Supplementary materials

Revisiting the Bayesian Brain: predictive processes of facial emotion recognition in autism

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S1 Package versions

The following packages are used in this RMarkdown file:

```
## [1] "R version 4.5.1 (2025-06-13)"
```

```
## [1] "knitr version 1.50"
## [1] "ggplot2 version 4.0.0"
## [1] "brms version 2.22.0"
## [1] "designr version 0.1.13"
## [1] "bridgesampling version 1.1.2"
## [1] "tidyverse version 2.0.0"
## [1] "ggpubr version 0.6.1"
## [1] "ggrain version 0.0.4"
## [1] "bayesplot version 1.13.0"
## [1] "SBC version 0.3.0.9000"
## [1] "rstatix version 0.7.2"
## [1] "BayesFactor version 0.9.12.4.7"
## [1] "effectsize version 1.0.1"
## [1] "bayestestR version 0.17.0"
```

S2 Methods

S2.1 Preprocessing of pupil sizes

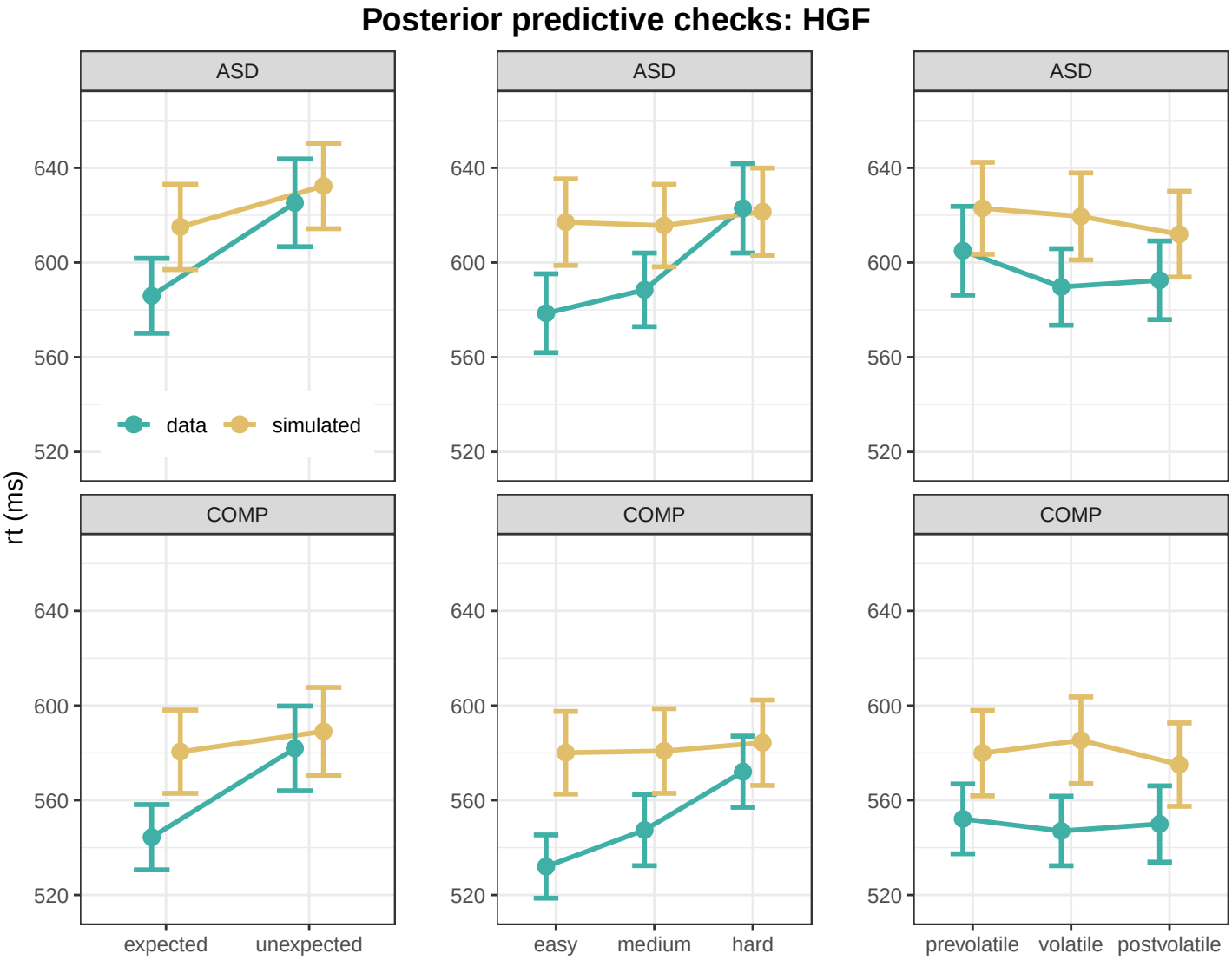
We classified any extreme values (above 8 and below 2mm) as well as participant-specific extreme velocities and blinks as artefacts. Then, we low-pass filtered the data with a threshold of 4Hz based on Kret and Sjak-Shie (2019), smoothed the data and interpolated all artefacts shorter than half a second with cubic spline interpolation. Next, data was downsampled to 100Hz and trials with more than one third of the datapoints missing were excluded from analysis. Last, we applied correction based on a baseline of 200ms before onset of the face presentation. We visualised data quality and excluded trials if the pupil trace indicates recording artefacts or baseline artefacts as well as if the baseline pupil size is considered an outlier (absolute z-score larger than 2).

S2.2 Bayesian linear (mixed) models

All contrasts are set to sum coding. The models for the volatilities extracted from the HGF and for the pupil sizes used a Gaussian likelihood, while both the reaction times and learning rate updates were modelled using a lognormal distribution. The reaction time model additionally included a shift. All models included the predictor Group (ASD, COMP). The reaction time model also included Expectancy, Phase and Difficulty as well as all interactions on the population-level, and participant with slopes for Expectancy, Phase, Difficulty and their interactions as well as trials with slopes for Group on the group-level. The hypothesis regarding pupil sizes was evaluated using a model with the predictors Group, Expectancy and their interaction as well as intercepts for the participants on the group-level. Since pupil sizes are sensitive to physical movements (Mathôt & Vilotijević, 2023), we include RT of each trial instead of including trial on the group-level, as preregistered. The model for the learning rate updates included Group, Level (environmental or cue-outcome association) and Change (stable to volatile or volatile to stable) on the population-level as well as participants with slopes for Level and Change on the group-level.

S3 Model evaluation

S3.1 Posterior predictive checks for HGF



S3.2 Comparison of LME across groups

```
## ---
##  Model:
## Type: BFlinearModel, JZS
## Intercept only
## Data types:
## diagnosis :  fixed
```

	bf	error	time	code
diagnosis	-1.04496	5.81e-05	Wed Oct 15 12:08:23 2025	144d96dd874c4

S4 Volatility parameters and learning rate updates

S4.1 Phasic volatility

```
##  Family: gaussian
##   Links: mu = identity; sigma = identity
## Formula: be4 ~ diagnosis
##    Data: df.hgf (Number of observations: 44)
```

```
##   Draws: 4 chains, each with iter = 3000; warmup = 1000; thin = 1;
##          total post-warmup draws = 8000
##
## Regression Coefficients:
##            Estimate Est.Error l-95% CI u-95% CI Rhat Bulk_ESS Tail_ESS
## Intercept      0.15      0.07     0.01     0.30 1.00     6857     4868
## diagnosis1     0.10      0.07    -0.03     0.24 1.00     7164     5392
##
## Further Distributional Parameters:
##       Estimate Est.Error l-95% CI u-95% CI Rhat Bulk_ESS Tail_ESS
## sigma     0.48      0.05     0.39     0.60 1.00     6978     5752
##
## Draws were sampled using sample(hmc). For each parameter, Bulk_ESS
## and Tail_ESS are effective sample size measures, and Rhat is the potential
## scale reduction factor on split chains (at convergence, Rhat = 1).
```

S4.2 Environmental tonic volatility

```
##  Family: gaussian
##   Links: mu = identity; sigma = identity
## Formula: om3 ~ diagnosis
##    Data: df.hgf (Number of observations: 44)
##   Draws: 4 chains, each with iter = 3000; warmup = 1000; thin = 1;
##          total post-warmup draws = 8000
##
## Regression Coefficients:
##            Estimate Est.Error l-95% CI u-95% CI Rhat Bulk_ESS Tail_ESS
## Intercept     -2.25      0.22    -2.68    -1.81 1.00     7060     5591
## diagnosis1    -0.03      0.16    -0.36     0.29 1.00     7761     5723
##
## Further Distributional Parameters:
##       Estimate Est.Error l-95% CI u-95% CI Rhat Bulk_ESS Tail_ESS
## sigma     1.46      0.13     1.22     1.74 1.00     7903     5912
##
## Draws were sampled using sample(hmc). For each parameter, Bulk_ESS
## and Tail_ESS are effective sample size measures, and Rhat is the potential
## scale reduction factor on split chains (at convergence, Rhat = 1).
```

S4.3 Bernoulli model with HGF parameters

```
##  Family: bernoulli
##   Links: mu = logit
## Formula: group ~ sbe1 + sbe2 + sbe3 + sbe4 + sze + som2 + som3
##    Data: df.hgf (Number of observations: 44)
##   Draws: 4 chains, each with iter = 3000; warmup = 1000; thin = 1;
##          total post-warmup draws = 8000
##
## Regression Coefficients:
##           Estimate Est.Error l-95% CI u-95% CI Rhat Bulk_ESS Tail_ESS
## Intercept     0.00      0.27    -0.52     0.53 1.00    11653     6220
## sbe1         -0.46      0.42    -1.30     0.35 1.00     7619     6607
## sbe2          0.28      0.40    -0.48     1.09 1.00     8016     6758
## sbe3          0.28      0.46    -0.59     1.19 1.00     6374     5607
## sbe4          0.81      0.43    -0.02     1.68 1.00     7819     6003
## sze           0.24      0.40    -0.55     1.04 1.00     7223     6128
## som2          0.30      0.35    -0.38     1.00 1.00    10326     6234
## som3         -0.14      0.35    -0.84     0.54 1.00     8173     6191
##
## Draws were sampled using sample(hmc). For each parameter, Bulk_ESS
## and Tail_ESS are effective sample size measures, and Rhat is the potential
```

```
## scale reduction factor on split chains (at convergence, Rhat = 1).
```

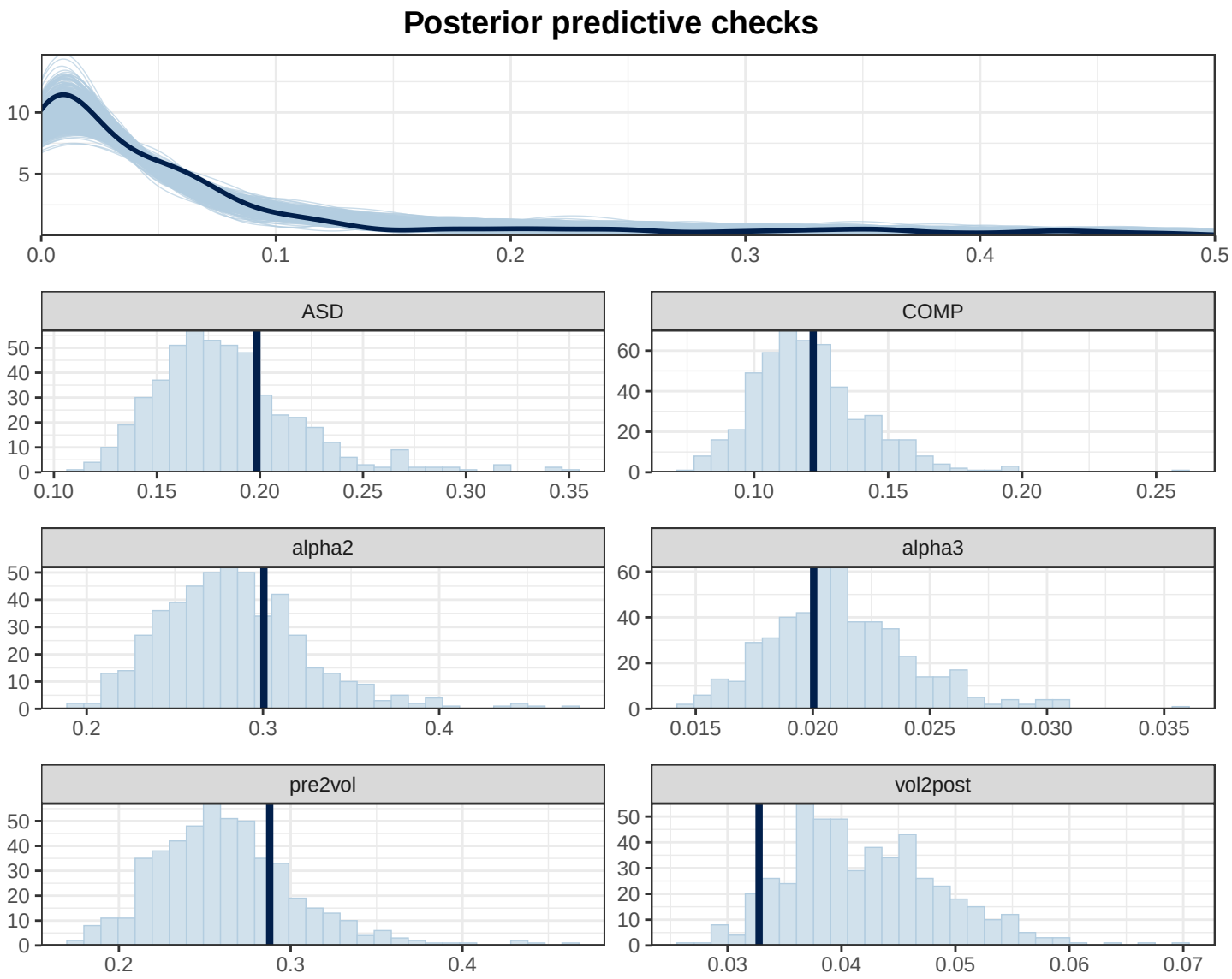
S4.4 Learning rate updates

```
##  Family: lognormal
##   Links: mu = identity; sigma = identity
## Formula: value ~ diagnosis * level * change + (level + change | subID)
##    Data: df.upd (Number of observations: 176)
##   Draws: 4 chains, each with iter = 3000; warmup = 1000; thin = 1;
##          total post-warmup draws = 8000
##
## Multilevel Hyperparameters:
## ~subID (Number of levels: 44)
##                         Estimate Est.Error l-95% CI u-95% CI Rhat Bulk_ESS
## sd(Intercept)               0.48      0.07     0.35     0.64 1.00     2751
## sd(level1)                  0.74      0.09     0.57     0.94 1.00     2582
## sd(change1)                 0.11      0.06     0.01     0.22 1.00     2400
## cor(Intercept,level1)       0.40      0.16     0.08     0.68 1.00     1321
## cor(Intercept,change1)      0.51      0.32    -0.31     0.92 1.00     4714
## cor(level1,change1)         0.15      0.33    -0.54     0.72 1.00     8925
##                         Tail_ESS
## sd(Intercept)               4852
## sd(level1)                  4058
## sd(change1)                 1948
## cor(Intercept,level1)       2778
## cor(Intercept,change1)      4106
## cor(level1,change1)         5669
##
## Regression Coefficients:
##                             Estimate Est.Error l-95% CI u-95% CI Rhat Bulk_ESS
## Intercept                     -3.57      0.08    -3.74    -3.41 1.00     2132
## diagnosis1                     0.17      0.09     0.00     0.33 1.00     2328
## level1                         1.36      0.12     1.13     1.60 1.00     2131
## change1                        1.11      0.05     1.02     1.20 1.00     7150
## diagnosis1:level1              0.03      0.12    -0.21     0.27 1.00     2149
## diagnosis1:change1            -0.09      0.05    -0.18    -0.00 1.00     7153
## level1:change1                -0.24      0.04    -0.32    -0.16 1.00    10154
## diagnosis1:level1:change1      0.12      0.04     0.04     0.20 1.00    10027
##                             Tail_ESS
## Intercept                       3428
## diagnosis1                      3860
## level1                          3391
## change1                         5410
## diagnosis1:level1               3702
## diagnosis1:change1              5459
## level1:change1                  6174
## diagnosis1:level1:change1       5466
##
## Further Distributional Parameters:
##       Estimate Est.Error l-95% CI u-95% CI Rhat Bulk_ESS Tail_ESS
## sigma     0.55      0.05     0.47     0.64 1.00     2647     4808
##
## Draws were sampled using sample(hmc). For each parameter, Bulk_ESS
## and Tail_ESS are effective sample size measures, and Rhat is the potential
## scale reduction factor on split chains (at convergence, Rhat = 1).
```

S4.4.1 Posterior predictive checks

```
## Warning: Removed 6814 rows containing non-finite outside the scale range
## (`stat_density()`).
```

```
## Warning: Removed 15 rows containing non-finite outside the scale range
## (`stat_density()`).
```



S4.4.2 ANOVA of ranked learning rate updates

```
## ---
##  Model:
## Type: BFlinearModel, JZS
## Intercept only
## Data types:
## diagnosis :  fixed
```

	bf
level + change	105.308214
level + change + level:change	105.274233
diagnosis + level + change + level:change	104.709253
diagnosis + level + change	104.630776
diagnosis + level + change + diagnosis:change	103.743090
diagnosis + level + change + diagnosis:change + level:change	103.632709
diagnosis + level + diagnosis:level + change + level:change	103.524108
diagnosis + level + diagnosis:level + change	103.470738
diagnosis + level + diagnosis:level + change + diagnosis:change + level:change	102.352071
diagnosis + level + diagnosis:level + change + diagnosis:change	102.350676
diagnosis + level + diagnosis:level + change + diagnosis:change + level:change + diagnosis:level:change	101.547006

	bf
level	51.218852
diagnosis + level	49.989893
diagnosis + level + diagnosis:level	48.643403
change	23.304343
diagnosis + change	21.885668
diagnosis + change + diagnosis:change	20.537285
diagnosis	-1.494272

S5 Reaction times, pupil sizes and accuracies

S5.1 Reaction times

```
##  Family: shifted_lognormal
##   Links: mu = identity; sigma = identity; ndt = identity
## Formula: rt.cor ~ diagnosis * expected * phase * difficulty + (expected * phase * difficulty | subID) + (di
##    Data: df.pal (Number of observations: 11207)
##   Draws: 4 chains, each with iter = 6000; warmup = 1500; thin = 1;
##          total post-warmup draws = 18000
##
## Multilevel Hyperparameters:
## ~subID (Number of levels: 44)
##                                                    Estimate
## sd(Intercept)                                          0.16
## sd(expected1)                                          0.01
## sd(phase1)                                             0.06
## sd(phase2)                                             0.02
## sd(difficulty1)                                        0.01
## sd(difficulty2)                                        0.01
## sd(expected1:phase1)                                   0.01
## sd(expected1:phase2)                                   0.01
## sd(expected1:difficulty1)                              0.00
## sd(expected1:difficulty2)                              0.01
## sd(phase1:difficulty1)                                 0.01
## sd(phase2:difficulty1)                                 0.01
## sd(phase1:difficulty2)                                 0.01
## sd(phase2:difficulty2)                                 0.01
## sd(expected1:phase1:difficulty1)                       0.01
## sd(expected1:phase2:difficulty1)                       0.01
## sd(expected1:phase1:difficulty2)                       0.01
## sd(expected1:phase2:difficulty2)                       0.01
## cor(Intercept,expected1)                              -0.00
## cor(Intercept,phase1)                                 -0.04
## cor(expected1,phase1)                                  0.12
## cor(Intercept,phase2)                                 -0.01
## cor(expected1,phase2)                                 -0.01
## cor(phase1,phase2)                                    -0.14
## cor(Intercept,difficulty1)                            -0.04
## cor(expected1,difficulty1)                             0.07
## cor(phase1,difficulty1)                               -0.16
## cor(phase2,difficulty1)                                0.01
## cor(Intercept,difficulty2)                            -0.02
## cor(expected1,difficulty2)                             0.03
## cor(phase1,difficulty2)                               -0.08
## cor(phase2,difficulty2)                                0.01
## cor(difficulty1,difficulty2)                           0.01
## cor(Intercept,expected1:phase1)                       -0.04
## cor(expected1,expected1:phase1)                        0.05
## cor(phase1,expected1:phase1)                           0.04
```

```
## cor(phase2,expected1:phase1)                                -0.08
## cor(difficulty1,expected1:phase1)                           -0.01
## cor(difficulty2,expected1:phase1)                            0.00
## cor(Intercept,expected1:phase2)                              0.05
## cor(expected1,expected1:phase2)                             -0.01
## cor(phase1,expected1:phase2)                                -0.08
## cor(phase2,expected1:phase2)                                -0.06
## cor(difficulty1,expected1:phase2)                            0.03
## cor(difficulty2,expected1:phase2)                            0.06
## cor(expected1:phase1,expected1:phase2)                      -0.04
## cor(Intercept,expected1:difficulty1)                        -0.04
## cor(expected1,expected1:difficulty1)                         0.02
## cor(phase1,expected1:difficulty1)                            0.01
## cor(phase2,expected1:difficulty1)                            0.05
## cor(difficulty1,expected1:difficulty1)                      -0.03
## cor(difficulty2,expected1:difficulty1)                      -0.00
## cor(expected1:phase1,expected1:difficulty1)                  0.00
## cor(expected1:phase2,expected1:difficulty1)                 -0.01
## cor(Intercept,expected1:difficulty2)                        -0.07
## cor(expected1,expected1:difficulty2)                         0.04
## cor(phase1,expected1:difficulty2)                            0.29
## cor(phase2,expected1:difficulty2)                            0.01
## cor(difficulty1,expected1:difficulty2)                      -0.09
## cor(difficulty2,expected1:difficulty2)                      -0.06
## cor(expected1:phase1,expected1:difficulty2)                 -0.00
## cor(expected1:phase2,expected1:difficulty2)                  0.04
## cor(expected1:difficulty1,expected1:difficulty2)            -0.04
## cor(Intercept,phase1:difficulty1)                           -0.02
## cor(expected1,phase1:difficulty1)                           -0.03
## cor(phase1,phase1:difficulty1)                               0.02
## cor(phase2,phase1:difficulty1)                               0.02
## cor(difficulty1,phase1:difficulty1)                         -0.01
## cor(difficulty2,phase1:difficulty1)                         -0.00
## cor(expected1:phase1,phase1:difficulty1)                    -0.02
## cor(expected1:phase2,phase1:difficulty1)                    -0.01
## cor(expected1:difficulty1,phase1:difficulty1)                0.01
## cor(expected1:difficulty2,phase1:difficulty1)                0.04
## cor(Intercept,phase2:difficulty1)                           -0.03
## cor(expected1,phase2:difficulty1)                            0.10
## cor(phase1,phase2:difficulty1)                              -0.08
## cor(phase2,phase2:difficulty1)                              -0.05
## cor(difficulty1,phase2:difficulty1)                          0.09
## cor(difficulty2,phase2:difficulty1)                          0.05
## cor(expected1:phase1,phase2:difficulty1)                    -0.02
## cor(expected1:phase2,phase2:difficulty1)                     0.02
## cor(expected1:difficulty1,phase2:difficulty1)                0.02
## cor(expected1:difficulty2,phase2:difficulty1)                0.02
## cor(phase1:difficulty1,phase2:difficulty1)                  -0.04
## cor(Intercept,phase1:difficulty2)                            0.03
## cor(expected1,phase1:difficulty2)                           -0.02
## cor(phase1,phase1:difficulty2)                               0.04
## cor(phase2,phase1:difficulty2)                               0.05
## cor(difficulty1,phase1:difficulty2)                         -0.04
## cor(difficulty2,phase1:difficulty2)                          0.00
## cor(expected1:phase1,phase1:difficulty2)                    -0.03
## cor(expected1:phase2,phase1:difficulty2)                    -0.01
## cor(expected1:difficulty1,phase1:difficulty2)               -0.01
## cor(expected1:difficulty2,phase1:difficulty2)                0.06
## cor(phase1:difficulty1,phase1:difficulty2)                  -0.02
## cor(phase2:difficulty1,phase1:difficulty2)                  -0.03
```

```
## cor(Intercept,phase2:difficulty2)                                    0.04
## cor(expected1,phase2:difficulty2)                                    0.01
## cor(phase1,phase2:difficulty2)                                      -0.08
## cor(phase2,phase2:difficulty2)                                      -0.01
## cor(difficulty1,phase2:difficulty2)                                  0.02
## cor(difficulty2,phase2:difficulty2)                                  0.01
## cor(expected1:phase1,phase2:difficulty2)                             0.02
## cor(expected1:phase2,phase2:difficulty2)                             0.02
## cor(expected1:difficulty1,phase2:difficulty2)                       -0.01
## cor(expected1:difficulty2,phase2:difficulty2)                       -0.04
## cor(phase1:difficulty1,phase2:difficulty2)                          -0.03
## cor(phase2:difficulty1,phase2:difficulty2)                          -0.05
## cor(phase1:difficulty2,phase2:difficulty2)                          -0.01
## cor(Intercept,expected1:phase1:difficulty1)                          0.04
## cor(expected1,expected1:phase1:difficulty1)                         -0.04
## cor(phase1,expected1:phase1:difficulty1)                            -0.01
## cor(phase2,expected1:phase1:difficulty1)                             0.05
## cor(difficulty1,expected1:phase1:difficulty1)                       -0.00
## cor(difficulty2,expected1:phase1:difficulty1)                       -0.01
## cor(expected1:phase1,expected1:phase1:difficulty1)                  -0.01
## cor(expected1:phase2,expected1:phase1:difficulty1)                   0.01
## cor(expected1:difficulty1,expected1:phase1:difficulty1)              0.01
## cor(expected1:difficulty2,expected1:phase1:difficulty1)              0.00
## cor(phase1:difficulty1,expected1:phase1:difficulty1)                -0.02
## cor(phase2:difficulty1,expected1:phase1:difficulty1)                -0.03
## cor(phase1:difficulty2,expected1:phase1:difficulty1)                -0.02
## cor(phase2:difficulty2,expected1:phase1:difficulty1)                -0.02
## cor(Intercept,expected1:phase2:difficulty1)                          0.10
## cor(expected1,expected1:phase2:difficulty1)                          0.02
## cor(phase1,expected1:phase2:difficulty1)                             0.04
## cor(phase2,expected1:phase2:difficulty1)                             0.07
## cor(difficulty1,expected1:phase2:difficulty1)                       -0.00
## cor(difficulty2,expected1:phase2:difficulty1)                        0.00
## cor(expected1:phase1,expected1:phase2:difficulty1)                  -0.00
## cor(expected1:phase2,expected1:phase2:difficulty1)                   0.01
## cor(expected1:difficulty1,expected1:phase2:difficulty1)             -0.00
## cor(expected1:difficulty2,expected1:phase2:difficulty1)              0.00
## cor(phase1:difficulty1,expected1:phase2:difficulty1)                -0.01
## cor(phase2:difficulty1,expected1:phase2:difficulty1)                -0.04
## cor(phase1:difficulty2,expected1:phase2:difficulty1)                 0.00
## cor(phase2:difficulty2,expected1:phase2:difficulty1)                -0.02
## cor(expected1:phase1:difficulty1,expected1:phase2:difficulty1)      -0.01
## cor(Intercept,expected1:phase1:difficulty2)                          0.04
## cor(expected1,expected1:phase1:difficulty2)                         -0.06
## cor(phase1,expected1:phase1:difficulty2)                            -0.06
## cor(phase2,expected1:phase1:difficulty2)                             0.10
## cor(difficulty1,expected1:phase1:difficulty2)                       -0.01
## cor(difficulty2,expected1:phase1:difficulty2)                        0.03
## cor(expected1:phase1,expected1:phase1:difficulty2)                  -0.05
## cor(expected1:phase2,expected1:phase1:difficulty2)                   0.03
## cor(expected1:difficulty1,expected1:phase1:difficulty2)             -0.01
## cor(expected1:difficulty2,expected1:phase1:difficulty2)              0.04
## cor(phase1:difficulty1,expected1:phase1:difficulty2)                -0.01
## cor(phase2:difficulty1,expected1:phase1:difficulty2)                -0.02
## cor(phase1:difficulty2,expected1:phase1:difficulty2)                -0.02
## cor(phase2:difficulty2,expected1:phase1:difficulty2)                -0.00
## cor(expected1:phase1:difficulty1,expected1:phase1:difficulty2)      -0.01
## cor(expected1:phase2:difficulty1,expected1:phase1:difficulty2)       0.01
## cor(Intercept,expected1:phase2:difficulty2)                          0.09
## cor(expected1,expected1:phase2:difficulty2)                         -0.01
```

```
## cor(phase1,expected1:phase2:difficulty2)                          -0.04
## cor(phase2,expected1:phase2:difficulty2)                           0.08
## cor(difficulty1,expected1:phase2:difficulty2)                      0.00
## cor(difficulty2,expected1:phase2:difficulty2)                      0.01
## cor(expected1:phase1,expected1:phase2:difficulty2)                 0.00
## cor(expected1:phase2,expected1:phase2:difficulty2)                 0.03
## cor(expected1:difficulty1,expected1:phase2:difficulty2)           -0.02
## cor(expected1:difficulty2,expected1:phase2:difficulty2)           -0.03
## cor(phase1:difficulty1,expected1:phase2:difficulty2)              -0.00
## cor(phase2:difficulty1,expected1:phase2:difficulty2)              -0.04
## cor(phase1:difficulty2,expected1:phase2:difficulty2)               0.00
## cor(phase2:difficulty2,expected1:phase2:difficulty2)              -0.02
## cor(expected1:phase1:difficulty1,expected1:phase2:difficulty2)     0.01
## cor(expected1:phase2:difficulty1,expected1:phase2:difficulty2)    -0.02
## cor(expected1:phase1:difficulty2,expected1:phase2:difficulty2)     0.01
##                                                                Est.Error
## sd(Intercept)                                                       0.02
## sd(expected1)                                                       0.01
## sd(phase1)                                                          0.01
## sd(phase2)                                                          0.00
## sd(difficulty1)                                                     0.00
## sd(difficulty2)                                                     0.00
## sd(expected1:phase1)                                                0.01
## sd(expected1:phase2)                                                0.00
## sd(expected1:difficulty1)                                           0.00
## sd(expected1:difficulty2)                                           0.00
## sd(phase1:difficulty1)                                              0.00
## sd(phase2:difficulty1)                                              0.01
## sd(phase1:difficulty2)                                              0.00
## sd(phase2:difficulty2)                                              0.01
## sd(expected1:phase1:difficulty1)                                    0.00
## sd(expected1:phase2:difficulty1)                                    0.00
## sd(expected1:phase1:difficulty2)                                    0.01
## sd(expected1:phase2:difficulty2)                                    0.00
## cor(Intercept,expected1)                                            0.18
## cor(Intercept,phase1)                                               0.13
## cor(expected1,phase1)                                               0.18
## cor(Intercept,phase2)                                               0.15
## cor(expected1,phase2)                                               0.19
## cor(phase1,phase2)                                                  0.16
## cor(Intercept,difficulty1)                                          0.20
## cor(expected1,difficulty1)                                          0.21
## cor(phase1,difficulty1)                                             0.21
## cor(phase2,difficulty1)                                             0.21
## cor(Intercept,difficulty2)                                          0.21
## cor(expected1,difficulty2)                                          0.21
## cor(phase1,difficulty2)                                             0.21
## cor(phase2,difficulty2)                                             0.21
## cor(difficulty1,difficulty2)                                        0.22
## cor(Intercept,expected1:phase1)                                     0.20
## cor(expected1,expected1:phase1)                                     0.22
## cor(phase1,expected1:phase1)                                        0.20
## cor(phase2,expected1:phase1)                                        0.21
## cor(difficulty1,expected1:phase1)                                   0.22
## cor(difficulty2,expected1:phase1)                                   0.22
## cor(Intercept,expected1:phase2)                                     0.21
## cor(expected1,expected1:phase2)                                     0.22
## cor(phase1,expected1:phase2)                                        0.21
## cor(phase2,expected1:phase2)                                        0.22
## cor(difficulty1,expected1:phase2)                                   0.22
```

```
## cor(difficulty2,expected1:phase2)                                  0.22
## cor(expected1:phase1,expected1:phase2)                             0.22
## cor(Intercept,expected1:difficulty1)                               0.21
## cor(expected1,expected1:difficulty1)                               0.22
## cor(phase1,expected1:difficulty1)                                  0.21
## cor(phase2,expected1:difficulty1)                                  0.21
## cor(difficulty1,expected1:difficulty1)                             0.22
## cor(difficulty2,expected1:difficulty1)                             0.22
## cor(expected1:phase1,expected1:difficulty1)                        0.22
## cor(expected1:phase2,expected1:difficulty1)                        0.22
## cor(Intercept,expected1:difficulty2)                               0.17
## cor(expected1,expected1:difficulty2)                               0.20
## cor(phase1,expected1:difficulty2)                                  0.17
## cor(phase2,expected1:difficulty2)                                  0.19
## cor(difficulty1,expected1:difficulty2)                             0.22
## cor(difficulty2,expected1:difficulty2)                             0.22
## cor(expected1:phase1,expected1:difficulty2)                        0.21
## cor(expected1:phase2,expected1:difficulty2)                        0.22
## cor(expected1:difficulty1,expected1:difficulty2)                   0.22
## cor(Intercept,phase1:difficulty1)                                  0.21
## cor(expected1,phase1:difficulty1)                                  0.22
## cor(phase1,phase1:difficulty1)                                     0.21
## cor(phase2,phase1:difficulty1)                                     0.22
## cor(difficulty1,phase1:difficulty1)                                0.22
## cor(difficulty2,phase1:difficulty1)                                0.22
## cor(expected1:phase1,phase1:difficulty1)                           0.22
## cor(expected1:phase2,phase1:difficulty1)                           0.22
## cor(expected1:difficulty1,phase1:difficulty1)                      0.22
## cor(expected1:difficulty2,phase1:difficulty1)                      0.22
## cor(Intercept,phase2:difficulty1)                                  0.19
## cor(expected1,phase2:difficulty1)                                  0.20
## cor(phase1,phase2:difficulty1)                                     0.19
## cor(phase2,phase2:difficulty1)                                     0.20
## cor(difficulty1,phase2:difficulty1)                                0.21
## cor(difficulty2,phase2:difficulty1)                                0.22
## cor(expected1:phase1,phase2:difficulty1)                           0.22
## cor(expected1:phase2,phase2:difficulty1)                           0.22
## cor(expected1:difficulty1,phase2:difficulty1)                      0.22
## cor(expected1:difficulty2,phase2:difficulty1)                      0.20
## cor(phase1:difficulty1,phase2:difficulty1)                         0.22
## cor(Intercept,phase1:difficulty2)                                  0.21
## cor(expected1,phase1:difficulty2)                                  0.22
## cor(phase1,phase1:difficulty2)                                     0.22
## cor(phase2,phase1:difficulty2)                                     0.22
## cor(difficulty1,phase1:difficulty2)                                0.22
## cor(difficulty2,phase1:difficulty2)                                0.22
## cor(expected1:phase1,phase1:difficulty2)                           0.22
## cor(expected1:phase2,phase1:difficulty2)                           0.22
## cor(expected1:difficulty1,phase1:difficulty2)                      0.22
## cor(expected1:difficulty2,phase1:difficulty2)                      0.21
## cor(phase1:difficulty1,phase1:difficulty2)                         0.22
## cor(phase2:difficulty1,phase1:difficulty2)                         0.22
## cor(Intercept,phase2:difficulty2)                                  0.20
## cor(expected1,phase2:difficulty2)                                  0.21
## cor(phase1,phase2:difficulty2)                                     0.20
## cor(phase2,phase2:difficulty2)                                     0.21
## cor(difficulty1,phase2:difficulty2)                                0.21
## cor(difficulty2,phase2:difficulty2)                                0.22
## cor(expected1:phase1,phase2:difficulty2)                           0.22
## cor(expected1:phase2,phase2:difficulty2)                           0.22
```

```
## cor(expected1:difficulty1,phase2:difficulty2)                      0.22
## cor(expected1:difficulty2,phase2:difficulty2)                      0.21
## cor(phase1:difficulty1,phase2:difficulty2)                         0.22
## cor(phase2:difficulty1,phase2:difficulty2)                         0.22
## cor(phase1:difficulty2,phase2:difficulty2)                         0.22
## cor(Intercept,expected1:phase1:difficulty1)                        0.21
## cor(expected1,expected1:phase1:difficulty1)                        0.21
## cor(phase1,expected1:phase1:difficulty1)                           0.21
## cor(phase2,expected1:phase1:difficulty1)                           0.22
## cor(difficulty1,expected1:phase1:difficulty1)                      0.22
## cor(difficulty2,expected1:phase1:difficulty1)                      0.22
## cor(expected1:phase1,expected1:phase1:difficulty1)                 0.22
## cor(expected1:phase2,expected1:phase1:difficulty1)                 0.22
## cor(expected1:difficulty1,expected1:phase1:difficulty1)            0.22
## cor(expected1:difficulty2,expected1:phase1:difficulty1)            0.21
## cor(phase1:difficulty1,expected1:phase1:difficulty1)               0.22
## cor(phase2:difficulty1,expected1:phase1:difficulty1)               0.22
## cor(phase1:difficulty2,expected1:phase1:difficulty1)               0.22
## cor(phase2:difficulty2,expected1:phase1:difficulty1)               0.22
## cor(Intercept,expected1:phase2:difficulty1)                        0.21
## cor(expected1,expected1:phase2:difficulty1)                        0.22
## cor(phase1,expected1:phase2:difficulty1)                           0.21
## cor(phase2,expected1:phase2:difficulty1)                           0.22
## cor(difficulty1,expected1:phase2:difficulty1)                      0.22
## cor(difficulty2,expected1:phase2:difficulty1)                      0.22
## cor(expected1:phase1,expected1:phase2:difficulty1)                 0.22
## cor(expected1:phase2,expected1:phase2:difficulty1)                 0.22
## cor(expected1:difficulty1,expected1:phase2:difficulty1)            0.22
## cor(expected1:difficulty2,expected1:phase2:difficulty1)            0.21
## cor(phase1:difficulty1,expected1:phase2:difficulty1)               0.22
## cor(phase2:difficulty1,expected1:phase2:difficulty1)               0.22
## cor(phase1:difficulty2,expected1:phase2:difficulty1)               0.22
## cor(phase2:difficulty2,expected1:phase2:difficulty1)               0.22
## cor(expected1:phase1:difficulty1,expected1:phase2:difficulty1)     0.22
## cor(Intercept,expected1:phase1:difficulty2)                        0.21
## cor(expected1,expected1:phase1:difficulty2)                        0.22
## cor(phase1,expected1:phase1:difficulty2)                           0.21
## cor(phase2,expected1:phase1:difficulty2)                           0.21
## cor(difficulty1,expected1:phase1:difficulty2)                      0.22
## cor(difficulty2,expected1:phase1:difficulty2)                      0.22
## cor(expected1:phase1,expected1:phase1:difficulty2)                 0.22
## cor(expected1:phase2,expected1:phase1:difficulty2)                 0.22
## cor(expected1:difficulty1,expected1:phase1:difficulty2)            0.22
## cor(expected1:difficulty2,expected1:phase1:difficulty2)            0.21
## cor(phase1:difficulty1,expected1:phase1:difficulty2)               0.22
## cor(phase2:difficulty1,expected1:phase1:difficulty2)               0.22
## cor(phase1:difficulty2,expected1:phase1:difficulty2)               0.22
## cor(phase2:difficulty2,expected1:phase1:difficulty2)               0.22
## cor(expected1:phase1:difficulty1,expected1:phase1:difficulty2)     0.22
## cor(expected1:phase2:difficulty1,expected1:phase1:difficulty2)     0.22
## cor(Intercept,expected1:phase2:difficulty2)                        0.22
## cor(expected1,expected1:phase2:difficulty2)                        0.22
## cor(phase1,expected1:phase2:difficulty2)                           0.21
## cor(phase2,expected1:phase2:difficulty2)                           0.22
## cor(difficulty1,expected1:phase2:difficulty2)                      0.22
## cor(difficulty2,expected1:phase2:difficulty2)                      0.22
## cor(expected1:phase1,expected1:phase2:difficulty2)                 0.22
## cor(expected1:phase2,expected1:phase2:difficulty2)                 0.22
## cor(expected1:difficulty1,expected1:phase2:difficulty2)            0.22
## cor(expected1:difficulty2,expected1:phase2:difficulty2)            0.22
```

```
## cor(phase1:difficulty1,expected1:phase2:difficulty2)                0.22
## cor(phase2:difficulty1,expected1:phase2:difficulty2)                0.22
## cor(phase1:difficulty2,expected1:phase2:difficulty2)                0.22
## cor(phase2:difficulty2,expected1:phase2:difficulty2)                0.22
## cor(expected1:phase1:difficulty1,expected1:phase2:difficulty2)      0.22
## cor(expected1:phase2:difficulty1,expected1:phase2:difficulty2)      0.22
## cor(expected1:phase1:difficulty2,expected1:phase2:difficulty2)      0.22
##                                                                  l-95% CI
## sd(Intercept)                                                        0.13
## sd(expected1)                                                        0.00
## sd(phase1)                                                           0.04
## sd(phase2)                                                           0.01
## sd(difficulty1)                                                      0.00
## sd(difficulty2)                                                      0.00
## sd(expected1:phase1)                                                 0.00
## sd(expected1:phase2)                                                 0.00
## sd(expected1:difficulty1)                                            0.00
## sd(expected1:difficulty2)                                            0.00
## sd(phase1:difficulty1)                                               0.00
## sd(phase2:difficulty1)                                               0.00
## sd(phase1:difficulty2)                                               0.00
## sd(phase2:difficulty2)                                               0.00
## sd(expected1:phase1:difficulty1)                                     0.00
## sd(expected1:phase2:difficulty1)                                     0.00
## sd(expected1:phase1:difficulty2)                                     0.00
## sd(expected1:phase2:difficulty2)                                     0.00
## cor(Intercept,expected1)                                            -0.34
## cor(Intercept,phase1)                                               -0.30
## cor(expected1,phase1)                                               -0.24
## cor(Intercept,phase2)                                               -0.31
## cor(expected1,phase2)                                               -0.39
## cor(phase1,phase2)                                                  -0.45
## cor(Intercept,difficulty1)                                          -0.42
## cor(expected1,difficulty1)                                          -0.36
## cor(phase1,difficulty1)                                             -0.54
## cor(phase2,difficulty1)                                             -0.40
## cor(Intercept,difficulty2)                                          -0.42
## cor(expected1,difficulty2)                                          -0.38
## cor(phase1,difficulty2)                                             -0.48
## cor(phase2,difficulty2)                                             -0.40
## cor(difficulty1,difficulty2)                                        -0.41
## cor(Intercept,expected1:phase1)                                     -0.42
## cor(expected1,expected1:phase1)                                     -0.38
## cor(phase1,expected1:phase1)                                        -0.36
## cor(phase2,expected1:phase1)                                        -0.47
## cor(difficulty1,expected1:phase1)                                   -0.42
## cor(difficulty2,expected1:phase1)                                   -0.42
## cor(Intercept,expected1:phase2)                                     -0.36
## cor(expected1,expected1:phase2)                                     -0.43
## cor(phase1,expected1:phase2)                                        -0.48
## cor(phase2,expected1:phase2)                                        -0.48
## cor(difficulty1,expected1:phase2)                                   -0.39
## cor(difficulty2,expected1:phase2)                                   -0.38
## cor(expected1:phase1,expected1:phase2)                              -0.47
## cor(Intercept,expected1:difficulty1)                                -0.44
## cor(expected1,expected1:difficulty1)                                -0.41
## cor(phase1,expected1:difficulty1)                                   -0.41
## cor(phase2,expected1:difficulty1)                                   -0.37
## cor(difficulty1,expected1:difficulty1)                              -0.46
## cor(difficulty2,expected1:difficulty1)                              -0.43
```

```
## cor(expected1:phase1,expected1:difficulty1)                    -0.42
## cor(expected1:phase2,expected1:difficulty1)                    -0.43
## cor(Intercept,expected1:difficulty2)                           -0.40
## cor(expected1,expected1:difficulty2)                           -0.35
## cor(phase1,expected1:difficulty2)                              -0.08
## cor(phase2,expected1:difficulty2)                              -0.36
## cor(difficulty1,expected1:difficulty2)                         -0.49
## cor(difficulty2,expected1:difficulty2)                         -0.47
## cor(expected1:phase1,expected1:difficulty2)                    -0.41
## cor(expected1:phase2,expected1:difficulty2)                    -0.38
## cor(expected1:difficulty1,expected1:difficulty2)               -0.46
## cor(Intercept,phase1:difficulty1)                              -0.43
## cor(expected1,phase1:difficulty1)                              -0.45
## cor(phase1,phase1:difficulty1)                                 -0.40
## cor(phase2,phase1:difficulty1)                                 -0.41
## cor(difficulty1,phase1:difficulty1)                            -0.43
## cor(difficulty2,phase1:difficulty1)                            -0.43
## cor(expected1:phase1,phase1:difficulty1)                       -0.44
## cor(expected1:phase2,phase1:difficulty1)                       -0.43
## cor(expected1:difficulty1,phase1:difficulty1)                  -0.42
## cor(expected1:difficulty2,phase1:difficulty1)                  -0.39
## cor(Intercept,phase2:difficulty1)                              -0.39
## cor(expected1,phase2:difficulty1)                              -0.31
## cor(phase1,phase2:difficulty1)                                 -0.43
## cor(phase2,phase2:difficulty1)                                 -0.43
## cor(difficulty1,phase2:difficulty1)                            -0.33
## cor(difficulty2,phase2:difficulty1)                            -0.38
## cor(expected1:phase1,phase2:difficulty1)                       -0.43
## cor(expected1:phase2,phase2:difficulty1)                       -0.40
## cor(expected1:difficulty1,phase2:difficulty1)                  -0.40
## cor(expected1:difficulty2,phase2:difficulty1)                  -0.38
## cor(phase1:difficulty1,phase2:difficulty1)                     -0.46
## cor(Intercept,phase1:difficulty2)                              -0.39
## cor(expected1,phase1:difficulty2)                              -0.44
## cor(phase1,phase1:difficulty2)                                 -0.38
## cor(phase2,phase1:difficulty2)                                 -0.38
## cor(difficulty1,phase1:difficulty2)                            -0.45
## cor(difficulty2,phase1:difficulty2)                            -0.42
## cor(expected1:phase1,phase1:difficulty2)                       -0.45
## cor(expected1:phase2,phase1:difficulty2)                       -0.43
## cor(expected1:difficulty1,phase1:difficulty2)                  -0.43
## cor(expected1:difficulty2,phase1:difficulty2)                  -0.36
## cor(phase1:difficulty1,phase1:difficulty2)                     -0.44
## cor(phase2:difficulty1,phase1:difficulty2)                     -0.45
## cor(Intercept,phase2:difficulty2)                              -0.35
## cor(expected1,phase2:difficulty2)                              -0.41
## cor(phase1,phase2:difficulty2)                                 -0.47
## cor(phase2,phase2:difficulty2)                                 -0.40
## cor(difficulty1,phase2:difficulty2)                            -0.39
## cor(difficulty2,phase2:difficulty2)                            -0.41
## cor(expected1:phase1,phase2:difficulty2)                       -0.41
## cor(expected1:phase2,phase2:difficulty2)                       -0.40
## cor(expected1:difficulty1,phase2:difficulty2)                  -0.44
## cor(expected1:difficulty2,phase2:difficulty2)                  -0.44
## cor(phase1:difficulty1,phase2:difficulty2)                     -0.45
## cor(phase2:difficulty1,phase2:difficulty2)                     -0.46
## cor(phase1:difficulty2,phase2:difficulty2)                     -0.43
## cor(Intercept,expected1:phase1:difficulty1)                    -0.37
## cor(expected1,expected1:phase1:difficulty1)                    -0.45
## cor(phase1,expected1:phase1:difficulty1)                       -0.42
```

```
## cor(phase2,expected1:phase1:difficulty1)                            -0.38
## cor(difficulty1,expected1:phase1:difficulty1)                       -0.42
## cor(difficulty2,expected1:phase1:difficulty1)                       -0.44
## cor(expected1:phase1,expected1:phase1:difficulty1)                  -0.43
## cor(expected1:phase2,expected1:phase1:difficulty1)                  -0.42
## cor(expected1:difficulty1,expected1:phase1:difficulty1)             -0.41
## cor(expected1:difficulty2,expected1:phase1:difficulty1)             -0.41
## cor(phase1:difficulty1,expected1:phase1:difficulty1)                -0.45
## cor(phase2:difficulty1,expected1:phase1:difficulty1)                -0.45
## cor(phase1:difficulty2,expected1:phase1:difficulty1)                -0.44
## cor(phase2:difficulty2,expected1:phase1:difficulty1)                -0.44
## cor(Intercept,expected1:phase2:difficulty1)                         -0.33
## cor(expected1,expected1:phase2:difficulty1)                         -0.40
## cor(phase1,expected1:phase2:difficulty1)                            -0.38
## cor(phase2,expected1:phase2:difficulty1)                            -0.35
## cor(difficulty1,expected1:phase2:difficulty1)                       -0.42
## cor(difficulty2,expected1:phase2:difficulty1)                       -0.41
## cor(expected1:phase1,expected1:phase2:difficulty1)                  -0.42
## cor(expected1:phase2,expected1:phase2:difficulty1)                  -0.42
## cor(expected1:difficulty1,expected1:phase2:difficulty1)             -0.43
## cor(expected1:difficulty2,expected1:phase2:difficulty1)             -0.41
## cor(phase1:difficulty1,expected1:phase2:difficulty1)                -0.43
## cor(phase2:difficulty1,expected1:phase2:difficulty1)                -0.45
## cor(phase1:difficulty2,expected1:phase2:difficulty1)                -0.42
## cor(phase2:difficulty2,expected1:phase2:difficulty1)                -0.44
## cor(expected1:phase1:difficulty1,expected1:phase2:difficulty1)      -0.43
## cor(Intercept,expected1:phase1:difficulty2)                         -0.37
## cor(expected1,expected1:phase1:difficulty2)                         -0.47
## cor(phase1,expected1:phase1:difficulty2)                            -0.44
## cor(phase2,expected1:phase1:difficulty2)                            -0.33
## cor(difficulty1,expected1:phase1:difficulty2)                       -0.43
## cor(difficulty2,expected1:phase1:difficulty2)                       -0.40
## cor(expected1:phase1,expected1:phase1:difficulty2)                  -0.46
## cor(expected1:phase2,expected1:phase1:difficulty2)                  -0.39
## cor(expected1:difficulty1,expected1:phase1:difficulty2)             -0.43
## cor(expected1:difficulty2,expected1:phase1:difficulty2)             -0.38
## cor(phase1:difficulty1,expected1:phase1:difficulty2)                -0.43
## cor(phase2:difficulty1,expected1:phase1:difficulty2)                -0.43
## cor(phase1:difficulty2,expected1:phase1:difficulty2)                -0.44
## cor(phase2:difficulty2,expected1:phase1:difficulty2)                -0.42
## cor(expected1:phase1:difficulty1,expected1:phase1:difficulty2)      -0.43
## cor(expected1:phase2:difficulty1,expected1:phase1:difficulty2)      -0.41
## cor(Intercept,expected1:phase2:difficulty2)                         -0.34
## cor(expected1,expected1:phase2:difficulty2)                         -0.43
## cor(phase1,expected1:phase2:difficulty2)                            -0.45
## cor(phase2,expected1:phase2:difficulty2)                            -0.35
## cor(difficulty1,expected1:phase2:difficulty2)                       -0.42
## cor(difficulty2,expected1:phase2:difficulty2)                       -0.41
## cor(expected1:phase1,expected1:phase2:difficulty2)                  -0.42
## cor(expected1:phase2,expected1:phase2:difficulty2)                  -0.40
## cor(expected1:difficulty1,expected1:phase2:difficulty2)             -0.44
## cor(expected1:difficulty2,expected1:phase2:difficulty2)             -0.45
## cor(phase1:difficulty1,expected1:phase2:difficulty2)                -0.42
## cor(phase2:difficulty1,expected1:phase2:difficulty2)                -0.45
## cor(phase1:difficulty2,expected1:phase2:difficulty2)                -0.41
## cor(phase2:difficulty2,expected1:phase2:difficulty2)                -0.43
## cor(expected1:phase1:difficulty1,expected1:phase2:difficulty2)      -0.41
## cor(expected1:phase2:difficulty1,expected1:phase2:difficulty2)      -0.44
## cor(expected1:phase1:difficulty2,expected1:phase2:difficulty2)      -0.42
##                                                                  u-95% CI Rhat
```

```
## sd(Intercept)                                        0.20 1.00
## sd(expected1)                                        0.02 1.00
## sd(phase1)                                           0.07 1.00
## sd(phase2)                                           0.03 1.00
## sd(difficulty1)                                      0.02 1.00
## sd(difficulty2)                                      0.02 1.00
## sd(expected1:phase1)                                 0.02 1.00
## sd(expected1:phase2)                                 0.02 1.00
## sd(expected1:difficulty1)                            0.01 1.00
## sd(expected1:difficulty2)                            0.02 1.00
## sd(phase1:difficulty1)                               0.02 1.00
## sd(phase2:difficulty1)                               0.03 1.00
## sd(phase1:difficulty2)                               0.02 1.00
## sd(phase2:difficulty2)                               0.02 1.00
## sd(expected1:phase1:difficulty1)                     0.02 1.00
## sd(expected1:phase2:difficulty1)                     0.02 1.00
## sd(expected1:phase1:difficulty2)                     0.02 1.00
## sd(expected1:phase2:difficulty2)                     0.02 1.00
## cor(Intercept,expected1)                             0.35 1.00
## cor(Intercept,phase1)                                0.22 1.00
## cor(expected1,phase1)                                0.46 1.00
## cor(Intercept,phase2)                                0.29 1.00
## cor(expected1,phase2)                                0.37 1.00
## cor(phase1,phase2)                                   0.18 1.00
## cor(Intercept,difficulty1)                           0.35 1.00
## cor(expected1,difficulty1)                           0.46 1.00
## cor(phase1,difficulty1)                              0.26 1.00
## cor(phase2,difficulty1)                              0.41 1.00
## cor(Intercept,difficulty2)                           0.39 1.00
## cor(expected1,difficulty2)                           0.44 1.00
## cor(phase1,difficulty2)                              0.34 1.00
## cor(phase2,difficulty2)                              0.42 1.00
## cor(difficulty1,difficulty2)                         0.43 1.00
## cor(Intercept,expected1:phase1)                      0.36 1.00
## cor(expected1,expected1:phase1)                      0.47 1.00
## cor(phase1,expected1:phase1)                         0.43 1.00
## cor(phase2,expected1:phase1)                         0.35 1.00
## cor(difficulty1,expected1:phase1)                    0.41 1.00
## cor(difficulty2,expected1:phase1)                    0.42 1.00
## cor(Intercept,expected1:phase2)                      0.45 1.00
## cor(expected1,expected1:phase2)                      0.42 1.00
## cor(phase1,expected1:phase2)                         0.34 1.00
## cor(phase2,expected1:phase2)                         0.36 1.00
## cor(difficulty1,expected1:phase2)                    0.45 1.00
## cor(difficulty2,expected1:phase2)                    0.48 1.00
## cor(expected1:phase1,expected1:phase2)               0.38 1.00
## cor(Intercept,expected1:difficulty1)                 0.38 1.00
## cor(expected1,expected1:difficulty1)                 0.44 1.00
## cor(phase1,expected1:difficulty1)                    0.41 1.00
## cor(phase2,expected1:difficulty1)                    0.46 1.00
## cor(difficulty1,expected1:difficulty1)               0.41 1.00
## cor(difficulty2,expected1:difficulty1)               0.42 1.00
## cor(expected1:phase1,expected1:difficulty1)          0.42 1.00
## cor(expected1:phase2,expected1:difficulty1)          0.41 1.00
## cor(Intercept,expected1:difficulty2)                 0.27 1.00
## cor(expected1,expected1:difficulty2)                 0.43 1.00
## cor(phase1,expected1:difficulty2)                    0.60 1.00
## cor(phase2,expected1:difficulty2)                    0.38 1.00
## cor(difficulty1,expected1:difficulty2)               0.34 1.00
## cor(difficulty2,expected1:difficulty2)               0.37 1.00
```

```
## cor(expected1:phase1,expected1:difficulty2)                          0.41 1.00
## cor(expected1:phase2,expected1:difficulty2)                          0.45 1.00
## cor(expected1:difficulty1,expected1:difficulty2)                     0.39 1.00
## cor(Intercept,phase1:difficulty1)                                    0.39 1.00
## cor(expected1,phase1:difficulty1)                                    0.39 1.00
## cor(phase1,phase1:difficulty1)                                       0.43 1.00
## cor(phase2,phase1:difficulty1)                                       0.43 1.00
## cor(difficulty1,phase1:difficulty1)                                  0.42 1.00
## cor(difficulty2,phase1:difficulty1)                                  0.42 1.00
## cor(expected1:phase1,phase1:difficulty1)                             0.40 1.00
## cor(expected1:phase2,phase1:difficulty1)                             0.41 1.00
## cor(expected1:difficulty1,phase1:difficulty1)                        0.43 1.00
## cor(expected1:difficulty2,phase1:difficulty1)                        0.45 1.00
## cor(Intercept,phase2:difficulty1)                                    0.33 1.00
## cor(expected1,phase2:difficulty1)                                    0.48 1.00
## cor(phase1,phase2:difficulty1)                                       0.29 1.00
## cor(phase2,phase2:difficulty1)                                       0.34 1.00
## cor(difficulty1,phase2:difficulty1)                                  0.49 1.00
## cor(difficulty2,phase2:difficulty1)                                  0.46 1.00
## cor(expected1:phase1,phase2:difficulty1)                             0.40 1.00
## cor(expected1:phase2,phase2:difficulty1)                             0.44 1.00
## cor(expected1:difficulty1,phase2:difficulty1)                        0.44 1.00
## cor(expected1:difficulty2,phase2:difficulty1)                        0.42 1.00
## cor(phase1:difficulty1,phase2:difficulty1)                           0.39 1.00
## cor(Intercept,phase1:difficulty2)                                    0.44 1.00
## cor(expected1,phase1:difficulty2)                                    0.40 1.00
## cor(phase1,phase1:difficulty2)                                       0.45 1.00
## cor(phase2,phase1:difficulty2)                                       0.47 1.00
## cor(difficulty1,phase1:difficulty2)                                  0.39 1.00
## cor(difficulty2,phase1:difficulty2)                                  0.42 1.00
## cor(expected1:phase1,phase1:difficulty2)                             0.40 1.00
## cor(expected1:phase2,phase1:difficulty2)                             0.41 1.00
## cor(expected1:difficulty1,phase1:difficulty2)                        0.42 1.00
## cor(expected1:difficulty2,phase1:difficulty2)                        0.46 1.00
## cor(phase1:difficulty1,phase1:difficulty2)                           0.42 1.00
## cor(phase2:difficulty1,phase1:difficulty2)                           0.39 1.00
## cor(Intercept,phase2:difficulty2)                                    0.42 1.00
## cor(expected1,phase2:difficulty2)                                    0.42 1.00
## cor(phase1,phase2:difficulty2)                                       0.33 1.00
## cor(phase2,phase2:difficulty2)                                       0.40 1.00
## cor(difficulty1,phase2:difficulty2)                                  0.44 1.00
## cor(difficulty2,phase2:difficulty2)                                  0.43 1.00
## cor(expected1:phase1,phase2:difficulty2)                             0.44 1.00
## cor(expected1:phase2,phase2:difficulty2)                             0.43 1.00
## cor(expected1:difficulty1,phase2:difficulty2)                        0.41 1.00
## cor(expected1:difficulty2,phase2:difficulty2)                        0.38 1.00
## cor(phase1:difficulty1,phase2:difficulty2)                           0.41 1.00
## cor(phase2:difficulty1,phase2:difficulty2)                           0.38 1.00
## cor(phase1:difficulty2,phase2:difficulty2)                           0.41 1.00
## cor(Intercept,expected1:phase1:difficulty1)                          0.44 1.00
## cor(expected1,expected1:phase1:difficulty1)                          0.38 1.00
## cor(phase1,expected1:phase1:difficulty1)                             0.40 1.00
## cor(phase2,expected1:phase1:difficulty1)                             0.46 1.00
## cor(difficulty1,expected1:phase1:difficulty1)                        0.42 1.00
## cor(difficulty2,expected1:phase1:difficulty1)                        0.41 1.00
## cor(expected1:phase1,expected1:phase1:difficulty1)                   0.41 1.00
## cor(expected1:phase2,expected1:phase1:difficulty1)                   0.43 1.00
## cor(expected1:difficulty1,expected1:phase1:difficulty1)              0.44 1.00
## cor(expected1:difficulty2,expected1:phase1:difficulty1)              0.42 1.00
## cor(phase1:difficulty1,expected1:phase1:difficulty1)                 0.41 1.00
```

```
## cor(phase2:difficulty1,expected1:phase1:difficulty1)                0.39 1.00
## cor(phase1:difficulty2,expected1:phase1:difficulty1)                0.41 1.00
## cor(phase2:difficulty2,expected1:phase1:difficulty1)                0.40 1.00
## cor(Intercept,expected1:phase2:difficulty1)                         0.49 1.00
## cor(expected1,expected1:phase2:difficulty1)                         0.44 1.00
## cor(phase1,expected1:phase2:difficulty1)                            0.44 1.00
## cor(phase2,expected1:phase2:difficulty1)                            0.48 1.00
## cor(difficulty1,expected1:phase2:difficulty1)                       0.42 1.00
## cor(difficulty2,expected1:phase2:difficulty1)                       0.42 1.00
## cor(expected1:phase1,expected1:phase2:difficulty1)                  0.42 1.00
## cor(expected1:phase2,expected1:phase2:difficulty1)                  0.43 1.00
## cor(expected1:difficulty1,expected1:phase2:difficulty1)             0.42 1.00
## cor(expected1:difficulty2,expected1:phase2:difficulty1)             0.42 1.00
## cor(phase1:difficulty1,expected1:phase2:difficulty1)                0.42 1.00
## cor(phase2:difficulty1,expected1:phase2:difficulty1)                0.39 1.00
## cor(phase1:difficulty2,expected1:phase2:difficulty1)                0.42 1.00
## cor(phase2:difficulty2,expected1:phase2:difficulty1)                0.40 1.00
## cor(expected1:phase1:difficulty1,expected1:phase2:difficulty1)      0.41 1.00
## cor(Intercept,expected1:phase1:difficulty2)                         0.43 1.00
## cor(expected1,expected1:phase1:difficulty2)                         0.36 1.00
## cor(phase1,expected1:phase1:difficulty2)                            0.36 1.00
## cor(phase2,expected1:phase1:difficulty2)                            0.50 1.00
## cor(difficulty1,expected1:phase1:difficulty2)                       0.41 1.00
## cor(difficulty2,expected1:phase1:difficulty2)                       0.45 1.00
## cor(expected1:phase1,expected1:phase1:difficulty2)                  0.38 1.00
## cor(expected1:phase2,expected1:phase1:difficulty2)                  0.45 1.00
## cor(expected1:difficulty1,expected1:phase1:difficulty2)             0.41 1.00
## cor(expected1:difficulty2,expected1:phase1:difficulty2)             0.45 1.00
## cor(phase1:difficulty1,expected1:phase1:difficulty2)                0.41 1.00
## cor(phase2:difficulty1,expected1:phase1:difficulty2)                0.41 1.00
## cor(phase1:difficulty2,expected1:phase1:difficulty2)                0.40 1.00
## cor(phase2:difficulty2,expected1:phase1:difficulty2)                0.41 1.00
## cor(expected1:phase1:difficulty1,expected1:phase1:difficulty2)      0.41 1.00
## cor(expected1:phase2:difficulty1,expected1:phase1:difficulty2)      0.43 1.00
## cor(Intercept,expected1:phase2:difficulty2)                         0.49 1.00
## cor(expected1,expected1:phase2:difficulty2)                         0.41 1.00
## cor(phase1,expected1:phase2:difficulty2)                            0.38 1.00
## cor(phase2,expected1:phase2:difficulty2)                            0.49 1.00
## cor(difficulty1,expected1:phase2:difficulty2)                       0.42 1.00
## cor(difficulty2,expected1:phase2:difficulty2)                       0.44 1.00
## cor(expected1:phase1,expected1:phase2:difficulty2)                  0.43 1.00
## cor(expected1:phase2,expected1:phase2:difficulty2)                  0.45 1.00
## cor(expected1:difficulty1,expected1:phase2:difficulty2)             0.40 1.00
## cor(expected1:difficulty2,expected1:phase2:difficulty2)             0.38 1.00
## cor(phase1:difficulty1,expected1:phase2:difficulty2)                0.42 1.00
## cor(phase2:difficulty1,expected1:phase2:difficulty2)                0.39 1.00
## cor(phase1:difficulty2,expected1:phase2:difficulty2)                0.43 1.00
## cor(phase2:difficulty2,expected1:phase2:difficulty2)                0.41 1.00
## cor(expected1:phase1:difficulty1,expected1:phase2:difficulty2)      0.43 1.00
## cor(expected1:phase2:difficulty1,expected1:phase2:difficulty2)      0.41 1.00
## cor(expected1:phase1:difficulty2,expected1:phase2:difficulty2)      0.43 1.00
##                                                                  Bulk_ESS
## sd(Intercept)                                                        3149
## sd(expected1)                                                        4745
## sd(phase1)                                                           7678
## sd(phase2)                                                           7995
## sd(difficulty1)                                                      5760
## sd(difficulty2)                                                      6791
## sd(expected1:phase1)                                                 4821
## sd(expected1:phase2)                                                 5887
```

```
## sd(expected1:difficulty1)                                  9067
## sd(expected1:difficulty2)                                  6088
## sd(phase1:difficulty1)                                    10782
## sd(phase2:difficulty1)                                     4812
## sd(phase1:difficulty2)                                     8954
## sd(phase2:difficulty2)                                     5878
## sd(expected1:phase1:difficulty1)                           8722
## sd(expected1:phase2:difficulty1)                           8523
## sd(expected1:phase1:difficulty2)                           6855
## sd(expected1:phase2:difficulty2)                           8083
## cor(Intercept,expected1)                                  27289
## cor(Intercept,phase1)                                      9349
## cor(expected1,phase1)                                      2613
## cor(Intercept,phase2)                                     18825
## cor(expected1,phase2)                                      8621
## cor(phase1,phase2)                                        15074
## cor(Intercept,difficulty1)                                34860
## cor(expected1,difficulty1)                                17919
## cor(phase1,difficulty1)                                   21107
## cor(phase2,difficulty1)                                   25935
## cor(Intercept,difficulty2)                                35309
## cor(expected1,difficulty2)                                24094
## cor(phase1,difficulty2)                                   28374
## cor(phase2,difficulty2)                                   27923
## cor(difficulty1,difficulty2)                              20285
## cor(Intercept,expected1:phase1)                           35442
## cor(expected1,expected1:phase1)                           19747
## cor(phase1,expected1:phase1)                              30130
## cor(phase2,expected1:phase1)                              20802
## cor(difficulty1,expected1:phase1)                         17965
## cor(difficulty2,expected1:phase1)                         16948
## cor(Intercept,expected1:phase2)                           34728
## cor(expected1,expected1:phase2)                           26274
## cor(phase1,expected1:phase2)                              27911
## cor(phase2,expected1:phase2)                              22263
## cor(difficulty1,expected1:phase2)                         19179
## cor(difficulty2,expected1:phase2)                         14220
## cor(expected1:phase1,expected1:phase2)                    17477
## cor(Intercept,expected1:difficulty1)                      35774
## cor(expected1,expected1:difficulty1)                      31034
## cor(phase1,expected1:difficulty1)                         31936
## cor(phase2,expected1:difficulty1)                         27614
## cor(difficulty1,expected1:difficulty1)                    21439
## cor(difficulty2,expected1:difficulty1)                    20297
## cor(expected1:phase1,expected1:difficulty1)               19323
## cor(expected1:phase2,expected1:difficulty1)               15576
## cor(Intercept,expected1:difficulty2)                      26699
## cor(expected1,expected1:difficulty2)                      12358
## cor(phase1,expected1:difficulty2)                         18573
## cor(phase2,expected1:difficulty2)                         19170
## cor(difficulty1,expected1:difficulty2)                    12139
## cor(difficulty2,expected1:difficulty2)                    14601
## cor(expected1:phase1,expected1:difficulty2)               13726
## cor(expected1:phase2,expected1:difficulty2)               11892
## cor(expected1:difficulty1,expected1:difficulty2)          12103
## cor(Intercept,phase1:difficulty1)                         37352
## cor(expected1,phase1:difficulty1)                         32823
## cor(phase1,phase1:difficulty1)                            35470
## cor(phase2,phase1:difficulty1)                            27977
## cor(difficulty1,phase1:difficulty1)                       21646
```

```
## cor(difficulty2,phase1:difficulty1)                                  19556
## cor(expected1:phase1,phase1:difficulty1)                             18786
## cor(expected1:phase2,phase1:difficulty1)                             17036
## cor(expected1:difficulty1,phase1:difficulty1)                        14101
## cor(expected1:difficulty2,phase1:difficulty1)                        18993
## cor(Intercept,phase2:difficulty1)                                    28050
## cor(expected1,phase2:difficulty1)                                    14117
## cor(phase1,phase2:difficulty1)                                       25198
## cor(phase2,phase2:difficulty1)                                       20726
## cor(difficulty1,phase2:difficulty1)                                  13103
## cor(difficulty2,phase2:difficulty1)                                  13036
## cor(expected1:phase1,phase2:difficulty1)                             13805
## cor(expected1:phase2,phase2:difficulty1)                             14182
## cor(expected1:difficulty1,phase2:difficulty1)                        13134
## cor(expected1:difficulty2,phase2:difficulty1)                        15978
## cor(phase1:difficulty1,phase2:difficulty1)                           12604
## cor(Intercept,phase1:difficulty2)                                    34092
## cor(expected1,phase1:difficulty2)                                    30039
## cor(phase1,phase1:difficulty2)                                       31498
## cor(phase2,phase1:difficulty2)                                       25545
## cor(difficulty1,phase1:difficulty2)                                  20397
## cor(difficulty2,phase1:difficulty2)                                  19287
## cor(expected1:phase1,phase1:difficulty2)                             18012
## cor(expected1:phase2,phase1:difficulty2)                             16964
## cor(expected1:difficulty1,phase1:difficulty2)                        13838
## cor(expected1:difficulty2,phase1:difficulty2)                        18331
## cor(phase1:difficulty1,phase1:difficulty2)                           13161
## cor(phase2:difficulty1,phase1:difficulty2)                           15761
## cor(Intercept,phase2:difficulty2)                                    31526
## cor(expected1,phase2:difficulty2)                                    24938
## cor(phase1,phase2:difficulty2)                                       23884
## cor(phase2,phase2:difficulty2)                                       25363
## cor(difficulty1,phase2:difficulty2)                                  18090
## cor(difficulty2,phase2:difficulty2)                                  16719
## cor(expected1:phase1,phase2:difficulty2)                             17322
## cor(expected1:phase2,phase2:difficulty2)                             15872
## cor(expected1:difficulty1,phase2:difficulty2)                        14167
## cor(expected1:difficulty2,phase2:difficulty2)                        18084
## cor(phase1:difficulty1,phase2:difficulty2)                           12081
## cor(phase2:difficulty1,phase2:difficulty2)                           14874
## cor(phase1:difficulty2,phase2:difficulty2)                           12833
## cor(Intercept,expected1:phase1:difficulty1)                          33605
## cor(expected1,expected1:phase1:difficulty1)                          27705
## cor(phase1,expected1:phase1:difficulty1)                             35093
## cor(phase2,expected1:phase1:difficulty1)                             27745
## cor(difficulty1,expected1:phase1:difficulty1)                        21512
## cor(difficulty2,expected1:phase1:difficulty1)                        20067
## cor(expected1:phase1,expected1:phase1:difficulty1)                   18415
## cor(expected1:phase2,expected1:phase1:difficulty1)                   16294
## cor(expected1:difficulty1,expected1:phase1:difficulty1)              15096
## cor(expected1:difficulty2,expected1:phase1:difficulty1)              20155
## cor(phase1:difficulty1,expected1:phase1:difficulty1)                 12484
## cor(phase2:difficulty1,expected1:phase1:difficulty1)                 15997
## cor(phase1:difficulty2,expected1:phase1:difficulty1)                 11619
## cor(phase2:difficulty2,expected1:phase1:difficulty1)                 12280
## cor(Intercept,expected1:phase2:difficulty1)                          26990
## cor(expected1,expected1:phase2:difficulty1)                          27447
## cor(phase1,expected1:phase2:difficulty1)                             30311
## cor(phase2,expected1:phase2:difficulty1)                             22611
## cor(difficulty1,expected1:phase2:difficulty1)                        20483
```

```
## cor(difficulty2,expected1:phase2:difficulty1)                     19350
## cor(expected1:phase1,expected1:phase2:difficulty1)                17896
## cor(expected1:phase2,expected1:phase2:difficulty1)                17484
## cor(expected1:difficulty1,expected1:phase2:difficulty1)           14938
## cor(expected1:difficulty2,expected1:phase2:difficulty1)           20080
## cor(phase1:difficulty1,expected1:phase2:difficulty1)              12491
## cor(phase2:difficulty1,expected1:phase2:difficulty1)              15188
## cor(phase1:difficulty2,expected1:phase2:difficulty1)              11531
## cor(phase2:difficulty2,expected1:phase2:difficulty1)              12837
## cor(expected1:phase1:difficulty1,expected1:phase2:difficulty1)    10815
## cor(Intercept,expected1:phase1:difficulty2)                       34730
## cor(expected1,expected1:phase1:difficulty2)                       23642
## cor(phase1,expected1:phase1:difficulty2)                          28945
## cor(phase2,expected1:phase1:difficulty2)                          20249
## cor(difficulty1,expected1:phase1:difficulty2)                     19707
## cor(difficulty2,expected1:phase1:difficulty2)                     18108
## cor(expected1:phase1,expected1:phase1:difficulty2)                15806
## cor(expected1:phase2,expected1:phase1:difficulty2)                14364
## cor(expected1:difficulty1,expected1:phase1:difficulty2)           15408
## cor(expected1:difficulty2,expected1:phase1:difficulty2)           18049
## cor(phase1:difficulty1,expected1:phase1:difficulty2)              13491
## cor(phase2:difficulty1,expected1:phase1:difficulty2)              17107
## cor(phase1:difficulty2,expected1:phase1:difficulty2)              12272
## cor(phase2:difficulty2,expected1:phase1:difficulty2)              12874
## cor(expected1:phase1:difficulty1,expected1:phase1:difficulty2)    11083
## cor(expected1:phase2:difficulty1,expected1:phase1:difficulty2)    11112
## cor(Intercept,expected1:phase2:difficulty2)                       28133
## cor(expected1,expected1:phase2:difficulty2)                       28291
## cor(phase1,expected1:phase2:difficulty2)                          31934
## cor(phase2,expected1:phase2:difficulty2)                          25747
## cor(difficulty1,expected1:phase2:difficulty2)                     21361
## cor(difficulty2,expected1:phase2:difficulty2)                     18911
## cor(expected1:phase1,expected1:phase2:difficulty2)                19111
## cor(expected1:phase2,expected1:phase2:difficulty2)                16030
## cor(expected1:difficulty1,expected1:phase2:difficulty2)           13591
## cor(expected1:difficulty2,expected1:phase2:difficulty2)           19047
## cor(phase1:difficulty1,expected1:phase2:difficulty2)              12615
## cor(phase2:difficulty1,expected1:phase2:difficulty2)              14862
## cor(phase1:difficulty2,expected1:phase2:difficulty2)              12112
## cor(phase2:difficulty2,expected1:phase2:difficulty2)              13632
## cor(expected1:phase1:difficulty1,expected1:phase2:difficulty2)    11191
## cor(expected1:phase2:difficulty1,expected1:phase2:difficulty2)     9659
## cor(expected1:phase1:difficulty2,expected1:phase2:difficulty2)    11249
##                                                                 Tail_ESS
## sd(Intercept)                                                       5544
## sd(expected1)                                                       4084
## sd(phase1)                                                         11763
## sd(phase2)                                                          9176
## sd(difficulty1)                                                     7605
## sd(difficulty2)                                                     8670
## sd(expected1:phase1)                                                8183
## sd(expected1:phase2)                                                8133
## sd(expected1:difficulty1)                                           8851
## sd(expected1:difficulty2)                                           4343
## sd(phase1:difficulty1)                                              9577
## sd(phase2:difficulty1)                                              5235
## sd(phase1:difficulty2)                                              8480
## sd(phase2:difficulty2)                                              7346
## sd(expected1:phase1:difficulty1)                                    8137
## sd(expected1:phase2:difficulty1)                                    9658
```

```
## sd(expected1:phase1:difficulty2)                                7577
## sd(expected1:phase2:difficulty2)                                8810
## cor(Intercept,expected1)                                       14201
## cor(Intercept,phase1)                                          11917
## cor(expected1,phase1)                                           5125
## cor(Intercept,phase2)                                          14694
## cor(expected1,phase2)                                          11478
## cor(phase1,phase2)                                             14457
## cor(Intercept,difficulty1)                                     14221
## cor(expected1,difficulty1)                                     12664
## cor(phase1,difficulty1)                                        14083
## cor(phase2,difficulty1)                                        13281
## cor(Intercept,difficulty2)                                     12870
## cor(expected1,difficulty2)                                     14092
## cor(phase1,difficulty2)                                        14199
## cor(phase2,difficulty2)                                        14664
## cor(difficulty1,difficulty2)                                   13949
## cor(Intercept,expected1:phase1)                                12829
## cor(expected1,expected1:phase1)                                13463
## cor(phase1,expected1:phase1)                                   13750
## cor(phase2,expected1:phase1)                                   13930
## cor(difficulty1,expected1:phase1)                              14732
## cor(difficulty2,expected1:phase1)                              15016
## cor(Intercept,expected1:phase2)                                13878
## cor(expected1,expected1:phase2)                                13258
## cor(phase1,expected1:phase2)                                   13628
## cor(phase2,expected1:phase2)                                   14212
## cor(difficulty1,expected1:phase2)                              14839
## cor(difficulty2,expected1:phase2)                              13554
## cor(expected1:phase1,expected1:phase2)                         15153
## cor(Intercept,expected1:difficulty1)                           13338
## cor(expected1,expected1:difficulty1)                           13438
## cor(phase1,expected1:difficulty1)                              12880
## cor(phase2,expected1:difficulty1)                              13220
## cor(difficulty1,expected1:difficulty1)                         14011
## cor(difficulty2,expected1:difficulty1)                         14546
## cor(expected1:phase1,expected1:difficulty1)                    14257
## cor(expected1:phase2,expected1:difficulty1)                    12705
## cor(Intercept,expected1:difficulty2)                           13952
## cor(expected1,expected1:difficulty2)                           13583
## cor(phase1,expected1:difficulty2)                              12697
## cor(phase2,expected1:difficulty2)                              14952
## cor(difficulty1,expected1:difficulty2)                         14318
## cor(difficulty2,expected1:difficulty2)                         14570
## cor(expected1:phase1,expected1:difficulty2)                    15096
## cor(expected1:phase2,expected1:difficulty2)                    14788
## cor(expected1:difficulty1,expected1:difficulty2)               15125
## cor(Intercept,phase1:difficulty1)                              13678
## cor(expected1,phase1:difficulty1)                              14233
## cor(phase1,phase1:difficulty1)                                 13191
## cor(phase2,phase1:difficulty1)                                 13129
## cor(difficulty1,phase1:difficulty1)                            13692
## cor(difficulty2,phase1:difficulty1)                            14200
## cor(expected1:phase1,phase1:difficulty1)                       14026
## cor(expected1:phase2,phase1:difficulty1)                       14219
## cor(expected1:difficulty1,phase1:difficulty1)                  14254
## cor(expected1:difficulty2,phase1:difficulty1)                  15218
## cor(Intercept,phase2:difficulty1)                              12762
## cor(expected1,phase2:difficulty1)                              13558
## cor(phase1,phase2:difficulty1)                                 14444
```

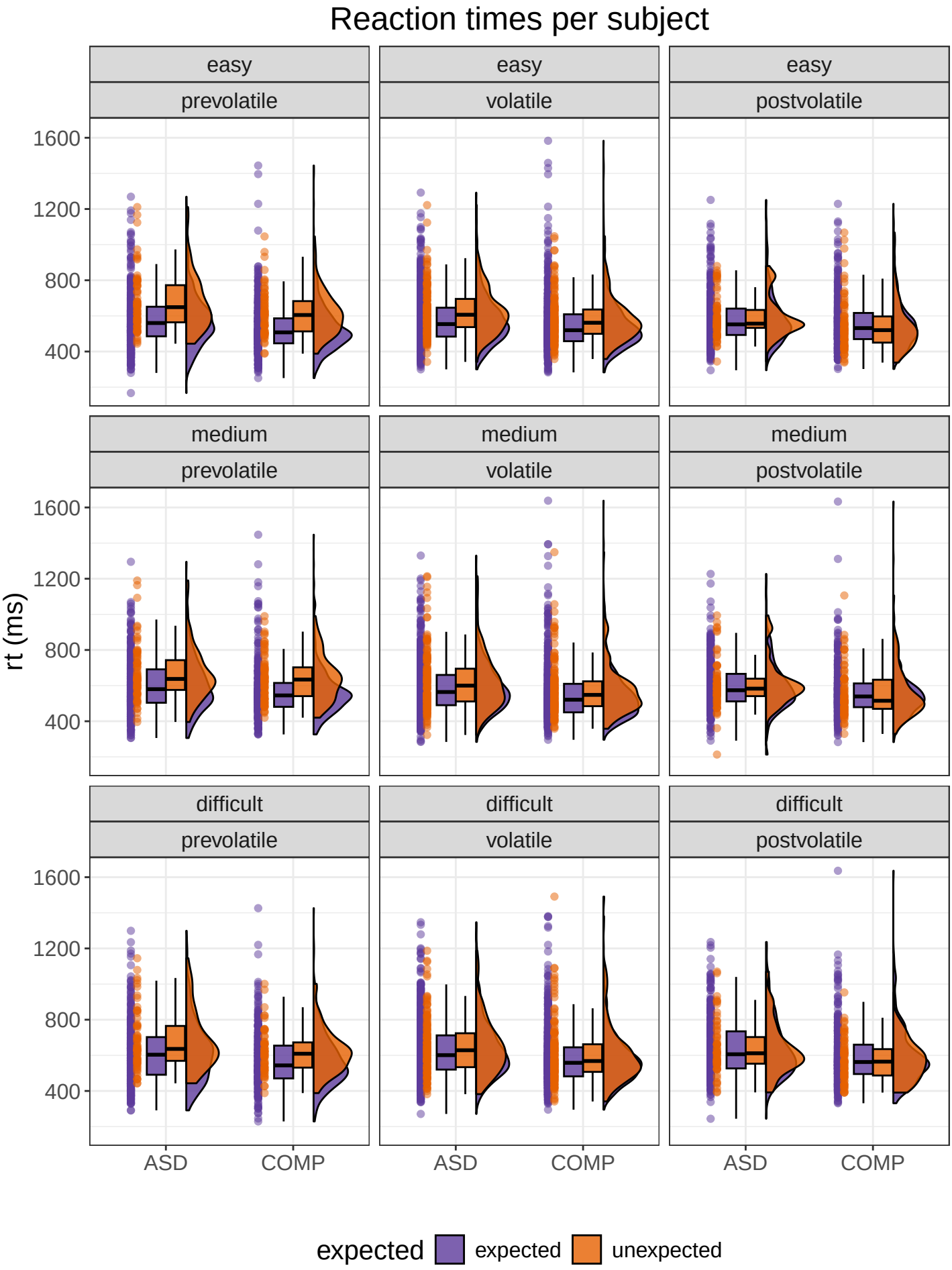
```
## cor(phase2,phase2:difficulty1)                                    13904
## cor(difficulty1,phase2:difficulty1)                               13969
## cor(difficulty2,phase2:difficulty1)                               14586
## cor(expected1:phase1,phase2:difficulty1)                          14625
## cor(expected1:phase2,phase2:difficulty1)                          15007
## cor(expected1:difficulty1,phase2:difficulty1)                     13761
## cor(expected1:difficulty2,phase2:difficulty1)                     16048
## cor(phase1:difficulty1,phase2:difficulty1)                        14648
## cor(Intercept,phase1:difficulty2)                                 13578
## cor(expected1,phase1:difficulty2)                                 12528
## cor(phase1,phase1:difficulty2)                                    13553
## cor(phase2,phase1:difficulty2)                                    12976
## cor(difficulty1,phase1:difficulty2)                               13062
## cor(difficulty2,phase1:difficulty2)                               13990
## cor(expected1:phase1,phase1:difficulty2)                          14922
## cor(expected1:phase2,phase1:difficulty2)                          15245
## cor(expected1:difficulty1,phase1:difficulty2)                     13665
## cor(expected1:difficulty2,phase1:difficulty2)                     14660
## cor(phase1:difficulty1,phase1:difficulty2)                        14547
## cor(phase2:difficulty1,phase1:difficulty2)                        15387
## cor(Intercept,phase2:difficulty2)                                 13859
## cor(expected1,phase2:difficulty2)                                 14301
## cor(phase1,phase2:difficulty2)                                    12800
## cor(phase2,phase2:difficulty2)                                    14350
## cor(difficulty1,phase2:difficulty2)                               14777
## cor(difficulty2,phase2:difficulty2)                               14355
## cor(expected1:phase1,phase2:difficulty2)                          14374
## cor(expected1:phase2,phase2:difficulty2)                          15093
## cor(expected1:difficulty1,phase2:difficulty2)                     15077
## cor(expected1:difficulty2,phase2:difficulty2)                     15242
## cor(phase1:difficulty1,phase2:difficulty2)                        14853
## cor(phase2:difficulty1,phase2:difficulty2)                        15856
## cor(phase1:difficulty2,phase2:difficulty2)                        14907
## cor(Intercept,expected1:phase1:difficulty1)                       13388
## cor(expected1,expected1:phase1:difficulty1)                       14077
## cor(phase1,expected1:phase1:difficulty1)                          13484
## cor(phase2,expected1:phase1:difficulty1)                          13443
## cor(difficulty1,expected1:phase1:difficulty1)                     14630
## cor(difficulty2,expected1:phase1:difficulty1)                     13979
## cor(expected1:phase1,expected1:phase1:difficulty1)                15474
## cor(expected1:phase2,expected1:phase1:difficulty1)                14892
## cor(expected1:difficulty1,expected1:phase1:difficulty1)           15168
## cor(expected1:difficulty2,expected1:phase1:difficulty1)           14844
## cor(phase1:difficulty1,expected1:phase1:difficulty1)              14111
## cor(phase2:difficulty1,expected1:phase1:difficulty1)              15451
## cor(phase1:difficulty2,expected1:phase1:difficulty1)              13985
## cor(phase2:difficulty2,expected1:phase1:difficulty1)              14042
## cor(Intercept,expected1:phase2:difficulty1)                       13634
## cor(expected1,expected1:phase2:difficulty1)                       13657
## cor(phase1,expected1:phase2:difficulty1)                          13391
## cor(phase2,expected1:phase2:difficulty1)                          13987
## cor(difficulty1,expected1:phase2:difficulty1)                     13551
## cor(difficulty2,expected1:phase2:difficulty1)                     14253
## cor(expected1:phase1,expected1:phase2:difficulty1)                14080
## cor(expected1:phase2,expected1:phase2:difficulty1)                14275
## cor(expected1:difficulty1,expected1:phase2:difficulty1)           14949
## cor(expected1:difficulty2,expected1:phase2:difficulty1)           15395
## cor(phase1:difficulty1,expected1:phase2:difficulty1)              14651
## cor(phase2:difficulty1,expected1:phase2:difficulty1)              14521
## cor(phase1:difficulty2,expected1:phase2:difficulty1)              13935
```

```
## cor(phase2:difficulty2,expected1:phase2:difficulty1)              14099
## cor(expected1:phase1:difficulty1,expected1:phase2:difficulty1)    14314
## cor(Intercept,expected1:phase1:difficulty2)                       12487
## cor(expected1,expected1:phase1:difficulty2)                       14044
## cor(phase1,expected1:phase1:difficulty2)                          13872
## cor(phase2,expected1:phase1:difficulty2)                          13094
## cor(difficulty1,expected1:phase1:difficulty2)                     13371
## cor(difficulty2,expected1:phase1:difficulty2)                     14929
## cor(expected1:phase1,expected1:phase1:difficulty2)                15211
## cor(expected1:phase2,expected1:phase1:difficulty2)                14118
## cor(expected1:difficulty1,expected1:phase1:difficulty2)           15059
## cor(expected1:difficulty2,expected1:phase1:difficulty2)           15279
## cor(phase1:difficulty1,expected1:phase1:difficulty2)              15251
## cor(phase2:difficulty1,expected1:phase1:difficulty2)              15467
## cor(phase1:difficulty2,expected1:phase1:difficulty2)              14909
## cor(phase2:difficulty2,expected1:phase1:difficulty2)              14660
## cor(expected1:phase1:difficulty1,expected1:phase1:difficulty2)    14105
## cor(expected1:phase2:difficulty1,expected1:phase1:difficulty2)    14394
## cor(Intercept,expected1:phase2:difficulty2)                       13149
## cor(expected1,expected1:phase2:difficulty2)                       13706
## cor(phase1,expected1:phase2:difficulty2)                          13551
## cor(phase2,expected1:phase2:difficulty2)                          13922
## cor(difficulty1,expected1:phase2:difficulty2)                     14221
## cor(difficulty2,expected1:phase2:difficulty2)                     14651
## cor(expected1:phase1,expected1:phase2:difficulty2)                14390
## cor(expected1:phase2,expected1:phase2:difficulty2)                14380
## cor(expected1:difficulty1,expected1:phase2:difficulty2)           14311
## cor(expected1:difficulty2,expected1:phase2:difficulty2)           15488
## cor(phase1:difficulty1,expected1:phase2:difficulty2)              14330
## cor(phase2:difficulty1,expected1:phase2:difficulty2)              13690
## cor(phase1:difficulty2,expected1:phase2:difficulty2)              13794
## cor(phase2:difficulty2,expected1:phase2:difficulty2)              15011
## cor(expected1:phase1:difficulty1,expected1:phase2:difficulty2)    15334
## cor(expected1:phase2:difficulty1,expected1:phase2:difficulty2)    13620
## cor(expected1:phase1:difficulty2,expected1:phase2:difficulty2)    13966
##
## ~trl (Number of levels: 288)
##                           Estimate Est.Error l-95% CI u-95% CI Rhat Bulk_ESS
## sd(Intercept)                 0.06      0.00     0.05     0.07 1.00     7395
## sd(diagnosis1)                0.01      0.00     0.00     0.02 1.00     3741
## cor(Intercept,diagnosis1)     0.03      0.35    -0.69     0.71 1.00    21237
##                           Tail_ESS
## sd(Intercept)                12182
## sd(diagnosis1)                7318
## cor(Intercept,diagnosis1)    10591
##
## Regression Coefficients:
##                                      Estimate Est.Error l-95% CI u-95% CI
## Intercept                                6.17      0.03     6.12     6.23
## diagnosis1                               0.03      0.02    -0.01     0.07
## expected1                               -0.04      0.01    -0.05    -0.02
## phase1                                   0.03      0.01     0.00     0.05
## phase2                                  -0.01      0.01    -0.02     0.01
## difficulty1                             -0.03      0.01    -0.04    -0.01
## difficulty2                             -0.01      0.01    -0.02     0.01
## diagnosis1:expected1                    -0.00      0.00    -0.01     0.01
## diagnosis1:phase1                        0.00      0.01    -0.02     0.02
## diagnosis1:phase2                       -0.00      0.01    -0.01     0.01
## expected1:phase1                        -0.04      0.01    -0.05    -0.02
## expected1:phase2                         0.00      0.01    -0.01     0.02
```

```
## diagnosis1:difficulty1                     0.00      0.00    -0.01     0.01
## diagnosis1:difficulty2                    -0.00      0.00    -0.01     0.01
## expected1:difficulty1                     -0.01      0.01    -0.03     0.00
## expected1:difficulty2                      0.00      0.01    -0.01     0.02
## phase1:difficulty1                        -0.00      0.01    -0.02     0.02
## phase2:difficulty1                         0.01      0.01    -0.01     0.03
## phase1:difficulty2                         0.02      0.01    -0.00     0.04
## phase2:difficulty2                        -0.01      0.01    -0.03     0.01
## diagnosis1:expected1:phase1                0.01      0.01    -0.00     0.02
## diagnosis1:expected1:phase2                0.00      0.00    -0.01     0.01
## diagnosis1:expected1:difficulty1          -0.00      0.00    -0.01     0.01
## diagnosis1:expected1:difficulty2           0.00      0.00    -0.01     0.01
## diagnosis1:phase1:difficulty1              0.01      0.01    -0.01     0.02
## diagnosis1:phase2:difficulty1             -0.00      0.01    -0.01     0.01
## diagnosis1:phase1:difficulty2             -0.01      0.01    -0.02     0.01
## diagnosis1:phase2:difficulty2              0.01      0.01    -0.01     0.02
## expected1:phase1:difficulty1              -0.01      0.01    -0.03     0.01
## expected1:phase2:difficulty1              -0.00      0.01    -0.02     0.02
## expected1:phase1:difficulty2               0.01      0.01    -0.02     0.03
## expected1:phase2:difficulty2              -0.00      0.01    -0.02     0.02
## diagnosis1:expected1:phase1:difficulty1    0.00      0.01    -0.01     0.02
## diagnosis1:expected1:phase2:difficulty1    0.00      0.01    -0.01     0.01
## diagnosis1:expected1:phase1:difficulty2   -0.00      0.01    -0.01     0.01
## diagnosis1:expected1:phase2:difficulty2   -0.00      0.01    -0.02     0.01
##                                        Rhat Bulk_ESS Tail_ESS
## Intercept                              1.00     1845     4403
## diagnosis1                             1.00     1884     3305
## expected1                              1.00    10083    12702
## phase1                                 1.00     6761     9589
## phase2                                 1.00     8441    11148
## difficulty1                            1.00     8289    11626
## difficulty2                            1.00     8504    11731
## diagnosis1:expected1                   1.00    19211    14759
## diagnosis1:phase1                      1.00     6434    10799
## diagnosis1:phase2                      1.00    15067    14633
## expected1:phase1                       1.00     9181    11343
## expected1:phase2                       1.00     8635    12070
## diagnosis1:difficulty1                 1.00    16956    14624
## diagnosis1:difficulty2                 1.00    18692    15227
## expected1:difficulty1                  1.00     8002    11088
## expected1:difficulty2                  1.00     7965    10283
## phase1:difficulty1                     1.00     8060    11648
## phase2:difficulty1                     1.00     7989    11209
## phase1:difficulty2                     1.00     8367    11425
## phase2:difficulty2                     1.00     7970    11218
## diagnosis1:expected1:phase1            1.00    25920    15621
## diagnosis1:expected1:phase2            1.00    23007    15510
## diagnosis1:expected1:difficulty1       1.00    17794    14751
## diagnosis1:expected1:difficulty2       1.00    16122    14948
## diagnosis1:phase1:difficulty1          1.00    15240    14451
## diagnosis1:phase2:difficulty1          1.00    13895    12915
## diagnosis1:phase1:difficulty2          1.00    15980    14790
## diagnosis1:phase2:difficulty2          1.00    15110    14708
## expected1:phase1:difficulty1           1.00     7790    11261
## expected1:phase2:difficulty1           1.00     7602    11295
## expected1:phase1:difficulty2           1.00     8608    12268
## expected1:phase2:difficulty2           1.00     8034    10958
## diagnosis1:expected1:phase1:difficulty1 1.00    15527    13584
## diagnosis1:expected1:phase2:difficulty1 1.00    14325    14873
## diagnosis1:expected1:phase1:difficulty2 1.00    16115    14760
```

```
## diagnosis1:expected1:phase2:difficulty2 1.00    15825    14645
##
## Further Distributional Parameters:
##       Estimate Est.Error l-95% CI u-95% CI Rhat Bulk_ESS Tail_ESS
## sigma     0.23      0.00     0.22     0.24 1.00    13158    13192
## ndt     100.15      7.50    84.81   114.20 1.00    12727    13392
##
## Draws were sampled using sample(hmc). For each parameter, Bulk_ESS
## and Tail_ESS are effective sample size measures, and Rhat is the potential
## scale reduction factor on split chains (at convergence, Rhat = 1).
```

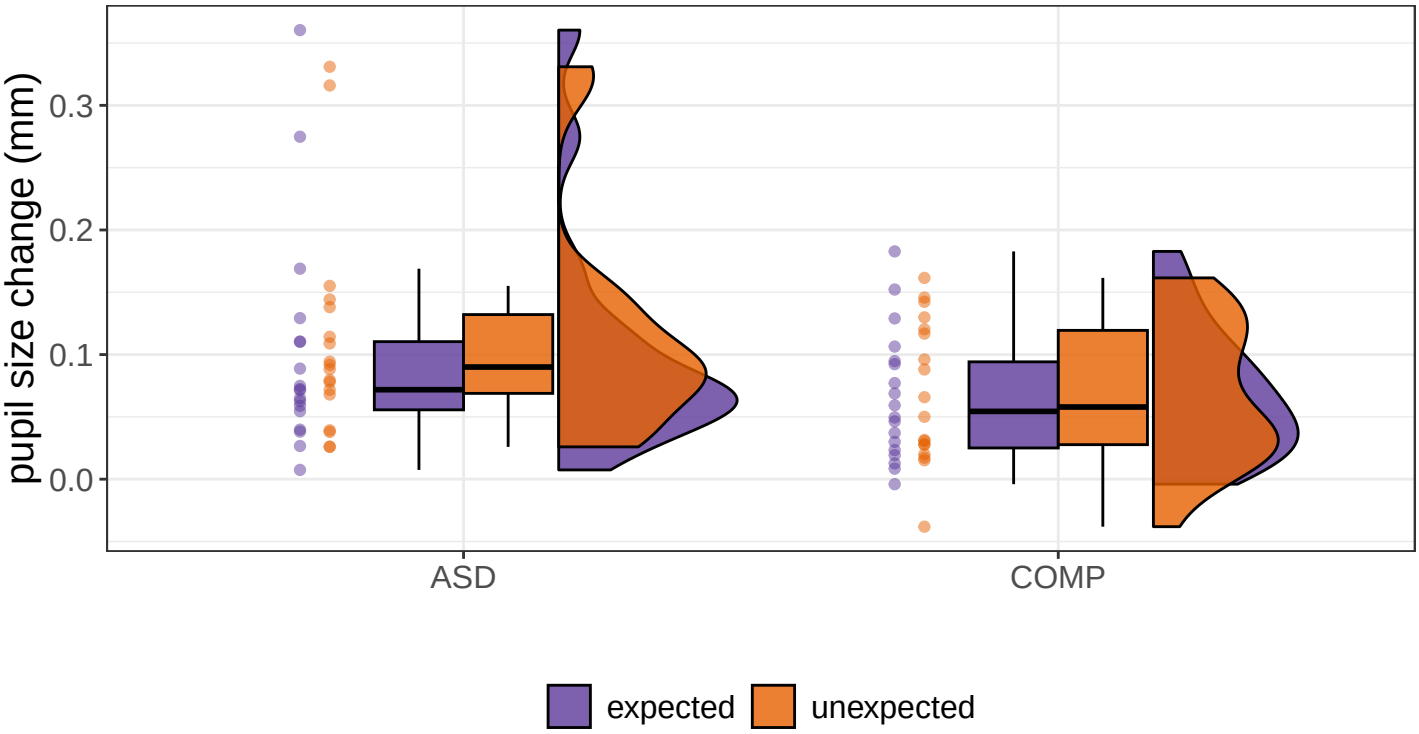
```
## Warning in (function (mapping = NULL, data = NULL, stat = "half_ydensity", :
## Ignoring unknown parameters: `outlier.shape`
```


Reaction times per subject
easy
prevolatile
volatile
postvolatile
medium
prevolatile
volatile
postvolatile
difficult
prevolatile
volatile
postvolatile
rt (ms)
1600
1200
800
400
ASD
COMP
expected
expected
unexpected

S5.2 Pupil sizes

```
##  Family: gaussian
##   Links: mu = identity; sigma = identity
## Formula: rel_pupil ~ diagnosis * expected + rts + (1 | subID)
##    Data: df (Number of observations: 9386)
##   Draws: 4 chains, each with iter = 6000; warmup = 1500; thin = 1;
##          total post-warmup draws = 18000
##
## Multilevel Hyperparameters:
## ~subID (Number of levels: 36)
##               Estimate Est.Error l-95% CI u-95% CI Rhat Bulk_ESS Tail_ESS
## sd(Intercept)     0.08      0.01     0.06     0.10 1.00     1241     2664
##
## Regression Coefficients:
##                       Estimate Est.Error l-95% CI u-95% CI Rhat Bulk_ESS
## Intercept                 0.09      0.01     0.06     0.11 1.01      665
## diagnosis1                0.01      0.01    -0.01     0.04 1.01      519
## expected1                -0.00      0.00    -0.01     0.00 1.00    14324
## rts                       0.00      0.00     0.00     0.00 1.00    19381
## diagnosis1:expected1     -0.00      0.00    -0.01     0.00 1.00    14336
##                       Tail_ESS
## Intercept                 1481
## diagnosis1                1096
## expected1                13389
## rts                      14510
## diagnosis1:expected1     13538
##
## Further Distributional Parameters:
##       Estimate Est.Error l-95% CI u-95% CI Rhat Bulk_ESS Tail_ESS
## sigma     0.16      0.00     0.16     0.16 1.00     7253     9039
##
## Draws were sampled using sample(hmc). For each parameter, Bulk_ESS
## and Tail_ESS are effective sample size measures, and Rhat is the potential
## scale reduction factor on split chains (at convergence, Rhat = 1).
```

```
## Warning in (function (mapping = NULL, data = NULL, stat = "half_ydensity", :
## Ignoring unknown parameters: `outlier.shape`
```



S5.3 Accuracies

```
## ---
##  Model:
## Type: BFlinearModel, JZS
## Intercept only
## Data types:
## diagnosis :  fixed
```

	bf
diagnosis + expected + difficulty	41.15
diagnosis + difficulty	40.83
diagnosis + expected + diagnosis:expected + difficulty	40.29
diagnosis + expected + difficulty + diagnosis:difficulty	39.74
diagnosis + difficulty + diagnosis:difficulty	39.39
diagnosis + expected + diagnosis:expected + difficulty + diagnosis:difficulty	38.93
diagnosis + expected + difficulty + expected:difficulty	38.50
diagnosis + expected + diagnosis:expected + difficulty + expected:difficulty	37.72
diagnosis + phase + expected + difficulty	37.37
diagnosis + expected + difficulty + diagnosis:difficulty + expected:difficulty	37.13
diagnosis + phase + difficulty	37.12
diagnosis + phase + expected + diagnosis:expected + difficulty	36.56
diagnosis + expected + diagnosis:expected + difficulty + diagnosis:difficulty + expected:difficulty	36.26
diagnosis + phase + expected + difficulty + diagnosis:difficulty	36.10
diagnosis + phase + difficulty + diagnosis:difficulty	35.64
diagnosis + phase + expected + diagnosis:expected + difficulty + diagnosis:difficulty	35.11
diagnosis + phase + expected + difficulty + expected:difficulty	34.79
diagnosis + phase + diagnosis:phase + expected + difficulty	34.55
diagnosis + phase + diagnosis:phase + difficulty	34.25
diagnosis + phase + expected + phase:expected + difficulty	33.91
diagnosis + phase + expected + diagnosis:expected + difficulty + expected:difficulty	33.87
expected + difficulty	33.81
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + difficulty	33.67
diagnosis + expected + diagnosis:expected + difficulty + diagnosis:difficulty + expected:difficulty + diagnosis:expected:difficulty	33.63

	bf
difficulty	33.54
diagnosis + phase + expected + difficulty + phase:difficulty	33.48
diagnosis + phase + expected + difficulty + diagnosis:difficulty + expected:difficulty	33.31
diagnosis + phase + difficulty + phase:difficulty	33.12
diagnosis + phase + diagnosis:phase + expected + difficulty + diagnosis:difficulty	33.09
diagnosis + phase + expected + diagnosis:expected + phase:expected + difficulty	33.08
diagnosis + phase + diagnosis:phase + difficulty + diagnosis:difficulty	33.01
diagnosis + phase + expected + diagnosis:expected + difficulty + phase:difficulty	32.58
diagnosis + phase + expected + diagnosis:expected + difficulty + diagnosis:difficulty + expected:difficulty	32.52
diagnosis + phase + expected + phase:expected + difficulty + diagnosis:difficulty	32.45
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + difficulty + diagnosis:difficulty	32.31
diagnosis + phase + expected + difficulty + diagnosis:difficulty + phase:difficulty	32.04
diagnosis + phase + diagnosis:phase + expected + difficulty + expected:difficulty	31.87
diagnosis + phase + difficulty + diagnosis:difficulty + phase:difficulty	31.71
diagnosis + phase + expected + diagnosis:expected + phase:expected + difficulty + diagnosis:difficulty	31.62
diagnosis + phase + expected + diagnosis:expected + difficulty + diagnosis:difficulty + phase:difficulty	31.43
diagnosis + phase + expected + phase:expected + difficulty + expected:difficulty	31.24
expected + difficulty + expected:difficulty	31.11
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + difficulty + expected:difficulty	31.07
diagnosis + phase + diagnosis:phase + expected + phase:expected + difficulty	31.07
diagnosis + phase + expected + difficulty + phase:difficulty + expected:difficulty	30.88
diagnosis + phase + diagnosis:phase + expected + difficulty + phase:difficulty	30.67
diagnosis + phase + diagnosis:phase + expected + difficulty + diagnosis:difficulty + expected:difficulty	30.62
diagnosis + phase + expected + diagnosis:expected + phase:expected + difficulty + expected:difficulty	30.35
diagnosis + phase + diagnosis:phase + difficulty + phase:difficulty	30.26
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + difficulty	30.21
diagnosis + phase + expected + diagnosis:expected + difficulty + phase:difficulty + expected:difficulty	30.07
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + diagnosis:phase:expected + difficulty	30.07
phase + expected + difficulty	30.00
diagnosis + phase + expected + phase:expected + difficulty + phase:difficulty	29.93
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + difficulty + phase:difficulty	29.90
diagnosis + phase + expected + phase:expected + difficulty + diagnosis:difficulty + expected:difficulty	29.88
diagnosis + phase + expected + diagnosis:expected + difficulty + diagnosis:difficulty + expected:difficulty + diagnosis:expected:difficulty	29.84
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + difficulty + diagnosis:difficulty + expected:difficulty	29.79
phase + difficulty	29.78
diagnosis + phase + diagnosis:phase + expected + phase:expected + difficulty + diagnosis:difficulty	29.56
diagnosis + phase + expected + difficulty + diagnosis:difficulty + phase:difficulty + expected:difficulty	29.46
diagnosis + phase + expected + diagnosis:expected + phase:expected + difficulty + diagnosis:difficulty + expected:difficulty	29.17
diagnosis + phase + diagnosis:phase + expected + difficulty + diagnosis:difficulty + phase:difficulty	29.16
diagnosis + phase + expected + diagnosis:expected + phase:expected + difficulty + phase:difficulty	29.09
diagnosis + phase + diagnosis:phase + difficulty + diagnosis:difficulty + phase:difficulty	28.85
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + difficulty + diagnosis:difficulty	28.78
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + diagnosis:phase:expected + difficulty + diagnosis:difficulty	28.72
diagnosis + phase + expected + diagnosis:expected + difficulty + diagnosis:difficulty + phase:difficulty + expected:difficulty	28.69
diagnosis + phase + expected + phase:expected + difficulty + diagnosis:difficulty + phase:difficulty	28.52
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + difficulty + diagnosis:difficulty + phase:difficulty	28.52
diagnosis + phase + diagnosis:phase + expected + phase:expected + difficulty + expected:difficulty	28.45
diagnosis + phase + diagnosis:phase + expected + difficulty + phase:difficulty + expected:difficulty	27.95
diagnosis + phase + expected + diagnosis:expected + phase:expected + difficulty + diagnosis:difficulty + phase:difficulty	27.73

	bf
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + difficulty + expected:difficulty	27.56
diagnosis + phase + diagnosis:phase + expected + phase:expected + difficulty + phase:difficulty	27.47
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + diagnosis:phase:expected + difficulty + expected:difficulty	27.40
phase + expected + difficulty + expected:difficulty	27.34
diagnosis + phase + expected + phase:expected + difficulty + phase:difficulty + expected:difficulty	27.28
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + difficulty + phase:difficulty + expected:difficulty	27.14
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + difficulty + diagnosis:difficulty + expected:difficulty + diagnosis:expected:difficulty	27.09
diagnosis + phase + diagnosis:phase + expected + phase:expected + difficulty + diagnosis:difficulty + expected:difficulty	26.90
diagnosis + phase + expected + diagnosis:expected + phase:expected + difficulty + diagnosis:difficulty + expected:difficulty + diagnosis:expected:difficulty	26.63
diagnosis + phase + diagnosis:phase + expected + difficulty + diagnosis:difficulty + phase:difficulty + expected:difficulty	26.56
diagnosis + phase + expected + diagnosis:expected + phase:expected + difficulty + phase:difficulty + expected:difficulty	26.52
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + diagnosis:phase:expected + difficulty + phase:difficulty	26.51
phase + expected + phase:expected + difficulty	26.50
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + difficulty + phase:difficulty	26.25
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + difficulty + diagnosis:difficulty + expected:difficulty	26.10
phase + expected + difficulty + phase:difficulty	26.07
diagnosis + phase + expected + diagnosis:expected + difficulty + diagnosis:difficulty + phase:difficulty + expected:difficulty + diagnosis:expected:difficulty	26.06
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + diagnosis:phase:expected + difficulty + diagnosis:difficulty + expected:difficulty	26.00
diagnosis + phase + expected + phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + expected:difficulty	25.94
diagnosis + phase + diagnosis:phase + expected + phase:expected + difficulty + diagnosis:difficulty + phase:difficulty	25.81
phase + difficulty + phase:difficulty	25.78
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + difficulty + diagnosis:difficulty + phase:difficulty + expected:difficulty	25.72
diagnosis + phase + diagnosis:phase + expected + difficulty + diagnosis:difficulty + phase:difficulty + diagnosis:phase:difficulty	25.54
diagnosis + phase + expected + diagnosis:expected + phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + expected:difficulty	25.19
diagnosis + phase + diagnosis:phase + difficulty + diagnosis:difficulty + phase:difficulty + diagnosis:phase:difficulty	25.18
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + difficulty + diagnosis:difficulty + phase:difficulty	25.03
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + diagnosis:phase:expected + difficulty + diagnosis:difficulty + phase:difficulty	24.87
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + difficulty + diagnosis:difficulty + phase:difficulty + diagnosis:phase:difficulty	24.76
diagnosis + phase + expected + phase:expected + difficulty + phase:difficulty + expected:difficulty + phase:expected:difficulty	24.44
diagnosis + phase + diagnosis:phase + expected + phase:expected + difficulty + phase:difficulty + expected:difficulty	24.38
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + difficulty + phase:difficulty + expected:difficulty	24.02
phase + expected + phase:expected + difficulty + expected:difficulty	24.01
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + diagnosis:phase:expected + difficulty + phase:difficulty + expected:difficulty	23.67
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + difficulty + diagnosis:difficulty + expected:difficulty + diagnosis:expected:difficulty	23.53

	bf
diagnosis + phase + expected + diagnosis:expected + phase:expected + difficulty + phase:difficulty + expected:difficulty + phase:expected:difficulty	23.50
phase + expected + difficulty + phase:difficulty + expected:difficulty	23.44
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + diagnosis:phase:expected + difficulty + diagnosis:difficulty + expected:difficulty + diagnosis:expected:difficulty	23.38
diagnosis + phase + diagnosis:phase + expected + phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + expected:difficulty	23.30
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + difficulty + diagnosis:difficulty + phase:difficulty + expected:difficulty + diagnosis:expected:difficulty	23.09
diagnosis + phase + diagnosis:phase + expected + difficulty + diagnosis:difficulty + phase:difficulty + diagnosis:phase:difficulty + expected:difficulty	22.87
diagnosis + phase + expected + phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + expected:difficulty + phase:expected:difficulty	22.86
phase + expected + phase:expected + difficulty + phase:difficulty	22.57
diagnosis + phase + expected + diagnosis:expected + phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + expected:difficulty + diagnosis:expected:difficulty	22.55
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + expected:difficulty	22.38
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + diagnosis:phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + expected:difficulty	22.21
diagnosis + phase + expected + diagnosis:expected + phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + expected:difficulty + phase:expected:difficulty	22.15
diagnosis + phase + diagnosis:phase + expected + phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + diagnosis:phase:difficulty	22.14
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + difficulty + diagnosis:difficulty + phase:difficulty + diagnosis:phase:difficulty + expected:difficulty	22.07
diagnosis + phase + diagnosis:phase + expected + phase:expected + difficulty + phase:difficulty + expected:difficulty + phase:expected:difficulty	21.45
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + diagnosis:phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + diagnosis:phase:difficulty	21.20
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + diagnosis:phase:difficulty	21.17
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + difficulty + phase:difficulty + expected:difficulty + phase:expected:difficulty	20.78
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + diagnosis:phase:expected + difficulty + phase:difficulty + expected:difficulty + phase:expected:difficulty	20.46
diagnosis + phase + diagnosis:phase + expected + phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + expected:difficulty + phase:expected:difficulty	20.05
phase + expected + phase:expected + difficulty + phase:difficulty + expected:difficulty	19.92
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + expected:difficulty + diagnosis:expected:difficulty	19.77
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + diagnosis:phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + expected:difficulty + diagnosis:expected:difficulty	19.64
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + diagnosis:phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + expected:difficulty + phase:expected:difficulty	19.61
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + difficulty + diagnosis:difficulty + phase:difficulty + diagnosis:phase:difficulty + expected:difficulty + diagnosis:expected:difficulty	19.58
diagnosis + phase + expected + diagnosis:expected + phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + expected:difficulty + diagnosis:expected:difficulty + phase:expected:difficulty	19.55
diagnosis + phase + diagnosis:phase + expected + phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + diagnosis:phase:difficulty + expected:difficulty	19.50
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + expected:difficulty + phase:expected:difficulty	19.27
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + diagnosis:phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + diagnosis:phase:difficulty + expected:difficulty	18.54
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + diagnosis:phase:difficulty + expected:difficulty	18.54
phase + expected + phase:expected + difficulty + phase:difficulty + expected:difficulty + phase:expected:difficulty	16.88

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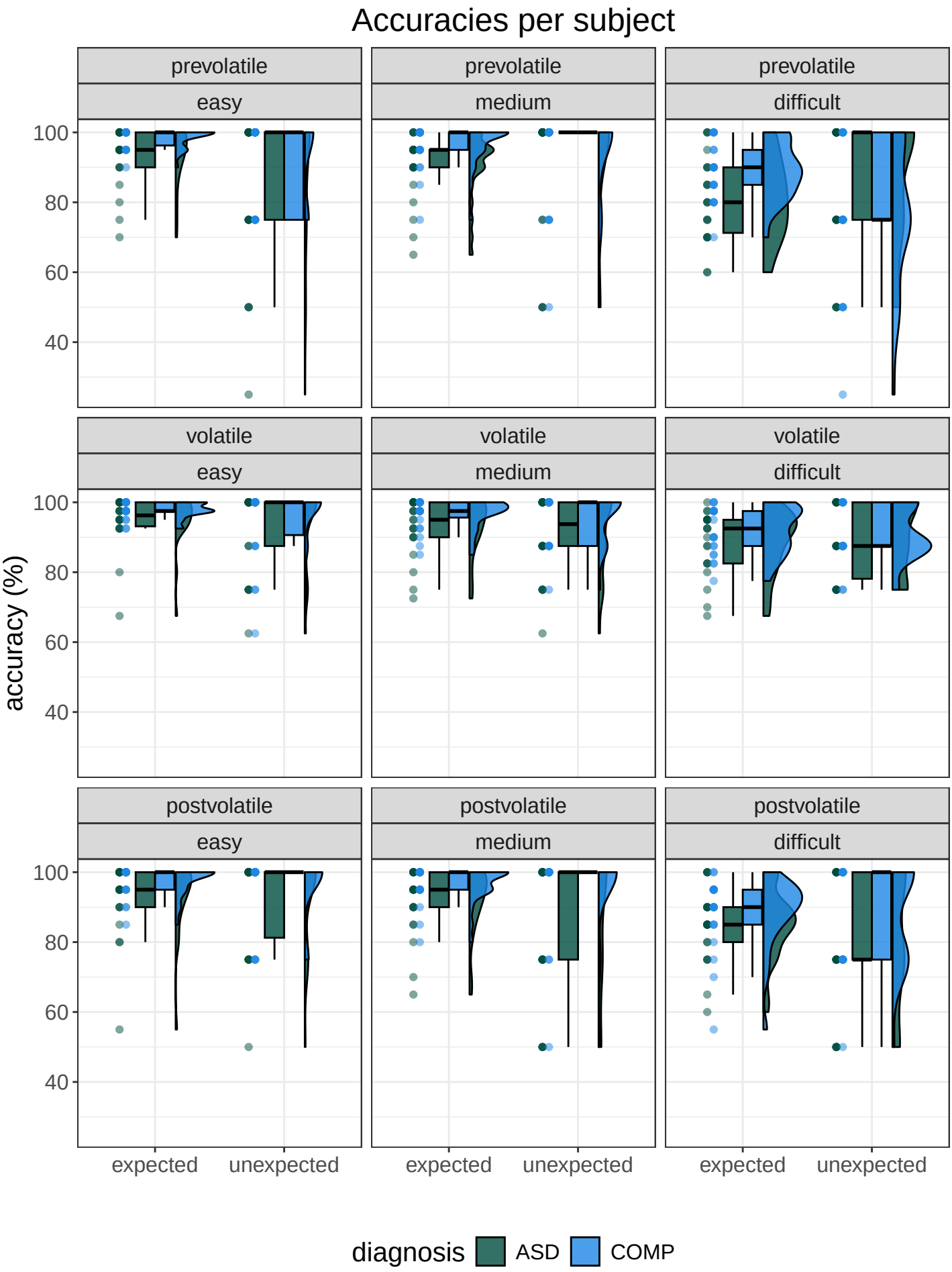
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + diagnosis:phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + expected:difficulty + diagnosis:expected:difficulty + phase:expected:difficulty	16.73
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + expected:difficulty + diagnosis:expected:difficulty + phase:expected:difficulty	16.68
diagnosis + phase + diagnosis:phase + expected + phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + diagnosis:phase:difficulty + expected:difficulty + phase:expected:difficulty	16.62
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + diagnosis:phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + diagnosis:phase:difficulty + expected:difficulty + diagnosis:expected:difficulty	16.25
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + diagnosis:phase:difficulty + expected:difficulty + diagnosis:expected:difficulty + phase:expected:difficulty	16.04
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + diagnosis:phase:difficulty + expected:difficulty + phase:expected:difficulty	15.62
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + diagnosis:phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + diagnosis:phase:difficulty + expected:difficulty + diagnosis:expected:difficulty + phase:expected:difficulty	15.46
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + diagnosis:phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + diagnosis:phase:difficulty + expected:difficulty + diagnosis:expected:difficulty + phase:expected:difficulty	13.50
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + diagnosis:phase:difficulty + expected:difficulty + diagnosis:expected:difficulty + phase:expected:difficulty	13.06
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + diagnosis:phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + diagnosis:phase:difficulty + expected:difficulty + diagnosis:expected:difficulty + phase:expected:difficulty + diagnosis:phase:expected:difficulty	11.21
diagnosis + expected	6.48
diagnosis	6.40
diagnosis + expected + diagnosis:expected	5.52
diagnosis + phase + expected	2.63
diagnosis + phase	2.58
diagnosis + phase + expected + diagnosis:expected	1.74
expected	0.01
diagnosis + phase + diagnosis:phase + expected	-0.27
diagnosis + phase + diagnosis:phase	-0.38
diagnosis + phase + expected + phase:expected	-0.87
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected	-1.25
diagnosis + phase + expected + diagnosis:expected + phase:expected	-1.89
diagnosis + phase + diagnosis:phase + expected + phase:expected	-3.78
phase	-3.82
phase + expected	-3.85
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected	-4.80
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + diagnosis:phase:expected	-5.23
phase + expected + phase:expected	-7.32

```
## Warning in (function (mapping = NULL, data = NULL, stat = "half_ydensity", :
## Ignoring unknown parameters: `outlier.shape`
```


Accuracies per subject
prevolatile
easy
prevolatile
medium
prevolatile
difficult
volatile
easy
volatile
medium
volatile
difficult
postvolatile
easy
postvolatile
medium
postvolatile
difficult
accuracy (%)
100
80
60
40
expected
unexpected
diagnosis
ASD
COMP