HW 8

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Research Question

Is there difference in infant attention, as measured by signal-to-noise ratio, to different affective expressions?

Variables

- `id`/`record_id`: Participant ID number
- `variable`: affect condition with the following options: Neutral, Happy, Angry, Fear
- `value`: SNR, measure of attention

Data Import

```
snr <- read_excel(here("data_files", "ssVEP_Bayes.xlsx"))
```

Variable Summary

Table Table 1 shows the summary statistics of evaluation ratings by groups.

Table 1: Descriptive statistics by groups

		Neutral	Happy	Angry	Fear
value	N	96	96	96	96
	Mean	1.65	1.83	1.72	1.60
	SD	0.57	0.65	0.63	0.44
	Min	0.82	0.72	0.82	0.93
	Max	4.36	3.41	3.87	3.38
	Histogram				

Model

Model:

$$Value_{variable,id} \sim N(\mu_{variable,id}, \sigma)$$
$$\mu_{variable,id} \sim N(\gamma_{variable}, \tau)$$

Prior:

$$\gamma \sim 0$$
$$\sigma \sim t^+(3, 0, 2.5)$$
$$\tau \sim t^+(3, 0, 2.5)$$

Analysis

We used 4 chains, each with 4,000 iterations (first 2,000 as warm-ups).

Results

As shown in the trace plots in Figure 1 below, the chains mixed well.

Table 2 shows the posterior distributions.

The analysis showed that on average, infants paid the most attention to fearful faces compared to all other faces with a posterior mean of 1.81 and a 90% CI of [1.72, 1.91]. Infants also paid more attention to happy faces than to neutral faces with a posterior mean of 1.71 and a 90% CI of [1.61, 'r round(mod_draws$q95[3], 2).
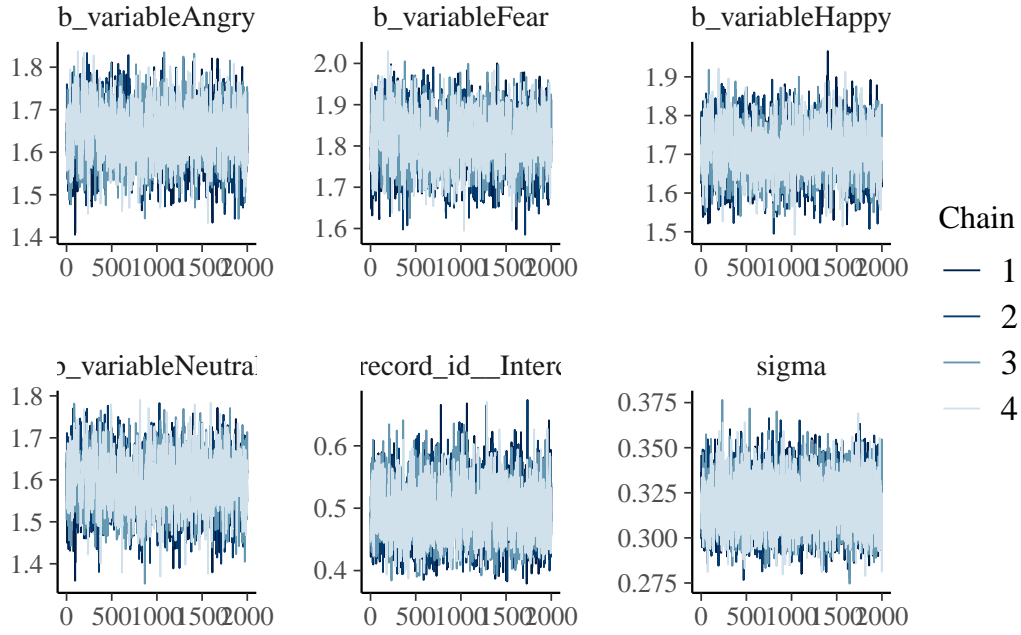
Figure 1: Trace plot of the posterior distributions of model parameters.

Table 2: Posterior summary of the model parameters.

```
# A tibble: 6 x 10
  variable          mean median     sd    mad    q5   q95  rhat ess_bulk ess_tail
  <chr>            <dbl>  <dbl>  <dbl>  <dbl> <dbl> <dbl> <dbl>    <dbl>    <dbl>
1 b_variableAngry   1.64   1.64 0.0597 0.0584  1.54  1.74  1.00    1626.    2775.
2 b_variableFear    1.81   1.81 0.0603 0.0596  1.72  1.91  1.00    1573.    2827.
3 b_variableHappy   1.71   1.71 0.0602 0.0587  1.61  1.81  1.00    1620.    3020.
4 b_variableNeut~   1.59   1.59 0.0602 0.0599  1.49  1.69  1.00    1629.    2927.
5 sd_record_id__~  0.493  0.490 0.0411 0.0405 0.430 0.564  1.00    1724.    3175.
6 sigma            0.319  0.318 0.0134 0.0136 0.297 0.342  1.00    8243.    6429.
```