Supplementary materials

Bayesian Brain in ADHD: potential catecholaminergic pathway of volatility estimation

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Contents

S1 Package versions

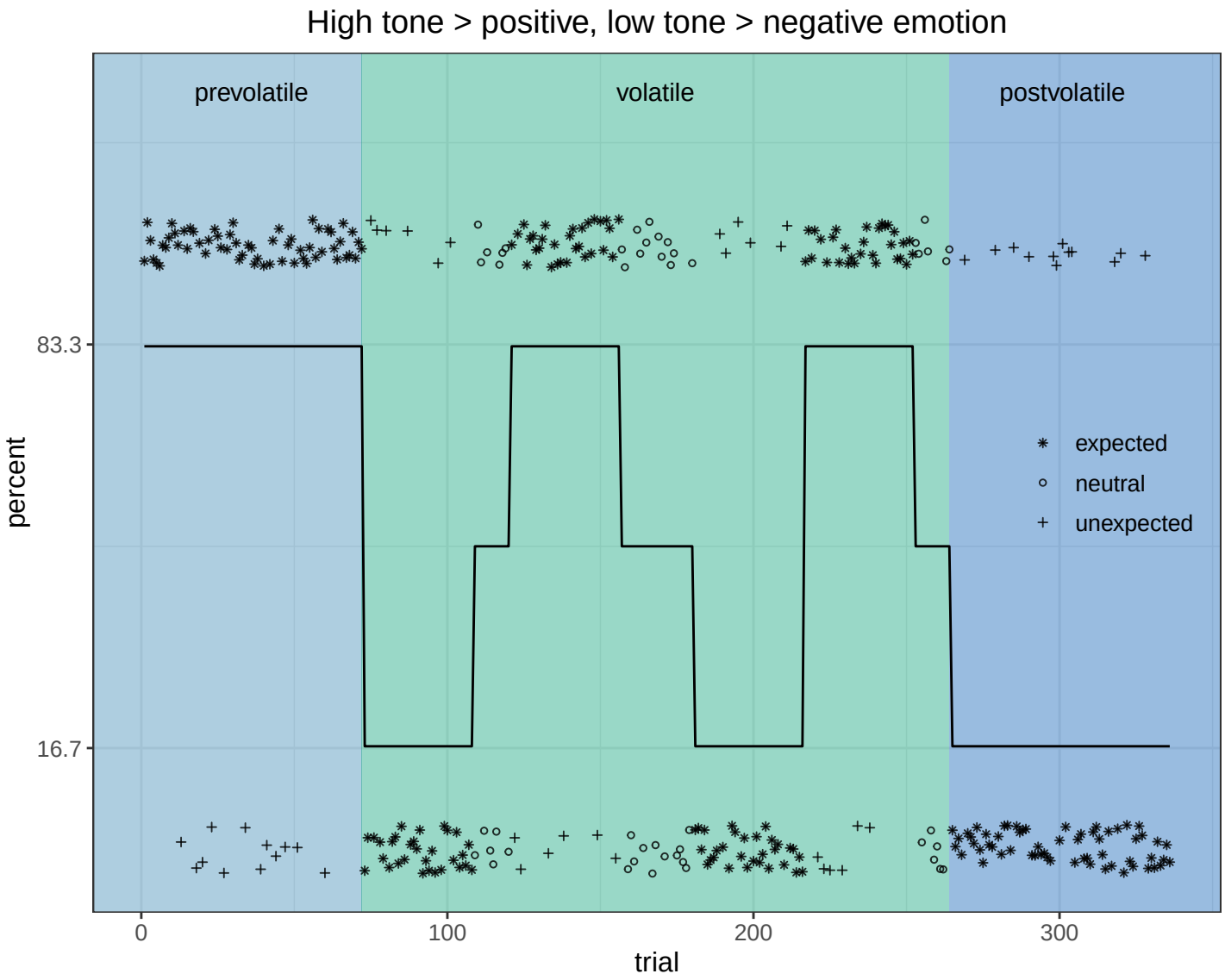
The following packages are used in this RMarkdown file:

```
## [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 Probabilistic associative learning task

S2.1 Development of associations across task



S2.2 Comparison of LME across groups

```
##                   bf        error                      time        code
## diagnosis -0.5840522 9.993788e-05 Thu Oct 30 11:19:46 2025 eca1873f721
```

S3 Participant-specific HGF and DDM parameters

S3.1 H3c: second level tonic volatility

```
##  Family: gaussian
##   Links: mu = identity; sigma = identity
## Formula: om2 ~ diagnosis
##    Data: df.hgf (Number of observations: 66)
##   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     -5.93      0.28    -6.48    -5.37 1.00     8326     6174
## diagnosis1     0.19      0.30    -0.39     0.78 1.00     7098     6186
```

```
## diagnosis2     0.15      0.30    -0.45     0.73 1.00     7272     5704
##
## Further Distributional Parameters:
##       Estimate Est.Error l-95% CI u-95% CI Rhat Bulk_ESS Tail_ESS
## sigma     2.28      0.16     1.99     2.61 1.00     8008     5792
##
## 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).
```

S3.2 Predicting ADHD diagnosis with HGF parameters

```
##  Family: bernoulli
##   Links: mu = logit
## Formula: group ~ sbe1 + sbe2 + sbe3 + sze + som2 + som3
##    Data: df.hgf (Number of observations: 41)
##   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     0.06      0.29    -0.52     0.63 1.00    11663     5569
## sbe1          0.18      0.36    -0.53     0.91 1.00    11572     5518
## sbe2         -0.09      0.37    -0.81     0.65 1.00    10220     6430
## sbe3         -0.19      0.36    -0.89     0.51 1.00    12722     6120
## sze           0.33      0.42    -0.48     1.17 1.00    10045     5970
## som2          0.66      0.36    -0.01     1.40 1.00    11259     6381
## som3         -0.04      0.44    -0.89     0.82 1.00     9145     6332
##
## 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).
```

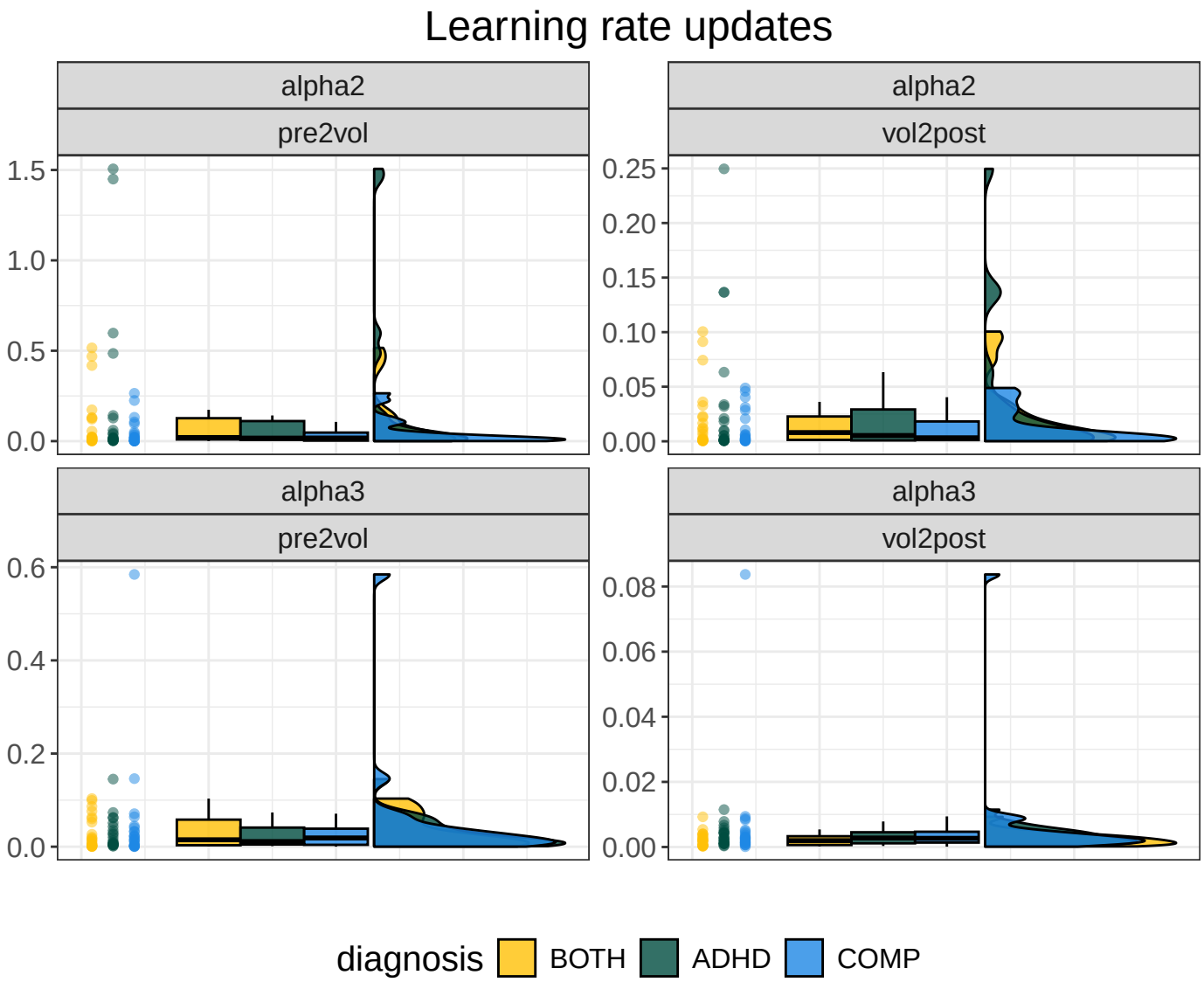
S3.3 Predicting ADHD medication with HGF parameters

```
##  Family: bernoulli
##   Links: mu = logit
## Formula: group.meds ~ sbe1 + sbe2 + sbe3 + 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     0.39      0.29    -0.17     0.96 1.00    13857     5726
## sbe1          0.19      0.35    -0.49     0.90 1.00    11114     6722
## sbe2          0.28      0.36    -0.43     1.00 1.00     9999     6075
## sbe3          0.04      0.33    -0.60     0.69 1.00    11532     6472
## sze           0.20      0.35    -0.46     0.91 1.00    11852     6181
## som2         -0.52      0.33    -1.20     0.11 1.00    10907     6430
## som3         -0.18      0.38    -0.94     0.56 1.00    11295     5957
##
## 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).
```

S3.4 Learning rate update

```
##  Family: lognormal
##   Links: mu = identity; sigma = identity
```

```
## Formula: value ~ diagnosis * level * change + (level + change | subID)
##    Data: df.upd (Number of observations: 264)
##   Draws: 4 chains, each with iter = 3000; warmup = 1000; thin = 1;
##          total post-warmup draws = 8000
##
## Multilevel Hyperparameters:
## ~subID (Number of levels: 66)
##                         Estimate Est.Error l-95% CI u-95% CI Rhat Bulk_ESS
## sd(Intercept)               1.11      0.12     0.90     1.35 1.00     2373
## sd(level1)                  0.82      0.10     0.63     1.03 1.00     2986
## sd(change1)                 0.21      0.08     0.05     0.36 1.00     2793
## cor(Intercept,level1)       0.41      0.13     0.15     0.65 1.00     2399
## cor(Intercept,change1)      0.60      0.23     0.02     0.92 1.00     5210
## cor(level1,change1)         0.62      0.23     0.03     0.92 1.00     5018
##                         Tail_ESS
## sd(Intercept)               4179
## sd(level1)                  5020
## sd(change1)                 1653
## cor(Intercept,level1)       4229
## cor(Intercept,change1)      3847
## cor(level1,change1)         3687
##
## Regression Coefficients:
##                             Estimate Est.Error l-95% CI u-95% CI Rhat Bulk_ESS
## Intercept                      -4.95      0.15    -5.24    -4.66 1.00     1627
## diagnosis1                      0.18      0.21    -0.22     0.59 1.00     1712
## diagnosis2                     -0.07      0.21    -0.48     0.33 1.00     1640
## level1                          0.33      0.12     0.10     0.56 1.00     2420
## change1                         0.77      0.07     0.64     0.90 1.00     6477
## diagnosis1:level1               0.06      0.17    -0.26     0.39 1.00     2513
## diagnosis2:level1               0.15      0.16    -0.17     0.47 1.00     2632
## diagnosis1:change1              0.05      0.10    -0.14     0.24 1.00     5609
## diagnosis2:change1              0.04      0.10    -0.15     0.23 1.00     6322
## level1:change1                 -0.10      0.06    -0.22     0.03 1.00    12332
## diagnosis1:level1:change1       0.06      0.09    -0.11     0.24 1.00     7030
## diagnosis2:level1:change1      -0.07      0.09    -0.24     0.10 1.00     7296
##                             Tail_ESS
## Intercept                       2760
## diagnosis1                      2534
## diagnosis2                      2841
## level1                          3706
## change1                         5573
## diagnosis1:level1               4210
## diagnosis2:level1               4199
## diagnosis1:change1              5829
## diagnosis2:change1              5894
## level1:change1                  5555
## diagnosis1:level1:change1       6185
## diagnosis2:level1:change1       5620
##
## Further Distributional Parameters:
##       Estimate Est.Error l-95% CI u-95% CI Rhat Bulk_ESS Tail_ESS
## sigma     1.01      0.07     0.89     1.15 1.00     2726     4036
##
## 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).
```



S3.5 Group differences in drift rate

```
##  Family: gaussian
##   Links: mu = identity; sigma = identity
## Formula: v ~ diagnosis * phase + (1 | s)
##    Data: df.lng (Number of observations: 198)
##   Draws: 4 chains, each with iter = 3000; warmup = 1000; thin = 1;
##          total post-warmup draws = 8000
##
## Multilevel Hyperparameters:
## ~s (Number of levels: 66)
##               Estimate Est.Error l-95% CI u-95% CI Rhat Bulk_ESS Tail_ESS
## sd(Intercept)     0.59      0.06     0.49     0.72 1.00     1552     3009
##
## Regression Coefficients:
##                   Estimate Est.Error l-95% CI u-95% CI Rhat Bulk_ESS Tail_ESS
## Intercept             2.31      0.08     2.16     2.47 1.01      912     1772
## diagnosis1           -0.27      0.11    -0.48    -0.07 1.01      883     1820
## diagnosis2           -0.05      0.11    -0.26     0.16 1.01      900     1974
## phase1               -0.03      0.03    -0.09     0.04 1.00     6249     5825
## phase2                0.04      0.03    -0.02     0.11 1.00     6359     5664
## diagnosis1:phase1     0.08      0.05    -0.01     0.17 1.00     5341     5891
## diagnosis2:phase1    -0.01      0.05    -0.11     0.08 1.00     5088     5845
## diagnosis1:phase2     0.01      0.05    -0.08     0.11 1.00     5421     5318
```

```
## diagnosis2:phase2    -0.03      0.05    -0.12     0.06 1.00     4940     5486
##
## Further Distributional Parameters:
##       Estimate Est.Error l-95% CI u-95% CI Rhat Bulk_ESS Tail_ESS
## sigma     0.33      0.02     0.29     0.38 1.00     4744     5283
##
## 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).
```

S3.6 Influence of medication on drift rate

```
##  Family: gaussian
##   Links: mu = identity; sigma = identity
## Formula: v ~ adhd.meds.bin * phase + (1 | s)
##    Data: df.lng.sel (Number of observations: 132)
##   Draws: 4 chains, each with iter = 3000; warmup = 1000; thin = 1;
##          total post-warmup draws = 8000
##
## Multilevel Hyperparameters:
## ~s (Number of levels: 44)
##               Estimate Est.Error l-95% CI u-95% CI Rhat Bulk_ESS Tail_ESS
## sd(Intercept)     0.55      0.07     0.44     0.70 1.00     1552     2718
##
## Regression Coefficients:
##                       Estimate Est.Error l-95% CI u-95% CI Rhat Bulk_ESS
## Intercept                 2.14      0.09     1.97     2.32 1.00     1049
## adhd.meds.bin1            0.06      0.09    -0.11     0.22 1.00     1057
## phase1                    0.01      0.03    -0.06     0.07 1.00     6948
## phase2                    0.03      0.03    -0.03     0.10 1.00     7233
## adhd.meds.bin1:phase1     0.01      0.03    -0.06     0.08 1.00     7207
## adhd.meds.bin1:phase2    -0.00      0.03    -0.07     0.06 1.00     7282
##                       Tail_ESS
## Intercept                 2335
## adhd.meds.bin1            1984
## phase1                    6272
## phase2                    6017
## adhd.meds.bin1:phase1     5843
## adhd.meds.bin1:phase2     5958
##
## Further Distributional Parameters:
##       Estimate Est.Error l-95% CI u-95% CI Rhat Bulk_ESS Tail_ESS
## sigma     0.28      0.02     0.24     0.32 1.00     4994     5476
##
## 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).
```

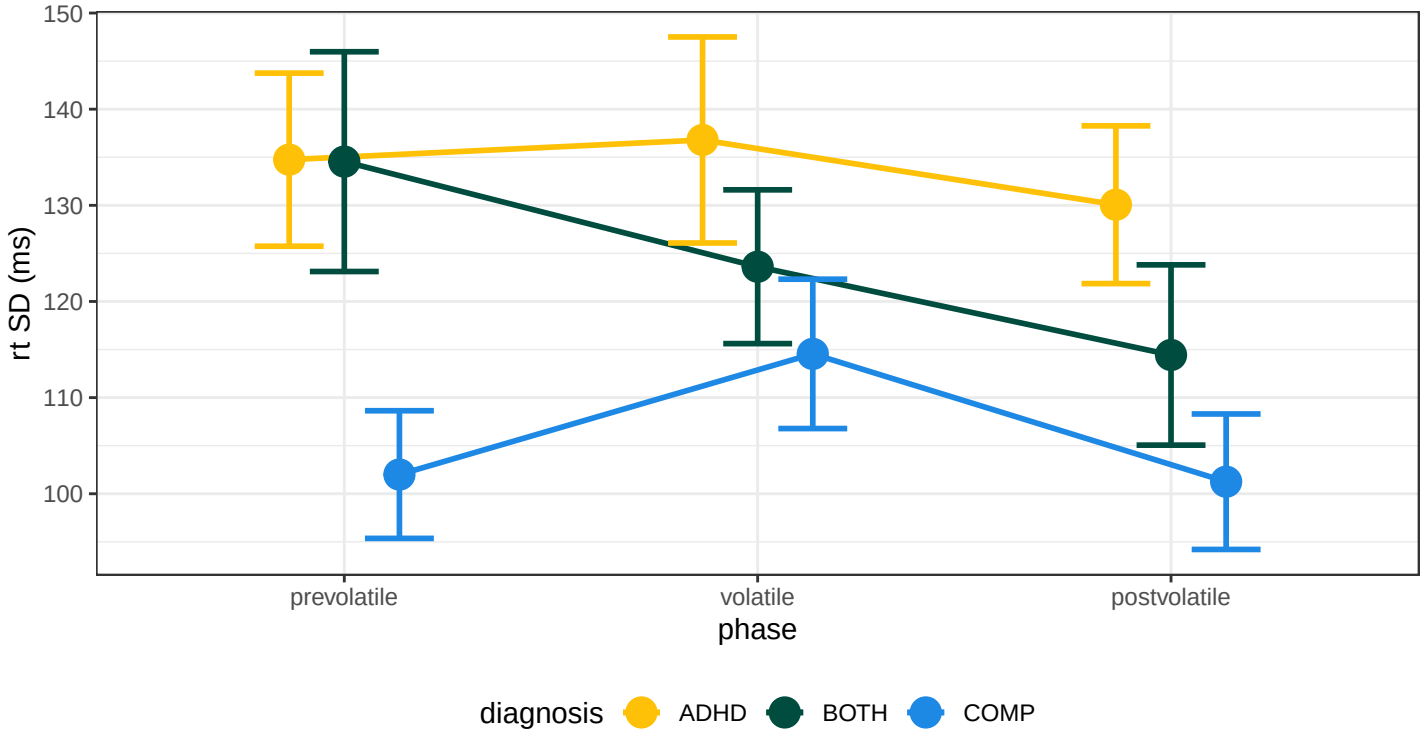
S4 Conventional analyses of responses and pupil sizes

S4.1 Response time variance

```
##  Family: lognormal
##   Links: mu = identity; sigma = identity
## Formula: rt.var ~ diagnosis * expected * phase + (expected + phase | subID)
##    Data: df.var (Number of observations: 387)
##   Draws: 4 chains, each with iter = 6000; warmup = 1500; thin = 1;
##          total post-warmup draws = 18000
##
## Multilevel Hyperparameters:
```

```
## ~subID (Number of levels: 66)
##                           Estimate Est.Error l-95% CI u-95% CI Rhat Bulk_ESS
## sd(Intercept)                 0.36      0.03     0.30     0.43 1.00     3864
## sd(expected1)                 0.02      0.01     0.00     0.05 1.00     4508
## sd(phase1)                    0.09      0.02     0.05     0.12 1.00     6414
## sd(phase2)                    0.03      0.02     0.00     0.08 1.00     4058
## cor(Intercept,expected1)     -0.20      0.31    -0.74     0.47 1.00    22631
## cor(Intercept,phase1)        -0.23      0.18    -0.56     0.13 1.00    17311
## cor(expected1,phase1)         0.26      0.33    -0.48     0.81 1.00     2930
## cor(Intercept,phase2)         0.04      0.30    -0.56     0.62 1.00    22936
## cor(expected1,phase2)         0.19      0.37    -0.59     0.81 1.00     6950
## cor(phase1,phase2)            0.08      0.34    -0.58     0.70 1.00    17998
##                           Tail_ESS
## sd(Intercept)                 7484
## sd(expected1)                 5809
## sd(phase1)                    6234
## sd(phase2)                    6446
## cor(Intercept,expected1)     12093
## cor(Intercept,phase1)        13589
## cor(expected1,phase1)         5561
## cor(Intercept,phase2)        12392
## cor(expected1,phase2)        11325
## cor(phase1,phase2)           14323
##
## Regression Coefficients:
##                               Estimate Est.Error l-95% CI u-95% CI Rhat Bulk_ESS
## Intercept                         4.71      0.04     4.62     4.79 1.00     2209
## diagnosis1                        0.09      0.06    -0.03     0.21 1.00     2291
## diagnosis2                        0.03      0.06    -0.09     0.15 1.00     2444
## expected1                         0.06      0.01     0.04     0.08 1.00    30294
## phase1                            0.02      0.02    -0.01     0.05 1.00    15167
## phase2                            0.03      0.01     0.00     0.06 1.00    26066
## diagnosis1:expected1             -0.01      0.01    -0.04     0.02 1.00    22496
## diagnosis2:expected1             -0.00      0.01    -0.03     0.02 1.00    22150
## diagnosis1:phase1                 0.00      0.02    -0.05     0.05 1.00    13212
## diagnosis2:phase1                 0.05      0.02    -0.00     0.10 1.00    13450
## diagnosis1:phase2                -0.03      0.02    -0.07     0.01 1.00    19605
## diagnosis2:phase2                -0.02      0.02    -0.06     0.02 1.00    20126
## expected1:phase1                  0.02      0.01    -0.00     0.05 1.00    27027
## expected1:phase2                 -0.02      0.01    -0.05     0.00 1.00    25645
## diagnosis1:expected1:phase1      -0.01      0.02    -0.05     0.03 1.00    19059
## diagnosis2:expected1:phase1      -0.01      0.02    -0.05     0.02 1.00    19306
## diagnosis1:expected1:phase2       0.04      0.02    -0.00     0.07 1.00    19797
## diagnosis2:expected1:phase2       0.00      0.02    -0.03     0.04 1.00    18557
##                               Tail_ESS
## Intercept                         5022
## diagnosis1                        4509
## diagnosis2                        4865
## expected1                        13918
## phase1                           13959
## phase2                           13147
## diagnosis1:expected1             14370
## diagnosis2:expected1             14145
## diagnosis1:phase1                13651
## diagnosis2:phase1                13448
## diagnosis1:phase2                13824
## diagnosis2:phase2                14268
## expected1:phase1                 15127
## expected1:phase2                 15707
## diagnosis1:expected1:phase1      15059
```

```
## diagnosis2:expected1:phase1    13226
## diagnosis1:expected1:phase2    14941
## diagnosis2:expected1:phase2    14865
##
## Further Distributional Parameters:
##       Estimate Est.Error l-95% CI u-95% CI Rhat Bulk_ESS Tail_ESS
## sigma     0.18      0.01     0.17     0.20 1.00     6545    10033
##
## 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 Response 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: 16886)
##   Draws: 4 chains, each with iter = 6000; warmup = 1500; thin = 1;
##          total post-warmup draws = 18000
##
## Multilevel Hyperparameters:
## ~subID (Number of levels: 66)
##                                                    Estimate
## sd(Intercept)                                          0.19
## sd(expected1)                                          0.02
## sd(phase1)                                             0.06
## sd(phase2)                                             0.02
## sd(difficulty1)                                        0.01
## sd(difficulty2)                                        0.01
## sd(expected1:phase1)                                   0.02
## 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)                                  0.23
## cor(Intercept,phase1)                                     0.08
## cor(expected1,phase1)                                     0.22
## cor(Intercept,phase2)                                     0.09
## cor(expected1,phase2)                                     0.04
## cor(phase1,phase2)                                       -0.25
## cor(Intercept,difficulty1)                               -0.25
## cor(expected1,difficulty1)                               -0.08
## cor(phase1,difficulty1)                                  -0.17
## cor(phase2,difficulty1)                                  -0.07
## cor(Intercept,difficulty2)                               -0.04
## cor(expected1,difficulty2)                               -0.11
## cor(phase1,difficulty2)                                  -0.17
## cor(phase2,difficulty2)                                   0.09
## cor(difficulty1,difficulty2)                              0.02
## cor(Intercept,expected1:phase1)                           0.03
## cor(expected1,expected1:phase1)                           0.17
## cor(phase1,expected1:phase1)                              0.09
## cor(phase2,expected1:phase1)                             -0.17
## cor(difficulty1,expected1:phase1)                         0.06
## cor(difficulty2,expected1:phase1)                        -0.02
## cor(Intercept,expected1:phase2)                           0.21
## cor(expected1,expected1:phase2)                           0.07
## cor(phase1,expected1:phase2)                             -0.05
## cor(phase2,expected1:phase2)                              0.04
## cor(difficulty1,expected1:phase2)                         0.05
## cor(difficulty2,expected1:phase2)                         0.13
## cor(expected1:phase1,expected1:phase2)                    0.01
## cor(Intercept,expected1:difficulty1)                     -0.07
## cor(expected1,expected1:difficulty1)                      0.03
## cor(phase1,expected1:difficulty1)                         0.03
## cor(phase2,expected1:difficulty1)                         0.00
## cor(difficulty1,expected1:difficulty1)                   -0.01
## cor(difficulty2,expected1:difficulty1)                   -0.00
## cor(expected1:phase1,expected1:difficulty1)               0.04
## cor(expected1:phase2,expected1:difficulty1)               0.01
## cor(Intercept,expected1:difficulty2)                      0.01
## cor(expected1,expected1:difficulty2)                      0.05
## cor(phase1,expected1:difficulty2)                         0.10
## cor(phase2,expected1:difficulty2)                         0.07
## cor(difficulty1,expected1:difficulty2)                    0.02
## cor(difficulty2,expected1:difficulty2)                   -0.01
## cor(expected1:phase1,expected1:difficulty2)               0.06
## cor(expected1:phase2,expected1:difficulty2)               0.07
## cor(expected1:difficulty1,expected1:difficulty2)         -0.01
## cor(Intercept,phase1:difficulty1)                        -0.09
## cor(expected1,phase1:difficulty1)                         0.06
## cor(phase1,phase1:difficulty1)                            0.15
## cor(phase2,phase1:difficulty1)                           -0.11
## cor(difficulty1,phase1:difficulty1)                       0.07
## cor(difficulty2,phase1:difficulty1)                      -0.06
## cor(expected1:phase1,phase1:difficulty1)                  0.07
## cor(expected1:phase2,phase1:difficulty1)                 -0.04
## cor(expected1:difficulty1,phase1:difficulty1)             0.05
```

```
## cor(expected1:difficulty2,phase1:difficulty1)                    0.01
## cor(Intercept,phase2:difficulty1)                               -0.05
## cor(expected1,phase2:difficulty1)                                0.05
## cor(phase1,phase2:difficulty1)                                  -0.11
## cor(phase2,phase2:difficulty1)                                   0.03
## cor(difficulty1,phase2:difficulty1)                              0.09
## cor(difficulty2,phase2:difficulty1)                              0.01
## cor(expected1:phase1,phase2:difficulty1)                         0.01
## cor(expected1:phase2,phase2:difficulty1)                         0.08
## cor(expected1:difficulty1,phase2:difficulty1)                    0.03
## cor(expected1:difficulty2,phase2:difficulty1)                   -0.03
## cor(phase1:difficulty1,phase2:difficulty1)                      -0.02
## cor(Intercept,phase1:difficulty2)                                0.06
## cor(expected1,phase1:difficulty2)                               -0.03
## cor(phase1,phase1:difficulty2)                                   0.04
## cor(phase2,phase1:difficulty2)                                  -0.06
## cor(difficulty1,phase1:difficulty2)                             -0.05
## cor(difficulty2,phase1:difficulty2)                              0.01
## cor(expected1:phase1,phase1:difficulty2)                        -0.03
## cor(expected1:phase2,phase1:difficulty2)                        -0.03
## cor(expected1:difficulty1,phase1:difficulty2)                   -0.04
## cor(expected1:difficulty2,phase1:difficulty2)                   -0.00
## cor(phase1:difficulty1,phase1:difficulty2)                      -0.05
## cor(phase2:difficulty1,phase1:difficulty2)                      -0.05
## cor(Intercept,phase2:difficulty2)                                0.23
## cor(expected1,phase2:difficulty2)                                0.13
## cor(phase1,phase2:difficulty2)                                  -0.08
## cor(phase2,phase2:difficulty2)                                   0.04
## cor(difficulty1,phase2:difficulty2)                              0.04
## cor(difficulty2,phase2:difficulty2)                              0.02
## cor(expected1:phase1,phase2:difficulty2)                         0.09
## cor(expected1:phase2,phase2:difficulty2)                         0.19
## cor(expected1:difficulty1,phase2:difficulty2)                   -0.02
## cor(expected1:difficulty2,phase2:difficulty2)                    0.01
## cor(phase1:difficulty1,phase2:difficulty2)                      -0.09
## cor(phase2:difficulty1,phase2:difficulty2)                      -0.04
## cor(phase1:difficulty2,phase2:difficulty2)                      -0.05
## cor(Intercept,expected1:phase1:difficulty1)                      0.06
## cor(expected1,expected1:phase1:difficulty1)                      0.07
## cor(phase1,expected1:phase1:difficulty1)                         0.13
## cor(phase2,expected1:phase1:difficulty1)                        -0.01
## cor(difficulty1,expected1:phase1:difficulty1)                   -0.01
## cor(difficulty2,expected1:phase1:difficulty1)                   -0.01
## cor(expected1:phase1,expected1:phase1:difficulty1)               0.03
## cor(expected1:phase2,expected1:phase1:difficulty1)               0.02
## cor(expected1:difficulty1,expected1:phase1:difficulty1)          0.02
## cor(expected1:difficulty2,expected1:phase1:difficulty1)          0.04
## cor(phase1:difficulty1,expected1:phase1:difficulty1)            -0.05
## cor(phase2:difficulty1,expected1:phase1:difficulty1)            -0.04
## cor(phase1:difficulty2,expected1:phase1:difficulty1)            -0.02
## cor(phase2:difficulty2,expected1:phase1:difficulty1)            -0.00
## cor(Intercept,expected1:phase2:difficulty1)                      0.04
## cor(expected1,expected1:phase2:difficulty1)                      0.10
## cor(phase1,expected1:phase2:difficulty1)                         0.06
## cor(phase2,expected1:phase2:difficulty1)                         0.05
## cor(difficulty1,expected1:phase2:difficulty1)                   -0.04
## cor(difficulty2,expected1:phase2:difficulty1)                   -0.03
## cor(expected1:phase1,expected1:phase2:difficulty1)              -0.01
## cor(expected1:phase2,expected1:phase2:difficulty1)              -0.01
## cor(expected1:difficulty1,expected1:phase2:difficulty1)         -0.02
```

```
## cor(expected1:difficulty2,expected1:phase2:difficulty1)           0.01
## cor(phase1:difficulty1,expected1:phase2:difficulty1)             -0.02
## cor(phase2:difficulty1,expected1:phase2:difficulty1)             -0.05
## cor(phase1:difficulty2,expected1:phase2:difficulty1)             -0.01
## cor(phase2:difficulty2,expected1:phase2:difficulty1)             -0.01
## cor(expected1:phase1:difficulty1,expected1:phase2:difficulty1)   -0.00
## cor(Intercept,expected1:phase1:difficulty2)                       0.02
## cor(expected1,expected1:phase1:difficulty2)                      -0.04
## cor(phase1,expected1:phase1:difficulty2)                          0.02
## cor(phase2,expected1:phase1:difficulty2)                         -0.01
## cor(difficulty1,expected1:phase1:difficulty2)                    -0.02
## cor(difficulty2,expected1:phase1:difficulty2)                     0.03
## cor(expected1:phase1,expected1:phase1:difficulty2)               -0.03
## cor(expected1:phase2,expected1:phase1:difficulty2)               -0.03
## cor(expected1:difficulty1,expected1:phase1:difficulty2)          -0.02
## cor(expected1:difficulty2,expected1:phase1:difficulty2)           0.01
## cor(phase1:difficulty1,expected1:phase1:difficulty2)             -0.04
## cor(phase2:difficulty1,expected1:phase1:difficulty2)             -0.03
## cor(phase1:difficulty2,expected1:phase1:difficulty2)             -0.01
## cor(phase2:difficulty2,expected1:phase1:difficulty2)             -0.03
## cor(expected1:phase1:difficulty1,expected1:phase1:difficulty2)   -0.03
## cor(expected1:phase2:difficulty1,expected1:phase1:difficulty2)   -0.01
## cor(Intercept,expected1:phase2:difficulty2)                       0.04
## cor(expected1,expected1:phase2:difficulty2)                       0.07
## cor(phase1,expected1:phase2:difficulty2)                          0.09
## cor(phase2,expected1:phase2:difficulty2)                          0.06
## cor(difficulty1,expected1:phase2:difficulty2)                    -0.03
## cor(difficulty2,expected1:phase2:difficulty2)                    -0.04
## cor(expected1:phase1,expected1:phase2:difficulty2)                0.01
## cor(expected1:phase2,expected1:phase2:difficulty2)                0.01
## cor(expected1:difficulty1,expected1:phase2:difficulty2)          -0.01
## cor(expected1:difficulty2,expected1:phase2:difficulty2)          -0.00
## cor(phase1:difficulty1,expected1:phase2:difficulty2)             -0.00
## cor(phase2:difficulty1,expected1:phase2:difficulty2)             -0.04
## cor(phase1:difficulty2,expected1:phase2:difficulty2)             -0.03
## cor(phase2:difficulty2,expected1:phase2:difficulty2)             -0.07
## cor(expected1:phase1:difficulty1,expected1:phase2:difficulty2)    0.01
## cor(expected1:phase2:difficulty1,expected1:phase2:difficulty2)   -0.01
## cor(expected1:phase1:difficulty2,expected1:phase2:difficulty2)   -0.03
##                                                                Est.Error
## sd(Intercept)                                                       0.02
## sd(expected1)                                                       0.00
## sd(phase1)                                                          0.01
## sd(phase2)                                                          0.00
## sd(difficulty1)                                                     0.00
## sd(difficulty2)                                                     0.00
## sd(expected1:phase1)                                                0.01
## sd(expected1:phase2)                                                0.01
## sd(expected1:difficulty1)                                           0.00
## sd(expected1:difficulty2)                                           0.00
## sd(phase1:difficulty1)                                              0.01
## sd(phase2:difficulty1)                                              0.00
## 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)                                    0.00
## sd(expected1:phase2:difficulty2)                                    0.00
## cor(Intercept,expected1)                                            0.14
## cor(Intercept,phase1)                                               0.12
```

```
## cor(expected1,phase1)                                          0.15
## cor(Intercept,phase2)                                          0.14
## cor(expected1,phase2)                                          0.18
## cor(phase1,phase2)                                             0.15
## cor(Intercept,difficulty1)                                     0.17
## cor(expected1,difficulty1)                                     0.19
## cor(phase1,difficulty1)                                        0.17
## cor(phase2,difficulty1)                                        0.19
## cor(Intercept,difficulty2)                                     0.19
## cor(expected1,difficulty2)                                     0.20
## cor(phase1,difficulty2)                                        0.19
## cor(phase2,difficulty2)                                        0.20
## cor(difficulty1,difficulty2)                                   0.21
## cor(Intercept,expected1:phase1)                                0.17
## cor(expected1,expected1:phase1)                                0.19
## cor(phase1,expected1:phase1)                                   0.18
## cor(phase2,expected1:phase1)                                   0.19
## cor(difficulty1,expected1:phase1)                              0.20
## cor(difficulty2,expected1:phase1)                              0.21
## cor(Intercept,expected1:phase2)                                0.17
## cor(expected1,expected1:phase2)                                0.19
## cor(phase1,expected1:phase2)                                   0.17
## cor(phase2,expected1:phase2)                                   0.19
## cor(difficulty1,expected1:phase2)                              0.20
## cor(difficulty2,expected1:phase2)                              0.21
## cor(expected1:phase1,expected1:phase2)                         0.20
## 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)                         0.21
## cor(expected1:phase1,expected1:difficulty1)                    0.22
## cor(expected1:phase2,expected1:difficulty1)                    0.21
## cor(Intercept,expected1:difficulty2)                           0.19
## cor(expected1,expected1:difficulty2)                           0.21
## cor(phase1,expected1:difficulty2)                              0.20
## cor(phase2,expected1:difficulty2)                              0.21
## cor(difficulty1,expected1:difficulty2)                         0.21
## cor(difficulty2,expected1:difficulty2)                         0.22
## cor(expected1:phase1,expected1:difficulty2)                    0.21
## cor(expected1:phase2,expected1:difficulty2)                    0.21
## cor(expected1:difficulty1,expected1:difficulty2)               0.22
## cor(Intercept,phase1:difficulty1)                              0.20
## cor(expected1,phase1:difficulty1)                              0.21
## cor(phase1,phase1:difficulty1)                                 0.21
## cor(phase2,phase1:difficulty1)                                 0.21
## cor(difficulty1,phase1:difficulty1)                            0.21
## cor(difficulty2,phase1:difficulty1)                            0.21
## cor(expected1:phase1,phase1:difficulty1)                       0.21
## cor(expected1:phase2,phase1:difficulty1)                       0.21
## cor(expected1:difficulty1,phase1:difficulty1)                  0.22
## cor(expected1:difficulty2,phase1:difficulty1)                  0.22
## cor(Intercept,phase2:difficulty1)                              0.20
## cor(expected1,phase2:difficulty1)                              0.21
## cor(phase1,phase2:difficulty1)                                 0.20
## cor(phase2,phase2:difficulty1)                                 0.21
## cor(difficulty1,phase2:difficulty1)                            0.21
## cor(difficulty2,phase2:difficulty1)                            0.21
## cor(expected1:phase1,phase2:difficulty1)                       0.21
```

```
## cor(expected1:phase2,phase2:difficulty1)                              0.21
## cor(expected1:difficulty1,phase2:difficulty1)                         0.22
## cor(expected1:difficulty2,phase2:difficulty1)                         0.22
## cor(phase1:difficulty1,phase2:difficulty1)                            0.22
## cor(Intercept,phase1:difficulty2)                                     0.21
## cor(expected1,phase1:difficulty2)                                     0.21
## cor(phase1,phase1:difficulty2)                                        0.21
## cor(phase2,phase1:difficulty2)                                        0.21
## 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)                         0.22
## cor(phase1:difficulty1,phase1:difficulty2)                            0.22
## cor(phase2:difficulty1,phase1:difficulty2)                            0.22
## cor(Intercept,phase2:difficulty2)                                     0.17
## cor(expected1,phase2:difficulty2)                                     0.19
## cor(phase1,phase2:difficulty2)                                        0.18
## cor(phase2,phase2:difficulty2)                                        0.19
## cor(difficulty1,phase2:difficulty2)                                   0.20
## cor(difficulty2,phase2:difficulty2)                                   0.21
## cor(expected1:phase1,phase2:difficulty2)                              0.20
## cor(expected1:phase2,phase2:difficulty2)                              0.20
## 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)                            0.21
## cor(phase1:difficulty2,phase2:difficulty2)                            0.22
## cor(Intercept,expected1:phase1:difficulty1)                           0.21
## cor(expected1,expected1:phase1:difficulty1)                           0.22
## cor(phase1,expected1:phase1:difficulty1)                              0.22
## cor(phase2,expected1:phase1:difficulty1)                              0.22
## cor(difficulty1,expected1:phase1:difficulty1)                         0.21
## cor(difficulty2,expected1:phase1:difficulty1)                         0.22
## cor(expected1:phase1,expected1:phase1:difficulty1)                    0.22
## cor(expected1:phase2,expected1:phase1:difficulty1)                    0.21
## cor(expected1:difficulty1,expected1:phase1:difficulty1)               0.22
## cor(expected1:difficulty2,expected1:phase1:difficulty1)               0.22
## 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)                              0.21
## 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)               0.22
## 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)                           0.21
```

```
## cor(phase1,expected1:phase1:difficulty2)                              0.21
## cor(phase2,expected1:phase1:difficulty2)                              0.21
## cor(difficulty1,expected1:phase1:difficulty2)                         0.21
## cor(difficulty2,expected1:phase1:difficulty2)                         0.22
## cor(expected1:phase1,expected1:phase1:difficulty2)                    0.21
## cor(expected1:phase2,expected1:phase1:difficulty2)                    0.22
## cor(expected1:difficulty1,expected1:phase1:difficulty2)               0.22
## cor(expected1:difficulty2,expected1:phase1:difficulty2)               0.22
## 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)        0.21
## cor(Intercept,expected1:phase2:difficulty2)                           0.21
## cor(expected1,expected1:phase2:difficulty2)                           0.21
## cor(phase1,expected1:phase2:difficulty2)                              0.21
## cor(phase2,expected1:phase2:difficulty2)                              0.21
## cor(difficulty1,expected1:phase2:difficulty2)                         0.21
## cor(difficulty2,expected1:phase2:difficulty2)                         0.22
## cor(expected1:phase1,expected1:phase2:difficulty2)                    0.21
## cor(expected1:phase2,expected1:phase2:difficulty2)                    0.21
## 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)                                                        0.16
## sd(expected1)                                                        0.01
## sd(phase1)                                                           0.05
## 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)                                            -0.06
## cor(Intercept,phase1)                                               -0.15
## cor(expected1,phase1)                                               -0.09
## cor(Intercept,phase2)                                               -0.19
## cor(expected1,phase2)                                               -0.31
## cor(phase1,phase2)                                                  -0.52
## cor(Intercept,difficulty1)                                          -0.55
## cor(expected1,difficulty1)                                          -0.44
## cor(phase1,difficulty1)                                             -0.50
## cor(phase2,difficulty1)                                             -0.44
```

```
## cor(Intercept,difficulty2)                                    -0.40
## cor(expected1,difficulty2)                                    -0.49
## cor(phase1,difficulty2)                                       -0.52
## cor(phase2,difficulty2)                                       -0.31
## cor(difficulty1,difficulty2)                                  -0.38
## cor(Intercept,expected1:phase1)                               -0.30
## cor(expected1,expected1:phase1)                               -0.22
## cor(phase1,expected1:phase1)                                  -0.25
## cor(phase2,expected1:phase1)                                  -0.53
## cor(difficulty1,expected1:phase1)                             -0.33
## cor(difficulty2,expected1:phase1)                             -0.42
## cor(Intercept,expected1:phase2)                               -0.14
## cor(expected1,expected1:phase2)                               -0.30
## cor(phase1,expected1:phase2)                                  -0.38
## cor(phase2,expected1:phase2)                                  -0.33
## cor(difficulty1,expected1:phase2)                             -0.35
## cor(difficulty2,expected1:phase2)                             -0.29
## cor(expected1:phase1,expected1:phase2)                        -0.38
## cor(Intercept,expected1:difficulty1)                          -0.47
## cor(expected1,expected1:difficulty1)                          -0.39
## cor(phase1,expected1:difficulty1)                             -0.40
## cor(phase2,expected1:difficulty1)                             -0.42
## cor(difficulty1,expected1:difficulty1)                        -0.43
## cor(difficulty2,expected1:difficulty1)                        -0.42
## cor(expected1:phase1,expected1:difficulty1)                   -0.39
## cor(expected1:phase2,expected1:difficulty1)                   -0.40
## cor(Intercept,expected1:difficulty2)                          -0.37
## cor(expected1,expected1:difficulty2)                          -0.36
## cor(phase1,expected1:difficulty2)                             -0.31
## cor(phase2,expected1:difficulty2)                             -0.34
## cor(difficulty1,expected1:difficulty2)                        -0.39
## cor(difficulty2,expected1:difficulty2)                        -0.42
## cor(expected1:phase1,expected1:difficulty2)                   -0.36
## cor(expected1:phase2,expected1:difficulty2)                   -0.34
## cor(expected1:difficulty1,expected1:difficulty2)              -0.42
## cor(Intercept,phase1:difficulty1)                             -0.46
## cor(expected1,phase1:difficulty1)                             -0.36
## cor(phase1,phase1:difficulty1)                                -0.28
## cor(phase2,phase1:difficulty1)                                -0.51
## cor(difficulty1,phase1:difficulty1)                           -0.35
## cor(difficulty2,phase1:difficulty1)                           -0.48
## cor(expected1:phase1,phase1:difficulty1)                      -0.35
## cor(expected1:phase2,phase1:difficulty1)                      -0.44
## cor(expected1:difficulty1,phase1:difficulty1)                 -0.38
## cor(expected1:difficulty2,phase1:difficulty1)                 -0.41
## cor(Intercept,phase2:difficulty1)                             -0.42
## cor(expected1,phase2:difficulty1)                             -0.37
## cor(phase1,phase2:difficulty1)                                -0.49
## cor(phase2,phase2:difficulty1)                                -0.37
## cor(difficulty1,phase2:difficulty1)                           -0.34
## cor(difficulty2,phase2:difficulty1)                           -0.40
## cor(expected1:phase1,phase2:difficulty1)                      -0.40
## cor(expected1:phase2,phase2:difficulty1)                      -0.35
## cor(expected1:difficulty1,phase2:difficulty1)                 -0.40
## cor(expected1:difficulty2,phase2:difficulty1)                 -0.45
## cor(phase1:difficulty1,phase2:difficulty1)                    -0.44
## cor(Intercept,phase1:difficulty2)                             -0.36
## cor(expected1,phase1:difficulty2)                             -0.43
## cor(phase1,phase1:difficulty2)                                -0.37
## cor(phase2,phase1:difficulty2)                                -0.46
```

```
## cor(difficulty1,phase1:difficulty2)                                  -0.46
## cor(difficulty2,phase1:difficulty2)                                  -0.41
## cor(expected1:phase1,phase1:difficulty2)                             -0.45
## cor(expected1:phase2,phase1:difficulty2)                             -0.44
## cor(expected1:difficulty1,phase1:difficulty2)                        -0.46
## cor(expected1:difficulty2,phase1:difficulty2)                        -0.42
## cor(phase1:difficulty1,phase1:difficulty2)                           -0.48
## cor(phase2:difficulty1,phase1:difficulty2)                           -0.47
## cor(Intercept,phase2:difficulty2)                                    -0.14
## cor(expected1,phase2:difficulty2)                                    -0.26
## cor(phase1,phase2:difficulty2)                                       -0.42
## cor(phase2,phase2:difficulty2)                                       -0.33
## cor(difficulty1,phase2:difficulty2)                                  -0.36
## cor(difficulty2,phase2:difficulty2)                                  -0.38
## cor(expected1:phase1,phase2:difficulty2)                             -0.32
## cor(expected1:phase2,phase2:difficulty2)                             -0.22
## cor(expected1:difficulty1,phase2:difficulty2)                        -0.43
## cor(expected1:difficulty2,phase2:difficulty2)                        -0.41
## cor(phase1:difficulty1,phase2:difficulty2)                           -0.49
## cor(phase2:difficulty1,phase2:difficulty2)                           -0.44
## cor(phase1:difficulty2,phase2:difficulty2)                           -0.46
## cor(Intercept,expected1:phase1:difficulty1)                          -0.36
## cor(expected1,expected1:phase1:difficulty1)                          -0.37
## cor(phase1,expected1:phase1:difficulty1)                             -0.33
## cor(phase2,expected1:phase1:difficulty1)                             -0.43
## cor(difficulty1,expected1:phase1:difficulty1)                        -0.42
## cor(difficulty2,expected1:phase1:difficulty1)                        -0.43
## cor(expected1:phase1,expected1:phase1:difficulty1)                   -0.40
## cor(expected1:phase2,expected1:phase1:difficulty1)                   -0.39
## cor(expected1:difficulty1,expected1:phase1:difficulty1)              -0.41
## cor(expected1:difficulty2,expected1:phase1:difficulty1)              -0.40
## cor(phase1:difficulty1,expected1:phase1:difficulty1)                 -0.47
## cor(phase2:difficulty1,expected1:phase1:difficulty1)                 -0.46
## cor(phase1:difficulty2,expected1:phase1:difficulty1)                 -0.44
## cor(phase2:difficulty2,expected1:phase1:difficulty1)                 -0.41
## cor(Intercept,expected1:phase2:difficulty1)                          -0.37
## cor(expected1,expected1:phase2:difficulty1)                          -0.34
## cor(phase1,expected1:phase2:difficulty1)                             -0.37
## cor(phase2,expected1:phase2:difficulty1)                             -0.37
## cor(difficulty1,expected1:phase2:difficulty1)                        -0.45
## cor(difficulty2,expected1:phase2:difficulty1)                        -0.44
## cor(expected1:phase1,expected1:phase2:difficulty1)                   -0.44
## 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)                 -0.44
## cor(phase2:difficulty1,expected1:phase2:difficulty1)                 -0.47
## cor(phase1:difficulty2,expected1:phase2:difficulty1)                 -0.44
## cor(phase2:difficulty2,expected1:phase2:difficulty1)                 -0.42
## cor(expected1:phase1:difficulty1,expected1:phase2:difficulty1)       -0.42
## cor(Intercept,expected1:phase1:difficulty2)                          -0.38
## cor(expected1,expected1:phase1:difficulty2)                          -0.45
## cor(phase1,expected1:phase1:difficulty2)                             -0.39
## cor(phase2,expected1:phase1:difficulty2)                             -0.43
## cor(difficulty1,expected1:phase1:difficulty2)                        -0.43
## cor(difficulty2,expected1:phase1:difficulty2)                        -0.40
## cor(expected1:phase1,expected1:phase1:difficulty2)                   -0.44
## cor(expected1:phase2,expected1:phase1:difficulty2)                   -0.45
## cor(expected1:difficulty1,expected1:phase1:difficulty2)              -0.43
## cor(expected1:difficulty2,expected1:phase1:difficulty2)              -0.41
```

```
## cor(phase1:difficulty1,expected1:phase1:difficulty2)              -0.46
## cor(phase2:difficulty1,expected1:phase1:difficulty2)              -0.45
## cor(phase1:difficulty2,expected1:phase1:difficulty2)              -0.44
## cor(phase2:difficulty2,expected1:phase1:difficulty2)              -0.45
## cor(expected1:phase1:difficulty1,expected1:phase1:difficulty2)    -0.46
## cor(expected1:phase2:difficulty1,expected1:phase1:difficulty2)    -0.43
## cor(Intercept,expected1:phase2:difficulty2)                       -0.37
## cor(expected1,expected1:phase2:difficulty2)                       -0.35
## cor(phase1,expected1:phase2:difficulty2)                          -0.33
## cor(phase2,expected1:phase2:difficulty2)                          -0.36
## cor(difficulty1,expected1:phase2:difficulty2)                     -0.44
## cor(difficulty2,expected1:phase2:difficulty2)                     -0.46
## cor(expected1:phase1,expected1:phase2:difficulty2)                -0.40
## cor(expected1:phase2,expected1:phase2:difficulty2)                -0.42
## cor(expected1:difficulty1,expected1:phase2:difficulty2)           -0.42
## cor(expected1:difficulty2,expected1:phase2:difficulty2)           -0.42
## cor(phase1:difficulty1,expected1:phase2:difficulty2)              -0.42
## cor(phase2:difficulty1,expected1:phase2:difficulty2)              -0.46
## cor(phase1:difficulty2,expected1:phase2:difficulty2)              -0.45
## cor(phase2:difficulty2,expected1:phase2:difficulty2)              -0.49
## cor(expected1:phase1:difficulty1,expected1:phase2:difficulty2)    -0.41
## cor(expected1:phase2:difficulty1,expected1:phase2:difficulty2)    -0.42
## cor(expected1:phase1:difficulty2,expected1:phase2:difficulty2)    -0.46
##                                                                u-95% CI Rhat
## sd(Intercept)                                                      0.23 1.00
## sd(expected1)                                                      0.03 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)                                               0.03 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)                                             0.02 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)                                   0.01 1.00
## sd(expected1:phase1:difficulty2)                                   0.02 1.00
## sd(expected1:phase2:difficulty2)                                   0.02 1.00
## cor(Intercept,expected1)                                           0.50 1.00
## cor(Intercept,phase1)                                              0.31 1.00
## cor(expected1,phase1)                                              0.51 1.00
## cor(Intercept,phase2)                                              0.36 1.00
## cor(expected1,phase2)                                              0.38 1.00
## cor(phase1,phase2)                                                 0.05 1.00
## cor(Intercept,difficulty1)                                         0.10 1.00
## cor(expected1,difficulty1)                                         0.30 1.00
## cor(phase1,difficulty1)                                            0.18 1.00
## cor(phase2,difficulty1)                                            0.30 1.00
## cor(Intercept,difficulty2)                                         0.34 1.00
## cor(expected1,difficulty2)                                         0.30 1.00
## cor(phase1,difficulty2)                                            0.23 1.00
## cor(phase2,difficulty2)                                            0.47 1.00
## cor(difficulty1,difficulty2)                                       0.43 1.00
## cor(Intercept,expected1:phase1)                                    0.36 1.00
## cor(expected1,expected1:phase1)                                    0.53 1.00
## cor(phase1,expected1:phase1)                                       0.44 1.00
```

```
## cor(phase2,expected1:phase1)                                    0.21 1.00
## cor(difficulty1,expected1:phase1)                               0.44 1.00
## cor(difficulty2,expected1:phase1)                               0.38 1.00
## cor(Intercept,expected1:phase2)                                 0.51 1.00
## cor(expected1,expected1:phase2)                                 0.45 1.00
## cor(phase1,expected1:phase2)                                    0.30 1.00
## cor(phase2,expected1:phase2)                                    0.43 1.00
## cor(difficulty1,expected1:phase2)                               0.43 1.00
## cor(difficulty2,expected1:phase2)                               0.52 1.00
## cor(expected1:phase1,expected1:phase2)                          0.41 1.00
## cor(Intercept,expected1:difficulty1)                            0.35 1.00
## cor(expected1,expected1:difficulty1)                            0.45 1.00
## cor(phase1,expected1:difficulty1)                               0.43 1.00
## cor(phase2,expected1:difficulty1)                               0.42 1.00
## cor(difficulty1,expected1:difficulty1)                          0.41 1.00
## cor(difficulty2,expected1:difficulty1)                          0.41 1.00
## cor(expected1:phase1,expected1:difficulty1)                     0.45 1.00
## cor(expected1:phase2,expected1:difficulty1)                     0.43 1.00
## cor(Intercept,expected1:difficulty2)                            0.38 1.00
## cor(expected1,expected1:difficulty2)                            0.45 1.00
## cor(phase1,expected1:difficulty2)                               0.47 1.00
## cor(phase2,expected1:difficulty2)                               0.46 1.00
## cor(difficulty1,expected1:difficulty2)                          0.42 1.00
## cor(difficulty2,expected1:difficulty2)                          0.41 1.00
## cor(expected1:phase1,expected1:difficulty2)                     0.46 1.00
## cor(expected1:phase2,expected1:difficulty2)                     0.48 1.00
## cor(expected1:difficulty1,expected1:difficulty2)                0.42 1.00
## cor(Intercept,phase1:difficulty1)                               0.31 1.00
## cor(expected1,phase1:difficulty1)                               0.45 1.00
## cor(phase1,phase1:difficulty1)                                  0.53 1.00
## cor(phase2,phase1:difficulty1)                                  0.31 1.00
## cor(difficulty1,phase1:difficulty1)                             0.47 1.00
## cor(difficulty2,phase1:difficulty1)                             0.36 1.00
## cor(expected1:phase1,phase1:difficulty1)                        0.47 1.00
## cor(expected1:phase2,phase1:difficulty1)                        0.38 1.00
## cor(expected1:difficulty1,phase1:difficulty1)                   0.46 1.00
## cor(expected1:difficulty2,phase1:difficulty1)                   0.42 1.00
## cor(Intercept,phase2:difficulty1)                               0.35 1.00
## cor(expected1,phase2:difficulty1)                               0.45 1.00
## cor(phase1,phase2:difficulty1)                                  0.31 1.00
## cor(phase2,phase2:difficulty1)                                  0.42 1.00
## cor(difficulty1,phase2:difficulty1)                             0.49 1.00
## cor(difficulty2,phase2:difficulty1)                             0.42 1.00
## cor(expected1:phase1,phase2:difficulty1)                        0.43 1.00
## cor(expected1:phase2,phase2:difficulty1)                        0.48 1.00
## cor(expected1:difficulty1,phase2:difficulty1)                   0.44 1.00
## cor(expected1:difficulty2,phase2:difficulty1)                   0.40 1.00
## cor(phase1:difficulty1,phase2:difficulty1)                      0.40 1.00
## cor(Intercept,phase1:difficulty2)                               0.45 1.00
## cor(expected1,phase1:difficulty2)                               0.39 1.00
## cor(phase1,phase1:difficulty2)                                  0.44 1.00
## cor(phase2,phase1:difficulty2)                                  0.36 1.00
## cor(difficulty1,phase1:difficulty2)                             0.39 1.00
## cor(difficulty2,phase1:difficulty2)                             0.43 1.00
## cor(expected1:phase1,phase1:difficulty2)                        0.39 1.00
## cor(expected1:phase2,phase1:difficulty2)                        0.38 1.00
## cor(expected1:difficulty1,phase1:difficulty2)                   0.40 1.00
## cor(expected1:difficulty2,phase1:difficulty2)                   0.42 1.00
## cor(phase1:difficulty1,phase1:difficulty2)                      0.38 1.00
## cor(phase2:difficulty1,phase1:difficulty2)                      0.38 1.00
```

```
## cor(Intercept,phase2:difficulty2)                                    0.54 1.00
## cor(expected1,phase2:difficulty2)                                    0.50 1.00
## cor(phase1,phase2:difficulty2)                                       0.28 1.00
## cor(phase2,phase2:difficulty2)                                       0.42 1.00
## cor(difficulty1,phase2:difficulty2)                                  0.42 1.00
## cor(difficulty2,phase2:difficulty2)                                  0.42 1.00
## cor(expected1:phase1,phase2:difficulty2)                             0.47 1.00
## cor(expected1:phase2,phase2:difficulty2)                             0.56 1.00
## cor(expected1:difficulty1,phase2:difficulty2)                        0.41 1.00
## cor(expected1:difficulty2,phase2:difficulty2)                        0.41 1.00
## cor(phase1:difficulty1,phase2:difficulty2)                           0.35 1.00
## cor(phase2:difficulty1,phase2:difficulty2)                           0.39 1.00
## cor(phase1:difficulty2,phase2:difficulty2)                           0.38 1.00
## cor(Intercept,expected1:phase1:difficulty1)                          0.46 1.00
## cor(expected1,expected1:phase1:difficulty1)                          0.47 1.00
## cor(phase1,expected1:phase1:difficulty1)                             0.54 1.00
## cor(phase2,expected1:phase1:difficulty1)                             0.41 1.00
## cor(difficulty1,expected1:phase1:difficulty1)                        0.41 1.00
## cor(difficulty2,expected1:phase1:difficulty1)                        0.40 1.00
## cor(expected1:phase1,expected1:phase1:difficulty1)                   0.45 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)              0.46 1.00
## cor(phase1:difficulty1,expected1:phase1:difficulty1)                 0.39 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)                 0.42 1.00
## cor(Intercept,expected1:phase2:difficulty1)                          0.44 1.00
## cor(expected1,expected1:phase2:difficulty1)                          0.50 1.00
## cor(phase1,expected1:phase2:difficulty1)                             0.46 1.00
## cor(phase2,expected1:phase2:difficulty1)                             0.46 1.00
## cor(difficulty1,expected1:phase2:difficulty1)                        0.38 1.00
## cor(difficulty2,expected1:phase2:difficulty1)                        0.39 1.00
## cor(expected1:phase1,expected1:phase2:difficulty1)                   0.41 1.00
## cor(expected1:phase2,expected1:phase2:difficulty1)                   0.41 1.00
## cor(expected1:difficulty1,expected1:phase2:difficulty1)              0.41 1.00
## cor(expected1:difficulty2,expected1:phase2:difficulty1)              0.42 1.00
## cor(phase1:difficulty1,expected1:phase2:difficulty1)                 0.40 1.00
## cor(phase2:difficulty1,expected1:phase2:difficulty1)                 0.38 1.00
## cor(phase1:difficulty2,expected1:phase2:difficulty1)                 0.42 1.00
## cor(phase2:difficulty2,expected1:phase2:difficulty1)                 0.41 1.00
## cor(expected1:phase1:difficulty1,expected1:phase2:difficulty1)       0.42 1.00
## cor(Intercept,expected1:phase1:difficulty2)                          0.42 1.00
## cor(expected1,expected1:phase1:difficulty2)                          0.39 1.00
## cor(phase1,expected1:phase1:difficulty2)                             0.42 1.00
## cor(phase2,expected1:phase1:difficulty2)                             0.40 1.00
## cor(difficulty1,expected1:phase1:difficulty2)                        0.39 1.00
## cor(difficulty2,expected1:phase1:difficulty2)                        0.44 1.00
## cor(expected1:phase1,expected1:phase1:difficulty2)                   0.39 1.00
## cor(expected1:phase2,expected1:phase1:difficulty2)                   0.40 1.00
## cor(expected1:difficulty1,expected1:phase1:difficulty2)              0.41 1.00
## cor(expected1:difficulty2,expected1:phase1:difficulty2)              0.43 1.00
## cor(phase1:difficulty1,expected1:phase1:difficulty2)                 0.39 1.00
## cor(phase2:difficulty1,expected1:phase1:difficulty2)                 0.40 1.00
## cor(phase1:difficulty2,expected1:phase1:difficulty2)                 0.41 1.00
## cor(phase2:difficulty2,expected1:phase1:difficulty2)                 0.39 1.00
## cor(expected1:phase1:difficulty1,expected1:phase1:difficulty2)       0.41 1.00
## cor(expected1:phase2:difficulty1,expected1:phase1:difficulty2)       0.40 1.00
## cor(Intercept,expected1:phase2:difficulty2)                          0.43 1.00
## cor(expected1,expected1:phase2:difficulty2)                          0.48 1.00
```

```
## cor(phase1,expected1:phase2:difficulty2)                          0.48 1.00
## cor(phase2,expected1:phase2:difficulty2)                          0.46 1.00
## cor(difficulty1,expected1:phase2:difficulty2)                     0.39 1.00
## cor(difficulty2,expected1:phase2:difficulty2)                     0.38 1.00
## cor(expected1:phase1,expected1:phase2:difficulty2)                0.43 1.00
## cor(expected1:phase2,expected1:phase2:difficulty2)                0.42 1.00
## cor(expected1:difficulty1,expected1:phase2:difficulty2)           0.42 1.00
## cor(expected1:difficulty2,expected1:phase2:difficulty2)           0.42 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)              0.40 1.00
## cor(phase2:difficulty2,expected1:phase2:difficulty2)              0.37 1.00
## cor(expected1:phase1:difficulty1,expected1:phase2:difficulty2)    0.44 1.00
## cor(expected1:phase2:difficulty1,expected1:phase2:difficulty2)    0.42 1.00
## cor(expected1:phase1:difficulty2,expected1:phase2:difficulty2)    0.39 1.00
##                                                                 Bulk_ESS
## sd(Intercept)                                                       2366
## sd(expected1)                                                       7066
## sd(phase1)                                                          7239
## sd(phase2)                                                          5858
## sd(difficulty1)                                                     4134
## sd(difficulty2)                                                     3095
## sd(expected1:phase1)                                                3029
## sd(expected1:phase2)                                                3068
## sd(expected1:difficulty1)                                           6251
## sd(expected1:difficulty2)                                           3722
## sd(phase1:difficulty1)                                              5189
## sd(phase2:difficulty1)                                              4898
## sd(phase1:difficulty2)                                              6330
## sd(phase2:difficulty2)                                              5160
## sd(expected1:phase1:difficulty1)                                    7427
## sd(expected1:phase2:difficulty1)                                    6694
## sd(expected1:phase1:difficulty2)                                    6824
## sd(expected1:phase2:difficulty2)                                    5243
## cor(Intercept,expected1)                                           14133
## cor(Intercept,phase1)                                               6683
## cor(expected1,phase1)                                               2663
## cor(Intercept,phase2)                                              12625
## cor(expected1,phase2)                                               6010
## cor(phase1,phase2)                                                 10967
## cor(Intercept,difficulty1)                                         16432
## cor(expected1,difficulty1)                                         12974
## cor(phase1,difficulty1)                                            15222
## cor(phase2,difficulty1)                                            13511
## cor(Intercept,difficulty2)                                         18051
## cor(expected1,difficulty2)                                         13174
## cor(phase1,difficulty2)                                            14317
## cor(phase2,difficulty2)                                            15036
## cor(difficulty1,difficulty2)                                       15041
## cor(Intercept,expected1:phase1)                                    18603
## cor(expected1,expected1:phase1)                                     9527
## cor(phase1,expected1:phase1)                                       13295
## cor(phase2,expected1:phase1)                                        9736
## cor(difficulty1,expected1:phase1)                                  10090
## cor(difficulty2,expected1:phase1)                                   8434
## cor(Intercept,expected1:phase2)                                    15949
## cor(expected1,expected1:phase2)                                    11900
## cor(phase1,expected1:phase2)                                       14657
## cor(phase2,expected1:phase2)                                       11006
## cor(difficulty1,expected1:phase2)                                   9619
```

```
## cor(difficulty2,expected1:phase2)                                  6869
## cor(expected1:phase1,expected1:phase2)                             9188
## cor(Intercept,expected1:difficulty1)                              22552
## cor(expected1,expected1:difficulty1)                              23500
## cor(phase1,expected1:difficulty1)                                 23198
## cor(phase2,expected1:difficulty1)                                 23837
## cor(difficulty1,expected1:difficulty1)                            19936
## cor(difficulty2,expected1:difficulty1)                            17646
## cor(expected1:phase1,expected1:difficulty1)                       16596
## cor(expected1:phase2,expected1:difficulty1)                       18736
## cor(Intercept,expected1:difficulty2)                              20349
## cor(expected1,expected1:difficulty2)                              15884
## cor(phase1,expected1:difficulty2)                                 18050
## cor(phase2,expected1:difficulty2)                                 16314
## cor(difficulty1,expected1:difficulty2)                            15940
## cor(difficulty2,expected1:difficulty2)                            15629
## cor(expected1:phase1,expected1:difficulty2)                       13665
## cor(expected1:phase2,expected1:difficulty2)                       13394
## cor(expected1:difficulty1,expected1:difficulty2)                  12206
## cor(Intercept,phase1:difficulty1)                                 20678
## cor(expected1,phase1:difficulty1)                                 16601
## cor(phase1,phase1:difficulty1)                                    15476
## cor(phase2,phase1:difficulty1)                                    15607
## cor(difficulty1,phase1:difficulty1)                               16586
## cor(difficulty2,phase1:difficulty1)                               15840
## cor(expected1:phase1,phase1:difficulty1)                          17038
## cor(expected1:phase2,phase1:difficulty1)                          17604
## cor(expected1:difficulty1,phase1:difficulty1)                     13039
## cor(expected1:difficulty2,phase1:difficulty1)                     14447
## cor(Intercept,phase2:difficulty1)                                 21087
## cor(expected1,phase2:difficulty1)                                 18351
## cor(phase1,phase2:difficulty1)                                    19609
## cor(phase2,phase2:difficulty1)                                    19276
## cor(difficulty1,phase2:difficulty1)                               14912
## cor(difficulty2,phase2:difficulty1)                               16387
## cor(expected1:phase1,phase2:difficulty1)                          16007
## cor(expected1:phase2,phase2:difficulty1)                          14459
## cor(expected1:difficulty1,phase2:difficulty1)                     13914
## cor(expected1:difficulty2,phase2:difficulty1)                     14616
## cor(phase1:difficulty1,phase2:difficulty1)                        14149
## cor(Intercept,phase1:difficulty2)                                 23002
## cor(expected1,phase1:difficulty2)                                 21002
## cor(phase1,phase1:difficulty2)                                    21507
## cor(phase2,phase1:difficulty2)                                    19294
## cor(difficulty1,phase1:difficulty2)                               18449
## cor(difficulty2,phase1:difficulty2)                               16976
## cor(expected1:phase1,phase1:difficulty2)                          18590
## cor(expected1:phase2,phase1:difficulty2)                          18237
## cor(expected1:difficulty1,phase1:difficulty2)                     12947
## cor(expected1:difficulty2,phase1:difficulty2)                     15489
## cor(phase1:difficulty1,phase1:difficulty2)                        12117
## cor(phase2:difficulty1,phase1:difficulty2)                        12498
## cor(Intercept,phase2:difficulty2)                                 18737
## cor(expected1,phase2:difficulty2)                                 11983
## cor(phase1,phase2:difficulty2)                                    19341
## cor(phase2,phase2:difficulty2)                                    14594
## cor(difficulty1,phase2:difficulty2)                               13320
## cor(difficulty2,phase2:difficulty2)                               11807
## cor(expected1:phase1,phase2:difficulty2)                          12466
## cor(expected1:phase2,phase2:difficulty2)                          10284
```

```
## cor(expected1:difficulty1,phase2:difficulty2)                    11650
## cor(expected1:difficulty2,phase2:difficulty2)                    12079
## cor(phase1:difficulty1,phase2:difficulty2)                       11518
## cor(phase2:difficulty1,phase2:difficulty2)                       11069
## cor(phase1:difficulty2,phase2:difficulty2)                       11275
## cor(Intercept,expected1:phase1:difficulty1)                      23070
## cor(expected1,expected1:phase1:difficulty1)                      19927
## cor(phase1,expected1:phase1:difficulty1)                         19826
## cor(phase2,expected1:phase1:difficulty1)                         23301
## cor(difficulty1,expected1:phase1:difficulty1)                    19693
## cor(difficulty2,expected1:phase1:difficulty1)                    18241
## cor(expected1:phase1,expected1:phase1:difficulty1)               20540
## cor(expected1:phase2,expected1:phase1:difficulty1)               18918
## cor(expected1:difficulty1,expected1:phase1:difficulty1)          14901
## cor(expected1:difficulty2,expected1:phase1:difficulty1)          15363
## cor(phase1:difficulty1,expected1:phase1:difficulty1)             13534
## cor(phase2:difficulty1,expected1:phase1:difficulty1)             12602
## cor(phase1:difficulty2,expected1:phase1:difficulty1)             12516
## cor(phase2:difficulty2,expected1:phase1:difficulty1)             15330
## cor(Intercept,expected1:phase2:difficulty1)                      23415
## cor(expected1,expected1:phase2:difficulty1)                      19618
## cor(phase1,expected1:phase2:difficulty1)                         22784
## cor(phase2,expected1:phase2:difficulty1)                         20412
## cor(difficulty1,expected1:phase2:difficulty1)                    19912
## cor(difficulty2,expected1:phase2:difficulty1)                    17690
## cor(expected1:phase1,expected1:phase2:difficulty1)               17898
## cor(expected1:phase2,expected1:phase2:difficulty1)               19036
## cor(expected1:difficulty1,expected1:phase2:difficulty1)          14669
## cor(expected1:difficulty2,expected1:phase2:difficulty1)          16225
## cor(phase1:difficulty1,expected1:phase2:difficulty1)             14340
## cor(phase2:difficulty1,expected1:phase2:difficulty1)             12139
## cor(phase1:difficulty2,expected1:phase2:difficulty1)             12162
## cor(phase2:difficulty2,expected1:phase2:difficulty1)             13742
## cor(expected1:phase1:difficulty1,expected1:phase2:difficulty1)   11303
## cor(Intercept,expected1:phase1:difficulty2)                      24977
## cor(expected1,expected1:phase1:difficulty2)                      21984
## cor(phase1,expected1:phase1:difficulty2)                         25112
## cor(phase2,expected1:phase1:difficulty2)                         23846
## cor(difficulty1,expected1:phase1:difficulty2)                    18818
## cor(difficulty2,expected1:phase1:difficulty2)                    16288
## cor(expected1:phase1,expected1:phase1:difficulty2)               18312
## cor(expected1:phase2,expected1:phase1:difficulty2)               18233
## cor(expected1:difficulty1,expected1:phase1:difficulty2)          13677
## cor(expected1:difficulty2,expected1:phase1:difficulty2)          14578
## cor(phase1:difficulty1,expected1:phase1:difficulty2)             13673
## cor(phase2:difficulty1,expected1:phase1:difficulty2)             13249
## cor(phase1:difficulty2,expected1:phase1:difficulty2)             12764
## cor(phase2:difficulty2,expected1:phase1:difficulty2)             15601
## cor(expected1:phase1:difficulty1,expected1:phase1:difficulty2)   11587
## cor(expected1:phase2:difficulty1,expected1:phase1:difficulty2)   10509
## cor(Intercept,expected1:phase2:difficulty2)                      22721
## cor(expected1,expected1:phase2:difficulty2)                      18641
## cor(phase1,expected1:phase2:difficulty2)                         21970
## cor(phase2,expected1:phase2:difficulty2)                         17872
## cor(difficulty1,expected1:phase2:difficulty2)                    19510
## cor(difficulty2,expected1:phase2:difficulty2)                    16470
## cor(expected1:phase1,expected1:phase2:difficulty2)               19280
## cor(expected1:phase2,expected1:phase2:difficulty2)               17766
## cor(expected1:difficulty1,expected1:phase2:difficulty2)          14471
## cor(expected1:difficulty2,expected1:phase2:difficulty2)          14774
```

```
## cor(phase1:difficulty1,expected1:phase2:difficulty2)              15075
## cor(phase2:difficulty1,expected1:phase2:difficulty2)              13598
## cor(phase1:difficulty2,expected1:phase2:difficulty2)              12355
## cor(phase2:difficulty2,expected1:phase2:difficulty2)              13156
## cor(expected1:phase1:difficulty1,expected1:phase2:difficulty2)    11294
## cor(expected1:phase2:difficulty1,expected1:phase2:difficulty2)    11446
## cor(expected1:phase1:difficulty2,expected1:phase2:difficulty2)    10626
##                                                                 Tail_ESS
## sd(Intercept)                                                       4846
## sd(expected1)                                                       7666
## sd(phase1)                                                         11628
## sd(phase2)                                                          7273
## sd(difficulty1)                                                     2776
## sd(difficulty2)                                                     3998
## sd(expected1:phase1)                                                2182
## sd(expected1:phase2)                                                2836
## sd(expected1:difficulty1)                                           7980
## sd(expected1:difficulty2)                                           5876
## sd(phase1:difficulty1)                                              6095
## sd(phase2:difficulty1)                                              6781
## sd(phase1:difficulty2)                                              6790
## sd(phase2:difficulty2)                                              5173
## sd(expected1:phase1:difficulty1)                                    6748
## sd(expected1:phase2:difficulty1)                                    7628
## sd(expected1:phase1:difficulty2)                                    7751
## sd(expected1:phase2:difficulty2)                                    7346
## cor(Intercept,expected1)                                           13901
## cor(Intercept,phase1)                                              10052
## cor(expected1,phase1)                                               5453
## cor(Intercept,phase2)                                              13120
## cor(expected1,phase2)                                               8180
## cor(phase1,phase2)                                                 13010
## cor(Intercept,difficulty1)                                         10045
## cor(expected1,difficulty1)                                         13322
## cor(phase1,difficulty1)                                            11806
## cor(phase2,difficulty1)                                            12642
## cor(Intercept,difficulty2)                                         12744
## cor(expected1,difficulty2)                                         13916
## cor(phase1,difficulty2)                                            11596
## cor(phase2,difficulty2)                                            13506
## cor(difficulty1,difficulty2)                                       13240
## cor(Intercept,expected1:phase1)                                    13281
## cor(expected1,expected1:phase1)                                    11700
## cor(phase1,expected1:phase1)                                       12199
## cor(phase2,expected1:phase1)                                       12181
## cor(difficulty1,expected1:phase1)                                  11920
## cor(difficulty2,expected1:phase1)                                  13198
## cor(Intercept,expected1:phase2)                                    12123
## cor(expected1,expected1:phase2)                                    13146
## cor(phase1,expected1:phase2)                                       13417
## cor(phase2,expected1:phase2)                                       12579
## cor(difficulty1,expected1:phase2)                                  11882
## cor(difficulty2,expected1:phase2)                                  11126
## cor(expected1:phase1,expected1:phase2)                             13013
## cor(Intercept,expected1:difficulty1)                               13046
## cor(expected1,expected1:difficulty1)                               13311
## cor(phase1,expected1:difficulty1)                                  14136
## cor(phase2,expected1:difficulty1)                                  13834
## cor(difficulty1,expected1:difficulty1)                             13714
## cor(difficulty2,expected1:difficulty1)                             14953
```

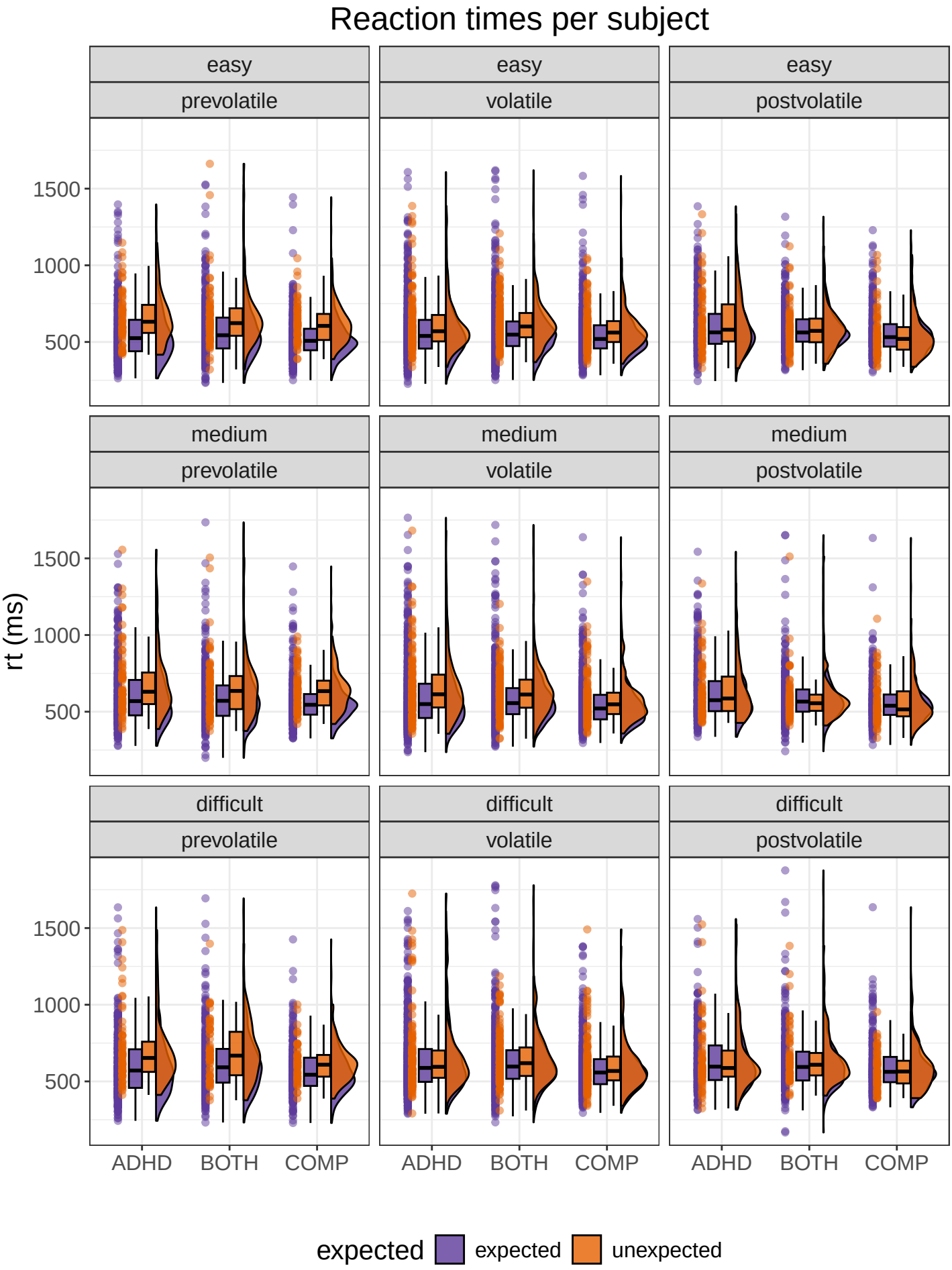
```
## cor(expected1:phase1,expected1:difficulty1)                          14001
## cor(expected1:phase2,expected1:difficulty1)                          14017
## cor(Intercept,expected1:difficulty2)                                 13541
## cor(expected1,expected1:difficulty2)                                 13431
## cor(phase1,expected1:difficulty2)                                    13038
## cor(phase2,expected1:difficulty2)                                    13622
## cor(difficulty1,expected1:difficulty2)                               12615
## cor(difficulty2,expected1:difficulty2)                               13899
## cor(expected1:phase1,expected1:difficulty2)                          14302
## cor(expected1:phase2,expected1:difficulty2)                          14382
## cor(expected1:difficulty1,expected1:difficulty2)                     14845
## cor(Intercept,phase1:difficulty1)                                    13282
## cor(expected1,phase1:difficulty1)                                    13648
## cor(phase1,phase1:difficulty1)                                       12386
## cor(phase2,phase1:difficulty1)                                       13542
## cor(difficulty1,phase1:difficulty1)                                  13964
## cor(difficulty2,phase1:difficulty1)                                  14759
## cor(expected1:phase1,phase1:difficulty1)                             14109
## cor(expected1:phase2,phase1:difficulty1)                             13794
## cor(expected1:difficulty1,phase1:difficulty1)                        14056
## cor(expected1:difficulty2,phase1:difficulty1)                        13721
## cor(Intercept,phase2:difficulty1)                                    13027
## cor(expected1,phase2:difficulty1)                                    13619
## cor(phase1,phase2:difficulty1)                                       13105
## cor(phase2,phase2:difficulty1)                                       13993
## cor(difficulty1,phase2:difficulty1)                                  13596
## cor(difficulty2,phase2:difficulty1)                                  14732
## cor(expected1:phase1,phase2:difficulty1)                             14957
## cor(expected1:phase2,phase2:difficulty1)                             14145
## cor(expected1:difficulty1,phase2:difficulty1)                        13741
## cor(expected1:difficulty2,phase2:difficulty1)                        15255
## cor(phase1:difficulty1,phase2:difficulty1)                           15542
## cor(Intercept,phase1:difficulty2)                                    13489
## cor(expected1,phase1:difficulty2)                                    13678
## cor(phase1,phase1:difficulty2)                                       12851
## cor(phase2,phase1:difficulty2)                                       13674
## cor(difficulty1,phase1:difficulty2)                                  13341
## cor(difficulty2,phase1:difficulty2)                                  13816
## cor(expected1:phase1,phase1:difficulty2)                             13784
## cor(expected1:phase2,phase1:difficulty2)                             14706
## cor(expected1:difficulty1,phase1:difficulty2)                        13261
## cor(expected1:difficulty2,phase1:difficulty2)                        14463
## cor(phase1:difficulty1,phase1:difficulty2)                           14085
## cor(phase2:difficulty1,phase1:difficulty2)                           14235
## cor(Intercept,phase2:difficulty2)                                    12832
## cor(expected1,phase2:difficulty2)                                    13495
## cor(phase1,phase2:difficulty2)                                       13723
## cor(phase2,phase2:difficulty2)                                       13388
## cor(difficulty1,phase2:difficulty2)                                  13522
## cor(difficulty2,phase2:difficulty2)                                  13222
## cor(expected1:phase1,phase2:difficulty2)                             13607
## cor(expected1:phase2,phase2:difficulty2)                             12021
## cor(expected1:difficulty1,phase2:difficulty2)                        14430
## cor(expected1:difficulty2,phase2:difficulty2)                        13639
## cor(phase1:difficulty1,phase2:difficulty2)                           13764
## cor(phase2:difficulty1,phase2:difficulty2)                           13464
## cor(phase1:difficulty2,phase2:difficulty2)                           15136
## cor(Intercept,expected1:phase1:difficulty1)                          13700
## cor(expected1,expected1:phase1:difficulty1)                          13061
## cor(phase1,expected1:phase1:difficulty1)                             13947
```

```
## cor(phase2,expected1:phase1:difficulty1)                              13971
## cor(difficulty1,expected1:phase1:difficulty1)                         14156
## cor(difficulty2,expected1:phase1:difficulty1)                         13666
## cor(expected1:phase1,expected1:phase1:difficulty1)                    13708
## cor(expected1:phase2,expected1:phase1:difficulty1)                    14229
## cor(expected1:difficulty1,expected1:phase1:difficulty1)               14680
## cor(expected1:difficulty2,expected1:phase1:difficulty1)               14001
## cor(phase1:difficulty1,expected1:phase1:difficulty1)                  13316
## cor(phase2:difficulty1,expected1:phase1:difficulty1)                  14134
## cor(phase1:difficulty2,expected1:phase1:difficulty1)                  14264
## cor(phase2:difficulty2,expected1:phase1:difficulty1)                  15749
## cor(Intercept,expected1:phase2:difficulty1)                           13120
## cor(expected1,expected1:phase2:difficulty1)                           13801
## cor(phase1,expected1:phase2:difficulty1)                              13974
## cor(phase2,expected1:phase2:difficulty1)                              14136
## cor(difficulty1,expected1:phase2:difficulty1)                         14253
## cor(difficulty2,expected1:phase2:difficulty1)                         14454
## cor(expected1:phase1,expected1:phase2:difficulty1)                    13891
## cor(expected1:phase2,expected1:phase2:difficulty1)                    14646
## cor(expected1:difficulty1,expected1:phase2:difficulty1)               14325
## cor(expected1:difficulty2,expected1:phase2:difficulty1)               15700
## cor(phase1:difficulty1,expected1:phase2:difficulty1)                  14899
## cor(phase2:difficulty1,expected1:phase2:difficulty1)                  14768
## cor(phase1:difficulty2,expected1:phase2:difficulty1)                  13772
## cor(phase2:difficulty2,expected1:phase2:difficulty1)                  14138
## cor(expected1:phase1:difficulty1,expected1:phase2:difficulty1)        14170
## cor(Intercept,expected1:phase1:difficulty2)                           13094
## cor(expected1,expected1:phase1:difficulty2)                           13509
## cor(phase1,expected1:phase1:difficulty2)                              12429
## cor(phase2,expected1:phase1:difficulty2)                              14026
## cor(difficulty1,expected1:phase1:difficulty2)                         14670
## cor(difficulty2,expected1:phase1:difficulty2)                         14558
## cor(expected1:phase1,expected1:phase1:difficulty2)                    14823
## cor(expected1:phase2,expected1:phase1:difficulty2)                    14127
## cor(expected1:difficulty1,expected1:phase1:difficulty2)               14486
## cor(expected1:difficulty2,expected1:phase1:difficulty2)               14711
## cor(phase1:difficulty1,expected1:phase1:difficulty2)                  14330
## cor(phase2:difficulty1,expected1:phase1:difficulty2)                  14702
## cor(phase1:difficulty2,expected1:phase1:difficulty2)                  15253
## cor(phase2:difficulty2,expected1:phase1:difficulty2)                  15659
## cor(expected1:phase1:difficulty1,expected1:phase1:difficulty2)        14662
## cor(expected1:phase2:difficulty1,expected1:phase1:difficulty2)        13875
## cor(Intercept,expected1:phase2:difficulty2)                           13616
## cor(expected1,expected1:phase2:difficulty2)                           14173
## cor(phase1,expected1:phase2:difficulty2)                              13712
## cor(phase2,expected1:phase2:difficulty2)                              13197
## cor(difficulty1,expected1:phase2:difficulty2)                         14104
## cor(difficulty2,expected1:phase2:difficulty2)                         14255
## cor(expected1:phase1,expected1:phase2:difficulty2)                    14359
## cor(expected1:phase2,expected1:phase2:difficulty2)                    14830
## cor(expected1:difficulty1,expected1:phase2:difficulty2)               15253
## cor(expected1:difficulty2,expected1:phase2:difficulty2)               14510
## cor(phase1:difficulty1,expected1:phase2:difficulty2)                  14737
## cor(phase2:difficulty1,expected1:phase2:difficulty2)                  14498
## cor(phase1:difficulty2,expected1:phase2:difficulty2)                  13653
## cor(phase2:difficulty2,expected1:phase2:difficulty2)                  14074
## cor(expected1:phase1:difficulty1,expected1:phase2:difficulty2)        14532
## cor(expected1:phase2:difficulty1,expected1:phase2:difficulty2)        14123
## cor(expected1:phase1:difficulty2,expected1:phase2:difficulty2)        14521
##
```

```
## ~trl (Number of levels: 288)
##                               Estimate Est.Error l-95% CI u-95% CI Rhat Bulk_ESS
## sd(Intercept)                     0.07      0.00     0.06     0.08 1.00     6048
## sd(diagnosis1)                    0.01      0.00     0.00     0.02 1.00     3418
## sd(diagnosis2)                    0.00      0.00     0.00     0.01 1.00     4559
## cor(Intercept,diagnosis1)         0.49      0.23    -0.03     0.87 1.00    10682
## cor(Intercept,diagnosis2)        -0.03      0.37    -0.72     0.69 1.00    18822
## cor(diagnosis1,diagnosis2)       -0.23      0.42    -0.88     0.65 1.00     8090
##                               Tail_ESS
## sd(Intercept)                    10131
## sd(diagnosis1)                    3325
## sd(diagnosis2)                    7185
## cor(Intercept,diagnosis1)         9190
## cor(Intercept,diagnosis2)        12435
## cor(diagnosis1,diagnosis2)       12092
##
## Regression Coefficients:
##                                         Estimate Est.Error l-95% CI u-95% CI
## Intercept                                   6.17      0.03     6.12     6.22
## diagnosis1                                  0.02      0.03    -0.03     0.07
## diagnosis2                                  0.02      0.03    -0.03     0.07
## expected1                                  -0.04      0.01    -0.05    -0.03
## phase1                                      0.02      0.01    -0.01     0.04
## phase2                                     -0.01      0.01    -0.02     0.01
## difficulty1                                -0.03      0.01    -0.05    -0.02
## difficulty2                                -0.00      0.01    -0.02     0.01
## diagnosis1:expected1                       -0.01      0.01    -0.02     0.00
## diagnosis2:expected1                       -0.00      0.00    -0.01     0.01
## diagnosis1:phase1                          -0.01      0.01    -0.03     0.01
## diagnosis2:phase1                          -0.00      0.01    -0.02     0.02
## diagnosis1:phase2                          -0.01      0.01    -0.02     0.01
## diagnosis2:phase2                           0.00      0.01    -0.01     0.02
## expected1:phase1                           -0.04      0.01    -0.06    -0.02
## expected1:phase2                            0.00      0.01    -0.01     0.02
## diagnosis1:difficulty1                     -0.01      0.01    -0.02     0.00
## diagnosis2:difficulty1                      0.00      0.01    -0.01     0.02
## diagnosis1:difficulty2                      0.02      0.01     0.01     0.03
## diagnosis2:difficulty2                     -0.02      0.01    -0.03    -0.01
## expected1:difficulty1                      -0.01      0.01    -0.03     0.00
## expected1:difficulty2                       0.00      0.01    -0.01     0.02
## phase1:difficulty1                         -0.01      0.01    -0.03     0.02
## phase2:difficulty1                         -0.00      0.01    -0.02     0.02
## phase1:difficulty2                          0.01      0.01    -0.01     0.04
## phase2:difficulty2                         -0.01      0.01    -0.03     0.01
## diagnosis1:expected1:phase1                -0.00      0.01    -0.02     0.01
## diagnosis2:expected1:phase1                 0.01      0.01    -0.00     0.02
## diagnosis1:expected1:phase2                 0.00      0.01    -0.01     0.01
## diagnosis2:expected1:phase2                -0.00      0.01    -0.01     0.01
## diagnosis1:expected1:difficulty1           -0.01      0.01    -0.02     0.01
## diagnosis2:expected1:difficulty1            0.01      0.01    -0.00     0.02
## diagnosis1:expected1:difficulty2           -0.00      0.01    -0.01     0.01
## diagnosis2:expected1:difficulty2            0.00      0.01    -0.01     0.01
## diagnosis1:phase1:difficulty1               0.00      0.01    -0.01     0.02
## diagnosis2:phase1:difficulty1               0.00      0.01    -0.01     0.02
## diagnosis1:phase2:difficulty1              -0.01      0.01    -0.02     0.00
## diagnosis2:phase2:difficulty1              -0.00      0.01    -0.02     0.01
## diagnosis1:phase1:difficulty2               0.00      0.01    -0.01     0.02
## diagnosis2:phase1:difficulty2              -0.01      0.01    -0.03     0.00
## diagnosis1:phase2:difficulty2              -0.00      0.01    -0.02     0.01
## diagnosis2:phase2:difficulty2               0.01      0.01    -0.00     0.03
```

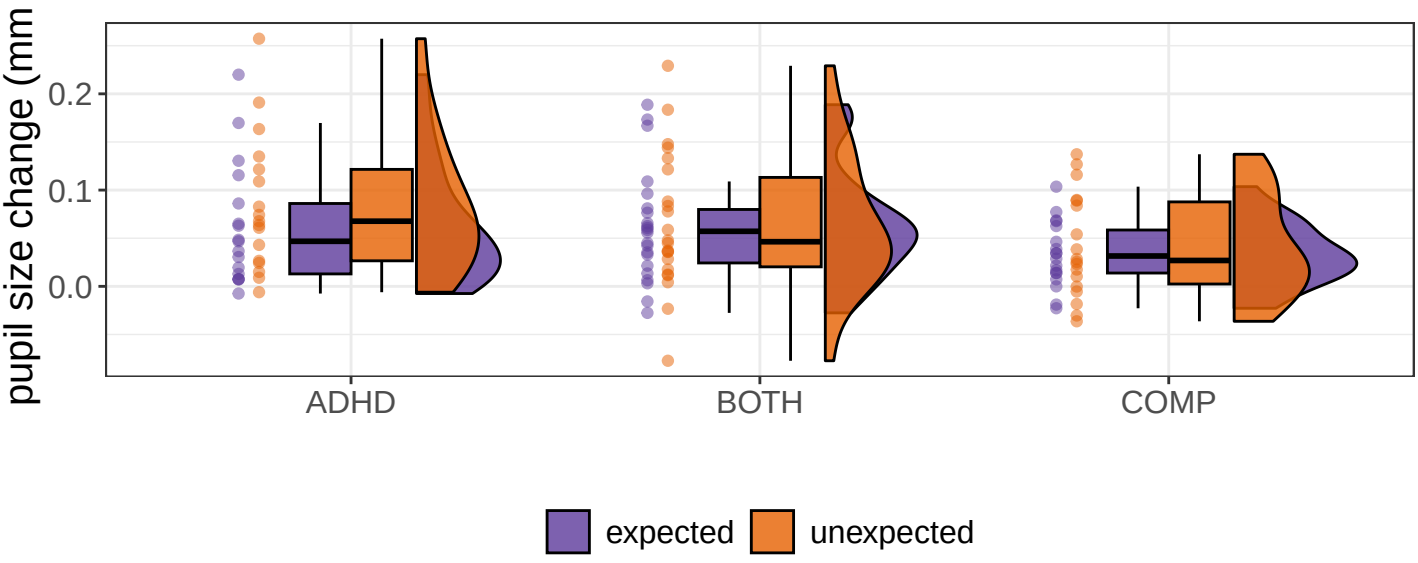
```
## expected1:phase1:difficulty1               -0.01      0.01    -0.03     0.02
## expected1:phase2:difficulty1               -0.00      0.01    -0.02     0.02
## expected1:phase1:difficulty2                0.01      0.01    -0.01     0.03
## expected1:phase2:difficulty2               -0.01      0.01    -0.03     0.01
## diagnosis1:expected1:phase1:difficulty1     0.00      0.01    -0.01     0.02
## diagnosis2:expected1:phase1:difficulty1     0.00      0.01    -0.01     0.02
## diagnosis1:expected1:phase2:difficulty1     0.01      0.01    -0.00     0.02
## diagnosis2:expected1:phase2:difficulty1    -0.01      0.01    -0.02     0.00
## diagnosis1:expected1:phase1:difficulty2     0.00      0.01    -0.01     0.02
## diagnosis2:expected1:phase1:difficulty2    -0.00      0.01    -0.02     0.01
## diagnosis1:expected1:phase2:difficulty2    -0.01      0.01    -0.02     0.00
## diagnosis2:expected1:phase2:difficulty2     0.00      0.01    -0.01     0.01
##                                          Rhat Bulk_ESS Tail_ESS
## Intercept                                1.00     1257     2922
## diagnosis1                               1.00     1384     3130
## diagnosis2                               1.00     1632     3199
## expected1                                1.00     5728     8644
## phase1                                   1.00     5107     8540
## phase2                                   1.00     5216     9337
## difficulty1                              1.00     4814     8336
## difficulty2                              1.00     4858     8799
## diagnosis1:expected1                     1.00    10348    13271
## diagnosis2:expected1                     1.00    10286    12734
## diagnosis1:phase1                        1.00     5440     9226
## diagnosis2:phase1                        1.00     5033     8789
## diagnosis1:phase2                        1.00     9242    11314
## diagnosis2:phase2                        1.00     9484    11579
## expected1:phase1                         1.00     5887     9381
## expected1:phase2                         1.00     5239     9521
## diagnosis1:difficulty1                   1.00     9997    11062
## diagnosis2:difficulty1                   1.00    10562    12419
## diagnosis1:difficulty2                   1.00    11211    12983
## diagnosis2:difficulty2                   1.00    11525    13218
## expected1:difficulty1                    1.00     4894     8458
## expected1:difficulty2                    1.00     5300     8739
## phase1:difficulty1                       1.00     4742     8273
## phase2:difficulty1                       1.00     4199     8491
## phase1:difficulty2                       1.00     4816     9280
## phase2:difficulty2                       1.00     4547     7937
## diagnosis1:expected1:phase1              1.00    13718    14036
## diagnosis2:expected1:phase1              1.00    13722    13021
## diagnosis1:expected1:phase2              1.00    10816    12500
## diagnosis2:expected1:phase2              1.00    11218    13346
## diagnosis1:expected1:difficulty1         1.00    10306    13500
## diagnosis2:expected1:difficulty1         1.00    11979    13393
## diagnosis1:expected1:difficulty2         1.00    11054    12978
## diagnosis2:expected1:difficulty2         1.00    11268    12715
## diagnosis1:phase1:difficulty1            1.00     9380    12504
## diagnosis2:phase1:difficulty1            1.00    10149    12743
## diagnosis1:phase2:difficulty1            1.00     9314    11792
## diagnosis2:phase2:difficulty1            1.00     9906    12839
## diagnosis1:phase1:difficulty2            1.00     9038    12396
## diagnosis2:phase1:difficulty2            1.00     9988    13029
## diagnosis1:phase2:difficulty2            1.00     9117    13078
## diagnosis2:phase2:difficulty2            1.00     9025    12760
## expected1:phase1:difficulty1             1.00     5180     8462
## expected1:phase2:difficulty1             1.00     4292     7684
## expected1:phase1:difficulty2             1.00     5284     8058
## expected1:phase2:difficulty2             1.00     4688     7872
## diagnosis1:expected1:phase1:difficulty1 1.00     9765    13094
```

```
## diagnosis2:expected1:phase1:difficulty1 1.00    10073    12791
## diagnosis1:expected1:phase2:difficulty1 1.00     9494    12343
## diagnosis2:expected1:phase2:difficulty1 1.00     9763    12819
## diagnosis1:expected1:phase1:difficulty2 1.00     9227    12066
## diagnosis2:expected1:phase1:difficulty2 1.00     9940    12701
## diagnosis1:expected1:phase2:difficulty2 1.00     9034    13206
## diagnosis2:expected1:phase2:difficulty2 1.00     9861    13223
##
## Further Distributional Parameters:
##       Estimate Est.Error l-95% CI u-95% CI Rhat Bulk_ESS Tail_ESS
## sigma     0.25      0.00     0.24     0.25 1.00    11159    11907
## ndt     106.89      5.16    96.49   116.71 1.00    10792    12313
##
## 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).
```


Reaction times per subject
easy
prevolatile
volatile
postvolatile
medium
prevolatile
volatile
postvolatile
difficult
prevolatile
volatile
postvolatile
rt (ms)
1500
1000
500
ADHD
BOTH
COMP
expected
expected
unexpected

S4.3 Pupil sizes

```
##  Family: gaussian
##   Links: mu = identity; sigma = identity
## Formula: rel_pupil ~ diagnosis * expected + rts + (1 | subID)
##    Data: df (Number of observations: 14661)
##   Draws: 4 chains, each with iter = 6000; warmup = 1500; thin = 1;
##          total post-warmup draws = 18000
##
## Multilevel Hyperparameters:
## ~subID (Number of levels: 57)
##               Estimate Est.Error l-95% CI u-95% CI Rhat Bulk_ESS Tail_ESS
## sd(Intercept)     0.06      0.01     0.05     0.07 1.00     1831     3420
##
## Regression Coefficients:
##                       Estimate Est.Error l-95% CI u-95% CI Rhat Bulk_ESS
## Intercept                 0.06      0.01     0.04     0.07 1.01     1301
## diagnosis1                0.01      0.01    -0.01     0.03 1.00     1276
## diagnosis2                0.00      0.01    -0.02     0.03 1.00     1087
## expected1                -0.00      0.00    -0.01     0.00 1.00    38787
## rts                       0.00      0.00     0.00     0.00 1.00    20007
## diagnosis1:expected1     -0.00      0.00    -0.01     0.00 1.00    21529
## diagnosis2:expected1      0.00      0.00    -0.00     0.01 1.00    21870
##                       Tail_ESS
## Intercept                 2673
## diagnosis1                2062
## diagnosis2                1993
## expected1                12036
## rts                      15436
## diagnosis1:expected1     14814
## diagnosis2:expected1     13960
##
## Further Distributional Parameters:
##       Estimate Est.Error l-95% CI u-95% CI Rhat Bulk_ESS Tail_ESS
## sigma     0.18      0.00     0.17     0.18 1.00    20066    11972
##
## 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 Accuracies

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## ---
```

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

	bf
diagnosis + expected + difficulty	46.41
diagnosis + difficulty	46.25
diagnosis + expected + difficulty + diagnosis:difficulty	45.02
diagnosis + difficulty + diagnosis:difficulty	44.85
diagnosis + phase + expected + phase:expected + difficulty	44.77
expected + difficulty	44.42
difficulty	44.28
diagnosis + expected + difficulty + expected:difficulty	43.35
diagnosis + phase + expected + difficulty	43.23
diagnosis + phase + expected + phase:expected + difficulty + diagnosis:difficulty	43.19
diagnosis + expected + diagnosis:expected + difficulty	43.15
diagnosis + phase + difficulty	43.00
phase + expected + phase:expected + difficulty	42.44
diagnosis + expected + difficulty + diagnosis:difficulty + expected:difficulty	42.04
diagnosis + phase + expected + difficulty + diagnosis:difficulty	41.95
diagnosis + expected + diagnosis:expected + difficulty + diagnosis:difficulty	41.72
diagnosis + phase + difficulty + diagnosis:difficulty	41.71
diagnosis + phase + expected + phase:expected + difficulty + expected:difficulty	41.53
expected + difficulty + expected:difficulty	41.35
phase + expected + difficulty	41.20
diagnosis + phase + expected + diagnosis:expected + phase:expected + difficulty	41.20
phase + difficulty	41.03
diagnosis + phase + diagnosis:phase + expected + phase:expected + difficulty	40.62
diagnosis + phase + expected + phase:expected + difficulty + diagnosis:difficulty + expected:difficulty	40.26
diagnosis + phase + expected + difficulty + expected:difficulty	40.25
diagnosis + expected + diagnosis:expected + difficulty + expected:difficulty	39.94
diagnosis + phase + expected + diagnosis:expected + difficulty	39.85
diagnosis + phase + expected + diagnosis:expected + phase:expected + difficulty + diagnosis:difficulty	39.84
diagnosis + phase + expected + phase:expected + difficulty + phase:difficulty	39.46
diagnosis + phase + diagnosis:phase + expected + phase:expected + difficulty + diagnosis:difficulty	39.35
phase + expected + phase:expected + difficulty + expected:difficulty	39.33
diagnosis + phase + diagnosis:phase + expected + difficulty	39.25
diagnosis + phase + diagnosis:phase + difficulty	39.13
diagnosis + phase + expected + difficulty + diagnosis:difficulty + expected:difficulty	38.86
diagnosis + expected + diagnosis:expected + difficulty + diagnosis:difficulty + expected:difficulty	38.69
diagnosis + phase + expected + phase:expected + difficulty + diagnosis:difficulty + phase:difficulty	38.62
diagnosis + phase + expected + diagnosis:expected + difficulty + diagnosis:difficulty	38.43
diagnosis + phase + expected + diagnosis:expected + phase:expected + difficulty + expected:difficulty	38.13
phase + expected + difficulty + expected:difficulty	38.13
diagnosis + phase + expected + difficulty + phase:difficulty	38.09
diagnosis + phase + diagnosis:phase + expected + difficulty + diagnosis:difficulty	38.05
diagnosis + phase + difficulty + phase:difficulty	38.04
diagnosis + phase + diagnosis:phase + difficulty + diagnosis:difficulty	37.77
diagnosis + phase + diagnosis:phase + expected + phase:expected + difficulty + expected:difficulty	37.59
phase + expected + phase:expected + difficulty + phase:difficulty	37.37
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + difficulty	37.29
diagnosis + phase + expected + diagnosis:expected + phase:expected + difficulty + diagnosis:difficulty + expected:difficulty	37.02
diagnosis + phase + expected + phase:expected + difficulty + phase:difficulty + expected:difficulty	36.80
diagnosis + phase + expected + difficulty + diagnosis:difficulty + phase:difficulty	36.78
diagnosis + phase + expected + diagnosis:expected + difficulty + expected:difficulty	36.78
diagnosis + phase + difficulty + diagnosis:difficulty + phase:difficulty	36.54

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diagnosis + phase + diagnosis:phase + expected + phase:expected + difficulty + diagnosis:difficulty + expected:difficulty	36.33
diagnosis + phase + diagnosis:phase + expected + difficulty + expected:difficulty	36.27
diagnosis + phase + expected + diagnosis:expected + phase:expected + difficulty + phase:difficulty	36.10
phase + expected + difficulty + phase:difficulty	36.08
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + difficulty + diagnosis:difficulty	36.01
phase + difficulty + phase:difficulty	35.92
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + difficulty	35.92
diagnosis + phase + diagnosis:phase + expected + phase:expected + difficulty + phase:difficulty	35.64
diagnosis + phase + expected + diagnosis:expected + difficulty + diagnosis:difficulty + expected:difficulty	35.45
diagnosis + phase + expected + phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + expected:difficulty	35.20
diagnosis + phase + expected + difficulty + phase:difficulty + expected:difficulty	35.06
diagnosis + phase + expected + difficulty + diagnosis:difficulty + phase:difficulty + expected:difficulty	34.99
diagnosis + phase + diagnosis:phase + expected + difficulty + diagnosis:difficulty + expected:difficulty	34.87
diagnosis + phase + expected + diagnosis:expected + phase:expected + difficulty + diagnosis:difficulty + phase:difficulty	34.76
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + difficulty + diagnosis:difficulty	34.74
diagnosis + phase + expected + diagnosis:expected + difficulty + phase:difficulty	34.73
phase + expected + phase:expected + difficulty + phase:difficulty + expected:difficulty	34.55
diagnosis + phase + diagnosis:phase + expected + phase:expected + difficulty + diagnosis:difficulty + phase:difficulty	34.29
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + difficulty + expected:difficulty	34.25
diagnosis + phase + diagnosis:phase + expected + difficulty + phase:difficulty	34.20
diagnosis + expected + diagnosis:expected + difficulty + diagnosis:difficulty + expected:difficulty + diagnosis:expected:difficulty	34.16
diagnosis + phase + diagnosis:phase + difficulty + phase:difficulty	34.01
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + diagnosis:phase:expected + difficulty	33.86
diagnosis + phase + expected + phase:expected + difficulty + phase:difficulty + expected:difficulty + phase:expected:difficulty	33.49
diagnosis + phase + expected + diagnosis:expected + difficulty + diagnosis:difficulty + phase:difficulty	33.34
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + difficulty + diagnosis:difficulty + expected:difficulty	33.06
diagnosis + phase + expected + diagnosis:expected + phase:expected + difficulty + phase:difficulty + expected:difficulty	33.05
phase + expected + difficulty + phase:difficulty + expected:difficulty	33.00
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + difficulty + expected:difficulty	32.91
diagnosis + phase + diagnosis:phase + expected + difficulty + diagnosis:difficulty + phase:difficulty	32.83
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + diagnosis:phase:expected + difficulty + diagnosis:difficulty	32.74
diagnosis + phase + diagnosis:phase + difficulty + diagnosis:difficulty + phase:difficulty	32.65
diagnosis + phase + diagnosis:phase + expected + phase:expected + difficulty + phase:difficulty + expected:difficulty	32.59
diagnosis + phase + expected + diagnosis:expected + phase:expected + difficulty + diagnosis:difficulty + expected:difficulty + diagnosis:expected:difficulty	32.34
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + difficulty + phase:difficulty	32.29
diagnosis + phase + expected + phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + expected:difficulty + phase:expected:difficulty	32.08
diagnosis + phase + expected + diagnosis:expected + phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + expected:difficulty	31.76
diagnosis + phase + expected + diagnosis:expected + difficulty + phase:difficulty + expected:difficulty	31.69
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + difficulty + diagnosis:difficulty + expected:difficulty	31.52
diagnosis + phase + diagnosis:phase + expected + phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + expected:difficulty	31.34
phase + expected + phase:expected + difficulty + phase:difficulty + expected:difficulty + phase:expected:difficulty	31.31
diagnosis + phase + diagnosis:phase + expected + difficulty + phase:difficulty + expected:difficulty	31.15

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diagnosis + phase + expected + diagnosis:expected + difficulty + diagnosis:difficulty + expected:difficulty + diagnosis:expected:difficulty	30.95
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + difficulty + diagnosis:difficulty + phase:difficulty	30.90
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + diagnosis:phase:expected + difficulty + expected:difficulty	30.81
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + difficulty + phase:difficulty	30.76
diagnosis + phase + expected + diagnosis:expected + difficulty + diagnosis:difficulty + phase:difficulty + expected:difficulty	30.45
diagnosis + phase + expected + diagnosis:expected + phase:expected + difficulty + phase:difficulty + expected:difficulty + phase:expected:difficulty	29.98
diagnosis + phase + diagnosis:phase + expected + phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + diagnosis:phase:difficulty	29.88
diagnosis + phase + diagnosis:phase + expected + difficulty + diagnosis:difficulty + phase:difficulty + expected:difficulty	29.86
diagnosis + phase + diagnosis:phase + expected + phase:expected + difficulty + phase:difficulty + expected:difficulty + phase:expected:difficulty	29.56
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + difficulty + diagnosis:difficulty + phase:difficulty	29.54
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + diagnosis:phase:expected + difficulty + diagnosis:difficulty + expected:difficulty	29.50
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + difficulty + phase:difficulty + expected:difficulty	29.13
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + diagnosis:phase:expected + difficulty + phase:difficulty	28.75
diagnosis + phase + expected + diagnosis:expected + phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + expected:difficulty + phase:expected:difficulty	28.68
diagnosis + phase + diagnosis:phase + expected + difficulty + diagnosis:difficulty + phase:difficulty + diagnosis:phase:difficulty	28.48
diagnosis + phase + diagnosis:phase + difficulty + diagnosis:difficulty + phase:difficulty + diagnosis:phase:difficulty	28.19
diagnosis + phase + diagnosis:phase + expected + phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + expected:difficulty + phase:expected:difficulty	28.17
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + expected:difficulty	28.15
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + difficulty + diagnosis:difficulty + expected:difficulty + diagnosis:expected:difficulty	27.81
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + difficulty + phase:difficulty + expected:difficulty	27.80
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + diagnosis:phase:expected + difficulty + diagnosis:difficulty + phase:difficulty	27.54
diagnosis + phase + expected + diagnosis:expected + phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + expected:difficulty + diagnosis:expected:difficulty	27.31
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + difficulty + diagnosis:difficulty + expected:difficulty + diagnosis:expected:difficulty	27.03
diagnosis + phase + diagnosis:phase + expected + phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + diagnosis:phase:difficulty + expected:difficulty	26.76
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + diagnosis:phase:difficulty	26.57
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + difficulty + diagnosis:difficulty + phase:difficulty + expected:difficulty	26.42
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + difficulty + phase:difficulty + expected:difficulty + phase:expected:difficulty	26.17
diagnosis + phase + expected + diagnosis:expected + difficulty + diagnosis:difficulty + phase:difficulty + expected:difficulty + diagnosis:expected:difficulty	25.83
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + diagnosis:phase:expected + difficulty + phase:difficulty + expected:difficulty	25.81
diagnosis + phase + diagnosis:phase + expected + difficulty + diagnosis:difficulty + phase:difficulty + diagnosis:phase:difficulty + expected:difficulty	25.42

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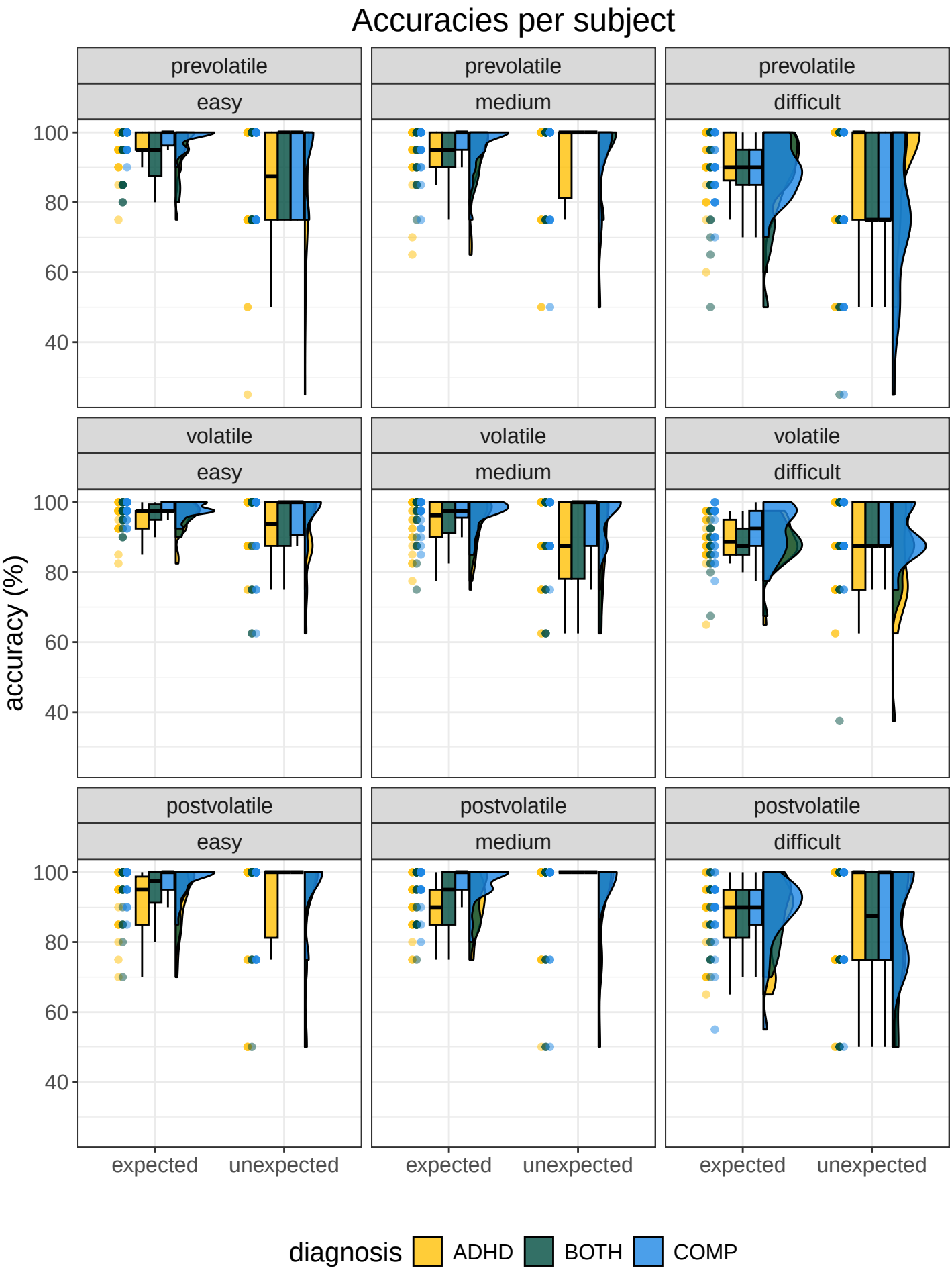
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + difficulty + diagnosis:difficulty + phase:difficulty + diagnosis:phase:difficulty	25.11
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + diagnosis:phase:expected + difficulty + diagnosis:difficulty + expected:difficulty + diagnosis:expected:difficulty	25.08
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + expected:difficulty + phase:expected:difficulty	24.94
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + diagnosis:phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + expected:difficulty	24.67
diagnosis + phase + expected + diagnosis:expected + phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + expected:difficulty + diagnosis:expected:difficulty + phase:expected:difficulty	24.26
diagnosis + phase + diagnosis:phase + expected + phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + diagnosis:phase:difficulty + expected:difficulty + phase:expected:difficulty	23.78
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + diagnosis:phase:difficulty + expected:difficulty	23.49
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + expected:difficulty + diagnosis:expected:difficulty	23.46
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + diagnosis:phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + diagnosis:phase:difficulty	23.04
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + diagnosis:phase:expected + difficulty + phase:difficulty + expected:difficulty + phase:expected:difficulty	22.73
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + difficulty + diagnosis:difficulty + phase:difficulty + diagnosis:phase:difficulty + expected:difficulty	22.03
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + difficulty + diagnosis:difficulty + phase:difficulty + expected:difficulty + diagnosis:expected:difficulty	22.02
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + diagnosis:phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + expected:difficulty + phase:expected:difficulty	21.45
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + diagnosis:phase:difficulty + expected:difficulty + phase:expected:difficulty	20.57
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + expected:difficulty + diagnosis:expected:difficulty + phase:expected:difficulty	20.36
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + diagnosis:phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + diagnosis:phase:difficulty + expected:difficulty	20.07
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + diagnosis:phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + expected:difficulty + diagnosis:expected:difficulty	19.99
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + diagnosis:phase:difficulty + expected:difficulty + diagnosis:expected:difficulty	19.07
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + difficulty + diagnosis:difficulty + phase:difficulty + diagnosis:phase:difficulty + expected:difficulty + diagnosis:expected:difficulty	17.60
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + diagnosis:phase:expected + difficulty + diagnosis:difficulty + phase:difficulty + diagnosis:phase:difficulty + expected:difficulty + phase:expected:difficulty	17.04
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	16.91
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	16.05
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	15.66
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	12.66
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	8.72
diagnosis	1.45
diagnosis + expected	1.41

	bf
expected	-0.08
diagnosis + phase + expected + phase:expected	-1.05
diagnosis + phase	-1.92
diagnosis + phase + expected	-1.99
diagnosis + expected + diagnosis:expected	-2.00
phase + expected + phase:expected	-2.60
phase	-3.36
phase + expected	-3.46
diagnosis + phase + expected + diagnosis:expected + phase:expected	-4.40
diagnosis + phase + diagnosis:phase + expected + phase:expected	-5.17
diagnosis + phase + expected + diagnosis:expected	-5.19
diagnosis + phase + diagnosis:phase	-6.00
diagnosis + phase + diagnosis:phase + expected	-6.01
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected	-8.52
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected	-9.36
diagnosis + phase + diagnosis:phase + expected + diagnosis:expected + phase:expected + diagnosis:phase:expected	-12.14


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
ADHD
BOTH
COMP