Estimating Support for Military Intervention by State Using Multilevel Regression with Post-Stratification

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Abstract

One of the most complex topics in American politics is military intervention. Public opinion on military intervention is historically divided into pro-war and anti-war positions. Understanding which states may be more or less likely to be pro-war is important for predicting which areas may have more protests, and inform policy positions for elected officials. This paper will create a model to predict opinions on military intervention using a frequentist and a Bayesian approach. Then, these models will be used in order to create a multilevel regression with post-stratification to estimate the public opinion within each state in the United States of America. In both the Bayesian and the frequentist approaches, our multilevel regression with post-stratification estimates that the public opinion within each state to believe that intervention is effective is between 60% and 70%. These results tend to be similar to the public opinion polls on military interventions throughout the late 2010s.

Introduction

The decision to go to war is a complex decision that has severe consequences. A report from Brown University estimated that around 900,000 deaths occurred in the War on Terror. These fatalities include soldiers, civilians, journalists, and aid workers. In addition, the U.S.'s War on Terror has incurred a cost of eight trillion dollars since 2001. Because of these high societal costs, it is not surprising that conflict tends to be a polarizing topic and a topic that has attracted theories on when conflict may occur.

One of the first theories of conflict is the "Just War" theory, by St. Augustine. This posited that conflict should occur if it is for a worthy cause, if conflict is likely to achieve that cause and if the conflict is sponsored by a legitimate government. "Just War" theory also states that conflict should only be used as a last resort, that conflict should not be disproportionate to the cause, and that non-combatants should be respected. Although this theory is valuable, the discourse on military conflict has been furthered by philosophers, politicians, and theologians over the past centuries.

However, perhaps the most relevant and important influence on our perception of conflict has been the United States' recent history of war. A lot of theories and thoughts on war were developed in the aftermath of the Vietnam War. As noted in Richard Haas's book, Intervention, the Vietnam War was an event that informs both our policymakers and citizens on what war is like. Perhaps more importantly, the Vietnam War and the protests related to U.S. involvement introduced the importance of U.S. public opinion to whether we should engage in military conflicts.

Caspar Weinberger, a Secretary of Defense under Ronald Reagan, introduced the Weinberger Doctrine, which stated that force should only be used if there is public or congressional support for military conflict. This was furthered by Warren Christopher, the Secretary of Defense under Bill Clinton, who said that having "a high likelihood of support" of popular and congressional support was a prerequisite for military intervention. Other politicians, such as George H.W. Bush, have not mentioned public opinion as a prerequisite, but have mentioned that it is desirable to have support for any military intervention.

The effects of public opinion during wartime are numerous. As noted by George Gallup, public opinion can often coincide with political changes. As stated in *How Important is Public Opinion in Time of War?*, "In addition to conscription, the people of this country have been ahead of their political leaders on virtually all important war-time issues" (Gallup, 441). In addition, conflict is often likely to not occur, or forces are likely to be withdrawn in the case of public disapproval. This can be seen in a lack of approval for U.S. intervention in Somalia, and later the U.S.'s lack of military intervention in Rwanda during the Rwandan Genocide. In addition, the mismanagement of military intervention threatens re-election campaigns for politicians. Because of this threat, "Politicians– Whose foremost goal is to gain or retain office- will, in an electoral context, be motivated to support changes in war policy if opinion trends among their constituents offer an incentive to do so" (Lieberfeld, 2008). Public opinion acts as a political constraint to the use of force, in addition to providing probable policy platforms during upcoming elections.

For policymakers, understanding public opinion is crucial to making the correct decision about when it is appropriate to use military force. In addition, for citizens, public opinion can provide a good predictor of future policy decisions. Therefore, this paper will attempt to create a frequentist and a Bayesian model to estimate the public opinion on military intervention based on a series of surveys known as the *Chicago Council Survey of American Public Opinion on U.S.Foreign Policy* from 2016 and 2017. The survey question that we will analyze focuses on the public opinion on the effectiveness of military intervention in achieving the foreign policy goals of the United States. Using these data, we will estimate the expected political support in each U.S. state in 2016 and 2017. This will be done using a method known as multilevel regression with post-stratification,

using data from the American Community Survey. Then, this paper will attempt to validate these models by checking that there are no errors in this model, and observing if national surveys from 2015 to 2019 produce similar national results to the results of this paper.

Background and Significance

There have been numerous opinion polls and regressions that have been run in order to estimate pro- or anti-war opinions during the "post-cold war" era. There are a few reasons why authors and academics tend to start their analysis of war trends in the "post-cold war" era. In general, the individual's personal policy preference on war tends to be very temporal. The cold war provided a very unique circumstance, such as the policy of deterrence and the fear of a global war, that does not necessarily reflect the current circumstances of conflicts in the "post-cold war" era. Because of this, our scholarship tends to focus on the "post-cold war" era as a separate era to the cold war era in understanding how the public perceives military intervention.

According to Gelpi and Feaver, the determination of a citizen's preference is based on that individual's demographics, and the context of the situation. Specifically, individuals tend to be in support of military intervention if they believe that they have the "Right" to attack, and they believe that military intervention will be successful to achieve their preferred policy goals. Many of these contextual results are likely to reflect incredibly temporal events that are vulnerable to political changes. For instance, individuals tend to look towards individuals such as politicians that they trust, and organizations such as NATO. If an organization like NATO, or a president that they trust endorse a military action, individuals are extremely likely to support that military interaction. This was found by both Khazan (2013) and by Gelpi and Feaver (2009).

In addition, individuals are likely to make choices depending on the Principal Policy Objective, according to Jentleson (1992). This thesis argues that individuals can evaluate the reasons why the U.S is intervening, and that the primary objective of intervention is likely to influence the level of political support. For instance, according to a poll from Jentleson, individuals tend to be more in support of Foreign Policy Restraint missions, as opposed to Internal Political Change missions. Foreign Policy Restraint typically involves the use of military force in order to affect the behavior of a nation, whereas Internal Political Change Missions involve using the military to replace or restructure an existing regime.

Finally, individuals also tend to support missions that they believe will be successful. As noted by Gelpi and Feaver (2009), public support for military intervention tends to drastically decrease during periods of failure. For instance, in the aftermath of a failed raid in Somalia in 1993, public support for military intervention dropped by 8 percentage points. In general, individuals tend to support a military intervention when there is evidence that the intervention is likely to be successful.

While these circumstantial predictors are important, there are additional variables that might be important in order to predict pro- versus anti-war sentiment. These variables are demographic, and tend to be less dependent on the context of the conflict in determining public opinion. For instance, our evidence of gender suggests that there is a mixed effect of whether women or men are more supportive of conflict. Because of the time period when this data was collected, it was not common practice to collect include variables to allow for more than the outdated gender binary of male and female, and therefore, the background research tends to omit considering these genders. Gelpi and Feaver wrote *Paying the Human Costs of War*, which collects regressions that indicate that there is conflicting evidence about the effect of gender in being pro- or anti-war. Men were more supportive of military intervention in Lebanon in 1983. Men also tended to be more supportive of military intervention in Somalia in 1993. In the early 2000s, a general poll reported by Gelpi and Feaver stated that there was no statistical significance in gender in determining whether an

individual supports military intervention. However, evidence from polls taken during the Kosovo crisis suggests that women were more likely to support military intervention through air strikes in the Kosovo War. Women were also more likely to fall into the category that Gelpi and Feaver refer to as "Timid Hawks". Gelpi and Feaver use this term to classify individuals who are supportive of war in the abstract, but tend to withdraw their support as the conflict becomes costly, or as casualties from the conflict increase. This is also important to note, as it highlights a major theme of Gelpi and Feaver, which is that casualty tolerance is not the same thing as conflict tolerance.

Another variable that is very important to consider is age. Anecdotally, there is evidence that suggests that age can both increase and decrease support for war. Many historians note the fervor that younger men tended to have for World War 1. Meanwhile, Vietnam War Era protests are remembered for the swarms of college students who protested against the U.S's involvement in Southeast Asia. However, data tends to provide a conflicted history of who tends to be more pro-war. Older individuals were less likely to support military intervention in Lebanon and Somalia. Older individuals were less likely to support the Iraq War (Smith and Lindsay, 2003). However, age did not appear to play any significant role in whether an individual supported intervention in the Kosovo War. In general, the role that age plays in determining pro- and anti-war support appears to be suggesting that, younger individuals are more likely to support conflict. However, this is only if we consider this to be a linear relationship.

The role of education in determining pro- and anti-war stance tends to be very consistent. These estimates tend to suggest that individuals with higher levels of education may be less likely to support war. People were less likely to support a military intervention in Kosovo with higher levels of education. In addition, people with higher levels of education were less likely to support the use of force if the objective of the mission is a matter of national security. However, education did not have a significant change for whether an individual supported military intervention in Yemen or Lebanon. In addition, according to Smith and Lindsay (2003), individuals with a postgraduate education were among the few groups to show majority opposition to the Iraq War in late 2002. All of this evidence tends to suggest that individuals with a high level of education are less likely to support war.

There are many different additional variables that might be important in determining which individuals will support or not support a war. For instance, people tend to support a war if that war was initiated by the party that aligns with their political identity. For instance, Democrats tend to be more supportive of military intervention if a Democratic president initiated that war, and Republican voters are more likely to support wars initiated during a Republican presidency. In addition, individuals who are veterans tend to be less likely to support military intervention, as found by Khazan (2013). The effect of other demographic variables, such as race, tend to have inconsistent evidence on the direction and the significance of the effect of racial identity on pro- and anti-war stance.

Data

The first dataset that we used was the Chicago Council Survey of American Public Opinion on U.S. Foreign Policy. This is an annual survey that asks questions related to the foreign policies in the United States and the public opinion on these policies. For our data, we used the 2016 and 2017 Chicago Council Survey of American Public Opinion. These two years were used because they are both publicly available, and the response question is worded the same in both surveys. The target population of this survey was those living in the U.S. who were non-institutionalized and who are aged over 18. The survey was administered by the KnowledgePanel, which is a probability-based web panel designed to be representative of the U.S. The administrators of this survey included

various checks, such as removing those who answered the test too quick and those who failed the "quality checks". The "quality checks" consisted of questions such as "Pick option 3", which indicates whether a respondent was attentive during the survey. The Chicago Council Survey has 4767 observations over the 2 years.

We took multiple steps to clean this data. First, any cases where there was a missing value were discarded to prevent any bias that might occur by keeping these variables in the dataset. In addition, many of the variables were manipulated to create new variables for the purpose of regression. Initially, there was a variable called *Q8_14*. This variable recorded the respondent's answer to the question *How effective do you think each of the following approaches are to achieving the foreign policy goals of the United States- very effective, somewhat effective, not very effective, or not effective at all: Intervening Militarily*. Using this variable, we manipulated it into a new variable called *ProWarBinary*. If this variable is equal to 1, then the respondent believes that military intervention is either very effective or somewhat effective. Meanwhile, if the respondent believes that military intervention is not very effective or not effective at all, then the variable will return with a value of 0.

In addition, the Chicago Foreign Council data also had additional variables that reflect the demographics of the respondents. In this case, the variables include information about the racial, political, social, economic and family history of the respondent. There are a few variables of note that will later be used in the model to build the multilevel regression with post-stratification. The variable *EducationBracket3* represents a subset of different levels of education. This includes a variables for those who did not get a high school diploma, those with a high school diploma, those with some college, those with a bachelor's degree, and those with more education than a bachelor's degree.

Another variable of note is *AgeBracket*. This variable indicates what age range the respondent is in. Respondents can either be in a stratum for those aged 18 to 24, 25 to 34, 35 to 44, 45 to 64, and for those who are 65 or older. These strata were constructed to match the format of the strata that are reported in the ACS. In addition, the Chicago Foreign Council also included information about what state a respondent was from, reported in the variable titled *State*. In addition, another variable that is included in the data is titled *MALE*. This variable is 1 if the respondent identifies as a man, and it is zero if the respondent identifies other than male. It should be noted that the Chicago Council Survey does not include more genders than male or female.

There are some checks that we may want to do to evaluate whether there was any response bias stemming from the way that question *Q8_14* was asked. In the survey, this response could have been shown anywhere between the first and the eighth statement. We might suspect that the order that military intervention is presented will influence the response and create response bias. One method can be checking if an individual thinks military intervention is effective or not depending on when the respondent is presented with the policy choice of military intervention.

Figure 1 illustrates the response of the perception of the effectiveness of military intervention, based on the variable *ProWarFactor*. The x-axis displays the order that military intervention was shown to the respondent. For instance, if the position that the statement was shown in was 5, that indicates that military intervention was the fifth foreign policy that the respondent was asked about. There is not a lot of variation in the responses of the effectiveness of military intervention depending on the position that the statement was shown in. Therefore, it appears like the position that the statement was shown in does not carry a significant level of bias, and therefore we can consider that source of response bias as insignificant.

We can also observe other relationships in our data. One particular question might be whether individuals have different levels of support based on the region they live in. Different cultural values and different regional relationships with the military may determine the different levels of support

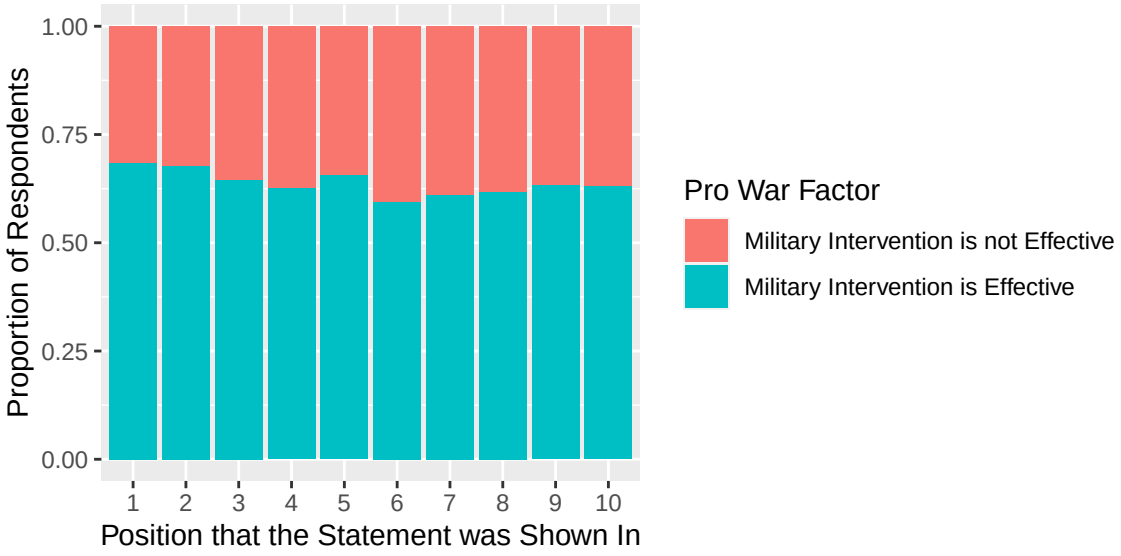

Figure 1: Proportion of Belief in Effectiveness of Intervention by Statement Order

for military conflict. For instance, Karol and Miguel (2007) tested whether different regions had different levels of political support for reelecting George W. Bush based on the number on how many casualties had occurred from citizens in each region, based on the speculation that different geographic regions had different relationships with the war. Therefore, support for intervention within each U.S. region may be important to determining if there is a different level of support depending on geographic region.

In Figure 2[1], we can see that there does appear to be some slight differences between different regions in determining the beliefs of effectiveness of conflict. The New England region has less support for conflict than the other regions. However, the West-South Central region and the East-South Central Region both tend to be more supportive of conflict than other regions. However, the significance of these responses is not clear based on Figure 2.

In addition, we are able to observe whether there are differences in pro-conflict and anti-intervention sentiment based on education. This is observed in Figure 3, which indicates that there is some correlation between education level and belief in the effectiveness of military intervention. For people who did not receive a high school diploma, roughly 75% of respondents believed that military intervention is an effective method to achieve the U.S's foreign policy goals. However, for those with a postgraduate degree, about 50% of respondents believed that military intervention is likely to achieve the U.S's foreign policy goals. In addition, Figure 4 illustrates that there is some potential relationship between age and support for military intervention. Those who were between ages 18-24 and 45-64 are more likely to support intervention, relative to other age brackets.

[1]Figure 2 displays an exploratory data analysis of whether the individual believed that military intervention was effective depending on what region an individual lives in. The East-North Central region is defined as Illinois, Indiana, Michigan, Ohio and Wisconsin. The East-South Central region is defined as Alabama, Kentucky, Mississippi, and Tennessee. The Mid-Atlantic region is defined as New Jersey, New York and Pennsylvania. The Mountain region is defined as Arizona, Colorado, Idaho, Montana, New Mexico, Nevada, Utah, and Wyoming. The New England region is defined as Connecticut, Massachusetts, Maine, New Hampshire, Rhode Island and Vermont. The Pacific region is defined as Alaska, California, Hawaii, Oregon and Washington. The South Atlantic region is defined as Washington D.C., Delaware, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, and West Virginia. The West-North Central region is defined as Iowa, Kansas, Minnesota, Missouri, North Dakota, Nebraska, and South Dakota. The West-South Central region is defined as Arkansas, Louisiana, Oklahoma, and Texas.

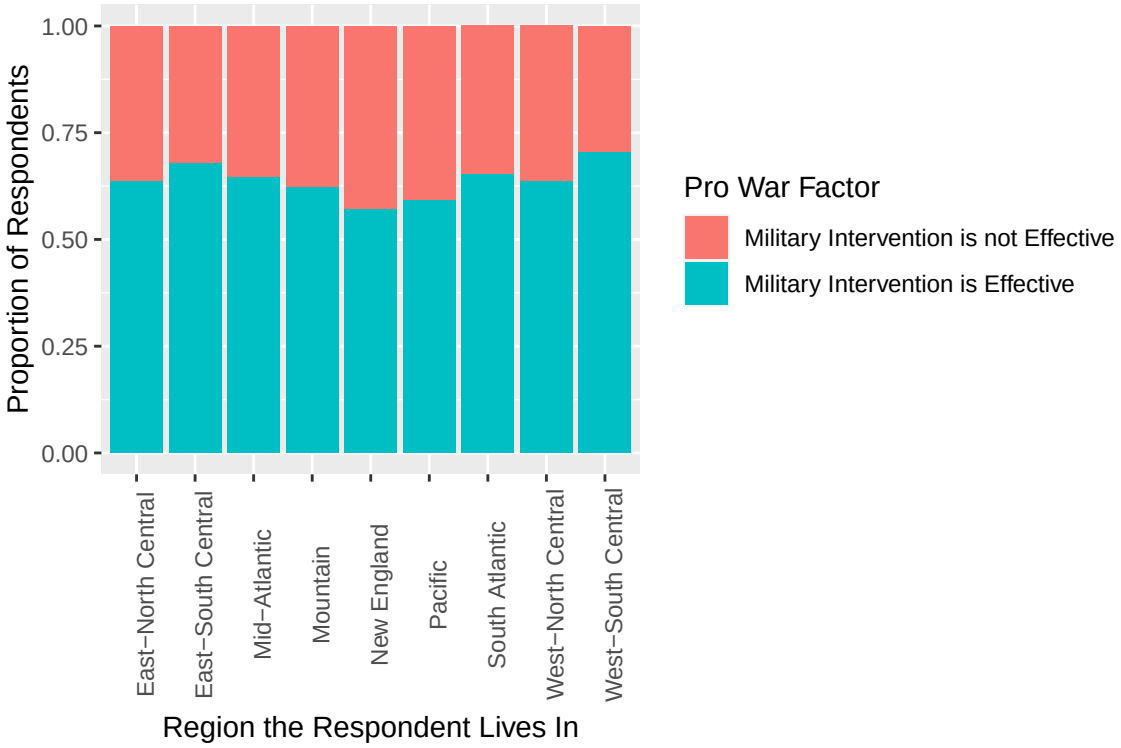

Figure 2: Belief in the Effectiveness of Intervention by Region of Residence

However, this relationship does not appear to be as strong as other relationships.

Another dataset that was used in this analysis is the American Community Survey. The American Community Survey, or ACS, is a survey that has information on individuals and households throughout the country. In particular, these data focus on the demographics, occupations, education, and other background information of respondents. The data that was used in this paper was the summary statistic named *B15001*, from the 5-Year ACS between 2015 and 2019. This data includes the raw count of number of respondents who were in a certain strata defined by gender, education level, and age bracket. These strata are pairwise disjoint, individuals cannot belong to multiple strata within the structure of the ACS. Then, we created a new variable, titled *TVP*, standing for Total Voting Population. This was the sum of all of the strata. We then divided each stratum by the variable *TVP*, in order to get an estimation of the proportion of each stratum within each state.

The ACS does have a few problems with it that make it a suboptimal resource to estimate proportions. The ACS does not ask questions about values such as what political party an individual identifies with, or what foreign policy goals the U.S. should have. These questions may be important in relation to pro- and ant-conflict sentiment. These problems will be of particular concern during the implementation of a multilevel regression with post-stratification model.

Methods

This paper will focus on using a multilevel regression with post-stratification, or MRP. A multilevel regression with post-stratification is a method to estimate public opinion for areas that are smaller than the national level, such as individual states. It is highly unlikely that there will be multiple

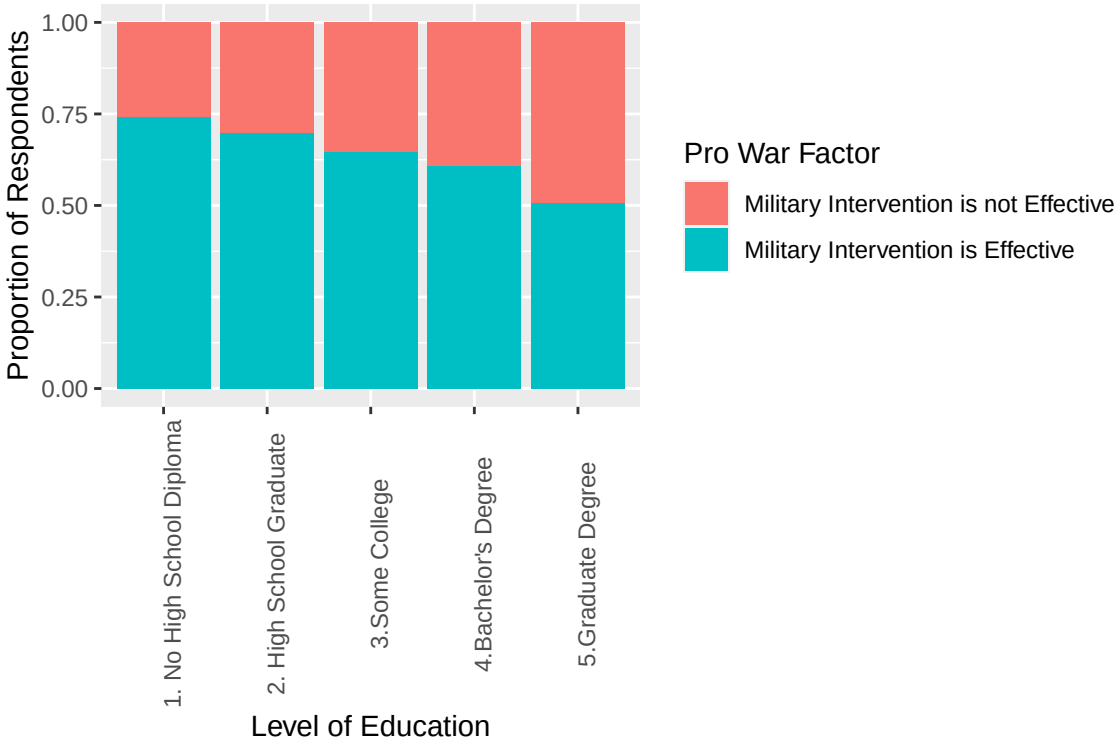

Figure 3: Belief in the Effectiveness of Intervention by Level of Education

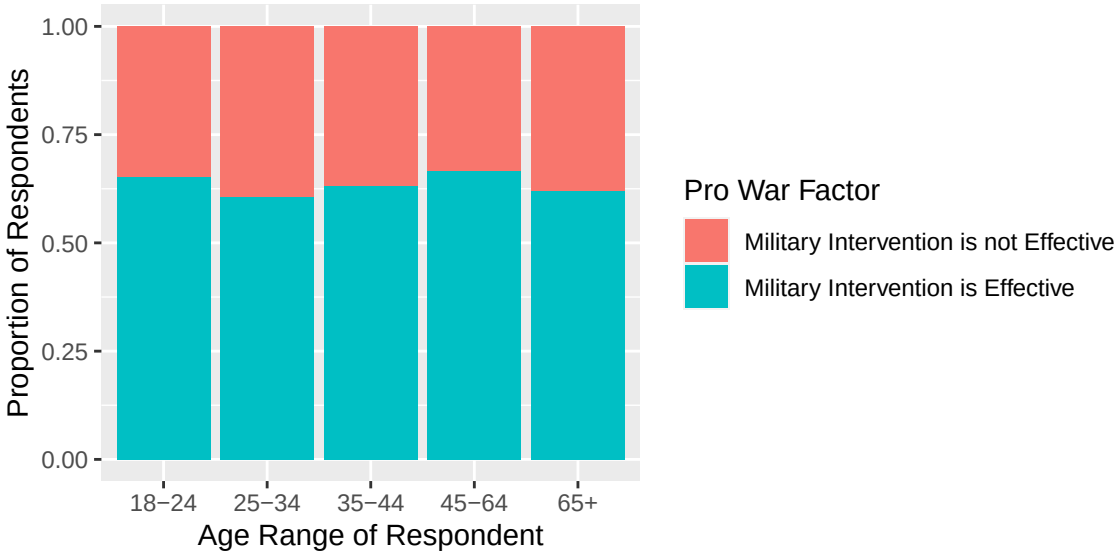

Figure 4: Belief in the Effectiveness of Intervention by Age

state surveys that all ask the same questions using similar wording and surveying methods. Because of this, strategies have been developed to use national level opinion polls to estimate public opinion for smaller geographic areas. One method is disaggregation, which is where national surveys are pooled and then sorted by region to calculate public opinion. However, MRP has become an alternative method to disaggregation. MRP has been shown to outperform disaggregation with small and medium sized samples and can estimate state public opinion with a single large national poll of roughly 1,400 respondents(Gelman, 2018). MRP is better suited for estimating public opinion issues that are swayed heavily by circumstances. In addition, MRP is useful for estimating the responses in smaller states that do not have a large number of respondents who reside in those states. Because of these advantages, building an MRP model is preferable to using a model of disaggregation to estimate the beliefs on the effectiveness of military intervention in each U.S. state. Multilevel regression with post-stratification has been used frequently to estimate public opinion by geographic area. For instance, Bohr (2014) used MRP to estimate the probability of an individual in each U.S. county believing in climate change, and understanding their preferences for environmental policy. In addition, Wang (2014) used MRP in order to estimate the voters' preferences for the U.S. election in 2012 by using surveys submitted through the online platform Xbox Live, which estimated the share of votes for Barack Obama with a margin of error of .6 percentage points.

There are a few steps needed in order to create an MRP. First, data needs to be collected that focus on public opinion, and different potential predictors. Next, there would need to be census data collected in order to estimate the proportion of different strata in each state. We would then estimate the probability of believing U.S. intervention is effective within each stratum based on our public opinion data, using a logistic regression from the Chicago Council Surveys. Then, using our estimates of the probability of any person within a strata being pro conflict, we post-stratify these models using the proportional size of the strata relative to the rest of the state.

One important detail in an MRP is that the design of the logistic regression and the design of the ACS must be cohesive in order to effectively implement an MRP. An MRP works because it is accurately able to assign each possible predicted response based on our regression to our weights for post-stratification. Therefore, there would be significant problems in using a multilevel regression with post-stratification if the multilevel regression includes terms that are not included in poststratify weights. This would result in us having predicted response probabilities without any understanding of what the approximate weights of these responses will be.

Therefore, in building our logistical regression, we will attempt to reduce the Akaike information criterion value, or AIC value. The model built must also allow us to estimate the weights of different responses based on the ACS data. In addition, the model that we analyze will also focus on the most important aspects that may have been identified in our data section. For instance, one important variable to use in our regressions would be education. Education level is a variable that shows a clear relationship to pro vs. anti-war sentiment. There are roughly 1000 different distinct counts that exist in the ACS data. However, only about 30 different types of counts include educational attainment as a key variable. In addition, very few of these variables account for the full voting aged population.

The best model found that includes variables that could be weighted in the census was a model which used educational attainment, gender, and age brackets. However, the state was also used as a random effect. This model produced the smallest AIC of any adequate model that was built in this experiment, at a value of 6130.953[2]. We can therefore write the estimated model as a two-

[2]There were other models that did produce AIC values that were smaller than 6130.953. However, these would not have allowed us to get a comprehensive set of probability weights from the ACS for the target population of

part section. The first part represents our post-stratification, where we multiply the probability of support of intervention by each stratum within the state by the probability of any given person in that state being within that stratum. We then sum the product of all these weighted probabilities in order to estimate the probability of support within each state. The second and third line below represents our multilevel model, which includes a random effect for the state, in order to account for variations in public opinion within each state that are not accounted for by our model. Finally, our estimation of the probability of being within each strata is defined by calculating the percent of people within each state j, who were in stratum i as a percent of the total voting population.

$$P(\theta_j = 1|\text{State} = j) = \sum_{i=1}^{50} P(\theta_{ij} = 1|\text{Stratum} = i) * P(\text{Stratum} = i|\text{State} = j) \tag{1}$$

$$P(\theta_{ij} = 1|\text{Stratum}_j = i) = \text{logit}^{-1}(\alpha + \beta_1 * X_{1_i} + \beta_2 * X_{2_i} + \beta_3 * X_{3_i} + \beta_4 * X_{4_i} + \beta 5 * X_{5_i} \tag{2}$$

$$\beta_6 * X_{6_i} + \beta_7 * X_{7_i} + \beta_8 * X_{8_i} + \beta_9 * X_{9_i} + u_j + \epsilon_{ij}) \tag{3}$$

$$u_j \sim \mathcal{N}(0,\, \sigma_u^2) \tag{4}$$

$$\epsilon_{ij} \sim \mathcal{N}(0,\, \sigma_\epsilon^2) \tag{5}$$

$$P(\text{Stratum} = i|\text{State} = j) = \frac{\text{Population in Stratum } i \text{ in State } j}{\text{Total Voting Population in State } j} \tag{6}$$

$\boldsymbol{\theta}_{ij}$ equals 1 if an individual in stratum i and state j believes that military intervention is effective. $\boldsymbol{\theta}_j$ equals one if an individual in state j believes that military intervention is effective or ineffective at achieving the U.S.'s policy goals. α represents the intercept, which would calculate the probability a woman who is between the ages of 18 to 24 with less than a high school education believes that military intervention is effective. Each of the subsequent β's then represent the effect of individual effects, such as identifying as a man, or having a graduate education, on pro-intervention sentiment. $\boldsymbol{X}_{1_i}$ refers to whether an individual in stratum i would identify as male. $\boldsymbol{X}_{2_i}$ refers to whether an individual in stratum i has completed a high school education. $\boldsymbol{X}_{3_i}$ refers to whether an individual in stratum i has attended some college, while $\boldsymbol{X}_{4_i}$ refers to whether an individual in stratum i has gotten a bachelor's degree. $\boldsymbol{X}_{5_i}$ refers to whether an individual in stratum i has attended college after a bachelor's degree. $\boldsymbol{X}_{6_i}$ refers to if an individual is from the age range of 25 to 34. $\boldsymbol{X}_{7_i}$ refers to individuals in stratum i in the age range of 35 to 44. $\boldsymbol{X}_{8_i}$ refers to individuals in stratum i if that individual is in the age range of 45 to 64 years old. Finally, $\boldsymbol{X}_{9_i}$ refers to if individuals in stratum i are 65 years old or older. The value u_j is the random effect that being within a certain state has on their beliefs of intervention, while ϵ_{ij} is the random error term.

By construction, our strata will be pairwise disjoint and they will cover the voting aged population. The strata are broken up into categories based on age, sex, and educational obtainment. In addition, it is not possible for an individual in the voting age population to not fit into any of the stratum, or for them to fit into multiple strata, based on the construction of the ACS and the Chicago Council survey. This is important to ensuring that our MRP model will be successful in estimating the probability of an individual's beliefs on military intervention within a certain state.

This paper will also build a logistic regression under a Bayesian framework. This would require us to set our priors. These priors would be based on the background research from the regressions that are in Gelpi and Feaver (2009). Using logistic regressions on public opinion on conflict, we

all voting aged persons in the United States. For instance, one model that performed better was the model titled "M25b" in the GitHub code. This model included the effect of ethnicity. However, it would have not allowed us to provide weights for any individual who was between the ages of 18 and 25. This would be a large chunk of the voting population that the model would not have adequate weights for, which would be a problem.

should be able to have an estimate of the effects of gender, education, and age on an individual's beliefs on military intervention.

The expected prior for the effect of beliefs on military intervention for gender is rather complex. For instance, traditional studies that focused on war, particularly in the 1980s and 1990s, tend to suggest that men tend to be more supportive of conflicts. However, this is contrasted with some contemporary data. For instance, women tended to be more likely to be classified as "Timid Hawks". In addition, women tended to have higher levels of support for military intervention is Kosovo, and for humanitarian missions in Yemen. There are two very important distinctions to be made in our previous data, the age of the data that we are observing, and how similar these surveys are to the Chicago Council survey question that we analyzed. For instance, more recent data tends to suggest women may be more likely to believe in conflict than men. In addition, when asked about military intervention before it happened, women tended to be more likely to support intervention, as seen in supporting intervention in Kosovo and Yemen. This is similar to the structure of the Chicago Foreign Council question, as it asks for the respondent's level of support before any military intervention has occurred. Because of this bias, there is some evidence that men may be slightly less likely to believe that war is effective in the abstract. Because of this, it might make sense to assign a prior for gender that allows for the effect of being male to be either positive or negative. However, there is a slight preference to show that women may prefer military conflict. Because of this, a prior of $X_1 \sim \mathcal{N}(-.1, 1)$ may be appropriate. The standard deviation suggests that we believe it is plausible that the effect could be positive or negative, but we do not expect the effect to be substantial, based on our background research.

Finally, a prior would need to be set for the effect of education on beliefs of military intervention. In older studies, such as examining support for conflicts in Lebanon and Somalia, there was not a very strong relationship between the level of education and an individual's preference for military conflict. However, in Kosovo, higher levels of education lead to an individual to be less likely to support military intervention. In addition, individuals were more likely be classified as "Timid Hawks" if they had more education. Because of these relationships, we might expect that the prior is that higher levels of education result in a lower likelihood of supporting war. Arbitrarily, some priors can therefore be set. For instance, we may establish that every subsequent level of education will affect education by -.2. Therefore, we might establish that each of our levels of education has an independent prior, as established below.

$$X_2 \sim \mathcal{N}(-.2, 1) \tag{7}$$
$$X_3 \sim \mathcal{N}(-.4, 1) \tag{8}$$
$$X_4 \sim \mathcal{N}(-.6, 1) \tag{9}$$
$$X_5 \sim \mathcal{N}(-.8, 1) \tag{10}$$

Another important prior to set is the expectations for the priors by age bracket. Most of these surveys use age as a continuous variable, instead of establishing different age brackets. However, these linear relationships tend to suggest that the effect of age on support for military intervention tends to be roughly close to 0, or suggest that younger individuals are more likely to support military intervention. In many of these regressions, the effect of age was also not statistically significant. Therefore, there may be some value in establishing a prior centered at zero, since there is not strong evidence establishing a trend. In addition, we are constructing a categorical variable, as opposed to other regressions which have treated age as a linear effect. Therefore, we might decide to use a prior, where for each age bracket we assume that the coefficient has a normal prior,

with a mean of zero and a standard deviation of 1. We chose a standard deviation of 1 to account for the fact that we do not expect the magnitude of effect for age to exceed 1 at any age range.

Frequentist Results

On Table 1, we are able to see the effects of each fixed effect in our model, as outlined previously on our equation through lines 2 to 3. We are able to see that the estimated intercept on this equation is 1.1191. This indicates that we expect that on average, a women aged between 18-24 without a high school diploma is 75.38% likely to believe that military intervention is effective, before accounting for the random effect of the state. According to our data from the Chicago Council, all else held equal, men are 23.5% less likely to believe that military intervention is an effective method of achieving the U.S.'s policy goals. These results are statistically significant.

The effects of education are also evident, based on our model. A respondent who had graduated from high school was 21.56% less likely to believe that military intervention is effective in achieving the U.S.'s goals, when compared to individuals who did not achieve a high school education. However, these results were not statistically significant at the 5% level. Meanwhile, respondents who attended some college were 38.07% less likely to believe military intervention is effective when compared to those who did not achieve a high school education. Respondents who got a bachelor's degree were 46.31% less likely to believe that military intervention was effective compared to those who did not get a high school diploma. Finally, respondents who had a postgraduate education were 64.67% less likely to believe that military intervention is effective compared to those who did not get a high school diploma. All of these results were statistically significant at the 5% level.

Table 1: Estimates of Fixed Effects

	Estimate	Std. Error	z value	Pr(>|z|)	95 % Confidence Interval
Intercept	1.1191	0.1580	7.0807	0.0000	[0.8093 , 1.4288]
Male	-0.2683	0.0614	-4.3684	0.0000	[-0.3886 , -0.1479]
High School Graduate	-0.2429	0.1351	-1.7977	0.0722	[-0.5078 , 0.0219]
Some College	-0.4791	0.1338	-3.5803	0.0003	[-0.7413 , -0.2168]
Bachelor's Degree	-0.6219	0.1390	-4.4746	0.0000	[-0.8943 , -0.3495]
Graduate Degree	-1.0406	0.1432	-7.2676	0.0000	[-1.3212 , -0.7599]
Age 25 to 34	-0.0221	0.1342	-0.1650	0.8689	[-0.2851 , 0.2408]
Age 35 to 44	0.1383	0.1405	0.9848	0.3247	[-0.137 , 0.4137]
Age 45 to 64	0.2317	0.1236	1.8750	0.0608	[-0.0105 , 0.474]
Age 65 or older	0.0150	0.1281	0.1173	0.9067	[-0.2361 , 0.2661]

The final set of fixed effects is related to the age of the respondent. People who are in the age range from 25 to 34 are 2.19% less likely to believe that military conflict is an effective strategy to achieve the U.S's foreign policy goals. However, these results are not statistically significant. Respondents who are aged 35 to 44 were 14.83% more likely to believe that military intervention is effective, but this result was not statistically significant. People aged 45 to 64 were 26.07% more likely to believe that military intervention, compared to people who were aged 18 to 24. These results were only statistically significant at the 10% level.

Using our estimates, we can estimate what the potential public opinion within each state might be. The results are displayed on Figure 5. Some states and regions tend to have a lower opinion of

military intervention than other states, as illustrated by the map. However, we estimate that 60% to 70% of voting aged adults within each state believe that intervention is effective at achieving the U.S's goals. States such as California, Massachusetts, and Minnesota all have roughly 62% of their citizens who believe that military intervention is an effective strategy to achieve the U.S's goals. Meanwhile, in Texas, roughly 68% of citizens believe that military intervention is an effective strategy to achieve the U.S's foreign policy goals. Other states, such as Arkansas, North Carolina, and Indiana, also have comparatively high levels of public belief that military intervention is effective.

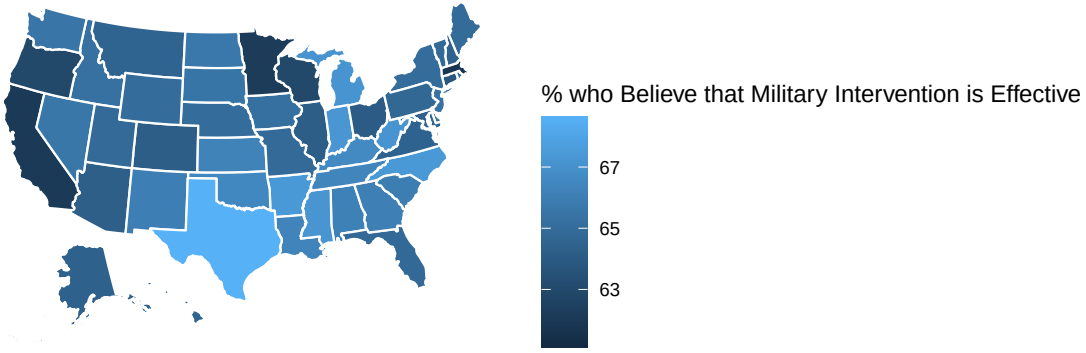

Figure 5: U.S. Map of Public Opinion on the Effectiveness of Military Intervention Under a Frequentist Model

Another interesting detail will be observing the comparison of using MRP and using disaggregation in order to estimate the probability that an individual is supportive of military intervention. Disaggregation is a blunt method, where we first break a national survey into each subsequent, smaller region, and then use the raw percent of responses from that subset of the survey to estimate public opinion without any model. The difference between the MRP model and a simple disaggregation model is illustrated in Figure 6. On this graph, points above the red line indicate that the MRP estimate is greater than the estimate provided by observing the percent who believed military intervention was effective in the poll within each state. Likewise, points below the red line indicate that the MRP-based estimate is lower than the estimate provided by observing the percent who believed military intervention was effective within each state. In addition, each point is labeled with what state it represents, with an line included to point to which point represents which state if needed a line is needed. Within some states, such as Hawaii, Vermont, Kansas, and North Dakota, the estimates are substantially different between these two methods. For instance, in Hawaii, the estimated probability of believing that military intervention is effective is 14 percentage points higher than in our disaggregation estimation.

Bayesian Results

Table 2 illustrates the results of running a Bayesian model, using the priors from the methods section. Before accounting for the random effect of what state the respondent lives in, an 18 to 24 year old woman who does not have a high school diploma has a 75.46% probability of believing

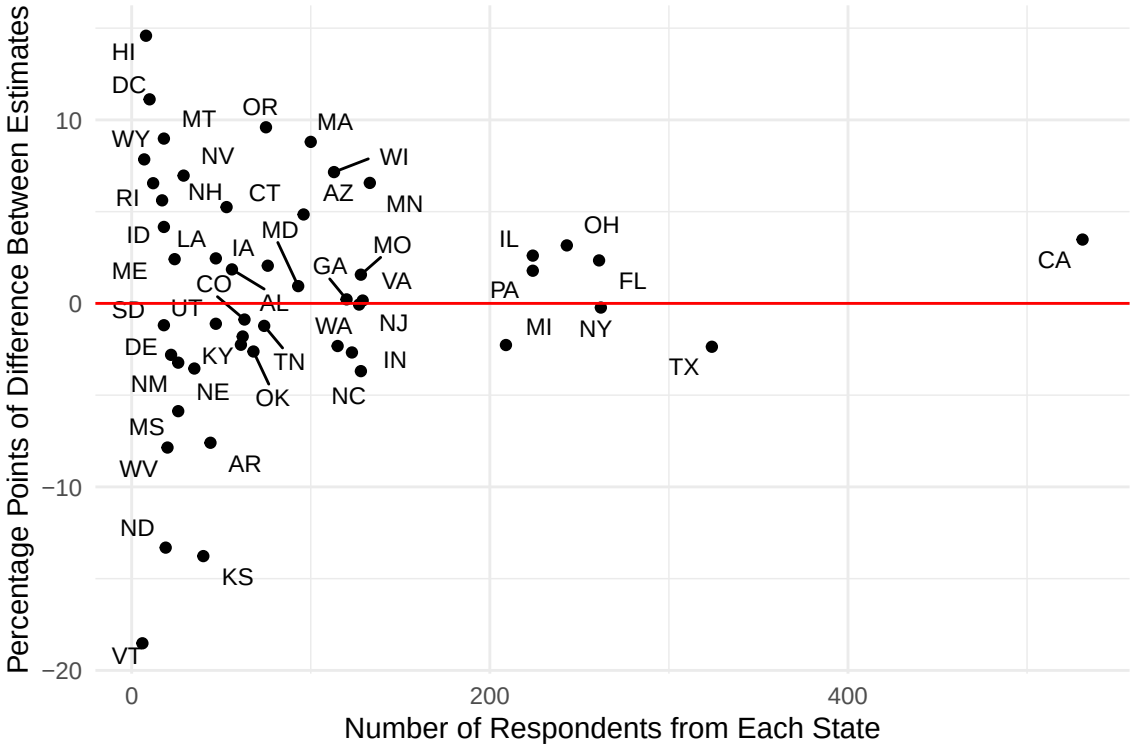

Figure 6: Differences in Estimates of Public Opinion Within Each State from a MRP and a Simple Disaggregation Model with Arrows and Labels for States

that military intervention is an effective strategy to achieve foreign goals. Men are 23.44% less likely to support military intervention, all else held equal. Meanwhile, high school graduates are 21.39% less likely to believe that military intervention is effective compared to those who did not complete a high school education. Respondents who attended some college were 37.97% more likely to believe that military intervention was effective compared to those who did not complete high school. Respondents who obtained a bachelor's degree were 46.17% less likely to believe that military intervention was effective compared to those who did not complete high school, all else held equal. Finally, respondents who attended some graduate school are 64.52% less likely to believe that military intervention was effective compared to those who did not complete high school, all else held equal.

The effects of age are also illustrated on Table 2. Respondents who are aged 25 to 34 were 2.76% less likely to believe that intervention was effective when compared to those who were aged 18 to 24. Respondents aged 35 to 44 were on average 14.02% more likely to believe that intervention was effective all else held equal. Respondents who were aged 45 to 64 were 25.23% more likely to believe that intervention was effective, while respondents who were aged 65 or older were .93% more likely to believe that intervention is effective.

The results from the Bayesian analysis tend to be rather similar to the results from our frequentist model. This may be because the priors that were used were centered at zero, and did included a broad range of potential values based on a reasonable sized standard deviation. We therefore suspect that most of the posterior sample was determined by the data, and that the priors do not hold a significant influence on the posterior results.

Table 2: Estimates of Fixed Effects

	Mean	SD	10% Quantile	Median	90% Quantile
Intercept	1.1235	0.1569	0.9208	1.1226	1.3240
Male	-0.2672	0.0622	-0.3472	-0.2671	-0.1879
High School Graduate	-0.2407	0.1349	-0.4151	-0.2401	-0.0660
Some College	-0.4776	0.1347	-0.6506	-0.4777	-0.3052
Bachelor's Degree	-0.6194	0.1394	-0.7981	-0.6181	-0.4391
Graduate Degree	-1.0363	0.1435	-1.2209	-1.0366	-0.8548
Age 25 to 34	-0.0280	0.1313	-0.1948	-0.0279	0.1412
Age 35 to 44	0.1312	0.1371	-0.0435	0.1301	0.3069
Age 45 to 64	0.2250	0.1213	0.0707	0.2249	0.3796
Age 65 or older	0.0093	0.1262	-0.1516	0.0078	0.1709

Using these results from the Bayesian analysis, we can then undergo the same MRP process to estimate the public opinion within each state by estimating the expected value within each stratum. The results of this analysis are shown in Figure 7. The results of these estimates are similar to the estimates for each state generated under the frequentist model. States such as Texas, North Carolina, Arkansas, and Mississippi all have large percentages of their voting aged populations who believe that military intervention is effective. In each of these states, we estimate that between 67% to 68% of their population believe that war is effective. However, states such as Massachusetts, California, and Minnesota all have estimates that between 62% to 63% of their population believe that military intervention is effective.

To assess model convergence, we observe the $\hat{R}$ values. This value, also known as the Gelman-Rubin Convergence Diagnostic, evaluates the level of between chain convergence and within chain

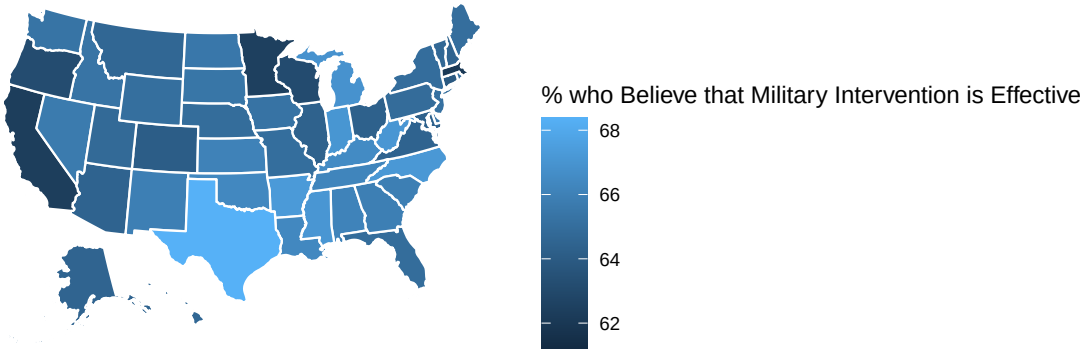

Figure 7: U.S. Map of Public Opinion on the Effectiveness of Military Intervention under a Bayesian Model

convergence of the estimates for each predictor and within each of the four chains ran in our model. If this value is above 1.05, then it suggests that the chains are not converging well. On Figure 8, the $\hat{R}$ score for each predictor is shown. Here, we can see that the $\hat{R}$ suggests that every predictor has converged well in this Bayesian model.

Another important detail to analyze is the credible intervals of the Bayesian predictors. The credible intervals are displayed in Figure 9. Based on these intervals, we can be reasonable certain about the direction of certain predictors. For instance, we do not have a definitive direction of the effect for the age-based predictors. However, we can also see that higher levels of educational attainment tend to have a negative effect on belief in military intervention. In addition, we are able to see that, in general, it appears that identifying as a man means the respondent is more likely to

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By observing these credible intervals, we can note whether we expect the effects of each predictor to have a statistically significant effect. For instance, we can see that gender and education-related variables tend to be statistically significant at the 5% level. The exception of the statistical significance of education-related effects is the difference between those who did not complete high school, and those who completed high school. However, age-based predictors are not statistically significant, based on Figure 9.

Discussion and Conclusions

In both our frequentist and Bayesian approaches to estimate state-level public opinion, we found that 60% to 70% of voting aged adults believe that military intervention is effective in each state. State level opinion polls on military intervention beliefs are scarce, as most polls do not focus on state-level responses. In addition, most polls do not have questions that align well with the Chicago Council Question "*How effective do you think each of the following approaches are to achieving the foreign policy goals of the United States- very effective, somewhat effective, not very effective, or not effective at all: Intervening Militarily*". Because of these problems, it may be hard to compare individual estimates of each state in our MRP model with other estimates. However,

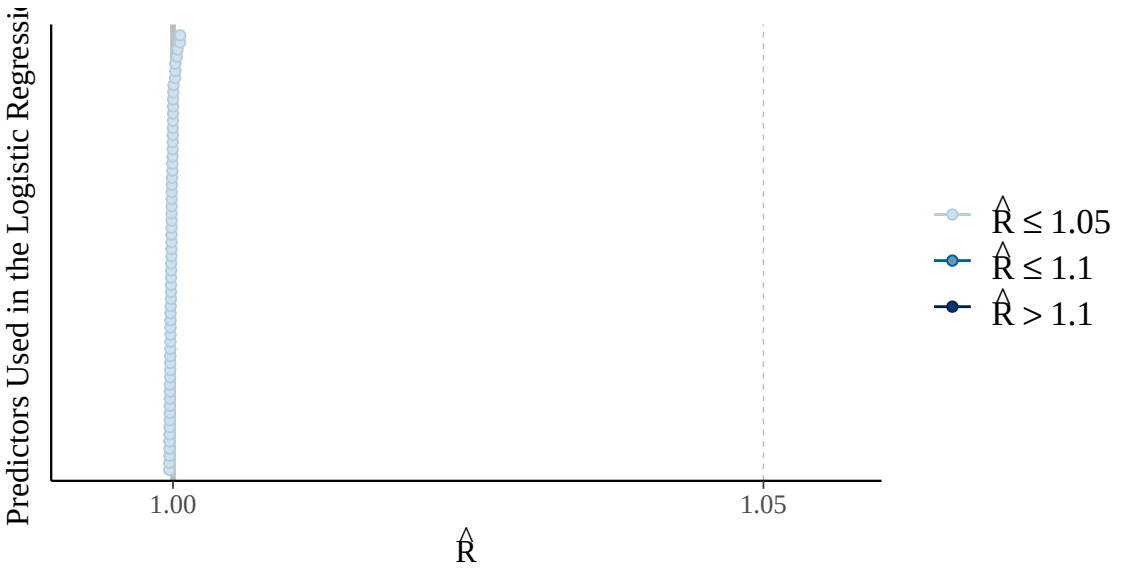

Figure 8: $\hat{R}$ Scores for each Effect to Estimate Between- and Within-Chain Covergence

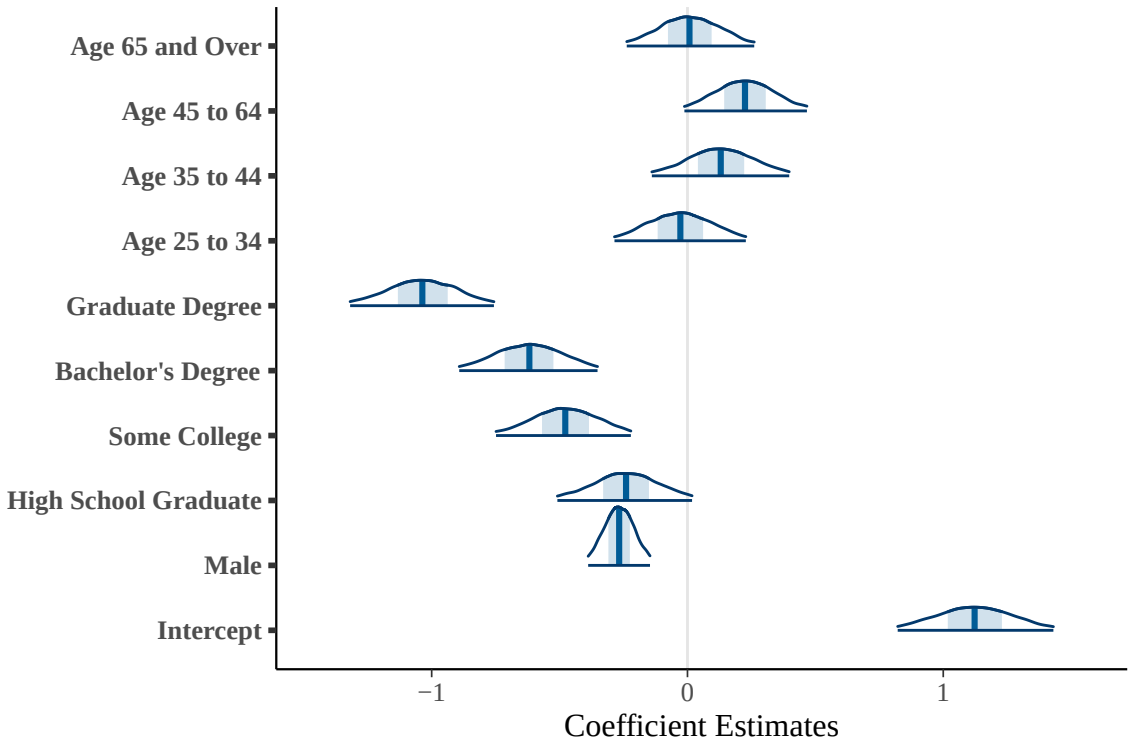

Figure 9: The 95% Credible Intervals of Estimates for the Coefficients in the Bayesian Model

we could observe contemporary polls to observe what percent of people are in support of military intervention. In 2016 and 2017, during the period of polling, the primary concern of military intervention was the focus on military intervention in Syria against the Islamic State.

Based on the estimates of our Bayesian and frequentist models, weighted by the total voting population of each state, the estimated percent of national voting aged adults who believe that military intervention is effective is expected to be roughly 65%. We can then compare these results to contemporary, national surveys from a similar time period. For instance, according to Pew Research, 63% of adults supported military action against Islamic militants in Iraq and Syria in 2015. In 2017, there is more evidence that individuals were in support of military intervention in Syria. According to the Morning Consult, in 2017, nearly 57% of Americans supported airstrikes and cyberattacks against Syria, while 58% supported establishing a no-fly zone. The airstrikes in retaliation to a chemical attack by Bashar Assad against Syrians in April 2017 were supported by 66% of voters. 58% of voters supported the airstrikes in 2018, while 19% of those who were polled had no opinion on the airstrikes. Finally, in 2019, surveys suggested that 60% of voters were in favor of keeping U.S. troops in Syria. Data taken on public opinion for military intervention in Syria is rather similar to the national estimates estimated by our MRP methods.

Beyond the validity of this study, there are additional weaknesses that must be noted, including the difficulties of this method, and the shortcomings of this paper. Some of the problems that we encounter include the requirement that our data on the survey and the data on the population of each stratum must be constructed similarly. Because of this, we are limited in the variables that we might choose for the model that we may choose to build. For instance, we were not able to analyze the impact of political orientation because these are not variables that are collected by the census. In addition, some variables are not packaged together. For instance, there was no variable that created strata in the ACS from different variables such as racial identity, veterans status, education level, and age. Therefore, in building our model, we were restricted by the ACS data. One potential solution, and opportunity for future research, is to use another form of Census, such as the Public Use Microdata, to create strata outside of the prebuilt strata included in the ACS. However, using the Public Use Microdata to create these strata would have required sufficient computing resources. Future researchers may improve our research by using the Public Use Microdata as opposed to the American Community Survey.

Another set of limitations from this data is caused by the question of interest. The question "*How effective do you think each of the following approaches are to achieving the foreign policy goals of the United States- very effective, somewhat effective, not very effective, or not effective at all: Intervening Militarily*" has three significant problems caused by vagueness. The first source of vagueness is the term "Intervening Militarily". As noted in both Haas (1994) and Gelpi et al (2009), there are many different methods of Intervening Militarily. For instance, militaries may have troops stationed overseas, such as in military stations. However, military intervention may also look like using U.S. troops to train foreign soldiers, establishing no-fly zones, using drones for airstrikes, or a ground invasion. All of these different military actions are likely to inspire different levels of public support.

In addition, another source of vagueness is "the foreign policy goals of the U.S." In the Chicago Survey, the surveyors list 16 different possible foreign policy goals the U.S. might have, including Combating International Terrorism, Protecting U.S. Jobs, Combating World Hunger, and Defending our Allies' Security. It is very reasonable that, whatever foreign policy goal is specified may change the response of public opinion on the effectiveness of military intervention to achieve these goals. For instance, respondents may believe that military intervention is appropriate to Combat International Terrorism, but not to Defend our Allies' Security. Without the specific foreign policy goal specified, the question must be interpreted as whether military intervention is in general a

good method to achieve these goals.

Finally, one last source of vagueness is the fact that this question does not specifically indicate the circumstances of military intervention. It is entirely conceivable, as noted by Gelpi et al. (2009) and Jentleson (1992) that individuals will give or revoke public support based on circumstantial variables. For instance, individuals might be supportive of military intervention based on the perceived threat of non-intervention, and the likelihood of military success.

Because of the vagueness of the question that we are estimating, the interpretations that we are able to make off the results of this paper are limited. We cannot use interpret these results as a reflection of public support about specific military intervention methods, specific policy goals, or specific circumstances of conflicts. Therefore, the results of this paper can best be seen as an abstract concept of general support and belief in military intervention as an effective policy choice. This could be seen as a reflection of public belief in one of St. Augustine's "Just War" axioms, where we are observing the public's belief that conflict is likely to achieve a worthy cause.

In this paper, we used data from the Chicago Council Survey of American Public Opinion on U.S. Foreign Policy and the American Community Survey in order to estimate public support for U.S. military intervention among voting aged U.S. residents. The method used is known as a multilevel regression with post-stratification, which uses larger national polls to estimate the percent of support within each U.S. state. In general, we found in most states that 60% to 70% of voting aged residents believed that military intervention is effective at achieving the U.S's foreign policy goals. These results were then further supported by contemporary polls that suggest that U.S. support for intervention tended to be around 60% from 2015 to 2019.

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Appendix

For information on the coding of this project, as well as the data files that were used in this project, please go to https://github.com/parkaukl/SeniorExperienceStats.

In addition, this appendix will include various plots related to the trace plots for our fixed effects. These trace plots show that models appear to have a good level of convergence within each of the chains. There is nothing alarming about the trace plots for any of the fixed effects. In addition, all of our density plots show strong evidence of a normal distribution, and do not show any significant problems.

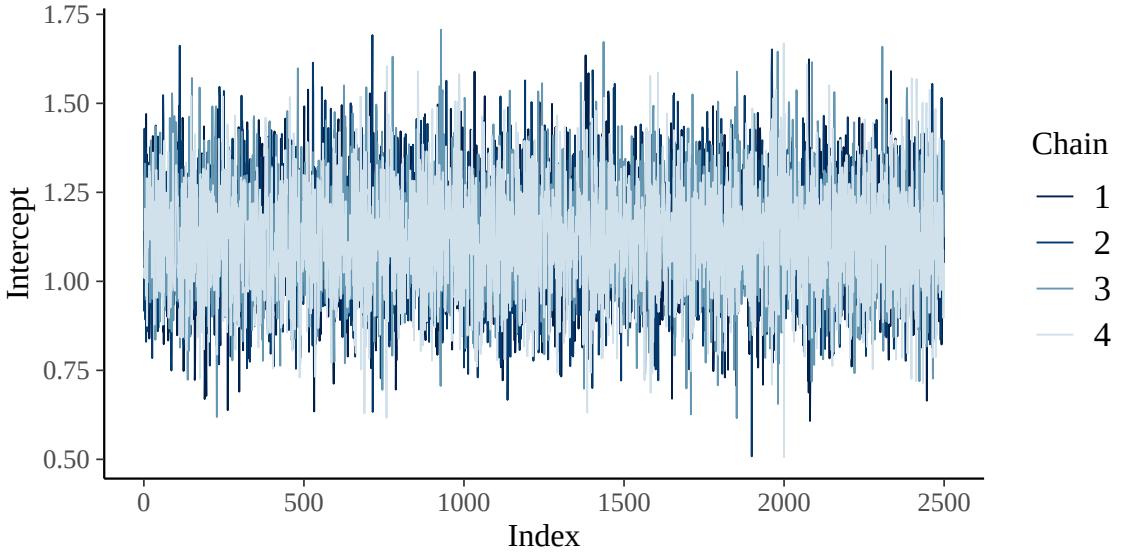

Figure 10: Trace Plot for the Intercept Coefficient

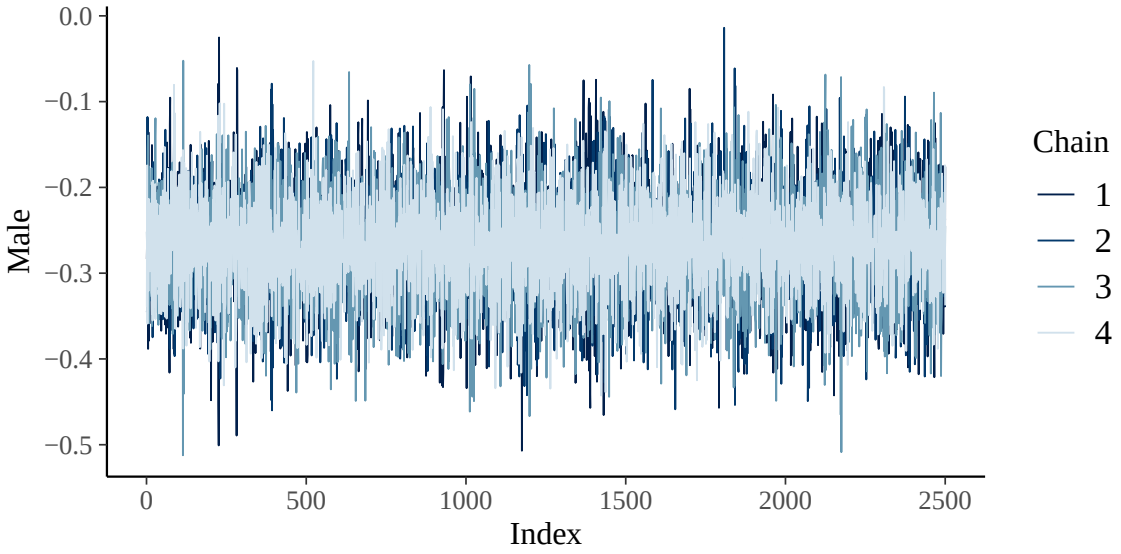

Figure 11: Trace Plot for the Male Coefficient

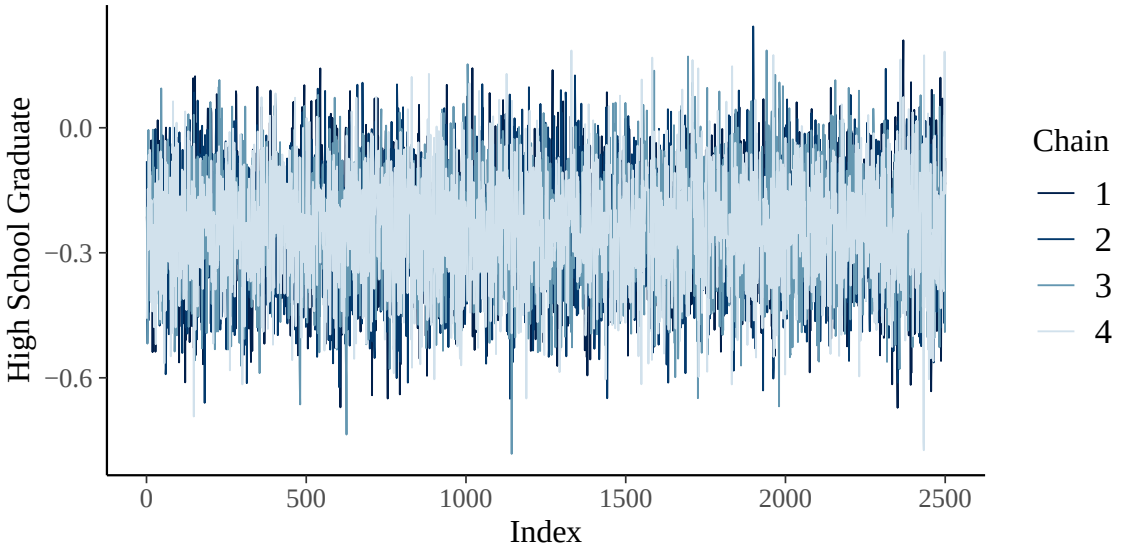

Figure 12: Trace Plot for the High School Graduate Coefficient

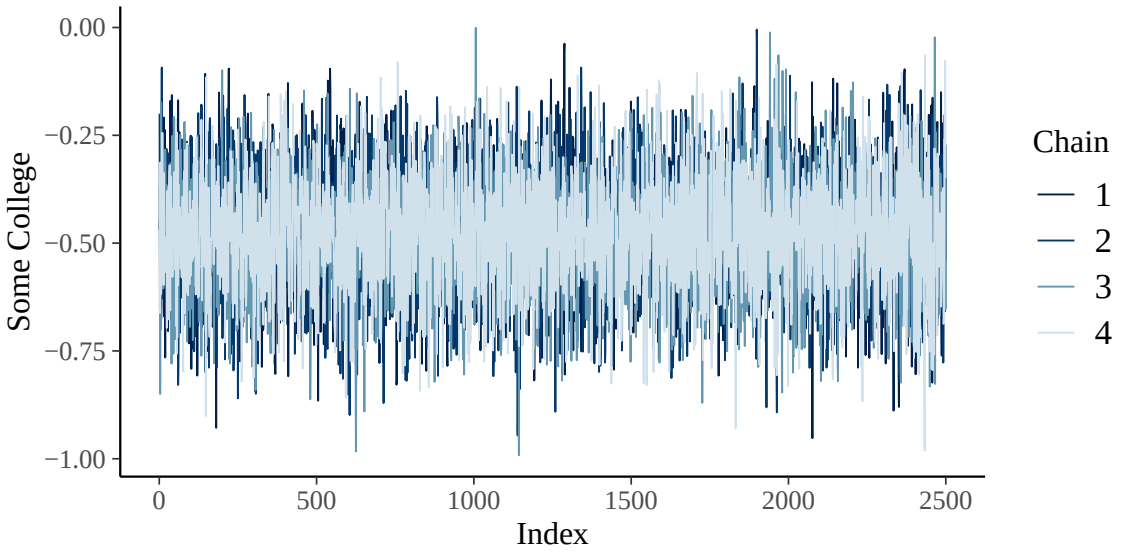

Figure 13: Trace Plot for the Some College Coefficient

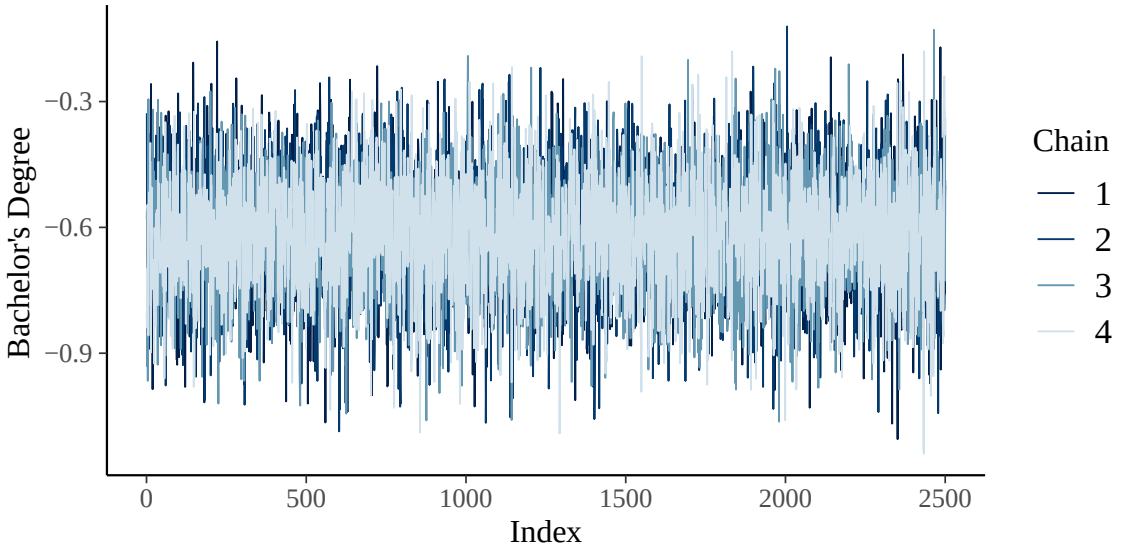

Figure 14: Trace Plot for the Bachelor's Degree Coefficient

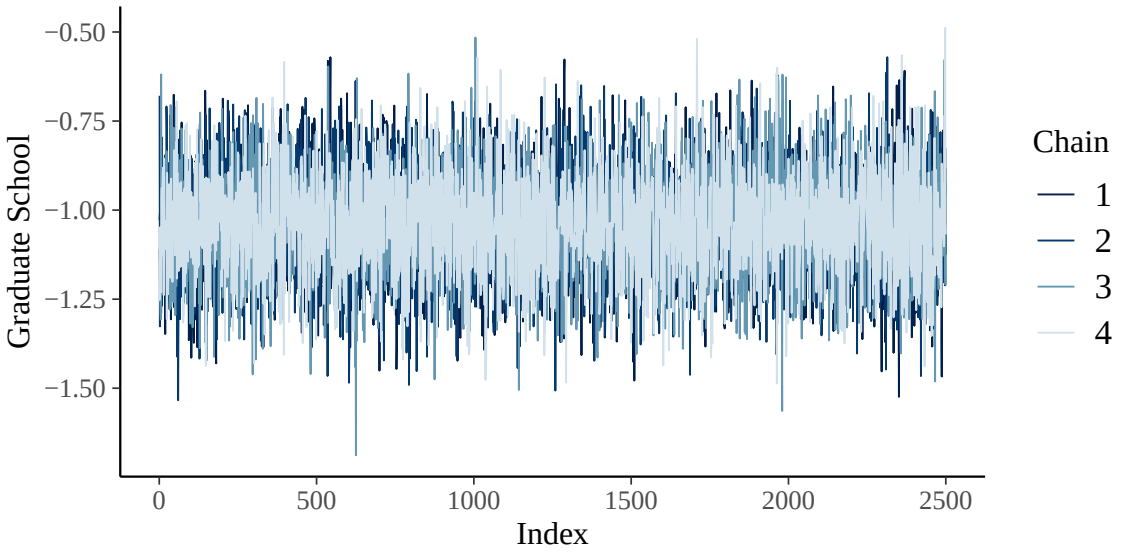

Figure 15: Trace Plot for the Graduate Degree Coefficient

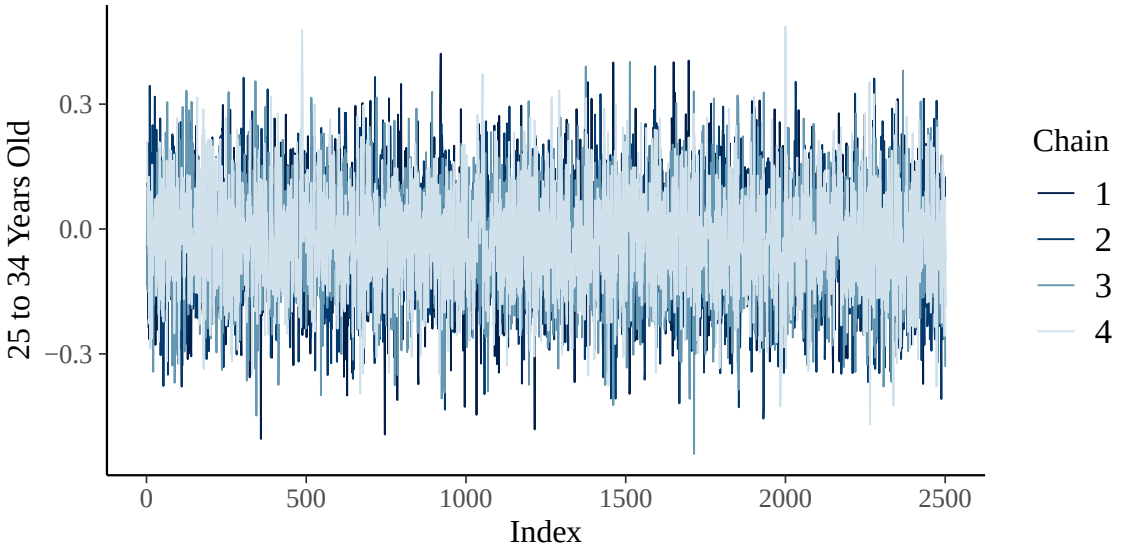

Figure 16: Trace Plot for the 25 to 34 Years Old Coefficient

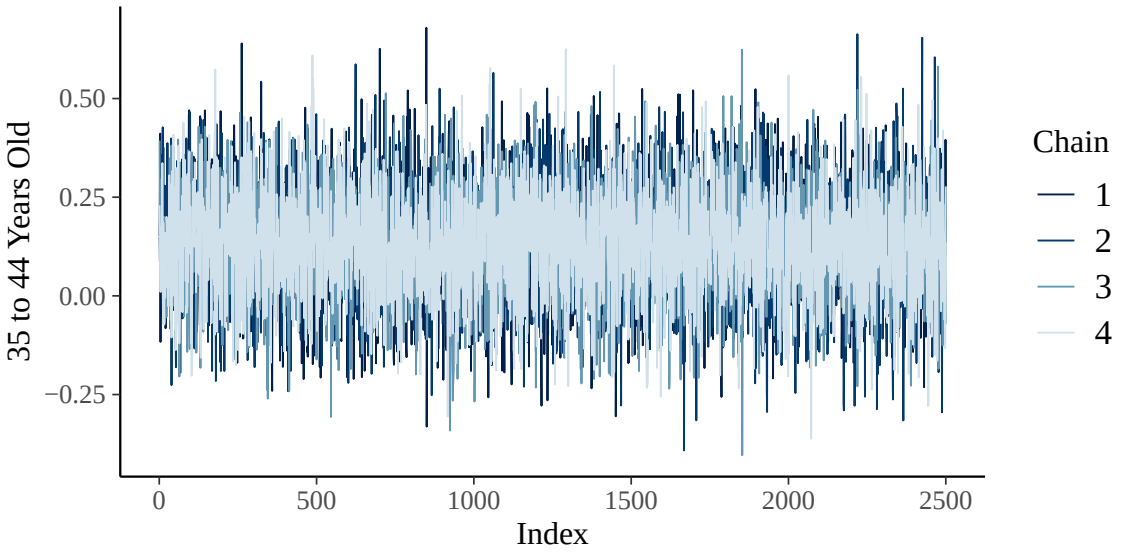

Figure 17: Trace Plot for the 35 to 44 Years Old Coefficient

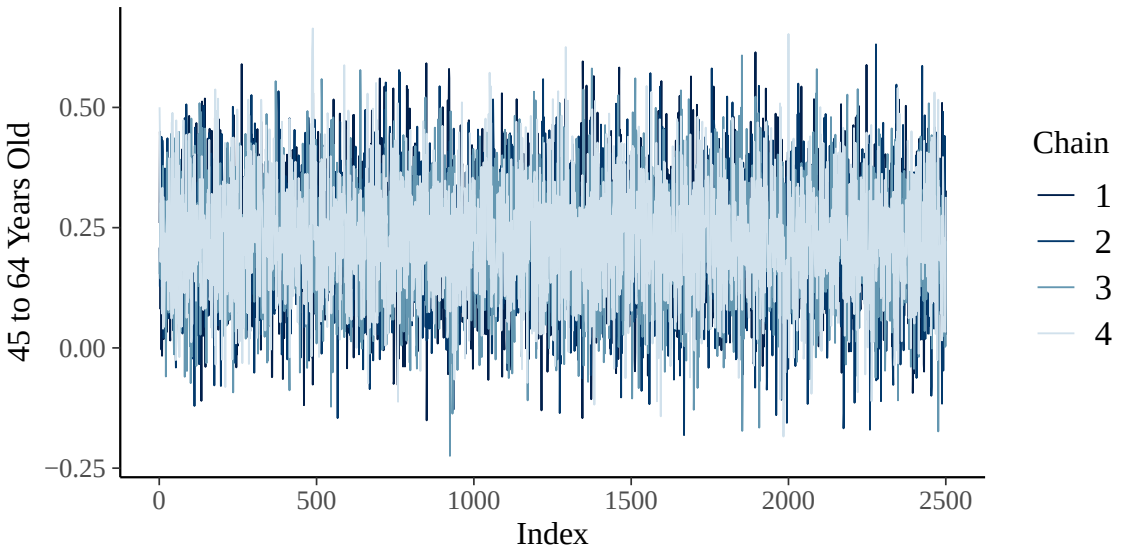

Figure 18: Trace Plot for the 45 to 64 Years Old Coefficient

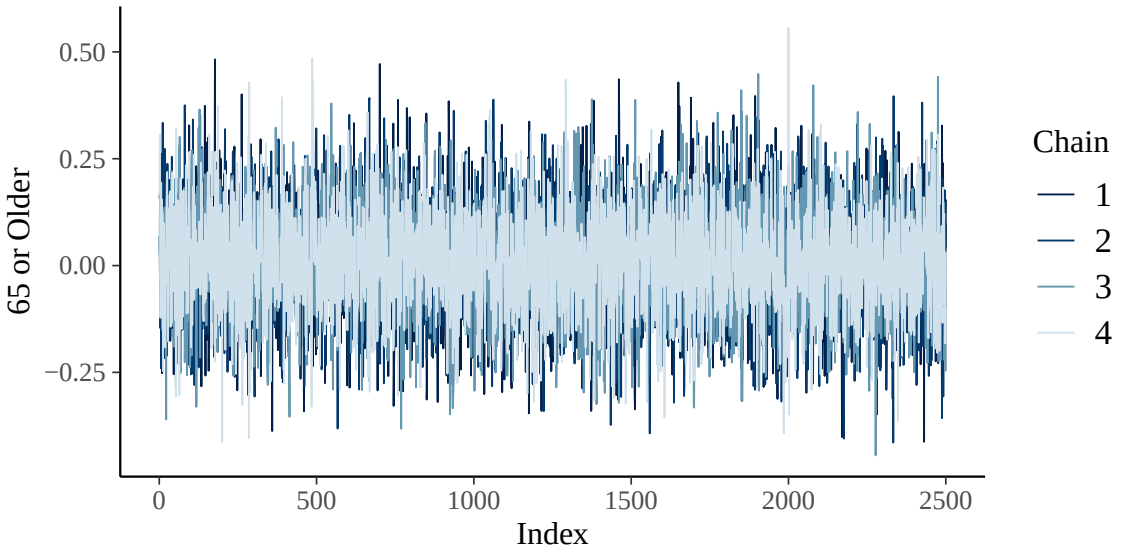

Figure 19: Trace Plot for the 65 Years Old or Older Coefficient

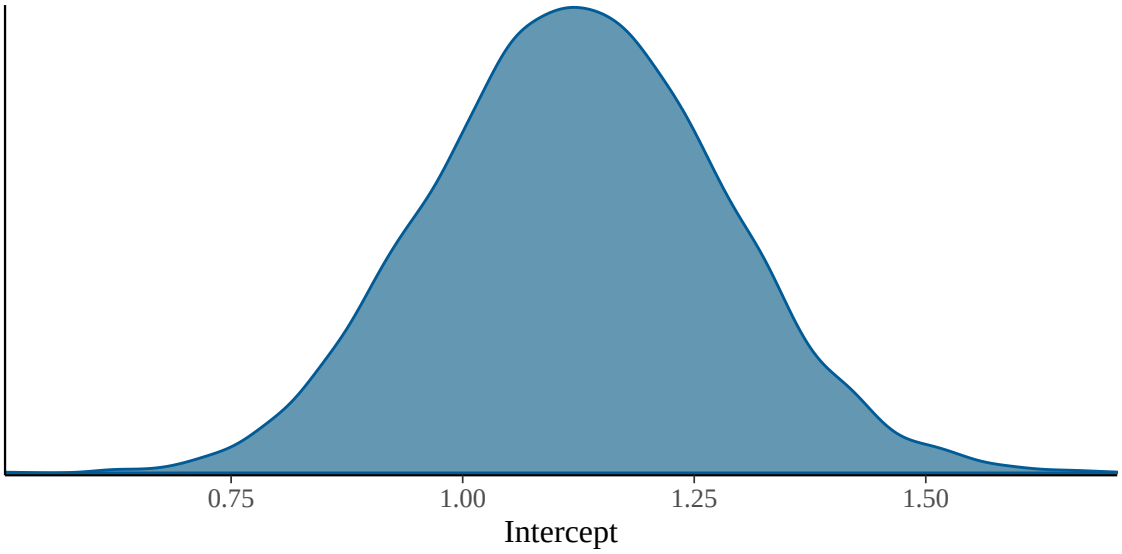

Figure 20: Density Plot for the Intercept Coefficient

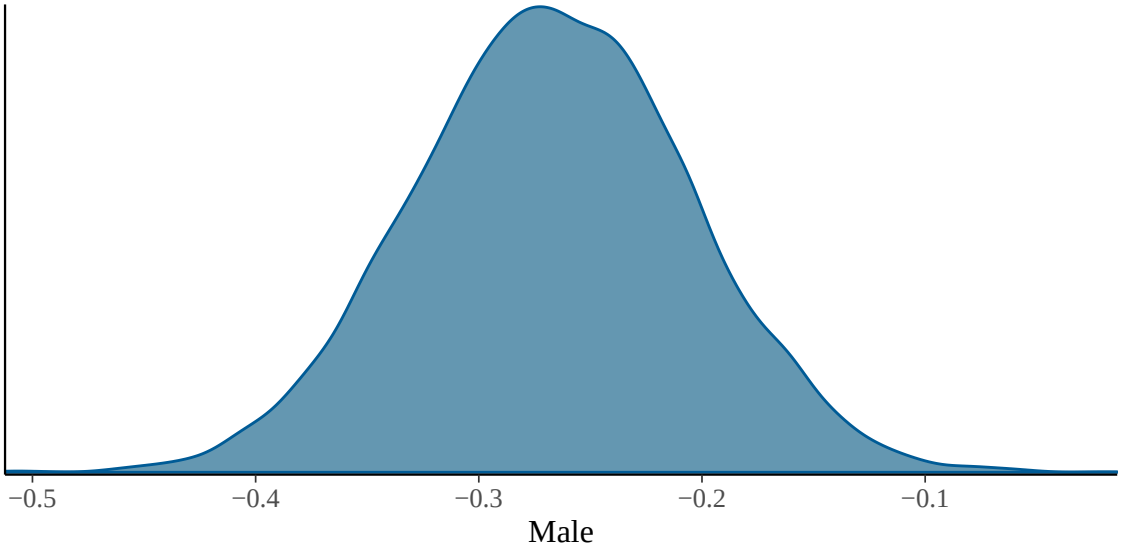

Figure 21: Density Plot for the Male Coefficient

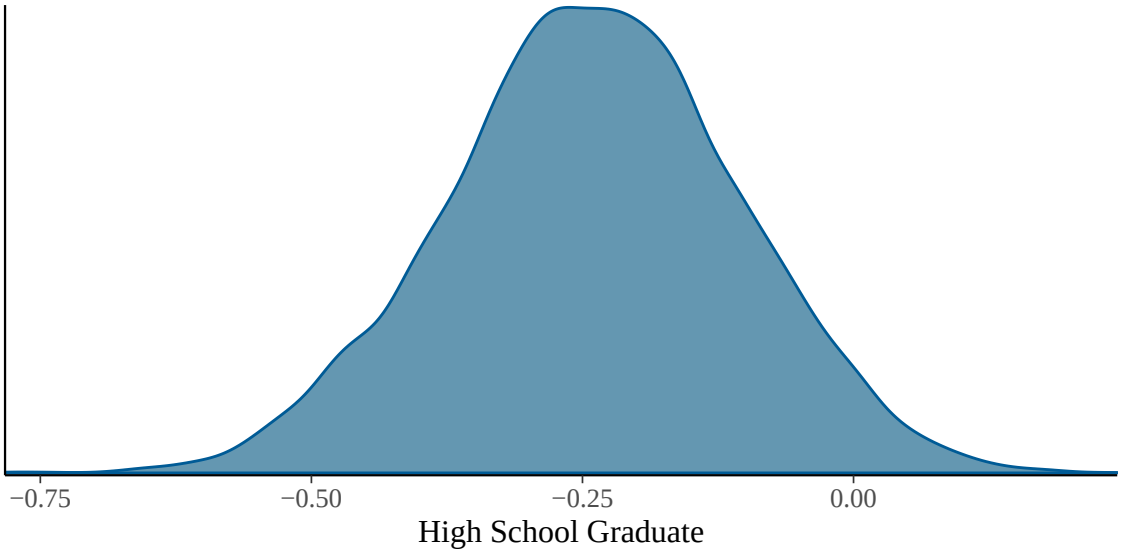

Figure 22: Density Plot for the High School Graduate Coefficient

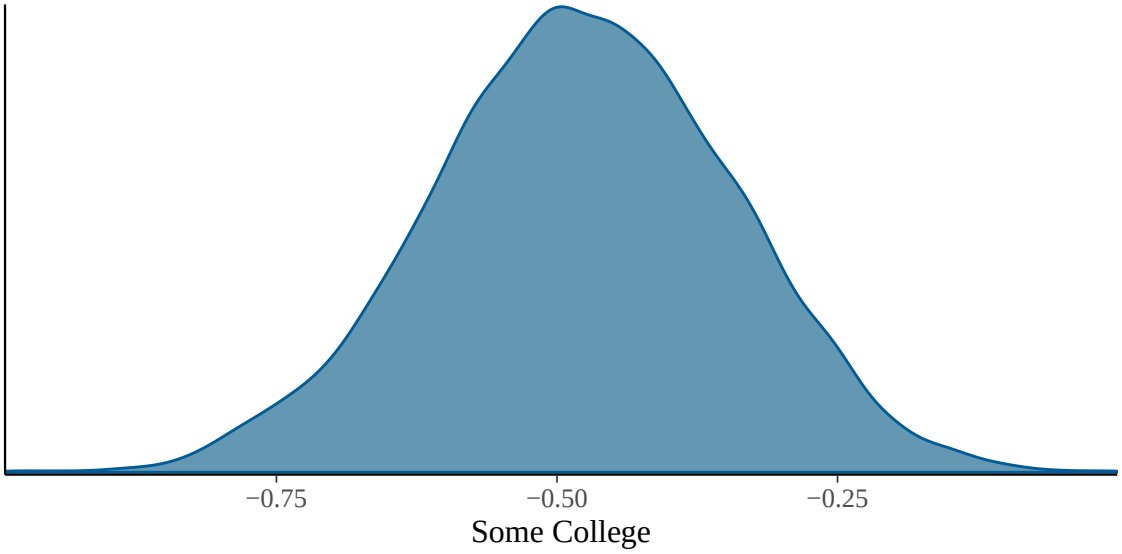

Figure 23: Density Plot for the Some College Coefficient

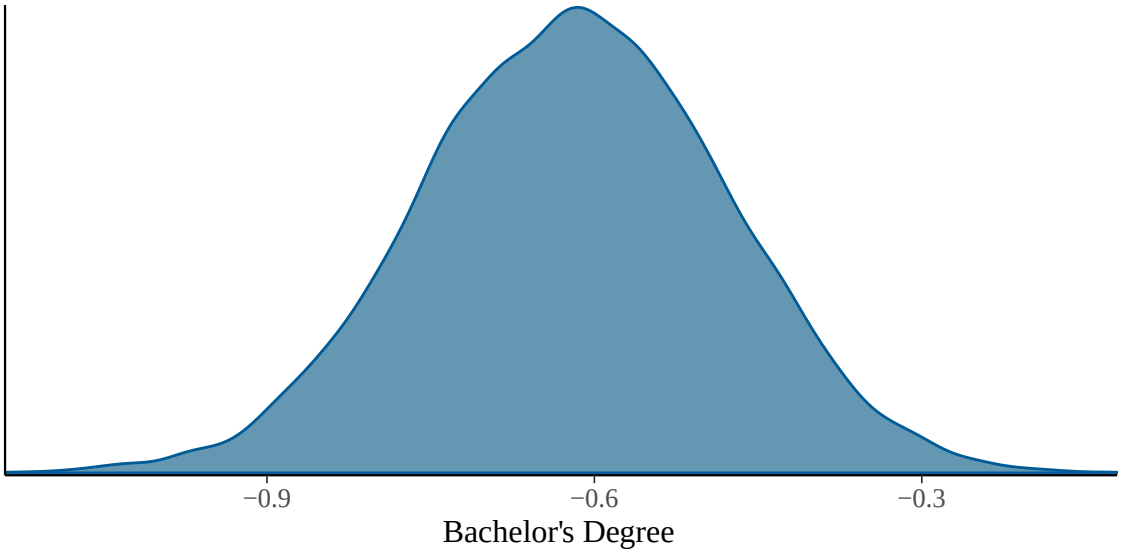

Figure 24: Density Plot for the Bachelor's Degree Coefficient

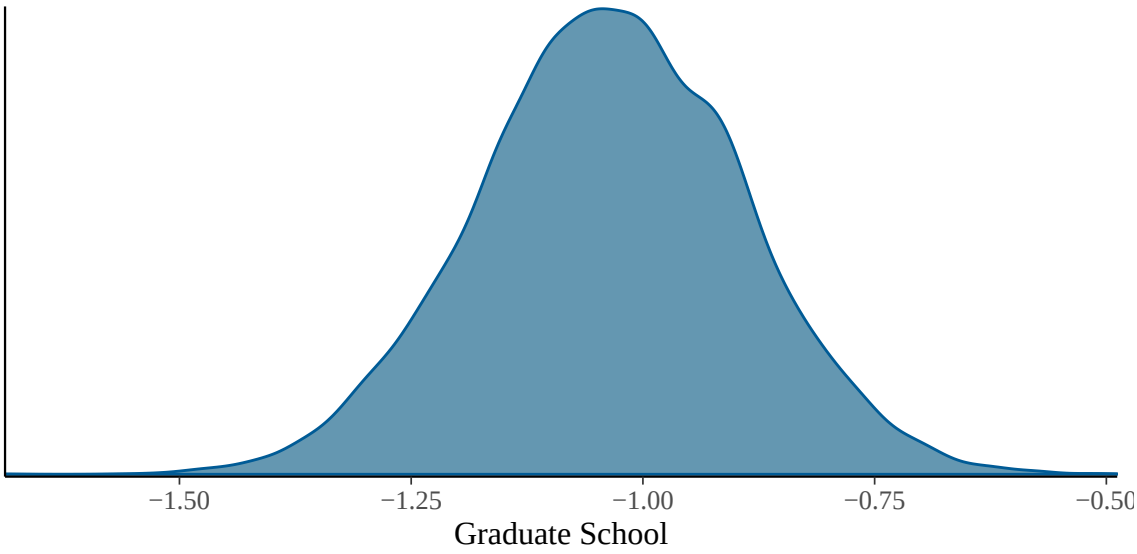

Figure 25: Density Plot for the Graduate Degree Coefficient

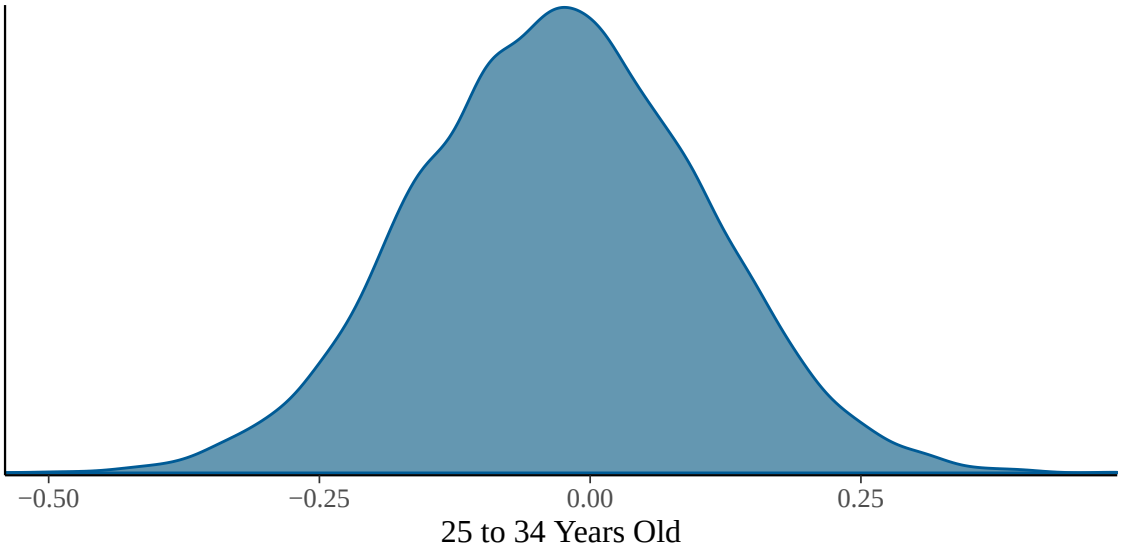

Figure 26: Density Plot for the 25 to 34 Years Old Coefficient

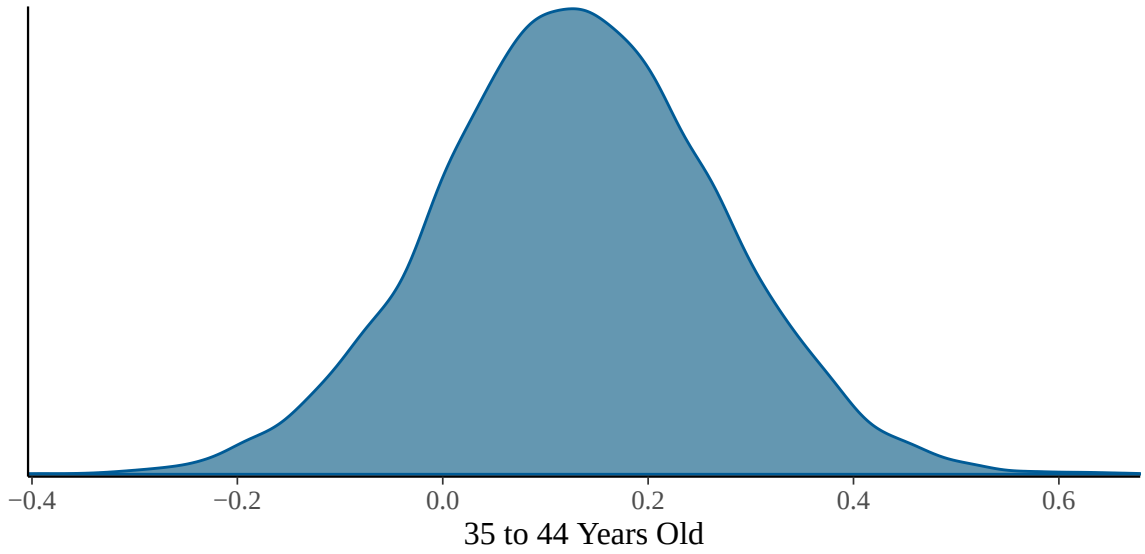

Figure 27: Density Plot for the 35 to 44 Years Old Coefficient

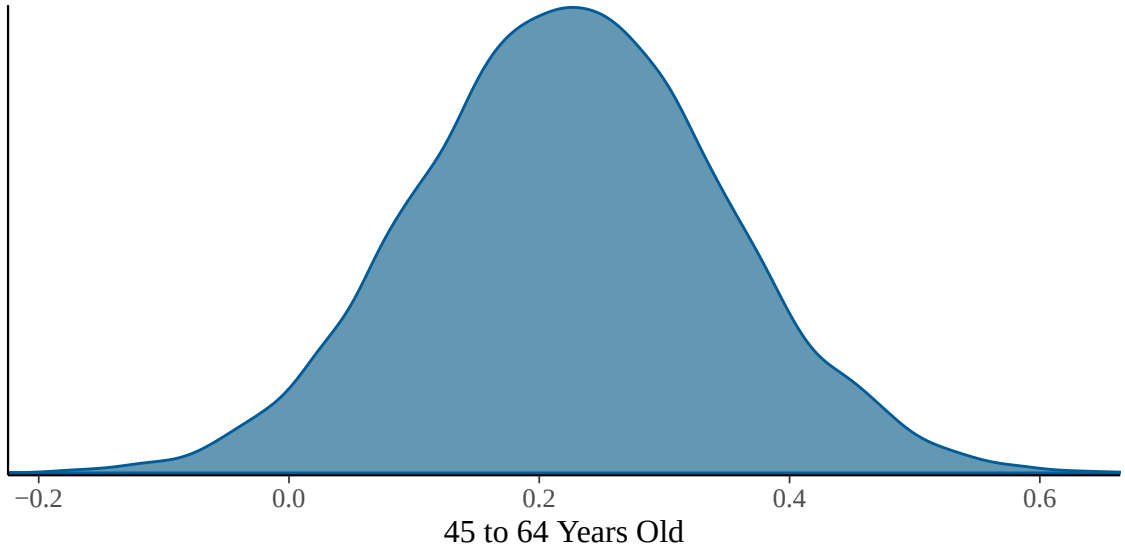

Figure 28: Density Plot for the 45 to 64 Years Old Coefficient

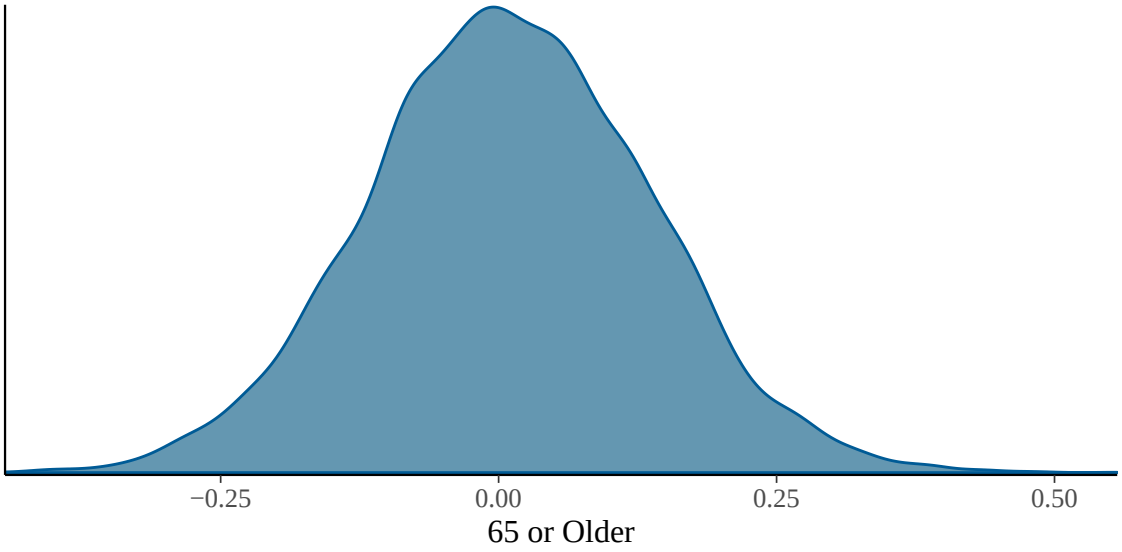

Figure 29: Density Plot for the 65 Years Old or Older Coefficient