Alcohol Abuse

and Mental/Physical Health in the United States

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Research Questions

- What is the extent of alcohol abuse in the United States?

- How do mental and physical health influence the likelihood of someone engaging in binge drinking?

About the Data

All data used in this project was retrieved from the CDC's Behavioral Risk Factor Survey (**BRFSS**) from **2018** and analyzed using **R**. Here are some relevant questions that survey participants were asked and their corresponding variable names:

Alcohol Consumption (ALCDAY5)	"During the past 30 days, how many days per week or per month did you have at least one drink of any alcoholic beverage such as beer, wine, a malt beverage or liquor?"
Binge Drinking Frequency (DRNK3GE5)	"Considering all types of alcoholic beverages, how many times during the past 30 days did you have 5 or more drinks for men or 4 or more drinks for women on an occasion?"
Binge Drinking Intensity (MAXDRNKS)	"During the past 30 days, what is the largest number of drinks you had on any occasion?"
Depressive Disorder (ADDEPEV2)	"(Ever told) you have a depressive disorder (including depression, major depression, dysthymia, or minor depression)?"
Mental Health (MENTHLTH)	"Now thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health not good?"
Physical Health (PHYSHLTH)	"Now thinking about your physical health, which includes physical illness and injury, for how many days during the past 30 days was your physical health not good?"
General Health (GENHLTH)	"Would you say that in general your health is: 1 - Excellent, 2 - Very Good, 3 - Good, 4 - Fair, 5 - Poor, 7 - Don't Know/Not Sure?"

Process (Using R)

Download BRFSS Data

I imported the data and found its associated codebook from the BRFSS Survey from 2018.

Data Manipulation

Since the BRFSS survey contains such a large amount of data, I kept only the most important variables in my dataframe and got rid of everything else.

Dealing with Undesirable Data

Many variables had values such as ‘88’ or ‘99’ as a placeholder where survey respondents refused to answer/didn’t give a proper answer, so I removed those values along with NA values.

Creating Subsets

I split the data into multiple different subsets in order to take a deeper look at different measures of alcohol abuse.

Data Visualization

I created 3 choropleth maps using the ‘sf’ package in R. I also created a few different varieties of bar plots using R’s ‘ggplot2’ package.

Logistic Regression

I created a logistic regression model to predict the likelihood of a person being a binge drinker based on their mental and physical health.

Three Ways to Measure Level of Alcohol Abuse

Prevalence

This refers to the **percentage** of adults in a given state who have consumed a certain number of alcoholic beverages on at least one occasion in the past 30 days. This can be:

- >= 5 drinks for men
- >= 4 drinks for women

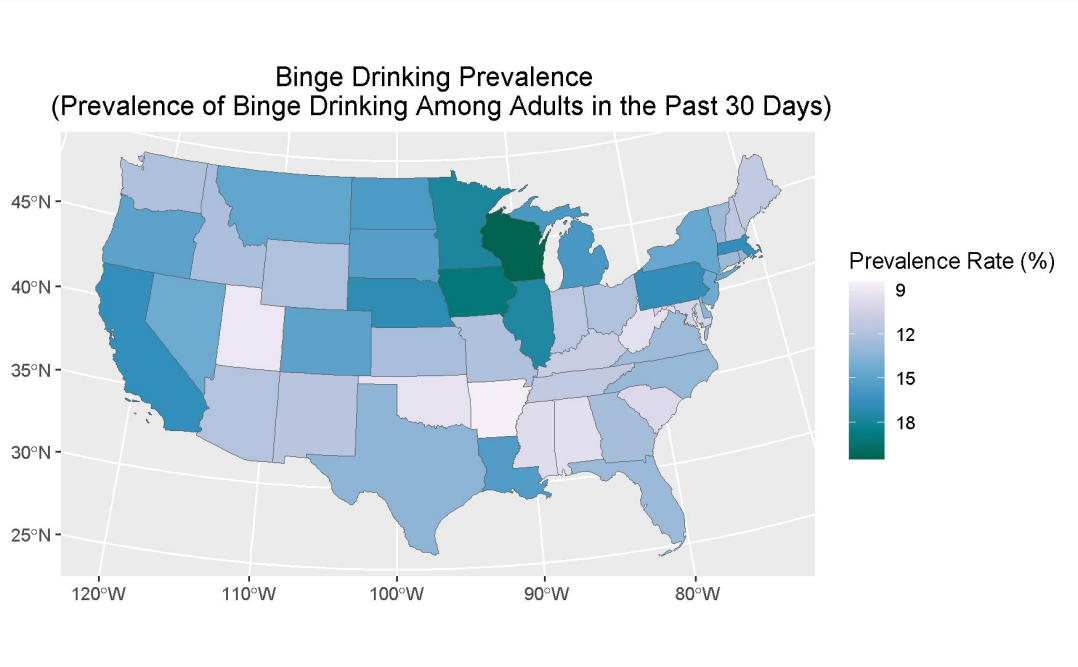
Intensity

This refers to the **maximum number** of alcoholic beverages consumed on a **single occasion** among **those who binge drink**, in the past 30 days.

Frequency

This refers to the average **number** of **'binge drinking' occasions** among those who binge drink, in the past 30 days.

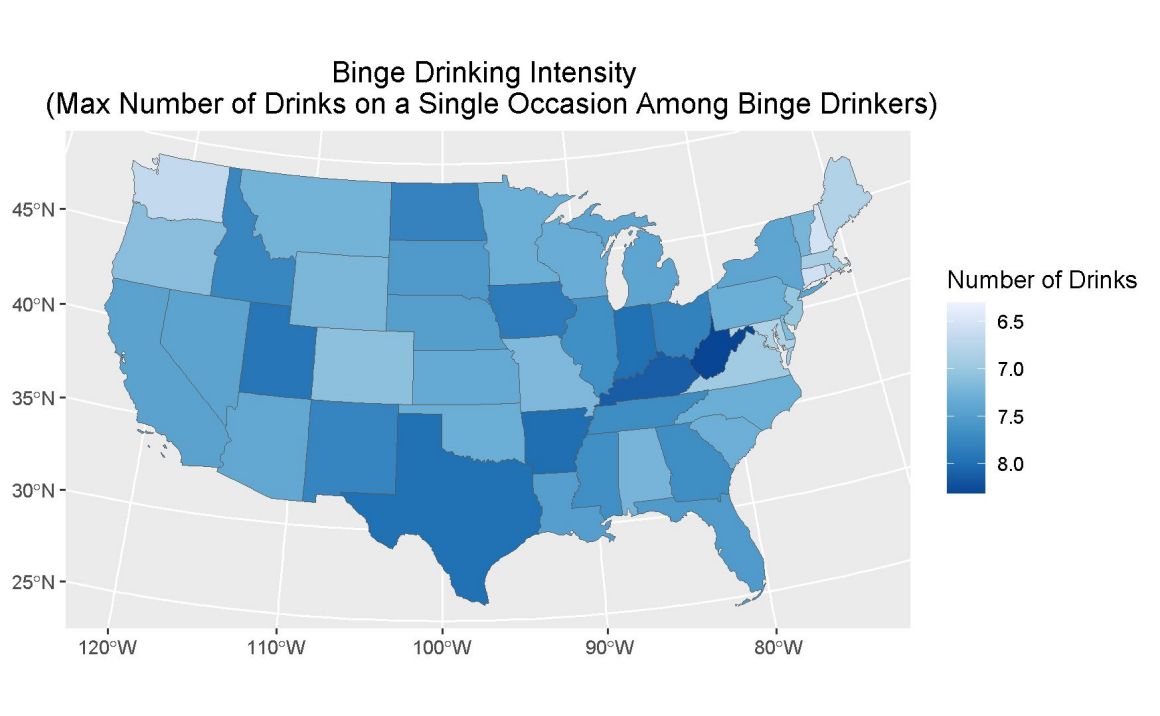
Binge Drinking Prevalence in the United States



- Wisconsin: 20.52%
- Iowa: 19.04%
- Minnesota: 17.85%
- Illinois: 17.62%

As shown in the map above, the overwhelming majority of binge drinkers are located in the Midwest.

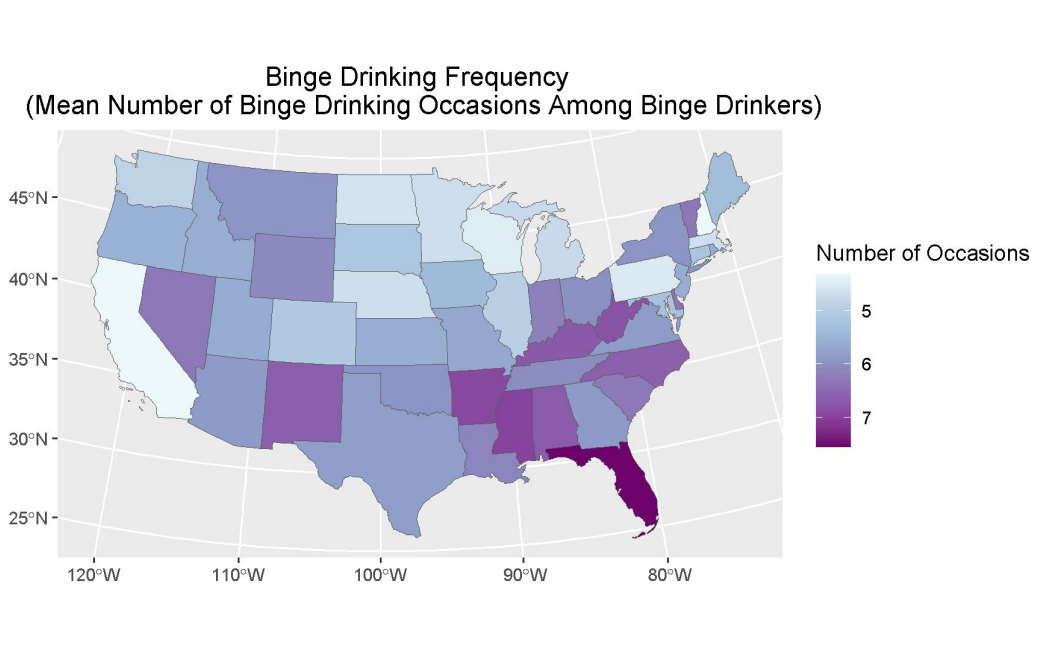
Binge Drinking Intensity in the United States



- W. Virginia: 8.31
- Kentucky: 8.13
- Arkansas: 7.99
- Texas: 7.98

Binge drinking intensity was more scattered than prevalence, but binge drinking intensity appears to be the highest in the Appalachian region of the United States.

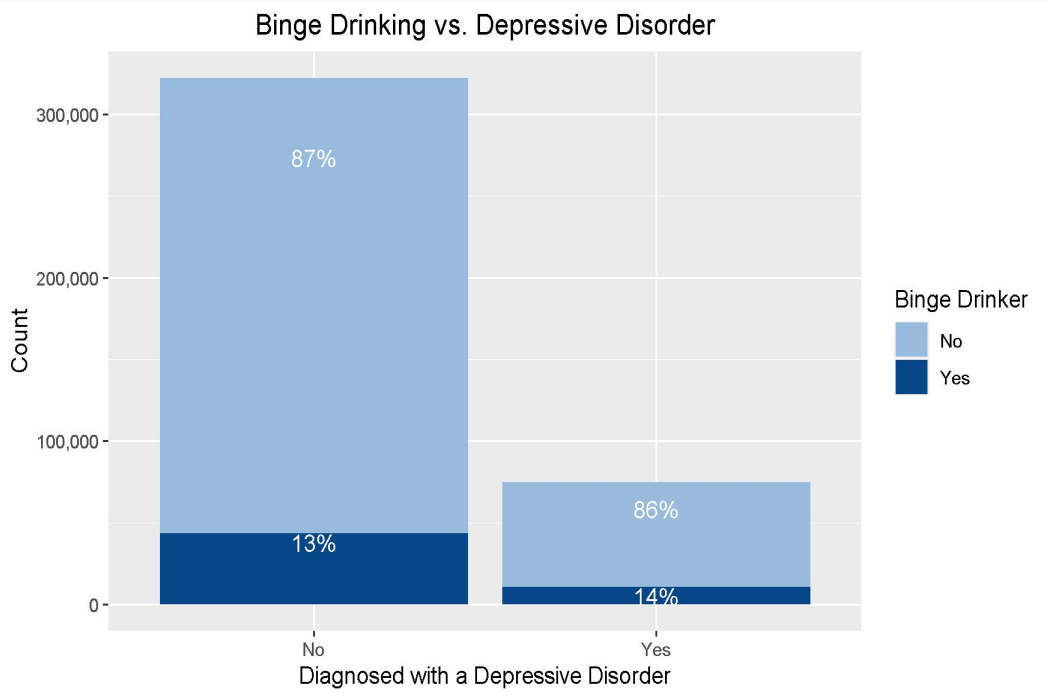
Binge Drinking Frequency in the United States



- Florida: 7.56
- Mississippi: 7.99
- Arkansas: 6.92
- W. Virginia: 6.78

As shown in the map above, those who binge drink the most frequently are located in the Southeast region of the United States.

Binge Drinking vs. Depressive Disorders



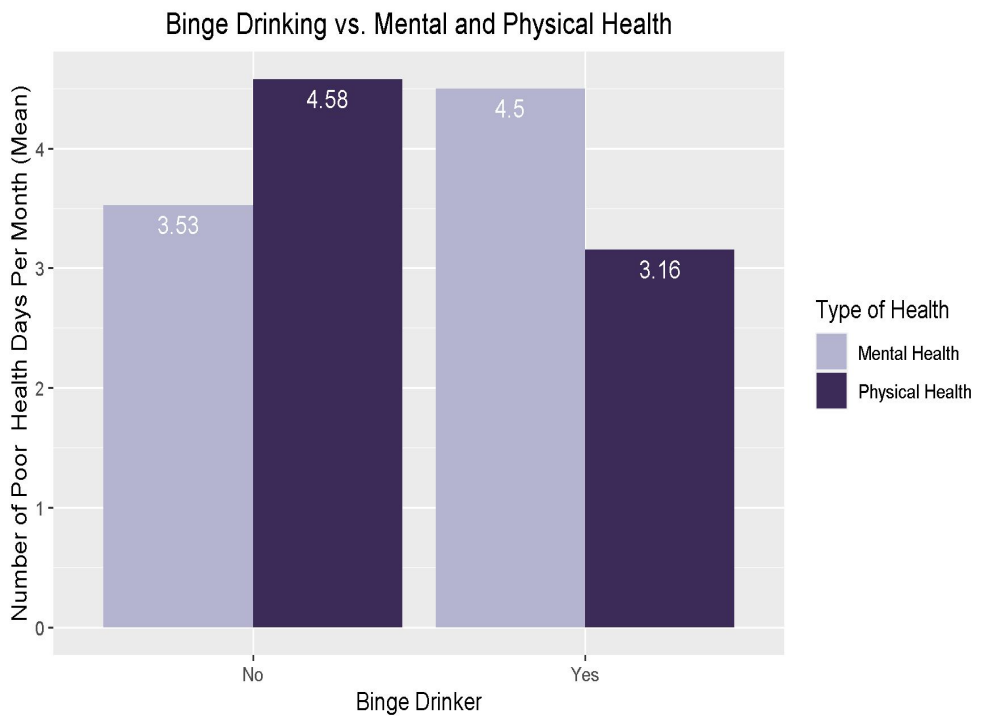
Based on this plot:

- Those diagnosed with a depressive disorder (depression, dysthymia, etc.) are only **slightly more likely** to engage in binge drinking.
  - **13%** of people **not** diagnosed with a depressive disorder engage in binge drinking.
  - **14%** of people **diagnosed** with a depressive disorder engage in binge drinking.

However, this data has some limitations:

- Only addresses people who are **diagnosed;** not being diagnosed with a depressive disorder does not necessarily indicate that a person does not have a depressive disorder.

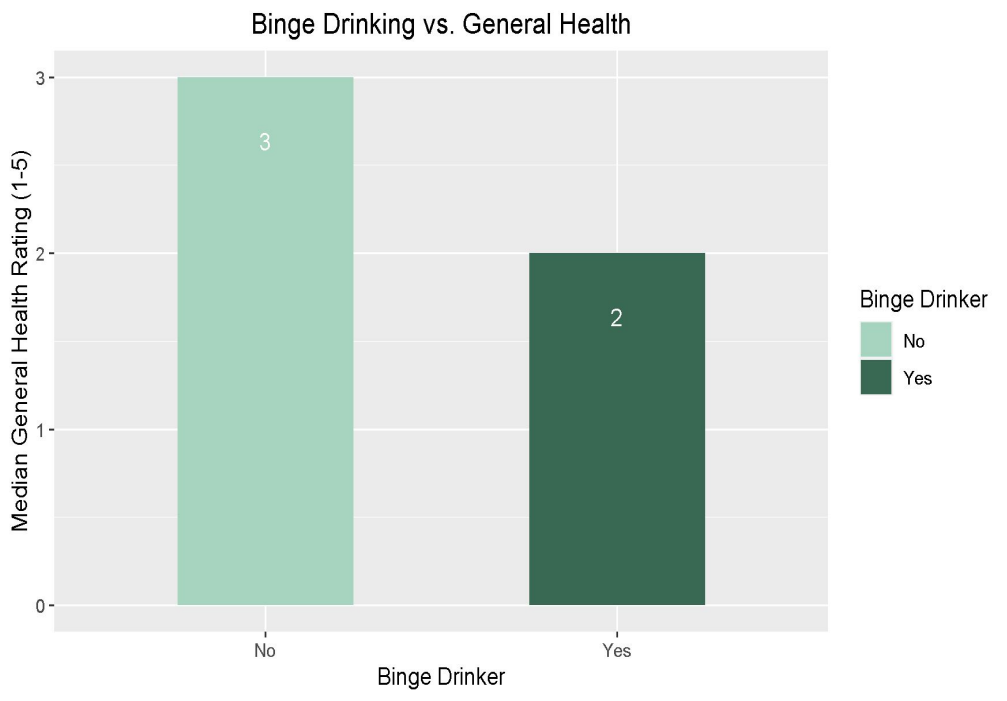
Binge Drinking vs. Mental and Physical Health



Based on this plot:

- People suffering from poor **mental health** are **more likely** to engage in binge drinking.
  - **Non-Binge Drinker** Average # of poor mental health days per month: **3.53**
  - **Binge Drinker** Average # of poor mental health days per month: **4.5**
    - This is approximately a **27.5%** difference!
- People suffering from poor **physical health** are actually **less likely** to engage in binge drinking.
  - **Non-Binge Drinker** Average # of poor physical health days per month: **4.58**
  - **Binge Drinker** Average # of poor physical health days per month: **3.16**

Binge Drinking vs. General Health



General Health Rating:

- 1 = Excellent
- 2 = Very Good
- 3 = Good
- 4 = Fair
- 5 = Poor

Based on this plot:

- People who rated their general health as **3-5** were **less likely** to engage in binge drinking than those who rated their general health as **1 or 2**.

Logistic Regression to Determine the Likelihood of Being a Binge Drinker Based on Mental/Physical Health

	Binge Drinker (No = 0, Yes = 1)			
Predictors	*Odds Ratios*	*CI*	*Statistic*	*p*
(Intercept)	0.21	0.21 – 0.22	-124.52	**<0.001**
Depressive Disorder	1.02	1.00 – 1.05	1.61	0.107
Mental Health	1.03	1.02 – 1.03	41.24	**<0.001**
Physical Health	0.98	0.98 – 0.98	-30.74	**<0.001**
General Health	0.88	0.87 – 0.89	-24.47	**<0.001**
Observations	396887			
R^2 Tjur	0.009			

- Binge Drinker:
  - 0 = No
  - 1 = Yes
- Depressive Disorder:
  - 0 = Not diagnosed with a depressive disorder
  - 1 = Diagnosed with a depressive disorder (depression, dysthymia, etc.)
- Mental Health:
  - # of days in the past 30 days where mental health was poor
- Physical Health:
  - # of days in the past 30 days where physical health was poor
- General Health:
  - Scale of 1-5, where 1 = Excellent and 5 = Poor

Logistic Regression to Determine the Likelihood of Being a Binge Drinker Based on Mental/Physical Health

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Based on this model:

- Being diagnosed with a **depressive disorder** does **not** have a large impact on whether or not a person is a binge drinker.
- **Mental Health** has the **strongest impact** on the likelihood of a person being a binge drinker. Those with a greater number of days where their mental health was poor are **more likely** to engage in binge drinking.
- **Physical Health** also has a **significant impact** on the likelihood of a person being a binge drinker. Those with a greater number of days where their physical health was poor are **less likely** to engage in binge drinking.
- **General Health** has a **significant impact** on the likelihood of a person being a binge drinker. Those who rated their health as **'poor'** are **less likely** to engage in binge drinking.

Conclusion

- Alcohol abuse is widespread across the entirety of the United States, with some hotspots being located in the Midwest and the Appalachian/Southern regions.
- The likelihood of someone engaging in binge drinking is significantly influenced by their mental and physical well-being.

Thanks!

R markdown script here

Sources

Centers for Disease Control and Prevention. (2022, October 27). *CDC - 2018 BRFSS survey data and Documentation*. Centers for Disease Control and Prevention. https://www.cdc.gov/brfss/annual_data/annual_2018.html