska, J., Nawrocka, N., & Bilinski, P. (2020). Alcohol consumption reported during the COVID-19 pandemic: The initial stage. *International Journal of Environmental Research and Public Health*, 17(13). <https://doi.org/10.3390/ijerph17134677>
- Cockerham, W. C., Rütten, A., & Abel, T. (2016). Conceptualizing contemporary health lifestyles: Moving beyond Weber. *The Sociological Quarterly*(2), 321-342.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. Hillsdale, NJ: Erlbaum Associates.
- Cooper, M. L. (1994). Motivations for alcohol use among adolescents: Development and validation of a four-factor model. *Psychological Assessment*, 6(2), 117.

- Delgadillo, J., Payne, S., Gilbody, S., Godfrey, C., Gore, S., Jessop, D., & Dale, V. (2012). Brief case finding tools for anxiety disorders: validation of GAD-7 and GAD-2 in addictions treatment. *Drug and Alcohol Dependence*, 125(1-2), 37-42. <https://doi.org/10.1016/j.drugalcdep.2012.03.011>
- Dumas, T. M., Ellis, W., & Litt, D. M. (2020). What does adolescent substance use look like during the COVID-19 pandemic? Examining changes in frequency, social contexts, and pandemic-related predictors. *Journal of Adolescent Health*, 67(3), 354-361. <https://doi.org/10.1016/j.jadohealth.2020.06.018>
- Emerson, K. G. (2020). Coping with being cooped up: Social distancing during COVID-19 among 60+ in the United States. *Rev Panam Salud Publica*, 44, e81. <https://doi.org/10.26633/rpsp.2020.81>
- Esterwood, E., & Saeed, S. A. (2020). Past epidemics, natural disasters, COVID19, and mental health: learning from history as we deal with the present and prepare for the future. *Psychiatric Quarterly*, 91(4), 1121-1133. <https://doi.org/10.1007/s11126-020-09808-4>
- Ettman, C. K., Abdalla, S. M., Cohen, G. H., Sampson, L., Vivier, P. M., & Galea, S. (2020). Prevalence of depression symptoms in US adults before and during the COVID-19 pandemic. *JAMA Network Open*, 3(9), e2019686-e2019686. <https://doi.org/10.1001/jamanetworkopen.2020.19686>
- Fahimi, M., & Kulp, D. (2009). Address-based sampling may provide alternatives for surveys that require contacts with representative samples of households. *Quirk's Marketing Research Review*.
- Foran, H. M., & O'Leary, K. D. (2008). Alcohol and intimate partner violence: a meta-analytic review. *Clinical Psychology Review*, 28(7), 1222-1234. <https://doi.org/10.1016/j.cpr.2008.05.001>
- FRED, Federal Reserve Bank of St. Louis. (n.d.). U.S. Census Bureau, Retail Sales: Beer, Wine, and Liquor Stores [MRTSSM4453USN]. Retrieved from <https://fred.stlouisfed.org/series/MRTSSM4453USN>
- Gakidou, E., Afshin, A., Abajobir, A. A., Abate, K. H., Abbafati, C., Abbas, K. M., Abd-Allah, F., Abdulle, A. M., Abera, S. F., Aboyans, V., Abu-Raddad, L. J., Abu-Rmeileh, N. M. E., Abyu, G. Y., Adedeji, I. A., Adetokunboh, O., Afarideh, M., Agrawal, A., Agrawal, S., Kiadaliri, A. A., Ahmadi, H., Ahmed, M. B., et al. (2017). Global, regional, and national comparative risk assessment of 84 behavioural, environmental and occupational, and metabolic risks or clusters of risks, 1990-2016: a systematic analysis for the Global Burden of Disease Study 2016. *Lancet*, 390(10100), 1345-1422. <Go to ISI>://WOS:000410630000006
- Grossman, E. R., Benjamin-Neelon, S. E., & Sonnenschein, S. (2020a). Alcohol consumption during the COVID-19 pandemic: a cross-sectional survey of US adults. *International Journal of Environmental Research and Public Health*, 17(24). <https://doi.org/10.3390/ijerph17249189>
- Grossman, E. R., Kerr, W. C., & Toomey, T. L. (2020b, May 18). The role of law and policy in reducing deaths attributable to alcohol to reach healthy people's substance abuse goals in the United States. Department of Health and Human Services, Office of Disease Prevention and Health Promotion (ODPHP). Retrieved from <https://www.healthypeople.gov/2020/law-and-health-policy/topic/substance-abuse>
- Grzywacz, J. G., & Almeida, D. M. (2008). Stress and binge drinking: a daily process examination of stressor pile-up and socioeconomic status in affect regulation. *International Journal of Stress Management*, 15(4), 364-380. <https://doi.org/10.1037/a0013368>

- Hasin, D. S., Stinson, F. S., Ogburn, E., & Grant, B. F. (2007). Prevalence, correlates, disability, and comorbidity of DSM-IV alcohol abuse and dependence in the United States: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Archives of General Psychiatry*, 64(7), 830-842. <https://doi.org/10.1001/archpsyc.64.7.830>
- Holingue, C., Kalb, L. G., Riehm, K. E., Bennett, D., Kapteyn, A., Veldhuis, C. B., Johnson, R. M., Fallin, M. D., Kreuter, F., Stuart, E. A., & Thrul, J. (2020). Mental distress in the United States at the beginning of the COVID-19 pandemic. *American Journal of Public Health*, 110(11), 1628-1634. <https://doi.org/10.2105/ajph.2020.305857>
- Ipsos KnowledgePanel. (2021). A methodological overview. Retrieved from <https://www.ipsos.com/sites/default/files/ipsosknowledgepanelmethodology.pdf>
- Jones-Webb, R., Karriker-Jaffe, K. J., Zemore, S. E., & Mulia, N. (2016). Effects of economic disruptions on alcohol use and problems: Why do African Americans fare worse? *Journal of Studies on Alcohol and Drugs*, 77(2), 261-271. <https://doi.org/10.15288/jsad.2016.77.261>
- Kaplan, L. M., Nayak, M. B., Greenfield, T. K., & Karriker-Jaffe, K. J. (2017). Alcohol's Harm to Children: Findings from the 2015 United States National Alcohol's Harm to Others Survey. *Journal of Pediatrics*, 184, 186-192. <https://doi.org/10.1016/j.jpeds.2017.01.025>
- Kessler, R. C., Crum, R. M., Warner, L. A., Nelson, C. B., Schulenberg, J., & Anthony, J. C. (1997). Lifetime co-occurrence of DSM-III-R alcohol abuse and dependence with other psychiatric disorders in the National Comorbidity Survey. *Archives of General Psychiatry*, 54(4), 313-321. <https://doi.org/10.1001/archpsyc.1997.01830160031005>
- Killgore, W. D. S., Cloonan, S. A., Taylor, E. C., Lucas, D. A., & Dailey, N. S. (2021). Alcohol dependence during COVID-19 lockdowns. *Psychiatry Research*, 296, 113676. <https://doi.org/10.1016/j.psychres.2020.113676>
- Kim, E. J., Marrast, L., & Conigliaro, J. (2020). COVID-19: magnifying the effect of health disparities [Editorial Material; Early Access]. *Journal of General Internal Medicine*, 2. <https://doi.org/10.1007/s11606-020-05881-4>
- Knell, G., Robertson, M. C., Dooley, E. E., Burford, K., & Mendez, K. S. (2020). Health behavior changes during COVID-19 pandemic and subsequent "stay-at-home" orders. *International Journal of Environmental Research and Public Health*, 17(17). <https://doi.org/10.3390/ijerph17176268>
- Kuntsche, E., Knibbe, R., Gmel, G., & Engels, R. (2006). Replication and validation of the Drinking Motive Questionnaire Revised (DMQ-R, Cooper, 1994) among adolescents in Switzerland. *Eur Addict Res*, 12(3), 161-168. <https://doi.org/10.1159/000092118>
- Lechner, W. V., Laurene, K. R., Patel, S., Anderson, M., Grega, C., & Kenne, D. R. (2020). Changes in alcohol use as a function of psychological distress and social support following COVID-19 related University closings. *Addictive Behaviors*, 110, 106527. <https://doi.org/10.1016/j.addbeh.2020.106527>
- Livingston, M., & Callinan, S. (2015). Underreporting in alcohol surveys: Whose drinking is underestimated? *Journal of Studies on Alcohol and Drugs*, 76(1), 158-164. <https://doi.org/10.15288/jsad.2015.76.158>
- Lowe, B., Kroenke, K., & Grafe, K. (2005). Detecting and monitoring depression with a two-item questionnaire (PHQ-2). *Journal of Psychosomatic Research*, 58(2), 163-171. <https://doi.org/10.1016/j.jpsychores.2004.09.006>
- Luk, T. T., Zhao, S., Weng, X., Wong, J. Y., Wu, Y. S., Ho, S. Y., Lam, T. H., & Wang, M. P. (2020). Exposure to health misinformation about COVID-19 and increased tobacco and alcohol use: a population-based survey in Hong Kong. *Tobacco Control*. <https://doi.org/10.1136/tobaccocontrol-2020-055960>

- Makhashvili, N., Javakhishvili, J. D., Sturua, L., Pilauri, K., Fuhr, D. C., & Roberts, B. (2020). The influence of concern about COVID-19 on mental health in the Republic of Georgia: a cross-sectional study. *Global Health*, 16(1), 111. <https://doi.org/10.1186/s12992-020-00641-9>
- McPhee, M. D., Keough, M. T., Rundle, S., Heath, L. M., Wardell, J. D., & Hendershot, C. S. (2020). Depression, environmental reward, coping motives and alcohol consumption during the COVID-19 pandemic. *Front Psychiatry*, 11, 574676. <https://doi.org/10.3389/fpsy.2020.574676>
- Moise, I. K., & Ruiz, M. O. (2016). Hospitalizations for substance abuse disorders before and after hurricane Katrina: spatial clustering and area-level predictors, New Orleans, 2004 and 2008. *Preventing Chronic Disease*, 13, E145. <https://doi.org/10.5888/pcd13.160107>
- National Institute on Alcohol Abuse and Alcoholism. (2014). National Epidemiologic Survey on Alcohol and Related Conditions-III (NESARC-III) Data Notes.
- National Institute on Alcohol Abuse and Alcoholism (NIAAA). (n.d.). Rethinking drinking: Alcohol & your health. Retrieved from <https://www.rethinkingdrinking.niaaa.nih.gov/>
- Neill, E., Meyer, D., Toh, W. L., van Rheenen, T. E., Phillipou, A., Tan, E. J., & Rossell, S. L. (2020). Alcohol use in Australia during the early days of the COVID-19 pandemic: Initial results from the COLLATE project. *Psychiatry Clin Neurosci*, 74(10), 542-549. <https://doi.org/10.1111/pcn.13099>
- Niedzwiedz, C. L., Green, M. J., Benzeval, M., Campbell, D., Craig, P., Demou, E., Leyland, A., Pearce, A., Thomson, R., Whitley, E., & Katikireddi, S. V. (2021). Mental health and health behaviours before and during the initial phase of the COVID-19 lockdown: longitudinal analyses of the UK Household Longitudinal Study. *Journal of Epidemiology and Community Health*, 75(3), 224-231. <https://doi.org/10.1136/jech-2020-215060>
- North, C. S., Ringwalt, C. L., Downs, D., Derzon, J., & Galvin, D. (2011). Postdisaster course of alcohol use disorders in systematically studied survivors of 10 disasters. *Archives of General Psychiatry*, 68(2), 173-180. <https://doi.org/10.1001/archgenpsychiatry.2010.131>
- Parks, V., Drakeford, L., Cope, M. R., & Slack, T. (2017). Disruption of routine behaviors following the deepwater horizon oil spill. *Society & Natural Resources*, 31(3), 277-290.
- Patrick, S. W., Henkhaus, L. E., Zickafoose, J. S., Lovell, K., Halvorson, A., Loch, S., Letterie, M., & Davis, M. M. (2020). Well-being of parents and children during the COVID-19 pandemic: a national survey. *Pediatrics*, 146(4). <https://doi.org/10.1542/peds.2020-016824>
- Peltier, M. R., Verplaetse, T. L., Mineur, Y. S., Petrakis, I. L., Cosgrove, K. P., Picciotto, M. R., & McKee, S. A. (2019). Sex differences in stress-related alcohol use. *Neurobiology of Stress*, 10, 100149. <https://doi.org/10.1016/j.ynstr.2019.100149>
- Peterson, Z. D., Vaughan, E. L., & Carver, D. N. (2020). Sexual identity and psychological reactions to COVID-19. *Traumatology*.
- Pfefferbaum, B., & North, C. S. (2020). Mental health and the Covid-19 pandemic. *New England Journal of Medicine*, 383(6), 510-512. <https://doi.org/10.1056/NEJMp2008017>
- Pollard, M. S., Tucker, J. S., & Green, H. D., Jr. (2020). Changes in adult alcohol use and consequences during the COVID-19 pandemic in the US. *JAMA Network Open*, 3(9), e2022942-e2022942. <https://doi.org/10.1001/jamanetworkopen.2020.22942>
- Prestigiaco, C. J., Liu, M. A., Plawecki, M. H., & Cyders, M. A. (2021). Early impact of the U.S. COVID-19 pandemic on drinking motives and alcohol use. *Substance Use and Misuse*, 56(9), 1383-1386. <https://doi.org/10.1080/10826084.2021.1928210>

- RAND Corporation. (n.d.). RAND American Life Panel Impacts of COVID-19 Survey: Item DRB_Q1. Retrieved from https://www.phenxtoolkit.org/toolkit_content/PDF/RAND_ALP_COVID19_Routine.pdf
- Rolland, B., Haesebaert, F., Zante, E., Benyamina, A., Haesebaert, J., & Franck, N. (2020). Global changes and factors of increase in caloric/salty food intake, screen use, and substance use during the early COVID-19 containment phase in the general population in France: Survey study. *JMIR Public Health Surveill*, 6(3), e19630. <https://doi.org/10.2196/19630>
- Rossinot, H., Fantin, R., & Venne, J. (2020). Behavioral changes during COVID-19 confinement in France: A web-based study. *International Journal of Environmental Research and Public Health*, 17(22). <https://doi.org/10.3390/ijerph17228444>
- Ryerson, N. C. (2020). Behavioral and psychological correlates of well-being during COVID-19. *Psychological Reports*, 33294120978160. <https://doi.org/10.1177/0033294120978160>
- Sacco, P., Bucholz, K. K., & Harrington, D. (2014). Gender differences in stressful life events, social support, perceived stress, and alcohol use among older adults: results from a national survey. *Substance Use and Misuse*, 49(4), 456-465. <https://doi.org/10.3109/10826084.2013.846379>
- Sacks, J. J., Gonzales, K. R., Bouchery, E. E., Tomedi, L. E., & Brewer, R. D. (2015). 2010 national and state costs of excessive alcohol consumption. *American Journal of Preventive Medicine*, 49(5), e73-e79. <https://doi.org/10.1016/j.amepre.2015.05.031>
- Sallie, S. N., Ritou, V., Bowden-Jones, H., & Voon, V. (2020). Assessing international alcohol consumption patterns during isolation from the COVID-19 pandemic using an online survey: highlighting negative emotionality mechanisms. *BMJ Open*, 10(11), e044276. <https://doi.org/10.1136/bmjopen-2020-044276>
- Sanchez, T. H., Zlotorzynska, M., Rai, M., & Baral, S. D. (2020). Characterizing the impact of COVID-19 on men who have sex with men across the United States in April, 2020. *AIDS and Behavior*, 24(7), 2024-2032. <https://doi.org/10.1007/s10461-020-02894-2>
- Sharma, P., Ebbert, J. O., Rosedahl, J. K., & Philpot, L. M. (2020). Changes in substance use among young adults during a respiratory disease pandemic. *SAGE Open Med*, 8, 2050312120965321. <https://doi.org/10.1177/2050312120965321>
- Shield, K., Manthey, J., Rylett, M., Probst, C., Wettlaufer, A., Parry, C. D. H., & Rehm, J. (2020). National, regional, and global burdens of disease from 2000 to 2016 attributable to alcohol use: a comparative risk assessment study. *Lancet Public Health*, 5(1), E51-E61. [https://doi.org/10.1016/s2468-2667\(19\)30231-2](https://doi.org/10.1016/s2468-2667(19)30231-2)
- Silczuk, A. (2020). Threatening increase in alcohol consumption in physicians quarantined due to coronavirus outbreak in Poland: the ALCOVID survey. *Journal of Public Health (Oxford, England)*, 42(3), 461-465. <https://doi.org/10.1093/pubmed/fdaa110>
- Stanesby, O., Labhart, F., Dietze, P., Wright, C. J. C., & Kuntsche, E. (2019). The contexts of heavy drinking: A systematic review of the combinations of context-related factors associated with heavy drinking occasions. *PLoS One*, 14(7), e0218465. <https://doi.org/10.1371/journal.pone.0218465>
- Stanton, R., To, Q. G., Khalesi, S., Williams, S. L., Alley, S. J., Thwaite, T. L., Fenning, A. S., & Vandelanotte, C. (2020). Depression, anxiety and stress during COVID-19: Associations with changes in physical activity, sleep, tobacco and alcohol use in Australian adults. *International Journal of Environmental Research and Public Health*, 17(11). <https://doi.org/10.3390/ijerph17114065>

- Stockwell, T., Donath, S., Cooper-Stanbury, M., Chikritzhs, T., Catalano, P., & Mateo, C. (2004). Under-reporting of alcohol consumption in household surveys: A comparison of quantity-frequency, graduated-frequency and recent recall. *Addiction*, 99(8), 1024-1033. <https://doi.org/10.1111/j.1360-0443.2004.00815.x>
- Stockwell, T., Zhao, J., Greenfield, T., Li, J., Livingston, M., & Meng, Y. (2016). Estimating under- and over-reporting of drinking in national surveys of alcohol consumption: identification of consistent biases across four English-speaking countries. *Addiction*, 111(7), 1203-1213. <https://doi.org/10.1111/add.13373>
- Substance Abuse and Mental Health Services Administration. (2020). National Survey on Drug Use and Health, 2019. Retrieved from SAMHSA's public data access system: pdas.samhsa.gov/#/survey/NSDUH-2019-DS0001/crosstab/? Substance Abuse and Mental Health Services Administration.
- Swendsen, J. D., & Merikangas, K. R. (2000). The comorbidity of depression and substance use disorders. *Clinical Psychology Review*, 20(2), 173-189. [https://doi.org/10.1016/S0272-7358\(99\)00026-4](https://doi.org/10.1016/S0272-7358(99)00026-4)
- Tran, T. D., Hammarberg, K., Kirkman, M., Nguyen, H. T. M., & Fisher, J. (2020a). Alcohol use and mental health status during the first months of COVID-19 pandemic in Australia. *Journal of Affective Disorders*, 277, 810-813. <https://doi.org/10.1016/j.jad.2020.09.012>
- Tran, T. V., Nguyen, H. C., Pham, L. V., Nguyen, M. H., Nguyen, H. C., Ha, T. H., Phan, D. T., Dao, H. K., Nguyen, P. B., Trinh, M. V., Do, T. V., Nguyen, H. Q., Nguyen, T. T. P., Nguyen, N. P. T., Tran, C. Q., Tran, K. V., Duong, T. T., Pham, H. X., Nguyen, L. V., Vo, T. T., Do, B. N., et al. (2020b). Impacts and interactions of COVID-19 response involvement, health-related behaviours, health literacy on anxiety, depression and health-related quality of life among healthcare workers: a cross-sectional study. *BMJ Open*, 10(12), e041394. <https://doi.org/10.1136/bmjopen-2020-041394>
- U.S. Census Bureau. (2020). Retail sales: Beer, wine, and liquor stores. U.S. Census Bureau,. Retrieved from <https://fred.stlouisfed.org/series/MRTSSM4453USN>
- Vanderbruggen, N., Matthys, F., Van Laere, S., Zeeuws, D., Santermans, L., Van den Aemele, S., & Crunelle, C. L. (2020). Self-reported alcohol, tobacco, and cannabis use during COVID-19 lockdown measures: results from a web-based survey. *Eur Addict Res*, 26(6), 309-315. <https://doi.org/10.1159/000510822>
- Wang, Y., Lu, H., Hu, M., Wu, S., Chen, J., Wang, L., Luo, T., Wu, Z., Liu, Y., Tang, J., Chen, W., Deng, Q., & Liao, Y. (2020). Alcohol consumption in China before and during COVID-19: preliminary results from an online retrospective survey. *Front Psychiatry*, 11, 597826. <https://doi.org/10.3389/fpsy.2020.597826>
- Wardell, J. D., Kempe, T., Rapinda, K. K., Single, A., Bilevicius, E., Frohlich, J. R., Hendershot, C. S., & Keough, M. T. (2020). Drinking to cope during COVID-19 Pandemic: the role of external and internal factors in coping motive pathways to alcohol use, solitary drinking, and alcohol problems. *Alcoholism: Clinical and Experimental Research*, 44(10), 2073-2083. <https://doi.org/10.1111/acer.14425>
- Weerakoon, S. M., Jetelina, K. K., & Knell, G. (2020). Longer time spent at home during COVID-19 pandemic is associated with binge drinking among US adults. *American Journal of Drug and Alcohol Abuse*, 1-9. <https://doi.org/10.1080/00952990.2020.1832508>
- Welch, A. E., Caramanica, K., Maslow, C. B., Cone, J. E., Farfel, M. R., Keyes, K. M., Stellman, S. D., & Hasin, D. S. (2014). Frequent binge drinking five to six years after exposure to 9/11: findings from the World Trade Center Health Registry. *Drug and Alcohol Dependence*, 140, 1-7. <https://doi.org/10.1016/j.drugalcdep.2014.04.013>
- White, A. M., Castle, I. P., & Hingson, R. W. (2020). Using death certificates to explore changes in alcohol-related mortality in the United States, 1999 to 2017. *44(1)*, 178-187. <https://doi.org/10.1111/acer.14239>

- Williams, E., Mulia, N., Karriker-Jaffe, K. J., & Lui, C. K. (2018). Changing racial/ethnic disparities in heavy drinking trajectories through young adulthood: A comparative cohort study. *Alcoholism, Clinical and Experimental Research*, 42(1), 135-143. <https://doi.org/10.1111/acer.13541>
- Witbrodt, J., Mulia, N., Zemore, S. E., & Kerr, W. C. (2014). Racial/ethnic disparities in alcohol-related problems: differences by gender and level of heavy drinking. *Alcoholism, Clinical and Experimental Research*, 38(6), 1662-1670. <https://doi.org/10.1111/acer.12398>
- Wu, P., Liu, X., Fang, Y., Fan, B., Fuller, C. J., Guan, Z., Yao, Z., Kong, J., Lu, J., & Litvak, I. J. (2008). Alcohol abuse/dependence symptoms among hospital employees exposed to a SARS outbreak. *Alcohol and Alcoholism*, 43(6), 706-712. <https://doi.org/10.1093/alcalc/aqn073>
- Zajacova, A., Jehn, A., Stackhouse, M., Denice, P., & Ramos, H. (2020). Changes in health behaviours during early COVID-19 and socio-demographic disparities: a cross-sectional analysis. *Canadian Journal of Public Health. Revue Canadienne de Sante Publique*, 111(6), 953-962. <https://doi.org/10.17269/s41997-020-00434-y>
- Zemore, S. E., Karriker-Jaffe, K. J., Mulia, N., Kerr, W. C., Ehlers, C. L., Cook, W. K., Martinez, P., Lui, C., & Greenfield, T. K. (2018). The future of research on alcohol-related disparities across US racial/ethnic groups: a plan of attack [Article]. *Journal of Studies on Alcohol and Drugs*, 79(1), 7-21. <Go to ISI>://WOS:000425287900002

This page intentionally left blank

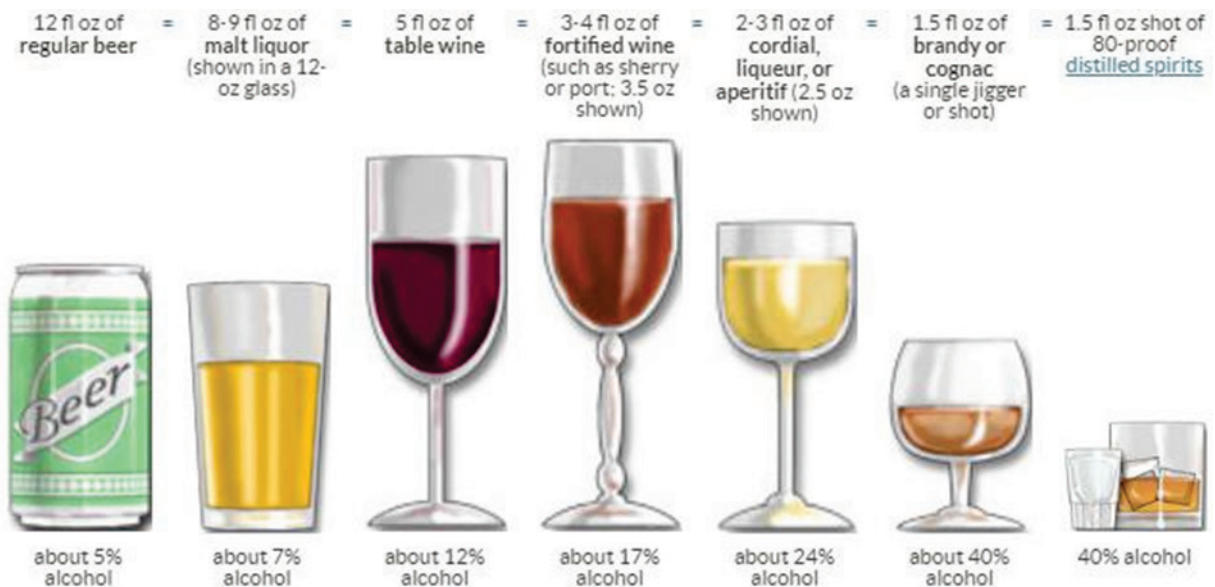
Appendix A

Survey Instruments: Waves 1 and 2

Wave 1

Alcohol Consumption

INTRO_1 The questions in this section are about your consumption of alcoholic beverages. When we ask how often you drink or how many drinks you consume, we are **not** asking about times when you had a sip or two from a drink. Instead, we are asking about your consumption of standard drinks as in the picture below. Each of the items in the picture below represents one standard drink.



Source: <https://www.rethinkingdrinking.niaaa.nih.gov/How-much-is-too-much/what-counts-as-a-drink/whats-A-Standard-drink.aspx>

First, we are going to ask you about your alcohol consumption **during the month of April 2020**.

Q1.1 During the month of April, about how often did you have one or more standard drinks (choose the best response)?

- Every day
- Nearly every day
- 3 to 4 times a week
- 2 times a week
- Once a week
- 2 to 3 times during the month
- Once during the month
- Never

Q1.2 [Ask if Q1.1 != Never] During the month of April, how many standard drinks did you USUALLY have on days when you drank?

_____ drinks.

Q1.3 [Ask if Q1.1 \geq 2-3 times] **During the month of April**, what was the LARGEST number of drinks that you drank in a single day?

_____ drinks.

[Validate: Q1.3 \geq Q1.2]

Q1.4 [Ask if Q1.3 $>$ Q1.2] **During the month of April**, about how often did you drink your largest amount you told us about in the last question (choose the best response)?

- Every day
- Nearly every day
- 3 to 4 times a week
- 2 times a week
- Once a week
- 2 to 3 times during the month
- Once during the month

[Validate: Q1.4 \leq Q1.1]

Q1.5 [Ask if Q1.3 \geq 5 [men] or 4 [women]] **During the month of April**, about how often did you drink FIVE [men]/FOUR [women] OR MORE drinks within 2 hours (choose the best response)?

- Every day
- Nearly every day
- 3 to 4 times a week
- 2 times a week
- Once a week
- 2 to 3 times during the month
- Once during the month

[Validate: Q1.5 \leq Q1.1]

TRANSITION_1 Now, we are going to ask you about your alcohol consumption **during the month of February 2020**, the last full month before stay-at-home orders were issued in most states.

Q1.6 **During the month of February**, about how often did you have one or more standard drinks (choose the best response)?

- Every day
- Nearly every day
- 3 to 4 times a week
- 2 times a week
- Once a week
- 2 to 3 times during the month
- Once during the month
- Never

Q1.7 [Ask if Q1.6 != Never] **During the month of February**, how many standard drinks did you USUALLY have on days when you drank?

_____drinks.

Q1.8 [Ask if Q1.6 >= 2-3 times] **During the month of February**, what was the LARGEST number of drinks that you drank in a single day?

_____drinks.

[Validate: Q1.8 >= Q1.7]

Q1.9 [Ask if Q1.8 > Q1.7] **During the month of February**, about how often did you drink your largest amount you told us about in the last question (choose the best response)?

- Every day
- Nearly every day
- 3 to 4 times a week
- 2 times a week
- Once a week
- 2 to 3 times during the month
- Once during the month

[Validate: Q1.9 <= Q1.6]

Q1.10 [Ask if Q1.8 >= 5 [men] or 4 [women]] **During the month of February**, about how often did you drink FIVE [men]/FOUR [women] OR MORE drinks within 2 hours (choose the best response)?

- Every day
- Nearly every day
- 3 to 4 times a week
- 2 times a week
- Once a week
- 2 to 3 times during the month
- Once during the month

[Validate: Q1.10 <= Q1.6]

Treatment Related to Alcohol

INTRO_2 This section asks about interactions with health care professionals and other services related to your alcohol use.

Q2.1 Has a doctor or other health care professional ever advised you to cut down on drinking or offered information about treatment or other resources (e.g., Alcoholics Anonymous).

Please select the best response.

- Yes, in the past year

- Yes, in my lifetime but not in the past year
- Yes, both in the past year and prior to the past year.
- No

Q2.2 Have you ever received treatment or counseling, or engaged in self-help services like Alcoholics Anonymous for your use of alcohol? Please select the best response.

- Yes, in the past year
- Yes, in my lifetime but not in the past year
- Yes, both in the past year and prior to the past year.
- No

Q2.3 [If Q2.2 != No] What types of treatment, counseling, or alcohol-related services have you received in your lifetime. Please select all that apply.

- Alcohol treatment or detoxification in a hospital setting
- Alcohol detoxification in any other setting
- Residential or outpatient treatment from a substance use disorder treatment facility/agency
- Sessions with a private physician, psychiatrist, psychologist, social worker, or any other professional related to your drinking.
- Sessions with a clergyman, priest, rabbi or any other religious counselor for any reason related to your drinking?
- Alcoholics Anonymous Meetings

Mental Health

INTRO_3 This section asks about issues related to your mental health for **the month of April 2020** and then for **the month of February 2020**, the last full month before stay-at-home orders were issued in most states.

Q3.1 Please select the best answer in each of the rows in the table below.

During the month of April , how often were you bothered by the following problems?	Not at all	Several days	More than half the days	Nearly every day
Little interest or pleasure in doing things	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Feeling down, depressed, or hopeless	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Feeling nervous, anxious or on edge	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not being able to stop or control worrying	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q3.2 Please select the best answer in each of the rows in the table below.

During the month of February , how often were you bothered by the following problems?	Not at all	Several days	More than half the days	Nearly every day
Little interest or pleasure in doing things	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Feeling down, depressed, or hopeless	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Feeling nervous, anxious or on edge	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not being able to stop or control worrying	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Employment Activities

INTRO_4 Finally, this section asks about your employment in the month of April 2020 and then for the month of **February 2020**, the last full month before stay-at-home orders were issued in most states.

Q4.1 Please tell us about your employment status **for the month of April 2020** (check all that apply).

- Working full-time (35+ hours a week)
- Working part-time (less than 35 hours a week)
- Employed but not working because of a temporary illness or injury
- Unemployed/laid off and looking for work
- Unemployed/laid off and not looking for work
- Unemployed and permanently disabled
- Retired
- In school
- Full-time homemaker

Q4.2 Please tell us about your employment status **for the month of February 2020** (check all that apply).

- Working full-time (35+ hours a week)
- Working part-time (less than 35 hours a week)
- Employed but not working because of a temporary illness or injury
- Unemployed/laid off and looking for work
- Unemployed/laid off and not looking for work
- Unemployed and permanently disabled
- Retired
- In school
- Full-time homemaker

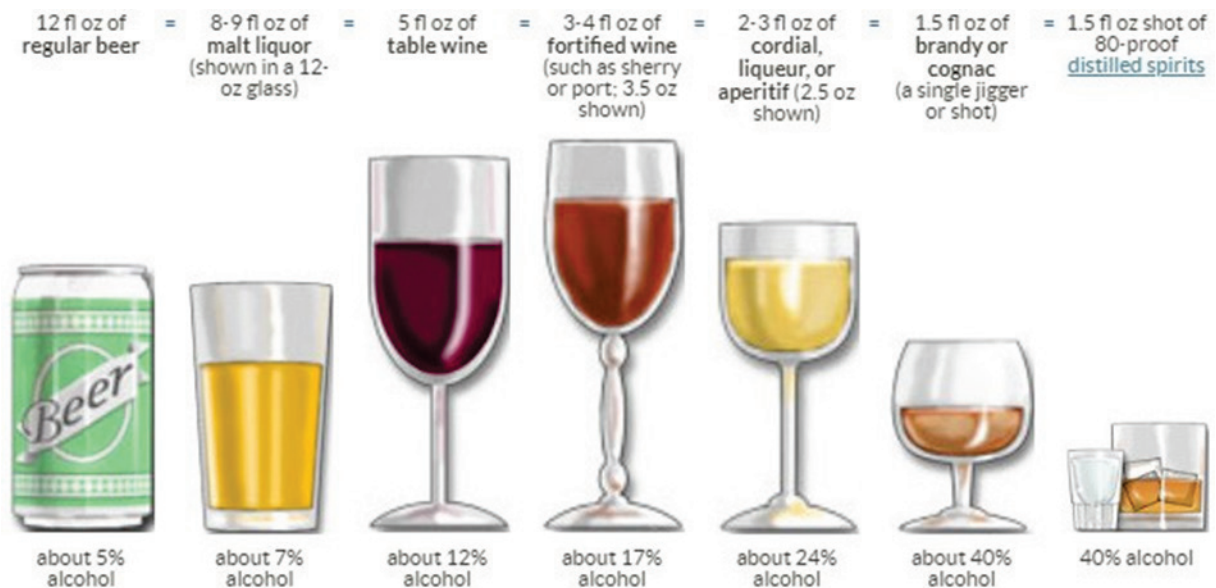
If you would like more information about consuming alcohol, please visit this website:

<https://www.rethinkingdrinking.niaaa.nih.gov/>

Wave 2

Drinking Alcohol

INTRO_1 The questions in this section are about your drinking of alcoholic beverages. When we ask how often you drink or how many drinks you have, we are **not** asking about times when you had a sip or two from a drink. Instead, we are asking about standard drinks, as in the following pictures. Each of the items in the following picture represents one standard drink.



Source: National Institute on Alcohol Abuse and Alcoholism (NIAAA). (n.d.). Rethinking drinking: Alcohol & your health: What's a "standard" drink? [Web page]. Retrieved from <https://www.rethinkingdrinking.niaaa.nih.gov/How-much-is-too-much/what-counts-as-a-drink/whats-A-Standard-drink.aspx>

November

First, we are going to ask you about your alcohol consumption during the full month of **November 2020**, not just around the Thanksgiving Holiday

Q1.1 During the month of **November**, about how often did you have one or more standard drinks? Choose the best response.

- Every day
- Nearly every day
- 3 to 4 times a week
- 2 times a week
- Once a week
- 2 to 3 times during the month
- Once during the month
- Never [Skip to Q1.11]

IF REFUSED SKIP TO 1.11

Q1.2 [Ask if Q1.1 != Never or refused] During **the month of November**, how many standard drinks did you USUALLY have on days when you drank?

_____ drinks.

Q1.3 [Ask if Q1.1 >= 2-3 times during the month] During **the month of November**, what was the LARGEST number of drinks that you drank in a single day?

_____ drinks.

[Validate: Q1.3 >= Q1.2 if Q1.2 refused no validation needed]

Q1.4 [Ask if Q1.3 > Q1.2] During **the month of November**, about how often did you drink [insert the number of drinks from q1.3] drinks in a single day? Choose the best response.

- Every day
- Nearly every day
- 3 to 4 times a week
- 2 times a week
- Once a week
- 2 to 3 times during the month
- Once during the month

[Validate: Q1.4 <= Q1.1]

Q1.5 [Ask if Q1.3 >= 5 [ppgender=1 (men)] or 4 [ppgender=2 (women)]] During **the month of November**, about how often did you drink **five** [men]/**four** [women] **or more** drinks **within 2 hours**? Choose the best response.

- Every day
- Nearly every day
- 3 to 4 times a week
- 2 times a week
- Once a week
- 2 to 3 times during the month
- Once during the month

[Validate: Q1.5 <= Q1.1]

Q1.6 [If Q1.1 != Never or refused] Which of the following types of alcohol did you drink in the month of **November**? Select all that apply.

- Beer
- Hard liquor or spirits (such as whiskey, gin, vodka, rum, or tequila)
- Wine (table wine or fortified wine)
- Wine cooler, hard seltzer, or malt liquor

Q1.7 [If Q1.1 != Never or refused, show only options endorsed in Q1.6] Which of the following types of alcohol did you drink **most often** in the month of **November**? Select the best response.

- Beer
- Hard liquor or spirits (such as whiskey, gin, vodka, rum, or tequila)
- Wine (table wine or fortified wine)
- Wine cooler, hard seltzer, or malt liquor

Q1.8 [If Q1.1 != Never or refused] When you drank in the month of **November**, how frequently was your drinking motivated by each of the reasons listed below.

- To forget your worries.
- Because it helped you when you felt depressed or nervous.
- To cheer up when you were in a bad mood.
- To make you feel more self-confident and sure of yourself.
- To forget about your problems.
- Because you like the feeling.
- Because it's exciting.
- To get high.
- Because it gives you a pleasant feeling.
- Because it's fun.

Response list

- Almost never/never
- Some of the time
- Half of the time
- Most of the time
- Almost always/always

Q1.9 [If Q1.1 != Never or refused] Please indicate where you drank alcohol during the month of **November**. Select all that apply.

- At home (including your yard)
- At someone else's home (including their yard)
- At a restaurant
- At a bar

- In a park
- On the street
- In a parking lot
- In a car
- Somewhere else

Q1.10 [If Q1.1 != Never or refused, show only options endorsed in Q1.9] Of the places where you drank alcohol during the month of **November**, where were you **most often** when drinking? Choose the best response.

- At home (including your yard)
- At someone else's home (including their yard)
- At a restaurant
- At a bar
- In a park
- On the street
- In a parking lot
- In a car
- Somewhere else

Q1.11 During the month of **November**, did you spend any money on beverages containing alcohol, either for yourself or for others?

- Yes
- No

Q1.12 [If Q1.11 = Yes] Please tell us about the alcohol purchases you made during the month of **November**. **How often did you purchase alcohol in these places?**

Choose the best response for each option.

At a restaurant or bar to drink on the premises.

From a restaurant or bar via delivery or takeout.

Inside a store.

Via curbside pickup or drive-through from any store.

Via delivery from any store or online vendor.

Response list

Every day

Nearly every day

2-4 times a week

1-3 times in November

Never in November

July

TRANSITION_1 Now we are going to ask you about your alcohol consumption during the full month of **July 2020**, not just around the 4th of July Holiday.

Q1.13 During **the month of July**, about how often did you have one or more standard drinks? Choose the best response.

- Every day
- Nearly every day
- 3 to 4 times a week
- 2 times a week
- Once a week
- 2 to 3 times during the month
- Once during the month
- Never [Skip to Q1.23]

If refused on Q1.13 skip to Q1.23

Q1.14 [Ask if Q1.13 != Never or refused] During **the month of July**, how many standard drinks did you USUALLY have on days when you drank?

_____ drinks.

Q1.15 [Ask if Q1.13 >= 2-3 times during the month] During **the month of July**, what was the LARGEST number of drinks that you drank in a single day?

_____ drinks.

[Validate: Q1.15 >= Q1.14 if Q1.14 refused no validation needed]

Q1.16 [Ask if Q1.15 > Q1.14] During **the month of July**, about how often did you drink insert the number of drinks from q1.3] drinks in a single day?? Choose the best response.

- Every day
- Nearly every day
- 3 to 4 times a week
- 2 times a week
- Once a week
- 2 to 3 times during the month
- Once during the month

[Validate: Q1.16 <= Q1.13]

Q1.17 [Ask if Q1.15 >= 5 [ppage=1 (men)] or 4 [ppage=2 (women)]] During **the month of July**, about how often did you drink **five** [men]/**four** [women] or more drinks **within 2 hours**?

Choose the best response.

- Every day
- Nearly every day
- 3 to 4 times a week
- 2 times a week

- Once a week
- 2 to 3 times during the month
- Once during the month

[Validate: Q1.17 <= Q1.13]

Q1.18 [If Q1.13 != Never or refused] Which of the following types of alcohol did you drink in the month of **July**? Select all that apply.

- Beer
- Hard liquor or spirits (such as whiskey, gin, vodka, rum, or tequila)
- Wine (table wine or fortified wine)
- Wine cooler, hard seltzer, or malt liquor

Q1.19 [If Q1.13 != Never or refused, show only options endorsed in Q1.18] Which of the following types of alcohol did you drink **most often** in the month of **July**? Select the best response.

- Beer
- Hard liquor or spirits (such as whiskey, gin, vodka, rum, or tequila)
- Wine (table wine or fortified wine)
- Wine cooler, hard seltzer, or malt liquor

Q1.20 [If Q1.13 != Never or refused] When you drank in the month of **July**, how frequently was your drinking motivated by each of the reasons listed below.

- To forget your worries.
- Because it helped you when you felt depressed or nervous.
- To cheer up when you were in a bad mood.
- To make you feel more self-confident and sure of yourself.
- To forget about your problems.
- Because you like the feeling.
- Because it's exciting.
- To get high.
- Because it gives you a pleasant feeling.
- Because it's fun.

Response list

- Almost never/never
- Some of the time
- Half of the time
- Most of the time
- Almost always/always

Q1.21 [If Q1.13 != Never or refused] Please indicate where you drank alcohol during the month of **July**. Select all that apply.

- At home (including your yard)
- At someone else's home (including their yard)
- At a restaurant
- At a bar

- In a park
- On the street
- In a parking lot
- In a car
- Somewhere else

Q1.22 [If Q1.13 != Never or refused, show only options endorsed in Q1.21] Of the places where you drank alcohol during the month of **July**, where were you **most often** when drinking? Choose the best response.

- At home (including your yard)
- At someone else's home (including their yard)
- At a restaurant
- At a bar
- In a park
- On the street
- In a parking lot
- In a car
- Somewhere else

Q1.23 During the month of **July**, did you spend any money on beverages containing alcohol, either for yourself or for others?

- Yes
- No

Q1.24 [If Q1.23 = Yes] Please tell us about the alcohol purchases you made during the month of **July**. **How often did you purchase alcohol in these places?**

Choose the best response for each option.

At a restaurant or bar to drink on the premises.

From a restaurant or bar via delivery or takeout.

Inside a store.

Via curbside pickup or drive-through from any store.

Via delivery from any store or online vendor.

Response list

Every day

Nearly every day

2-4 times a week

1-3 times in July

Never in July

February

TRANSITION_2 Now we are going to ask you about your alcohol consumption during the month of **February 2020**, the last full month before stay-at-home orders were issued in most states.

Q1.25 During **the month of February**, about how often did you have one or more standard drinks? Choose the best response.

- Every day
- Nearly every day
- 3 to 4 times a week
- 2 times a week
- Once a week
- 2 to 3 times during the month
- Once during the month
- Never [Skip to Q1.35]

If Q1.25 = refused skip to Q1.35

Q1.26 [Ask if Q1.25 != Never or refused] During the month of **February**, how many standard drinks did you USUALLY have on days when you drank?

_____ drinks.

Q1.27 [Ask if Q1.25 >= 2–3 times during the month] During **the month of February**, what was the LARGEST number of drinks that you drank in a single day?

_____ drinks.

[Validate: Q1.27 >= Q1.26 if Q1.26 no validation needed]

Q1.28 [Ask if Q1.27 > Q1.26] During **the month of February**, about how often did you drink insert the number of drinks from q1.3] drinks in a single day?? Choose the best response.

- Every day
- Nearly every day
- 3 to 4 times a week
- 2 times a week
- Once a week
- 2 to 3 times during the month
- Once during the month

[Validate: Q1.28 <= Q1.25]

Q1.29 [Ask if Q1.27 >= 5 [men] or 4 [women]] During **the month of February**, about how often did you drink **five** [men]/**four** [women] **or more** drinks **within 2 hours**? Choose the best response.

- Every day
- Nearly every day

- 3 to 4 times a week
- 2 times a week
- Once a week
- 2 to 3 times during the month
- Once during the month

[Validate: Q1.29 <= Q1.25]

Q1.30 [If Q1.25 != Never or refused] Which of the following types of alcohol did you drink in the month of **February**? Select all that apply.

- Beer
- Hard liquor or spirits (such as whiskey, gin, vodka, rum, or tequila)
- Wine (table wine or fortified wine)
- Wine cooler, hard seltzer, or malt liquor

Q1.31 [If Q1.25 != Never, show only options endorsed in Q1.30] Which of the following types of alcohol did you drink **most often** in the month of **February**? Select the best response.

- Beer
- Hard liquor or spirits (such as whiskey, gin, vodka, rum, or tequila)
- Wine (table wine or fortified wine)
- Wine cooler, hard seltzer, or malt liquor

Q1.32 [If Q1.25 != Never or refused] When you drank in the month of **February**, how frequently was your drinking motivated by each of the reasons listed below.

To forget your worries.

Because it helped you when you felt depressed or nervous.

To cheer up when you were in a bad mood.

To make you feel more self-confident and sure of yourself.

To forget about your problems.

Because you like the feeling.

Because it's exciting.

To get high.

Because it gives you a pleasant feeling.

Because it's fun.

Response list

Almost never/never

Some of the time

Half of the time

Most of the time

Almost always/always

Q1.33 [If Q1.25 != Never or refused] Please indicate where you drank alcohol during the month of **February**. Select all that apply.

- At home (including your yard)
- At someone else's home (including their yard)
- At a restaurant
- At a bar
- In a park
- On the street
- In a parking lot
- In a car
- Somewhere else

Q1.34 [If Q1.25 != Never or refused, show only options endorsed in Q1.33] Of the places where you drank alcohol during the month of **February**, where were you **most often** when drinking? Choose the best response.

- At home (including your yard)
- At someone else's home (including their yard)
- At a restaurant
- At a bar
- In a park
- On the street
- In a parking lot
- In a car
- Somewhere else

Q1.35 During the month of **February**, did you spend any money on beverages containing alcohol, either for yourself or for others?

- Yes
- No

Q1.36 [If Q1.35 = Yes] Please tell us about the alcohol purchases you made during the month of **February**. **How often did you purchase alcohol in these places?**

Choose the best response for each option.

At a restaurant or bar to drink on the premises.

From a restaurant or bar via delivery or takeout.

Inside a store.

Via curbside pickup or drive-through from any store.

Via delivery from any store or online vendor.

Response list

Every day

Nearly every day

2-4 times a week

1-3 times in February

Never in February

Treatment Related to Alcohol

Since May

INTRO_2 This section asks about interactions with health care professionals and other services related to your alcohol use since **May 2020**.

Q2.1 Has a doctor or other health care professional advised you to cut down on drinking or offered information about treatment or other resources (e.g., Alcoholics Anonymous) since **May of this year**?

- Yes
- No

Q2.2 Have you received treatment or counseling or engaged in self-help services like Alcoholics Anonymous for your use of alcohol since **May of this year**?

- Yes
- No

Q2.3 [If Q2.2 != No or refused] What types of treatment, counseling, or alcohol-related services have you used since **May of this year**? Please select all that apply.

- Alcohol treatment or detoxification in a hospital setting
- Alcohol detoxification in any other setting
- Residential or outpatient treatment from a substance use disorder treatment facility/agency
- Sessions with a private physician, psychiatrist, psychologist, social worker, or any other professional related to your drinking.
- Sessions with a religious counselor for any reason related to your drinking
- Alcoholics Anonymous or other 12-step or mutual-help meetings (like SMART Recovery, LifeRing Secular Recovery, Women for Sobriety, or some other group)

Mental Health

November

Q3.1 This section asks about issues related to your mental health for **the month of November 2020**.

During the month of November, how often were you bothered by the following problems? Please select the best answer for each of the following.

Little interest or pleasure in doing things
Feeling down, depressed, or hopeless
Feeling nervous, anxious, or on edge
Not being able to stop or control worrying

Response list

- Not at all
- Several days
- More than half the days
- Nearly every day

Other Substances

November

INTRO_3 The next few questions ask about your use of different types of drugs during the month of November.

Q4.1 During the month of **November**, did you use any of the following substances? Select all that apply.

- Marijuana/hashish (other than if directed by a doctor)
- Heroin, fentanyl, or other nonprescription opioids
- Other nonprescription drugs
- None of the above [Exclusive]

Q4.2 During the month of **November**, did you use any of the following prescription drugs for any reason? Select all that apply.

- Painkillers such as codeine, Percodan, Vicodin, OxyContin, or Demerol
- Sedatives like Ambien, zolpidem, or phenobarbital
- Stimulants such as amphetamines, Ritalin, or Adderall
- Tranquilizers like Xanax or Valium
- None of the above [Exclusive]

Q4.3 [If Q4.2 != None of the above or refused, list only selections from Q4.2] During the month of **November**, did you use any of the following prescription drugs in any way a doctor did not direct you to use them? This includes using them without a prescription of your own or using them in greater amounts, more often, or longer than you were told to take them? Select all that apply.

- Painkillers such as codeine, Percodan, Vicodin, OxyContin, or Demerol
- Sedatives like Ambien, zolpidem, or phenobarbital
- Stimulants such as amphetamines, Ritalin, or Adderall
- Tranquilizers like Xanax or Valium
- None of the above [Exclusive]

Q4.4 [Skip if Q4.1 == None of the above or refused AND Q4.2 == None of the above or refused] During the month of **November**, did you drink alcohol within 2 hours of taking any of the following substances? Select all that apply.

[List only substances selected in Q4.1 AND Q4.2]

- Painkillers such as codeine, Percodan, Vicodin, OxyContin, or Demerol
- Sedatives like Ambien, zolpidem, or phenobarbital
- Stimulants such as amphetamines, Ritalin, or Adderall

- Tranquilizers like Xanax or Valium
- Marijuana/hashish (other than if directed by a doctor)
- Heroin, fentanyl, or other nonprescription opioids
- Other nonprescription drugs
- None of the above [Exclusive]

Risk of Fetal Alcohol Spectrum Disorders

INTRO_4 [If $ppgender=1$ (male) or $ppage > 45$, skip to Q6.1] These questions ask about your reproductive health.

Q5.1 Please describe your pregnancy status over the past 9 months (since **February 2020**). Select all that apply.

- I am currently pregnant.
- I am not currently pregnant, but I was pregnant in February.
- I am not currently pregnant, but I was pregnant in April.
- I am not currently pregnant, but I was pregnant in July.
- I am not currently pregnant, but I was pregnant in November.
- I am not currently pregnant, but I am trying to become pregnant.
- I have had a procedure to prevent pregnancy (e.g., tubes tied) or have been told by a medical professional that I am unable to become pregnant. [Skip to Q6.1]
- None of the above

Q5.2 [Ask if Q5.1 = 1] How many weeks pregnant are you?

_____ weeks pregnant.

[Integer: range 6–40. After this question, skip to Q6.1]

Q5.3 [Ask if Q5.1 = 2, 3, 4, 5, or 7] During the month of **November**, did you have sexual intercourse with a male partner?

- Yes
- No [Skip to Q6.1]

Q5.4 [Ask if Q5.3 = Yes] When you had sexual intercourse with a male partner in **November**, how often did you use **at least one of the following methods** to prevent pregnancy:

- Long-acting contraceptives, such as an intrauterine device or a hormonal implant
- Short-acting contraceptives, such as pills, a patch, a shot, or a vaginal ring
- Barriers, such as condoms, diaphragms, sponges, or cervical caps

Response list

- All of the time
- Most of the time
- Some of the time
- None of the time

Employment and Related Activities

Q6.1 Please tell us about your employment status for **the month of November 2020**. Check all that apply.

- Working full-time (35+ hours a week)
- Working part-time (less than 35 hours a week)
- Employed but not working because of a temporary illness or injury
- Unemployed/laid off and looking for work
- Unemployed/laid off and not looking for work
- Unemployed and permanently disabled
- Retired
- In school
- Full-time homemaker

Q6.2 Has your household income changed significantly between **February** and **November 2020**? Choose the best response.

- Yes; my household income was **higher** in November than in February.
- Yes; my household income was **lower** in November than in February.
- No; my household income was about the same in November and February.

Q6.3 During the month of **November**, were there children in your house attending school or daycare less often or not at all due to COVID-19?

- Yes
- No

Q6.4 [Ask if Q6.3 = Yes] Please tell us how many children in each age group were attending school or daycare less often or not at all due to COVID-19 during the month of **November**.

Age 0–1: _____

Age 2–5: _____

Age 6–11: _____

Age 12–17: _____

Experience with COVID-19

Q7.1 Since the COVID-19 outbreak first started, was the health of your COVID ones affected by COVID-19 in any of these ways? Select all that apply.

- Someone close to you had to be quarantined due to infection or suspected infection.
- Someone close to you was infected.
- Someone close to you was hospitalized.
- Someone close to you died.
- None of the above

Q7.2 Since the COVID-19 outbreak first started, was your own health affected by COVID-19 in any of these ways? Select all that apply.

- You had to be quarantined due to infection or suspected infection.
- You were infected.
- You were hospitalized.
- None of the above

Q7.3 Since the COVID-19 outbreak first started, how much has it prevented you from...

Interacting with your friends?

Taking care of your usual daily chores?

Doing your usual job or other tasks?

Being able to take care of your family or others who depend on you as well as you would like?

Planning for the future?

Imagining a return to “a normal life” in the near future?

Response List

Not at all

A little

Somewhat

Very much

Totally

If you would like more information about consuming alcohol, please visit this website:
<https://www.rethinkingdrinking.niaaa.nih.gov/>.

Appendix B Characteristics of All Wave 2 Respondents

Tables

Number	Page
B.1 Demographic and Baseline Socioeconomic Characteristics, All Wave 2 Respondents	B-1
B.2 Drinking Measures by Month, All Wave 2 Respondents	B-2
B.3 Other Measures by Month, All Wave 2 Respondents	B-5

Table B.1 Demographic and Baseline Socioeconomic Characteristics, All Wave 2 Respondents

Characteristic	Percentage (N=790)
Female	51.63%
Age	
21–34	25.67%
35–49	24.64%
50–64	28.45%
65+	21.24%
Race	
White, non-Hispanic	64.21%
Black, non-Hispanic	10.79%
Other, non-Hispanic	8.30%
Hispanic	16.69%
Education	
No college	38.60%
Some college	28.79%
BA/BS	32.61%
Income	
<\$50,000	47.68%
\$50,000–\$100,000	32.14%
>\$100,000	20.18%
Has children	24.68%
Married	56.40%

Table B.2 Drinking Measures by Month, All Wave 2 Respondents

Measure	Feb	Apr	Jul	Nov
All Wave 2 respondents				
Drank in month				
Yes	53.8%	52.9%	56.0%	61.3%
N	785	785	789	788
Drinks per month				
Mean	11.5	15.7	16.0	16.0
SD	(28.1)	(34.2)	(39.2)	(35.2)
N	781	780	785	784
Exceed drinking guidelines				
Yes	15.8%	20.0%	19.7%	22.0%
N	782	780	785	785
Binge drinking				
Yes	12.7%	16.0%	14.0%	16.4%
N	789	787	780	778
Reported drinking to cope in any month				
Yes		32.1%		
N		789		
Reported drinking for enhancement in any month				
Yes		55.7%		
N		789		
Conditional on any drinking in the respective month				
Drinks per month				
Mean	21.5	29.8	28.7	26.2
SD	(35.6)	(42.4)	(49.0)	(41.7)
N	435	425	457	490
Drinks per drinking day				
Mean	2.5	2.6	2.6	2.6
SD	(1.9)	(2.1)	(2.2)	(2.2)
N	435	425	457	490
Usual frequency				
Mean	7.6	10.0	9.1	8.8
SD	(7.8)	(8.8)	(8.7)	(8.7)
N	439	430	461	494

(continued)

Table B.2 Drinking Measures by Month, All Wave 2 Respondents (continued)

Measure	Feb	Apr	Jul	Nov
Usual quantity				
Mean	2.2	2.4	2.4	2.3
SD	(1.6)	(1.9)	(1.9)	(2.1)
N	436	425	457	491
Maximum drinks on a day				
0–2	54.5%	45.4%	49.8%	49.0%
3–4	25.2%	30.2%	28.6%	29.4%
5–7	13.2%	15.6%	12.6%	14.0%
8+	7.1%	8.7%	9.0%	7.7%
N	436	425	457	491
Exceed drinking guidelines				
Yes	29.5%	38.1%	35.2%	36.0%
N	436	425	457	491
Binge drinking				
Yes	23.7%	30.5%	25.2%	27.0%
N	438	427	452	484
Reported drinking to cope				
Yes	41.9%	.	44.4%	42.6%
N	356	0	458	482
Reported drinking for enhancement				
Yes	83.9%	.	84.0%	83.3%
N	357	0	456	487
Most common beverage				
Beer	33.8%	.	42.3%	32.4%
Liquor or spirits	22.9%	.	21.6%	24.5%
Wine (table wine or fortified wine)	38.2%	.	25.0%	35.8%
Wine cooler, hard seltzer, or malt liquor	5.1%	.	11.1%	7.3%
N	356	0	458	490

(continued)

Table B.2 Drinking Measures by Month, All Wave 2 Respondents (continued)

Measure	Feb	Apr	Jul	Nov
Most common venue				
At home (including yard)	70.9%	.	81.7%	81.4%
At someone else's home (including yard)	10.8%	.	10.7%	10.5%
At a restaurant	12.6%	.	4.6%	5.8%
At a bar	3.1%	.	0.6%	1.5%
In a park	0.0%	.	0.3%	0.0%
Somewhere else	2.6%	.	2.1%	0.8%
N	359	0	461	491
Conditional on purchasing alcohol in the respective month				
Purchases at a restaurant or bar to drink on the premises				
Yes	66.9%	.	38.4%	38.7%
N	290	0	360	366
Purchases from a restaurant or bar via delivery or takeout				
Yes	11.3%	.	9.7%	9.8%
N	290	0	360	366
Purchases inside a store				
Yes	71.5%	.	76.0%	69.5%
N	289	0	359	366
Purchases via curbside pickup or drive-through from any store				
Yes	5.9%	.	9.6%	9.0%
N	290	0	359	366
Purchases via delivery from any store or online vendor				
Yes	4.0%	.	6.0%	10.8%
N	290	0	359	364

Table B.3 Other Measures by Month, All Wave 2 Respondents

Measure	Percentage
Lifetime advice to cut down/information offered	
Yes	7.4%
N	784
Advice to cut down/information offered, May–Nov	
Yes	2.8%
N	785
Lifetime treatment	
Yes	5.2%
N	781
Treatment, May–Nov	
Yes	1.0%
N	783
Other nonmedical substance use in Nov	
Yes	13.8%
N	788
Pregnant during study period (among women aged 45 or younger)	
Yes	9.2%
N	118
Employment, Feb	
Employed	62.6%
Unemployed	4.1%
Out of labor force	33.3%
N	783
Employment, Apr	
Employed	55.7%
Unemployed	6.8%
Out of labor force	37.5%
N	782
Employment, Nov	
Employed	57.5%
Unemployed	5.6%
Out of labor force	36.9%
N	790

(continued)

Table B.3 Other Measures by Month, All Wave 2 Respondents (continued)

Measure	Percentage
Income change	
Yes; my household income was higher	12.4%
Yes; my household income was lower	19.5%
No; my household income was about the same	68.1%
N	784
Any children missing school/daycare in Nov (of those with children)	
Yes	16.9%
N	785
Any children aged 0–1 missing school/daycare in Nov (of those with children)	
Yes	0.3%
N	170
Any children aged 2–5 missing school/daycare in Nov (of those with children)	
Yes	11.0%
N	170
Any children aged 6–11 missing school/daycare in Nov (of those with children)	
Yes	26.5%
N	170
Any children aged 12–17 missing school/daycare in Nov (of those with children)	
Yes	32.9%
N	170
Direct COVID-19 impact (quarantined due to infection, was infected or hospitalized)	
Yes	14.4%
N	785

Appendix C

Characteristics of Respondent Groups Defined by Drinking to Exceed Recommended Guidelines

Characteristic	Exceeded Drinking Guidelines in February → Number of Pandemic Months Exceeding Drinking Guidelines →								Total
	No 0	No 1	No 2	No 3	Yes 0	Yes 1	Yes 2	Yes 3	
Characteristic	(n=309)	(n=48)	(n=36)	(n=20)	(n=11)	(n=17)	(n=25)	(n=75)	(n=541)
Gender									
Male	52.5%	23.5%	47.5%	39.9%	59.7%	48.5%	36.5%	56.3%	48.4%
Female	47.5%	76.5%	52.5%	60.1%	40.3%	51.5%	63.5%	43.7%	51.6%
Age									
21-34	22.9%	26.9%	37.7%	27.7%	38.6%	21.4%	34.2%	23.2%	25.4%
35-49	24.2%	36.1%	30.9%	12.7%	0.0%	44.5%	29.6%	27.1%	26.3%
50-64	30.5%	22.8%	18.8%	36.7%	38.0%	24.2%	23.3%	28.6%	28.4%
65+	22.5%	14.2%	12.6%	22.9%	23.4%	9.9%	12.9%	21.2%	19.9%
Race									
White, non-Hispanic	62.5%	48.8%	57.9%	58.6%	77.0%	66.8%	82.6%	69.8%	62.9%
Black, non-Hispanic	10.6%	13.2%	15.0%	19.6%	0.0%	0.0%	0.0%	4.7%	9.7%
Other, non-Hispanic	9.6%	10.3%	2.8%	5.3%	0.0%	0.0%	11.2%	4.2%	7.9%
Hispanic	17.3%	27.7%	24.3%	16.5%	23.0%	33.2%	6.2%	21.2%	19.5%
Children in Household									
No	79.1%	65.0%	67.1%	73.8%	63.2%	72.9%	69.7%	61.1%	73.2%
Yes	20.9%	35.0%	32.9%	26.2%	36.8%	27.1%	30.3%	38.9%	26.8%
Baseline Educational Attainment									
No college	35.0%	56.0%	34.5%	36.5%	37.6%	33.7%	22.5%	29.6%	36.0%
Some college	28.2%	18.8%	32.1%	47.1%	18.0%	24.8%	38.6%	35.8%	29.3%
BA/BS+	36.7%	25.2%	33.4%	16.5%	44.4%	41.5%	38.9%	34.6%	34.7%

Characteristic	Exceeded Drinking Guidelines in February →				Number of Pandemic Months Exceeding Drinking Guidelines →				Total
	No 0	No 1	No 2	No 3	Yes 0	Yes 1	Yes 2	Yes 3	
	(n=309)	(n=48)	(n=36)	(n=20)	(n=11)	(n=17)	(n=25)	(n=75)	(n=541)
Baseline Annual Household Income									
<\$50k	25.0%	24.9%	28.0%	35.9%	31.3%	41.6%	16.8%	21.0%	25.4%
\$50-\$100k	31.1%	35.6%	22.4%	13.7%	14.3%	18.8%	14.8%	33.5%	29.1%
>\$100k	43.9%	39.4%	49.6%	50.4%	54.3%	39.6%	68.4%	45.6%	45.5%
Married at Baseline									
No	41.7%	46.4%	62.6%	56.2%	48.2%	57.3%	54.6%	36.6%	44.8%
Yes	58.3%	53.6%	37.4%	43.8%	51.8%	42.7%	45.4%	63.4%	55.2%
Ever Unemployed									
No	89.0%	89.2%	87.3%	76.6%	92.0%	91.6%	90.7%	91.5%	89.0%
Yes	11.0%	10.8%	12.7%	23.4%	8.0%	8.4%	9.3%	8.5%	11.0%
Any Positive PHQ-2									
No	84.1%	71.5%	72.1%	78.6%	45.2%	86.1%	49.2%	76.0%	78.2%
Yes	15.9%	28.5%	27.9%	21.4%	54.8%	13.9%	50.8%	24.0%	21.8%
Any Positive GAD-2									
No	82.2%	72.6%	58.3%	79.3%	57.3%	84.0%	72.6%	75.1%	77.4%
Yes	17.8%	27.4%	41.7%	20.7%	42.7%	16.0%	27.4%	24.9%	22.6%
Any Positive PHQ-2 or GAD-2									
No	76.4%	69.2%	50.7%	68.3%	45.2%	77.8%	49.2%	72.5%	71.0%
Yes	23.6%	30.8%	49.3%	31.7%	54.8%	22.2%	50.8%	27.5%	29.0%
Any Report of Drinking to Cope									
No	70.1%	35.8%	30.8%	36.5%	51.1%	32.0%	14.6%	40.1%	54.2%
Yes	29.9%	64.2%	69.2%	63.5%	48.9%	68.0%	85.4%	59.9%	45.8%
Any Report of Drinking to Cope in Feb									
No	84.2%	66.7%	54.2%	48.8%	65.0%	34.4%	54.8%	47.7%	70.7%
Yes	15.8%	33.3%	45.8%	51.2%	35.0%	65.6%	45.2%	52.3%	29.3%

Characteristic	Exceeded Drinking Guidelines in February → Number of Pandemic Months Exceeding Drinking Guidelines →								Total
	No 0	No 1	No 2	No 3	Yes 0	Yes 1	Yes 2	Yes 3	
Any Report of Drinking for Enhancement	(n=309)	(n=48)	(n=36)	(n=20)	(n=11)	(n=17)	(n=25)	(n=75)	(n=541)
No	31.3%	10.8%	1.9%	0.0%	33.1%	9.5%	0.0%	6.9%	20.5%
Yes	68.7%	89.2%	98.1%	100.0%	66.9%	90.5%	100.0%	93.1%	79.5%
Any Report of Drinking for Enhancement in Feb									
No	55.2%	31.3%	30.1%	4.8%	41.1%	29.3%	22.3%	9.3%	40.4%
Yes	44.8%	68.7%	69.9%	95.2%	58.9%	70.7%	77.7%	90.7%	59.6%
Reported Income Drop from Feb to Nov									
No	82.7%	76.4%	61.3%	72.2%	75.9%	73.8%	84.5%	75.6%	78.8%
Yes	17.3%	23.6%	38.7%	27.8%	24.1%	26.2%	15.5%	24.4%	21.2%
Direct COVID-19 Impact (I quarantined, was infected, or hospitalized)									
No	89.7%	82.2%	74.1%	73.5%	75.2%	86.4%	84.6%	83.5%	85.7%
Yes	10.3%	17.8%	25.9%	26.5%	24.8%	13.6%	15.4%	16.5%	14.3%
Indirect COVID-19 Impact (family/friend)									
None	60.7%	57.2%	55.7%	43.9%	67.8%	61.2%	62.0%	64.0%	60.0%
Close family/friend infected or quarantined	26.4%	32.1%	19.3%	35.2%	32.2%	32.5%	21.8%	24.1%	26.6%
Close family/friend hospitalized or died	12.9%	10.7%	25.0%	20.9%	0.0%	6.2%	16.2%	11.9%	13.4%
Any Reported Direct or Indirect Impact of COVID-19									
No	59.2%	54.9%	55.7%	40.5%	67.8%	61.2%	55.2%	61.3%	58.2%
Yes	40.8%	45.1%	44.3%	59.5%	32.2%	38.8%	44.8%	38.7%	41.8%
Significant Impact on Daily Life									
No	68.1%	54.3%	64.0%	60.0%	39.5%	51.4%	67.5%	77.6%	66.1%
Yes	31.9%	45.7%	36.0%	40.0%	60.5%	48.6%	32.5%	22.4%	33.9%

Estimates are survey-weighted means.

This page intentionally left blank

Appendix D Adjusted Predicted Values by Group: All Wave 2 Respondents

All	Drinks Consumed				Percentage Exceeding Drinking Guidelines				Percentage Binge Drinking			
	Feb	Apr	Jul	Nov	Feb	Apr	Jul	Nov	Feb	Apr	Jul	Nov
Gender												
Female	8.3	11.9^a	11.2	11.6^a	13.7%	20.3%^a	19.3%^a	21.5%^a	10.3%	14.9%^a	11.8%	15.0%
Male	15.3	19.4^a	20.3^a	20.5^a	15.5%	17.5%	18.5%	20.7%^a	10.9%	12.4%	12.8%	14.6%
Age												
21–34	10.0	12.4	13.3	14.5	14.4%	19.6%	19.6%	23.2%^a	11.8%	15.4%	11.8%	18.1%
35–49	12.3	16.4^a	15.4^a	16.3^a	16.5%	21.7%	21.8%	23.8%^a	15.5%	19.4%	18.9%	19.0%
50–64	12.0	17.1^a	19.0^{a,b}	16.3^a	13.9%	17.0%	18.6%	17.9%	11.2%	12.3%	15.1%	14.5%
64+	12.3	15.9^a	13.9 ^b	16.2^a	13.3%	17.7%	15.5%	20.2%^a	5.5%	9.1%^a	5.8%	8.9%
Race/ethnicity*												
White, non-Hispanic	13.4	16.5^a	15.0	15.8^a	17.8%	20.0%	20.5% ^b	20.8% ^b	12.9%	14.9%	13.7%	14.8% ^b
Black, non-Hispanic	5.3	7.4^a	15.0^a	14.6^a	3.8%	9.2%	16.2%^{a,b}	23.0%^{a,b}	3.5%	6.4%	11.3%^a	19.0%^{a,b}
Other race, non-Hispanic	8.5	14.2^a	23.8	17.0	8.4%	13.2%	11.9%	12.5%	5.2%	7.1%	9.1%	8.7%
Hispanic	10.5	17.4^a	14.2^a	16.3	18.5%	27.4%^a	18.8%	26.9%	14.3%	21.3%	9.8%	15.9%
Children in household												
No	9.9	12.0^{a,b}	12.1^a	12.0 ^b	11.9%	15.9%^a	15.8%^a	18.2%^a	8.7%	11.1%	9.9%	12.4%
Yes	16.6	25.9^{a,b}	25.9^a	27.3^{a,b}	23.0%	28.5%	28.5%	29.8%	16.8%	22.2%	20.2%	22.6%
Ever unemployed												
No	12.0	15.7^a	16.0^a	15.2^a	14.7%	18.7%^a	18.9%^a	20.0%^a	10.6%	13.3%^a	12.3%	14.0%
Yes	8.7	14.0	12.0	22.7^a	13.7%	21.6%	19.2%	30.2%^a	11.6%	17.0%	11.8%	19.6%
Ever PHQ+ or GAD+ ^{†,§}												
No	11.9	15.3^a	14.2^a	13.7 ^b	13.5%	18.2%^a	18.8%^a	17.9%^a	10.3%	13.3%^a	11.7%	12.0%
Yes	11.1	16.3^a	19.2^a	21.2^{a,b}	17.3%	21.0%	19.6%	30.1%^a	12.2%	14.8%	13.7%	22.1%^a

(continued)

All	Drinks Consumed				Percentage Exceeding Drinking Guidelines				Percentage Binge Drinking			
	Feb	Apr	Jul	Nov	Feb	Apr	Jul	Nov	Feb	Apr	Jul	Nov
Ever drinking to cope [†]												
No	7.0	8.8^{a,b}	6.7 ^b	7.3 ^b	6.9%	10.0%^a	9.2%	10.4%^a	4.5%	6.5%	5.2%	6.0%
Yes	21.5	29.7^{a,b}	34.4^{a,b}	33.9^{a,b}	31.9%	38.9%	40.7%^a	45.1%^a	25.1%	30.7%	29.3%	35.6%^a
Ever drinking for enhancement ^{†,‡,§}												
No	2.2	3.6^{a,b}	1.3 ^b	1.8 ^b	2.7%	3.2%	1.6%^{a,b}	2.0% ^b	1.7%	2.6%	0.8% ^b	1.3%
Yes	19.1	24.9^{a,b}	26.9^{a,b}	26.9^{a,b}	24.6%	32.0%^a	33.4%^{a,b}	37.0%^{a,b}	18.4%	23.3%^a	22.5% ^b	26.7%^a
Income drop, Feb–Nov [§]												
No	10.9	14.4^a	13.7^a	13.7^a	13.8%	17.7%^a	17.7%^a	18.7%^a	10.0%	12.8%^a	10.8%	12.3%
Yes	15.0	20.3^a	23.6^a	25.1^a	17.8%	24.3%	24.6%	32.2%^a	13.1%	17.3%	19.1%	25.9%^a
Direct health impact of COVID-19 [†]												
No	12.3	16.0^a	15.6^a	15.3^{a,b}	14.3%	17.8%^a	18.1%^a	19.7%^a	10.3%	13.0%^a	11.6%	13.7%
Yes	7.5	12.4^a	15.7^a	18.2^{a,b}	16.1%	24.4%	22.8%	29.1%^a	13.0%	18.2%	17.1%	20.7%
Indirect health impact of COVID-19												
No	12.0	15.7^a	14.0	15.0	15.9%	19.6%^a	18.8%	20.4%	11.4%	14.5%^a	11.7%	14.1%
Family/friend quarantined or infected	11.8	15.5^a	18.2^a	18.4^a	13.0%	16.6%	18.6%	20.6%^a	9.3%	11.8%	13.5%	13.7%
Family/friend hospitalized or died	9.9	14.8^a	17.4^a	13.2	11.6%	21.1%^a	20.6%^a	25.3%^a	9.7%	14.1%	13.5%	20.3%^a
Significant impact of COVID-19 on daily life [†]												
No	12.8	15.7^a	15.7	15.0 ^b	14.6%	18.5%^a	20.2%^a	21.5%^a	10.1%	12.9%^a	13.0%	14.4%^a
Yes	9.3	15.6^a	15.4^a	18.5^{a,b}	14.4%	19.8%	16.5%	21.2%^a	11.5%	15.3%	10.9%	16.3%

Bold text (and superscript a) indicates significant ($p < 0.05$) differences *within a row* (e.g., among females) relative to February. Shaded cells (and superscript b) represent significant ($p < 0.05$) differences between groups (e.g., between females and males) relative to February.

*Several racial/ethnic groups have significantly different changes from February and significantly different linear trends. Shaded cells represent significant differences between White, non-Hispanic and all other groups. See **Figure E.4b** for more details.

[†]Significant differences in linear trend for drinks consumed between groups ($p < 0.05$).

[‡]Significant differences in linear trend for exceeding drinking guidelines between groups ($p < 0.05$).

[§]Significant differences in linear trend for binge drinking between groups ($p < 0.05$).

Appendix E

Charts of Alcohol Consumption Outcomes for the Analytic Sample of Respondents Who Reported Drinking in Any Month (“Main Sample”) and for All Wave 2 Respondents

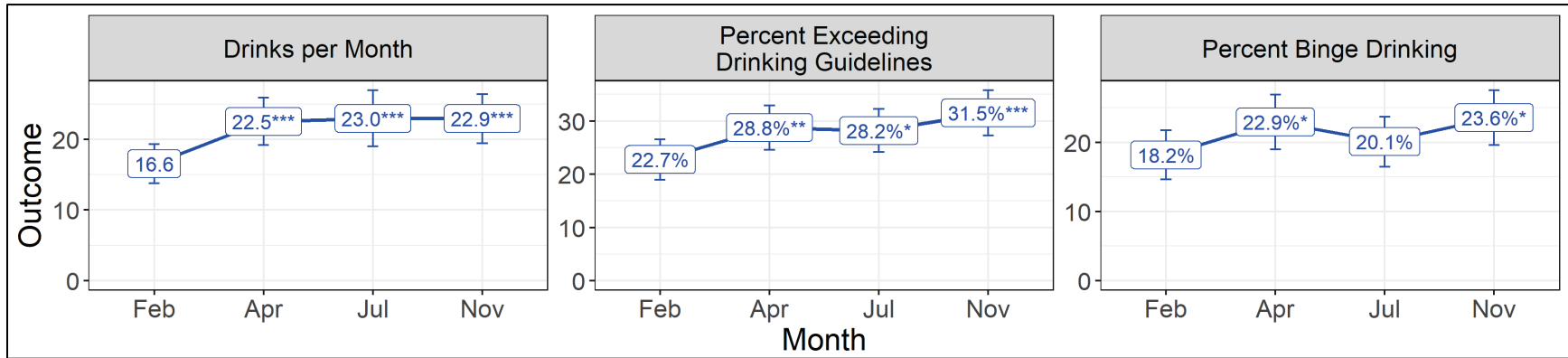
Figures

Number	Page
E.1a Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among the Main Sample	E-3
E.1b Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among All Wave 2 Respondents	E-4
E.2a Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among the Main Sample, by Gender	E-5
E.2b Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among All Wave 2 Respondents, by Gender	E-6
E.3a Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among the Main Sample, by Age Group	E-7
E.3b Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among All Wave 2 Respondents, by Age Group	E-8
E.4a Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among the Main Sample, by Race/Ethnicity	E-9
E.4b Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among All Wave 2 Respondents, by Race/Ethnicity	E-10
E.5a Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among the Main Sample, by Respondents with or without Children in the Household	E-11
E.5b Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among All Wave 2 Respondents, by Respondents with or without Children in the Household	E-12
E.6a Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among the Main Sample, by Unemployment	E-13
E.6b Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among All Wave 2 Respondents, by Unemployment	E-14
E.7a Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among the Main Sample, by PHQ-2+	E-15
E.7b Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among all Wave 2 Respondents, by PHQ-2+	E-16
E.8a Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among the Main Sample, by GAD-2+	E-17
E.8b Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among All Wave 2 Respondents, by GAD-2+	E-18
E.9a Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among the Main Sample, by PHQ-2/GAD-2+	E-19
E.9b Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among All Wave 2 Respondents, by PHQ-2/GAD-2+	E-20
E.10a Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among the Main Sample, by Ever Drinking to Cope	E-21

Figures (continued)

Number	Page
<u>E.10b Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among All Wave 2 Respondents, by Ever Drinking to Cope</u>	E-22
<u>E.11a Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among the Main Sample, by Drinking to Cope in February</u>	E-23
<u>E.11b Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among All Wave 2 Respondents, by Drinking to Cope in February</u>	E-24
<u>E.12a Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among the Main Sample, by Ever Drinking for Enhancement</u>	E-25
<u>E.12b Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among All Wave 2 Respondents, by Ever Drinking for Enhancement</u>	E-26
<u>E.13a Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among the Main Sample, by Drinking for Enhancement in February</u>	E-27
<u>E.13b Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among All Wave 2 Respondents, by Drinking for Enhancement in February</u>	E-28
<u>E.14a Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among the Main Sample, by Income Change Status</u>	E-29
<u>E.14b Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among All Wave 2 Respondents, by Income Change Status</u>	E-30
<u>E.15a Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among the Main Sample, by Respondent COVID-19 Experience</u>	E-31
<u>E.15b Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among All Wave 2 Respondents, by Respondent COVID-19 Experience</u>	E-32
<u>E.16a Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among the Main Sample, by COVID-19 Experience for Respondent’s Close Family Member or Friend</u>	E-33
<u>E.16b Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among All Wave 2 Respondents, by COVID-19 Experience for Respondent’s Close Family Member or Friend</u>	E-34
<u>E.17a Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among the Main Sample, by COVID-19 Experience of Respondent or Close Family Member or Friend</u>	E-35
<u>E.17b Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among All Wave 2 Respondents, by COVID-19 Experience of Respondent or Close Family Member or Friend</u>	E-36
<u>E.18a Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among the Main Sample, by Significant Impact of COVID-19 on Daily Life</u>	E-37
<u>E.18b Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among All Wave 2 Respondents, by Significant Impact of COVID-19 on Daily Life</u>	E-38

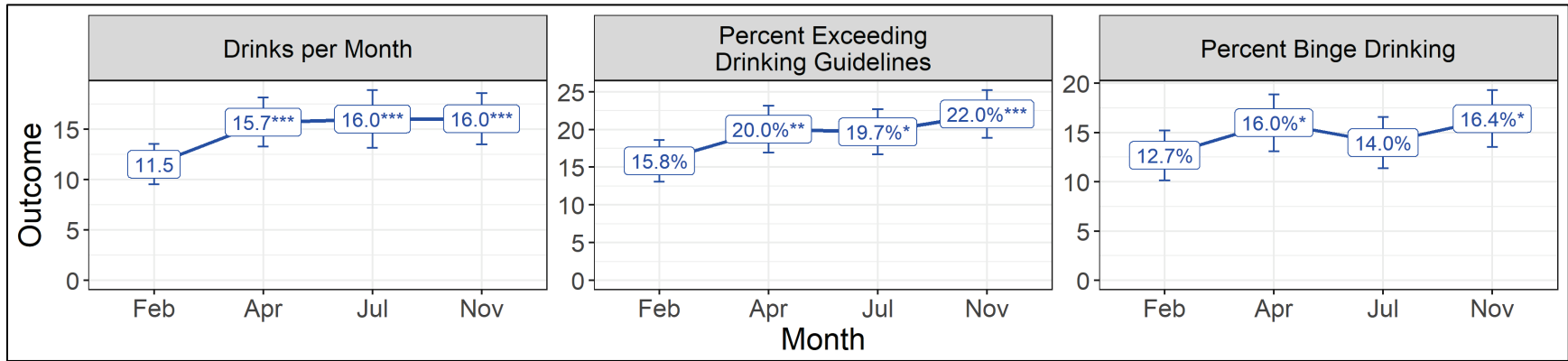
Figure E.1a Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among the Main Sample



Asterisks denote significant differences relative to February: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

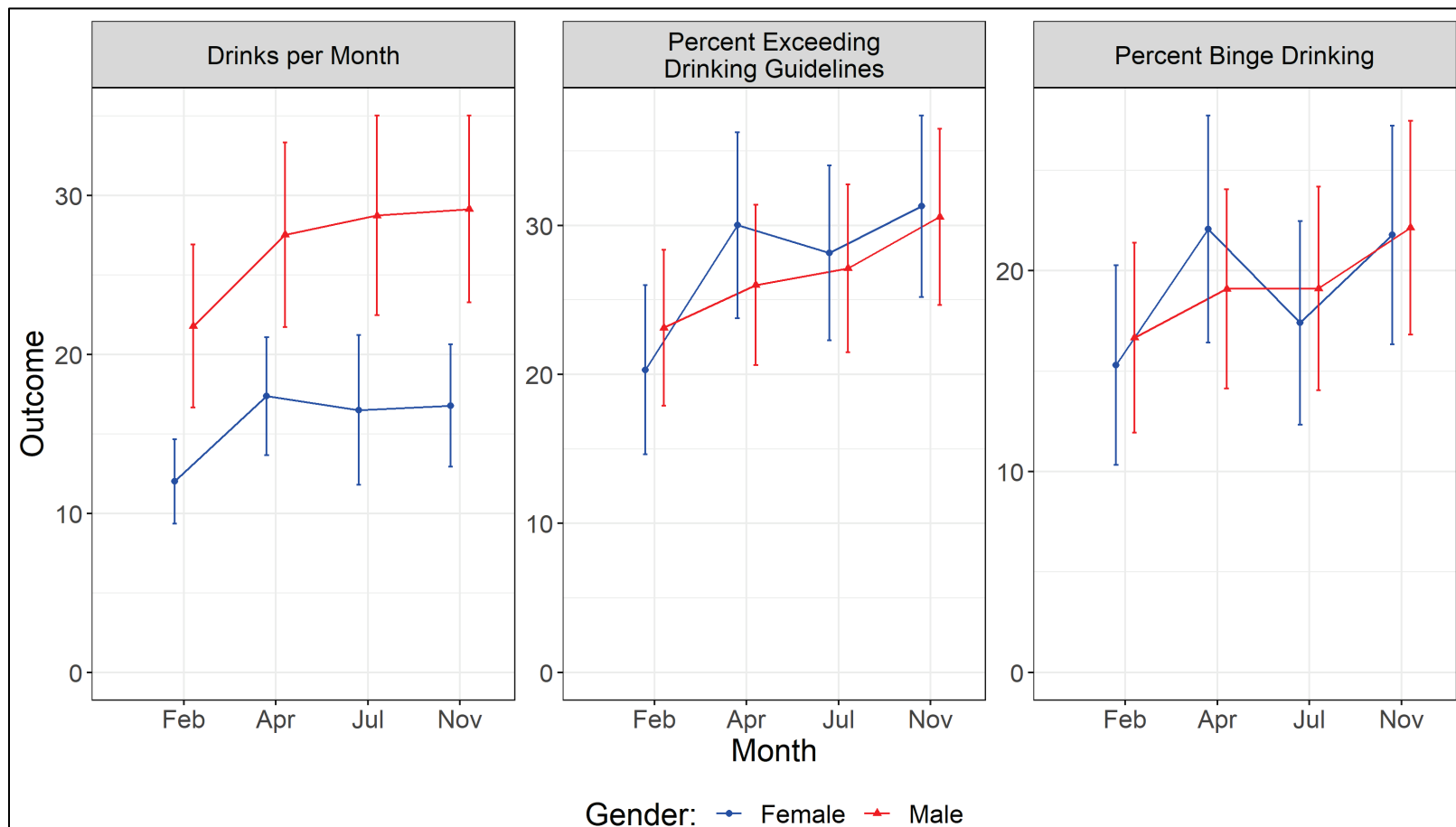
Figure E.1b Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among All Wave 2 Respondents

E-4



Asterisks denote significant differences relative to February: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Figure E.2a Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among the Main Sample, by Gender



The change in exceeding drinking guidelines from February to April is significantly different between groups ($p=0.048$).

Figure E.2b Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among All Wave 2 Respondents, by Gender

E-6

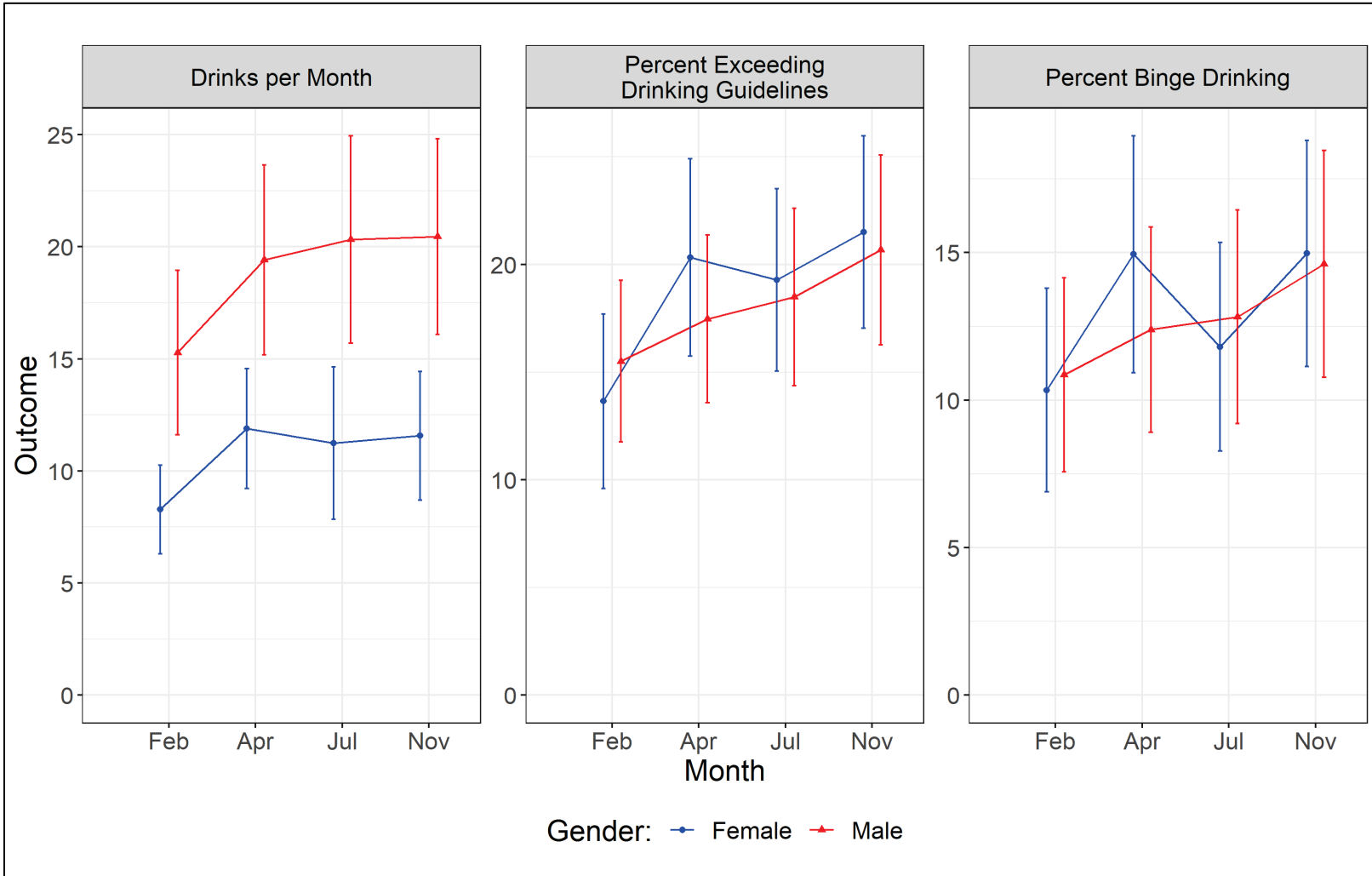
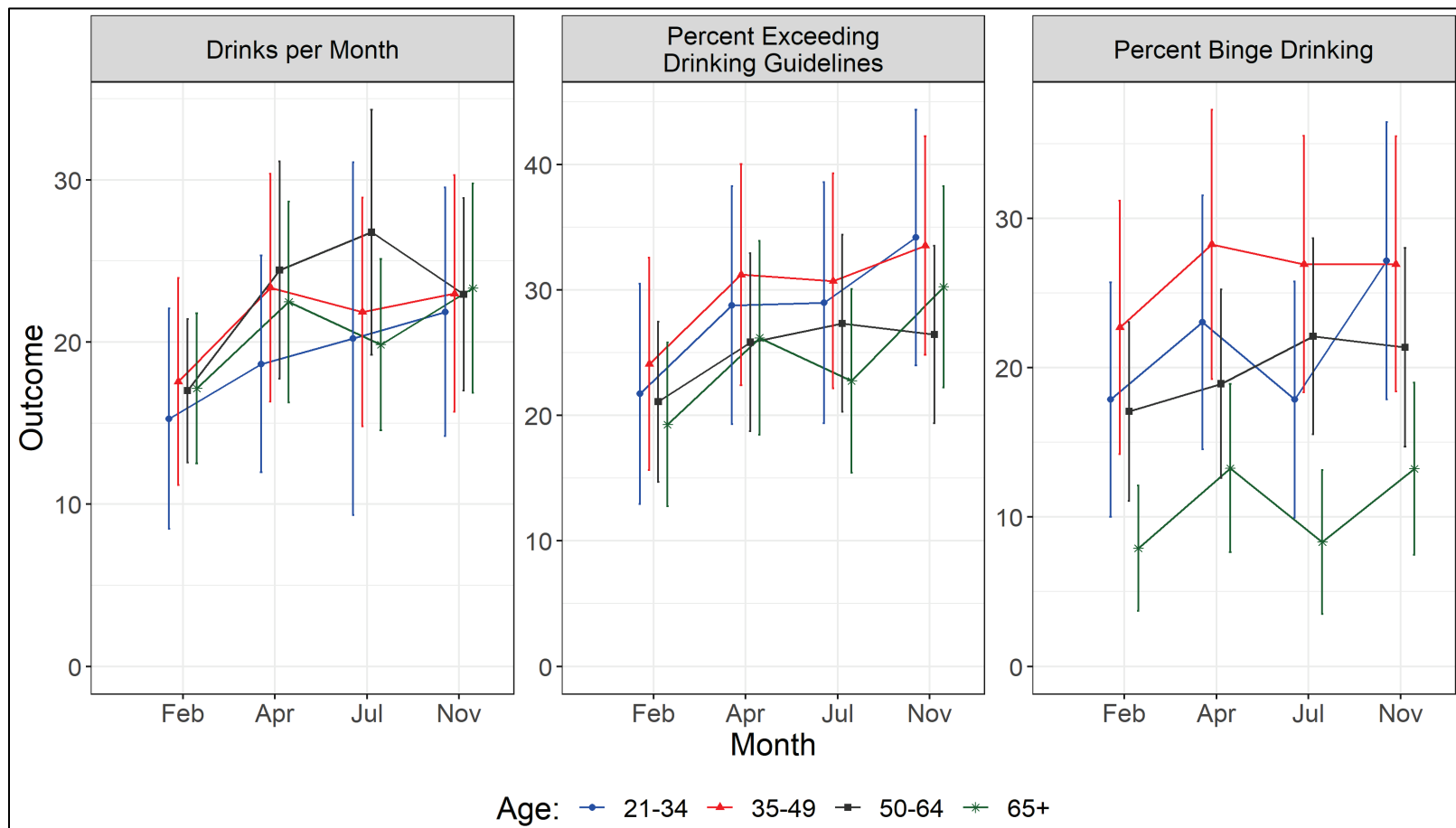


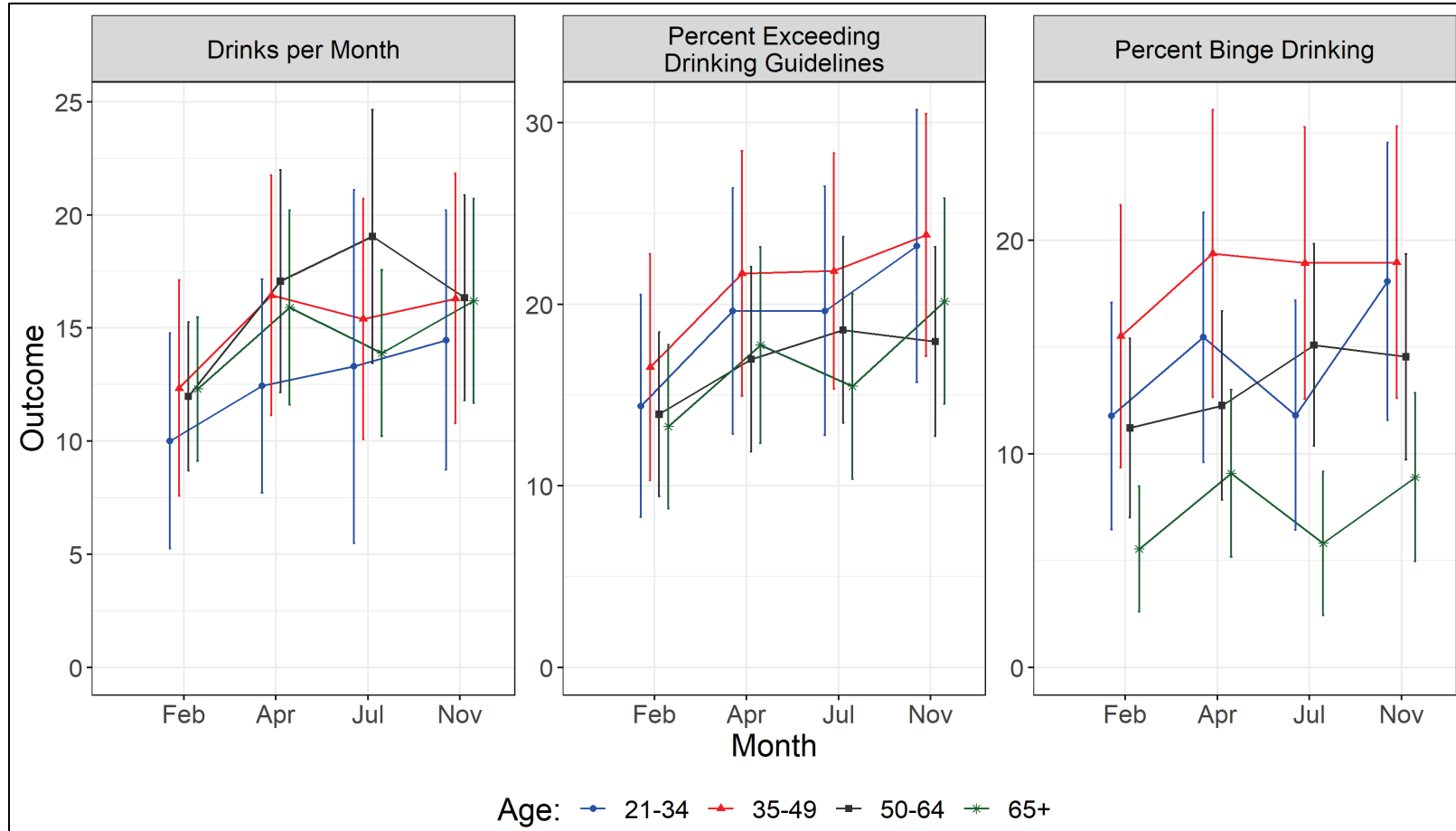
Figure E.3a Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among the Main Sample, by Age Group



The change in drinks per month from February to July is significantly different between ages 50–64 and ages 65+ ($p=0.027$).

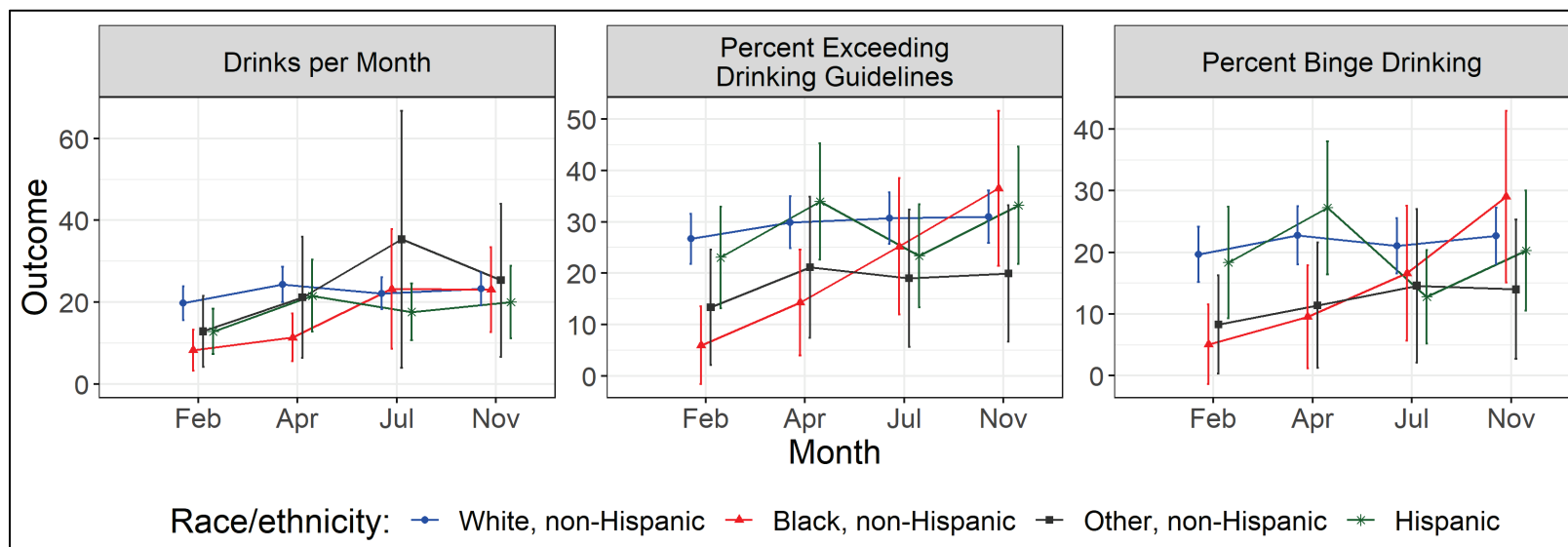
Figure E.3b Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among All Wave 2 Respondents, by Age Group

E-8



The change in drinks per month from February to July is significantly different between ages 50–64 and ages 65+ ($p=0.015$).

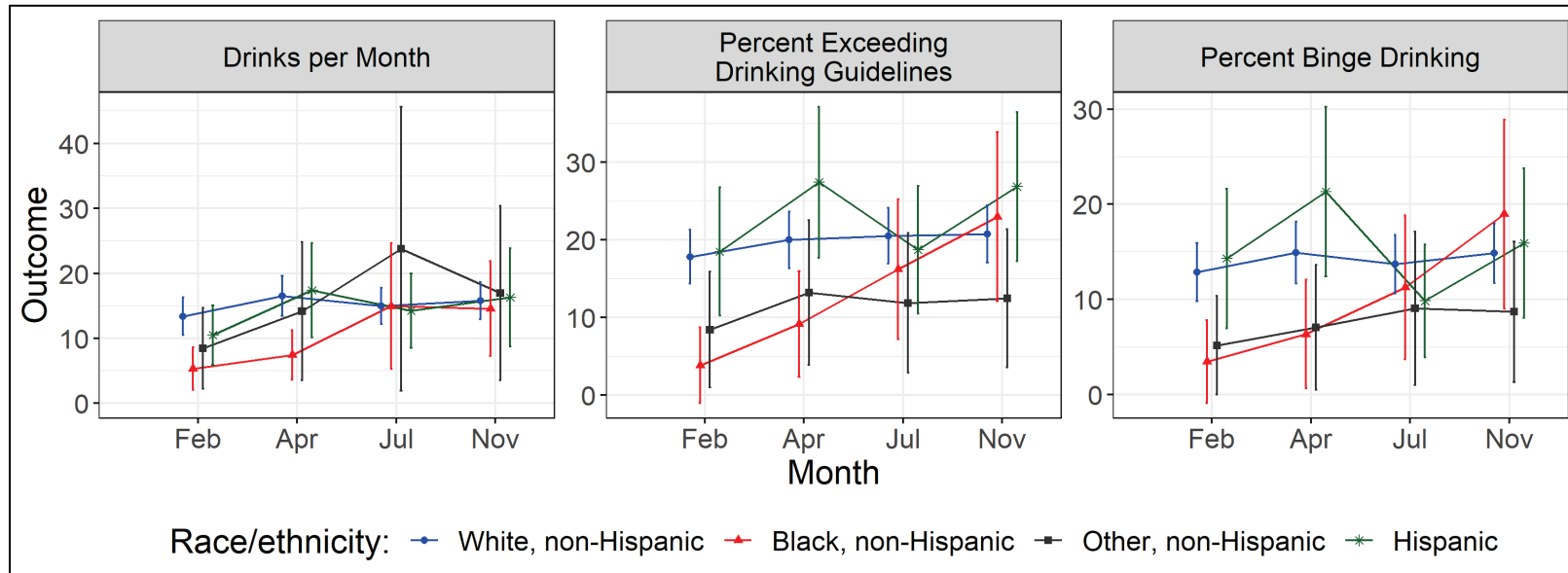
Figure E.4a Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among the Main Sample, by Race/Ethnicity



The change in exceeding drinking guidelines from February to July is significantly different between White and Black ($p=0.020$).
 The change in binge drinking from February to July is significantly different between Black and Hispanic ($p=0.014$).
 The change in exceeding drinking guidelines from February to July is significantly different between Black and Hispanic ($p=0.015$).
 The change in binge drinking from February to November is significantly different between White and Black ($p=0.006$).
 The change in exceeding drinking guidelines from February to November is significantly different between White and Black ($p=0.003$).
 The change in drinks per month from February to November is significantly different between White and Black ($p=0.027$).
 The change in binge drinking from February to November is significantly different between Black and Hispanic ($p=0.009$).
 The change in exceeding drinking guidelines from February to November is significantly different between Black and Other ($p=0.040$).
 The change in exceeding drinking guidelines from February to November is significantly different between Black and Hispanic ($p=0.021$).
 The trend in binge drinking is significantly different between White and Black ($p=0.001$).
 The trend in exceeding drinking guidelines is significantly different between White and Black ($p=0.000$).
 The trend in drinks per month is significantly different between White and Black ($p=0.015$).
 The trend in binge drinking is significantly different between Black and Other ($p=0.036$).
 The trend in binge drinking is significantly different between Black and Hispanic ($p=0.001$).
 The trend in exceeding drinking guidelines is significantly different between Black and Other ($p=0.017$).
 The trend in exceeding drinking guidelines is significantly different between Black and Hispanic ($p=0.004$).

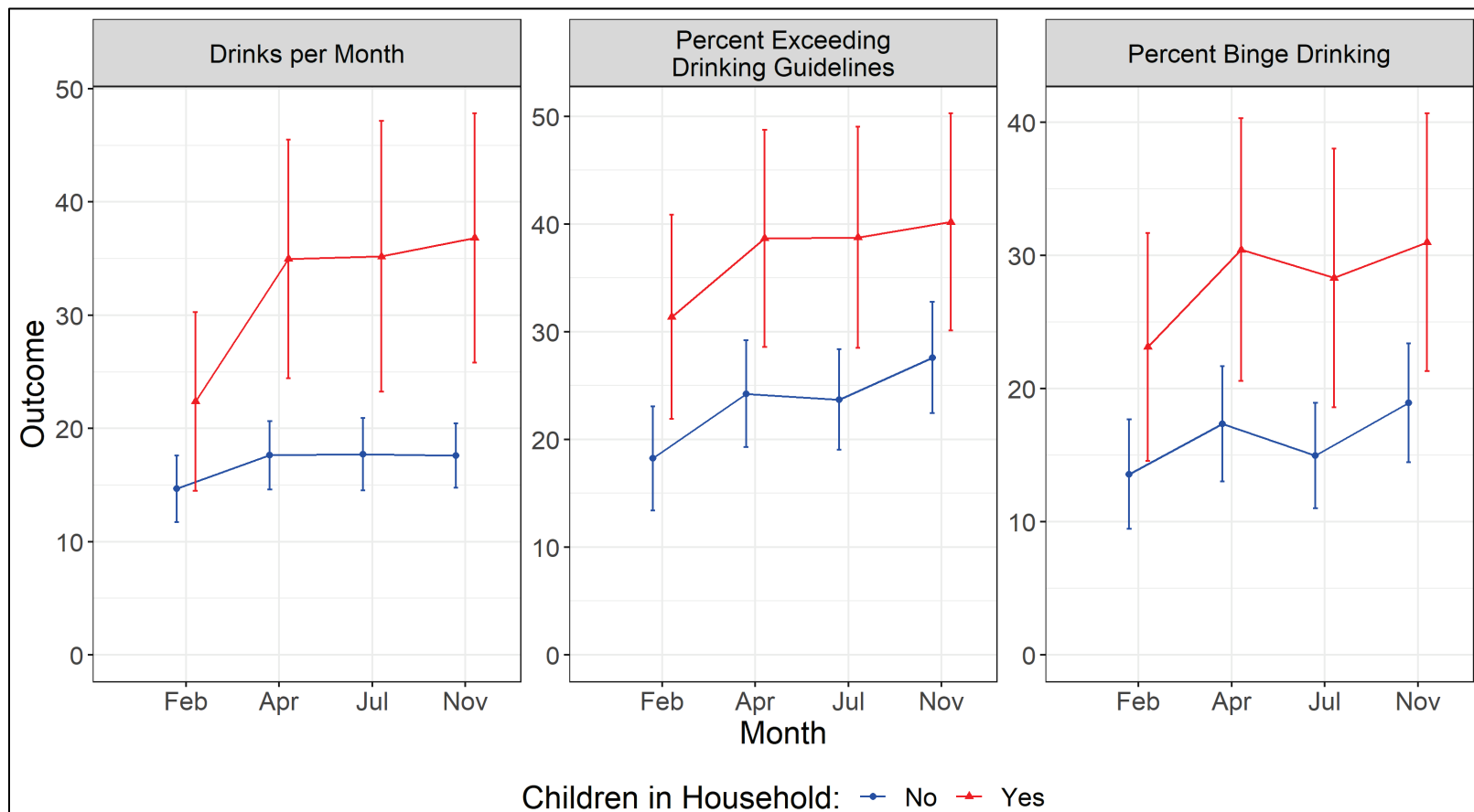
Figure E.4b Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among All Wave 2 Respondents, by Race/Ethnicity

E-10



The change in exceeding drinking guidelines from February to July is significantly different between White and Black ($p=0.021$).
 The change in binge drinking from February to July is significantly different between Black and Hispanic ($p=0.013$).
 The change in exceeding drinking guidelines from February to July is significantly different between Black and Hispanic ($p=0.017$).
 The change in binge drinking from February to November is significantly different between White and Black ($p=0.008$).
 The change in exceeding drinking guidelines from February to November is significantly different between White and Black ($p=0.005$).
 The change in drinks per month from February to November is significantly different between White and Black ($p=0.043$).
 The change in binge drinking from February to November is significantly different between Black and Hispanic ($p=0.013$).
 The change in exceeding drinking guidelines from February to November is significantly different between Black and Hispanic ($p=0.031$).
 The trend in binge drinking is significantly different between White and Black ($p=0.002$).
 The trend in exceeding drinking guidelines is significantly different between White and Black ($p=0.001$).
 The trend in drinks per month is significantly different between White and Black ($p=0.023$).
 The trend in binge drinking is significantly different between Black and Other ($p=0.047$).
 The trend in binge drinking is significantly different between Black and Hispanic ($p=0.001$).
 The trend in exceeding drinking guidelines is significantly different between Black and Other ($p=0.023$).
 The trend in exceeding drinking guidelines is significantly different between Black and Hispanic ($p=0.007$).

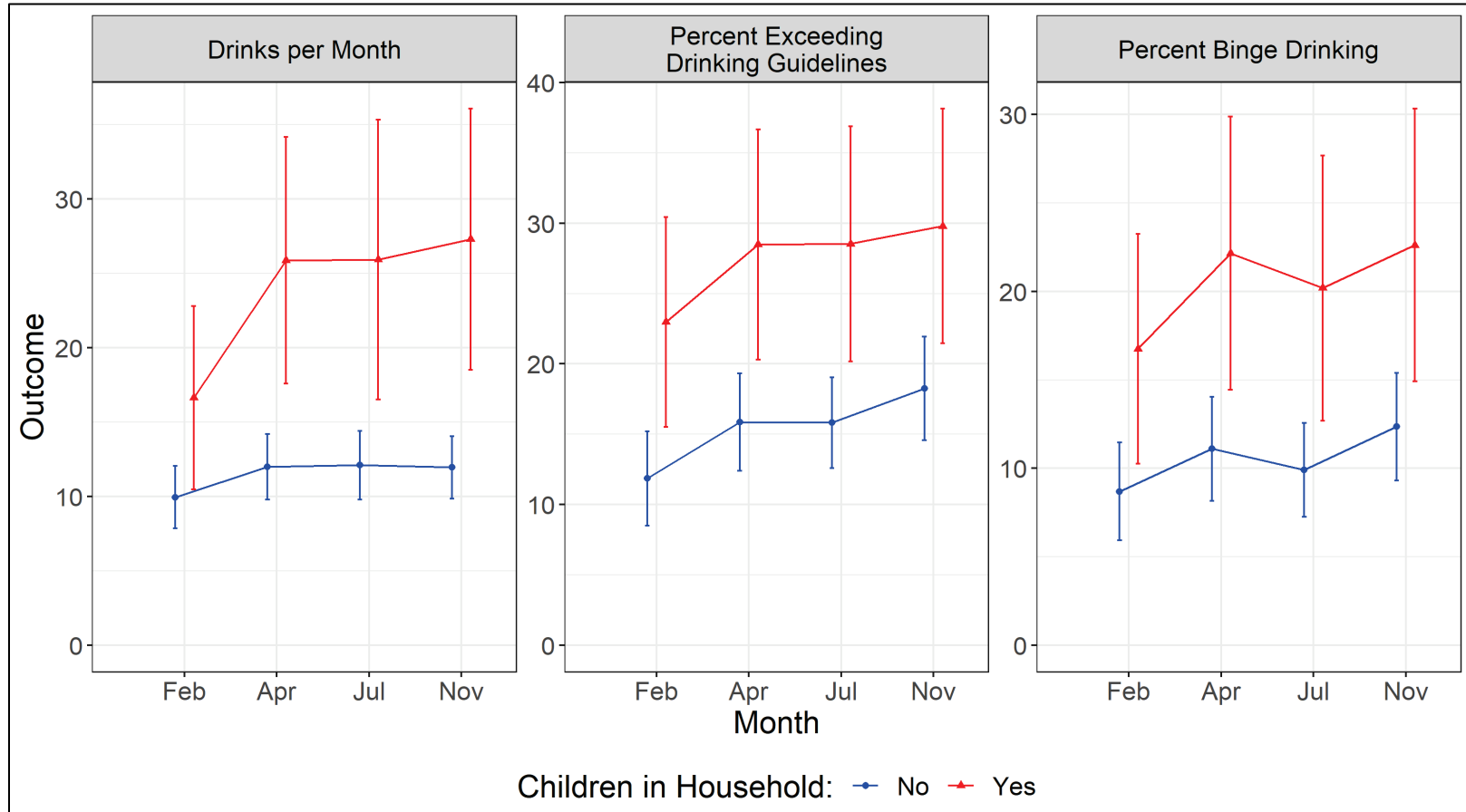
Figure E.5a Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among the Main Sample, by Respondents with or without Children in the Household



The change in drinks per month from February to April is significantly different between groups ($p=0.005$).
 The change in drinks per month from February to November is significantly different between groups ($p=0.014$).

Figure E.5b Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among All Wave 2 Respondents, by Respondents with or without Children in the Household

E-12



The change in drinks per month from February to April is significantly different between groups ($p=0.005$).
 The change in drinks per month from February to November is significantly different between groups ($p=0.017$).

Figure E.6a Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among the Main Sample, by Unemployment

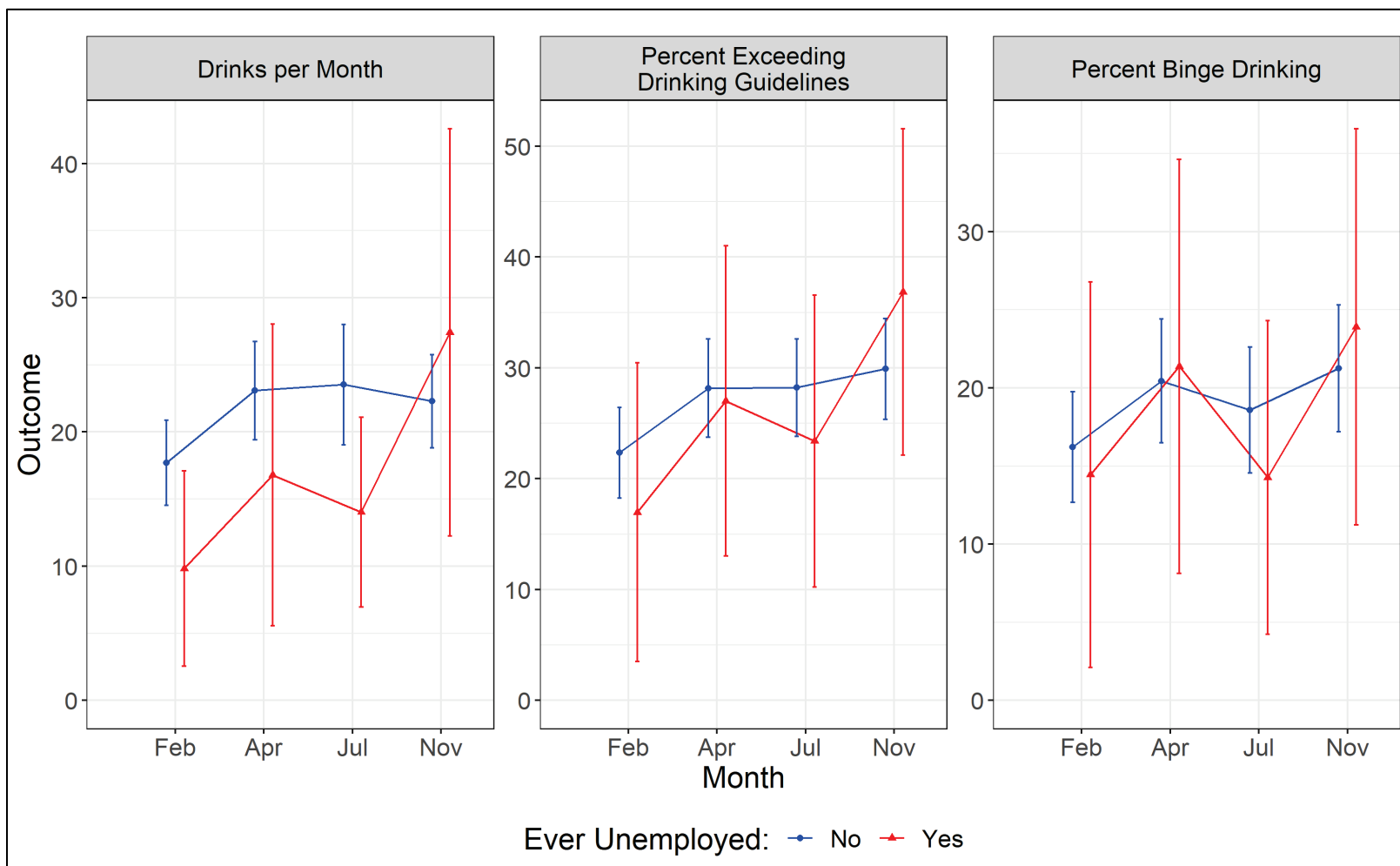


Figure E.6b Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among All Wave 2 Respondents, by Unemployment

E-14

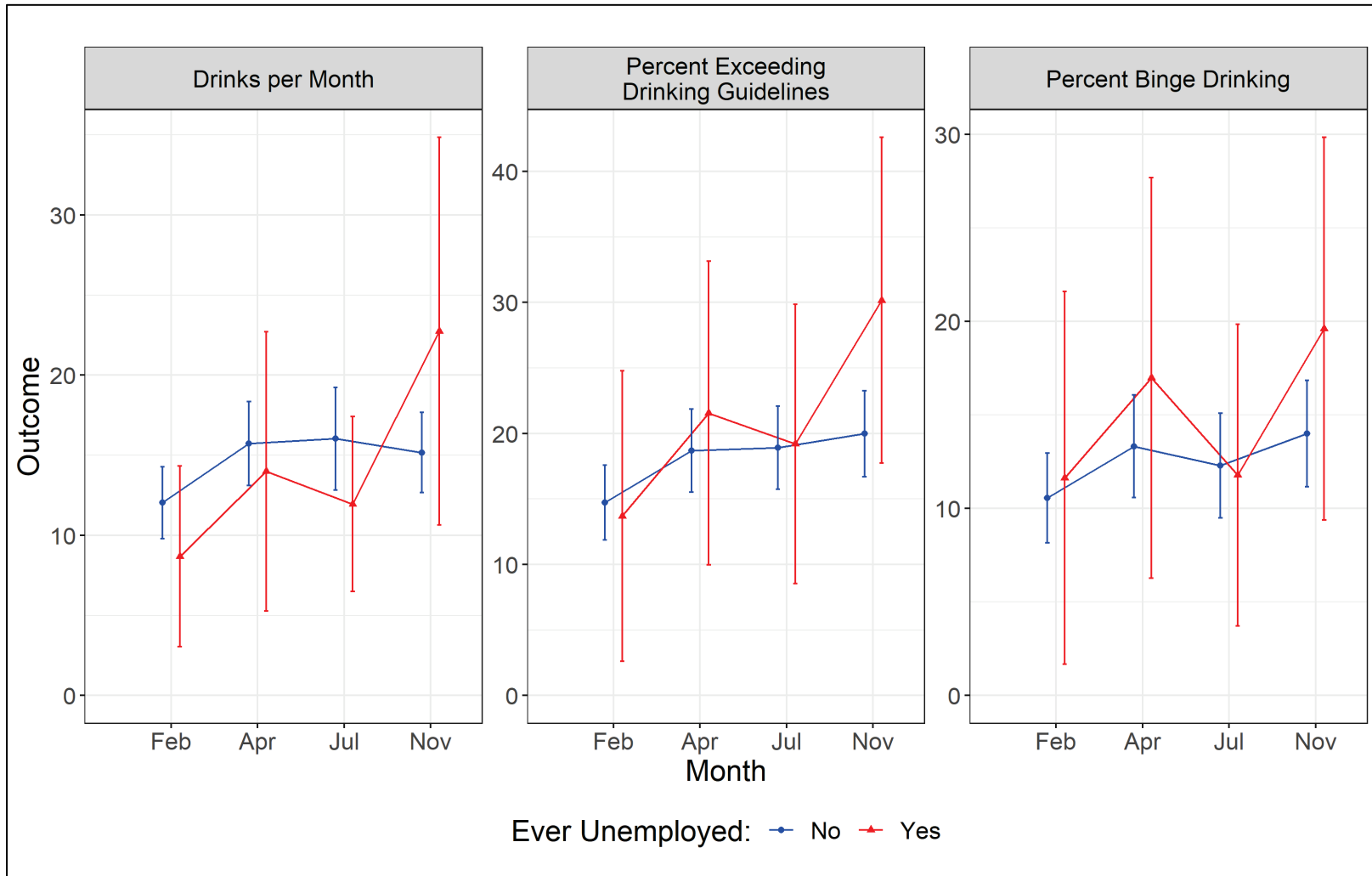
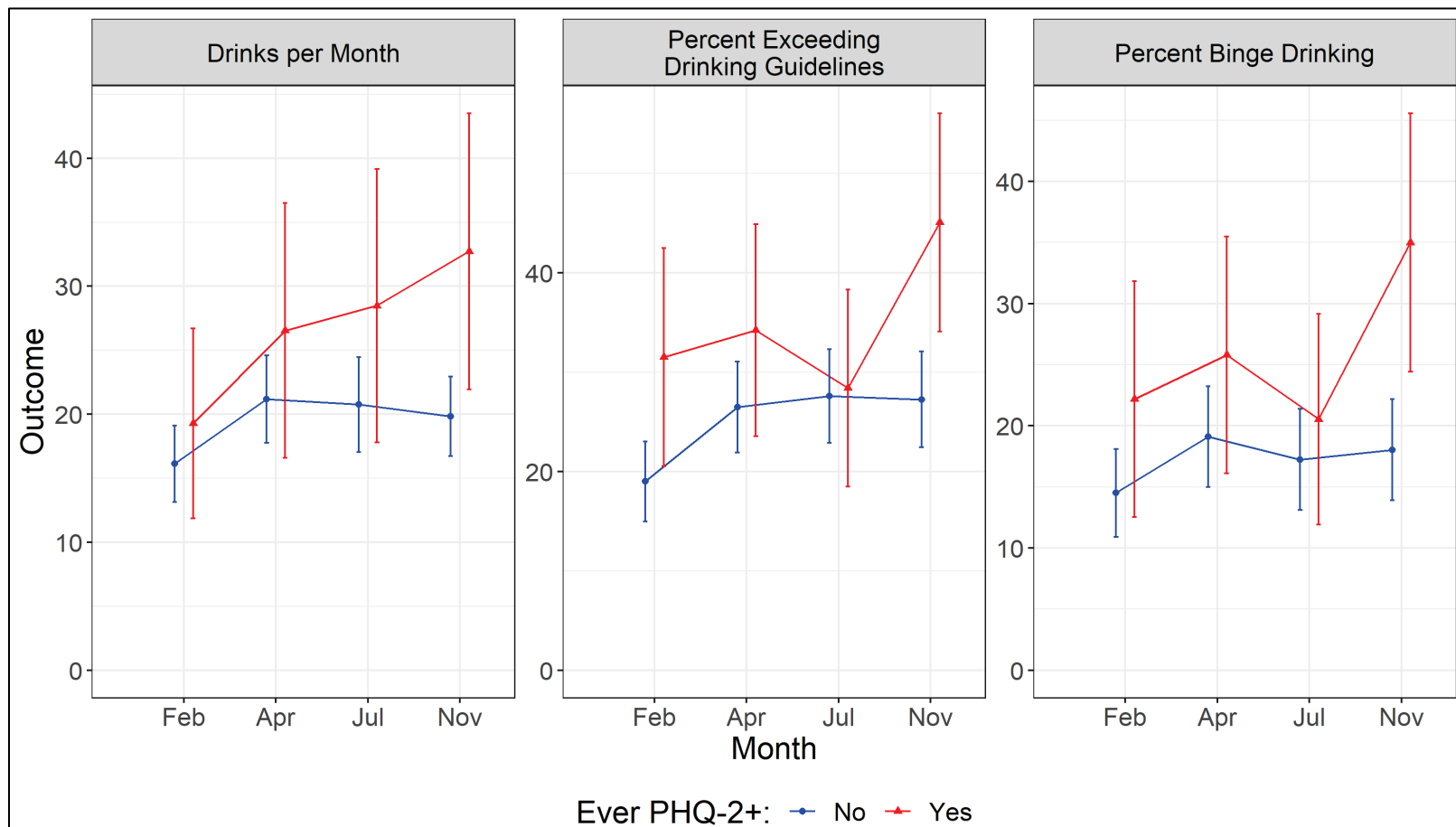


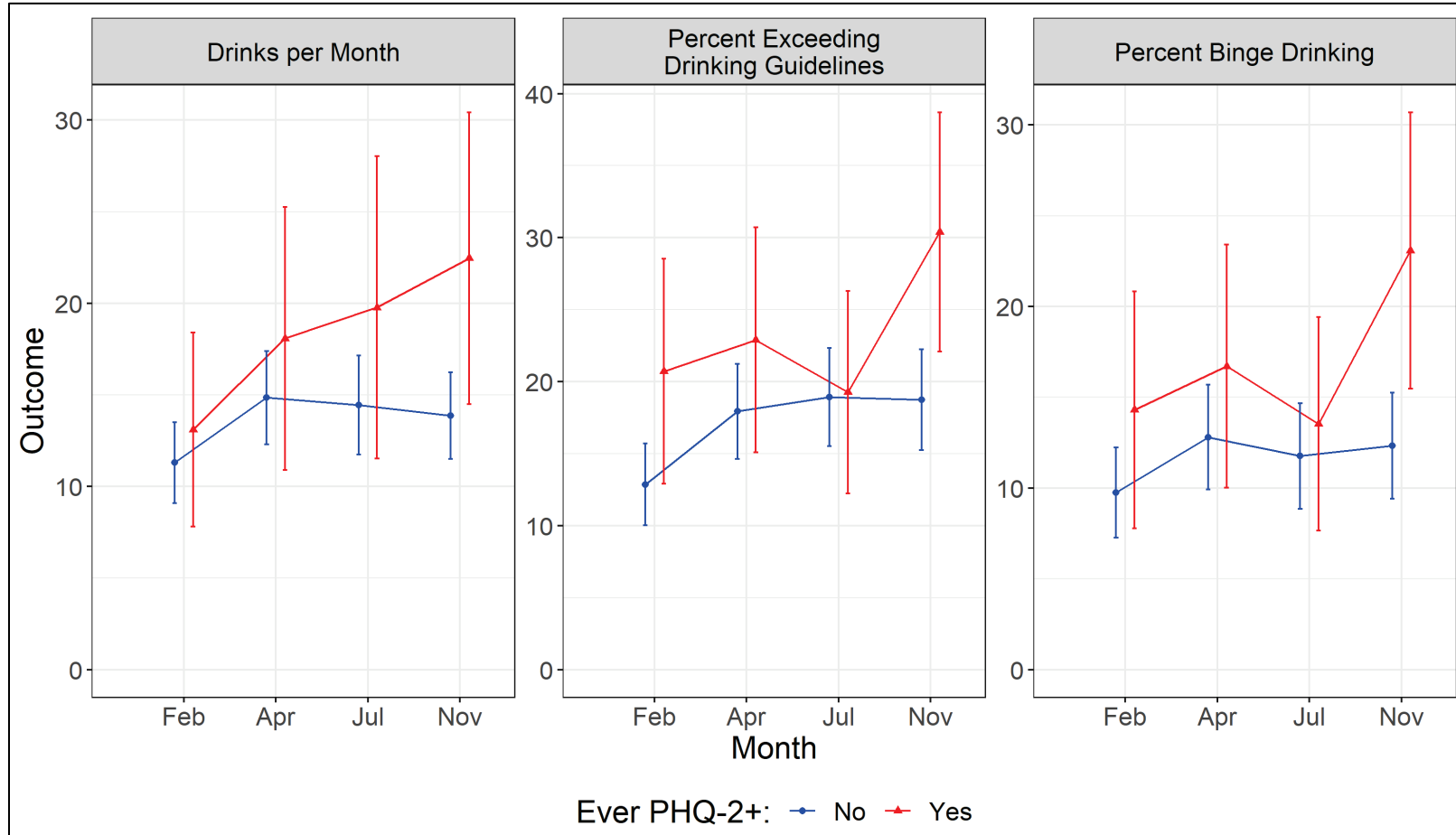
Figure E.7a Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among the Main Sample, by PHQ-2+



The change in exceeding drinking guidelines from February to July is significantly different between groups ($p=0.027$).

Figure E.7b Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among all Wave 2 Respondents, by PHQ-2+

E-16



The change in exceeding drinking guidelines from February to July is significantly different between groups ($p=0.025$).

Figure E.8a Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among the Main Sample, by GAD-2+

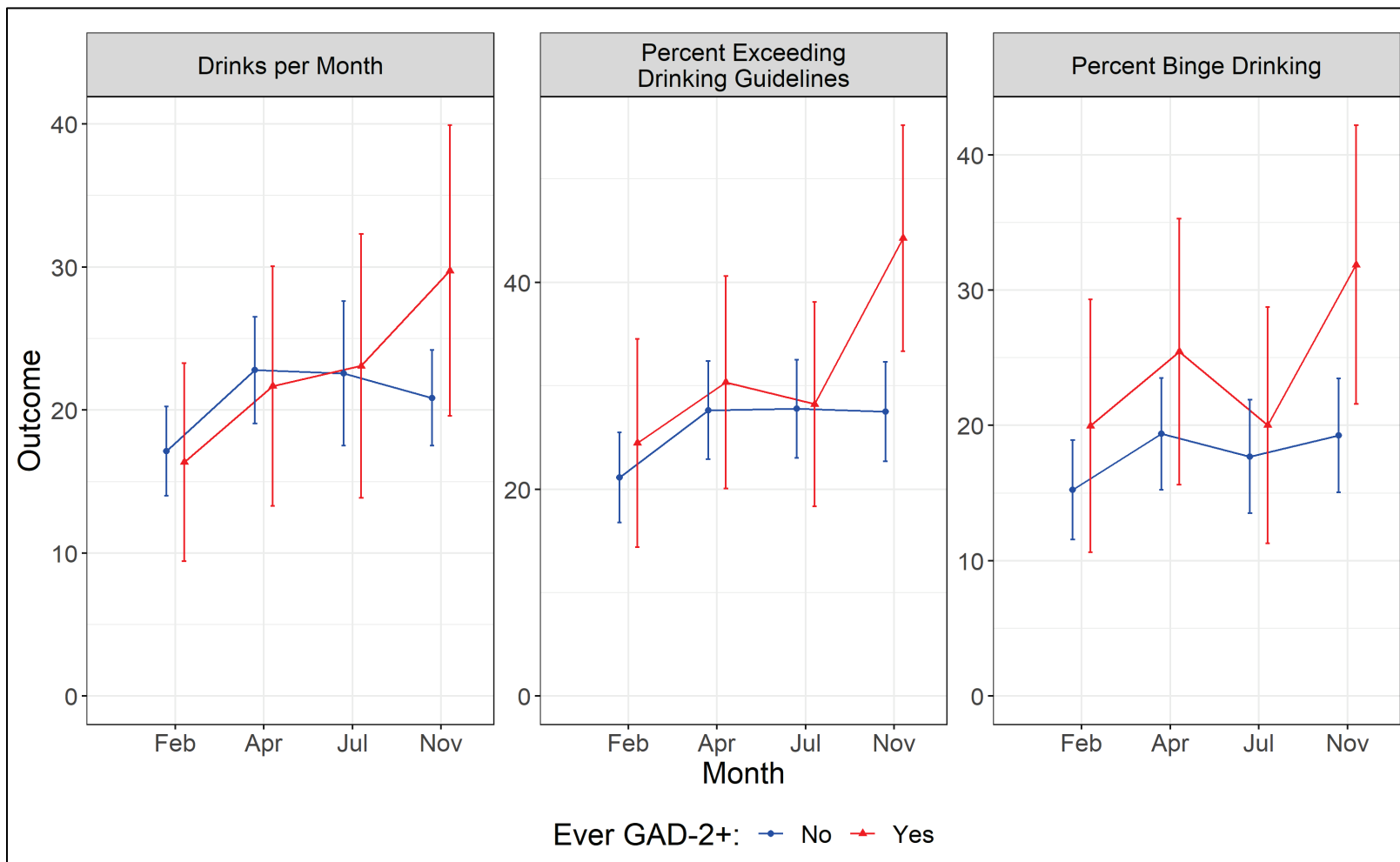


Figure E.8b Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among All Wave 2 Respondents, by GAD-2+

E-18

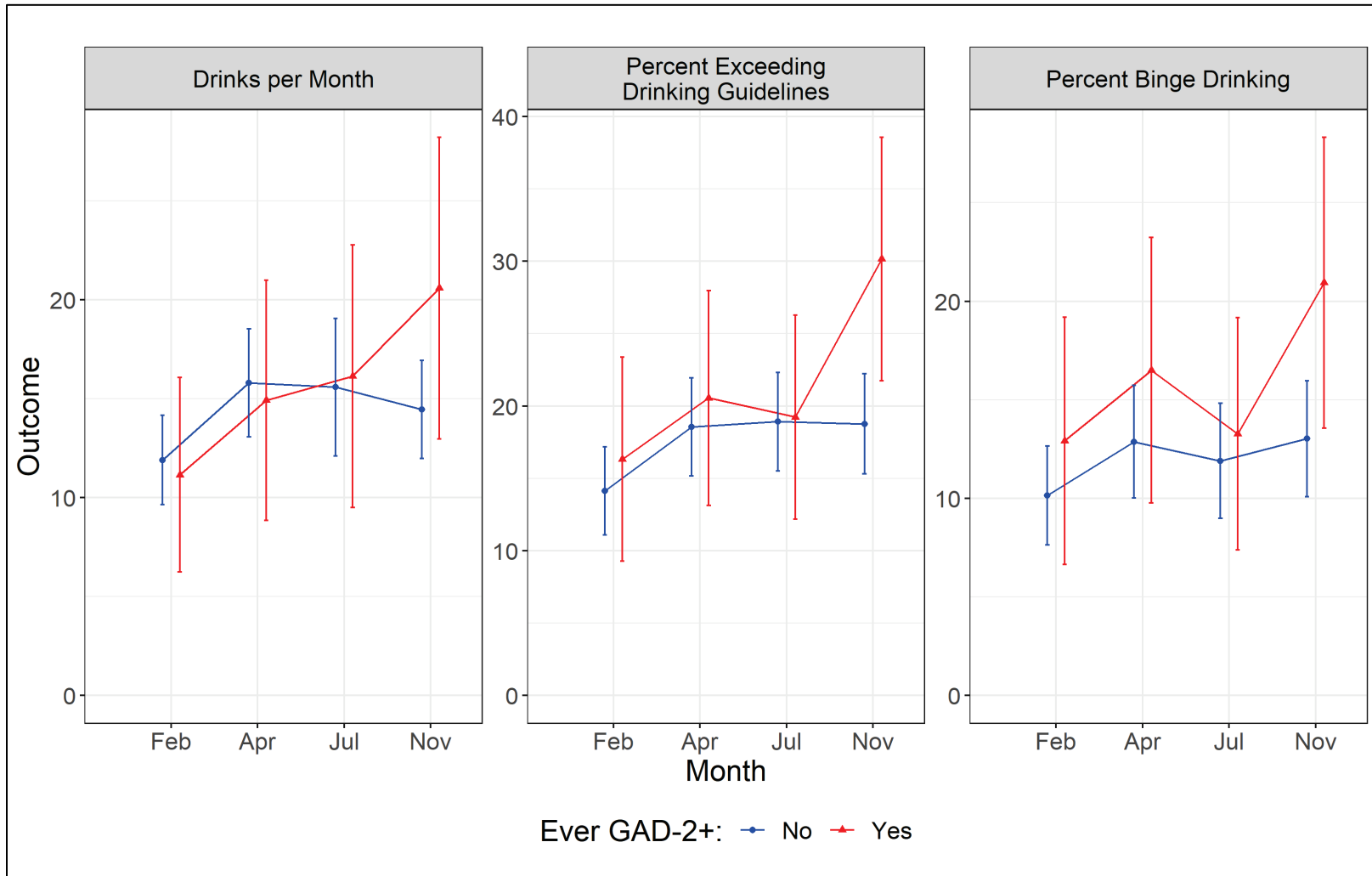
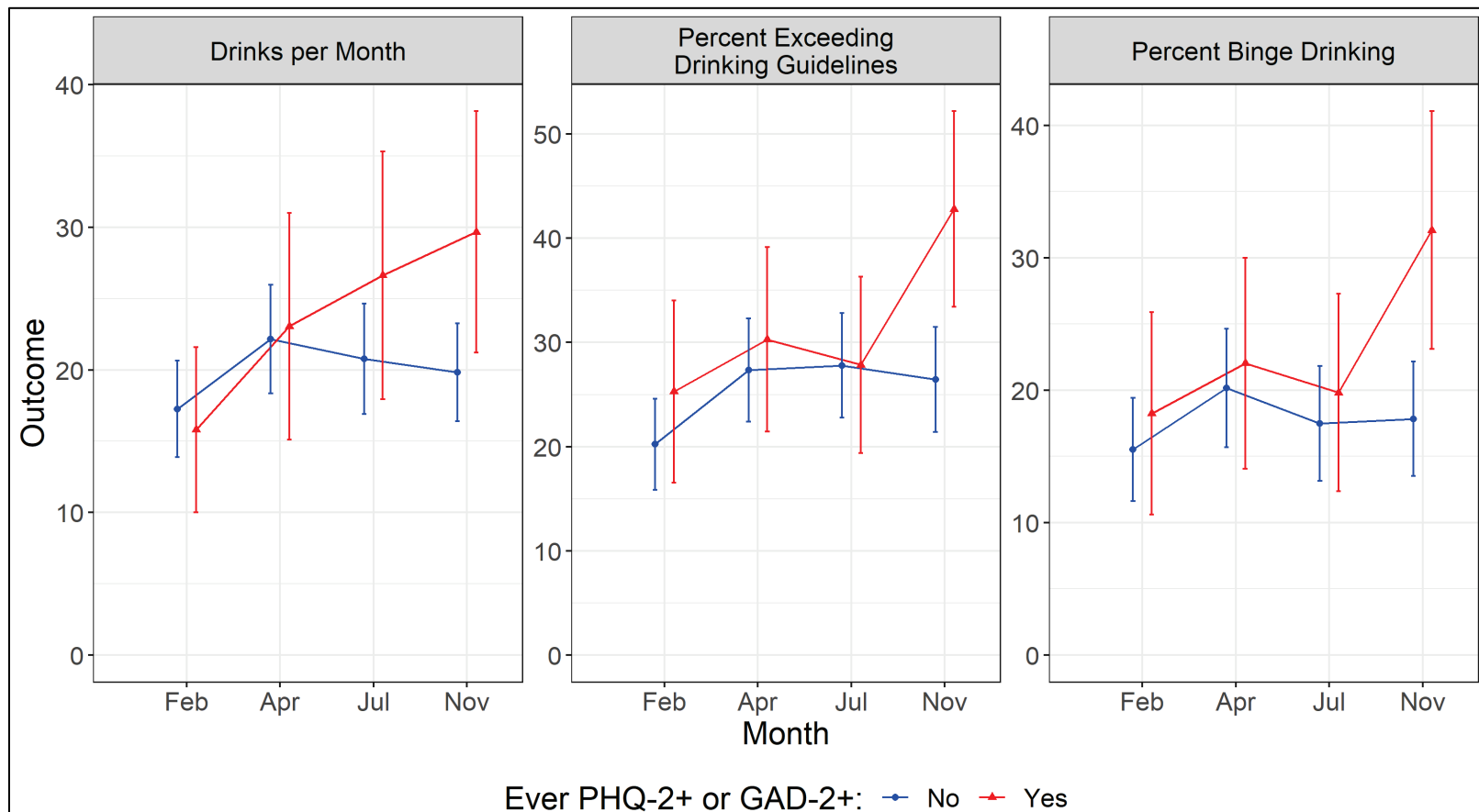


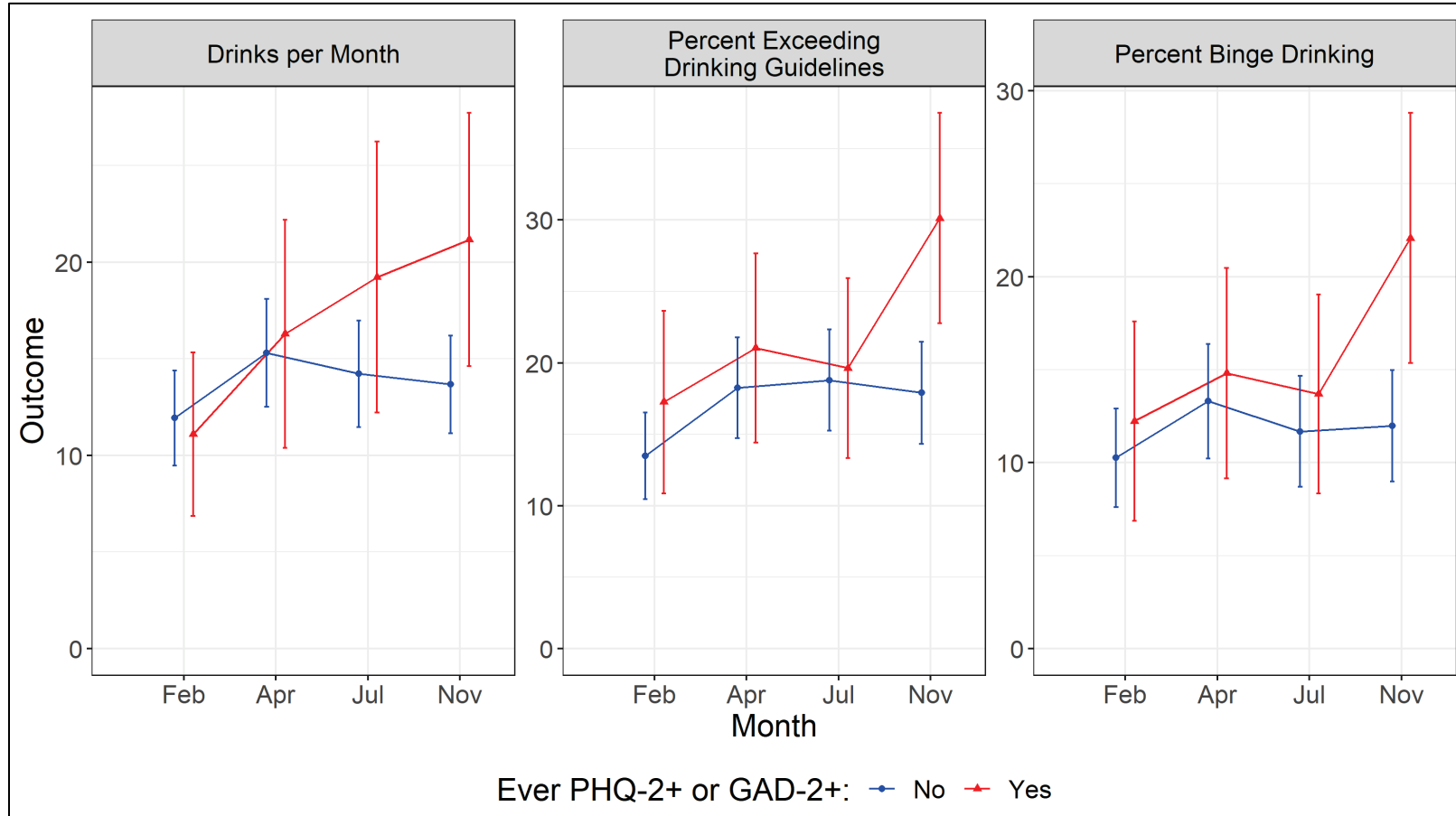
Figure E.9a Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among the Main Sample, by PHQ-2/GAD-2+



The change in drinks per month from February to November is significantly different between groups ($p=0.010$).
 The trend in binge drinking is significantly different between groups ($p=0.044$).
 The trend in drinks per month is significantly different between groups ($p=0.012$).

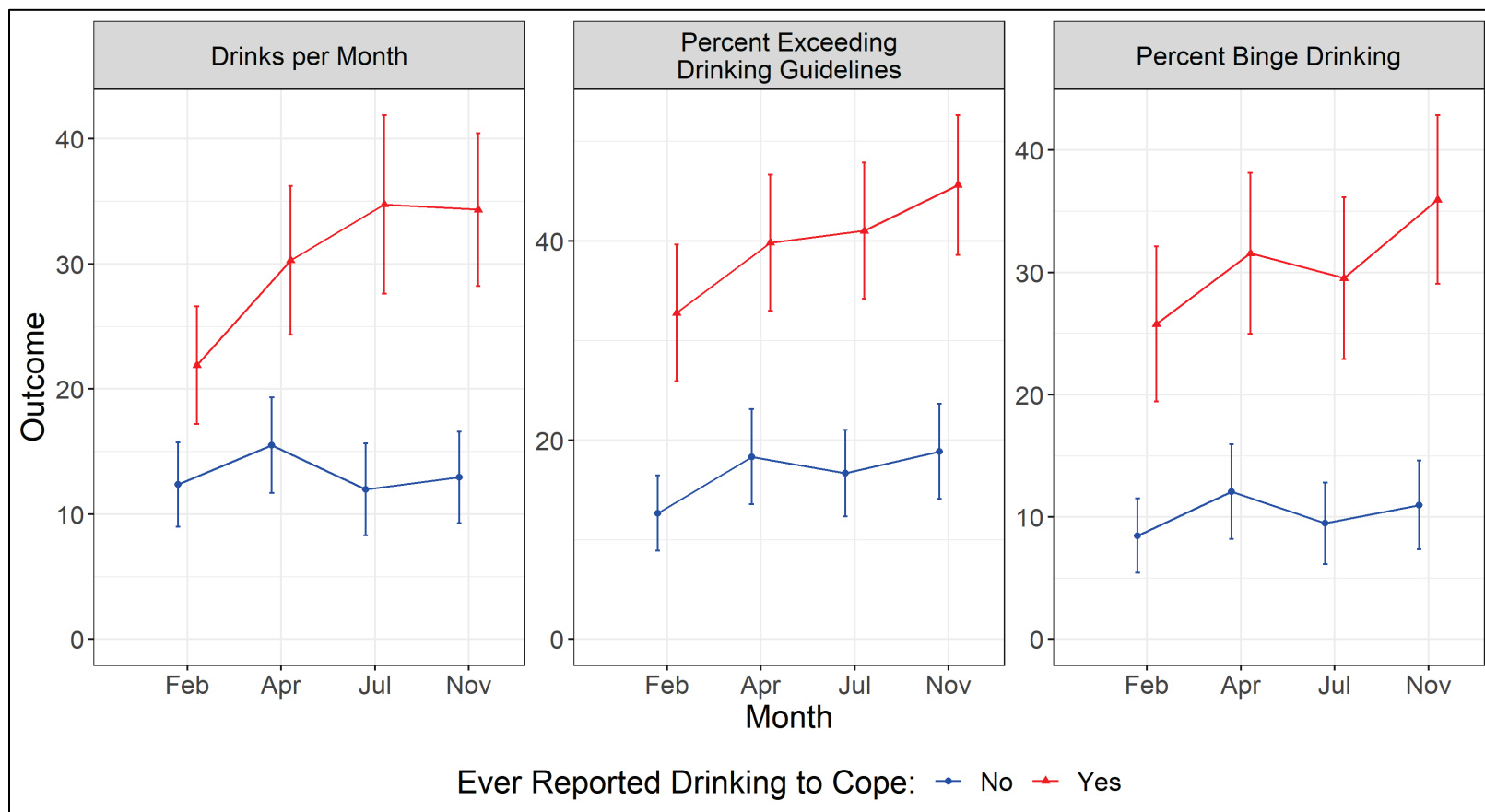
Figure E.9b Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among All Wave 2 Respondents, by PHQ-2/GAD-2+

E-20



The change in drinks per month from February to November is significantly different between groups ($p=0.009$).
 The trend in binge drinking is significantly different between groups ($p=0.041$).
 The trend in drinks per month is significantly different between groups ($p=0.010$).

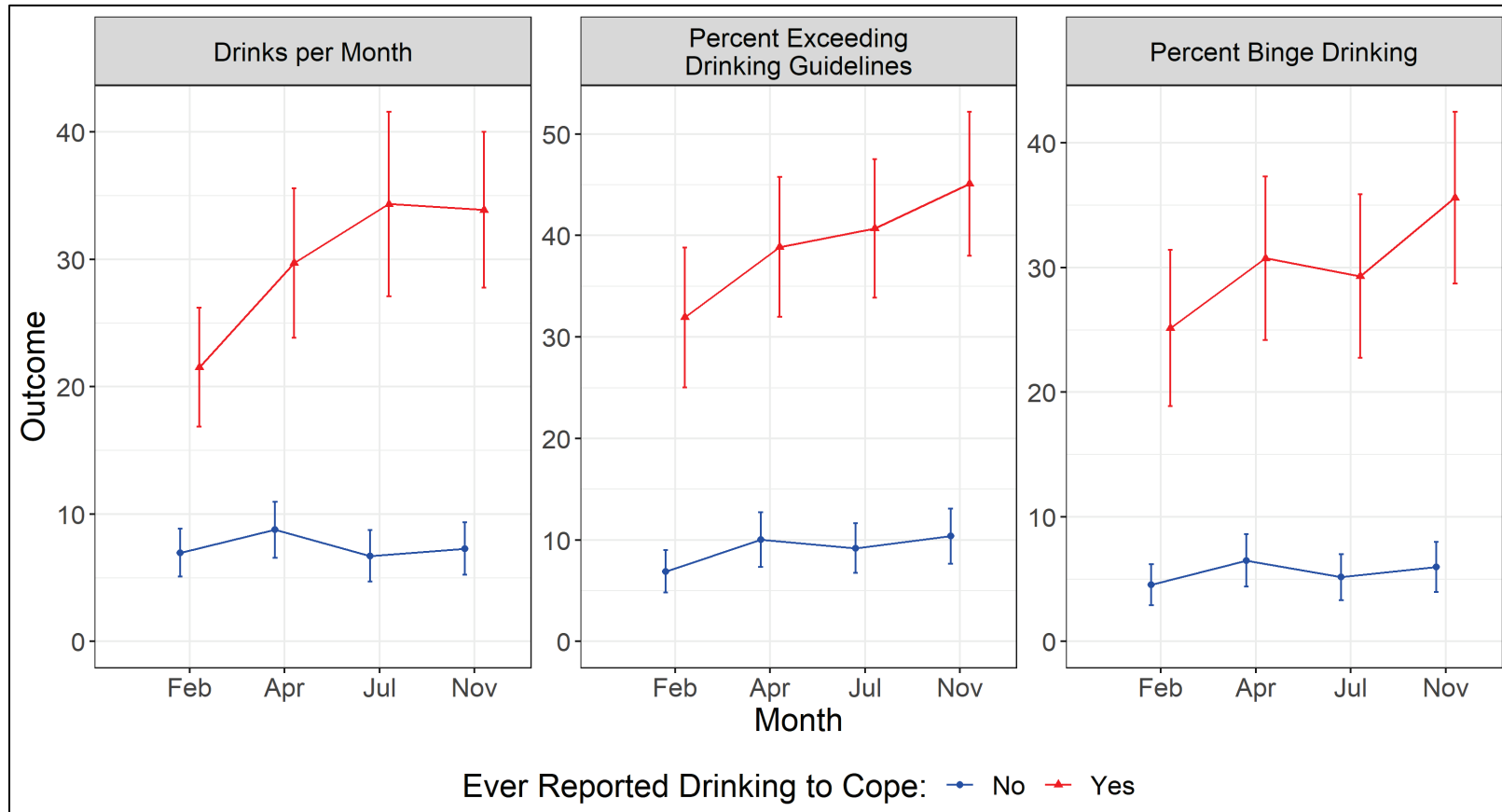
Figure E.10a Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among the Main Sample, by Ever Drinking to Cope



The change in drinks per month from February to April is significantly different between groups ($p=0.027$).
 The change in drinks per month from February to July is significantly different between groups ($p=0.000$).
 The change in drinks per month from February to November is significantly different between groups ($p=0.000$).
 The trend in drinks per month is significantly different between groups ($p=0.000$).

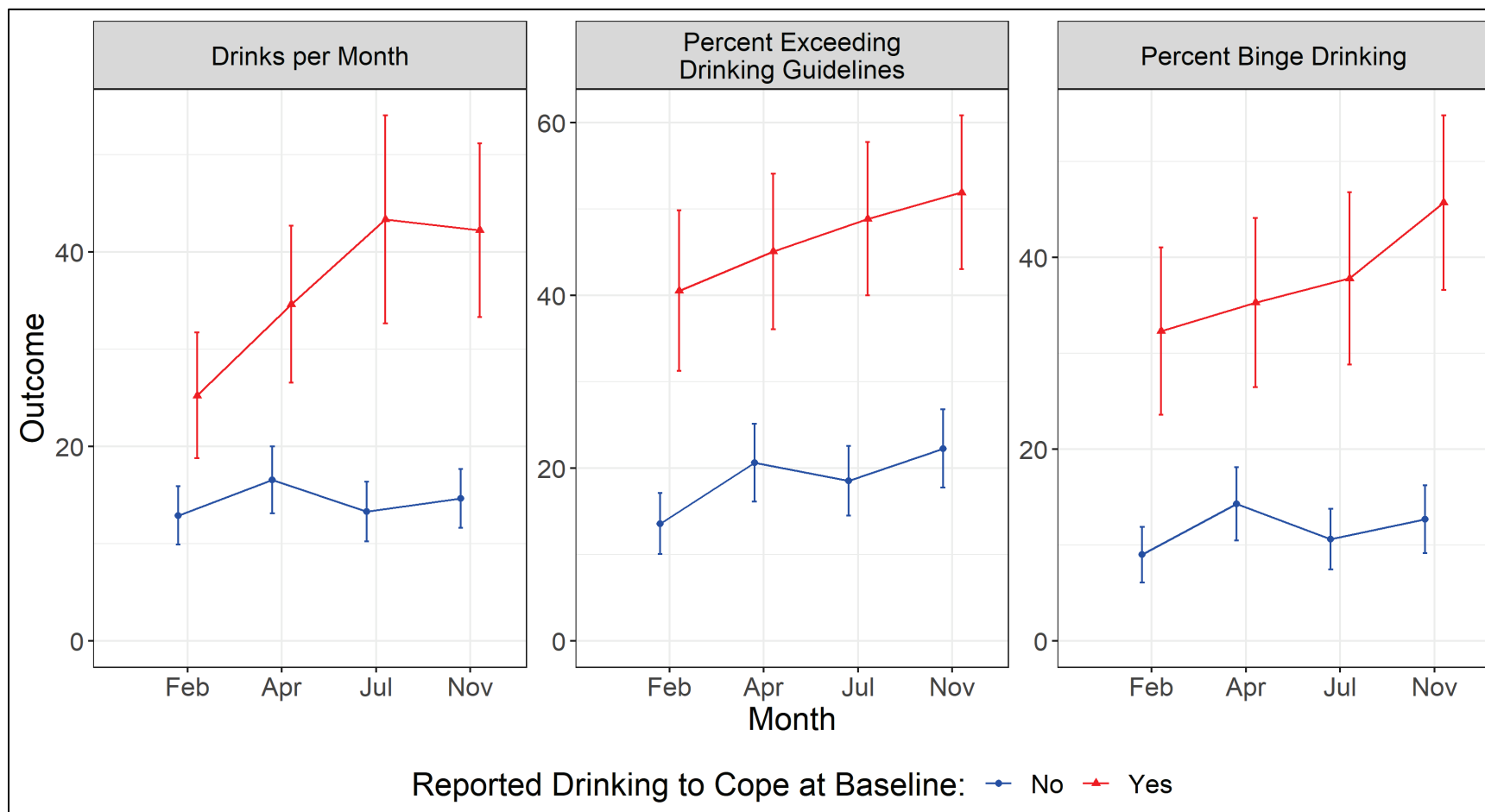
Figure E.10b Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among All Wave 2 Respondents, by Ever Drinking to Cope

E-22



The change in drinks per month from February to April is significantly different between groups ($p=0.002$).
 The change in drinks per month from February to July is significantly different between groups ($p=0.000$).
 The change in drinks per month from February to November is significantly different between groups ($p=0.000$).
 The trend in drinks per month is significantly different between groups ($p=0.000$).

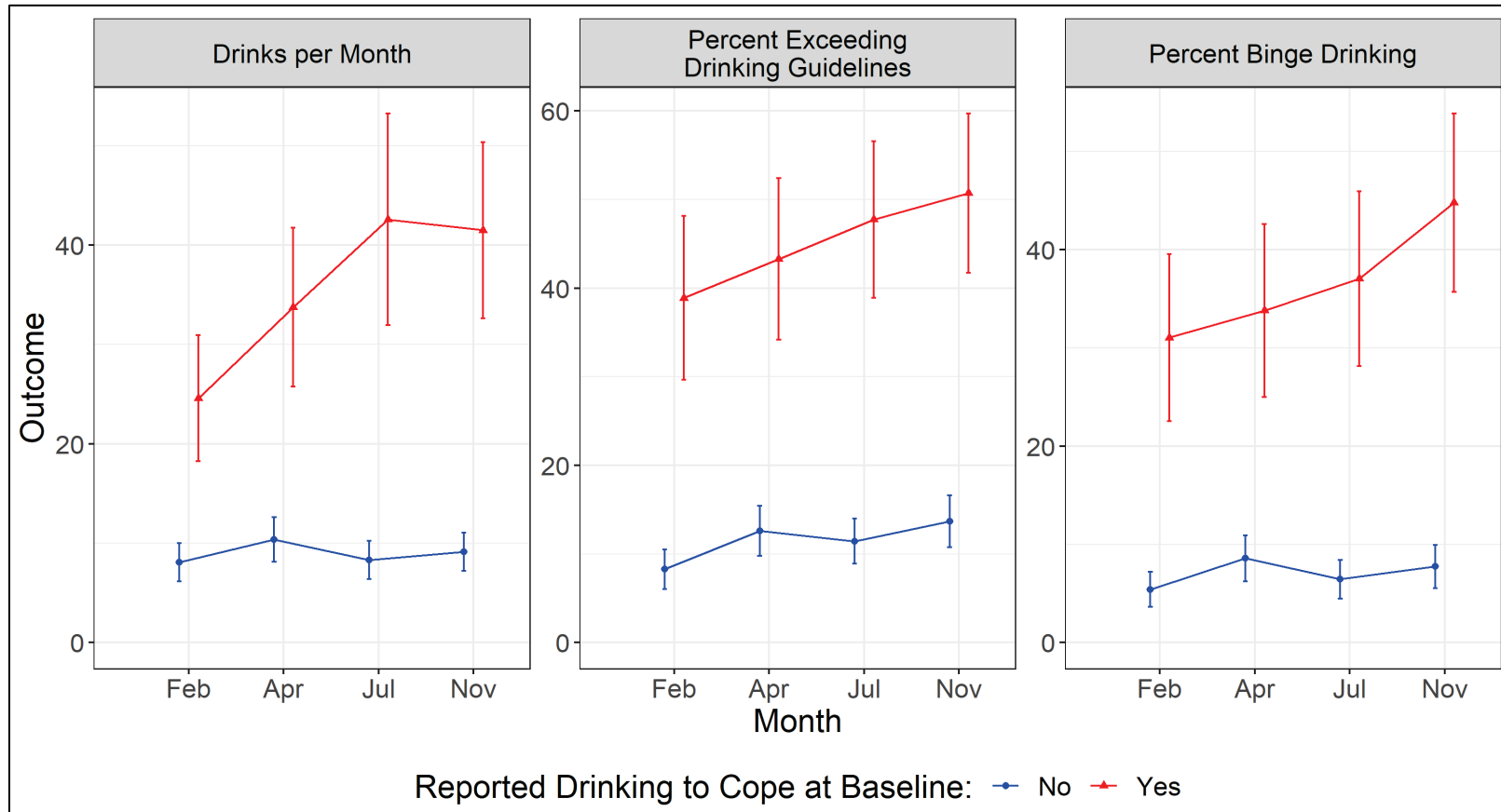
Figure E.11a Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among the Main Sample, by Drinking to Cope in February



The change in drinks per month from February to April is significantly different between groups ($p=0.032$).
 The change in drinks per month from February to July is significantly different between groups ($p=0.000$).
 The change in drinks per month from February to November is significantly different between groups ($p=0.001$).
 The trend in drinks per month is significantly different between groups ($p=0.000$).

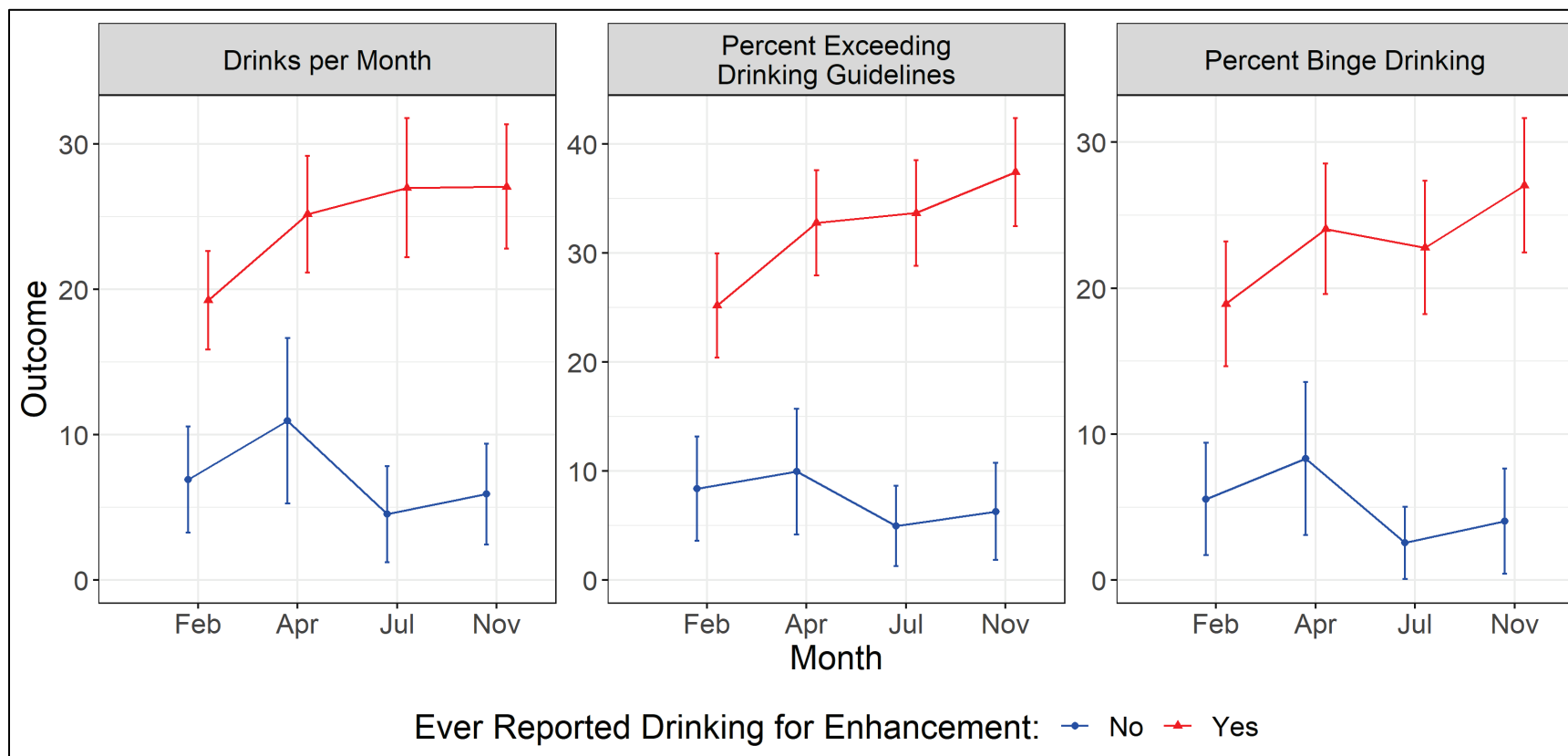
Figure E.11b Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among All Wave 2 Respondents, by Drinking to Cope in February

E-24



The change in drinks per month from February to April is significantly different between groups ($p=0.005$).
 The change in drinks per month from February to July is significantly different between groups ($p=0.000$).
 The change in drinks per month from February to November is significantly different between groups ($p=0.000$).
 The trend in drinks per month is significantly different between groups ($p=0.000$).

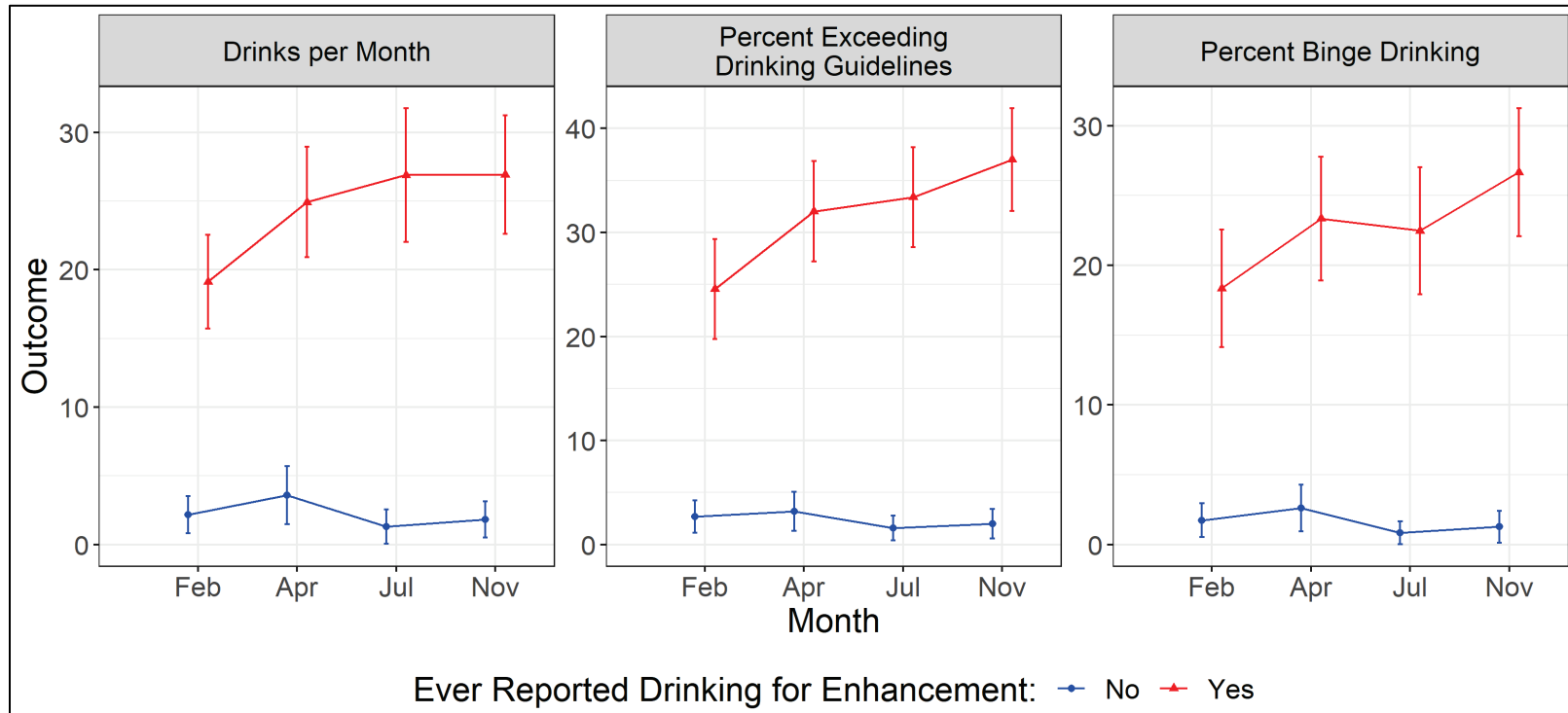
Figure E.12a Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among the Main Sample, by Ever Drinking for Enhancement



The change in binge drinking from February to July is significantly different between groups ($p=0.032$).
 The change in exceeding drinking guidelines from February to July is significantly different between groups ($p=0.005$).
 The change in drinks per month from February to July is significantly different between groups ($p=0.000$).
 The change in exceeding drinking guidelines from February to November is significantly different between groups ($p=0.019$).
 The trend in drinks per month from February to November is significantly different between groups ($p=0.000$).
 The trend in binge drinking is significantly different between groups ($p=0.039$).
 The trend in exceeding drinking guidelines is significantly different between groups ($p=0.010$).
 The trend in drinks per month is significantly different between groups ($p=0.000$).

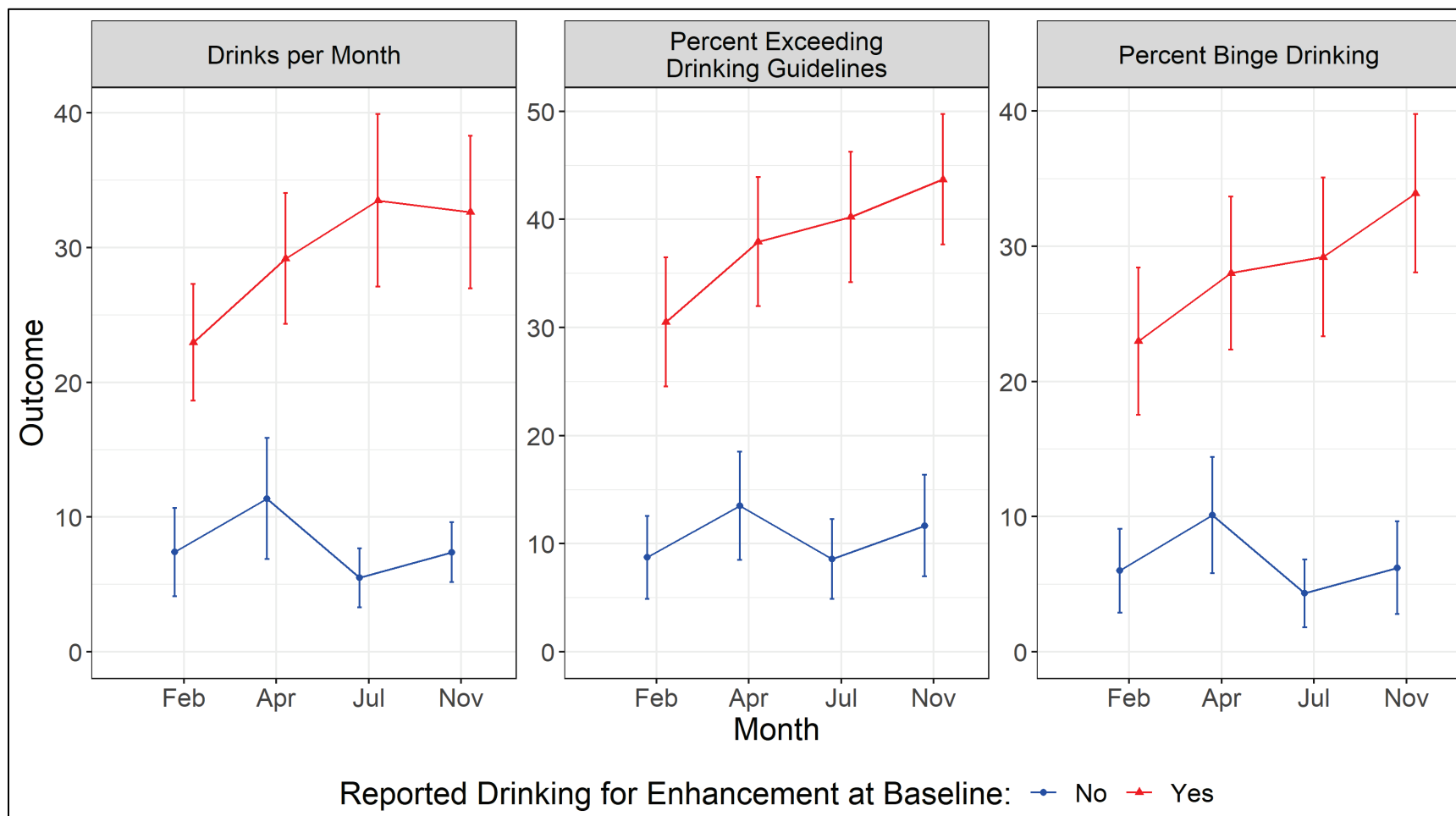
Figure E.12b Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among All Wave 2 Respondents, by Ever Drinking for Enhancement

E-26



The change in drinks per month from February to April is significantly different between groups ($p=0.001$).
 The change in binge drinking from February to July is significantly different between groups ($p=0.033$).
 The change in exceeding drinking guidelines from February to July is significantly different between groups ($p=0.004$).
 The change in drinks per month from February to July is significantly different between groups ($p=0.000$).
 The change in exceeding drinking guidelines from February to November is significantly different between groups ($p=0.012$).
 The change in drinks per month from February to November is significantly different between groups ($p=0.000$).
 The trend in binge drinking is significantly different between groups ($p=0.034$).
 The trend in exceeding drinking guidelines is significantly different between groups ($p=0.006$).
 The trend in drinks per month is significantly different between groups ($p=0.000$).

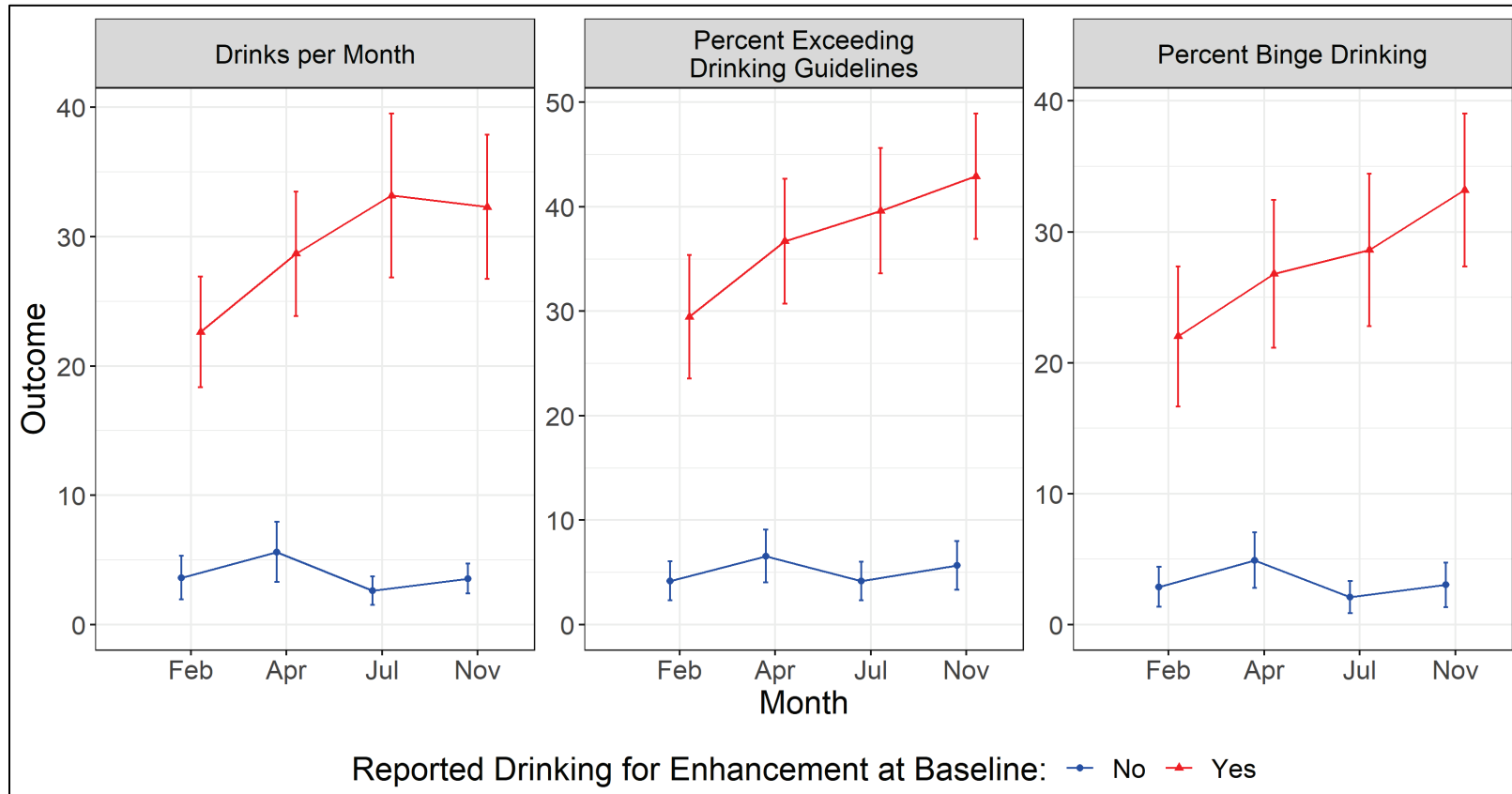
Figure E.13a Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among the Main Sample, by Drinking for Enhancement in February



The change in drinks per month from February to July is significantly different between groups ($p=0.000$).
 The change in drinks per month from February to November is significantly different between groups ($p=0.001$).
 The trend in drinks per month is significantly different between groups ($p=0.000$).

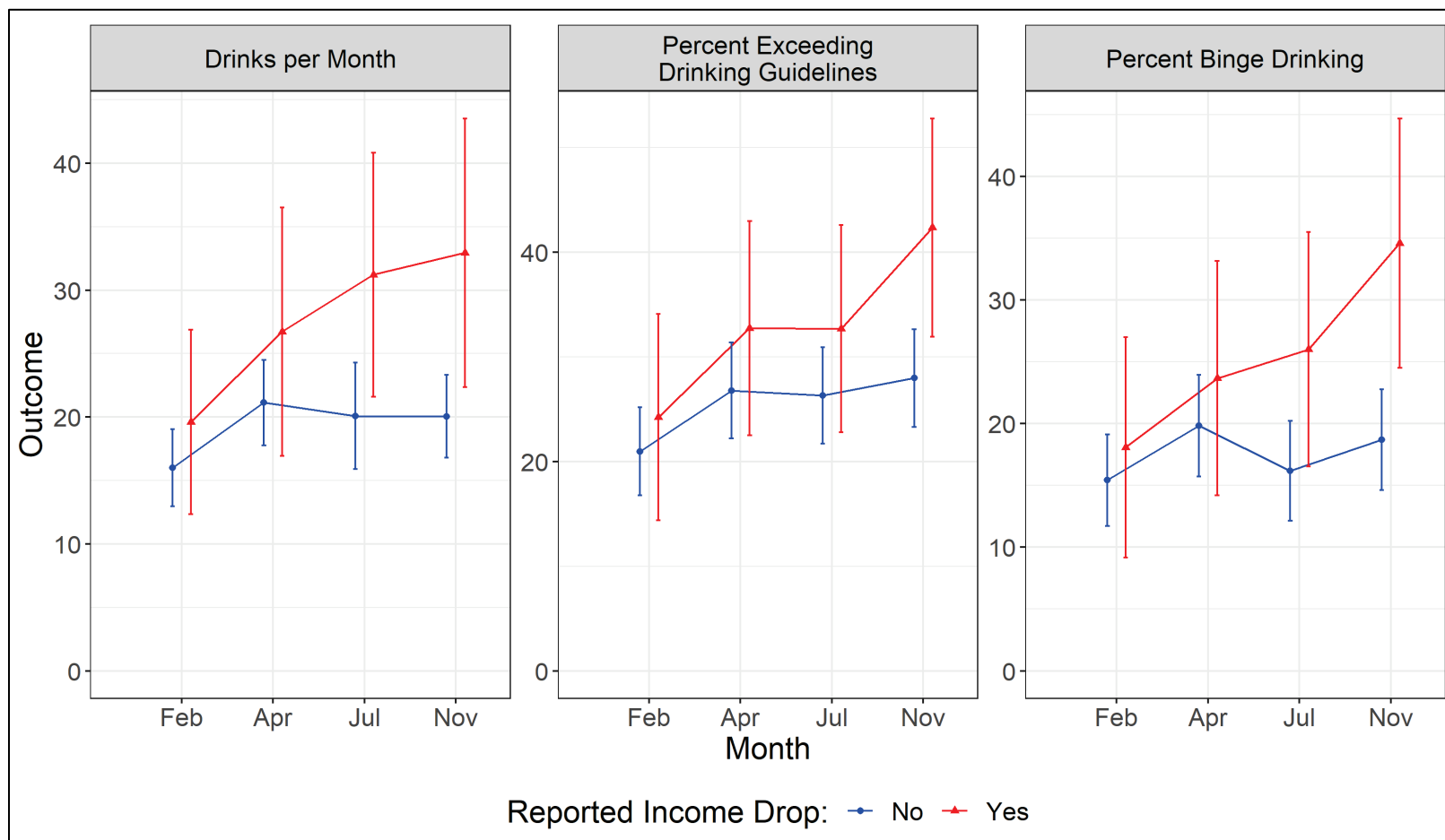
Figure E.13b Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among All Wave 2 Respondents, by Drinking for Enhancement in February

E-28



The change in drinks per month from February to April is significantly different between groups ($p=0.007$).
 The change in drinks per month from February to July is significantly different between groups ($p=0.000$).
 The change in drinks per month from February to November is significantly different between groups ($p=0.000$).
 The trend in binge drinking is significantly different between groups ($p=0.048$).
 The trend in drinks per month is significantly different between groups ($p=0.000$).

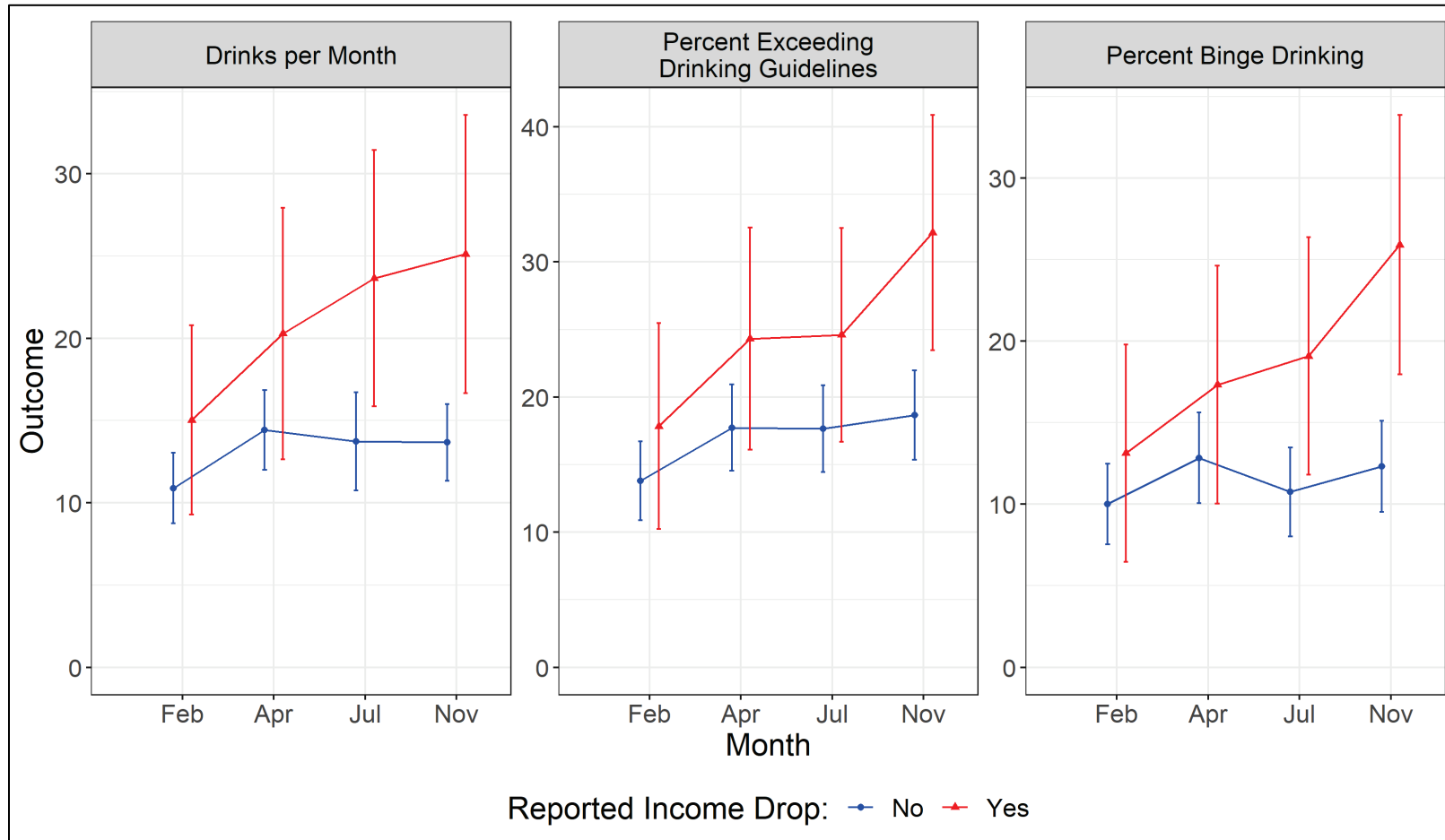
Figure E.14a Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among the Main Sample, by Income Change Status



The trend in binge drinking is significantly different between groups ($p=0.043$).

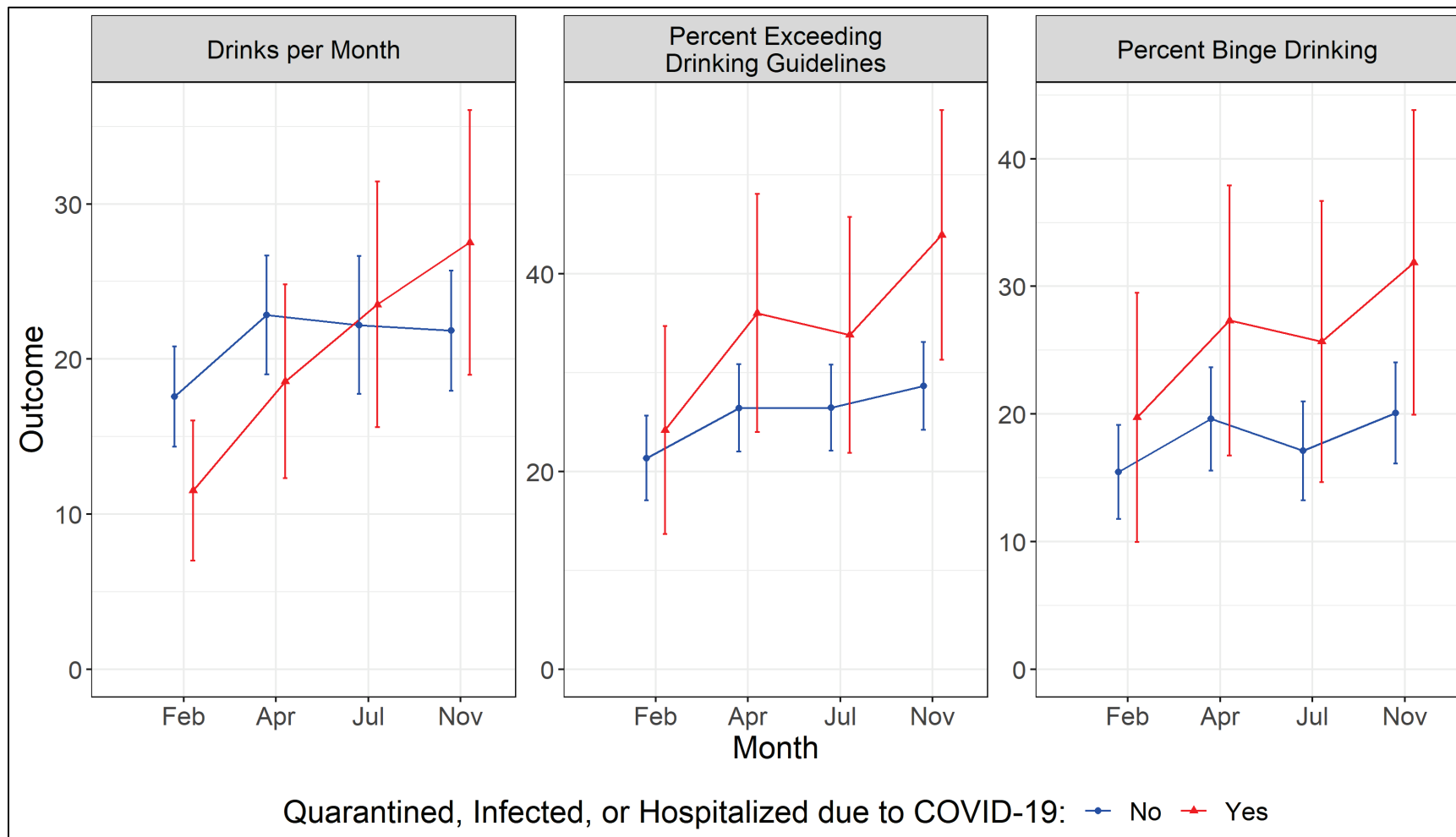
Figure E.14b Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among All Wave 2 Respondents, by Income Change Status

E-30



The trend in binge drinking is significantly different between groups ($p=0.039$).

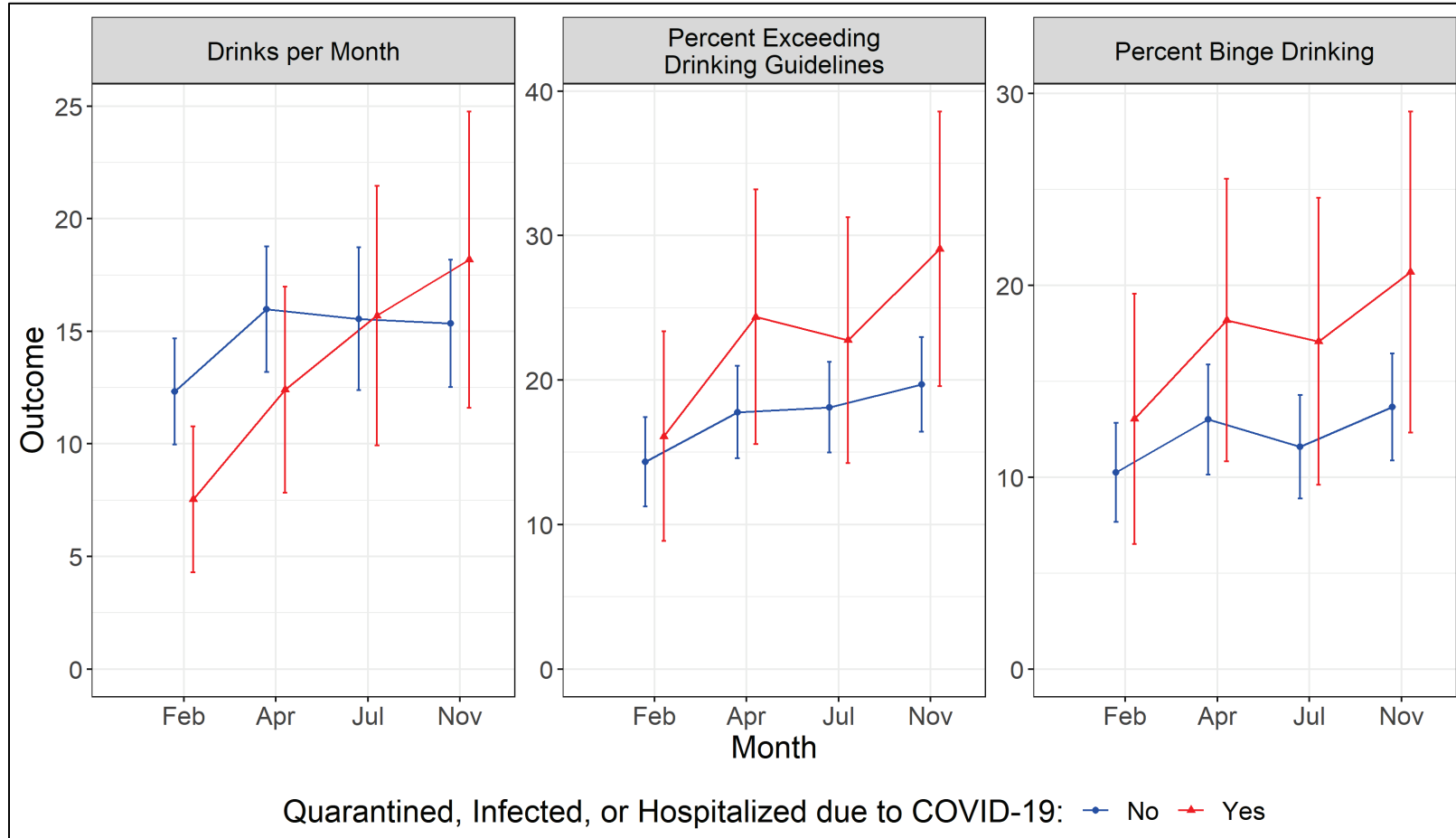
Figure E.15a Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among the Main Sample, by Respondent COVID-19 Experience



The change in drinks per month from February to November is significantly different between groups ($p=0.010$).
 The trend in drinks per month is significantly different between groups ($p=0.012$).

Figure E.15b Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among All Wave 2 Respondents, by Respondent COVID-19 Experience

E-32



The change in drinks per month from February to November is significantly different between groups ($p=0.022$).
 The trend in drinks per month is significantly different between groups ($p=0.025$).

Figure E.16a Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among the Main Sample, by COVID-19 Experience for Respondent’s Close Family Member or Friend

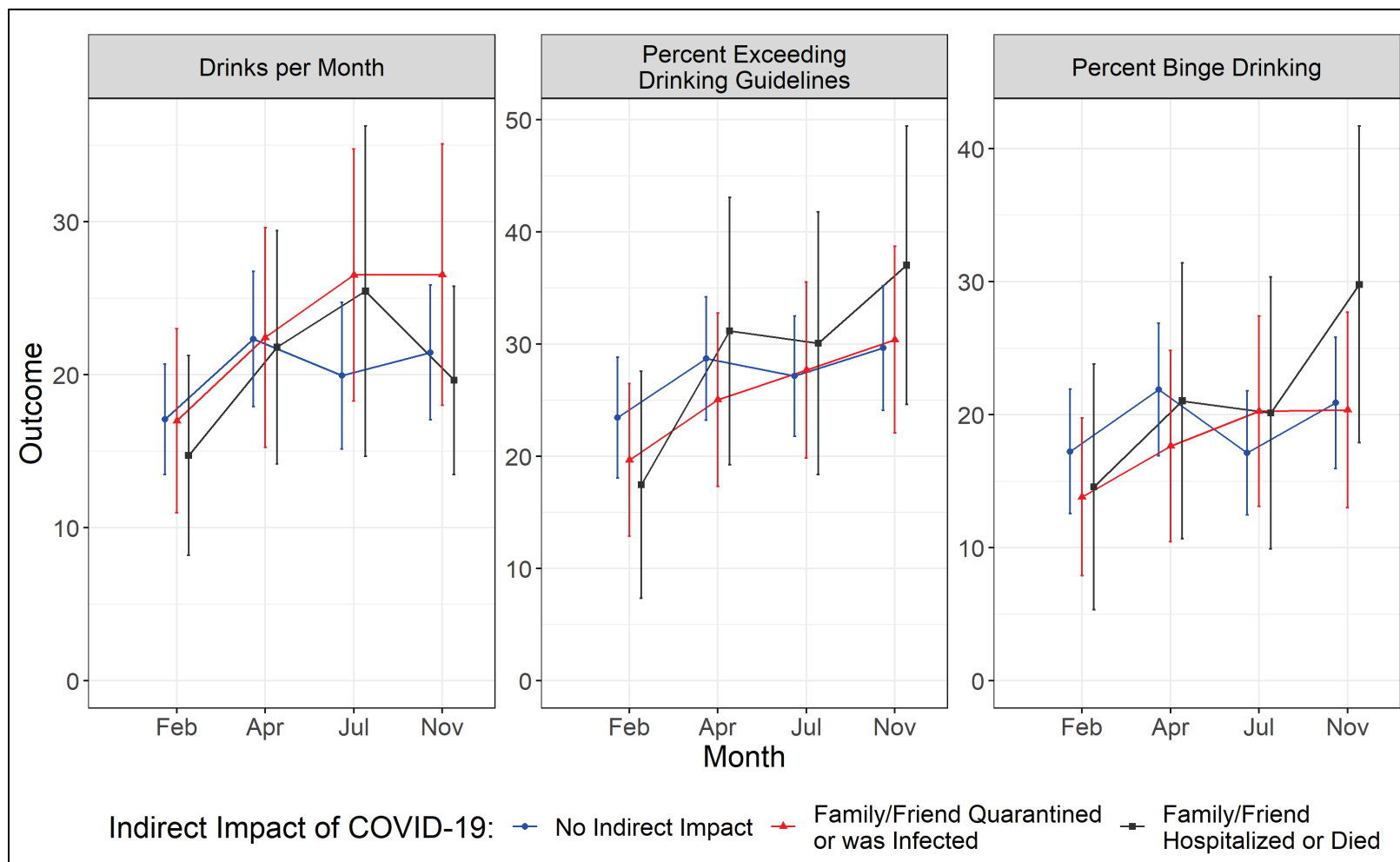


Figure E.16b Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among All Wave 2 Respondents, by COVID-19 Experience for Respondent’s Close Family Member or Friend

E-34

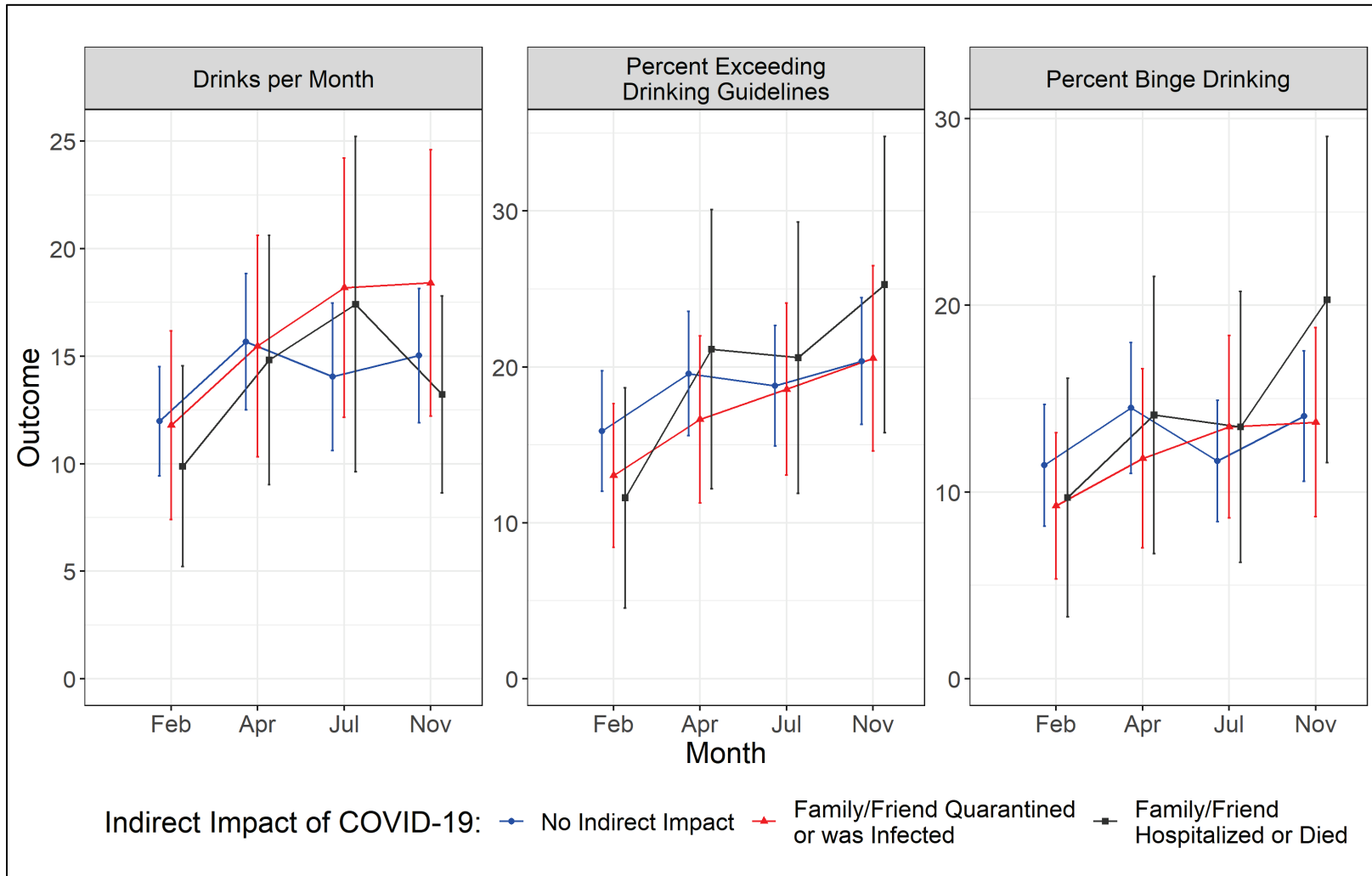
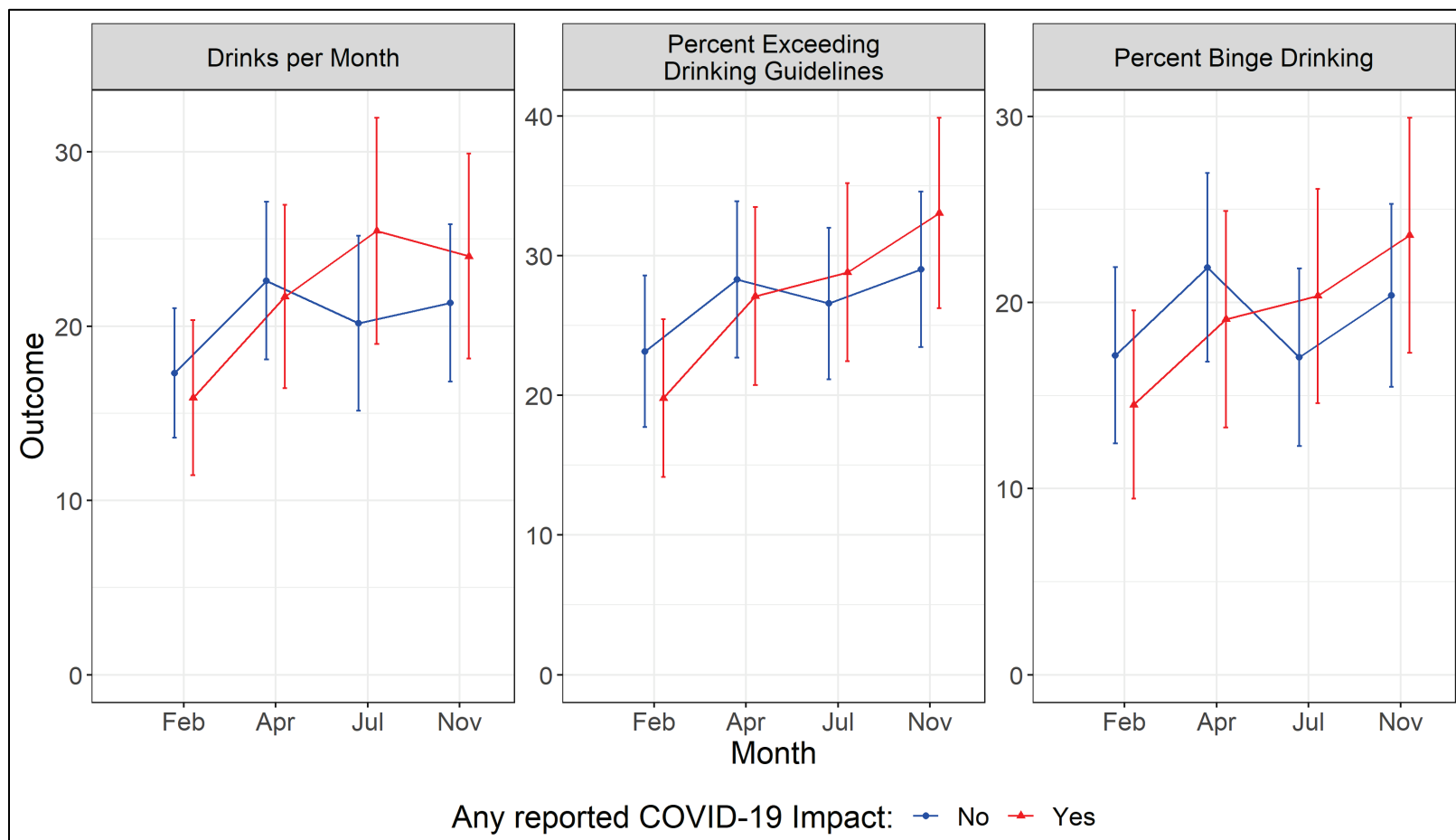


Figure E.17a Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among the Main Sample, by COVID-19 Experience of Respondent or Close Family Member or Friend



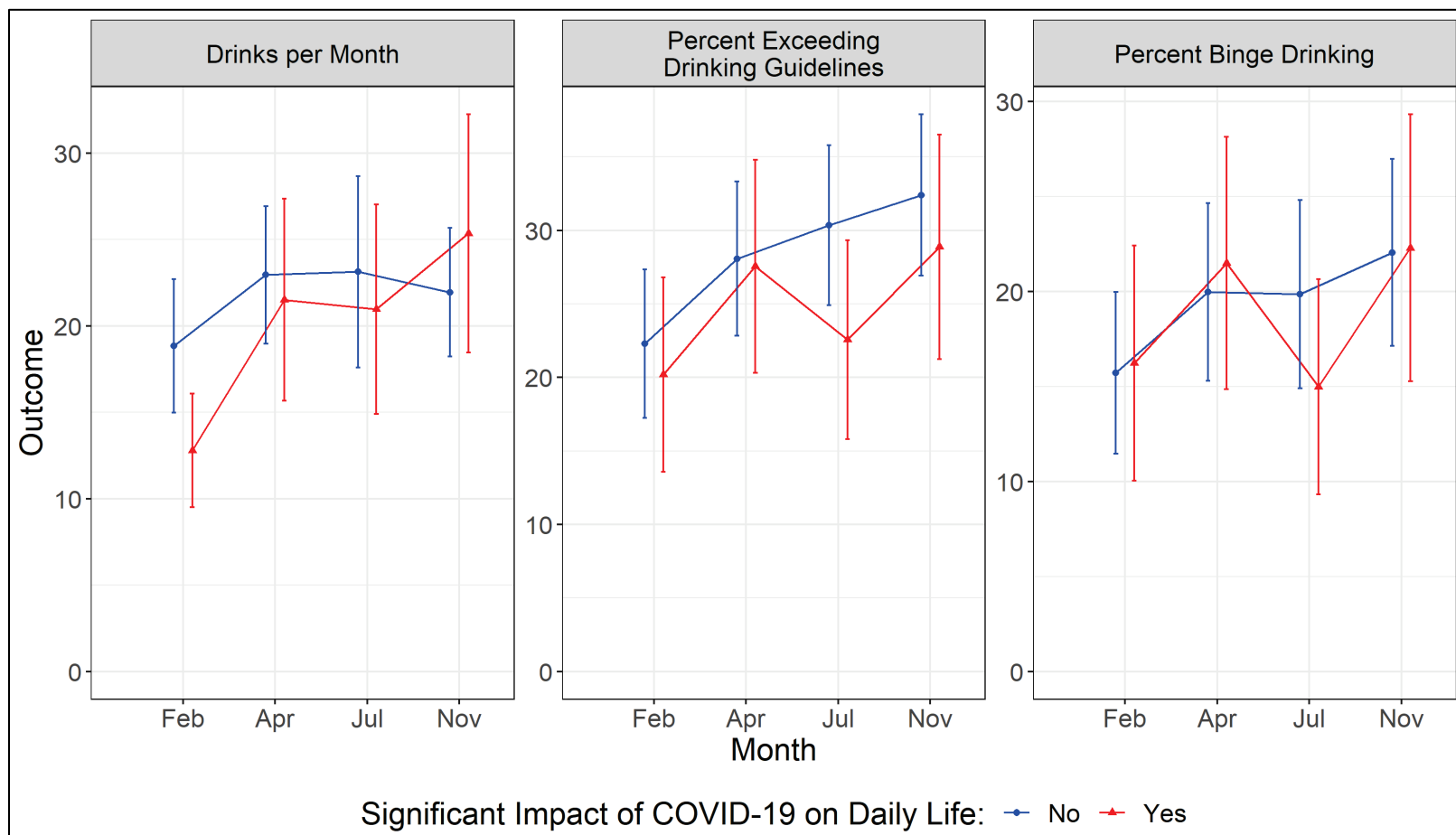
The change in drinks per month from February to July is significantly different between groups ($p=0.048$).

Figure E.17b Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among All Wave 2 Respondents, by COVID-19 Experience of Respondent or Close Family Member or Friend

E-36



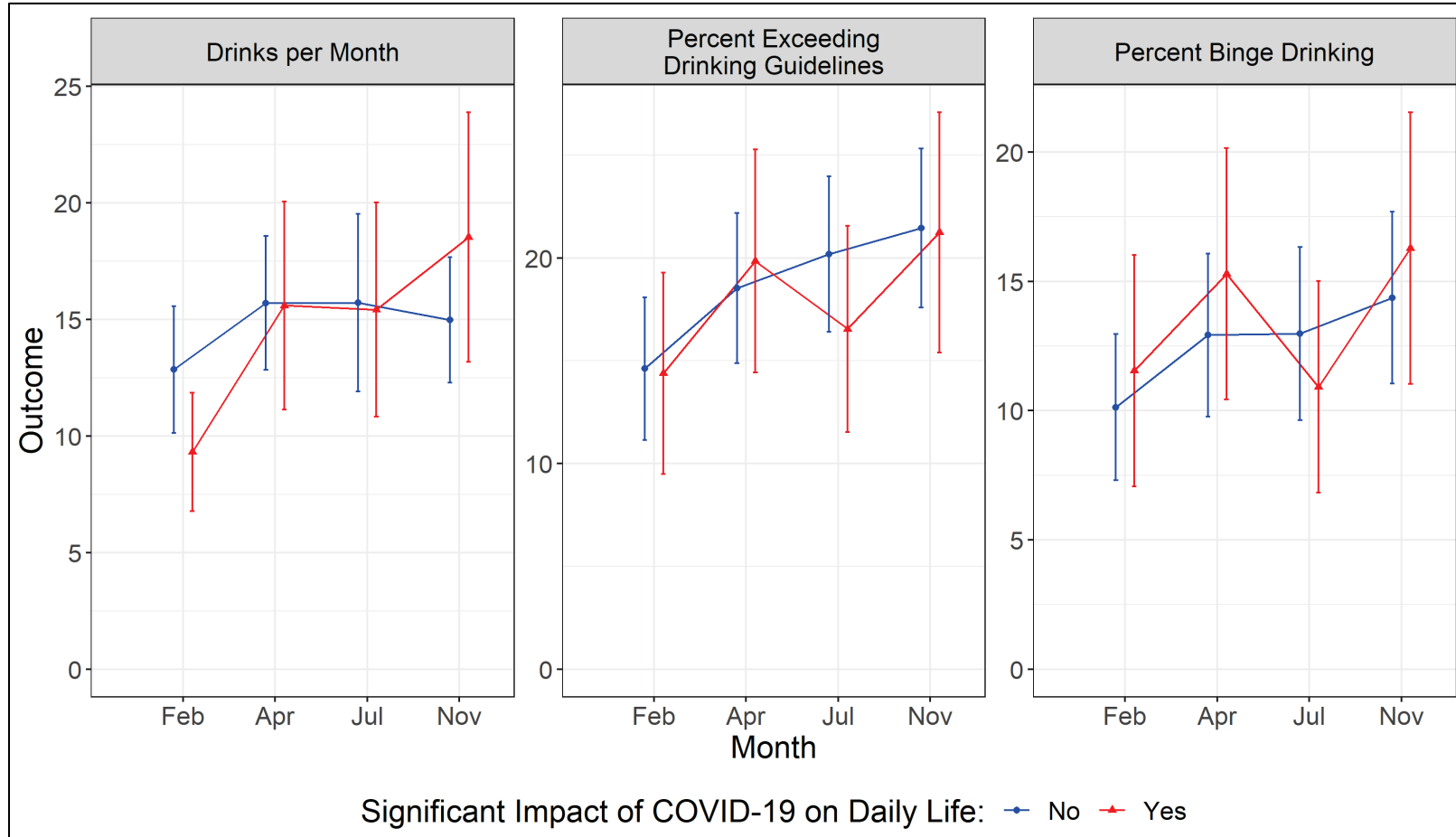
Figure E.18a Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among the Main Sample, by Significant Impact of COVID-19 on Daily Life



The change in drinks per month from February to November is significantly different between groups ($p=0.010$).
 The trend in drinks per month is significantly different between groups ($p=0.030$).

Figure E.18b Changes in Alcohol Consumption Outcomes: Feb–Nov 2020 among All Wave 2 Respondents, by Significant Impact of COVID-19 on Daily Life

E-38



The change in drinks per month from February to November is significantly different between groups ($p=0.007$).
 The trend in drinks per month is significantly different between groups ($p=0.021$).