Brief Analysis of Tagu's 2025 Data

A Clarke

First, we need to get set up:

```r
library(tidyverse)
library(cmdstanr)
library(patchwork)

source("../../functions/import_data.R")
source("../../functions/post_functions.R")
source("../../functions/plot_model.R")

knitr::opts_chunk$set(echo = TRUE,
                      dev = "ragg_png",
                      dpi = 400)
```

Import

Loading Data

```r
d <- import_data("tagu2025")

summary(d$found)
```

```
   condition         trial              person      targ_type
 negative:28800   Min.   :   1.0   Min.   : 1   Length:86400
 neutral :28800   1st Qu.: 900.8   1st Qu.:19   Class :character
 positive:28800   Median :1800.5   Median :38   Mode  :character
                  Mean   :1800.5   Mean   :38
                  3rd Qu.:2700.2   3rd Qu.:57
                  Max.   :3600.0   Max.   :75
```

```
       id              x                y                found
 Min.   : 1.00   Min.   :0.0000   Min.   :0.0000   Min.   : 1.00
 1st Qu.: 6.75   1st Qu.:0.1831   1st Qu.:0.1368   1st Qu.: 6.75
 Median :12.50   Median :0.4554   Median :0.3410   Median :12.50
 Mean   :12.50   Mean   :0.4997   Mean   :0.3077   Mean   :12.50
 3rd Qu.:18.25   3rd Qu.:0.7277   3rd Qu.:0.4785   3rd Qu.:18.25
 Max.   :24.00   Max.   :1.0000   Max.   :0.6153   Max.   :24.00
   item_class      trial_p
 Min.   :1.0   Min.   : 1.00
 1st Qu.:1.0   1st Qu.: 4.75
 Median :1.5   Median : 8.50
 Mean   :1.5   Mean   : 8.50
 3rd Qu.:2.0   3rd Qu.:12.25
 Max.   :2.0   Max.   :16.00
```

```
  summary(d$stim)
```

```
    person         condition          trial             id
 Min.   : 1   negative:28800   Min.   :   1.0   Min.   : 1.00
 1st Qu.:19   neutral :28800   1st Qu.: 900.8   1st Qu.: 6.75
 Median :38   positive:28800   Median :1800.5   Median :12.50
 Mean   :38                    Mean   :1800.5   Mean   :12.50
 3rd Qu.:57                    3rd Qu.:2700.2   3rd Qu.:18.25
 Max.   :75                    Max.   :3600.0   Max.   :24.00
       x                y             item_class      trial_p
 Min.   :0.0000   Min.   :0.0000   Min.   :1.0   Min.   : 1.00
 1st Qu.:0.1831   1st Qu.:0.1368   1st Qu.:1.0   1st Qu.: 4.75
 Median :0.4554   Median :0.3410   Median :1.5   Median : 8.50
 Mean   :0.4997   Mean   :0.3077   Mean   :1.5   Mean   : 8.50
 3rd Qu.:0.7277   3rd Qu.:0.4785   3rd Qu.:2.0   3rd Qu.:12.25
 Max.   :1.0000   Max.   :0.6153   Max.   :2.0   Max.   :16.00
```

Loading Model

The model was previously run and saved

```
  m <- readRDS("../1_fit_models/scratch/models/tagu2025all1_0.model")
```

```
  m$summary()
```

```
# A tibble: 262,073 x 10
   variable       mean   median      sd     mad      q5      q95  rhat ess_bulk
   <chr>         <dbl>    <dbl>   <dbl>   <dbl>   <dbl>    <dbl> <dbl>    <dbl>
 1 lp__       -8.15e+4 -8.15e+4 44.0     0      -8.15e+4 -8.14e+4 1.01     117.
 2 b_a[1]     -8.20e-2 -8.34e-2  0.0283 0.0302 -1.27e-1 -3.68e-2 1.02     383.
 3 b_a[2]      1.43e-1  1.43e-1  0.0200 0.0200  1.1 e-1  1.75e-1 1.01     356.
 4 b_a[3]      6.63e-2  6.50e-2  0.0329 0.0328  1.48e-2  1.22e-1 1.01     399.
 5 b_stick[1]  6.74e-1  6.74e-1  0.0459 0.0445  5.96e-1  7.49e-1 1.00     417.
 6 b_stick[2]  4.52e-1  4.50e-1  0.0292 0.0274  4.09e-1  5.02e-1 1.01     310.
 7 b_stick[3]  4.46e-1  4.47e-1  0.0322 0.0311  3.90e-1  5.01e-1 1.00     430.
 8 rho_delta[~ 1.91e+1  1.91e+1  0.415  0.445   1.85e+1  1.98e+1 1.00     415.
 9 rho_delta[~ 2.32e+1  2.32e+1  0.393  0.445   2.26e+1  2.38e+1 1.00     415.
10 rho_delta[~ 2.21e+1  2.21e+1  0.425  0.445   2.14e+1  2.28e+1 0.999    393.
# i 262,063 more rows
# i 1 more variable: ess_tail <dbl>
```
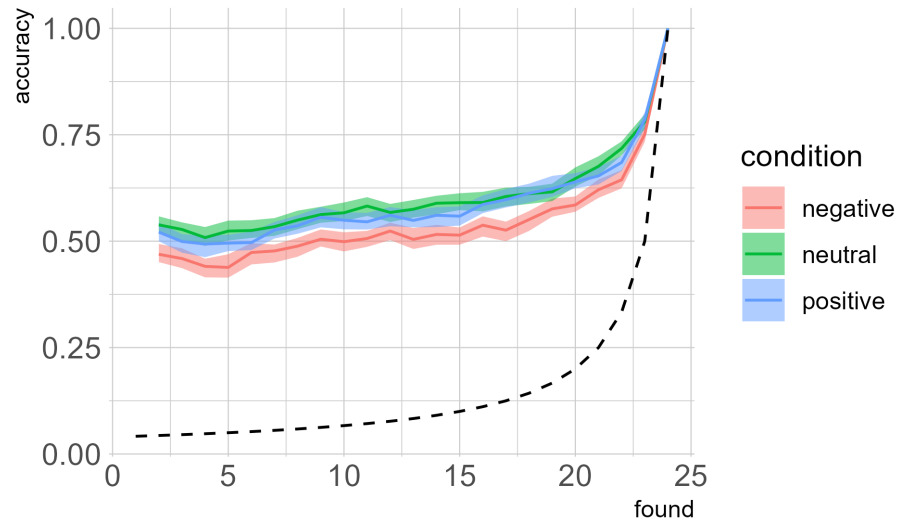
Now extract posterior samples and predictions.

```
pred <- extract_pred(m, d)
post <- extract_post(m, d)
```

Accuracy

```
acc <- summarise_acc(pred)
plot_model_accuracy(acc)
```

Looks like the model does a pretty good job of predicting which item will be selected next in all three conditions.