# $Zane\_Alderfer\_IST772\_Final$

## Zane

## 2023-09-16

dummy variables created above

```
#question2
public_dummy_mean <- mean(public_dummy)</pre>
hi_enrollment_mean <- mean(hi_enrollment)
relig_exempt_mean <- mean(relig_exempt)</pre>
show(public_dummy_mean)
## [1] 0.8381089
show(hi_enrollment_mean)
## [1] 0.4799427
show(relig_exempt_mean)
## [1] 0.5673352
means for dummy variables above
#question3
library(BayesFactor)
## Loading required package: coda
## Loading required package: Matrix
## *******
## Welcome to BayesFactor 0.9.12-4.4. If you have questions, please contact Richard Morey (richarddmore
## Type BFManual() to open the manual.
## *******
linear_regression <- lm(medical ~ pubpriv + enrollment, data = schoolvax)</pre>
BF_linear_regression <- lmBF(medical ~ pubpriv + enrollment, data = schoolvax, posterior = TRUE, iterat
## Warning: data coerced from tibble to data frame
```

#### summary(linear\_regression)

```
##
## Call:
## lm(formula = medical ~ pubpriv + enrollment, data = schoolvax)
##
## Residuals:
##
      Min
                1Q Median
                                3Q
                                       Max
## -0.3657 -0.2363 -0.1751 -0.1206 15.1251
##
## Coefficients:
##
                  Estimate Std. Error t value Pr(>|t|)
## (Intercept)
                 0.2128964 0.0853441
                                       2.495
                                                 0.0128 *
## pubprivPUBLIC -0.1841863 0.1019180 -1.807
                                                 0.0712 .
## enrollment
                 0.0017019 0.0009059
                                       1.879
                                                 0.0607 .
## ---
## Signif. codes: 0 '*** 0.001 '** 0.01 '* 0.05 '.' 0.1 ' ' 1
## Residual standard error: 0.8555 on 695 degrees of freedom
## Multiple R-squared: 0.006456,
                                   Adjusted R-squared:
## F-statistic: 2.258 on 2 and 695 DF, p-value: 0.1053
```

#### summary(BF\_linear\_regression)

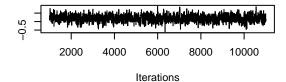
```
##
## Iterations = 1:10000
## Thinning interval = 1
## Number of chains = 1
## Sample size per chain = 10000
##
## 1. Empirical mean and standard deviation for each variable,
     plus standard error of the mean:
##
##
                                         SD Naive SE Time-series SE
##
                              Mean
                          0.251022 4.653e-02 4.653e-04
                                                            4.863e-04
## pubpriv-PRIVATE
                         0.085628 4.986e-02 4.986e-04
                                                            5.058e-04
## pubpriv-PUBLIC
                        -0.085628 4.986e-02 4.986e-04
                                                            5.058e-04
## enrollment-enrollment 0.001622 8.952e-04 8.952e-06
                                                            9.054e-06
## sig2
                         0.732056 4.000e-02 4.000e-04
                                                            4.000e-04
## g_pubpriv
                         1.121861 1.203e+01 1.203e-01
                                                            1.203e-01
## g_continuous
                         0.677820 9.511e+00 9.511e-02
                                                            9.511e-02
##
## 2. Quantiles for each variable:
##
##
                               2.5%
                                         25%
                                                   50%
                                                              75%
                                                                     97.5%
## mu
                         1.599e-01 0.219992 0.250987 0.282441 0.341877
## pubpriv-PRIVATE
                        -1.379e-02 0.052270 0.085769 0.118832 0.183389
## pubpriv-PUBLIC
                        -1.834e-01 -0.118832 -0.085769 -0.052270 0.013790
## enrollment-enrollment -9.533e-05 0.001011 0.001618 0.002223 0.003401
## sig2
                         6.582e-01 0.704267 0.730791 0.757846 0.814608
## g_pubpriv
                         3.696e-02 0.096824 0.196978 0.471650 5.370837
## g_continuous
                         1.816e-02 0.047076 0.092320 0.220348 2.753783
```

```
#question5
library(mcmc)
library(MCMCpack)
## Loading required package: MASS
## ## Markov Chain Monte Carlo Package (MCMCpack)
## ## Copyright (C) 2003-2023 Andrew D. Martin, Kevin M. Quinn, and Jong Hee Park
## ##
## ## Support provided by the U.S. National Science Foundation
## ## (Grants SES-0350646 and SES-0350613)
## ##
logistic_model <- glm(relig_exempt ~ public_dummy + hi_enrollment, family = binomial(),</pre>
                   data = schoolvax)
summary(logistic_model)
##
## Call:
## glm(formula = relig_exempt ~ public_dummy + hi_enrollment, family = binomial(),
       data = schoolvax)
##
## Coefficients:
                 Estimate Std. Error z value Pr(>|z|)
                 0.19102
                           0.18909
                                       1.010
                                                0.312
## (Intercept)
## public_dummy -0.04449
                             0.22596 -0.197
                                                0.844
## hi_enrollment 0.24624
                             0.16753
                                       1.470
                                                0.142
## (Dispersion parameter for binomial family taken to be 1)
##
       Null deviance: 954.94 on 697
                                      degrees of freedom
##
## Residual deviance: 952.58 on 695 degrees of freedom
## AIC: 958.58
## Number of Fisher Scoring iterations: 4
exp(coef(logistic_model))
##
     (Intercept) public_dummy hi_enrollment
                     0.9564884
                                   1.2792108
##
       1.2104854
vax_mcmc <- MCMClogit(formula = relig_exempt ~ public_dummy + hi_enrollment,</pre>
                    data = schoolvax)
summary(vax_mcmc)
```

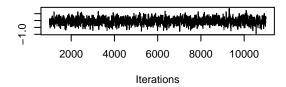
```
##
## Iterations = 1001:11000
## Thinning interval = 1
## Number of chains = 1
##
  Sample size per chain = 10000
##
  1. Empirical mean and standard deviation for each variable,
      plus standard error of the mean:
##
##
##
                              SD Naive SE Time-series SE
                     Mean
## (Intercept)
                  0.19470 0.1914 0.001914
                                                0.006247
  public_dummy -0.04457 0.2295 0.002295
                                                 0.007631
  hi_enrollment 0.24281 0.1683 0.001683
                                                 0.005541
## 2. Quantiles for each variable:
##
##
                     2.5%
                               25%
                                         50%
                                                75% 97.5%
## (Intercept)
                 -0.19071
                           0.06551
                                    0.19859 0.3243 0.5631
## public_dummy -0.48206 -0.20380 -0.04667 0.1032 0.4171
## hi enrollment -0.08911 0.13332 0.24158 0.3564 0.5700
```

plot(vax\_mcmc)

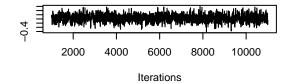
# Trace of (Intercept)



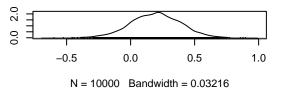
## Trace of public\_dummy



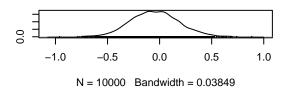
## Trace of hi\_enrollment



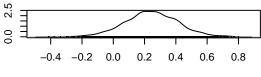
## **Density of (Intercept)**



## Density of public\_dummy



## Density of hi\_enrollment



N = 10000 Bandwidth = 0.02797