Hierarchical model for bicycle traffic across several streets

Hierarchical model for bicycle traffic

This notebook explores an example from Gelman et al.'s *Bayesian Data Analysis*, 3rd ed. This example appears across several exercises. The data come from a study of bicycle traffic on several streets in Berkeley, CA. Each street was observed for a fixed amount of time and the number of bicycles and other vehicles that passed by the checkpoint recorded. The task is to estimate the proportion of traffic that is made up of bicycles. In this notebook, we investigate only a small portion of the data, corresponding to streets that are classified as low-traffic neighborhood streets, and which have bike lanes. An extended analysis might investigate

```
# Setup
library(tibble)
library(dplyr)
library(ggplot2)
library(cmdstanr)

set_cmdstan_path('/opt/cmdstan/')
# Data from Table 3.3 in BDA
bicycles <- c(16,9,10,13,19,20,18,17,35,55)
others <- c(58,90,48,57,103,57,86,112,273,64)

data <- tibble(
  bicycles = bicycles,
  others = others,
  total = bicycles + others
)
data
```

```
## # A tibble: 10 x 3
##    bicycles others total
##       <dbl>  <dbl> <dbl>
##  1       16     58    74
##  2        9     90    99
##  3       10     48    58
##  4       13     57    70
##  5       19    103   122
##  6       20     57    77
##  7       18     86   104
##  8       17    112   129
##  9       35    273   308
## 10       55     64   119
```