Child mistreatment effects on Alcohol Consumption

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Introduction

The origin of substance abuse issues in adults is a topic that has been widely discussed in research, with a portion of these attributed to genetic factors and another fragment to environmental ones. According to Murphy et al. (1991) in 43% of serious child abuse cases at least one parent had struggled with some form of substance addiction. This type of inter-generational pattern is one of the many variables that contributes to paint a more complete picture of the reasons why an adult may turn to abusing controlled and illicit substances in the later years. This phenomenon is explained using a cognitive framework by Edalati and Krank (2016). In their work they reveal how childhood neglect can then turn into an increased vulnerability to addiction due to cognitive impairments such as memory issues (Edalati and Krank 2016).

Several other factors converge on the relationship between mistreatment and substance abuse, including sex differences. Research indicates that for women only physical mistreatment was related to a higher risk of drug abuse, while for men it was found that such behaviour is influenced both by physical and verbal abuse (Reinert. and Edwards 2009). These results demonstrate how it's important to account for different socio-economic and demographic effects to be able to correctly address the topic of how childhood mistreatment can impact substance abuse. Finally, from Brumley et al. (2019) we gathered that there is a positive relationship associated between alcohol and child mistreatment, they also propose a Childhood mistreatment index built on wave 3 and wave 4 Add Health data using a two-factor approach, we considered these one of our two healthcare measures, one being alcohol consumption and the other mistreatment (composite measurement). Notably, by building an index with this approach even when controlling for confounding variables, childhood mistreatment maintained significant explanatory power in their study.

This review will examine the relationship between childhood abuse, in the form of physical, sexual, or psychological harm, and subsequent substance abuse issues in

adults using the Add Health data in the form of a cross-sectional analysis about the third wave data (young adult years).

Descriptive Statistics

Data from Wave 3 of the National Longitudinal Study of Adolescent to Adult Health (Add Health data) was used, focusing on participants aged 18-28. Our final sample had 4,376 respondents after excluding cases with missing data and 13 variables (Appendix 1). Childhood maltreatment was assessed using items on physical abuse, sexual abuse, physical neglect, and social services intervention. Following Brumley et al. (2019), we employed a two-factor solution based on exploratory and confirmatory factor analysis. This approach allowed us to capture the multidimensional nature of childhood maltreatment experiences more effectively than a simple cumulative index. In fact, as it's depicted in Figure 1, we can see that physical abuse is a lot more common than the other variables, we can assume this is partially due to the way the question was formulated as it included also slaps, and other similar gestures that are typical ways to reprimand kids. That is why we separated the sexual_abuse, social_services and physical_neglect into another factor to calculate our score.

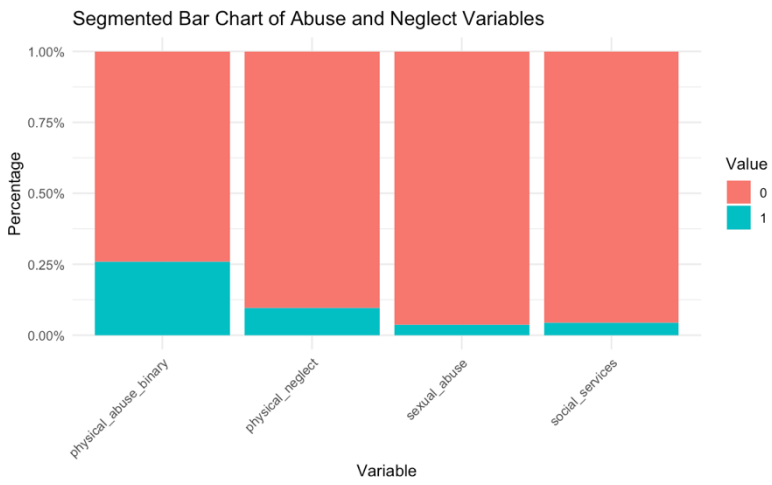

Figure 1 Incidence of abuse and neglect in sample

We considered heavy drinking as the number of days in the past year the participant drank 5 or more drinks in a row, this measure went from 0 (no consumption) to 6 (highest consumption). This measure aligns with commonly used definitions of binge drinking in the literature (Shin et al., 2009). Control variables included age, sex, race, education level, income, employment status, depression, and criminal convictions. These variables were selected based on their potential to influence both childhood maltreatment experiences and drinking behaviours in young adulthood.

The distribution of mistreatment scores shows a right-skewed pattern, with the majority of respondents reporting low or no mistreatment (Appendix 2, Table 1). Nevertheless, for those who have reported some form of mistreatment, there we have strong differences across different variables (Appendix 3, Figure 4).

When it comes to sex differences, females registered slightly lower rates of medium and low levels of mistreatment compared to males, but they registered higher rates of high levels of mistreatment. Across racial groups, Asian respondents had the highest proportion reporting medium/high mistreatment, followed by Native Americans, Whites and at the lowest amount Black respondents. This highlights how different cultural environments may impact how parents impart tutelage. Education level also showed a relationship with reported mistreatment, with those having high school or less education reporting higher rates across all mistreatment levels compared to those with college education, this may be an indicator that those with high school education may struggle more to proceed to later stages of education. Income was inversely related to reported mistreatment, with those below median income showing slightly higher rates across mistreatment levels. Interestingly, those with no income had the highest rate of reporting no mistreatment, but also a relatively high rate of low mistreatment.

On the Use of Weights

We used weighted survey regression models to examine the relationship between childhood maltreatment and heavy drinking, controlling for demographic and socioeconomic factors. Specifically, we used the weight for cross-sectional analysis as recommended by Add Health guidelines. The use of survey weights allowed us to account for the complex sampling design of the Add Health study and to produce nationally representative estimates. Interaction terms were included to test for moderation by sex and education level, as previous research has suggested potential differences in the effects of childhood maltreatment across these subgroups (Reinert & Edwards, 2009).

Regression

As shown in the graph in appendix 7, the relationship between childhood maltreatment and heavy drinking is non-linear. To achieve more normality in our data, we decided to use a log-linear model, taking the log of heavy drinking as our dependent variable.

We then decided to approach the analysis from a multi-step regression approach, trying to see how different variables impacted our model. With started by only including the total mistreatment score, and that showed a significant positive association with heavy drinking ($\beta = 0.05763$, $p < 0.01$). This relationship persisted across all subsequent models, even after controlling for various demographic and socioeconomic factors, the results from our regressions are summarised in Appendix 4 table 3.

This brings us to our final model, which included all control variables. Here childhood maltreatment remained a significant predictor of heavy drinking ($\beta = 0.05148$, $p < 0.01$) though not particularly strong in amount. When looking at our control variables, male sex ($\beta = 0.15711$, $p < 0.001$), white race ($\beta = 0.21462$, $p < 0.001$), and being employed ($\beta = 0.06111$, $p < 0.01$) were associated with increased heavy drinking. Overall as it can be seen in the graph figure 7 appendix 8 White and Native American were those with the highest consumption of alcohol. When it comes to socio-economic factors lower education levels ($\beta = -0.23156$, $p < 0.001$) and having no income ($\beta = -0.28364$, $p < 0.001$) were associated with decreased heavy drinking. This may be due to a plethora of factors, including the age of the respondents and drinking limits in the US, as well as the economic power partake in alcohol consumption. Depression also showed a positive association with heavy drinking ($\beta = 0.10906$, $p < 0.001$). We also run an interaction model by sex and education, and we found a marginally significant interaction between maltreatment and the male gender ($\beta = 0.18$, $p = 0.086$), that further underlines how the effect of maltreatment on heavy drinking may differ by gender. Similarly, education in our interaction model also confirmed previous results, with the interaction with “high school or less” having a negative coefficient ($\beta = -0.21$), complete results can be found in Appendix 5 table 4. As the order of magnitude of mistreatment is not extremely high, but it’s still significant statistically, in the future another analysis

could be conducted to see how different types of maltreatment, as well as the duration and intensity of such experiences, influence heavy drinking behaviour over time.

Limitations and Discussion

There are several limitations to be noted, to start this is by nature a cross-sectional analysis which means that we're not considering the temporal sequence of events that can help us draw causal conclusions on the impact of mistreatment. In particular, binge drinking behaviours are not uncommon in college age, we could expand on this research with a longitudinal study to verify how these behaviours evolve after. Again, because this is a cross-sectional analysis we're relying on retrospective self-reporting, which may be subject to recall bias, rather than data from previous cohorts of the Add Health survey. As the relationship is non-linear it's hard to compound for all the complex dynamics that led us to these results, there are several potential confounding factors that we may want to explore in the future such as past history of alcoholism in the family, or cognitive variables such as memory issues, and mental health struggles.

Despite these limitations, our study contributes to the growing body of evidence linking childhood maltreatment to later substance use problems. The persistent association between maltreatment and heavy drinking, even after controlling for various factors, underscores the long-term impact of childhood experiences on adult behaviour. Nevertheless, we could explore further, how gender and other socio-economic factors affect binge drinking as well as other substance abuse variables such as illegal drug consumption as overall those were the variables with the most influence on alcohol consumption.

References

Edalati, H. and Krank, M.D., 2016. Childhood maltreatment and development of substance use disorders: a review and a model of cognitive pathways. Trauma, Violence, & Abuse, 17(5), pp.454-467.

Reinert, D.F. and Edwards, C.E., 2009. Childhood physical and verbal mistreatment, psychological symptoms, and substance use: Sex differences and the moderating role of attachment. Journal of Family Violence, 24(8), pp.589-596.

Murphy, J.M., Jellinek, M., Quinn, D., Smith, G., Poitrast, F.G. and Goshko, M., 1991. Substance abuse and serious child mistreatment: Prevalence, risk, and outcome in a court sample. Child Abuse & Neglect, 15(3), pp.197-211.

Brumley, L.D., Brumley, B.P. and Jaffee, S.R., 2019. Comparing cumulative index and factor analytic approaches to measuring maltreatment in the National Longitudinal Study of Adolescent to Adult Health. *Child Abuse & Neglect*, 87, pp.65-76.

2Shin, S.H., Edwards, E.M. and Heeren, T., 2009. Child abuse and neglect: Relations to adolescent binge drinking in the national longitudinal study of Adolescent Health (AddHealth) Study. *Addictive Behaviors*, 34, pp.277-280.

Appendix

Appendix 1 Variables' Tables

Variable	Type	mean	sd	min	max
physical_abuse	Numeric	0.73	1.44	0	5
sexual_abuse	Numeric	0.04	0.19	0	1
physical_neglect	Numeric	0.10	0.29	0	1
social_services	Numeric	0.04	0.20	0	1
age	Numeric	21.82	1.80	18	28
employed	Numeric	0.69	0.46	0	1
depression	Numeric	0.11	0.31	0	1
heavy_drinking	Numeric	2.22	1.75	0	6
convicted	Numeric	0.11	0.31	0	1

Table 1 Numerical Variables

Variable	Type	Values
sex	Categorical	Female (2369, 54.14%), Male (2007, 45.86%)
race	Categorical	White (3078, 70.34%), Black (1049, 23.97%), Asian (183, 4.18%), Native American (66, 1.51%)
education	Categorical	College or higher (4103, 93.76%), High school or less (273, 6.24%)
income	Categorical	At or above median (2657, 60.72%), Below median (1484, 33.91%), No income (235, 5.37%)

Table 2 Categorical Variables

Appendix 2 Distribution of Health Measures

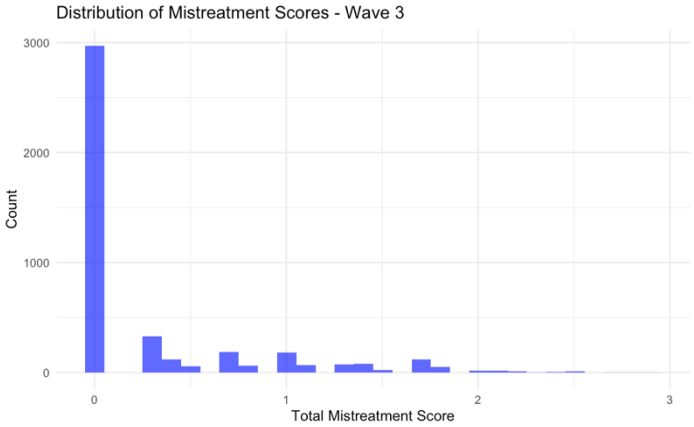

Figure 2 Distribution of mistreatment scores

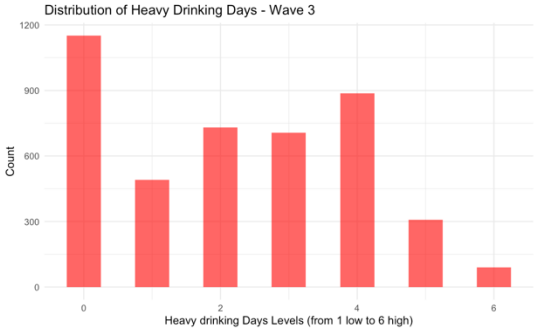

Figure 3 Distribution of Heavy Drinking

Appendix 3 Healthcare measures distribution

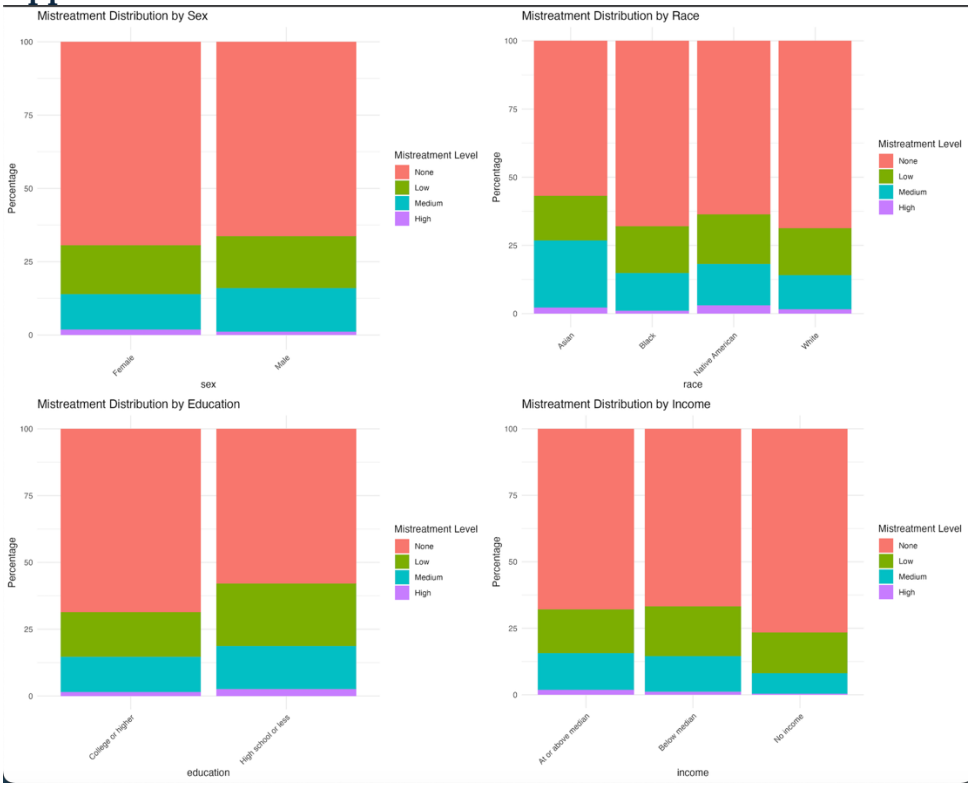

Figure 4 Mistreatment across different socio-economic variables

Appendix 4 Regression Results

Regression Results

	Dependent variable:				
	Log Heavy Drinking				
	survey-weighted normal				*OLS*
	Model 1	Model 2	Model 3	Model 4	Model 5
	(1)	(2)	(3)	(4)	(5)
Mistreatment Score	0.058**	0.059**	0.056**	0.051*	0.051**
	(0.021)	(0.021)	(0.021)	(0.022)	(0.018)
Sex		0.198***	0.195***		0.157***
		(0.022)	(0.022)		(0.020)
Race		-0.136*	-0.097		-0.076
		(0.060)	(0.060)		(0.050)
Age		0.200	0.233*		0.153
		(0.108)	(0.117)		(0.090)
Education		0.226***	0.232***		0.215***
		(0.056)	(0.056)		(0.048)
Income		0.006	0.004		
		(0.006)	(0.006)		
Employed			-0.200***		-0.232***
			(0.051)		(0.040)
Depression			-0.041		-0.028
			(0.025)		(0.021)
Convicted			-0.312***		-0.284***
			(0.055)		(0.043)
employed			0.059*		0.061**
			(0.026)		(0.021)
depression				0.109**	0.109***
				(0.034)	(0.031)
convicted					0.314***
					(0.031)
Constant	0.991***	0.594***	0.649***	0.981***	0.708***
	(0.013)	(0.149)	(0.151)	(0.014)	(0.051)
Observations	4,363	4,363	4,363	4,363	4,363
R^2					0.114
Adjusted R^2					0.112
Log Likelihood	-4,763.452	-4,614.743	-4,567.287	-4,757.463	
Akaike Inf. Crit.	9,530.905	9,243.485	9,156.574	9,520.925	
Residual Std. Error					0.624 (df = 4351)
F Statistic					50.810*** (df = 11; 4351)
Note:					*p<0.05; **p<0.01; ***p<0.001
					Standard errors in parentheses

Table 3 Regression Results

Appendix 5 Interaction model results

```
Call:
svyglm(formula = heavy_drinking ~ total_mistreatment_score *
    sex + total_mistreatment_score * education, design = w3_survey_design)

Survey design:
svydesign(ids = ~AID, weights = ~weight, data = w3_selected)

Coefficients:
                                                  Estimate Std. Error t value Pr(>|t|)
(Intercept)                                        1.97653    0.04430  44.617  < 2e-16 ***
total_mistreatment_score                           0.04866    0.06847   0.711  0.47728
sexMale                                            0.64083    0.06919   9.262  < 2e-16 ***
educationHigh school or less                      -0.40551    0.15681  -2.586  0.00974 **
total_mistreatment_score:sexMale                   0.18288    0.10646   1.718  0.08591 .
total_mistreatment_score:educationHigh school or less -0.20644    0.21908  -0.942  0.34609
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Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

(Dispersion parameter for gaussian family taken to be 2.954029)

Number of Fisher Scoring iterations: 2
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Table 4 Interaction Model results

Appendix 6 Distribution of Mistreatment by Depression and Conviction status

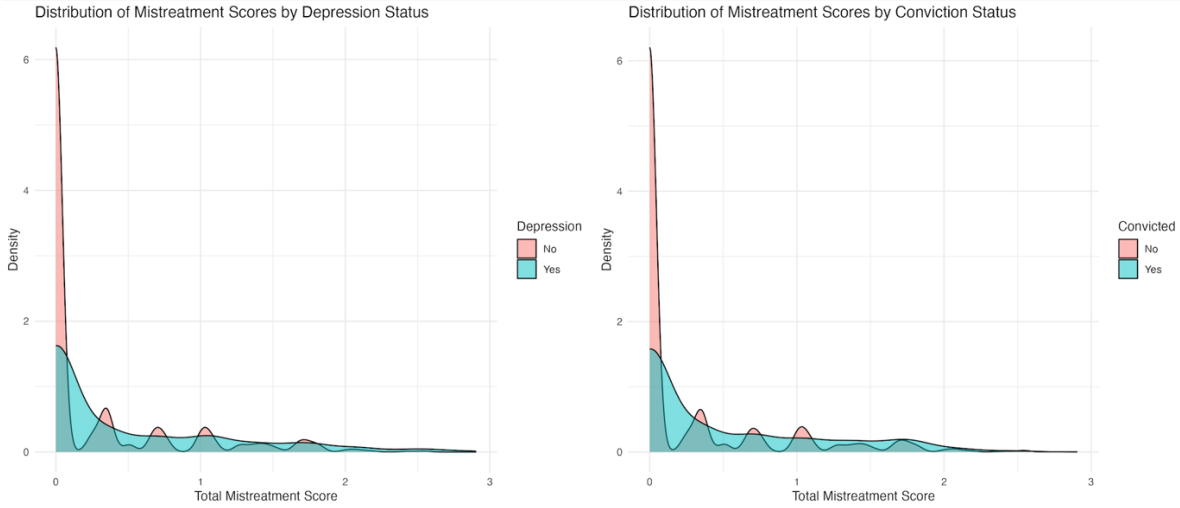

Figure 5 Distribution of Mistreatment by Depression and Conviction status

Appendix 7 Relationship between Mistreatment and Heavy Drinking

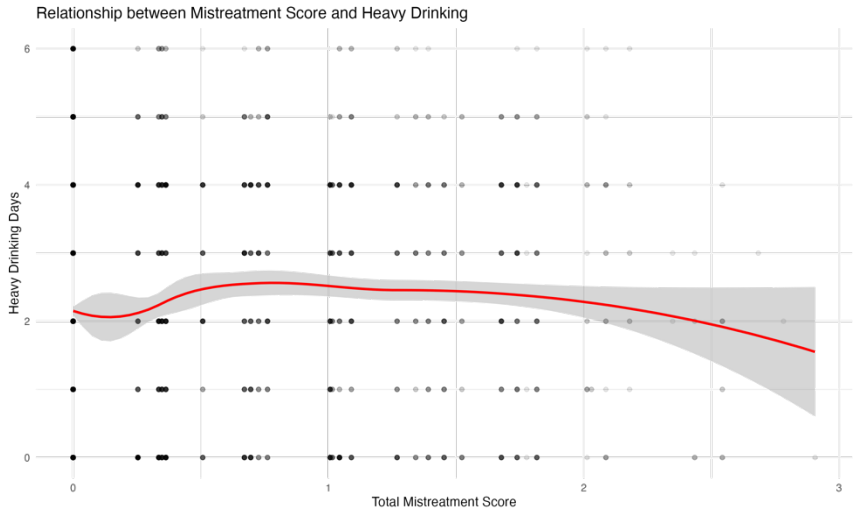

Figure 6 Relationship between Mistreatment and Heavy Drinking

Appendix 8 Effect of drinking on Race

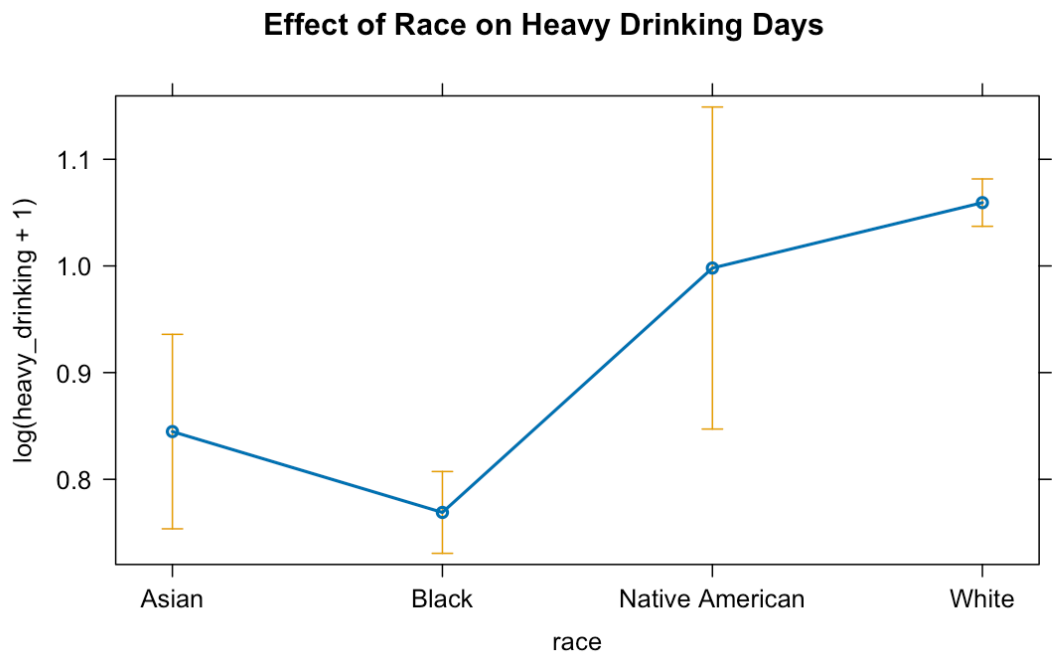

Figure 7 Effect of heavy drinking on Race

Appendix 9

Figure 8 Mistreatment and heavy drinking by sex