

# Gibbs Sampling with Data Augmentation for Bayesian Analysis of Binary and Polychotomous Response Data

STAT 230 Final Report

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## 1 Abstract

Here's the abstract.

## 2 Introduction

We cite Albert and Chib (1993)

Here's the introduction.

## 3 Methodology

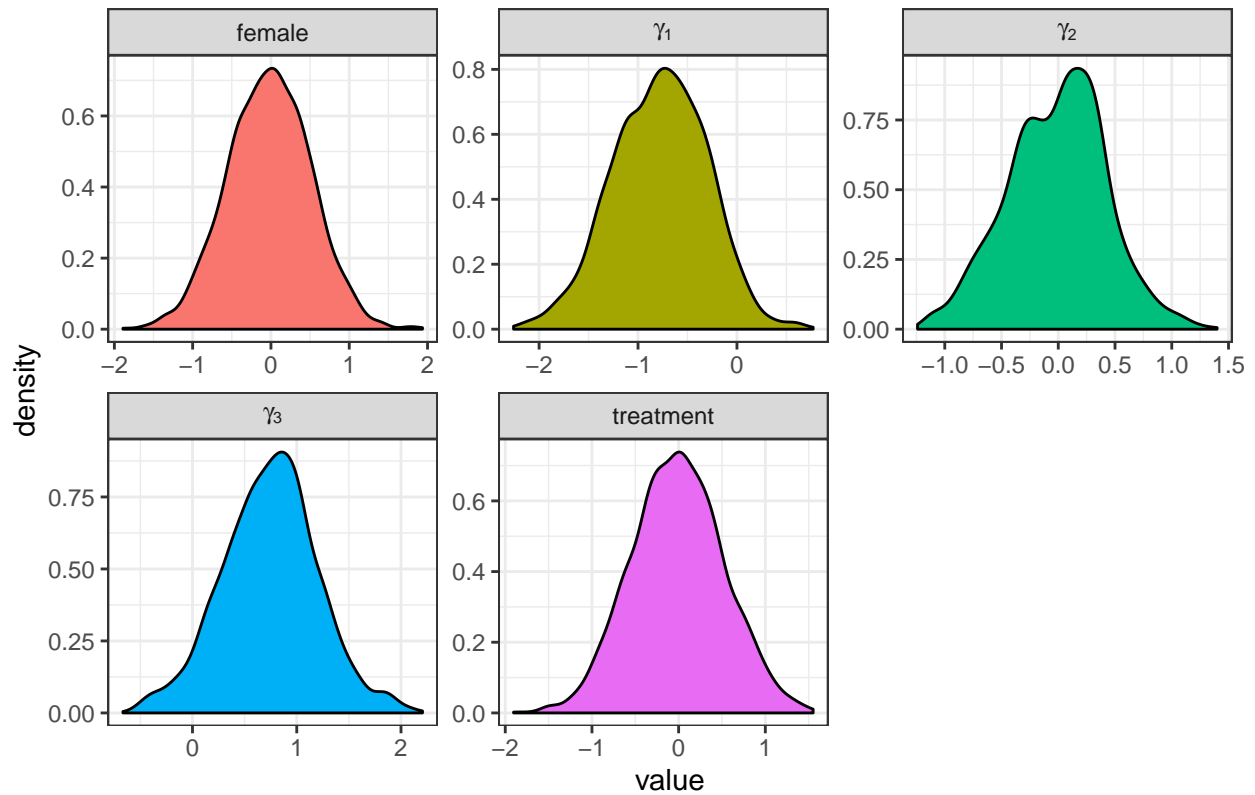
Here's the methodology.

## 4 Results

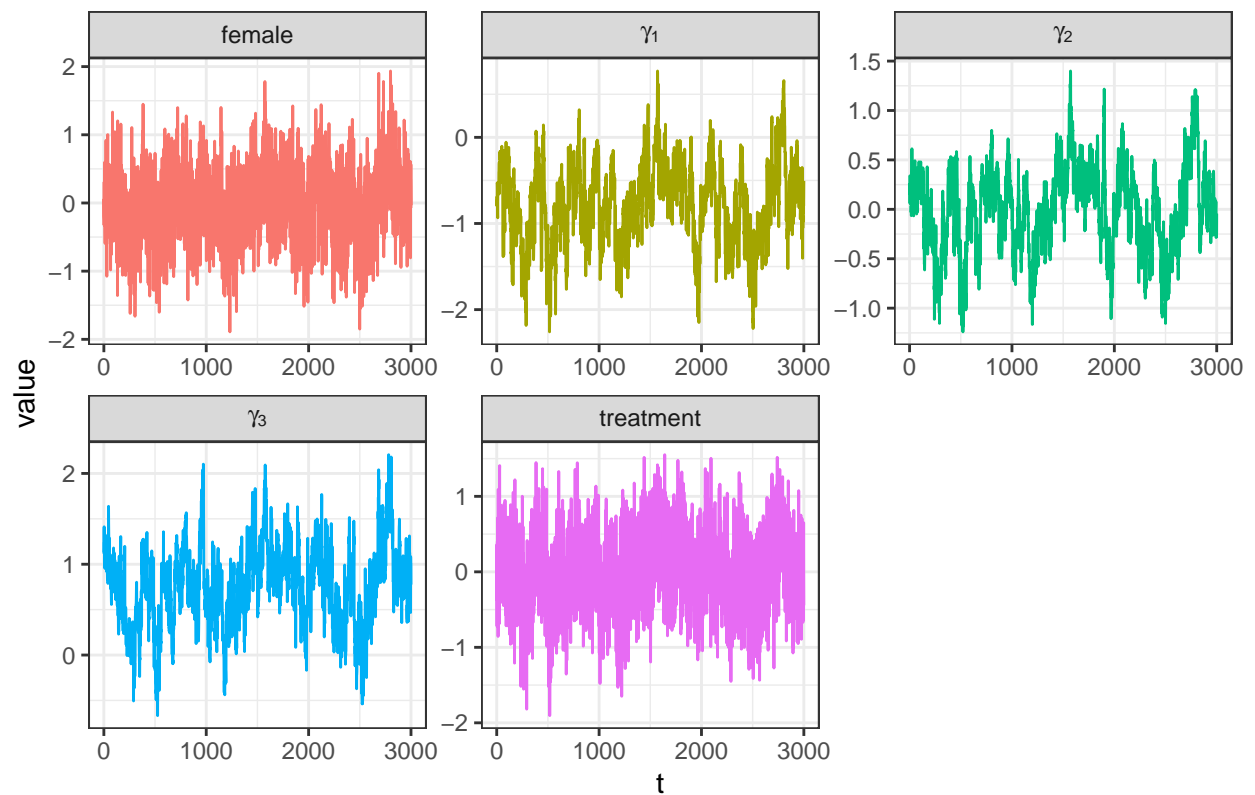
For three datasets, we apply the appropriate previously discussed model as well as standard maximum likelihood estimation and custom models written in Stan (Carpenter et al. 2017) and implemented in the RStan package (Stan Development Team 2019).

Here's the results.

#### 4.1 Small-cell Carcinoma Posterior Distributions



#### Trace Plot



```
## # A tibble: 5 x 5
##   female treatment `gamma[1]` `gamma[2]` `gamma[3]`
##   <dbl>      <dbl>      <dbl>      <dbl>      <dbl>
## 1 -0.0219  -0.0116      -0.778    -0.0115     0.745
## 2  0.532    0.530        0.476     0.434     0.457
## 3 -1.05     -1.04       -1.74     -0.890    -0.188
## 4 -0.0152  -0.0104     -0.765     0.0244     0.759
## 5  1.01      1.04        0.105     0.841     1.67
```

## 5 Discussion

Here's the discussion.

## 6 References

Albert, James H., and Siddhartha Chib. 1993. “Bayesian Analysis of Binary and Polychotomous Response Data.” *Journal of the American Statistical Association* 88 (422). Taylor & Francis: 669–79. <https://doi.org/10.1080/01621459.1993.10476321>.

Carpenter, Bob, Andrew Gelman, Matthew Hoffman, Daniel Lee, Ben Goodrich, Michael Betancourt, Marcus Brubaker, Jiqiang Guo, Peter Li, and Allen Riddell. 2017. “Stan: A Probabilistic Programming Language.” *Journal of Statistical Software, Articles* 76 (1): 1–32. <https://doi.org/10.18637/jss.v076.i01>.

Stan Development Team. 2019. “RStan: The R Interface to Stan.” <http://mc-stan.org/>.

## 7 Appendix