Experiment 1 (forced-choice task)

R code to reproduce the analysis of Experiment 1 reported in the manuscript *"Does case marking affect agreement attraction in comprehension?"*.

Participants

Participant exclusion. In total 189 participants were recruited, but data from 14 participants were excluded, resulting in 175 participants whose data were included in the analysis.

- Five participants missed the response deadline (i.e., timeout in all trials)
- Four participants reported bad vision
- Three participants reported a speech impairment
- One participant did not have Armenian as his/her L1
- One participant had filler accuracy below 70%

Demographic data. Below is the summary of demographic data after 14 participants were excluded. "Hand" stands for "Handedness", "Impairment" stands for "Language Impairment". As to the "Keypress", 89 participants pressed the "F" key to choose a singular verb form and the "J" key to choose a plural verb form, whereas 86 participants used the reverse key configuration.

Table 1: Summary of participants' demographic characteristics.

Age	Gender	Hand	Education	Impairment	Vision	Keypress
Min. :18.00	female:149	left : 11	higher :164	no :175	bad : 0	key_sg_f:89
1st Qu.:24.00	male : 26	right:164	secondary : 4	yes: 0	corrected: 56	key_sg_j:86
Median :28.00			vocational: 7		good :119	
Mean :28.77						
3rd Qu.:33.00						
Max. :40.00						

Contrast coding

Main effects and interaction

```
# Contrasts to evaluate the main effects of case, attractor number ('num'),
# and their interaction
##         a   b   c   d
#case    -1  -1   1   1   # case match is -1, mismatch is 1
#num     -1   1  -1   1   # singular attractor is -1, plural is 1
target$case<-ifelse(target$Type%in%c("a","b"),-1,1)
target$num<-ifelse(target$Type%in%c("a","c"),-1,1)
target$casexnum<-target$case*target$num
```

Nested comparisons

```
# Contrasts to evaluate the attractor number effects separately in case match
# (nominative attractor) and mismatch (accusative attractor) conditions
##          a   b   c   d
#case      -1  -1   1   1   # case match is -1, mismatch is 1
#attr_nom  -1   1   0   0   # singular attractor is -1, plural is 1
#attr_acc   0   0  -1   1
target$attr_nom<-ifelse(target$Type=="a",-1,ifelse(target$Type=="b",1,0))
target$attr_acc<-ifelse(target$Type=="c",-1,ifelse(target$Type=="d",1,0))
```

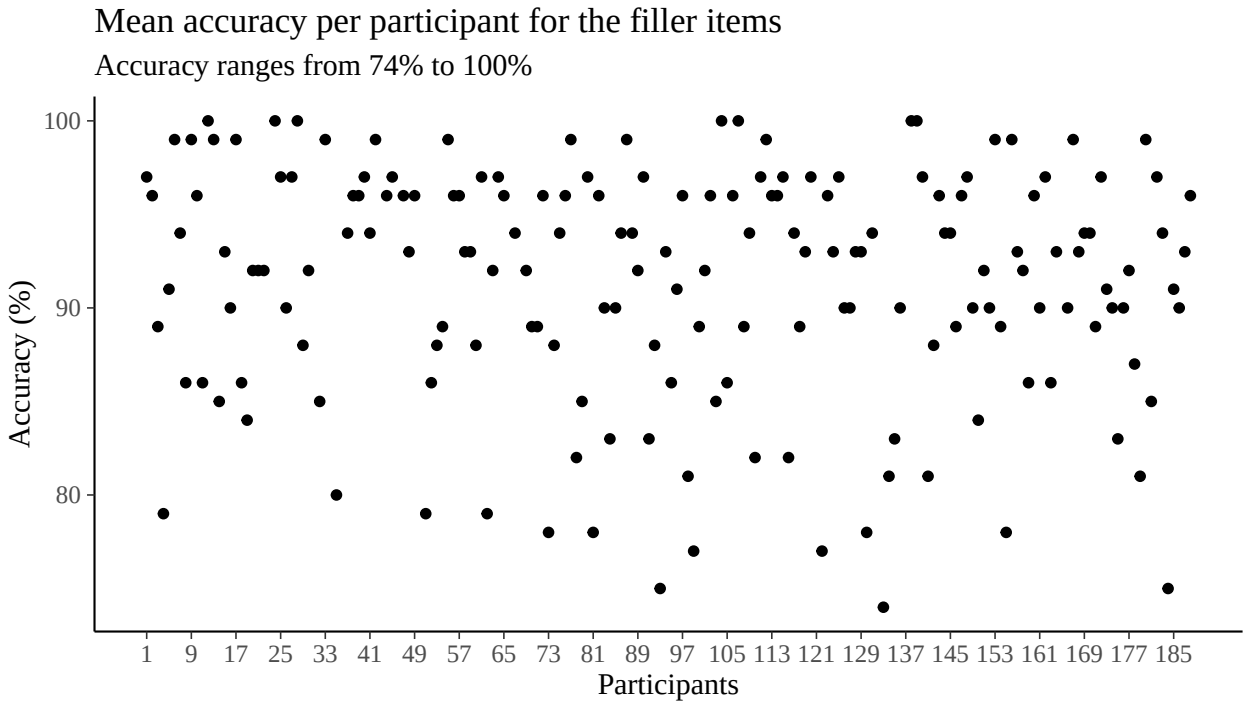
Filler accuracy

- Missed responses in the filler items constitute 1%.

```
## [1] 0.01039683
```

- Overall accuracy (%) for the filler items

```
##   fillerAccuracy fillerSE
## 1           91.4      0.3
```



Target accuracy

- Each condition has 2100 observations of which missed responses constitute:
  - a. case match, singular attractor - 20 NAs (0.95%)
  - b. case match, plural attractor - 33 NAs (1.57%)
  - c. case mismatch, singular attractor - 14 NAs (0.67%)
  - d. case mismatch, plural attractor - 27 NAs (1.29%)

- The NAs (missed responses) and the response times (RTs) below 200ms are excluded, resulting in the removal of 1.49% of the raw data.

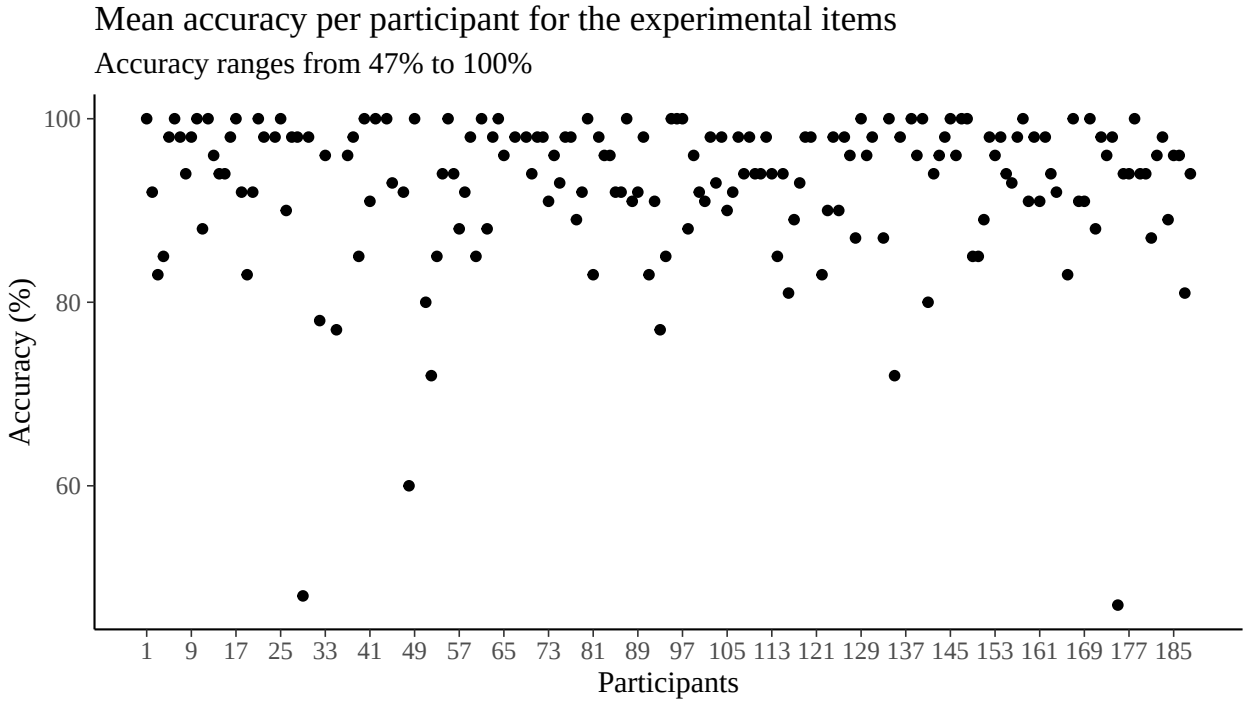
```
## [1] 0.01488095
```

- Overall accuracy (%) for the experimental items

```
##   trgAccuracy trgSE
## 1          93   0.3
```

Table 2: Mean accuracy per condition for the experimental items

	Condition	**Accuracy** [%]	**SE**
case match, singular attractor	a	97.1	0.4
case match, plural attractor	b	88.4	0.7
case mismatch, singular attractor	c	96.2	0.4
case mismatch, plural attractor	d	90.1	0.7



Response time data

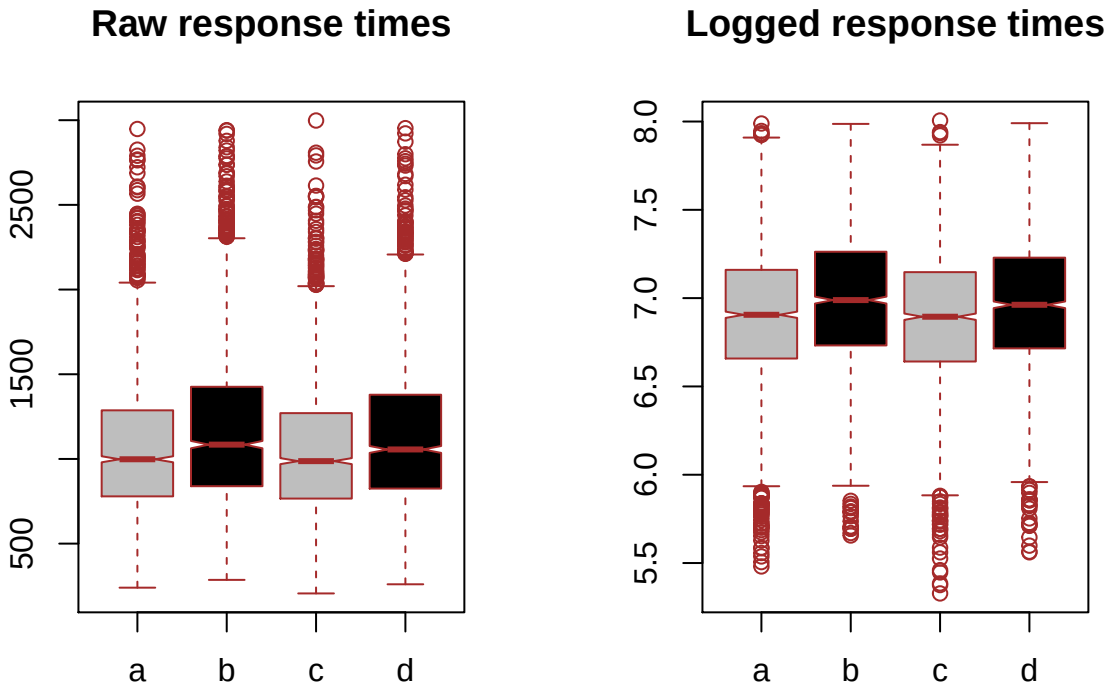


Table 3: Mean response time per condition. We have only considered the trials on which correct answers were provided.

	Condition	Mean RT [ms]	SE
case match, singular attractor	a	1064	9
case match, plural attractor	b	1175	11
case mismatch, singular attractor	c	1053	9
case mismatch, plural attractor	d	1136	10

Priors

```
# Priors for accuracy analysis involving main effects and interaction
priors_acc_two_way <- c(set_prior("normal(0,10)", class="Intercept"),
                set_prior("normal(0,1)", class="b", coef="case"),
                set_prior("normal(0,1)", class="b", coef="num"),
                set_prior("normal(0,1)", class="b", coef="casexnum"),
                set_prior("normal(0,1)", class="sd"),
                set_prior("lkj(2)", class="cor"))

# Priors for response time analysis involving main effects and interaction
priors_rt_two_way <- c(set_prior("normal(0,10)", class="Intercept"),
                set_prior("normal(0,1)", class="b", coef="case"),
                set_prior("normal(0,1)", class="b", coef="num"),
                set_prior("normal(0,1)", class="b", coef="casexnum"),
                set_prior("normal(0,1)", class="sd"),
                set_prior("normal(0,1)", class="sigma"),
                set_prior("lkj(2)", class="cor"))
```

```
# Priors for accuracy analysis involving nested comparisons
priors_acc_nested<- c(set_prior("normal(0,10)", class="Intercept"),
           set_prior("normal(0,1)", class="b", coef="case"),
           set_prior("normal(0,1)", class="b", coef="attr_nom"),
           set_prior("normal(0,1)", class="b", coef="attr_acc"),
           set_prior("normal(0,1)", class="sd"),
           set_prior("lkj(2)", class="cor"))

# Priors for response time analysis involving nested comparisons
priors_rt_nested<- c(set_prior("normal(0,10)", class="Intercept"),
           set_prior("normal(0,1)", class="b", coef="case"),
           set_prior("normal(0,1)", class="b", coef="attr_nom"),
           set_prior("normal(0,1)", class="b", coef="attr_acc"),
           set_prior("normal(0,1)", class="sd"),
           set_prior("normal(0,1)", class="sigma"),
           set_prior("lkj(2)", class="cor"))
```

Accuracy analysis results

In the tables below, each effect is described in terms of its posterior mean on log odds scale and the lower and upper bound of 95% credible interval.

Table 4: Model output for accuracy analysis examining main effects of case, attractor number ('num), and their interaction.

	Estimate	Est.Error	Q2.5	Q97.5
Intercept	3.5497241	0.1793124	3.2032652	3.9025210
case	-0.0064894	0.0733094	-0.1456523	0.1403388
num	-0.7678281	0.0978240	-0.9762837	-0.5861031
casexnum	0.1088730	0.0733731	-0.0422213	0.2472810

Model estimates back-transformed to percentages

```
##   Estimate_case     95% CrI
## 1           0 % [-0.8, 0.8]
```

```
##   Estimate_num      95% CrI
## 1       -4.6 % [-6.3, -3.1]
```

```
##   Estimate_casexnum     95% CrI
## 1             0.6 % [-0.2, 1.4]
```

Table 5: Model output for accuracy analysis examining attractor number effect (i.e., attraction effect) for the case match (nominative attractor; attr_nom) and case mismatch (accusative attractor; attr_acc) conditions separately.

	Estimate	Est.Error	Q2.5	Q97.5
Intercept	3.5192928	0.1690874	3.1987667	3.8610242
case	-0.0121841	0.0753030	-0.1493080	0.1416034
attr_nom	-0.8230143	0.1233843	-1.0776638	-0.5837617
attr_acc	-0.6424544	0.1042185	-0.8565782	-0.4454431

Model estimates back-transformed to percentages

```
##   Estimate_attraction_caseMatch      95% CrI
## 1                       -5.1 % [-7.5, -3.1]
```

```
##   Estimate_attraction_caseMismatch      95% CrI
## 1                          -3.8 % [-5.6, -2.4]
```

Response time analysis results

Only response times for correctly-answered trials have been included in the analysis. In the tables below, each effect is described in terms of its posterior mean on log scale and the lower and upper bound of 95% credible interval.

Table 6: Model output for response time analysis examining main effects of case, attractor number ('num'), and their interaction.

	Estimate	Est.Error	Q2.5	Q97.5
Intercept	6.9356502	0.0213723	6.8917834	6.9765730
case	-0.0104530	0.0036285	-0.0175075	-0.0032878
num	0.0467215	0.0053209	0.0361418	0.0571932
casexnum	-0.0062407	0.0039313	-0.0140098	0.0015258

Model estimates back-transformed to milliseconds

```
##   Estimate_case   95% CrI
## 1        -22 ms [-36, -7]
```

```
##   Estimate_num   95% CrI
## 1        96 ms [75, 117]
```

```
##   Estimate_casexnum  95% CrI
## 1            -13 ms [-29, 3]
```

Table 7: Model output for response time analysis examining attractor number effect (i.e., attraction effect) for the case match (nominative attractor; attr_nom) and case mismatch (accusative attractor; attr_acc) conditions separately.

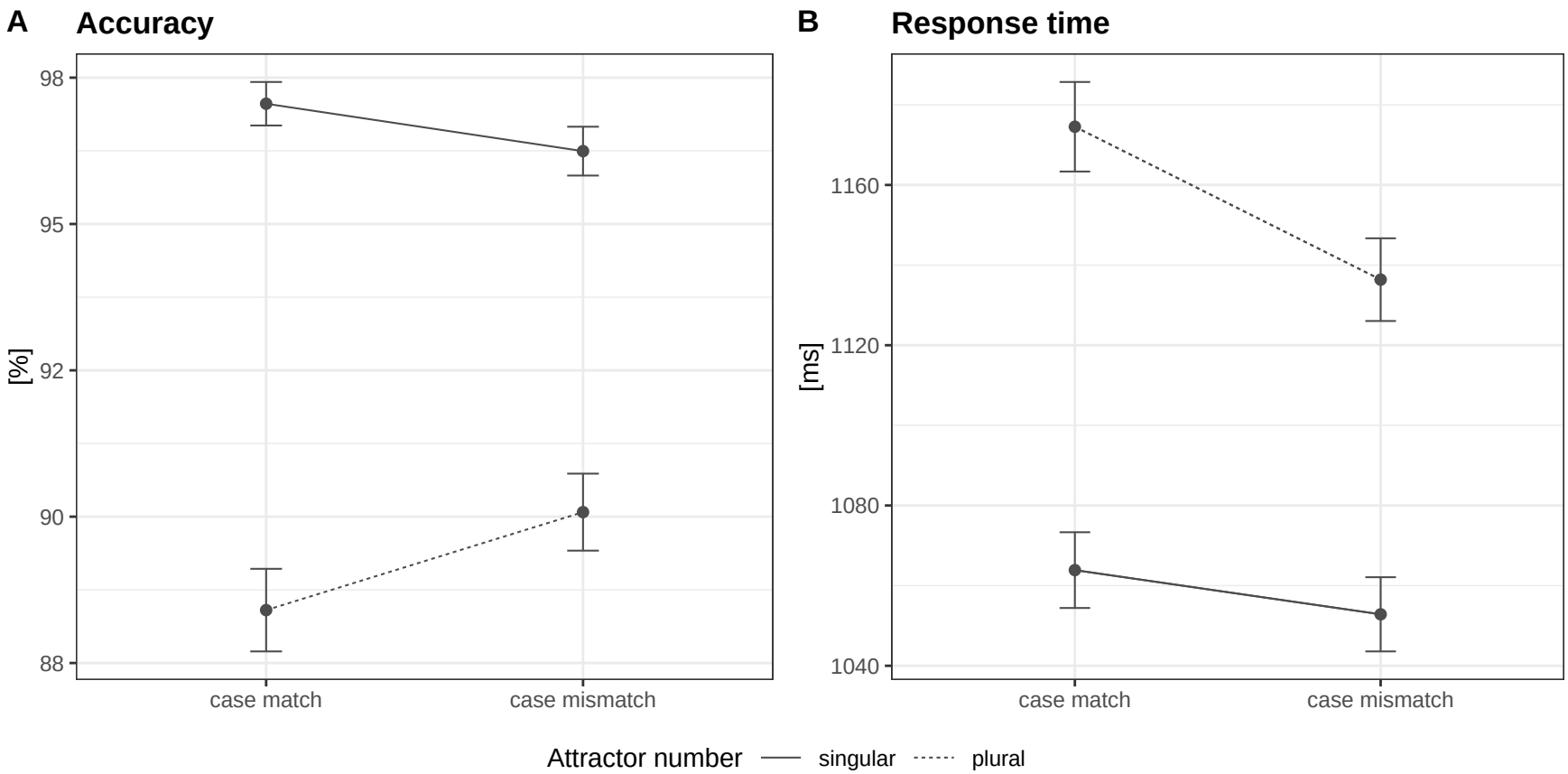
	Estimate	Est.Error	Q2.5	Q97.5
Intercept	6.9346041	0.0225610	6.8905307	6.9778023
case	-0.0103968	0.0037157	-0.0178547	-0.0033570
attr_nom	0.0529906	0.0072414	0.0384564	0.0675123
attr_acc	0.0407726	0.0061267	0.0285046	0.0530271

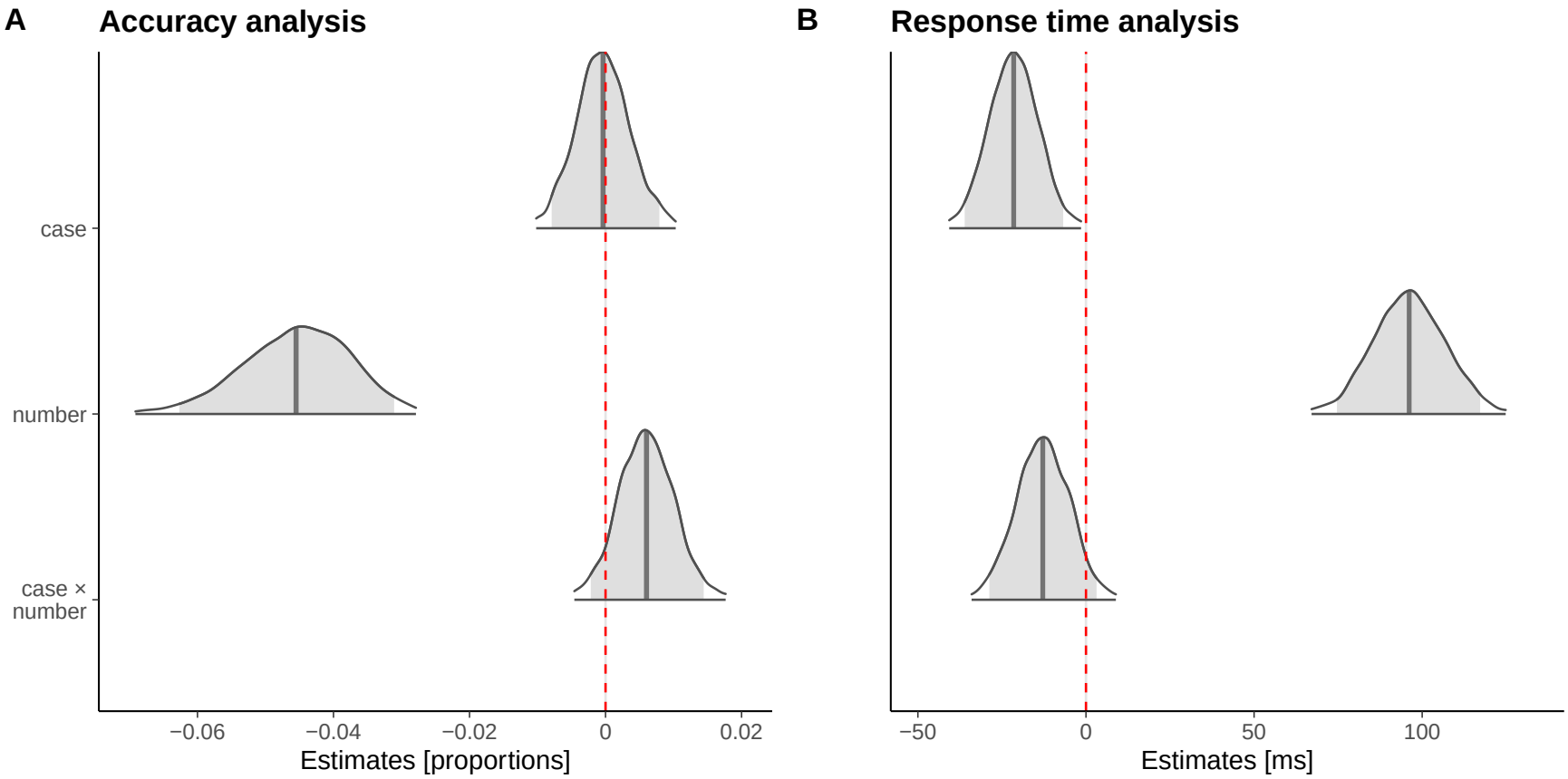
Model estimates back-transformed to milliseconds

```
##   Estimate_attraction_caseMatch   95% CrI
## 1                      109 ms [80, 139]
```

```
##   Estimate_attraction_caseMismatch   95% CrI
## 1                         84 ms [59, 109]
```

Plots


A
Accuracy
98
95
92
90
88
[%]
case match
case mismatch
B
Response time
1160
1120
1080
1040
[ms]
case match
case mismatch
Attractor number
singular
plural


A
Accuracy analysis
case
number
case ×
number
−0.06
−0.04
−0.02
0
0.02
Estimates [proportions]
B
Response time analysis
−50
0
50
100
Estimates [ms]