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# **Modeling the Relationship Between Alcohol Abuse in Young Adults and Their Level of Happiness at Home**

**Helen Moses, Aiden Chang, Zack Dong,**

## **Abstract**

This study analyzes the relationship between alcohol abuse in young adults and their level of happiness at home and adult involvement in their life. To investigate this relationship, we constructed a logistic regression model with presence of drinks consumed in the past thirty days as our response variable and home happiness, presence of alcohol problems in the home, and time spent unsupervised by an adult as our explanatory variables. Multiple Wald's tests and 95% confidence intervals yielded statistically discernible evidence in favor of an association between the odds of a young adult abusing alcohol and various home happiness factors.

## **Introduction**

In this case study we explore the relationship between alcohol abuse in young adults and their respective household environment. Alcohol abuse is characterized by recurrent use of alcohol and can result in serious problems such as an increased risk of addiction later in life (Shatterproof). Before preventative measures can be taken, it is necessary to understand the root causes of substance abuse in youths. Especially for teenagers and young adults, an unstable household with strained relationships or chronic usage by parents might result in an increased risk of abuse. We are interested in exploring this relationship, because if an association can be proven, researchers will have more information guiding their preventative efforts. For example, preventative measures can then be targeted at informing families of the important role they play in determining the odds their children will abuse alcohol. To test this theory, we developed a multiple logistic regression model based on a school-based survey dataset (Jama) of 4746 adolescents from Minneapolis/St Paul, Minn, metropolitan area. Additional details about the model will be provided in the sections below.

## **Methods**

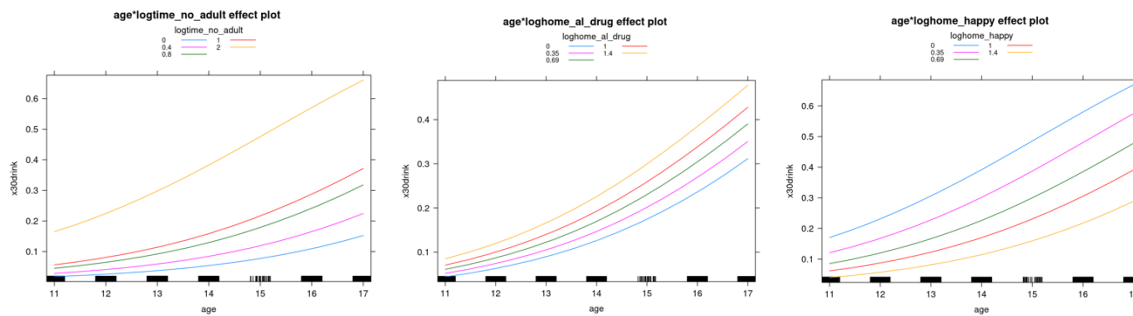
To explore the relationship between alcohol abuse in young adults and their level of happiness at home, it is necessary to fit a logistic regression model with drinks consumed in the last thirty days (0 representing no drinks, and 1 representing any response greater than 0) as the response variable, and home\_happy, home\_al\_drug, and time\_no\_adult as the three primary explanatory variables of interest. The home\_happy variable was constructed through asking students to measure how much they agree with the statement "I have a happy home". It is important to note that for our model to function properly, we changed the collected responses as follows: "strongly disagree" = 1, "disagree" = 2, "agree" = 3, and "strongly agree" = 4. The home\_al\_drug variable was constructed through asking students to measure how much they agree with the statement "There are people living in my home who have a serious alcohol or drug problem, with responses changed exactly as they were for home\_happy. Finally, the time\_no\_adult variable was constructed through asking students to report how much time per week on average is spend outside of school with no adult supervision. This variable was changed as follows: "0 hours" = 1,

“1-2 hours” = 2, “3-5 hours” = 3, “6-10 hours” = 4, “11 or more hours” = 5. These variables were selected because they are the most representative measures of how home factors influence the odds of a young adults abusing alcohol. It is known that as a person gets older, they are more likely to engage in drinking alcohol. To account for this fact, age was also included in the model. It is important to note that we are conducting a study observing data collected on an unaltered environment, so it is not possible to assert causation. As a result, our only goal for building this model is to investigate a linear relationship between alcohol abuse in young adults, and the three explanatory variables of interest described above.

## Results

After fitting the initial model, it became evident that the assumption of linearity was not met. To remedy this issue, we log transformed the response variables. Even with this transformation, the assumption of linearity for the home\_happy variable does not seem to be met. This is especially important to understand when analyzing the results of this study. However, the transformed home\_al\_drug and time\_no\_adult seem to meet all of the model assumptions. With the transformed fitted model, we can see that visually there appears to be a strong association between alcohol abuse and the three main explanatory variables of interest (*Figures 1-3*). In addition to creating an effects plot, the transformed logistic regression model was fitted using R (*Table 1*). The model equation is as follows:

$\text{logit}(\pi\text{hat}) = -7.04 + 0.38x_{\text{age}} - 1.15x_{\text{loghome\_happy}} + 0.50x_{\text{loghome\_al\_drug}} + 1.19x_{\text{time\_no\_adult}}$   
 (where  $\pi$  is the probability of a young adult abusing alcohol)



*Figures 1-3. Effects plot of logtime\_no\_adult, loghome\_al\_drug, and loghome\_happy after controlling for age.*

We can see that there is strong evidence in favor of there being a negative association between alcohol abuse and home happiness after accounting for age, home\_al\_drug, and time\_no\_adult (z-value: -8.170, p-value: <.001): We are 95% confident that a doubling of home happiness is associated with a decrease in the odds of a young adult abusing alcohol by between 34.78% and 23.04% after controlling for age, home\_al\_drug, and time\_no\_adult. We can see that there is strong evidence in favor of there being a positive association between alcohol abuse and the presence of an alcohol problem at home after accounting for age, home\_happy, and time\_no\_adult (z-value: 5.125, p-value: <.001): We are 95% confident that a doubling of the presence of an alcohol problem at home is associated with an increase in the odds of a young adult abusing alcohol by between 9.78 % and 23.09% after controlling for age, home\_happy, and time\_no\_adult. Finally, we can see that there is strong evidence in favor of there being a positive association between alcohol abuse and time spent unsupervised by an adult after accounting for age, home\_hapy, and home\_al\_drug (z-value: 9.638, p-value: <.001): We are 95% confident that a doubling of

time spent unsupervised by adults is associated with an increase in the odds of a young adult abusing alcohol by between 33.11% and 53.80% after controlling for age, home\_happy, and home\_al\_drug.

	Estimate	Standard Error	z value	p value
Intercept	-7.04	0.42671	-16.498	<2e-16
Age	0.38	0.02676	14.245	<2e-16
Loghome happy	-1.15	0.14030	-08.170	3.07e-16
Loghome al drug	0.50	0.09809	05.125	2.97e-07
Logtime no adult	-1.19	0.12361	09.638	<2e-16

Table 1. R output from the multiple logistic regression model.

## Discussion

Based on the results of our analysis, we can see that there is statistically discernible evidence of an association between alcohol abuse and home\_happy, home\_al\_drug, and time\_no\_adult, after controlling for age and each of the other variables. Thus, we can reject the null hypothesis and assert factors at home heavily influence the odds of a young adult abusing alcohol. As mentioned in the results section, it is important to note that not all of the model assumptions were met for the home\_happy variable. However, even if the conclusions drawn about the home\_happy variable are ignored, there is still a large amount of evidence presented that supports our alternative hypothesis. This can be supported through solely interpreting the results of the analysis on home\_al\_drug and time\_no\_adult. Hopefully, the results of this study can be used to inform parents of the important role they play in influencing the odds their children will abuse alcohol. However, because this was merely an observational study, and no causation was determined, it would be interesting to further study what other factors influence the odds a young adult will abuse alcohol. For example, in future study we would like to explore an association between socio economic status and the odds of a young adult abusing alcohol.

## Works Cited

“Addiction Risk Factors in Young People.” *Shatterproof*,  
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