MCMC Diagnostics - IFLS data

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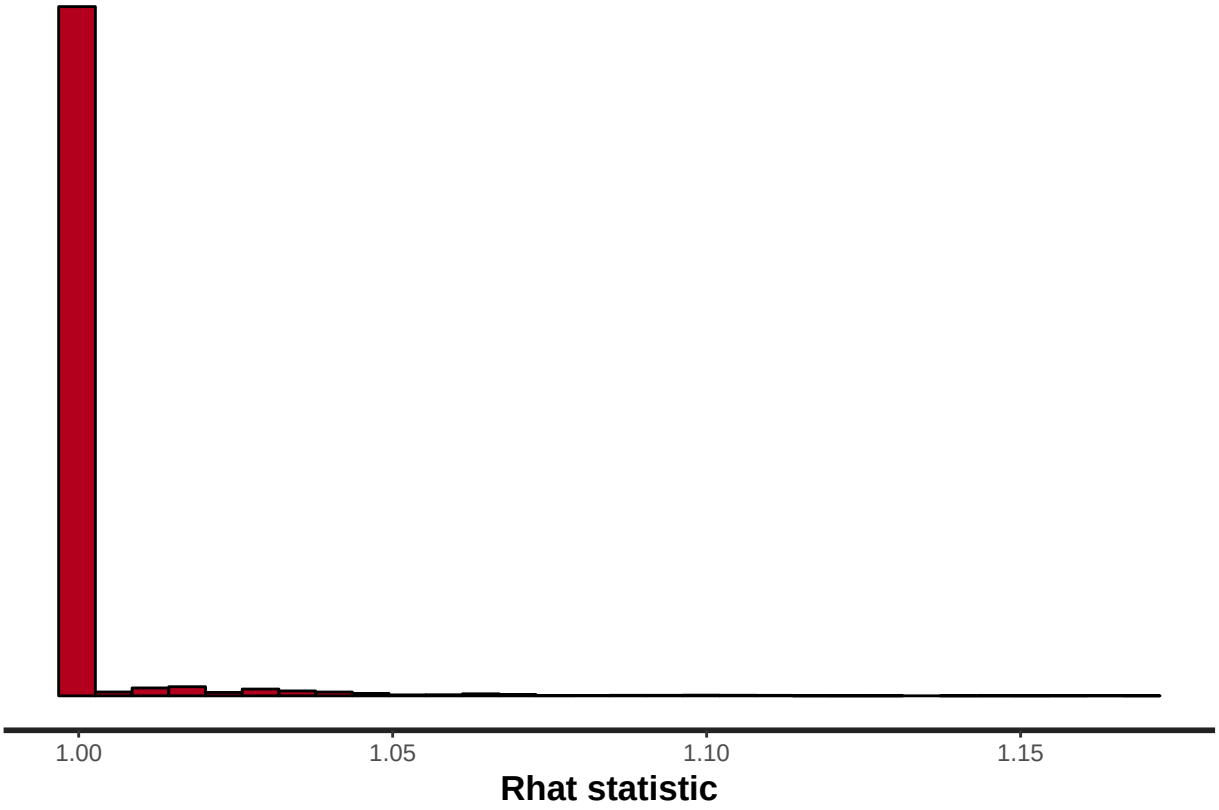
General MCMC diagnostic plots

Overall model diagnostics from rstan package.

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

```
## Warning: Removed 3955 rows containing non-finite values (stat_bin).
```

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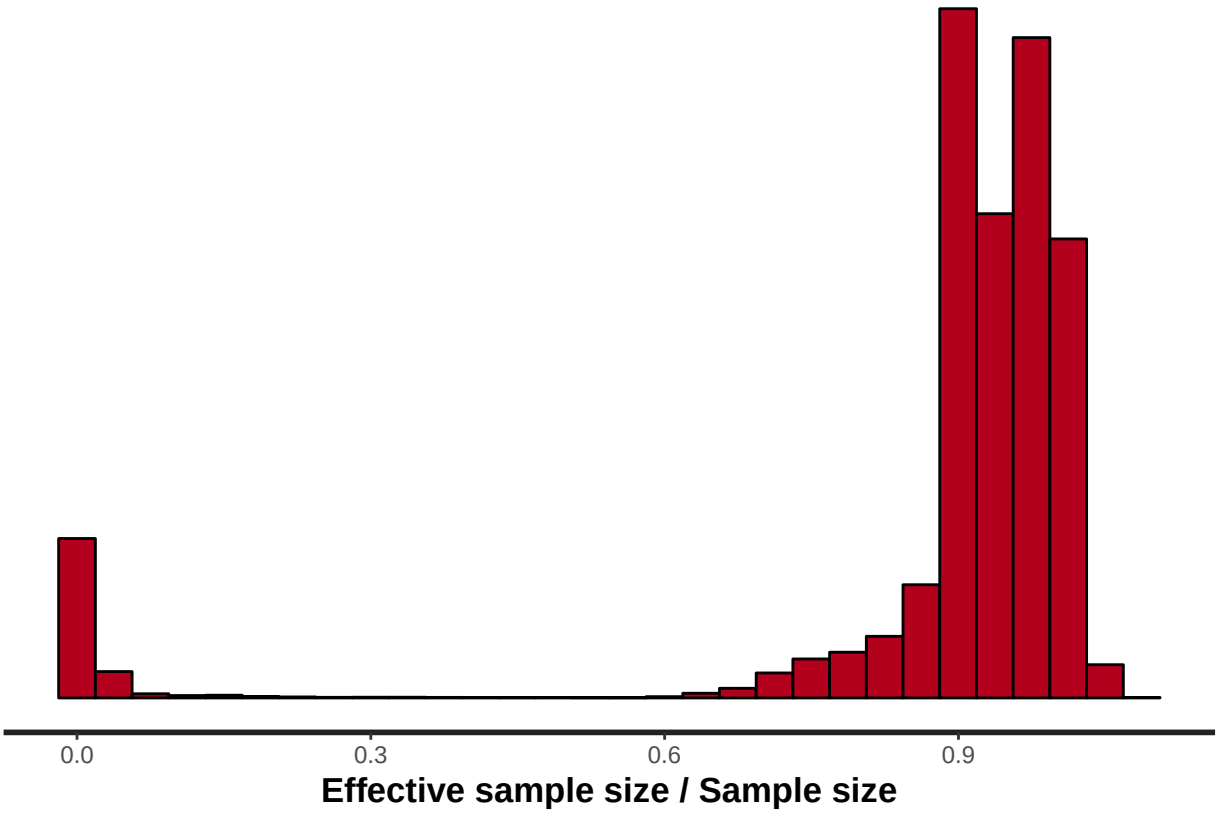
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

```
## Warning: Removed 3955 rows containing non-finite values (stat_bin).
```

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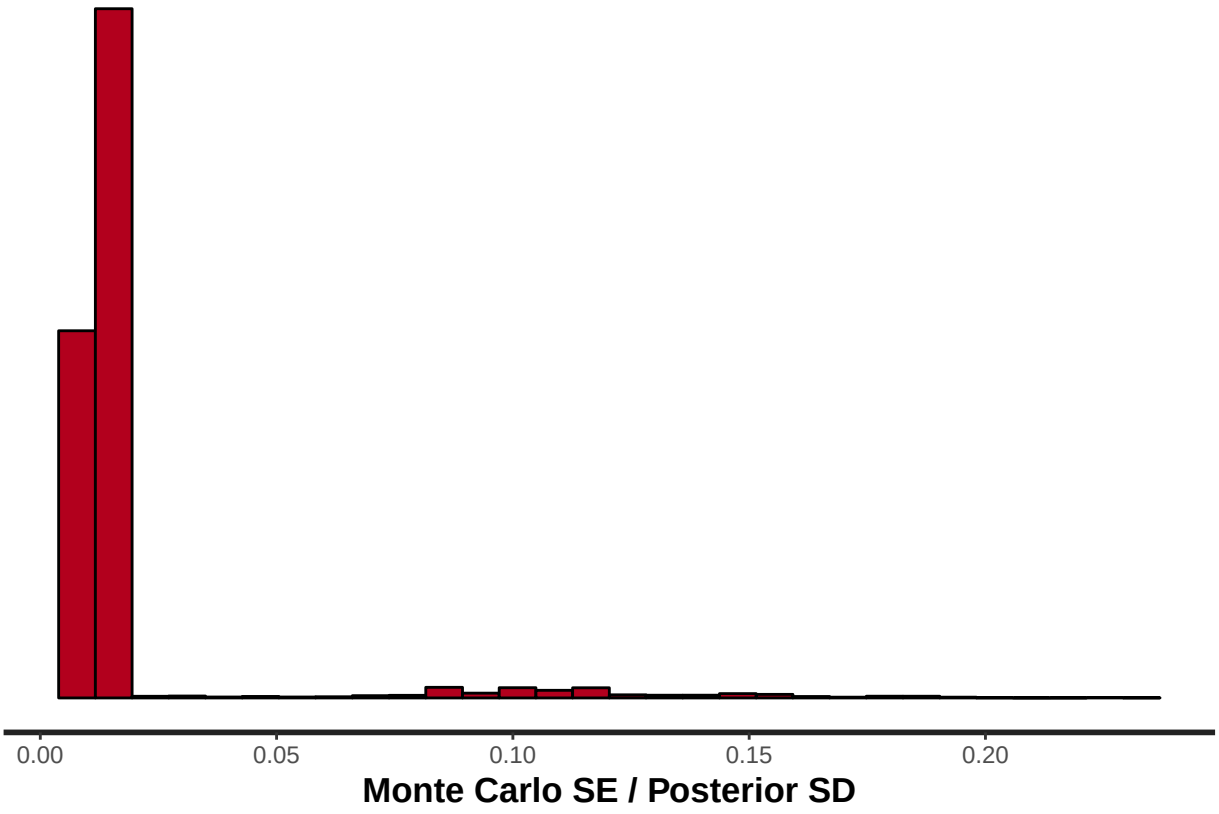
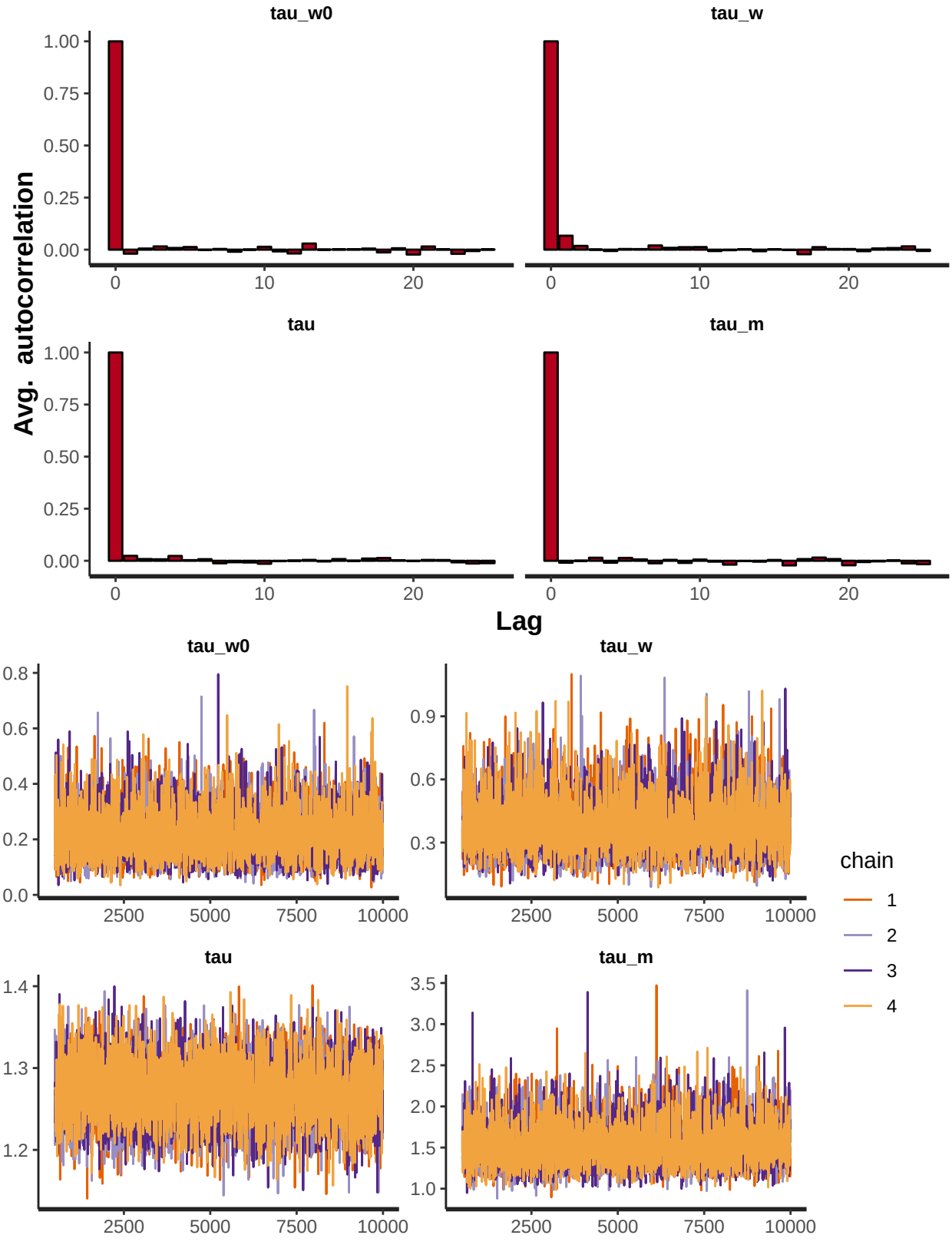
```
## Warning: Removed 3955 rows containing non-finite values (stat_bin).
```



Individual Parameter Diagnostics

Individual parameter plots. Autocorrelation and trace plots for individual parameters, and histograms of posterior medians for group parameters.

```
##             mean      se_mean         sd       25%      50%       75%
## tau_w0 0.2203424 0.0010343956 0.08825777 0.1561479 0.208315 0.2708558
## tau_w  0.3855286 0.0016325411 0.13163791 0.2929436 0.367410 0.4607506
## tau    1.2685478 0.0004529048 0.03716760 1.2437111 1.267690 1.2927721
## tau_m  1.5345284 0.0029897082 0.25773449 1.3554416 1.504295 1.6725506
##           n_eff     Rhat
## tau_w0 7280.021 1.000174
## tau_w  6501.802 1.000372
## tau    6734.652 1.001212
## tau_m  7431.688 0.999981
```

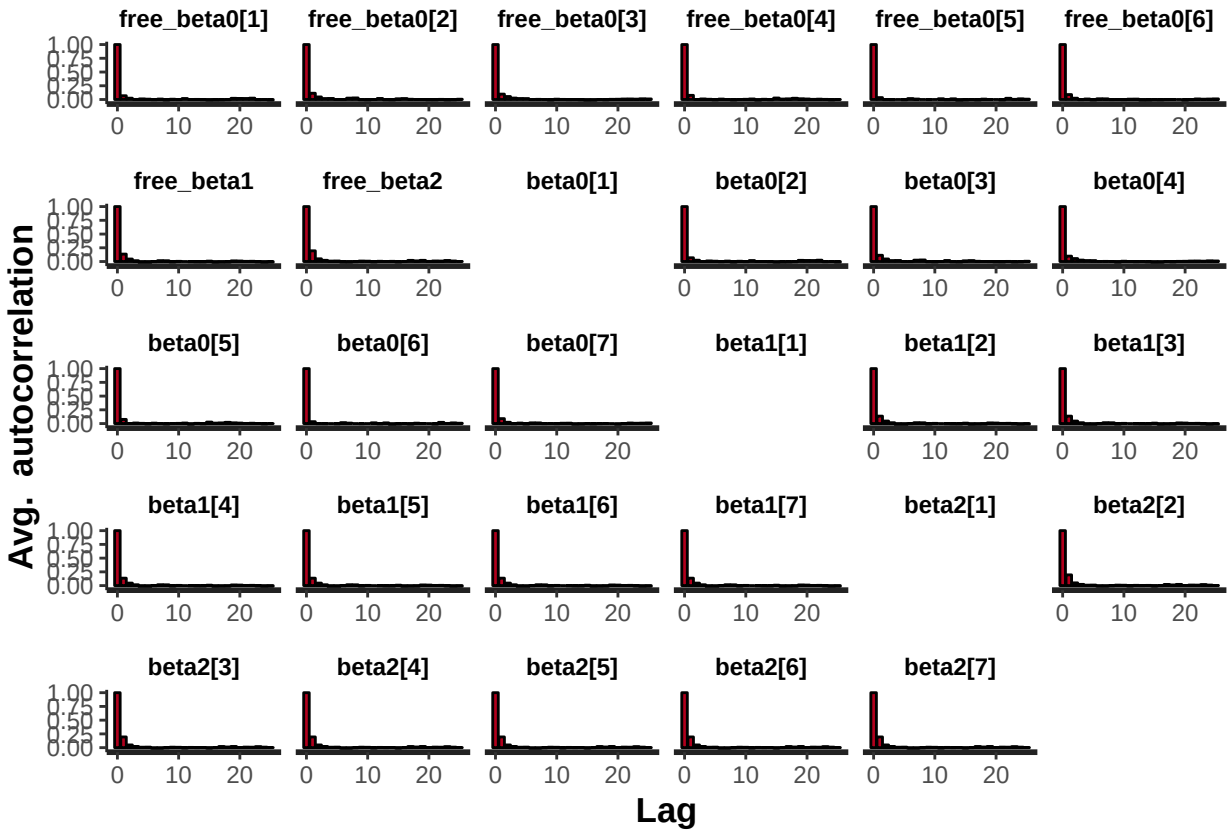


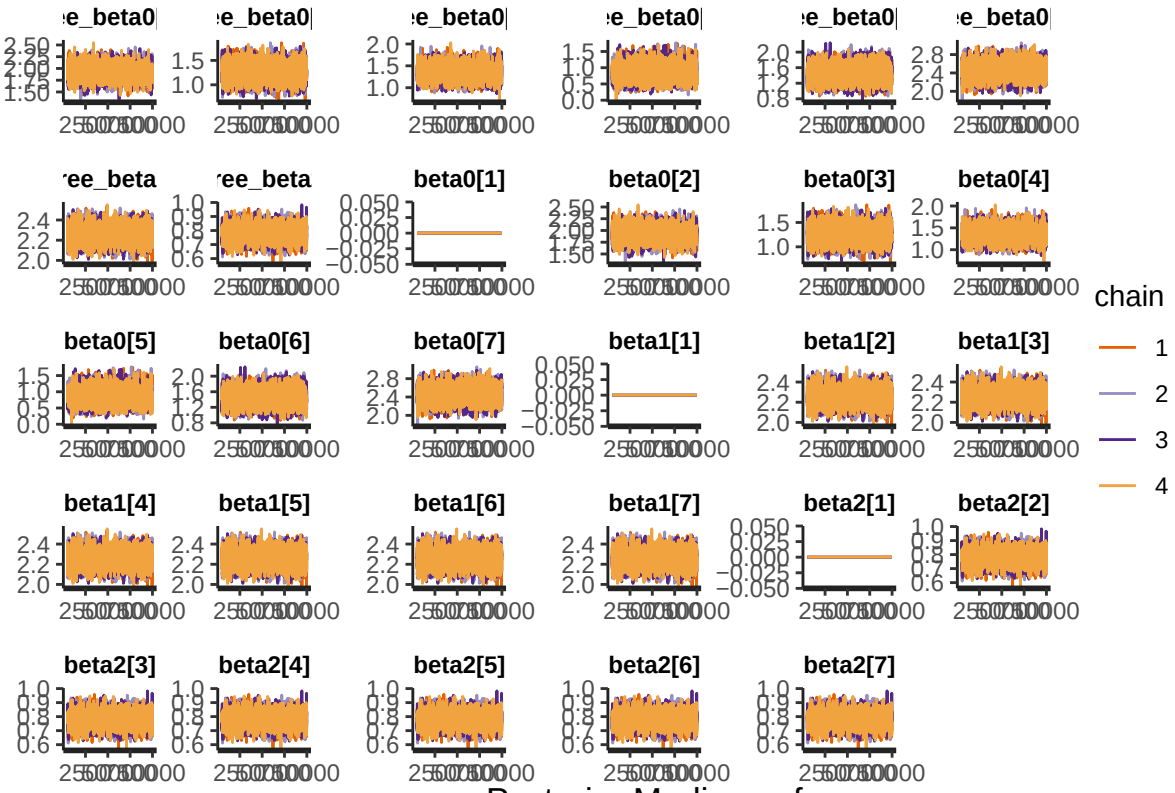

```
##                     mean      se_mean         sd       25%       50%
## free_beta0[1] 1.9152409 0.0019069043 0.15008767 1.8148174 1.9120890
## free_beta0[2] 1.2697415 0.0023363789 0.16836630 1.1556495 1.2687603
```

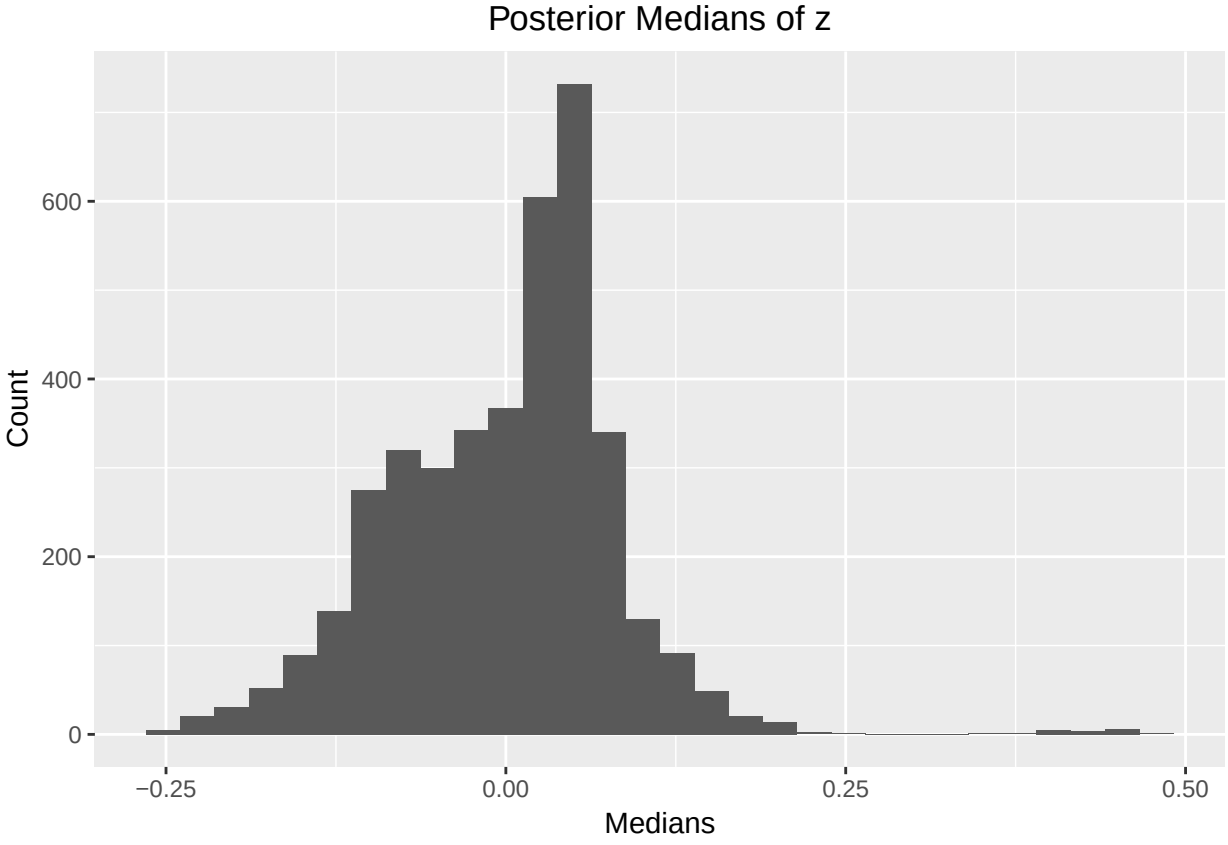
```
## free_beta0[3] 1.3592158 0.0021667594 0.15763251 1.2548919 1.3539935
## free_beta0[4] 0.8410734 0.0028585477 0.22999798 0.6818162 0.8256235
## free_beta0[5] 1.4511298 0.0023463981 0.19767764 1.3154906 1.4443227
## free_beta0[6] 2.4508473 0.0020971028 0.16545001 2.3403749 2.4508030
## free_beta1    2.2491345 0.0010569085 0.07801468 2.1961439 2.2465164
## free_beta2    0.7820303 0.0007656281 0.05317247 0.7460036 0.7811096
## beta0[1]      0.0000000          NaN 0.00000000 0.0000000 0.0000000
## beta0[2]      1.9152409 0.0019069043 0.15008767 1.8148174 1.9120890
## beta0[3]      1.2697415 0.0023363789 0.16836630 1.1556495 1.2687603
## beta0[4]      1.3592158 0.0021667594 0.15763251 1.2548919 1.3539935
## beta0[5]      0.8410734 0.0028585477 0.22999798 0.6818162 0.8256235
## beta0[6]      1.4511298 0.0023463981 0.19767764 1.3154906 1.4443227
## beta0[7]      2.4508473 0.0020971028 0.16545001 2.3403749 2.4508030
## beta1[1]      0.0000000          NaN 0.00000000 0.0000000 0.0000000
## beta1[2]      2.2491345 0.0010569085 0.07801468 2.1961439 2.2465164
## beta1[3]      2.2491345 0.0010569085 0.07801468 2.1961439 2.2465164
## beta1[4]      2.2491345 0.0010569085 0.07801468 2.1961439 2.2465164
## beta1[5]      2.2491345 0.0010569085 0.07801468 2.1961439 2.2465164
## beta1[6]      2.2491345 0.0010569085 0.07801468 2.1961439 2.2465164
## beta1[7]      2.2491345 0.0010569085 0.07801468 2.1961439 2.2465164
## beta2[1]      0.0000000          NaN 0.00000000 0.0000000 0.0000000
## beta2[2]      0.7820303 0.0007656281 0.05317247 0.7460036 0.7811096
## beta2[3]      0.7820303 0.0007656281 0.05317247 0.7460036 0.7811096
## beta2[4]      0.7820303 0.0007656281 0.05317247 0.7460036 0.7811096
## beta2[5]      0.7820303 0.0007656281 0.05317247 0.7460036 0.7811096
## beta2[6]      0.7820303 0.0007656281 0.05317247 0.7460036 0.7811096
## beta2[7]      0.7820303 0.0007656281 0.05317247 0.7460036 0.7811096
##                     75%    n_eff      Rhat
## free_beta0[1] 2.0151324 6194.871 1.0000750
## free_beta0[2] 1.3810884 5193.066 0.9998304
## free_beta0[3] 1.4626762 5292.614 0.9998901
## free_beta0[4] 0.9846428 6473.768 1.0002251
## free_beta0[5] 1.5809856 7097.603 0.9998707
## free_beta0[6] 2.5611182 6224.352 0.9998616
## free_beta1    2.3014273 5448.512 1.0004210
## free_beta2    0.8177100 4823.228 1.0002136
## beta0[1]      0.0000000      NaN       NaN
## beta0[2]      2.0151324 6194.871 1.0000750
## beta0[3]      1.3810884 5193.066 0.9998304
## beta0[4]      1.4626762 5292.614 0.9998901
## beta0[5]      0.9846428 6473.768 1.0002251
## beta0[6]      1.5809856 7097.603 0.9998707
## beta0[7]      2.5611182 6224.352 0.9998616
## beta1[1]      0.0000000      NaN       NaN
## beta1[2]      2.3014273 5448.512 1.0004210
## beta1[3]      2.3014273 5448.512 1.0004210
## beta1[4]      2.3014273 5448.512 1.0004210
## beta1[5]      2.3014273 5448.512 1.0004210
## beta1[6]      2.3014273 5448.512 1.0004210
## beta1[7]      2.3014273 5448.512 1.0004210
## beta2[1]      0.0000000      NaN       NaN
## beta2[2]      0.8177100 4823.228 1.0002136
## beta2[3]      0.8177100 4823.228 1.0002136
## beta2[4]      0.8177100 4823.228 1.0002136
```

```
## beta2[5]      0.8177100 4823.228 1.0002136
## beta2[6]      0.8177100 4823.228 1.0002136
## beta2[7]      0.8177100 4823.228 1.0002136
```

```
## Warning: Removed 312 rows containing non-finite values (stat_summary).
```

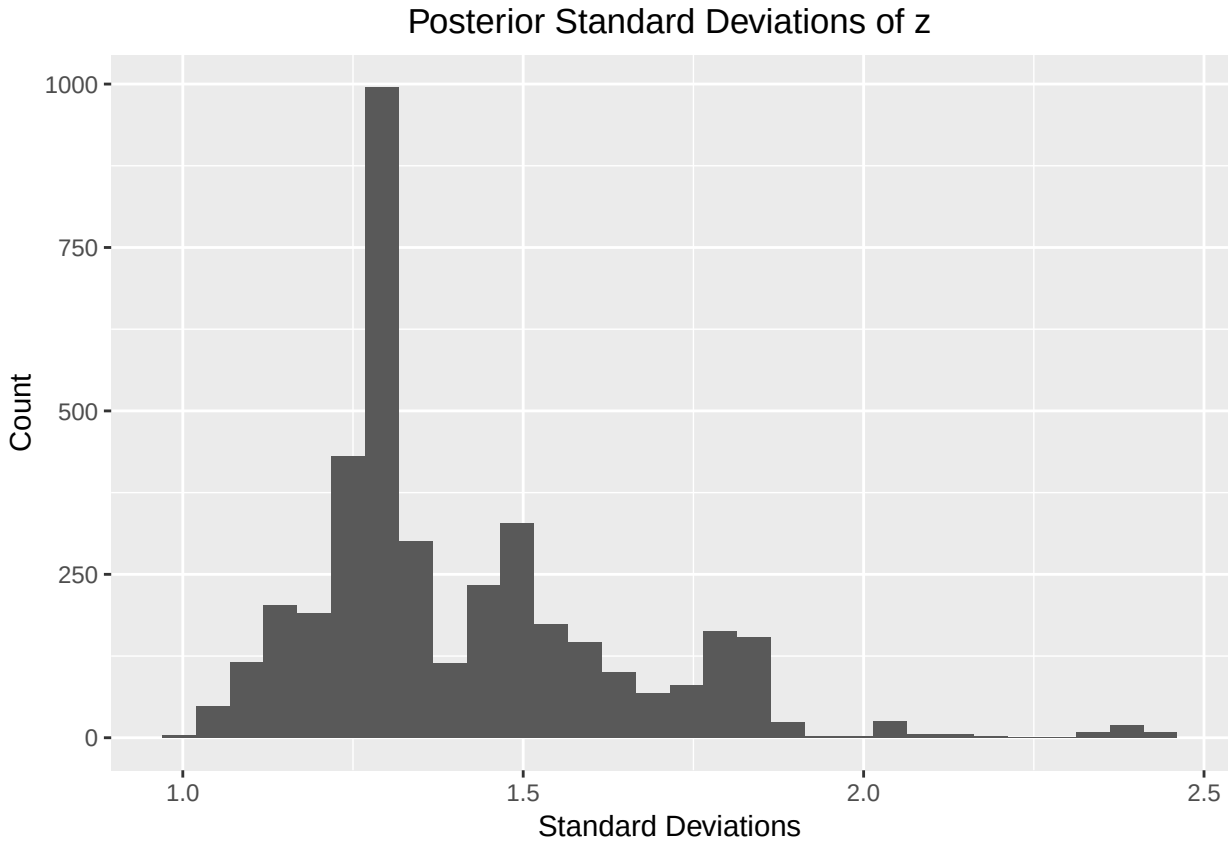


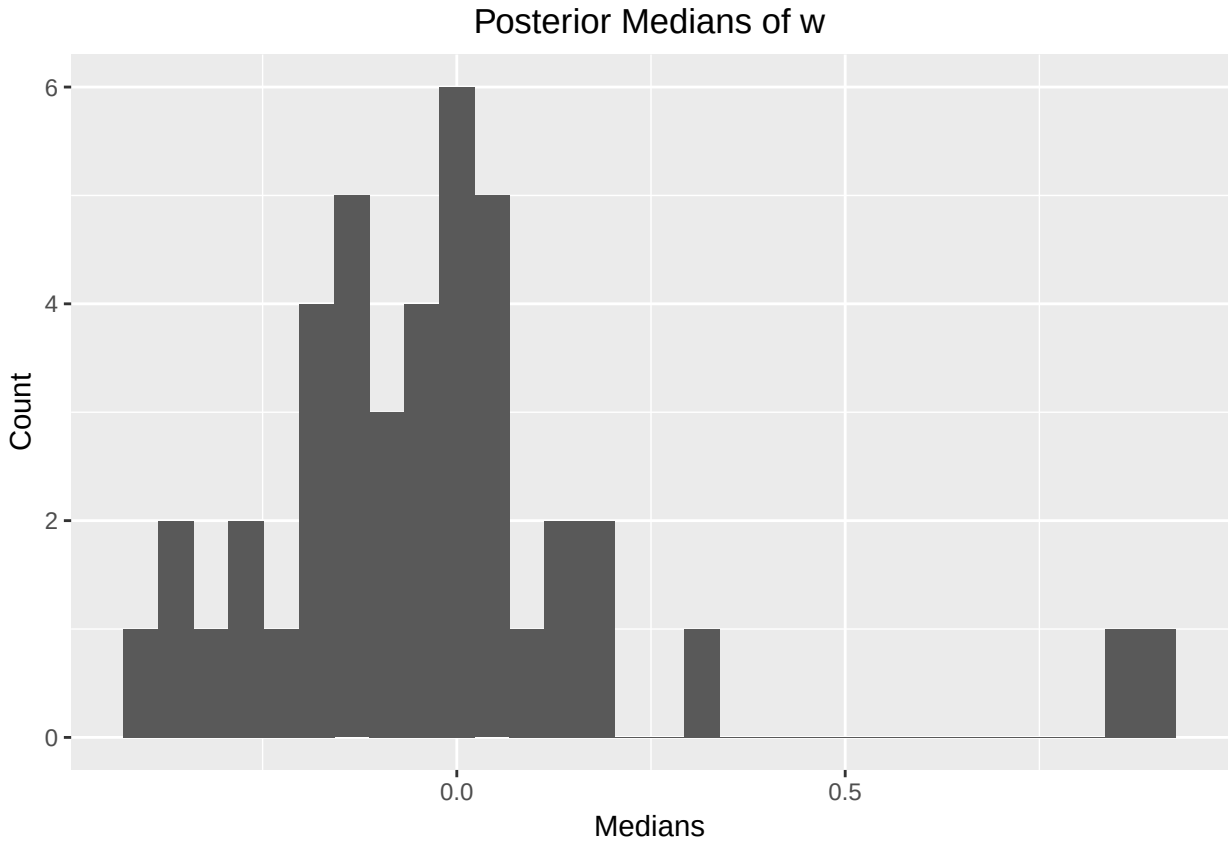

beta0[1]
beta0[2]
beta0[3]
beta0[4]
beta0[5]
beta0[6]
beta0[7]
beta1[1]
beta1[2]
beta1[3]
beta1[4]
beta1[5]
beta1[6]
beta1[7]
beta2[1]
beta2[2]
beta2[3]
beta2[4]
beta2[5]
beta2[6]
beta2[7]
chain
1
2
3
4


Posterior Medians of z
Count
Medians
600
400
200
0
−0.25
0.00
0.25
0.50

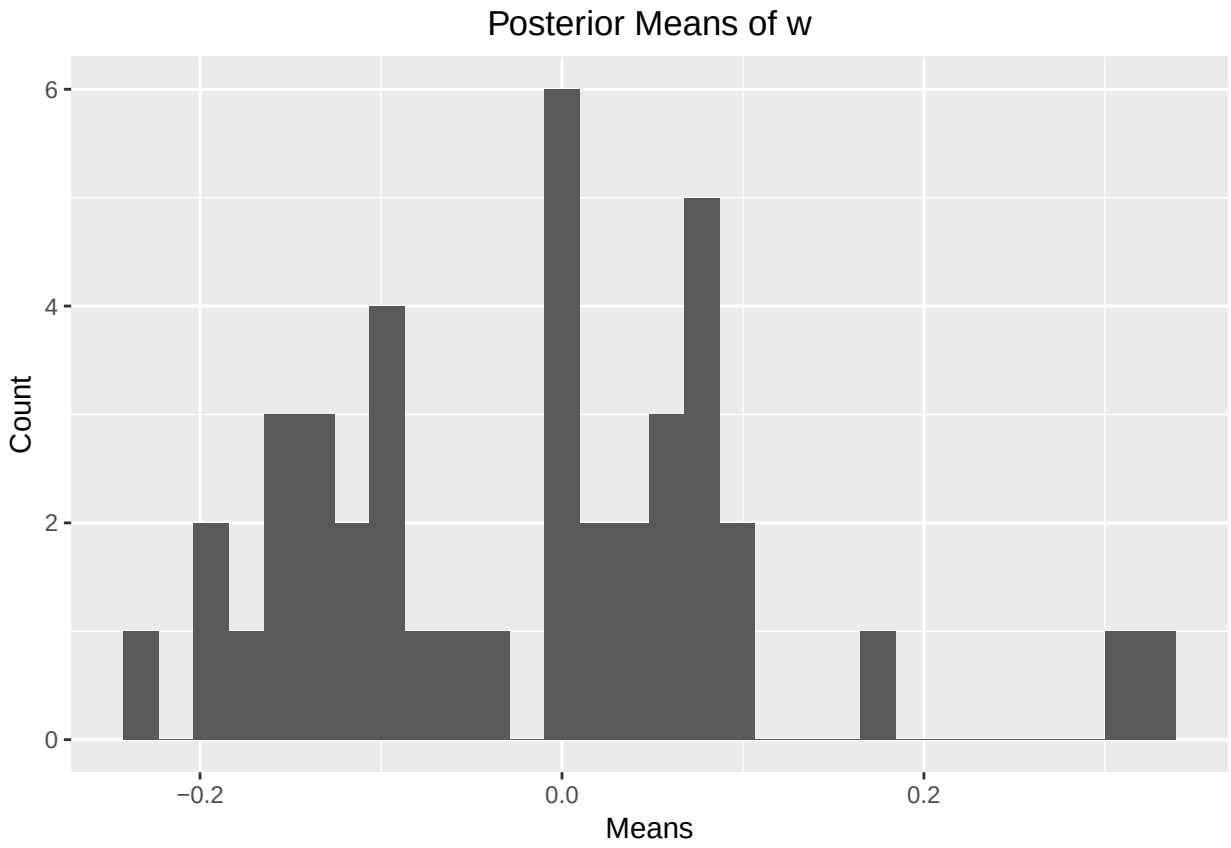
```
## [1] "        "
```

```
## [1] "      "
```

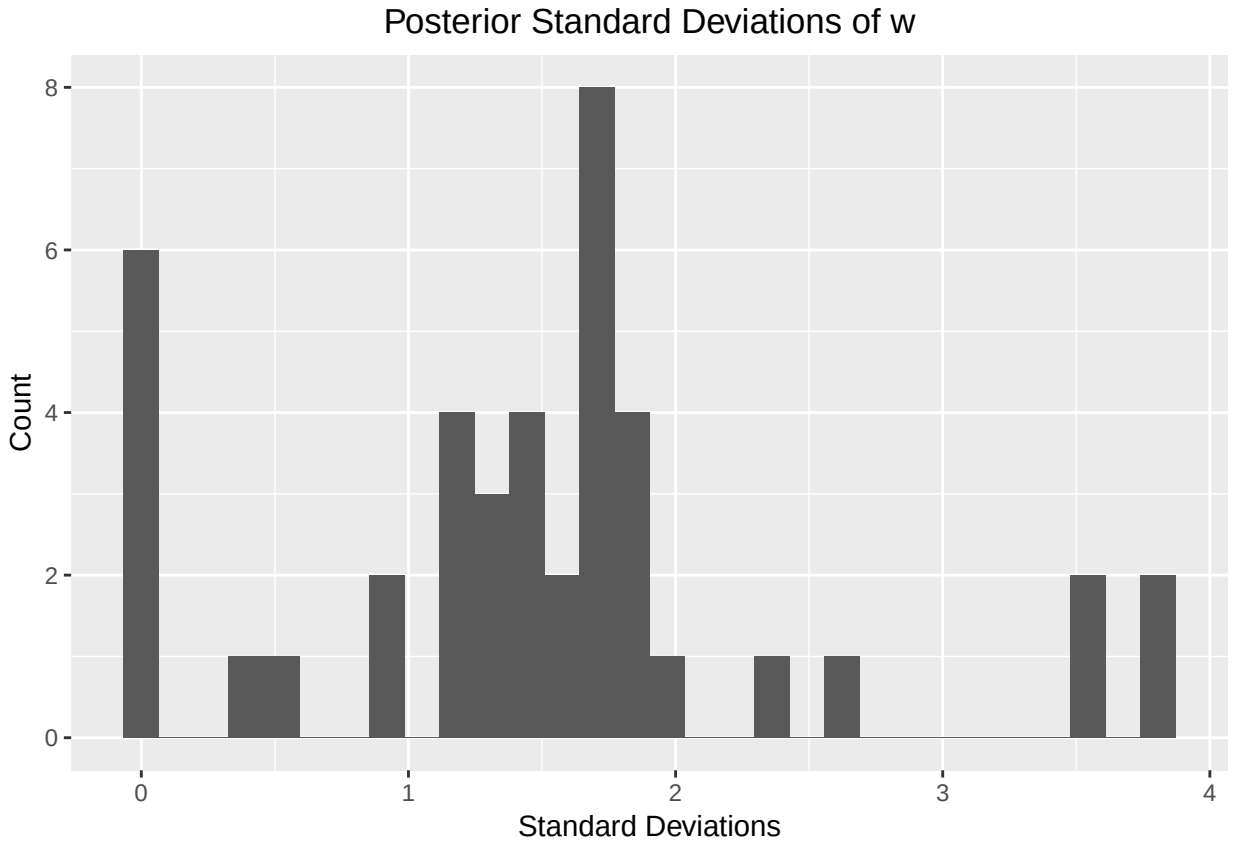

Posterior Standard Deviations of z
Count
1000
750
500
250
0
1.0
1.5
2.0
2.5
Standard Deviations

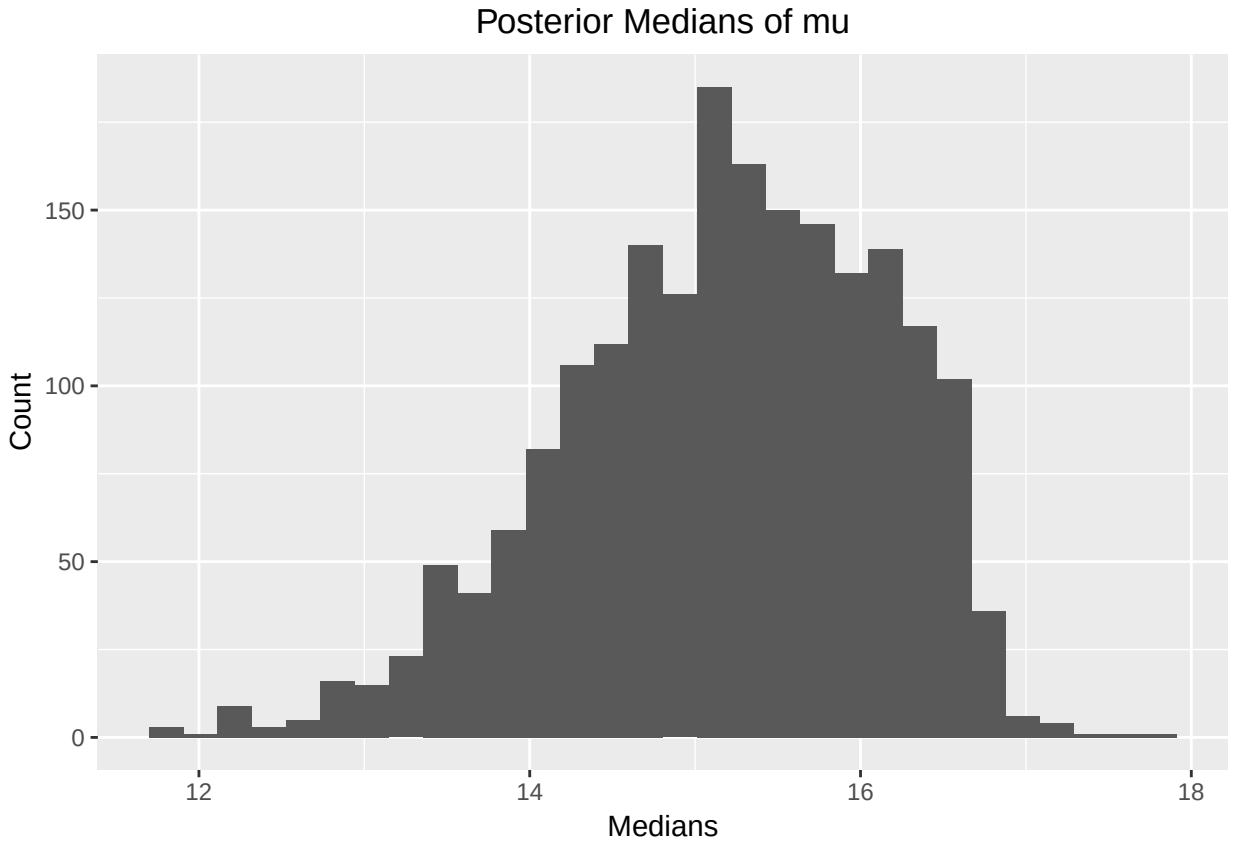

Posterior Medians of w
Count
6
4
2
0
0.0
0.5
Medians

```
## [1] "       "
```

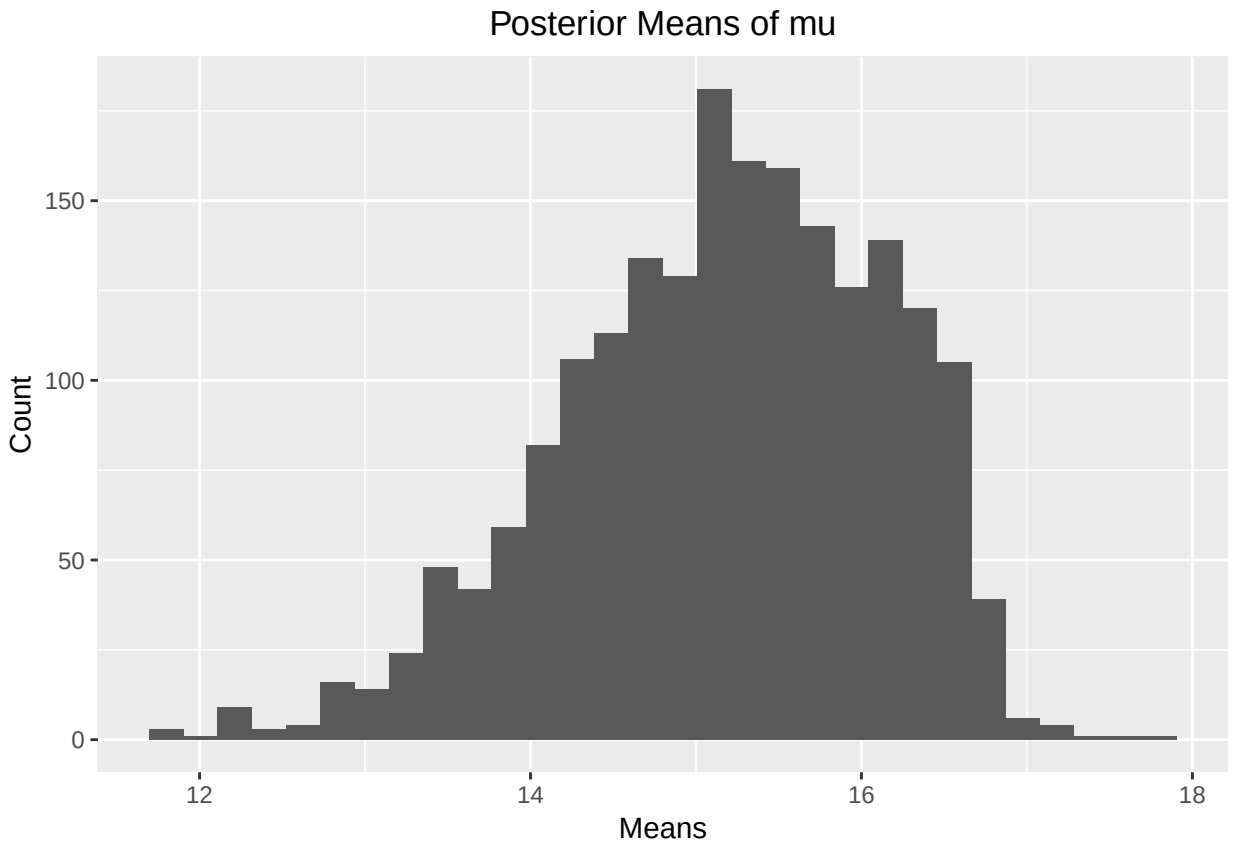



```
## [1] "       "
```

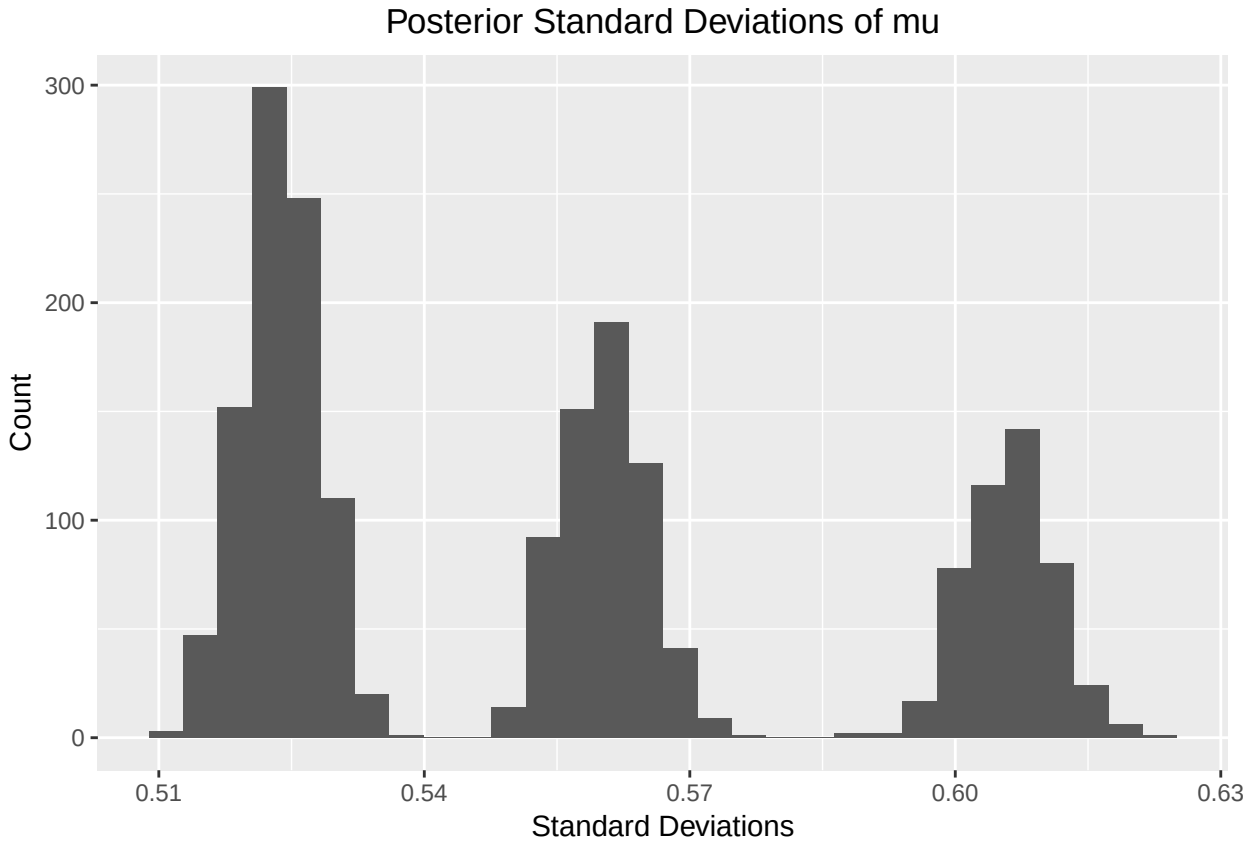

Posterior Standard Deviations of w
Count
8
6
4
2
0
0
1
2
3
4
Standard Deviations

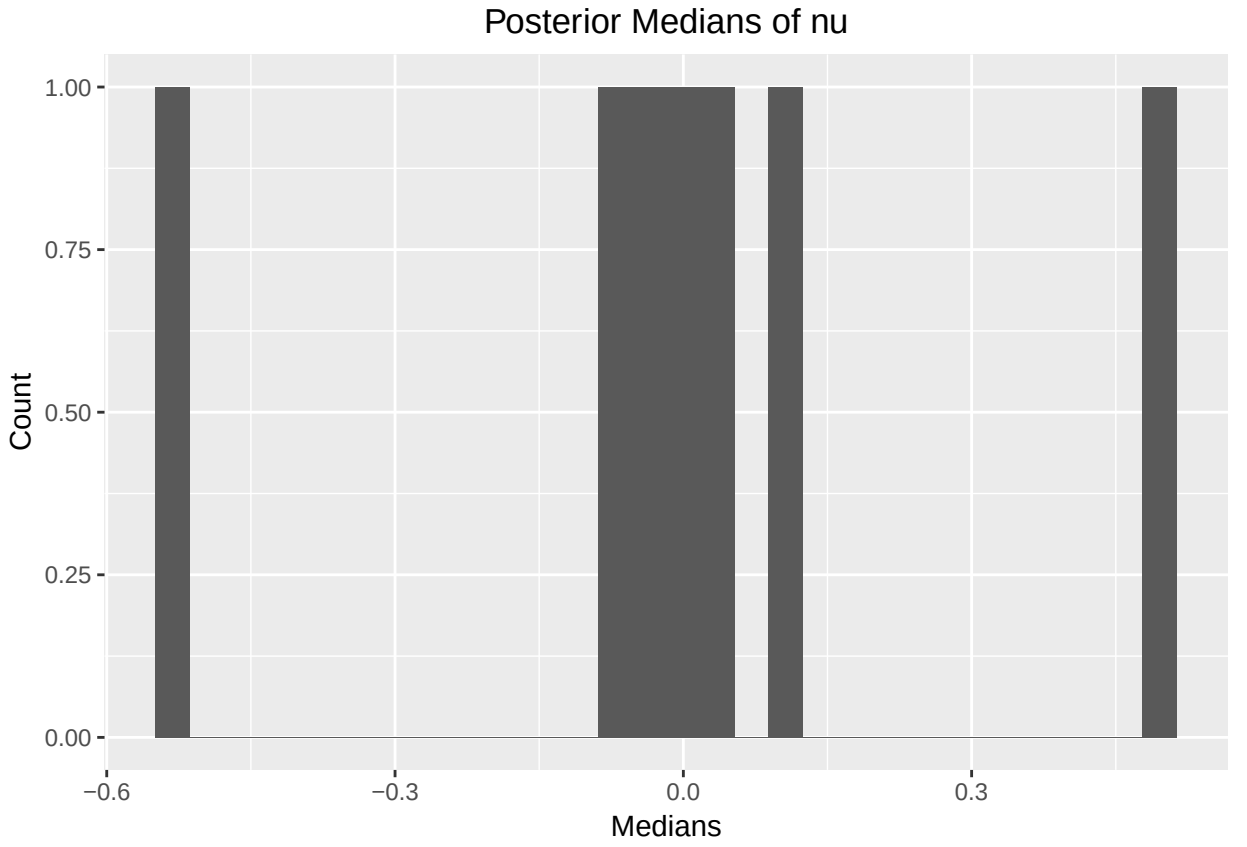

Posterior Medians of mu
Count
150
100
50
0
12
14
16
18
Medians

```
## [1] "       "
```

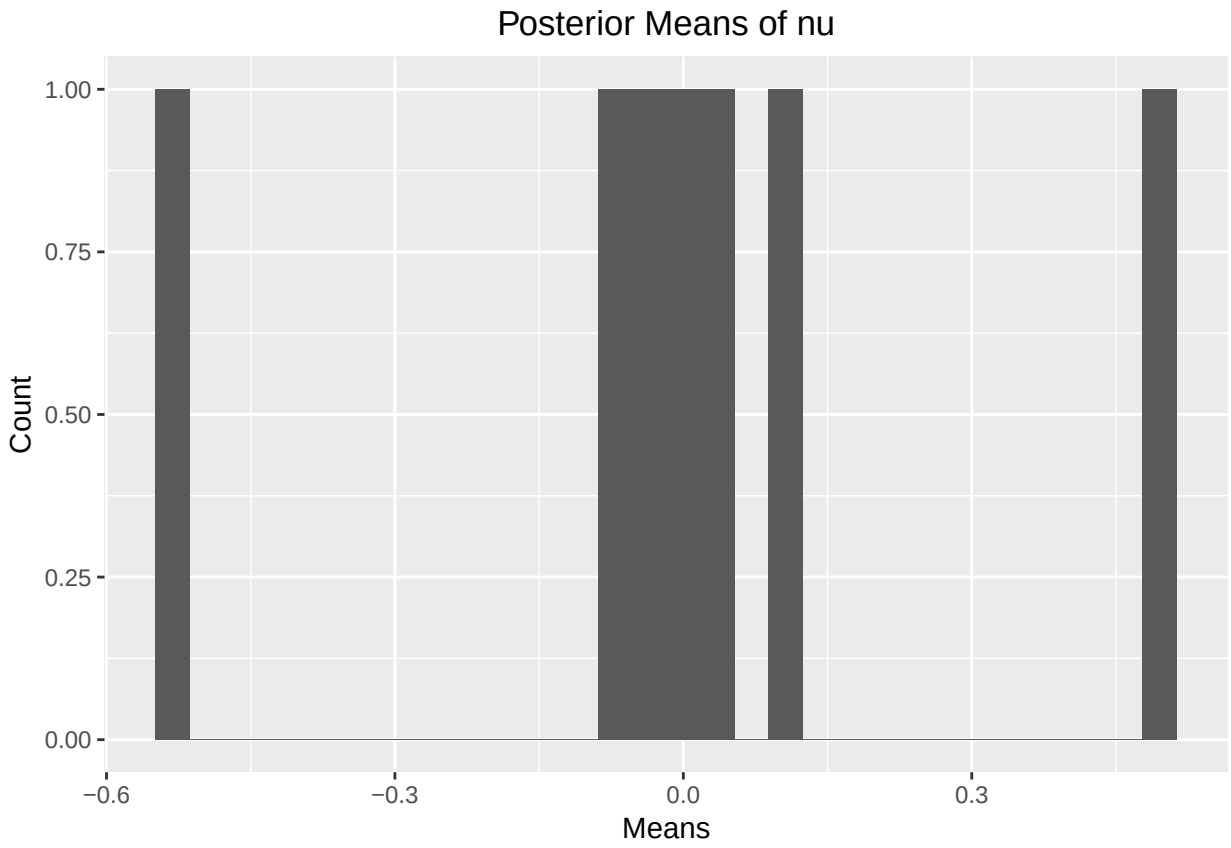



```
## [1] "       "
```

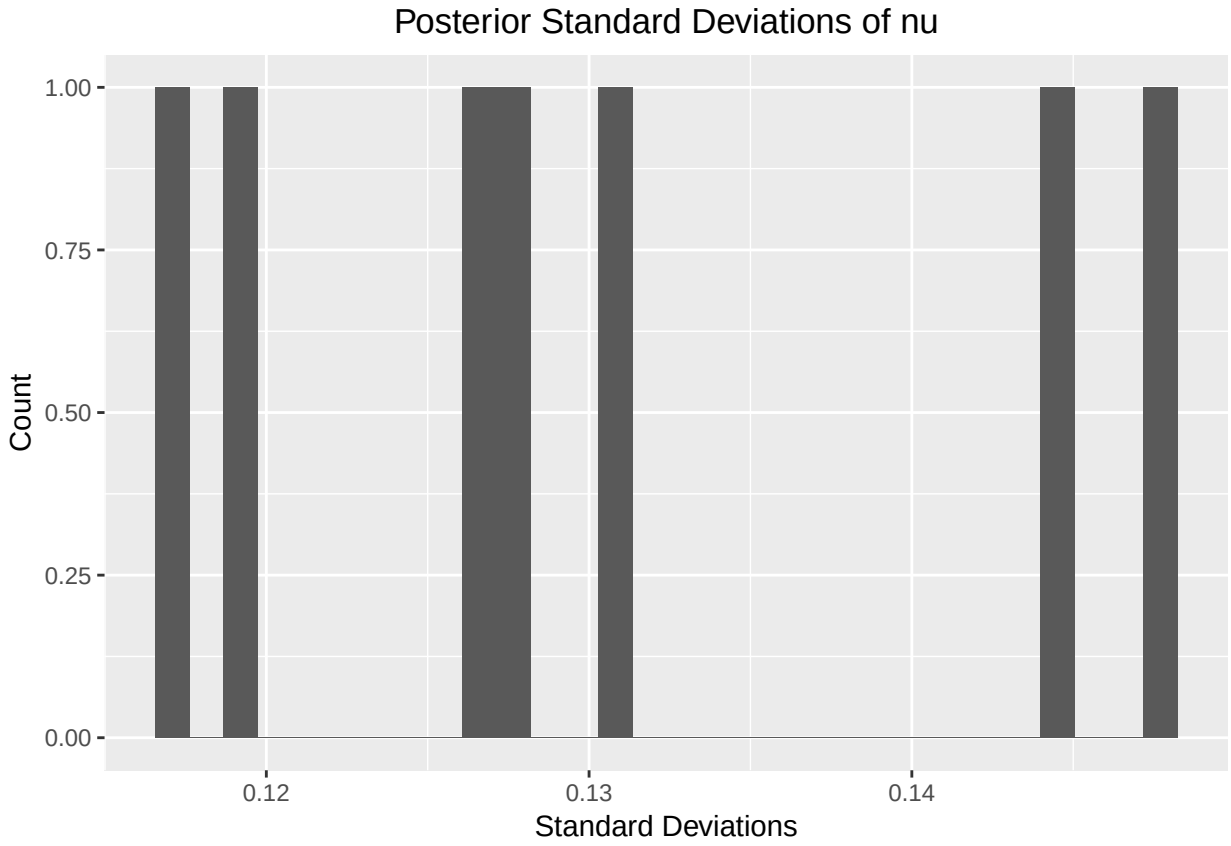

Posterior Standard Deviations of mu
300
200
100
0
Count
0.51
0.54
0.57
0.60
0.63
Standard Deviations

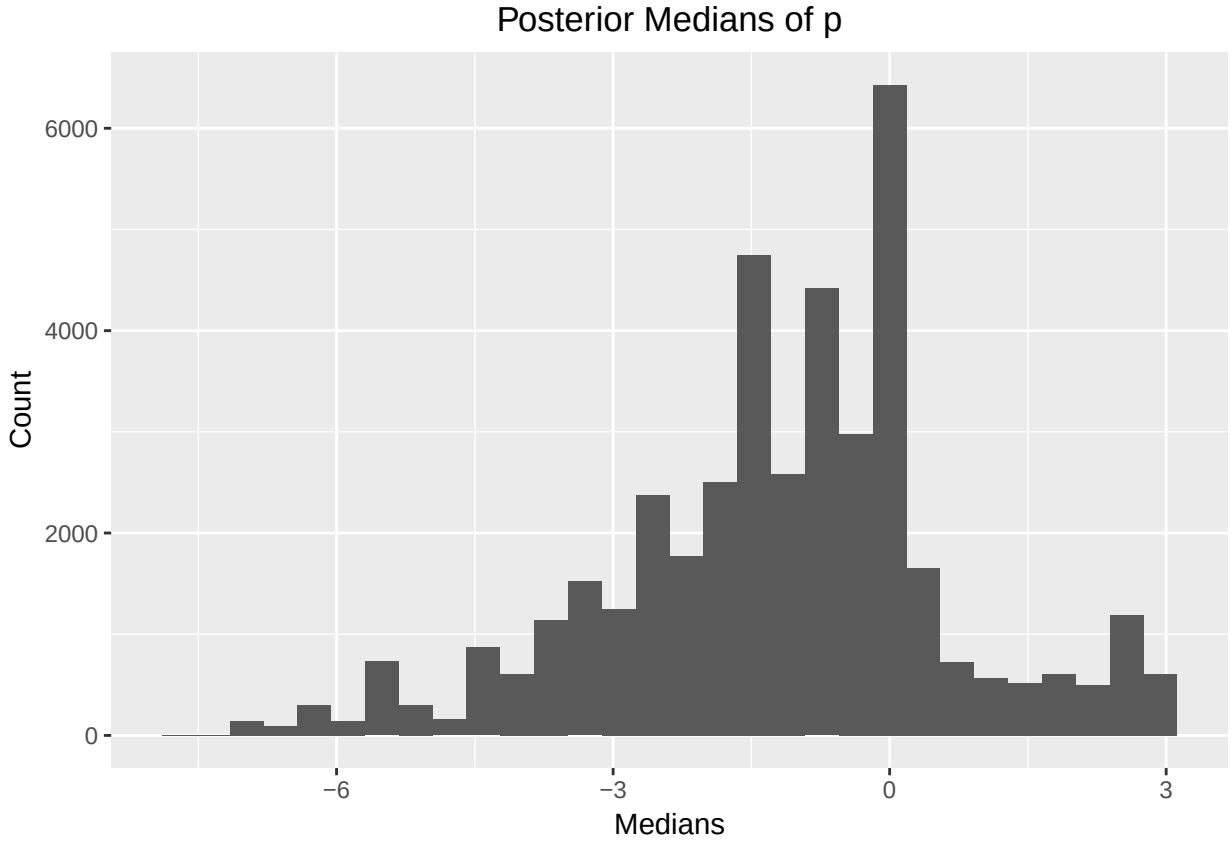

Posterior Medians of nu
1.00
0.75
0.50
0.25
0.00
Count
−0.6
−0.3
0.0
0.3
Medians

```
## [1] "       "
```

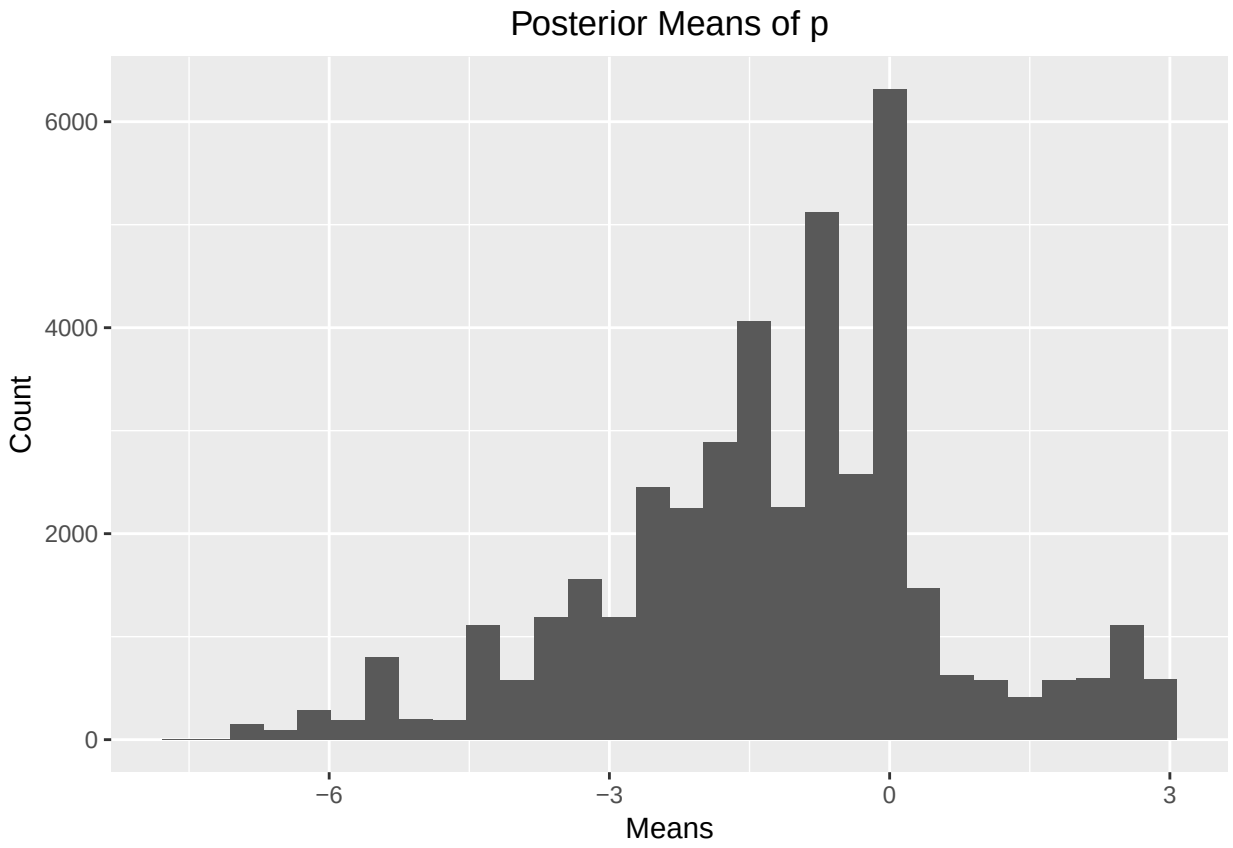

Posterior Means of nu
1.00
0.75
0.50
0.25
0.00
Count
−0.6
−0.3
0.0
0.3
Means

```
## [1] "       "
```

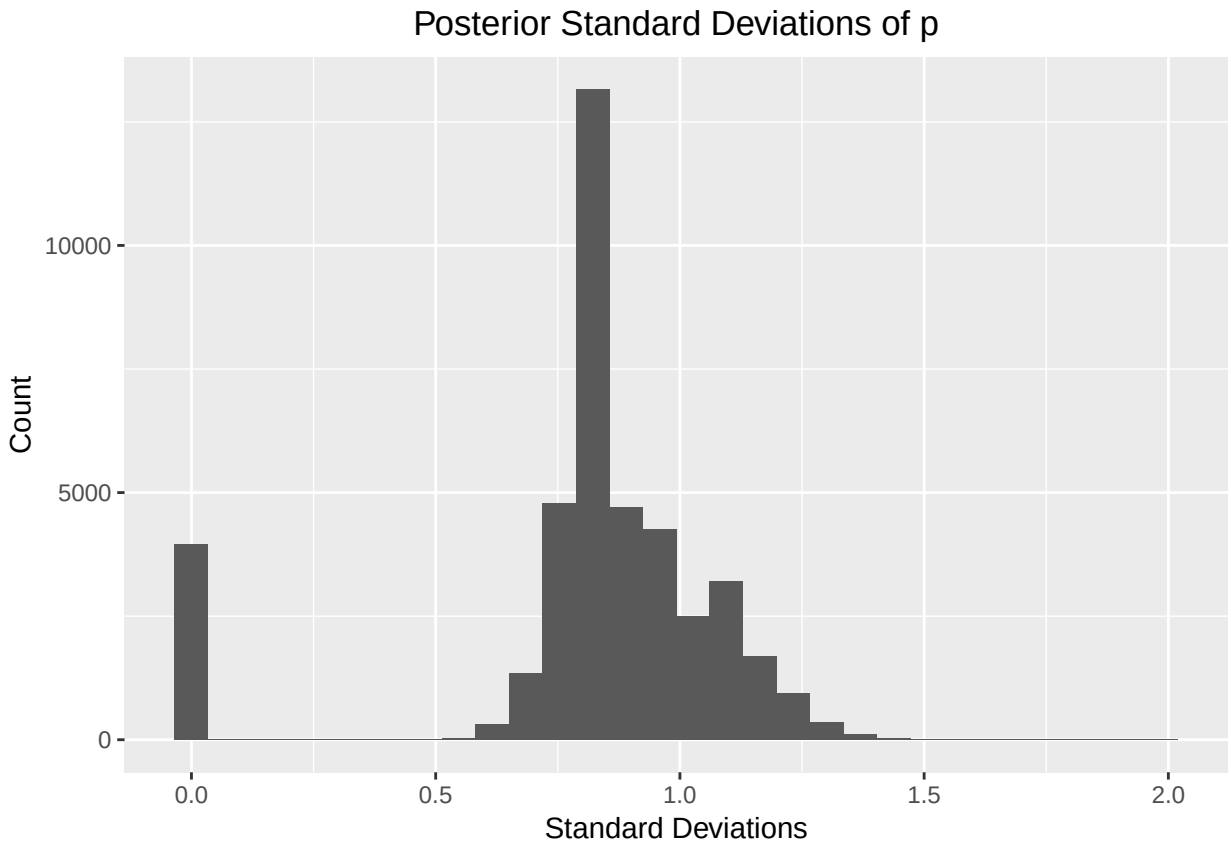

Posterior Standard Deviations of nu
1.00
0.75
0.50
0.25
0.00
Count
0.12
0.13
0.14
Standard Deviations


Posterior Medians of p
6000
4000
2000
0
Count
−6
−3
0
3
Medians

```
## [1] "       "
```




```
## [1] "       "
```



Histograms for β values and w, and z posterior means across chains.