Week 9, Day 2

Scene 1

Prompt: Let's create a new model. Consider `reg_chg` as a function of `treatment`, `poverty_n` and the interaction between the two.

- Write the math for this model.

- Describe the population for which you are creating the model.

- Fit the model and interpret the coefficients. Focus on the coefficient of the interaction term.

$$reg\_chg_i = \beta_0 + \beta_1 treatment + \beta_2 poverty\_n + \epsilon$$

```
## stan_glm
##  family:       gaussian [identity]
##  formula:      reg_chg ~ treatment * poverty_n
##  observations: 557
##  predictors:   4
## ------
##                          Median MAD_SD
## (Intercept)              0.0043 0.0025
## treatmentlocal           0.0212 0.0033
## poverty_n                0.0026 0.0024
## treatmentlocal:poverty_n 0.0155 0.0034
##
## Auxiliary parameter(s):
##       Median MAD_SD
## sigma 0.0403 0.0012
##
## ------
## * For help interpreting the printed output see ?print.stanreg
## * For info on the priors used see ?prior_summary.stanreg
```

Scene 2

Prompt: Let's begin with a question from Kenyan President Uhuru Kenyatta:

Consider the polling station 007/001. What are the chances of an increase in registration of 4% if I were to give it the local treatment in January?

Write a sentence or two for each of these topics:

- What would Wisdom suggest about the use of the `kenya` data to answer this question?

The poverty_n value is negative, which may balance out the treatment affect based on our stan_glm result and our data.

- Describe the ideal Preceptor Table.

The ideal preceptor table would have the control, treatment, and treatment:poverty_n interaction at all time points.

- Graph the posterior probability distribution `reg_chg` if polling station 007/001 were to be assigned treatment in January.

```
## Don't know how to automatically pick scale for object of type ppd/matrix/array. Defaulting to contin
```
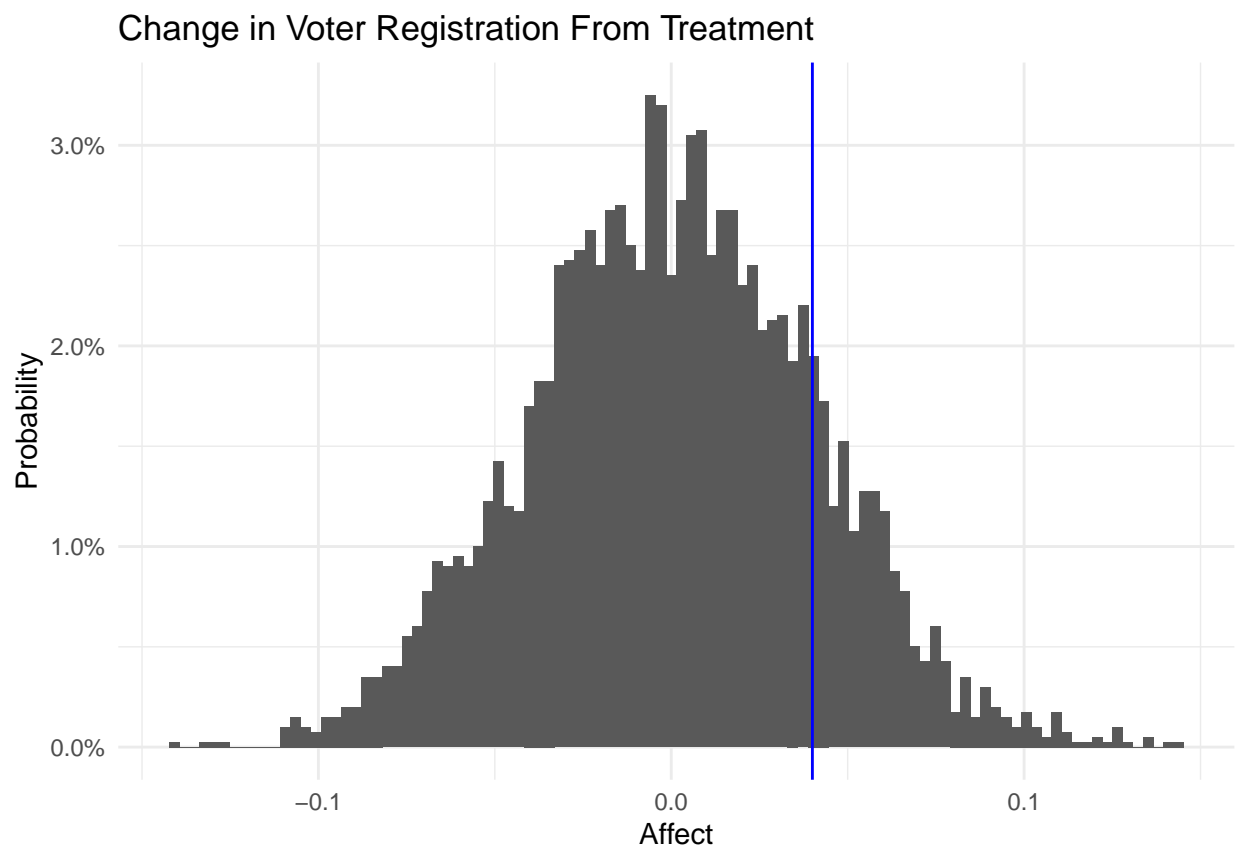

- Answer the President's question.

We predict no affect of treatment at polling station 007/001, however it is possible.

Scene 3

Prompt: President Kenyatta has another question:

I care more about increasing registration in poor communities. For a community with poverty_n equal to 2, what would you expect the change in registration under treatment to be?

Using the model which you created in Scene 1, create a graphic of the posterior probability distribution of the causal effect of `local` treatment in polling stations which have +2 sigma poverty rates. Note that there are two ways to do this. First, we can use a parameter approach. This is what we did in class last week. Second, we can use `posterior_epred()`, which is generally easier since it does the math for us. Use the `posterior_epred()` approach.

Change in Voter Registration From Treatment