

Hypothesis Testing for NSF Office Stress Project - Full Sensor Set

Below are the test results for each of the Conditions that had $n \geq 7$ subjects. Statistical testing can have three different possible outcomes: the data is already normal (t-test), the logarithm of the data is normal (t-test with log data), or the data is NOT normal (Wilcoxon test).

For notation, let:

WB-RB = Writing Baseline - Resting Baseline

SC-RB = Stress Condition - Resting Baseline

SC-WB = Stress Condition - Writing Baseline

DT-RB = Dual Task - Resting Baseline

DT-WB = Dual Task - Writing Baseline

DT-SC = Dual Task - Stress Condition

P-RB = Presentation - Resting Baseline

P-WB = Presentation - Writing Baseline

P-SC = Presentation - Stress Condition

P-DT = Presentation - Dual Task

For each of the graphs, let:

***** = $0.01 < p \leq 0.05$

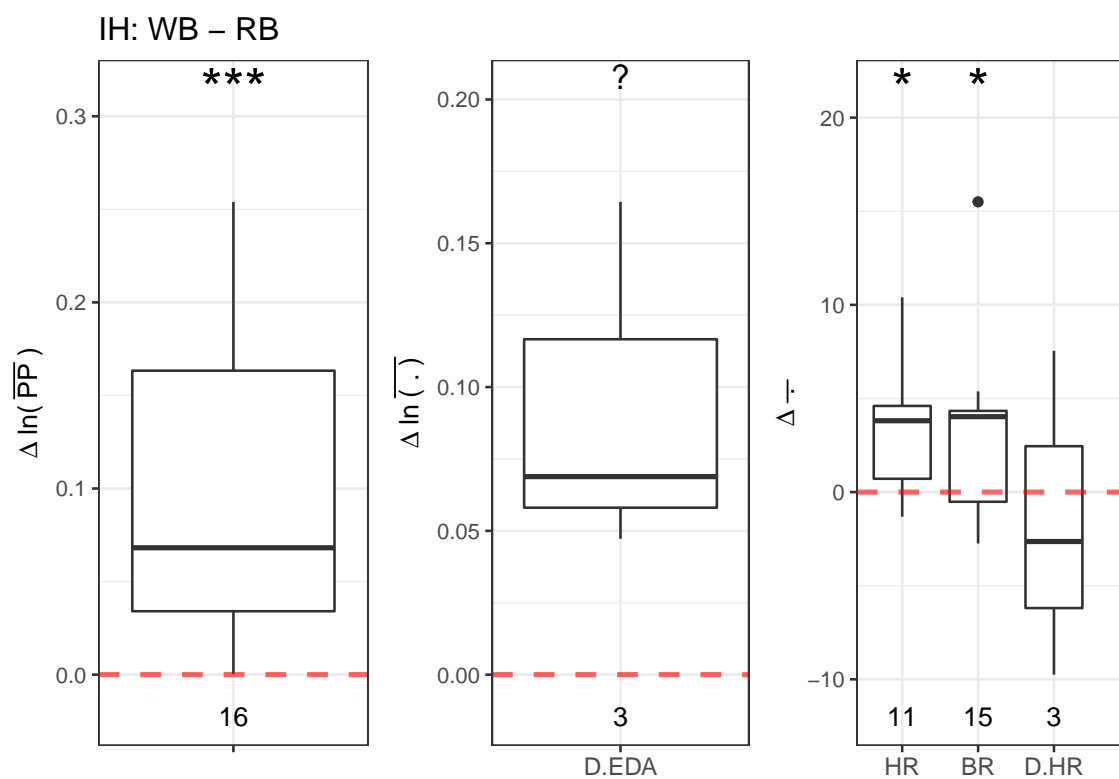
****** = $0.001 < p \leq 0.01$

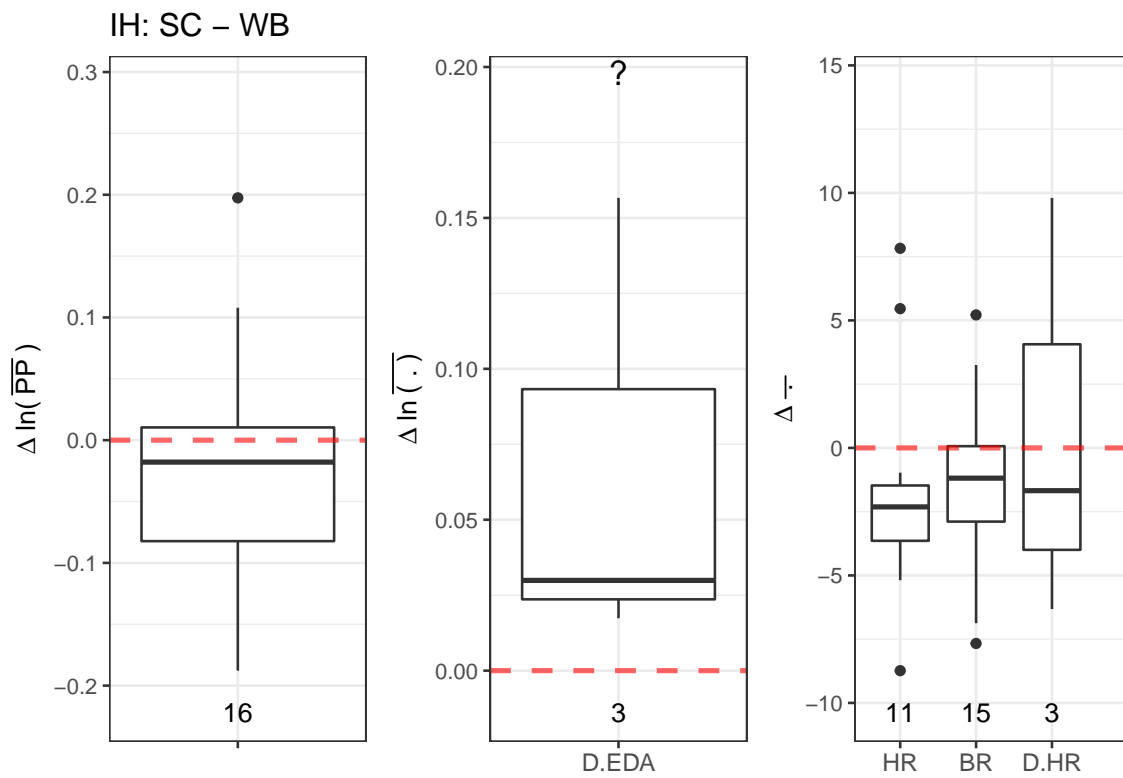
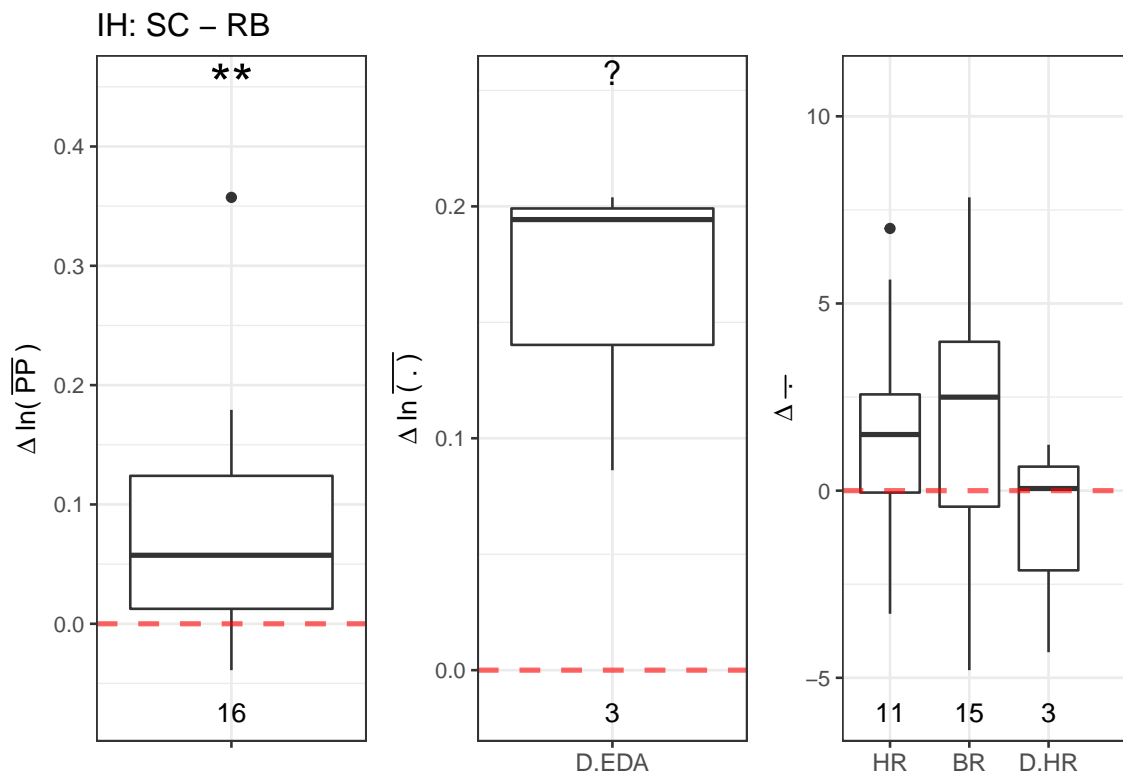
******* = $p \leq 0.001$

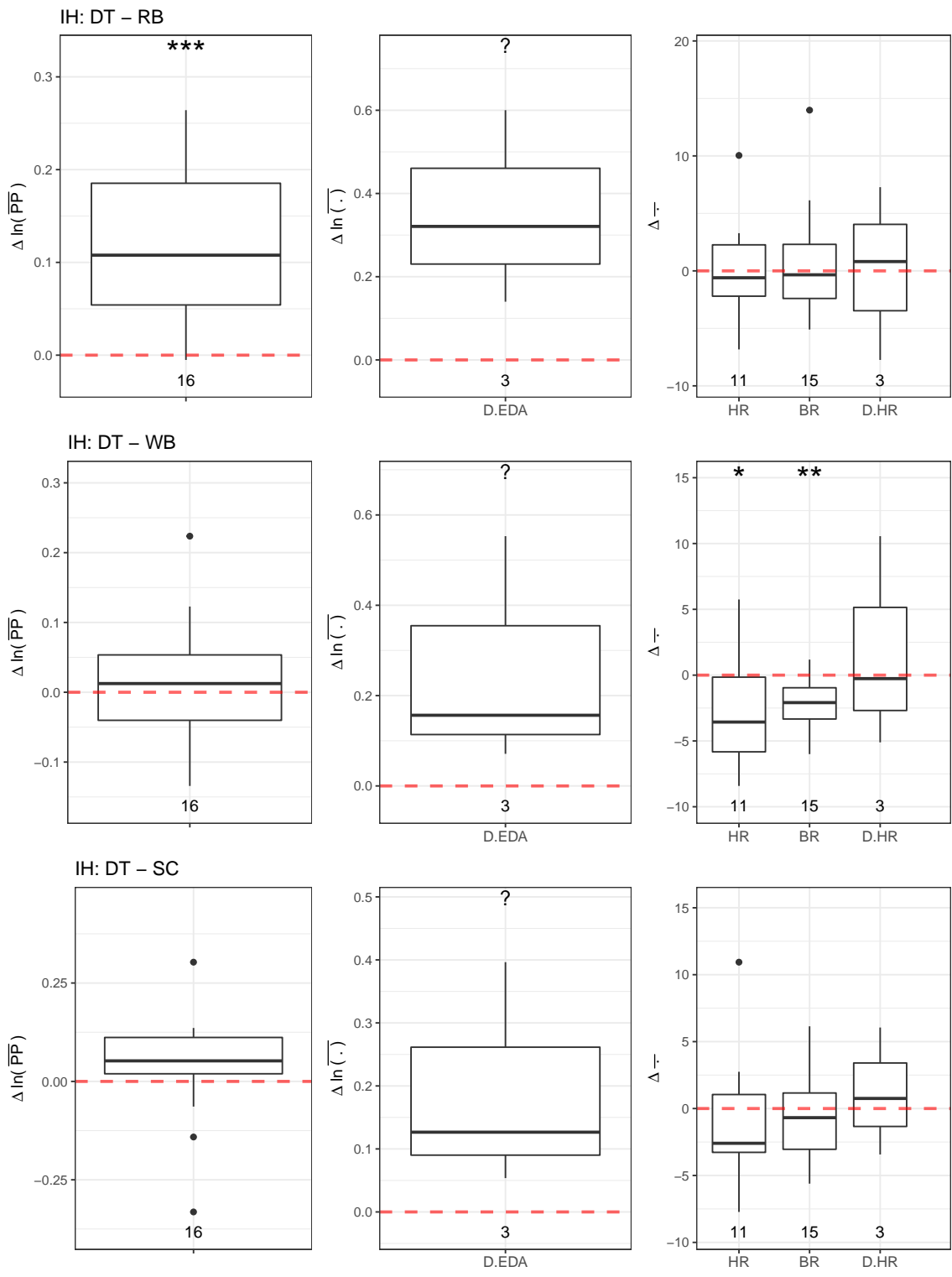
? = Did not run statistical test ($n < 7$)

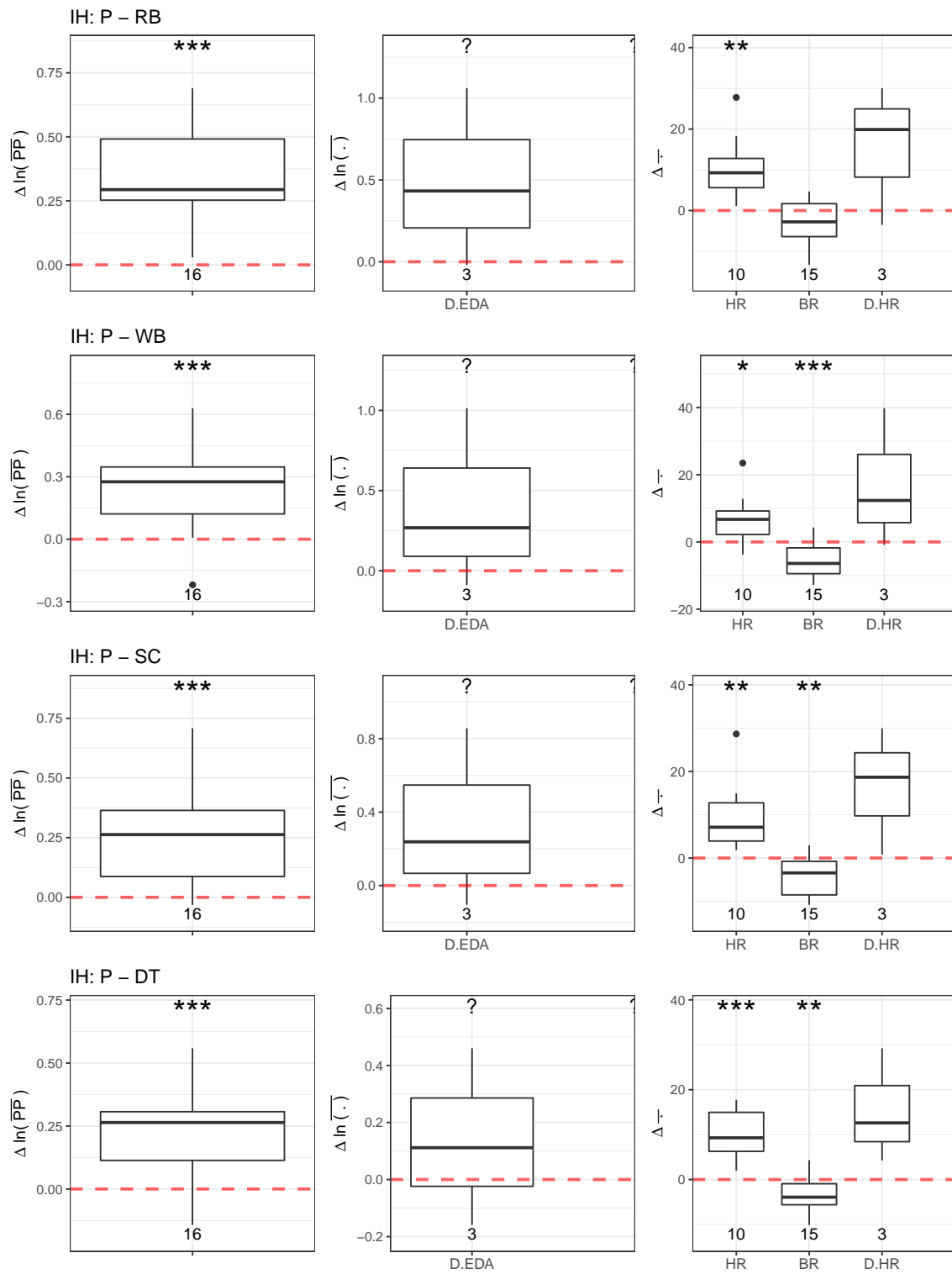
Intermittent-High (IH)

Sensor Channels per Activity

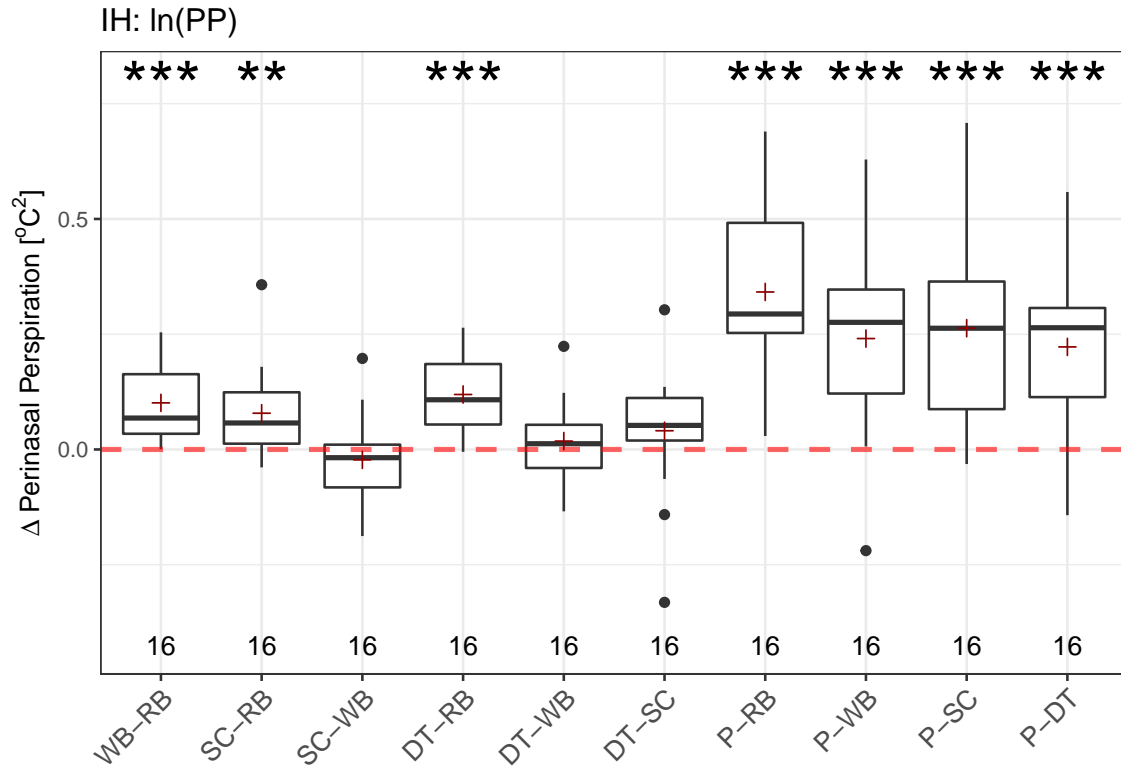






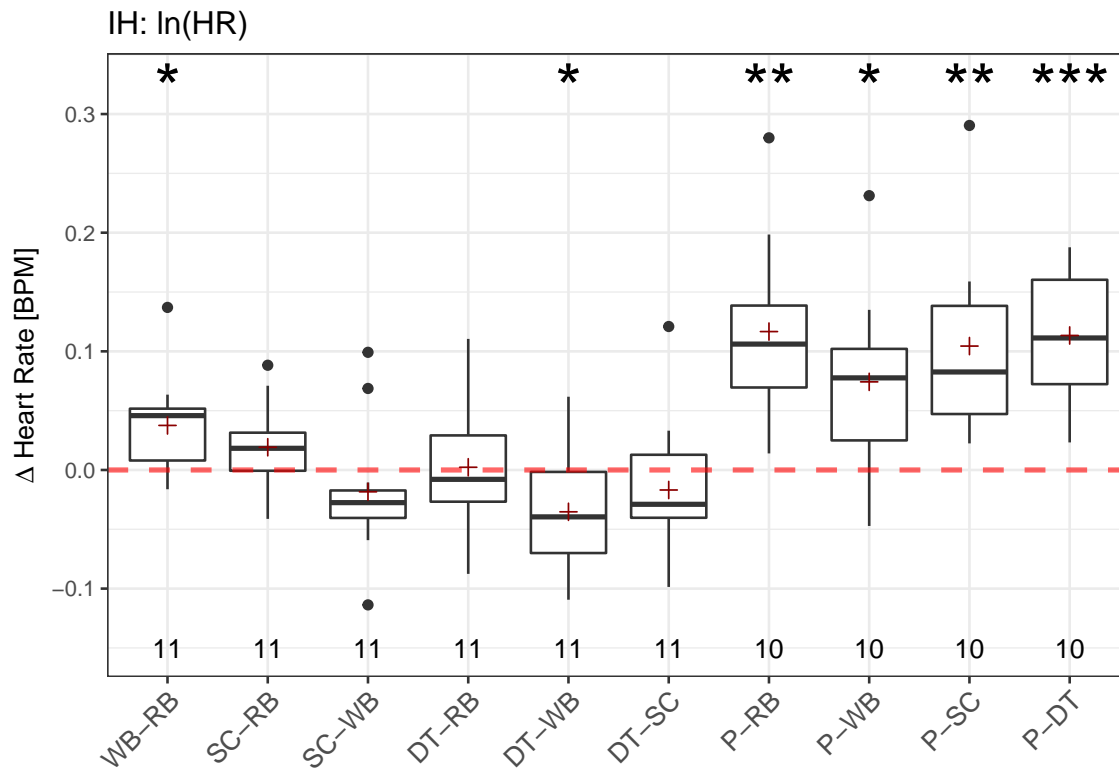


Sensor Channel across Activities



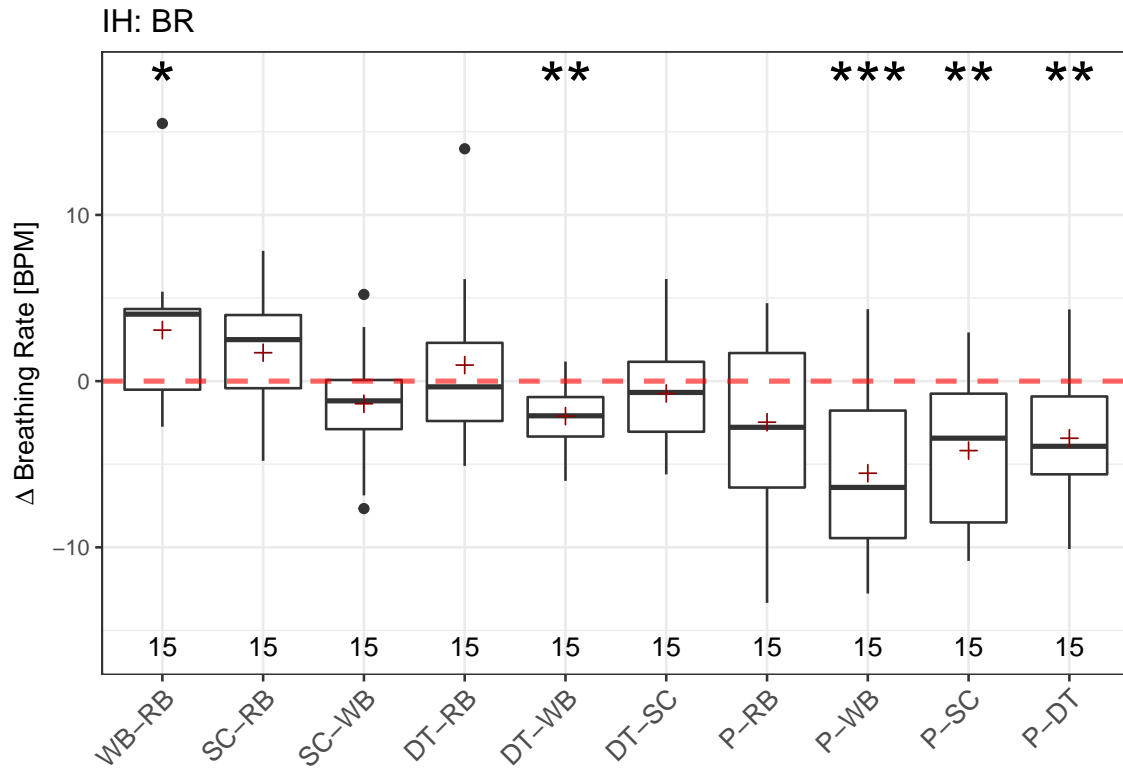
```
## In the following tests, we applied ln(PP).
##
## Writing Baseline - Resting Baseline
## Transformed t-test p = 2e-04 < 0.001 ***
##
## Stress Condition - Resting Baseline
## Transformed t-test p = 0.0072 < 0.01 **
##
## StressCondition - Writing Baseline
## Transformed t-test p = 0.3534 > 0.05
##
## Dual Task - Resting Baseline
## Transformed t-test p = 0 < 0.001 ***
##
## Dual Task - Writing Baseline
## Transformed t-test p = 0.4225 > 0.05
##
## Dual Task - Stress Condition
## Transformed t-test p = 0.257 > 0.05
##
## Presentation - Resting Baseline
## Transformed t-test p = 0 < 0.001 ***
##
```

```
## Presentation - Writing Baseline
## Transformed t-test p = 3e-04 < 0.001 ***
##
## Presentation - Stress Condition
## Transformed t-test p = 1e-04 < 0.001 ***
##
## Presentation - Dual Task
## Transformed t-test p = 4e-04 < 0.001 ***
```

```
## Writing Baseline - Resting Baseline
## Transformed t-test p = 0.0156 < 0.05  *
##
## Stress Condition - Resting Baseline
## Transformed t-test p = 0.1143 > 0.05
##
## StressCondition - Writing Baseline
## Transformed t-test p = 0.317 > 0.05
##
## Dual Task - Resting Baseline
## Transformed t-test p = 0.885 > 0.05
##
## Dual Task - Writing Baseline
## Transformed t-test p = 0.0361 < 0.05  *
##
## Dual Task - Stress Condition
## Transformed t-test p = 0.3857 > 0.05
##
## Presentation - Resting Baseline
## Transformed t-test p = 0.0011 < 0.01  **
##
## Presentation - Writing Baseline
## Transformed t-test p = 0.0133 < 0.05  *
##
## Presentation - Stress Condition
```

```
## Transformed t-test p = 0.0027 < 0.01  **
##
## Presentation - Dual Task
## Transformed t-test p = 1e-04 < 0.001  ***
```



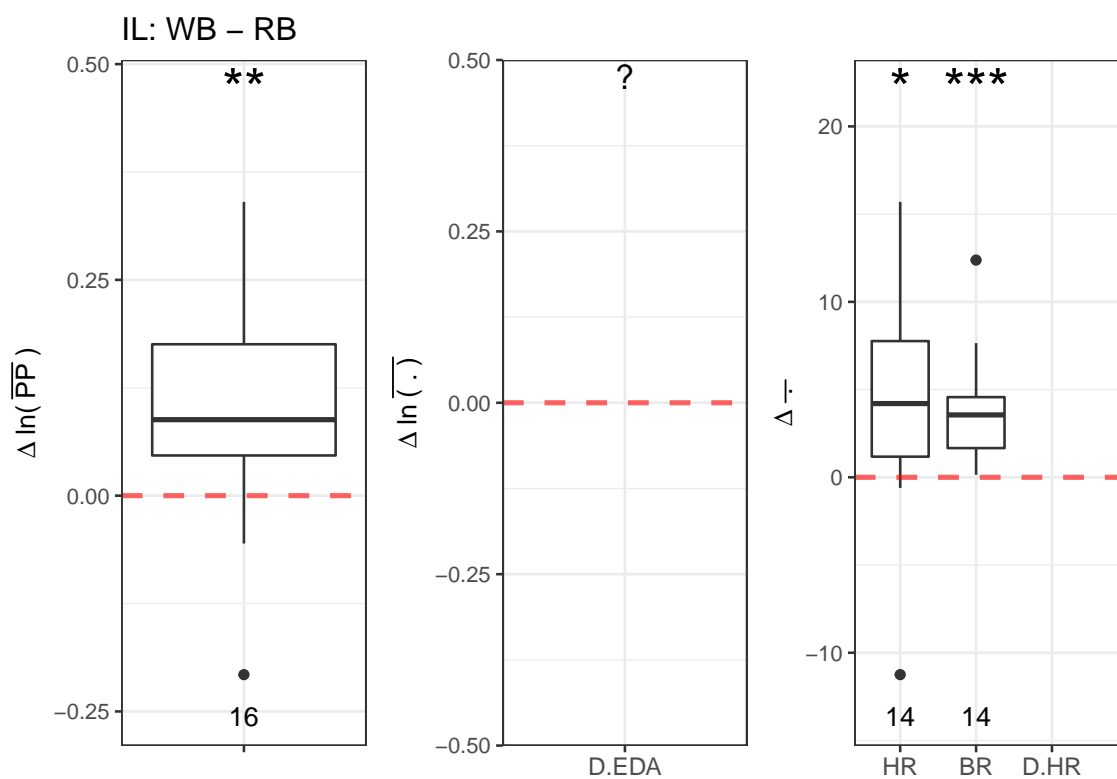
```
## Writing Baseline - Resting Baseline
## t-test p = 0.0184 < 0.05  *
##
## Stress Condition - Resting Baseline
## t-test p = 0.0865 > 0.05
##
## StressCondition - Writing Baseline
## t-test p = 0.1405 > 0.05
##
## Dual Task - Resting Baseline
## t-test p = 0.4484 > 0.05
##
## Dual Task - Writing Baseline
## t-test p = 0.0012 < 0.01  **
##
## Dual Task - Stress Condition
## t-test p = 0.3441 > 0.05
##
## Presentation - Resting Baseline
## t-test p = 0.0908 > 0.05
##
## Presentation - Writing Baseline
## t-test p = 7e-04 < 0.001  ***
##
## Presentation - Stress Condition
```

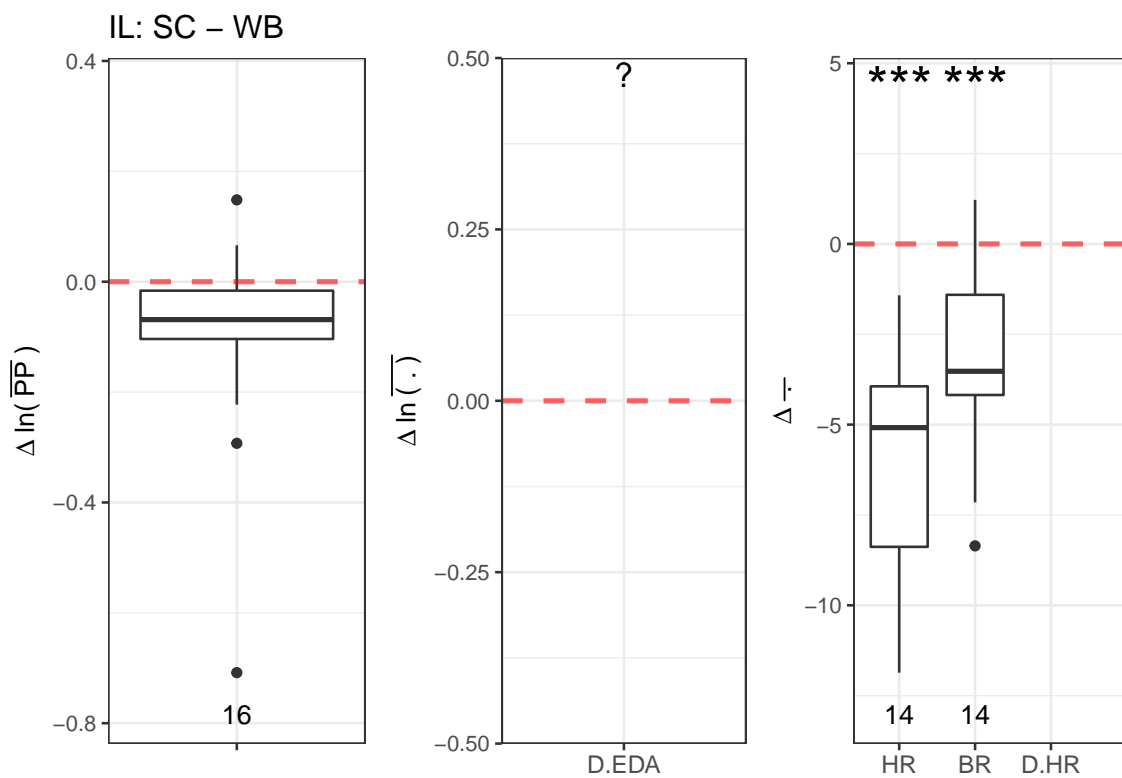
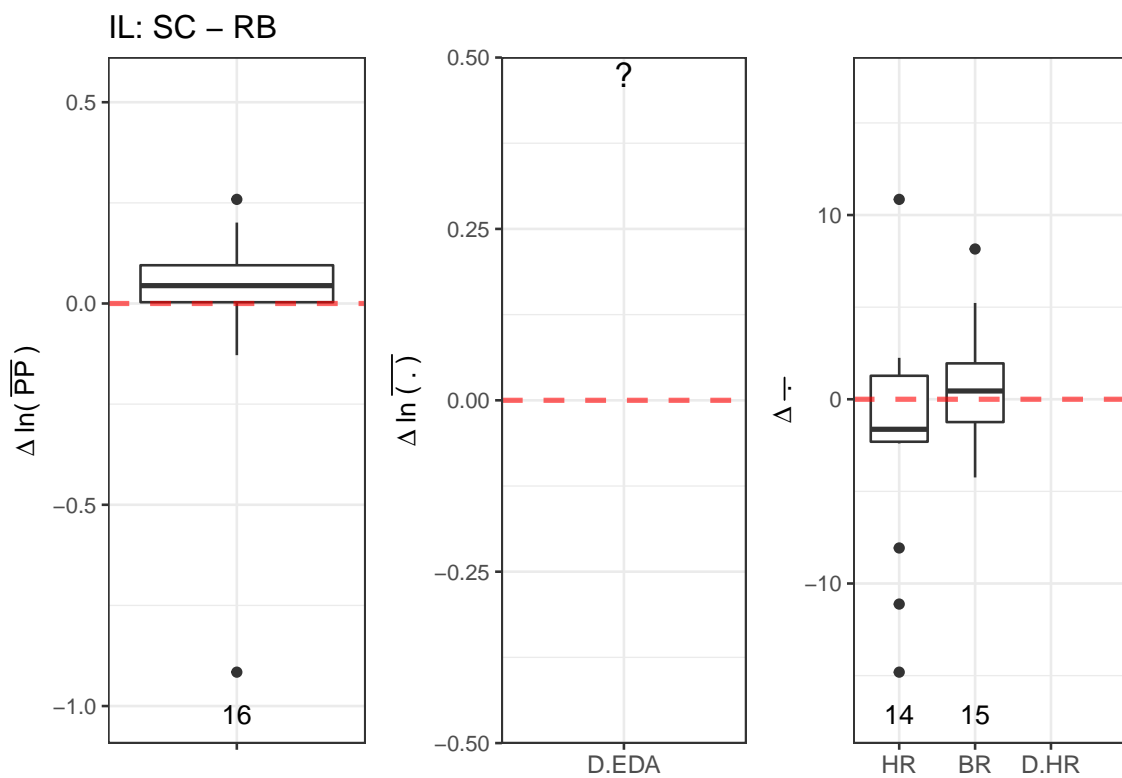
```
## t-test p = 0.0029 < 0.01 **
##
## Presentation - Dual Task
## t-test p = 0.0056 < 0.01 **
```

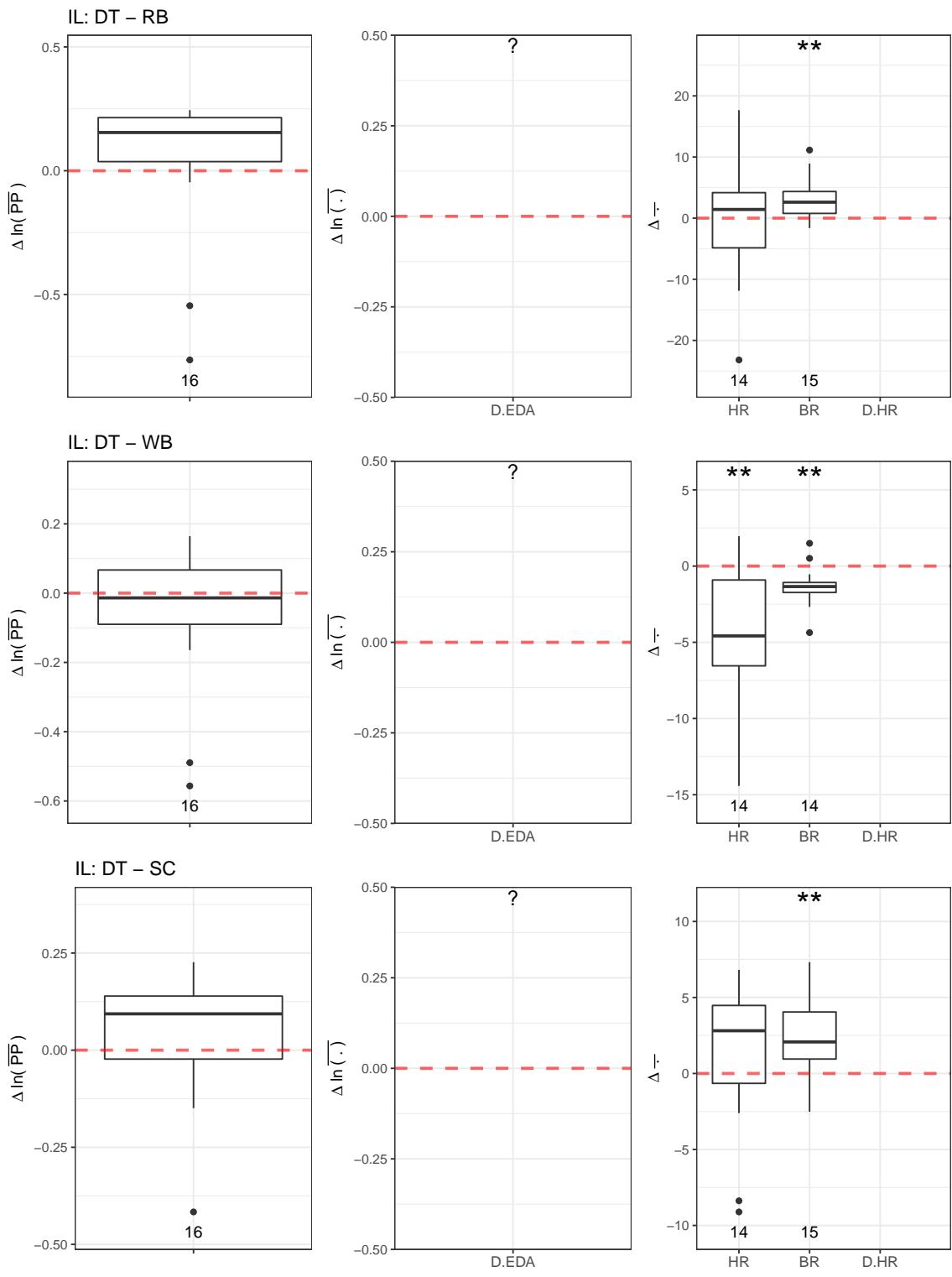
```
## IH has LESS than 7 subjects for D.EDA. Cannot continue with test.
## -----
## IH has LESS than 7 subjects for D.HR. Cannot continue with test.
## -----
```

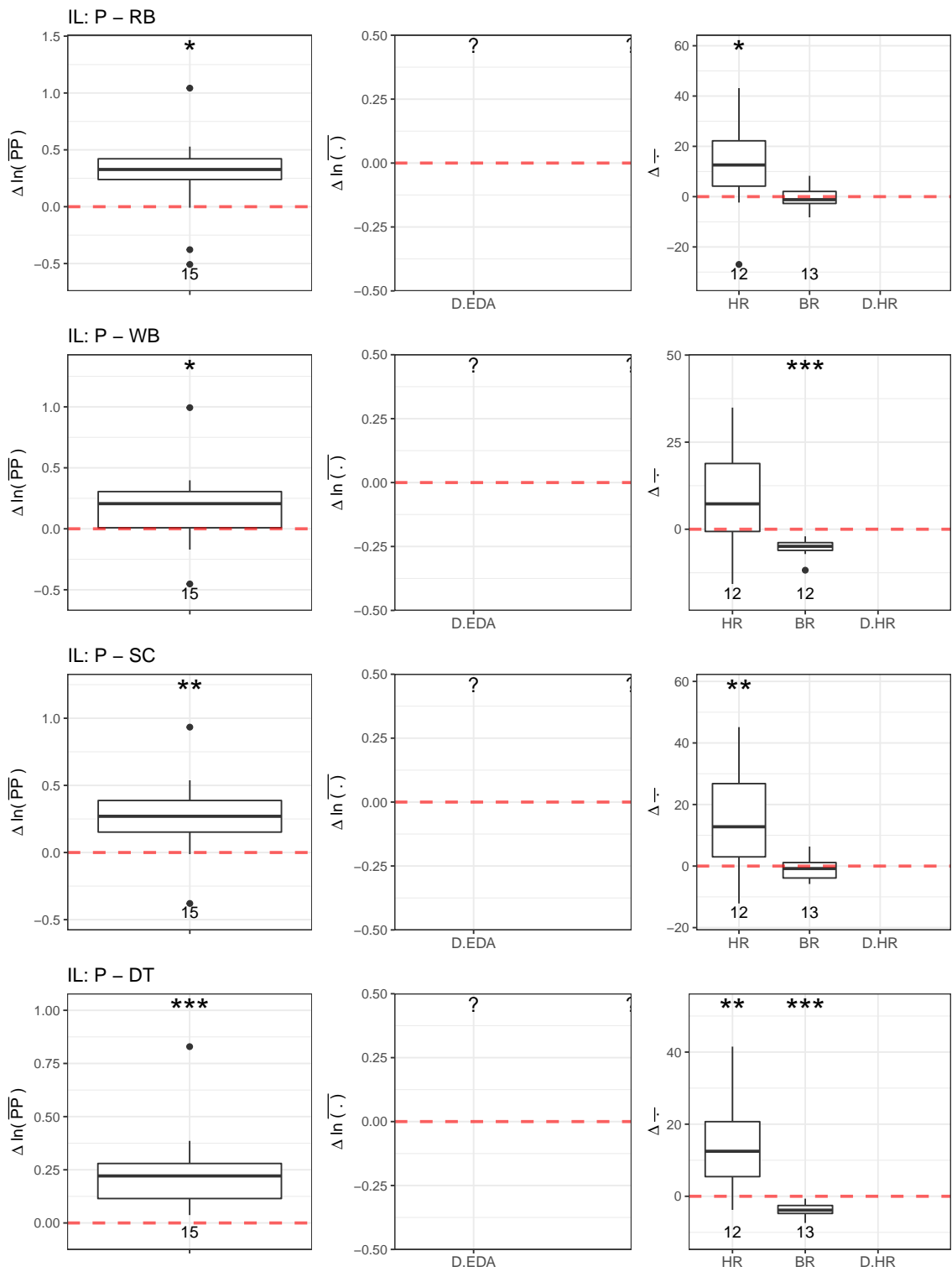
Intermittent-Low (IL)

Sensor Channels per Activity

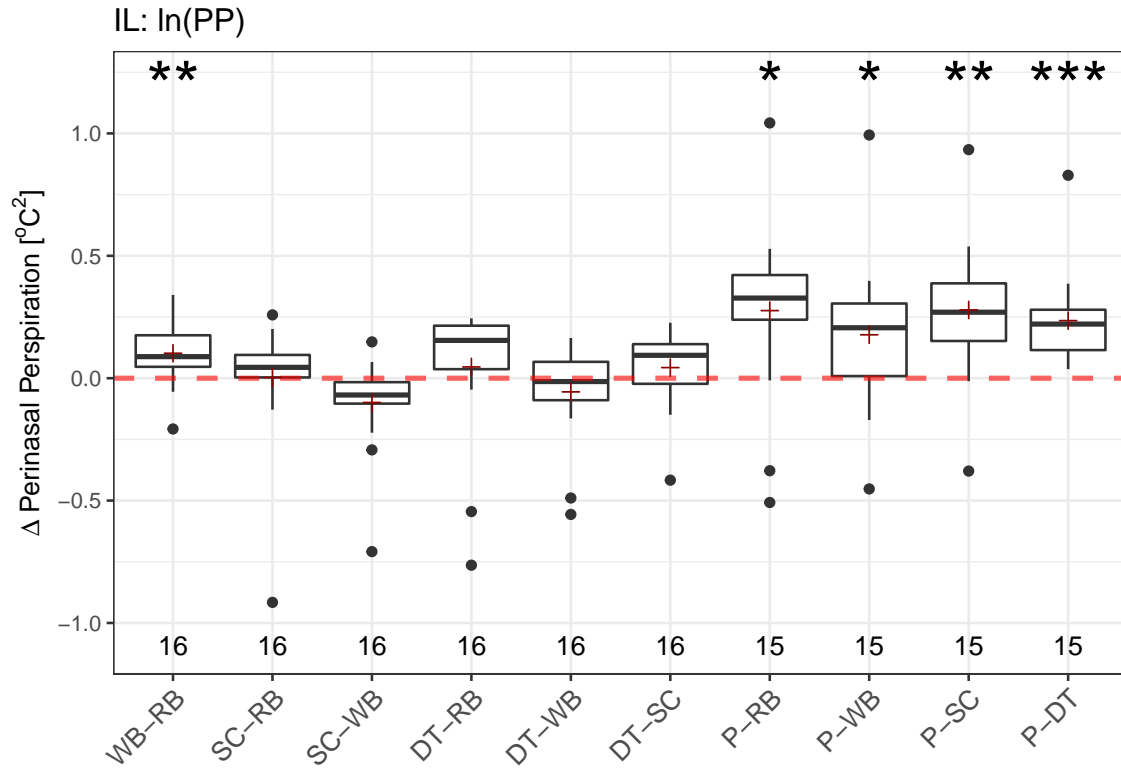






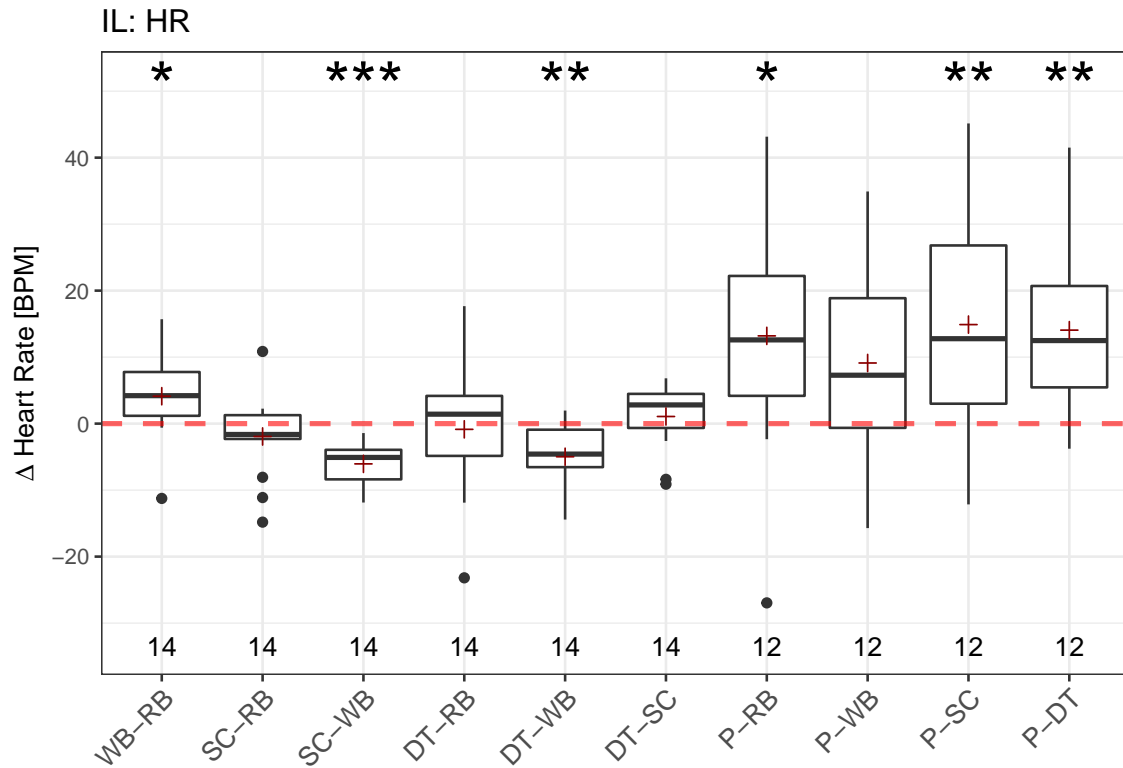


Sensor Channel across Activities



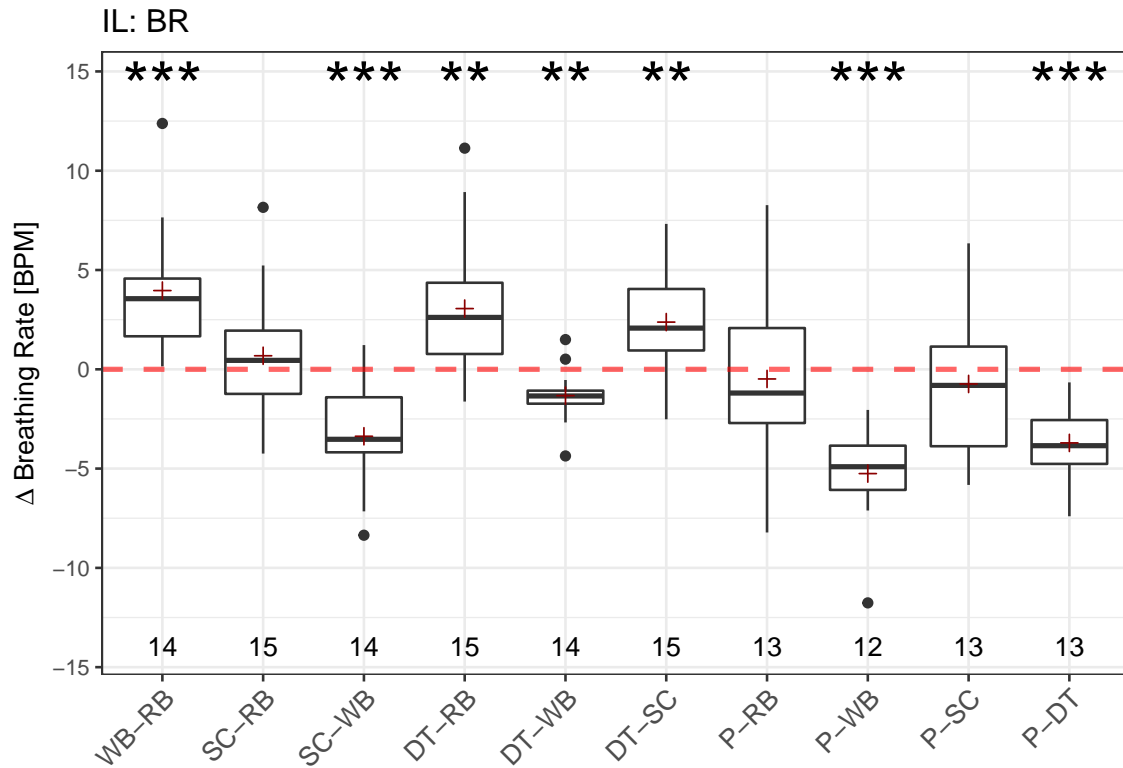
```
## Writing Baseline - Resting Baseline
## Transformed t-test p = 0.0081 < 0.01  **
##
## Stress Condition - Resting Baseline
## Transformed t-test p = 0.9677 > 0.05
##
## StressCondition - Writing Baseline
## Transformed t-test p = 0.0589 > 0.05
##
## Dual Task - Resting Baseline
## Transformed t-test p = 0.5346 > 0.05
##
## Dual Task - Writing Baseline
## Transformed t-test p = 0.2923 > 0.05
##
## Dual Task - Stress Condition
## Transformed t-test p = 0.2891 > 0.05
##
## Presentation - Resting Baseline
## Transformed t-test p = 0.0114 < 0.05  *
##
## Presentation - Writing Baseline
## Transformed t-test p = 0.0499 < 0.05  *
```

```
##
## Presentation - Stress Condition
## Transformed t-test p = 0.002 < 0.01  **
##
## Presentation - Dual Task
## Transformed t-test p = 4e-04 < 0.001  ***
```



```
## Writing Baseline - Resting Baseline
## t-test p = 0.0296 < 0.05  *
##
## Stress Condition - Resting Baseline
## t-test p = 0.2669 > 0.05
##
## StressCondition - Writing Baseline
## t-test p = 0 < 0.001  ***
##
## Dual Task - Resting Baseline
## t-test p = 0.7416 > 0.05
##
## Dual Task - Writing Baseline
## t-test p = 0.0038 < 0.01  **
##
## Dual Task - Stress Condition
## t-test p = 0.4266 > 0.05
##
## Presentation - Resting Baseline
## t-test p = 0.0326 < 0.05  *
##
## Presentation - Writing Baseline
## t-test p = 0.0531 > 0.05
##
## Presentation - Stress Condition
```

```
## t-test p = 0.0081 < 0.01 **  
##  
## Presentation - Dual Task  
## t-test p = 0.0038 < 0.01 **
```



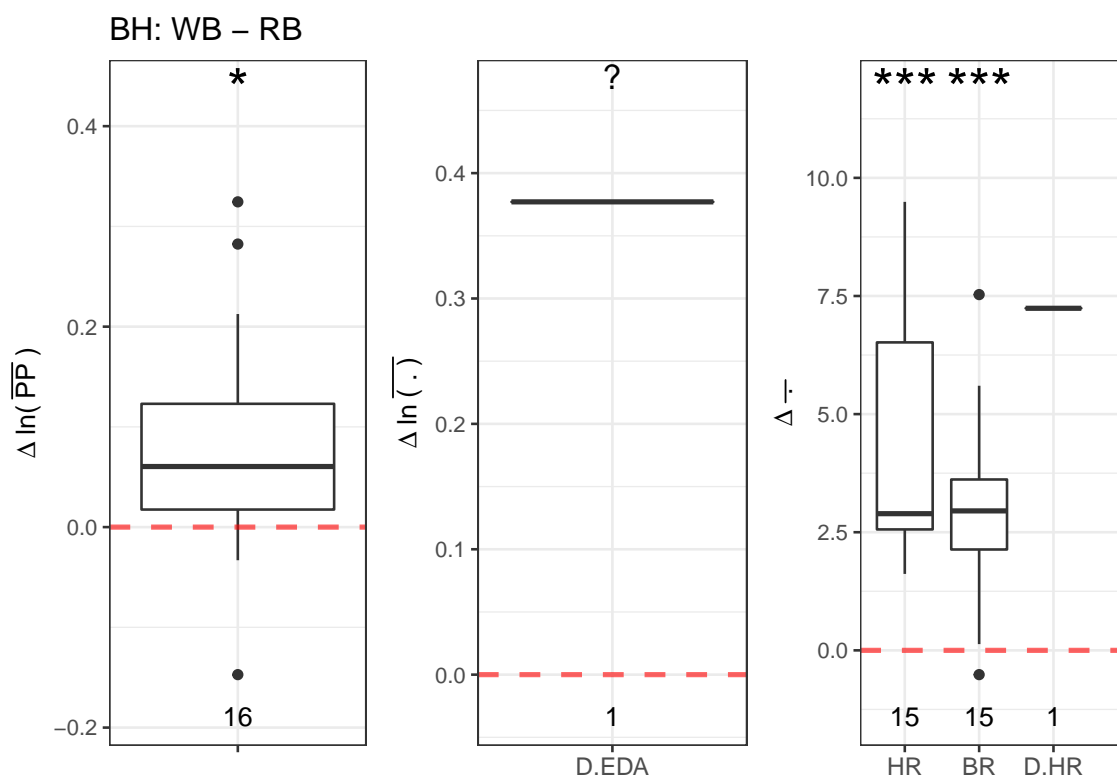
```
## Writing Baseline - Resting Baseline
## t-test p = 5e-04 < 0.001 ***
##
## Stress Condition - Resting Baseline
## t-test p = 0.4283 > 0.05
##
## StressCondition - Writing Baseline
## t-test p = 4e-04 < 0.001 ***
##
## Dual Task - Resting Baseline
## t-test p = 0.0063 < 0.01 **
##
## Dual Task - Writing Baseline
## t-test p = 0.0029 < 0.01 **
##
## Dual Task - Stress Condition
## t-test p = 0.0065 < 0.01 **
##
## Presentation - Resting Baseline
## t-test p = 0.7026 > 0.05
##
## Presentation - Writing Baseline
## t-test p = 0 < 0.001 ***
##
## Presentation - Stress Condition
```

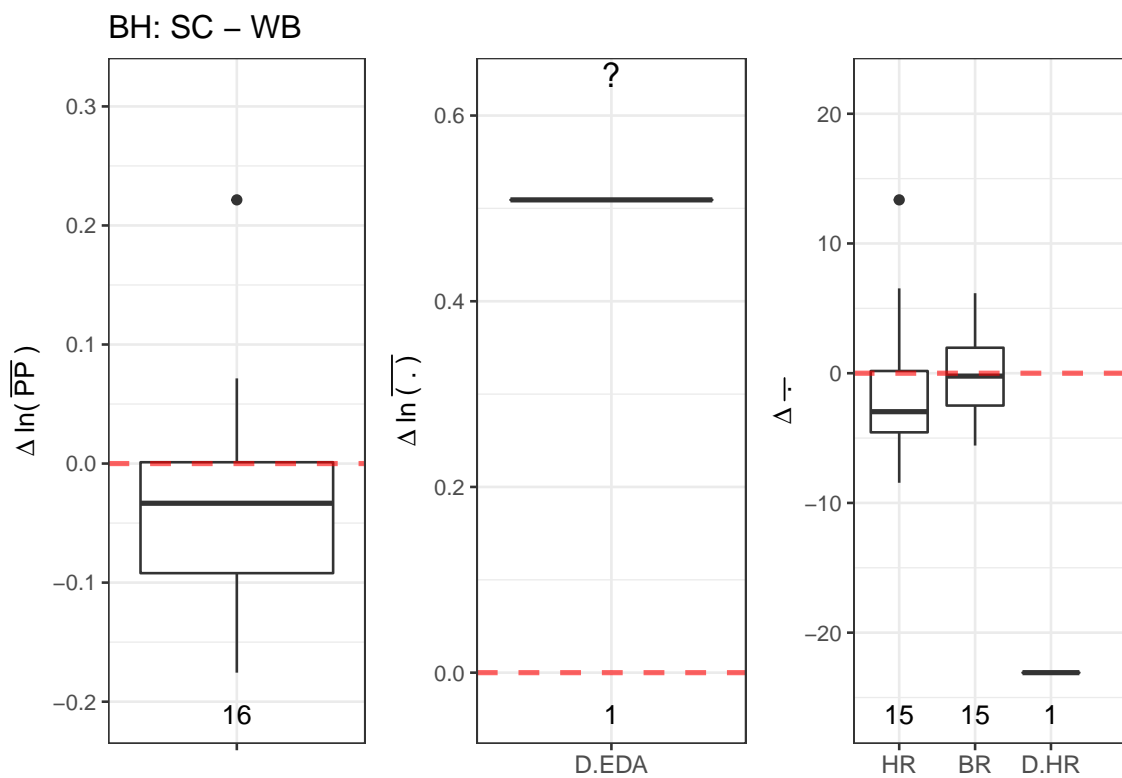
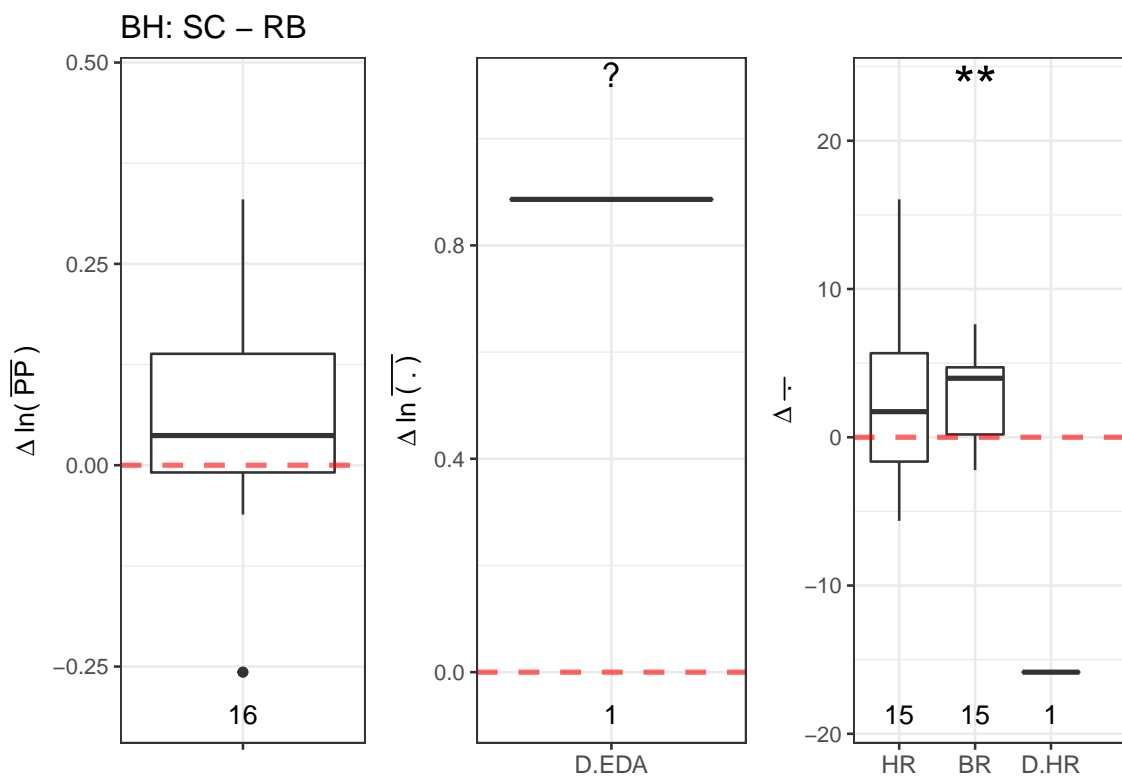
```
## t-test p = 0.4772 > 0.05
##
## Presentation - Dual Task
## t-test p = 0 < 0.001 ***
```

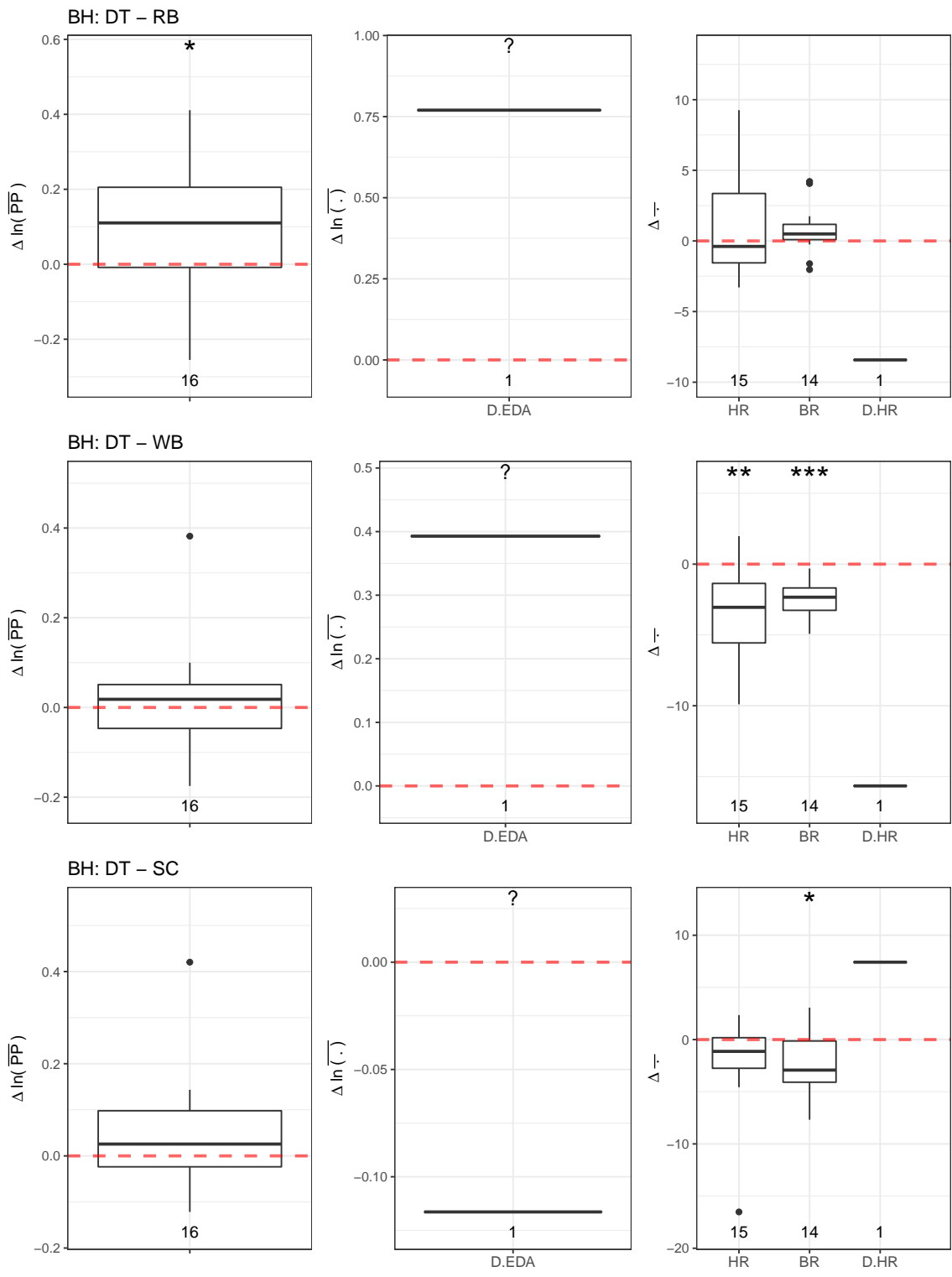
```
## IL has LESS than 7 subjects for D.EDA. Cannot continue with test.
## -----
## IL has LESS than 7 subjects for D.HR. Cannot continue with test.
## -----
```

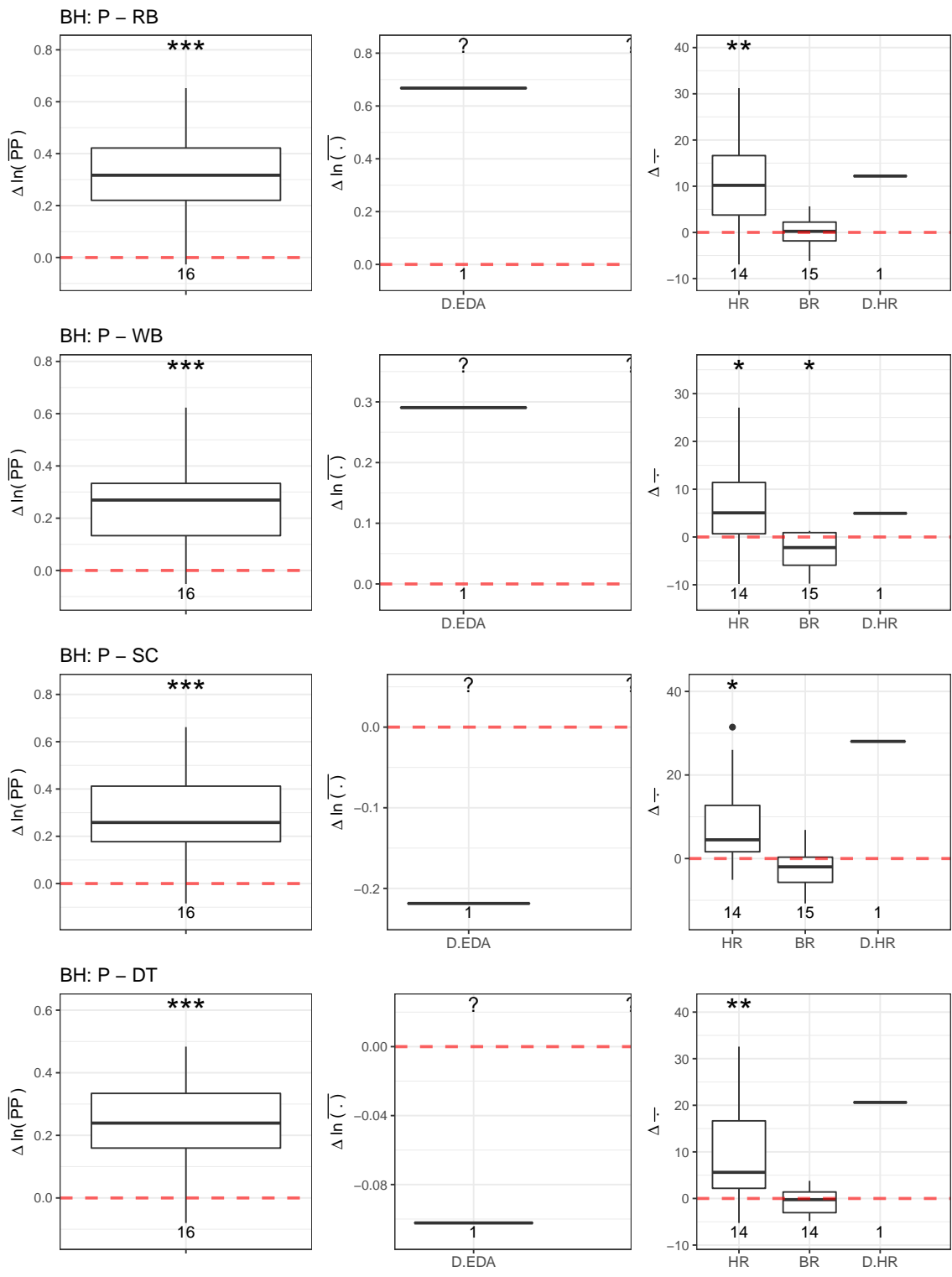
Batch-High (BH)

Sensor Channels per Activity

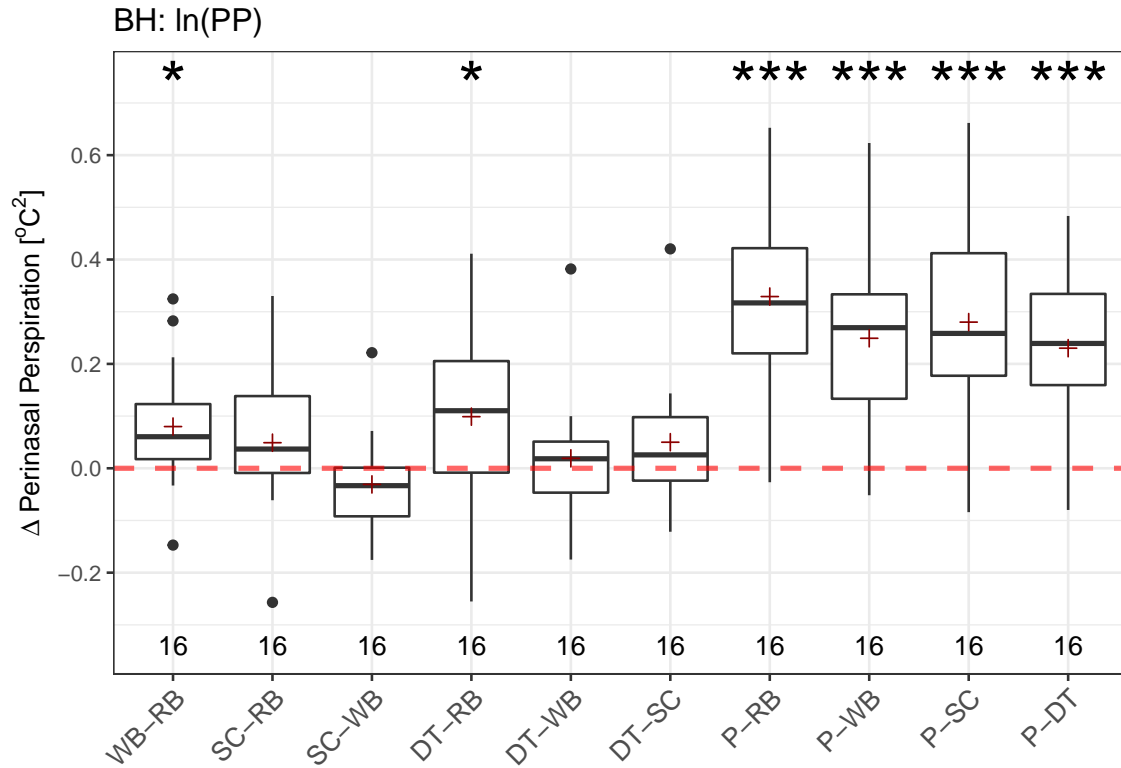






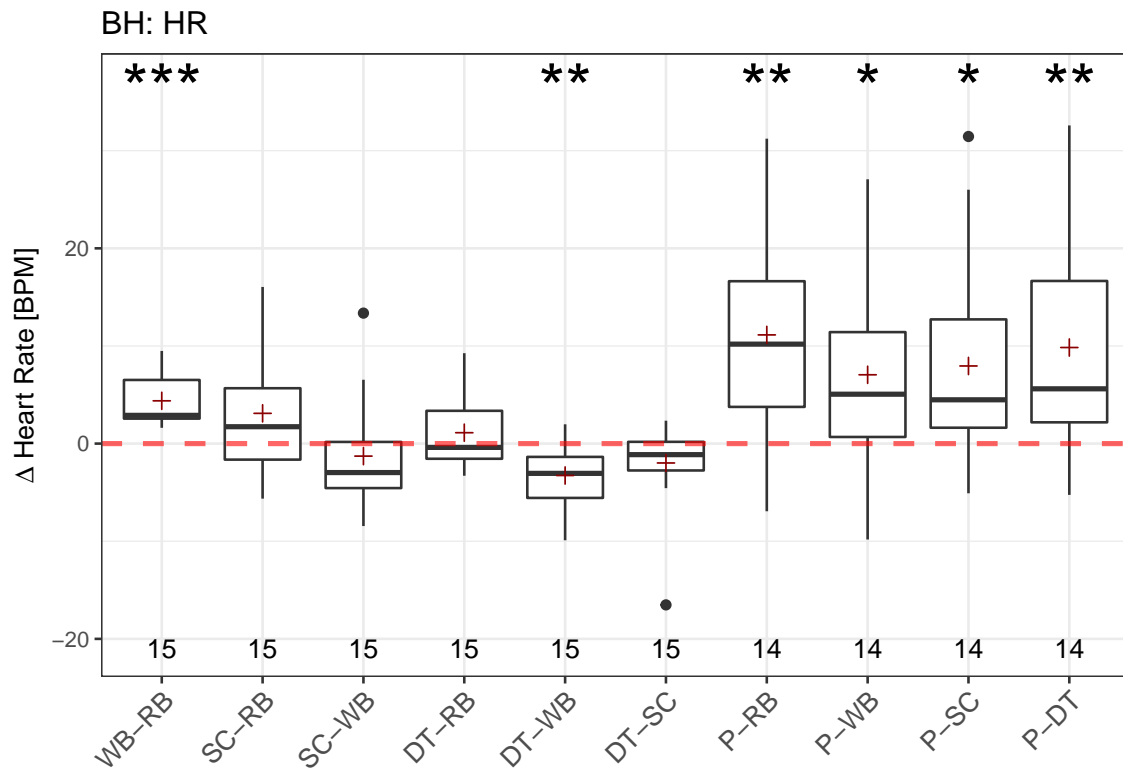


Sensor Channel across Activities



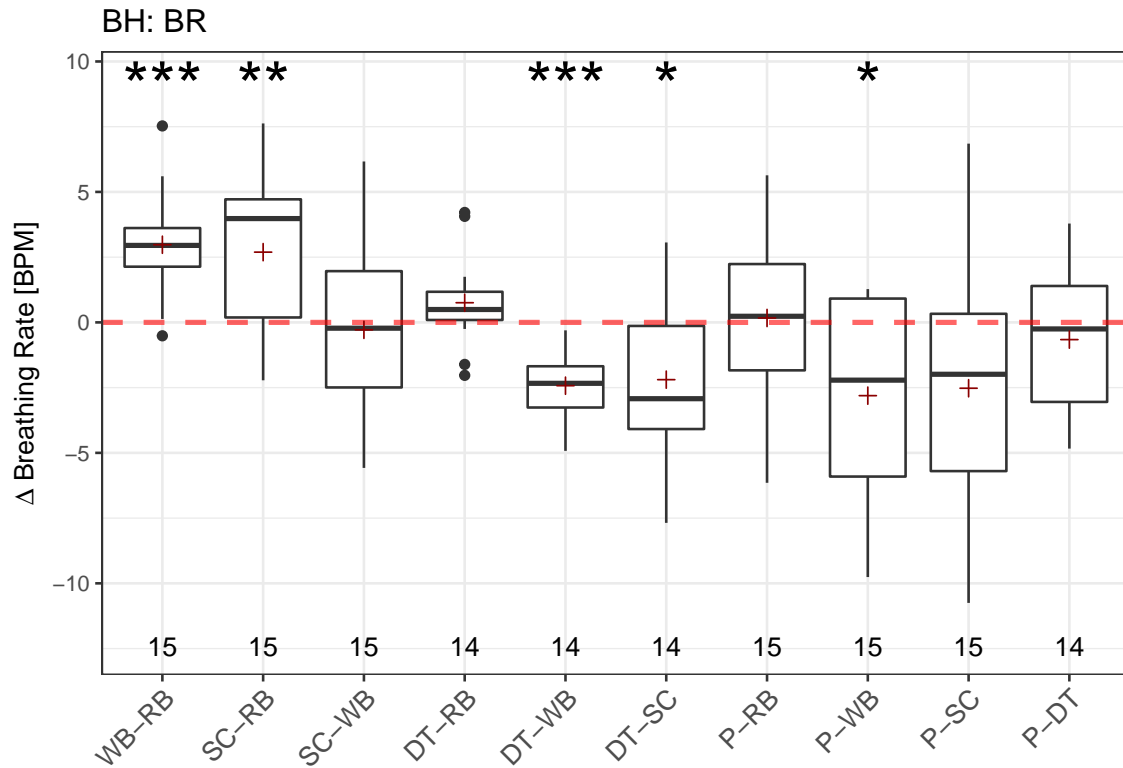
```
## Writing Baseline - Resting Baseline
## Transformed t-test p = 0.0173 < 0.05  *
##
## Stress Condition - Resting Baseline
## Transformed t-test p = 0.1505 > 0.05
##
## StressCondition - Writing Baseline
## Transformed t-test p = 0.1982 > 0.05
##
## Dual Task - Resting Baseline
## Transformed t-test p = 0.0257 < 0.05  *
##
## Dual Task - Writing Baseline
## Transformed t-test p = 0.5396 > 0.05
##
## Dual Task - Stress Condition
## Transformed t-test p = 0.1253 > 0.05
##
## Presentation - Resting Baseline
## Transformed t-test p = 0 < 0.001  ***
##
## Presentation - Writing Baseline
## Transformed t-test p = 1e-04 < 0.001  ***
```

```
##  
## Presentation - Stress Condition  
## Transformed t-test  $p = 0 < 0.001$  ***  
##  
## Presentation - Dual Task  
## Transformed t-test  $p = 0 < 0.001$  ***
```



```
## Writing Baseline - Resting Baseline
## t-test p = 0 < 0.001 ***
##
## Stress Condition - Resting Baseline
## t-test p = 0.0677 > 0.05
##
## StressCondition - Writing Baseline
## t-test p = 0.3915 > 0.05
##
## Dual Task - Resting Baseline
## t-test p = 0.2819 > 0.05
##
## Dual Task - Writing Baseline
## t-test p = 0.0013 < 0.01 **
##
## Dual Task - Stress Condition
## t-test p = 0.1068 > 0.05
##
## Presentation - Resting Baseline
## t-test p = 0.0048 < 0.01 **
##
## Presentation - Writing Baseline
## t-test p = 0.0414 < 0.05 *
##
## Presentation - Stress Condition
```

```
## t-test p = 0.0174 < 0.05  *  
##  
## Presentation - Dual Task  
## t-test p = 0.0088 < 0.01  **
```

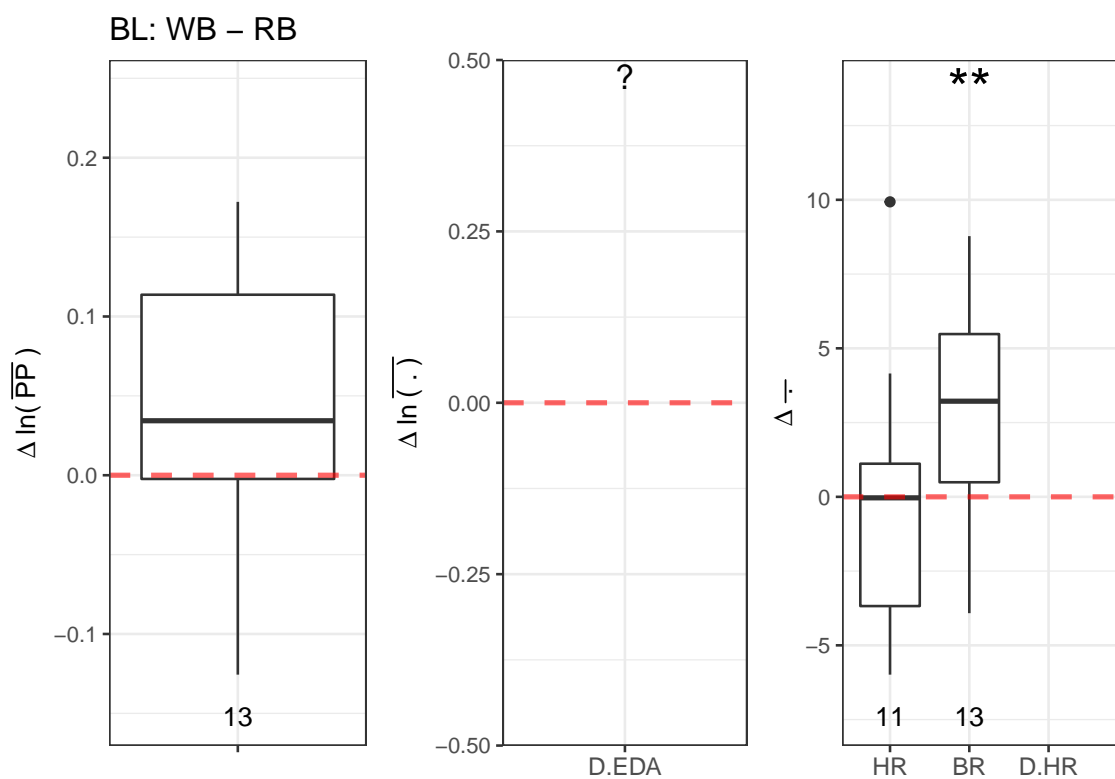
```
## Writing Baseline - Resting Baseline
## t-test p = 0 < 0.001 ***
##
## Stress Condition - Resting Baseline
## t-test p = 0.0061 < 0.01 **
##
## StressCondition - Writing Baseline
## t-test p = 0.7466 > 0.05
##
## Dual Task - Resting Baseline
## t-test p = 0.1299 > 0.05
##
## Dual Task - Writing Baseline
## t-test p = 0 < 0.001 ***
##
## Dual Task - Stress Condition
## t-test p = 0.0223 < 0.05 *
##
## Presentation - Resting Baseline
## t-test p = 0.8464 > 0.05
##
## Presentation - Writing Baseline
## t-test p = 0.0134 < 0.05 *
##
## Presentation - Stress Condition
```

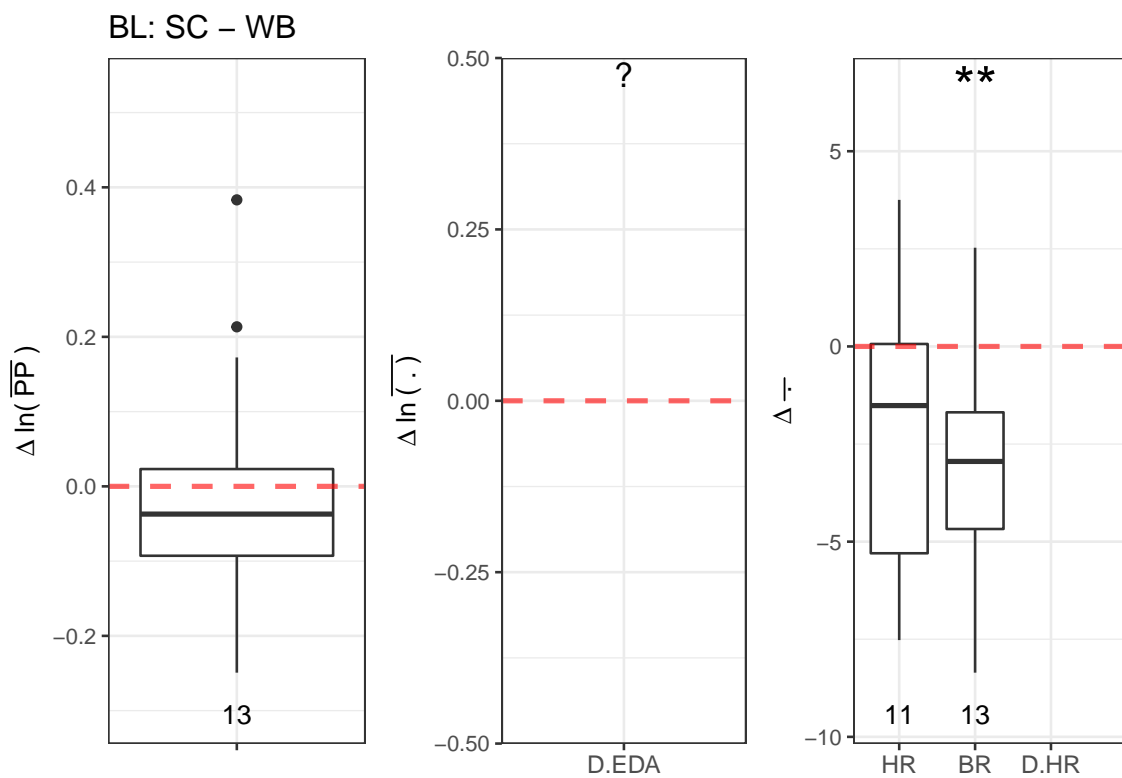
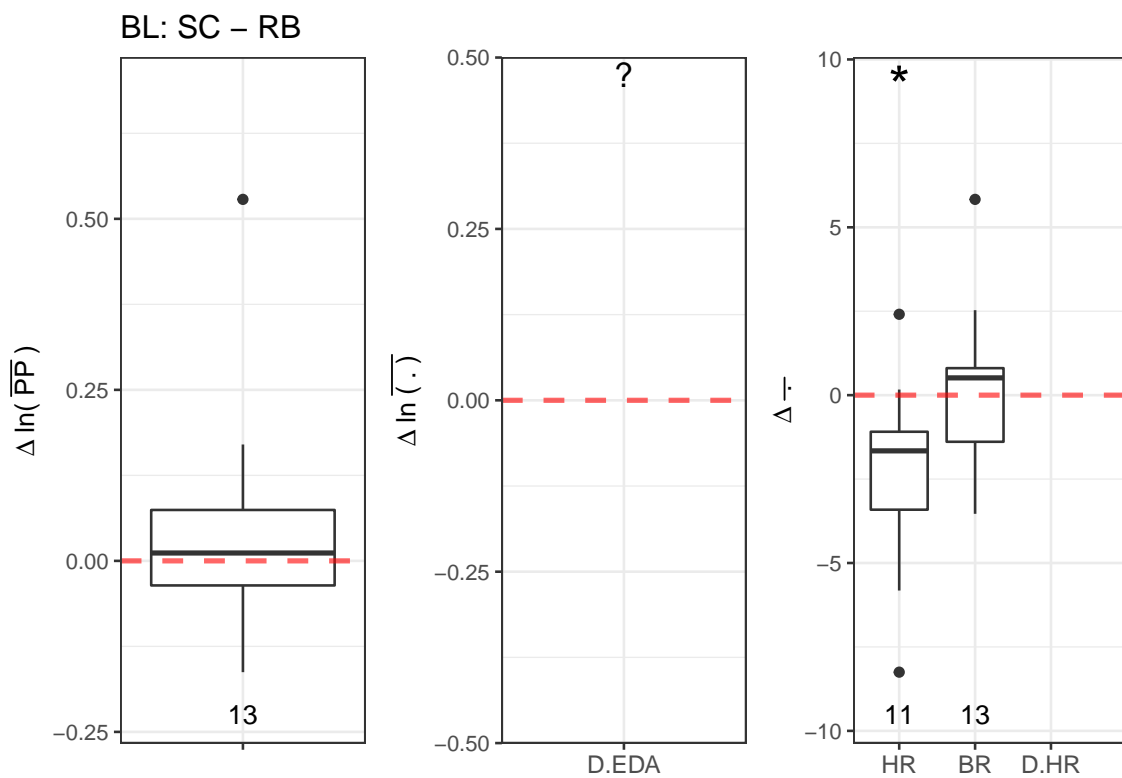
```
## t-test p = 0.0513 > 0.05
##
## Presentation - Dual Task
## t-test p = 0.4077 > 0.05
```

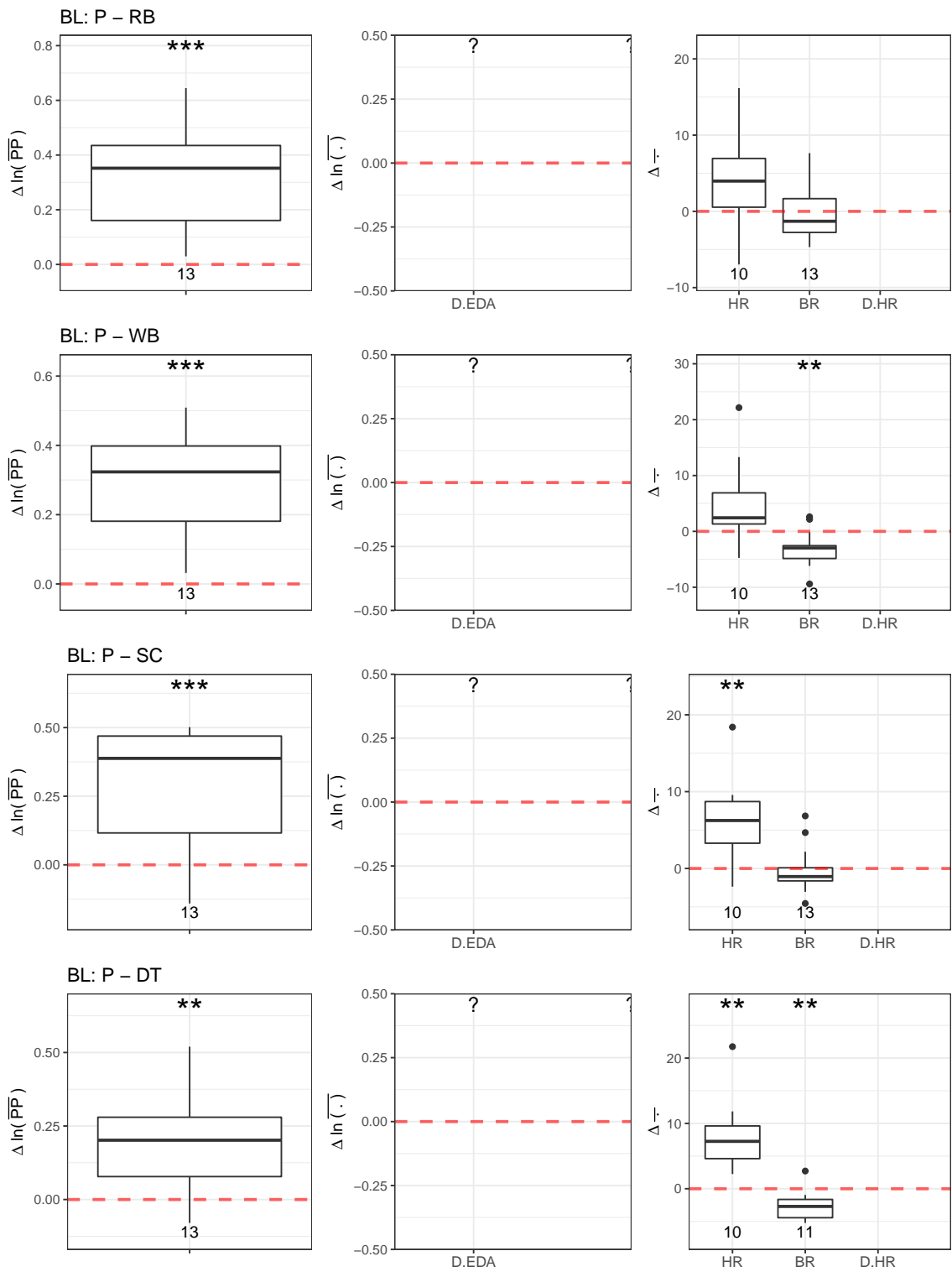
```
## BH has LESS than 7 subjects for D.EDA. Cannot continue with test.
## -----
## BH has LESS than 7 subjects for D.HR. Cannot continue with test.
## -----
```

Batch-Low (BL)

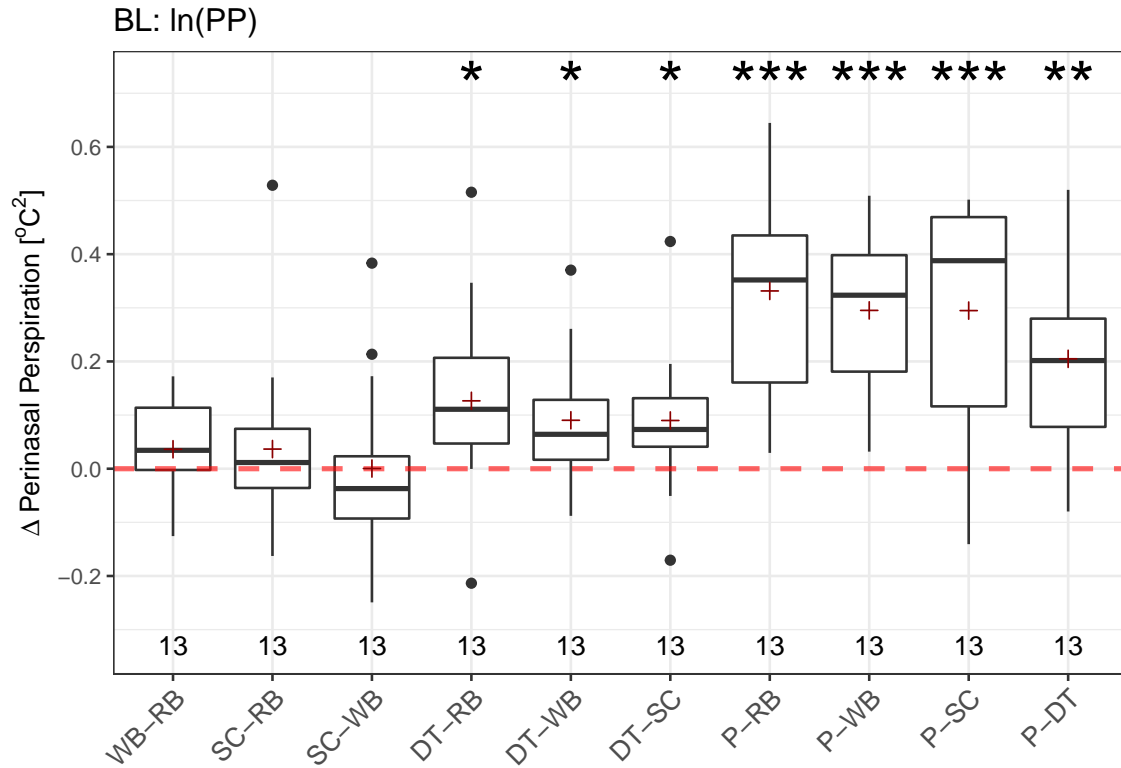
Sensor Channels per Activity







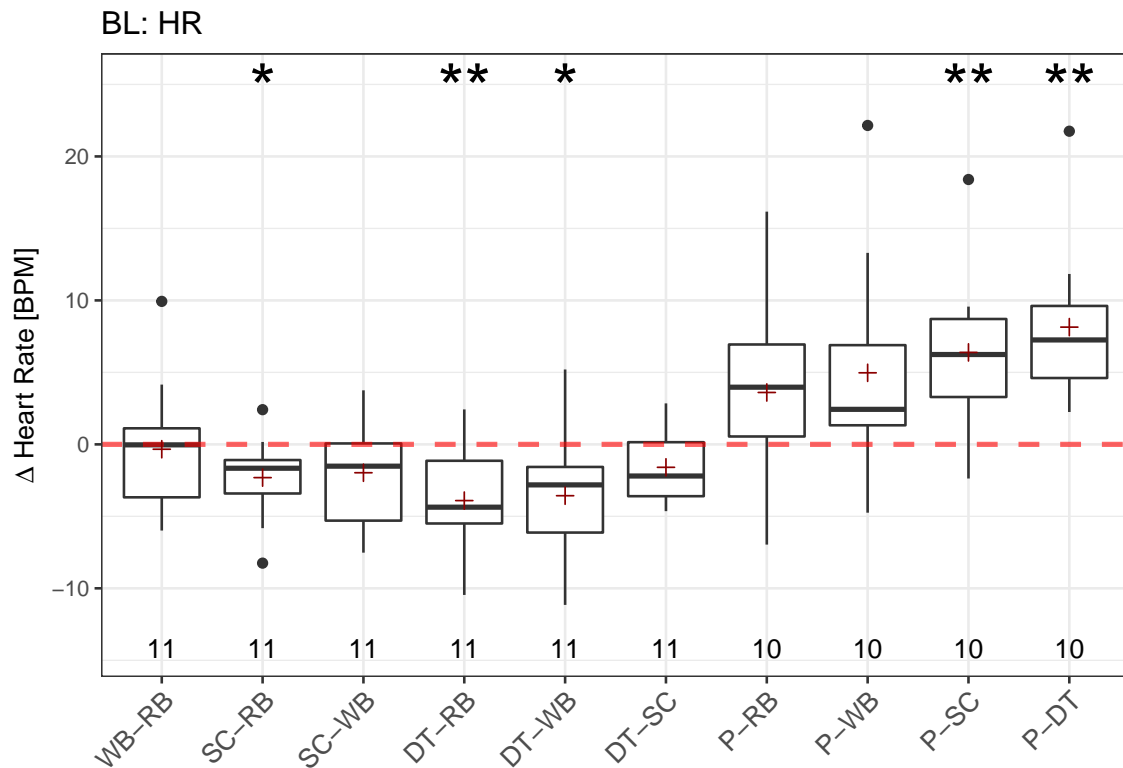
Sensor Channel across Activities



```
## Writing Baseline - Resting Baseline
## Transformed t-test p = 0.1764 > 0.05
##
## Stress Condition - Resting Baseline
## Transformed t-test p = 0.4585 > 0.05
##
## StressCondition - Writing Baseline
## Transformed t-test p = 0.9937 > 0.05
##
## Dual Task - Resting Baseline
## Transformed t-test p = 0.0241 < 0.05  *
##
## Dual Task - Writing Baseline
## Transformed t-test p = 0.0214 < 0.05  *
##
## Dual Task - Stress Condition
## Transformed t-test p = 0.0418 < 0.05  *
##
## Presentation - Resting Baseline
## Transformed t-test p = 1e-04 < 0.001  ***
##
## Presentation - Writing Baseline
## Transformed t-test p = 0 < 0.001  ***
```

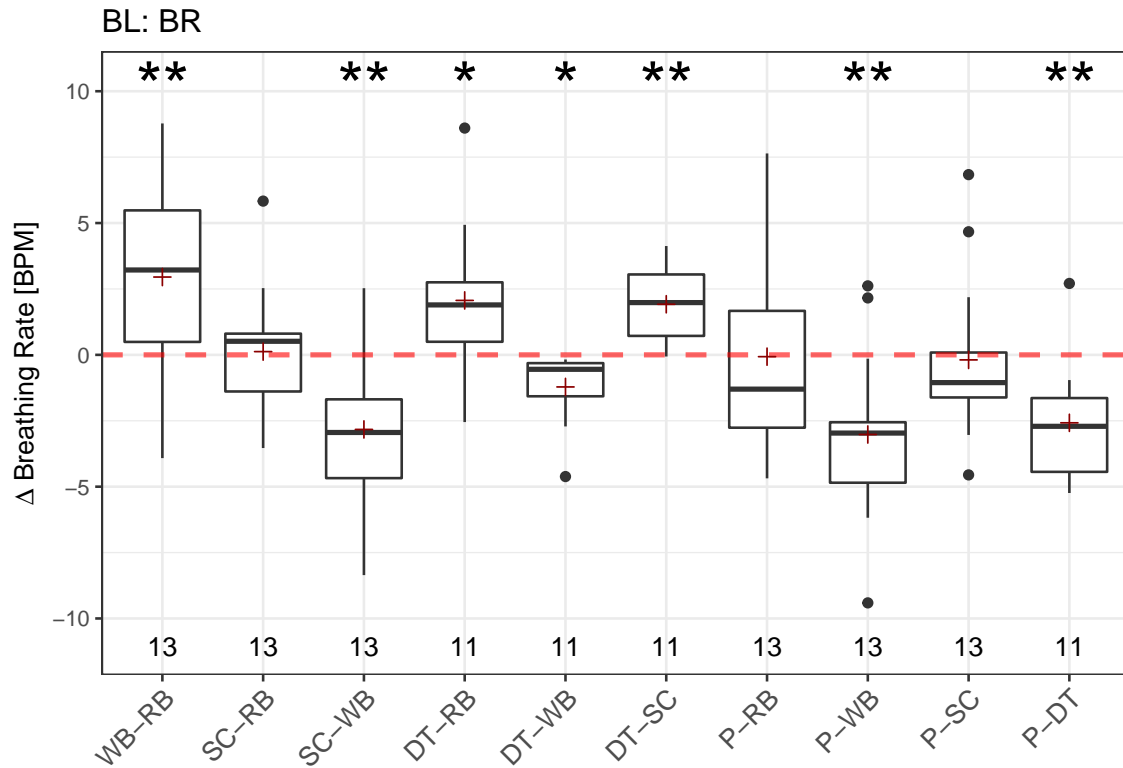


```
##  
## Presentation - Stress Condition  
## Transformed t-test p = 3e-04 < 0.001 ***  
##  
## Presentation - Dual Task  
## Transformed t-test p = 0.0012 < 0.01 **
```



```
## Writing Baseline - Resting Baseline
## t-test p = 0.8134 > 0.05
##
## Stress Condition - Resting Baseline
## t-test p = 0.0258 < 0.05  *
##
## StressCondition - Writing Baseline
## t-test p = 0.1201 > 0.05
##
## Dual Task - Resting Baseline
## t-test p = 0.0079 < 0.01  **
##
## Dual Task - Writing Baseline
## t-test p = 0.0261 < 0.05  *
##
## Dual Task - Stress Condition
## t-test p = 0.065 > 0.05
##
## Presentation - Resting Baseline
## t-test p = 0.1136 > 0.05
##
## Presentation - Writing Baseline
## t-test p = 0.0762 > 0.05
##
## Presentation - Stress Condition
```

```
## t-test p = 0.0055 < 0.01 **  
##  
## Presentation - Dual Task  
## t-test p = 0.0014 < 0.01 **
```

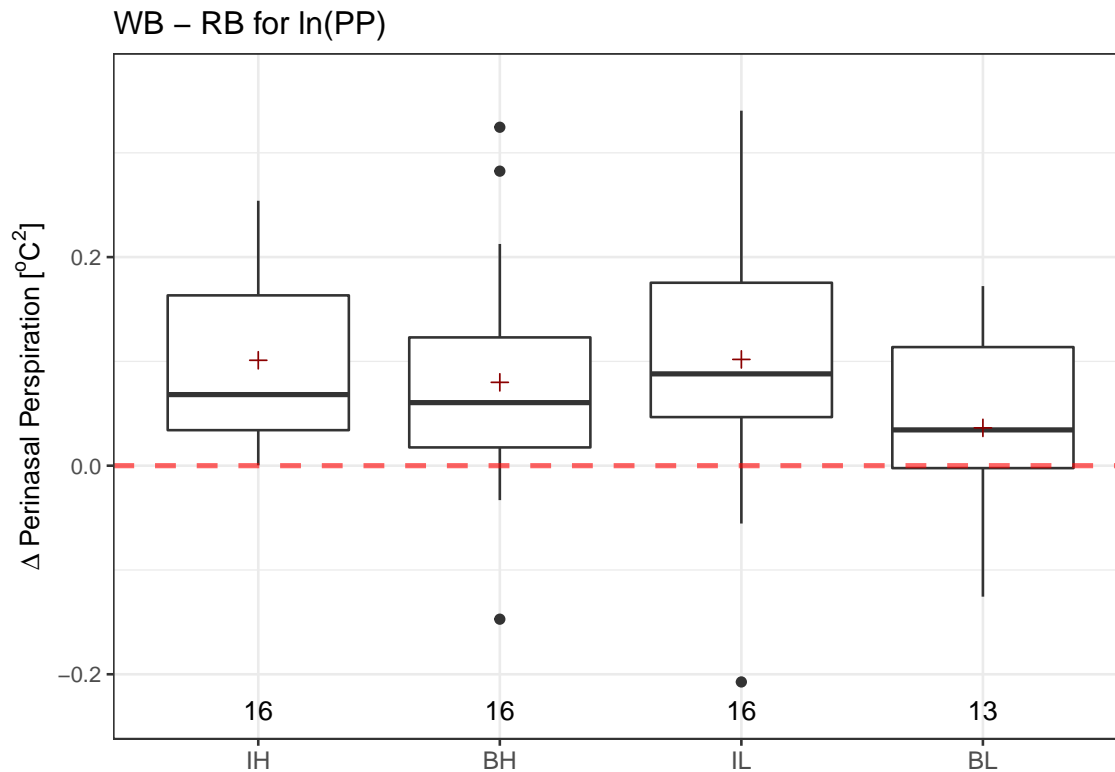


```
## Writing Baseline - Resting Baseline
## t-test p = 0.0089 < 0.01 **
##
## Stress Condition - Resting Baseline
## t-test p = 0.8576 > 0.05
##
## StressCondition - Writing Baseline
## t-test p = 0.0024 < 0.01 **
##
## Dual Task - Resting Baseline
## t-test p = 0.0411 < 0.05 *
##
## Dual Task - Writing Baseline
## t-test p = 0.0151 < 0.05 *
##
## Dual Task - Stress Condition
## t-test p = 0.0015 < 0.01 **
##
## Presentation - Resting Baseline
## t-test p = 0.9501 > 0.05
##
## Presentation - Writing Baseline
## t-test p = 0.0059 < 0.01 **
##
## Presentation - Stress Condition
```

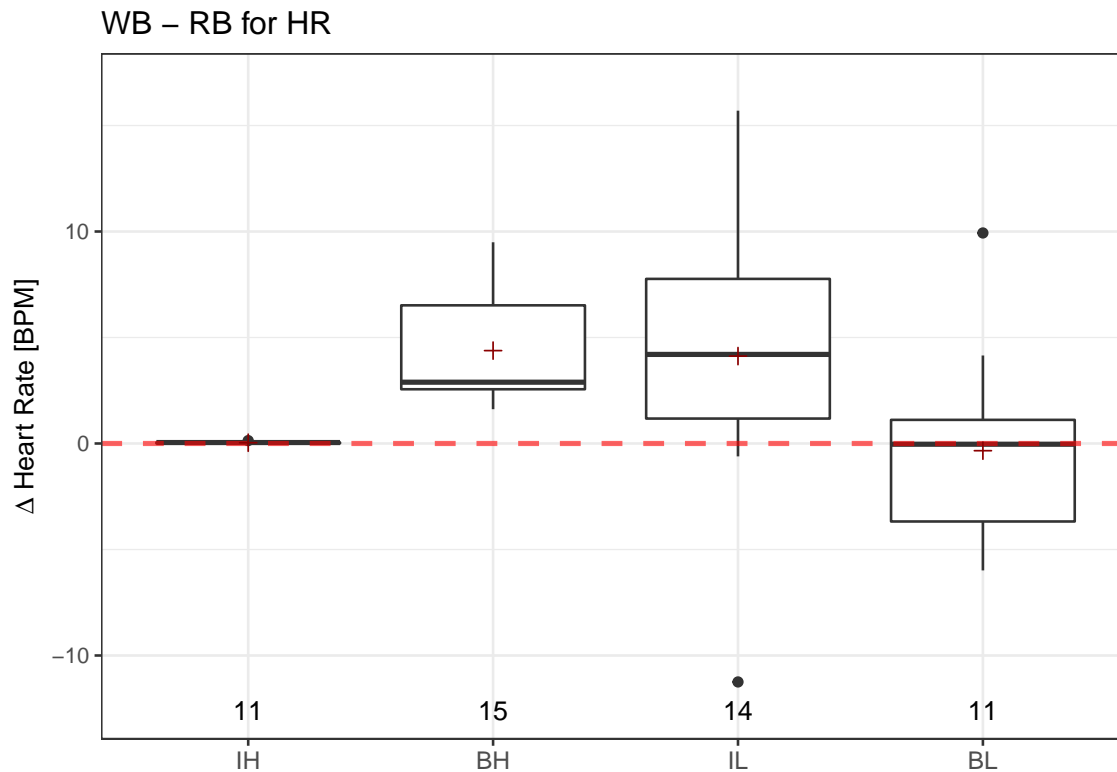
```
## t-test p = 0.8272 > 0.05
##
## Presentation - Dual Task
## t-test p = 0.0037 < 0.01 **
```

```
## BL has LESS than 7 subjects for D.EDA. Cannot continue with test.
## -----
## BL has LESS than 7 subjects for D.HR. Cannot continue with test.
## -----
```

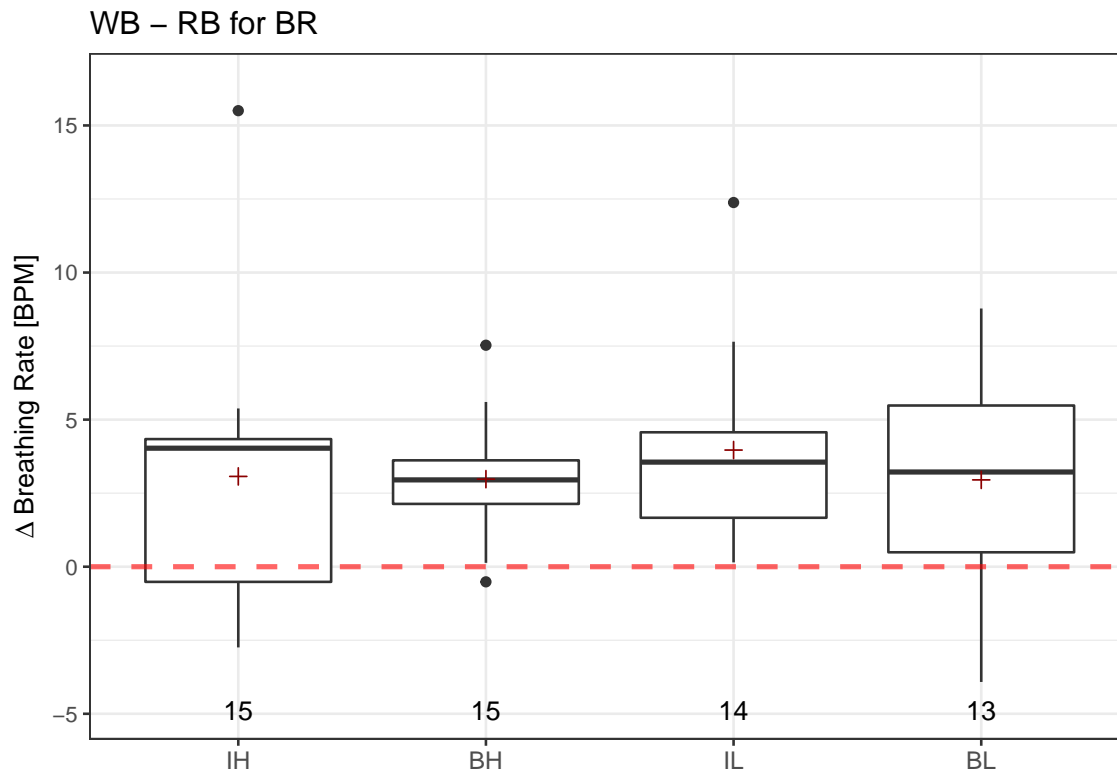
Across Activities



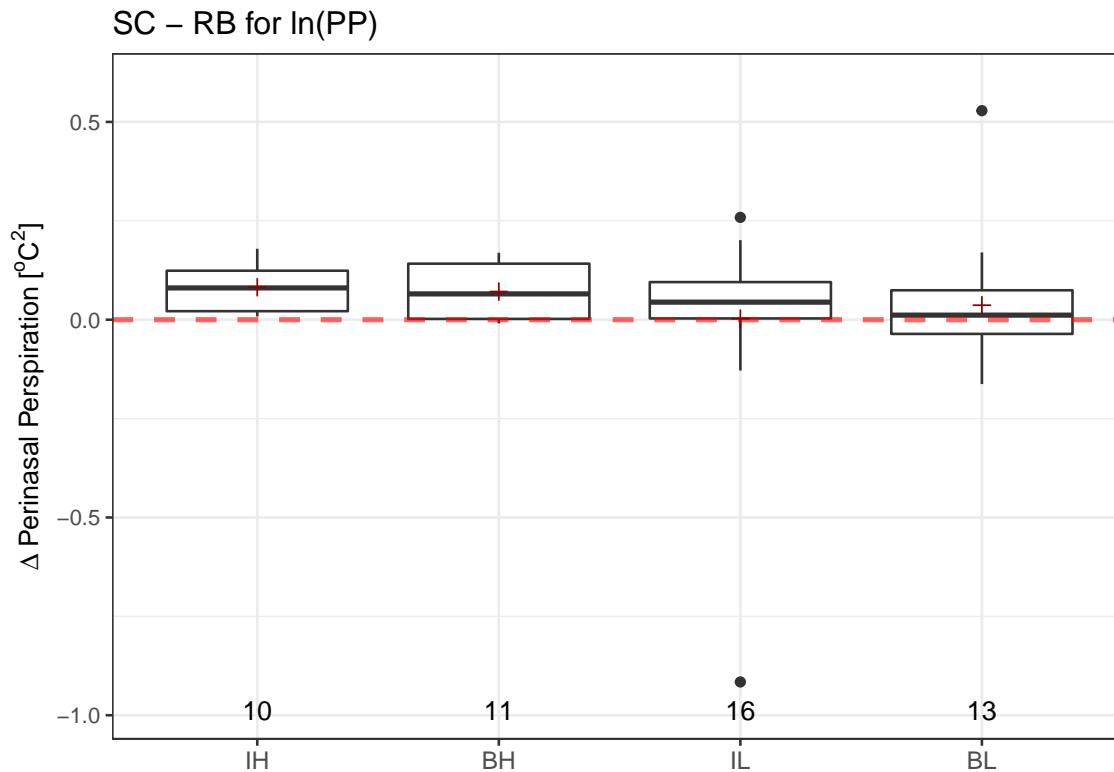
```
## ANOVA:
##           Df Sum Sq Mean Sq F value Pr(>F)
## Condition   3  0.0394  0.01314    1.092   0.36
## Residuals  57  0.6860  0.01204
##
## ---
##
##      Tukey multiple comparisons of means
##      95% family-wise confidence level
##
## Fit: aov(formula = formula(paste(diff, "~ Condition")), data = anova_df)
##
## $Condition
##           diff           lwr           upr           p adj
## BL-BH -0.043647845 -0.15205524  0.06475955  0.7116848
## IH-BH  0.021163957 -0.08148312  0.12381103  0.9473467
## IL-BH  0.021971674 -0.08067540  0.12461875  0.9416049
## IH-BL  0.064811803 -0.04359559  0.17321920  0.3967630
## IL-BL  0.065619520 -0.04278787  0.17402691  0.3857315
## IL-IH  0.000807717 -0.10183936  0.10345479  0.9999967
```



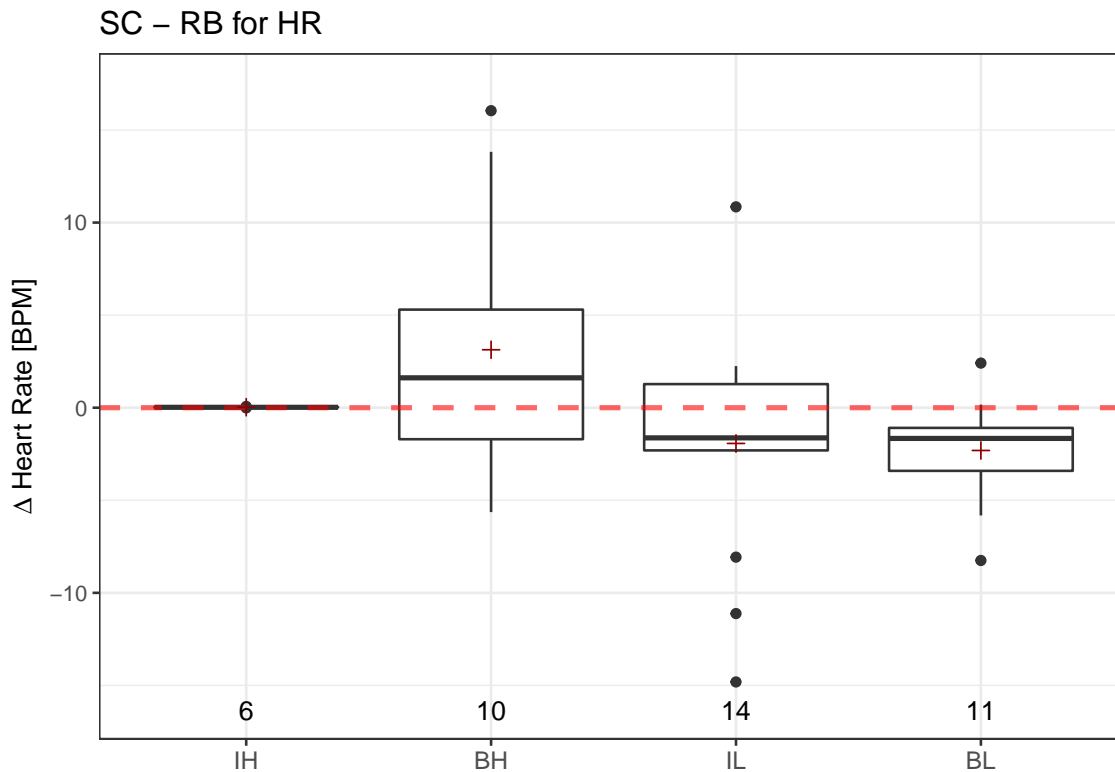
```
## ANOVA:
##           Df Sum Sq Mean Sq F value Pr(>F)
## Condition   3  244.2    81.41     4.57 0.00687 **
## Residuals  47   837.2    17.81
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## ---
##
##      Tukey multiple comparisons of means
##      95% family-wise confidence level
##
## Fit: aov(formula = formula(paste(diff, "~ Condition")), data = anova_df)
##
## $Condition
##           diff           lwr           upr      p adj
## BL-BH -4.7202863 -9.18254169 -0.2580309 0.0344119
## IH-BH -4.3440965 -8.80635193  0.1181588 0.0589960
## IL-BH -0.2590350 -4.43636775  3.9182978 0.9983741
## IH-BL  0.3761898 -4.41704143  5.1694209 0.9967249
## IL-BL  4.4612513 -0.06792643  8.9904291 0.0549364
## IL-IH  4.0850616 -0.44411618  8.6142393 0.0905467
```

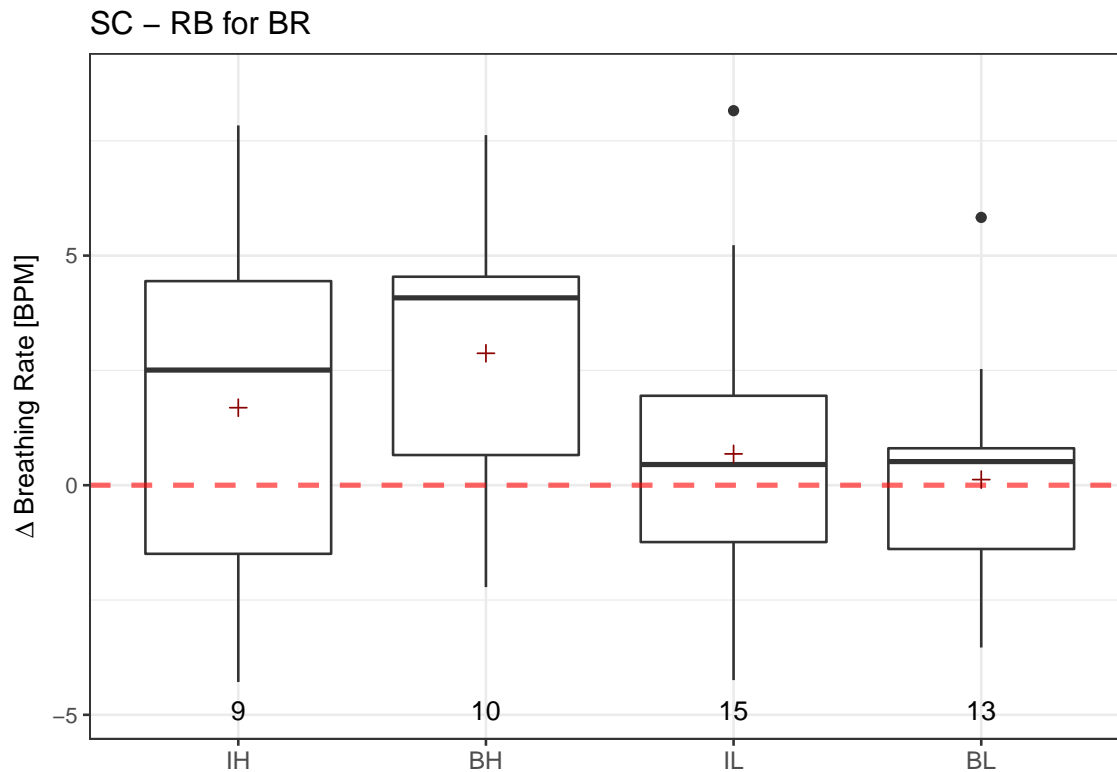
```
## ANOVA:
##           Df Sum Sq Mean Sq F value Pr(>F)
## Condition   3    9.9    3.31   0.288  0.834
## Residuals  53  609.6    11.50
##
## ---
##
##      Tukey multiple comparisons of means
##      95% family-wise confidence level
##
## Fit: aov(formula = formula(paste(diff, "~ Condition")), data = anova_df)
##
## $Condition
##           diff           lwr           upr           p adj
## BL-BH -0.02474297 -3.433576  3.384090  0.9999974
## IH-BH  0.09287912 -3.191955  3.377713  0.9998467
## IL-BH  0.98919813 -2.353779  4.332175  0.8609875
## IH-BL  0.11762209 -3.291211  3.526455  0.9997217
## IL-BL  1.01394109 -2.450955  4.478837  0.8648673
## IL-IH  0.89631900 -2.446658  4.239296  0.8922300
```



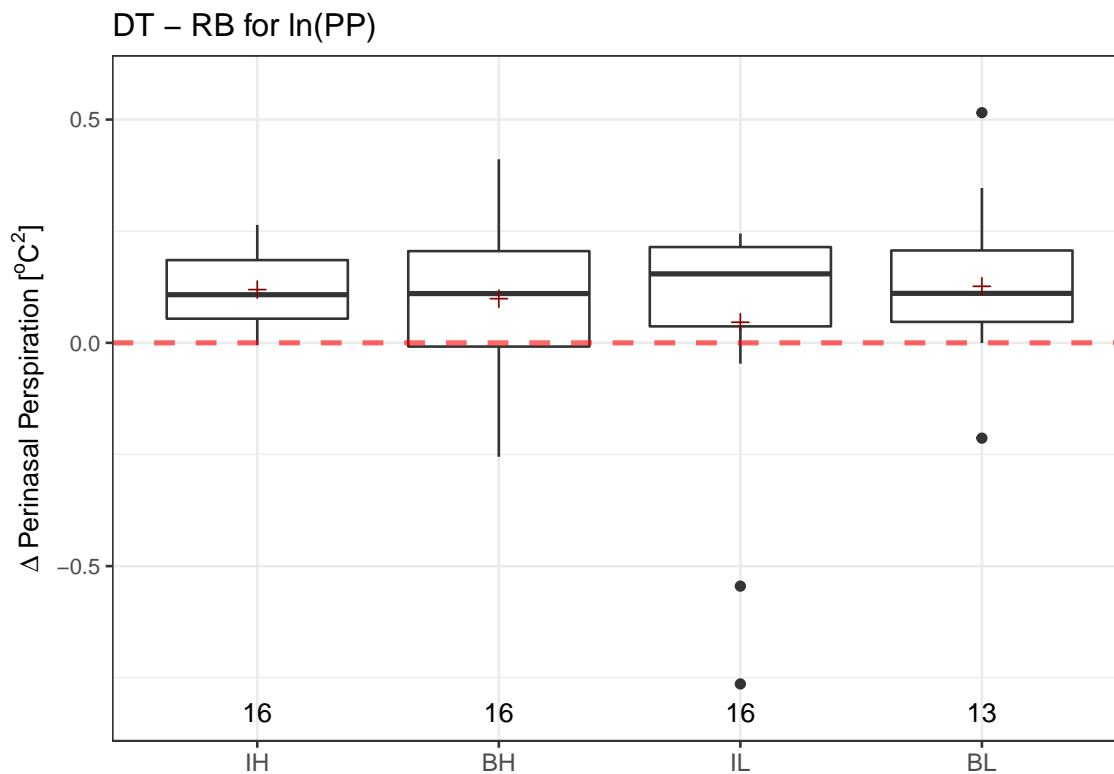
```
## [1] "Removed 12 subjects who had Stroop scores less than 30."
##
## ---
## ANOVA:
##           Df Sum Sq Mean Sq F value Pr(>F)
## Condition   3  0.0506  0.01688    0.533  0.662
## Residuals  46  1.4564  0.03166
##
## ---
##
##      Tukey multiple comparisons of means
##      95% family-wise confidence level
##
## Fit: aov(formula = formula(paste(diff, "~ Condition")), data = anova_df)
##
## $Condition
##           diff           lwr           upr           p adj
## BL-BH -0.03449372 -0.2287965  0.1598090  0.9645991
## IH-BH  0.01111613 -0.1961148  0.2183471  0.9989418
## IL-BH -0.06845539 -0.2542216  0.1173109  0.7601926
## IH-BL  0.04560985 -0.1538858  0.2451056  0.9285801
## IL-BL -0.03396166 -0.2110576  0.1431343  0.9560203
## IL-IH -0.07957152 -0.2707628  0.1116197  0.6856690
```



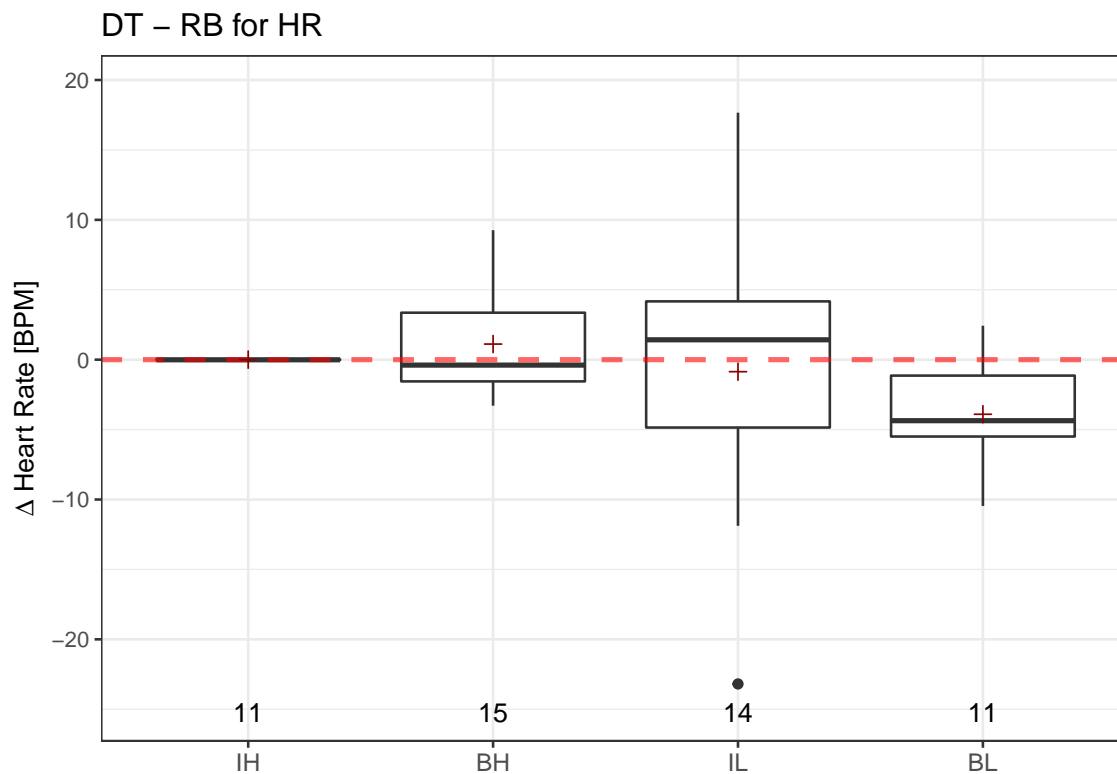
```
## [1] "Removed 12 subjects who had Stroop scores less than 30."
##
## ---
## ANOVA:
##           Df Sum Sq Mean Sq F value Pr(>F)
## Condition   3  198.1    66.03   2.369  0.0863 .
## Residuals  37 1031.4    27.88
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## ---
##
##      Tukey multiple comparisons of means
##      95% family-wise confidence level
##
## Fit: aov(formula = formula(paste(diff, "~ Condition")), data = anova_df)
##
## $Condition
##           diff           lwr           upr           p adj
## BL-BH -5.4399649 -11.644908  0.7649782  0.1033633
## IH-BH -3.1030319 -10.436491  4.2304271  0.6686862
## IL-BH -5.0598501 -10.939698  0.8199980  0.1130352
## IH-BL  2.3369330  -4.870440  9.5443060  0.8191477
## IL-BL  0.3801148  -5.341705  6.1019342  0.9979364
## IL-IH -1.9568182  -8.886286  4.9726493  0.8719810
```



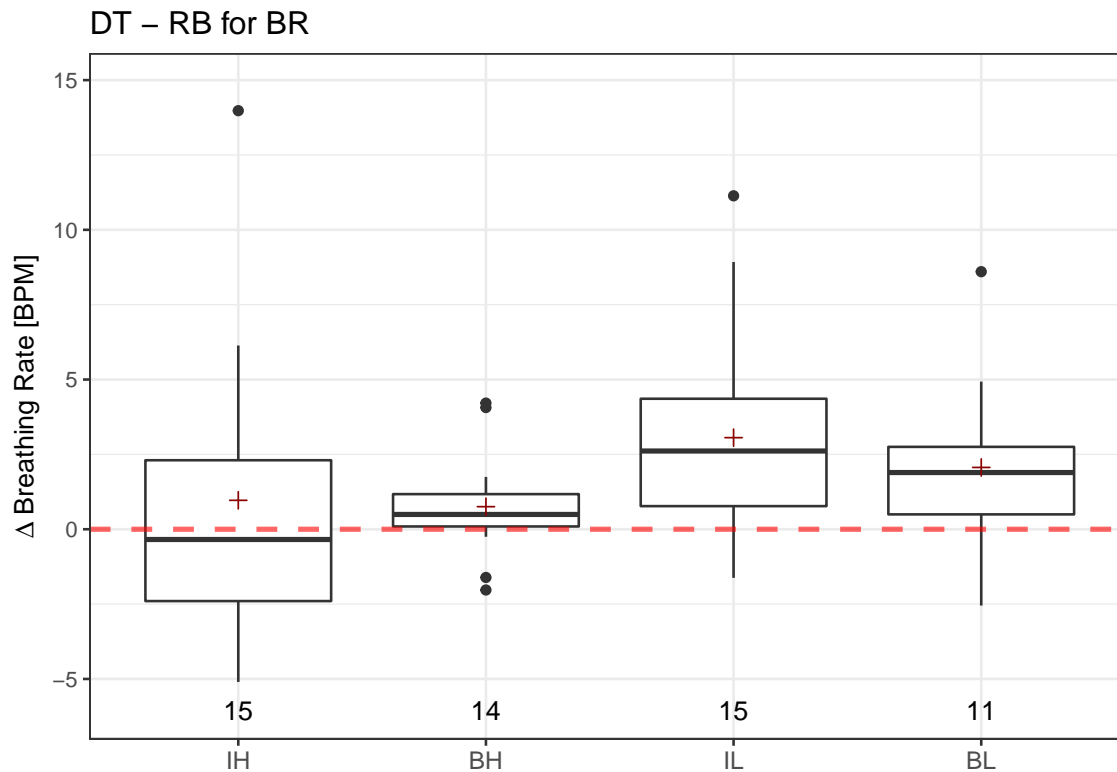
```
## [1] "Removed 12 subjects who had Stroop scores less than 30."
##
## ---
## ANOVA:
##           Df Sum Sq Mean Sq F value Pr(>F)
## Condition   3   49.2   16.410     1.65  0.192
## Residuals  43  427.5    9.943
##
## ---
##
## Tukey multiple comparisons of means
## 95% family-wise confidence level
##
## Fit: aov(formula = formula(paste(diff, "~ Condition")), data = anova_df)
##
## $Condition
##           diff           lwr           upr          p adj
## BL-BH -2.7501984 -6.294625  0.7942286  0.1780584
## IH-BH -1.1846675 -5.056436  2.6871006  0.8457771
## IL-BH -2.1906250 -5.630781  1.2495312  0.3353011
## IH-BL  1.5655309 -2.088500  5.2195617  0.6641112
## IL-BL  0.5595734 -2.633549  3.7526953  0.9655936
## IL-IH -1.0059575 -4.558936  2.5470206  0.8733195
```



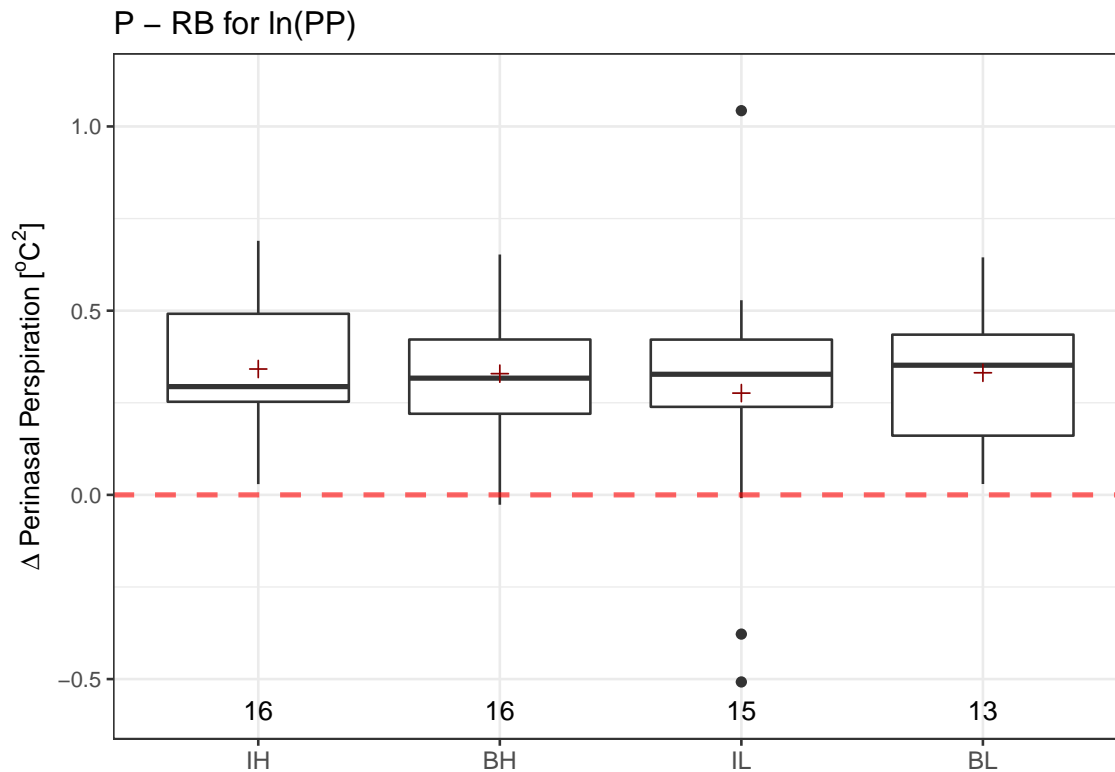
```
## ANOVA:
##           Df Sum Sq Mean Sq F value Pr(>F)
## Condition   3  0.0609  0.02028    0.546  0.653
## Residuals  57  2.1181  0.03716
##
## ---
##
##      Tukey multiple comparisons of means
##      95% family-wise confidence level
##
## Fit: aov(formula = formula(paste(diff, "~ Condition")), data = anova_df)
##
## $Condition
##           diff           lwr           upr           p adj
## BL-BH  0.027654745 -0.1628367  0.2181462  0.9805230
## IH-BH  0.020311813 -0.1600577  0.2006813  0.9906985
## IL-BH -0.052877931 -0.2332474  0.1274916  0.8650466
## IH-BL -0.007342932 -0.1978343  0.1831485  0.9996153
## IL-BL -0.080532676 -0.2710241  0.1099587  0.6795273
## IL-IH -0.073189744 -0.2535592  0.1071797  0.7067087
```



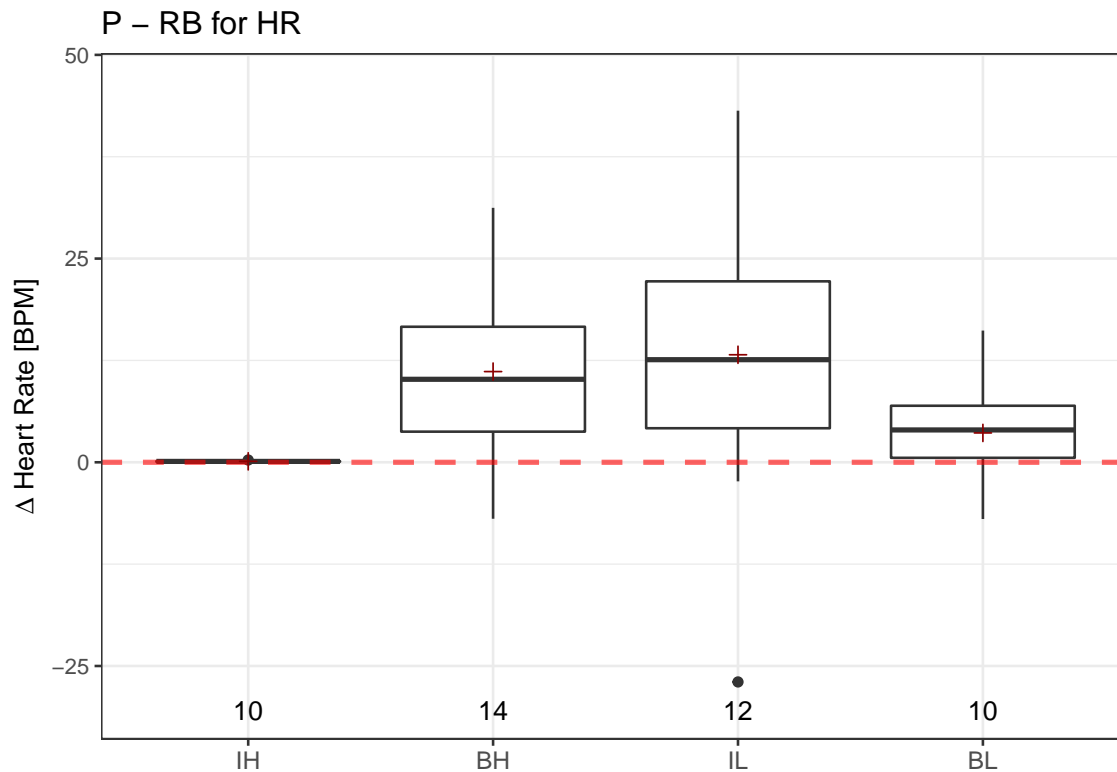
```
## ANOVA:
##           Df Sum Sq Mean Sq F value Pr(>F)
## Condition   3  168.1    56.03   1.705  0.179
## Residuals  47 1544.6    32.86
##
## ---
##
##      Tukey multiple comparisons of means
##      95% family-wise confidence level
##
## Fit: aov(formula = formula(paste(diff, "~ Condition")), data = anova_df)
##
## $Condition
##           diff           lwr           upr          p adj
## BL-BH -5.0205710 -11.081544   1.040402  0.1364377
## IH-BH -1.1130302  -7.174003   4.947942  0.9611485
## IL-BH -1.9740785  -7.648048   3.699891  0.7907532
## IH-BL  3.9075408  -2.602988  10.418070  0.3893134
## IL-BL  3.0464925  -3.105379   9.198364  0.5557307
## IL-IH -0.8610483  -7.012920   5.290823  0.9821104
```



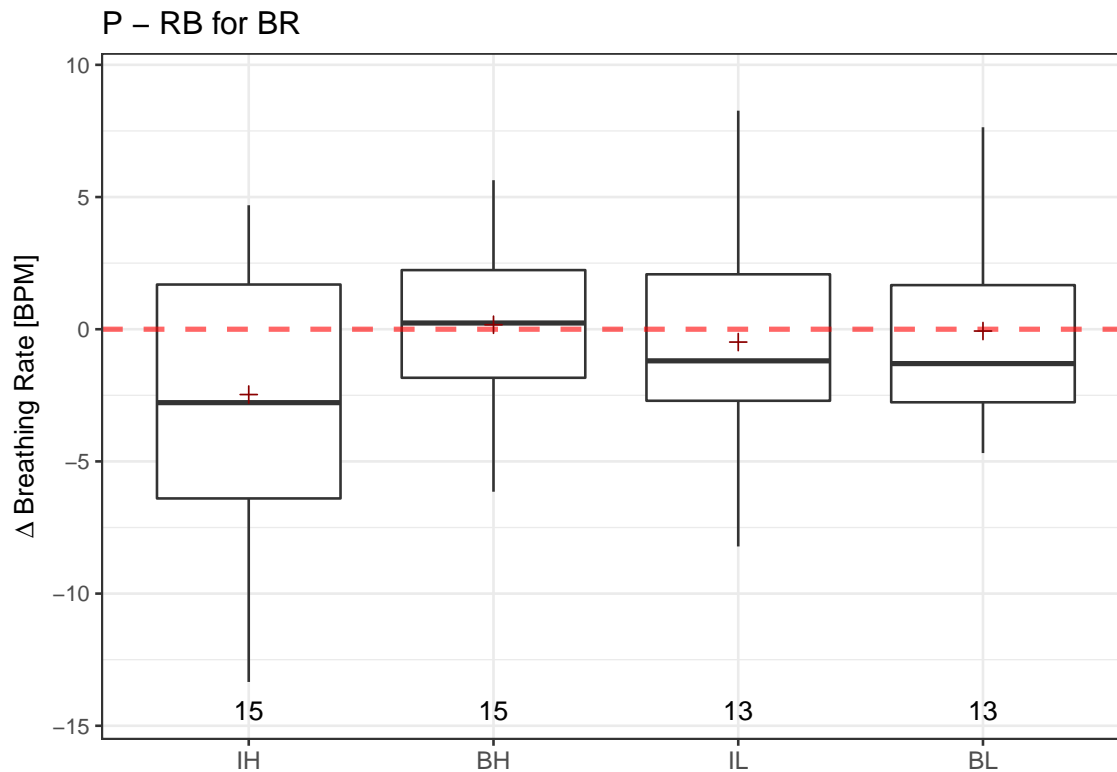
```
## ANOVA:
##           Df Sum Sq Mean Sq F value Pr(>F)
## Condition   3   49.7   16.58   1.326  0.276
## Residuals  51  638.0   12.51
##
## ---
##
##      Tukey multiple comparisons of means
##      95% family-wise confidence level
##
## Fit: aov(formula = formula(paste(diff, "~ Condition")), data = anova_df)
##
## $Condition
##           diff           lwr          upr          p adj
## BL-BH  1.3099094 -2.474716  5.094535  0.7947120
## IH-BH  0.2115210 -3.279099  3.702141  0.9984965
## IL-BH  2.3041802 -1.186440  5.794801  0.3076323
## IH-BL -1.0983884 -4.827093  2.630316  0.8621108
## IL-BL  0.9942709 -2.734434  4.722975  0.8933978
## IL-IH  2.0926593 -1.337250  5.522569  0.3765246
```



```
## ANOVA:
##           Df Sum Sq Mean Sq F value Pr(>F)
## Condition   3  0.039  0.01307   0.203  0.894
## Residuals  56  3.598  0.06426
##
## ---
##
##      Tukey multiple comparisons of means
##      95% family-wise confidence level
##
## Fit: aov(formula = formula(paste(diff, "~ Condition")), data = anova_df)
##
## $Condition
##           diff           lwr           upr           p adj
## BL-BH  0.002415346 -0.2482108  0.2530415  0.9999940
## IH-BH  0.012621504 -0.2246874  0.2499304  0.9989913
## IL-BH -0.052784275 -0.2940159  0.1884474  0.9378654
## IH-BL  0.010206158 -0.2404200  0.2608323  0.9995458
## IL-BL -0.055199621 -0.3095432  0.1991439  0.9392463
## IL-IH -0.065405779 -0.3066374  0.1758259  0.8895576
```

```
## ANOVA:
##           Df Sum Sq Mean Sq F value Pr(>F)
## Condition   3   1270    423.4     2.87 0.0476 *
## Residuals  42   6196    147.5
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## ---
##
##      Tukey multiple comparisons of means
##      95% family-wise confidence level
##
## Fit: aov(formula = formula(paste(diff, "~ Condition")), data = anova_df)
##
## $Condition
##           diff           lwr           upr          p adj
## BL-BH   -7.528592 -20.9809638   5.923781 0.4483057
## IH-BH  -11.016346 -24.4687186   2.436026 0.1425197
## IL-BH    2.063625 -10.7180949  14.845346 0.9726602
## IH-BL   -3.487755 -18.0179776  11.042468 0.9177087
## IL-BL    9.592217  -4.3194123  23.503846 0.2674849
## IL-IH   13.079972  -0.8316575  26.991601 0.0720480
```



```
## ANOVA:
##           Df Sum Sq Mean Sq F value Pr(>F)
## Condition   3   64.1    21.35    1.149  0.338
## Residuals  52  966.8     18.59
##
## ---
##
##      Tukey multiple comparisons of means
##      95% family-wise confidence level
##
## Fit: aov(formula = formula(paste(diff, "~ Condition")), data = anova_df)
##
## $Condition
##           diff           lwr          upr          p adj
## BL-BH -0.2386456 -4.575315  4.098023  0.9988745
## IH-BH -2.6409437 -6.819863  1.537975  0.3458474
## IL-BH -0.6556059 -4.992275  3.681063  0.9779099
## IH-BL -2.4022982 -6.738967  1.934371  0.4625181
## IL-BL -0.4169604 -4.905839  4.071919  0.9946706
## IL-IH  1.9853378 -2.351331  6.322007  0.6202247
```

Summary

Condition	Difference	Measure	p	Test	n	Significance
BH	WB - RB	PP	0.0173080	Transformed t-test	16	*
BH	WB - RB	HR	0.0000221	t-test	15	***
BH	WB - RB	BR	0.0000456	t-test	15	***
BH	SC - RB	PP	0.1505156	Transformed t-test	16	
BH	SC - RB	HR	0.0676868	t-test	15	
BH	SC - RB	BR	0.0060548	t-test	15	**
BH	SC - WB	PP	0.1982421	Transformed t-test	16	
BH	SC - WB	HR	0.3915336	t-test	15	
BH	SC - WB	BR	0.7466036	t-test	15	
BH	DT - RB	PP	0.0257406	Transformed t-test	16	*
BH	DT - RB	HR	0.2818579	t-test	15	
BH	DT - RB	BR	0.1299423	t-test	14	
BH	DT - WB	PP	0.5396050	Transformed t-test	16	
BH	DT - WB	HR	0.0012903	t-test	15	**
BH	DT - WB	BR	0.0000039	t-test	14	***
BH	DT - SC	PP	0.1253277	Transformed t-test	16	
BH	DT - SC	HR	0.1067941	t-test	15	
BH	DT - SC	BR	0.0223007	t-test	14	*
BH	P - RB	PP	0.0000065	Transformed t-test	16	***
BH	P - RB	HR	0.0048470	t-test	14	**
BH	P - RB	BR	0.8463726	t-test	15	
BH	P - WB	PP	0.0000833	Transformed t-test	16	***
BH	P - WB	HR	0.0414463	t-test	14	*
BH	P - WB	BR	0.0134266	t-test	15	*
BH	P - SC	PP	0.0000467	Transformed t-test	16	***
BH	P - SC	HR	0.0173810	t-test	14	*
BH	P - SC	BR	0.0512656	t-test	15	
BH	P - DT	PP	0.0000138	Transformed t-test	16	***
BH	P - DT	HR	0.0088212	t-test	14	**
BH	P - DT	BR	0.4077358	t-test	14	
BL	WB - RB	PP	0.1763941	Transformed t-test	13	
BL	WB - RB	HR	0.8133664	t-test	11	
BL	WB - RB	BR	0.0088800	t-test	13	**
BL	SC - RB	PP	0.4585047	Transformed t-test	13	
BL	SC - RB	HR	0.0257760	t-test	11	*
BL	SC - RB	BR	0.8576035	t-test	13	
BL	SC - WB	PP	0.9936892	Transformed t-test	13	
BL	SC - WB	HR	0.1201215	t-test	11	
BL	SC - WB	BR	0.0024067	t-test	13	**
BL	DT - RB	PP	0.0241232	Transformed t-test	13	*
BL	DT - RB	HR	0.0078735	t-test	11	**
BL	DT - RB	BR	0.0410673	t-test	11	*
BL	DT - WB	PP	0.0213562	Transformed t-test	13	*
BL	DT - WB	HR	0.0261257	t-test	11	*
BL	DT - WB	BR	0.0151163	t-test	11	*

(continued)

Condition	Difference	Measure	p	Test	n	Significance
BL	DT - SC	PP	0.0417586	Transformed t-test	13	*
BL	DT - SC	HR	0.0650008	t-test	11	
BL	DT - SC	BR	0.0014521	t-test	11	**
BL	P - RB	PP	0.0000579	Transformed t-test	13	***
BL	P - RB	HR	0.1136199	t-test	10	
BL	P - RB	BR	0.9501160	t-test	13	
BL	P - WB	PP	0.0000237	Transformed t-test	13	***
BL	P - WB	HR	0.0762259	t-test	10	
BL	P - WB	BR	0.0058776	t-test	13	**
BL	P - SC	PP	0.0003285	Transformed t-test	13	***
BL	P - SC	HR	0.0055325	t-test	10	**
BL	P - SC	BR	0.8272039	t-test	13	
BL	P - DT	PP	0.0011690	Transformed t-test	13	**
BL	P - DT	HR	0.0014189	t-test	10	**
BL	P - DT	BR	0.0037473	t-test	11	**
IH	WB - RB	PP	0.0002132	Transformed t-test	16	***
IH	WB - RB	HR	0.0156014	Transformed t-test	11	*
IH	WB - RB	BR	0.0184463	t-test	15	*
IH	SC - RB	PP	0.0072317	Transformed t-test	16	**
IH	SC - RB	HR	0.1143439	Transformed t-test	11	
IH	SC - RB	BR	0.0864944	t-test	15	
IH	SC - WB	PP	0.3534362	Transformed t-test	16	
IH	SC - WB	HR	0.3169827	Transformed t-test	11	
IH	SC - WB	BR	0.1404898	t-test	15	
IH	DT - RB	PP	0.0000331	Transformed t-test	16	***
IH	DT - RB	HR	0.8850103	Transformed t-test	11	
IH	DT - RB	BR	0.4484333	t-test	15	
IH	DT - WB	PP	0.4225392	Transformed t-test	16	
IH	DT - WB	HR	0.0361008	Transformed t-test	11	*
IH	DT - WB	BR	0.0012299	t-test	15	**
IH	DT - SC	PP	0.2570218	Transformed t-test	16	
IH	DT - SC	HR	0.3856627	Transformed t-test	11	
IH	DT - SC	BR	0.3441009	t-test	15	
IH	P - RB	PP	0.0000107	Transformed t-test	16	***
IH	P - RB	HR	0.0011076	Transformed t-test	10	**
IH	P - RB	BR	0.0907505	t-test	15	
IH	P - WB	PP	0.0002569	Transformed t-test	16	***
IH	P - WB	HR	0.0132975	Transformed t-test	10	*
IH	P - WB	BR	0.0007386	t-test	15	***
IH	P - SC	PP	0.0001499	Transformed t-test	16	***
IH	P - SC	HR	0.0027481	Transformed t-test	10	**
IH	P - SC	BR	0.0028918	t-test	15	**
IH	P - DT	PP	0.0003933	Transformed t-test	16	***
IH	P - DT	HR	0.0000932	Transformed t-test	10	***
IH	P - DT	BR	0.0056199	t-test	15	**
IL	WB - RB	PP	0.0081275	Transformed t-test	16	**
IL	WB - RB	HR	0.0296381	t-test	14	*

(continued)

Condition	Difference	Measure	p	Test	n	Significance
IL	WB - RB	BR	0.0005134	t-test	14	***
IL	SC - RB	PP	0.9676786	Transformed t-test	16	
IL	SC - RB	HR	0.2669373	t-test	14	
IL	SC - RB	BR	0.4282762	t-test	15	
IL	SC - WB	PP	0.0588774	Transformed t-test	16	
IL	SC - WB	HR	0.0000048	t-test	14	***
IL	SC - WB	BR	0.0004184	t-test	14	***
IL	DT - RB	PP	0.5346038	Transformed t-test	16	
IL	DT - RB	HR	0.7416151	t-test	14	
IL	DT - RB	BR	0.0063324	t-test	15	**
IL	DT - WB	PP	0.2922834	Transformed t-test	16	
IL	DT - WB	HR	0.0037787	t-test	14	**
IL	DT - WB	BR	0.0028507	t-test	14	**
IL	DT - SC	PP	0.2890821	Transformed t-test	16	
IL	DT - SC	HR	0.4266015	t-test	14	
IL	DT - SC	BR	0.0064712	t-test	15	**
IL	P - RB	PP	0.0113585	Transformed t-test	15	*
IL	P - RB	HR	0.0326350	t-test	12	*
IL	P - RB	BR	0.7026470	t-test	13	
IL	P - WB	PP	0.0499145	Transformed t-test	15	*
IL	P - WB	HR	0.0531180	t-test	12	
IL	P - WB	BR	0.0000168	t-test	12	***
IL	P - SC	PP	0.0020385	Transformed t-test	15	**
IL	P - SC	HR	0.0080668	t-test	12	**
IL	P - SC	BR	0.4772220	t-test	13	
IL	P - DT	PP	0.0003956	Transformed t-test	15	***
IL	P - DT	HR	0.0038321	t-test	12	**
IL	P - DT	BR	0.0000132	t-test	13	***