

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:

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

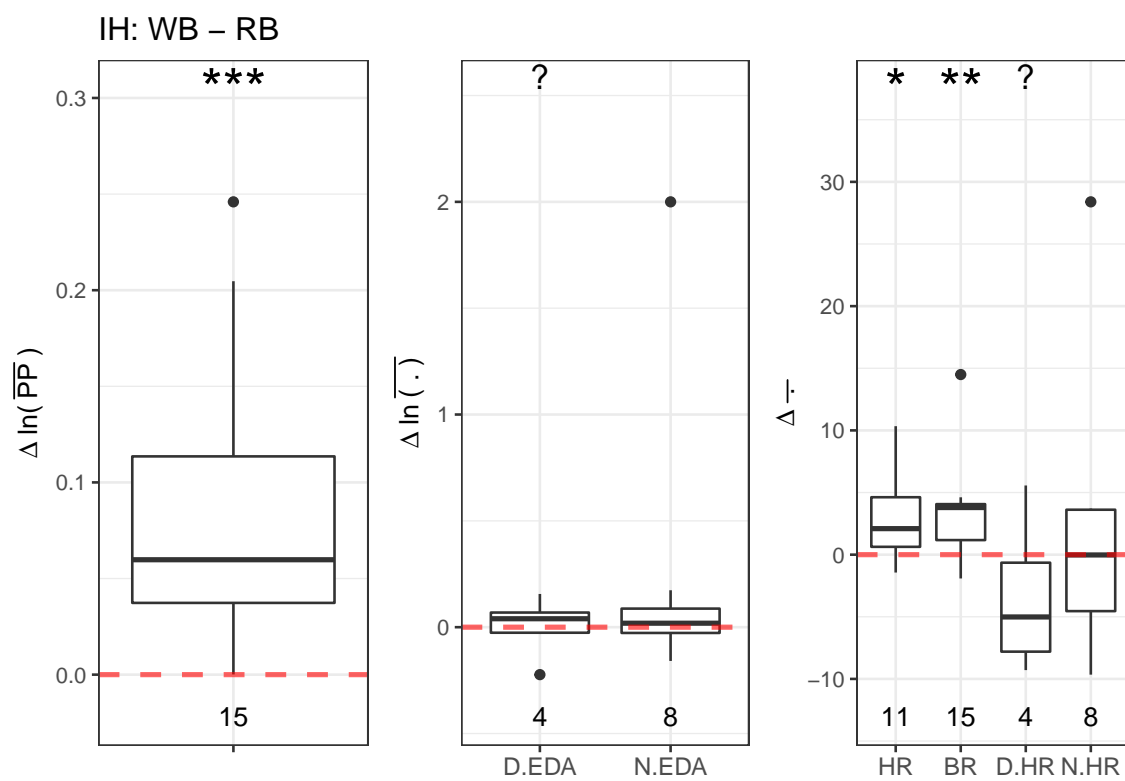
****** = $0.001 < p \leq 0.01$

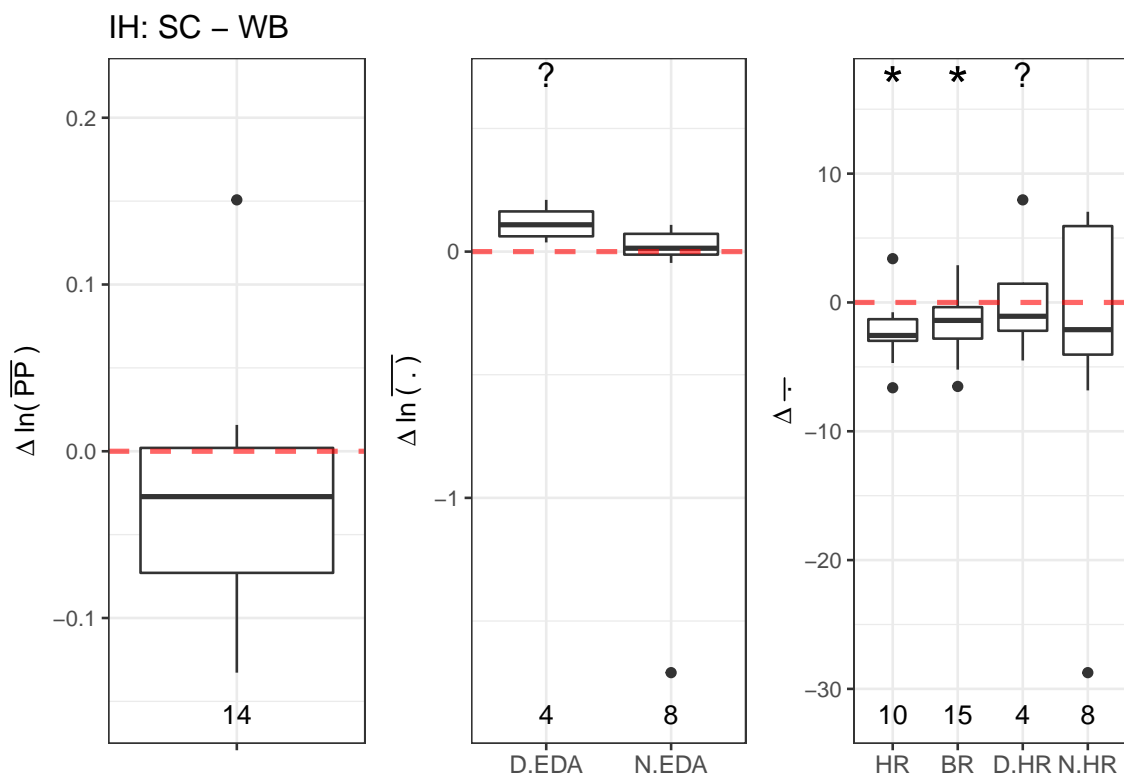
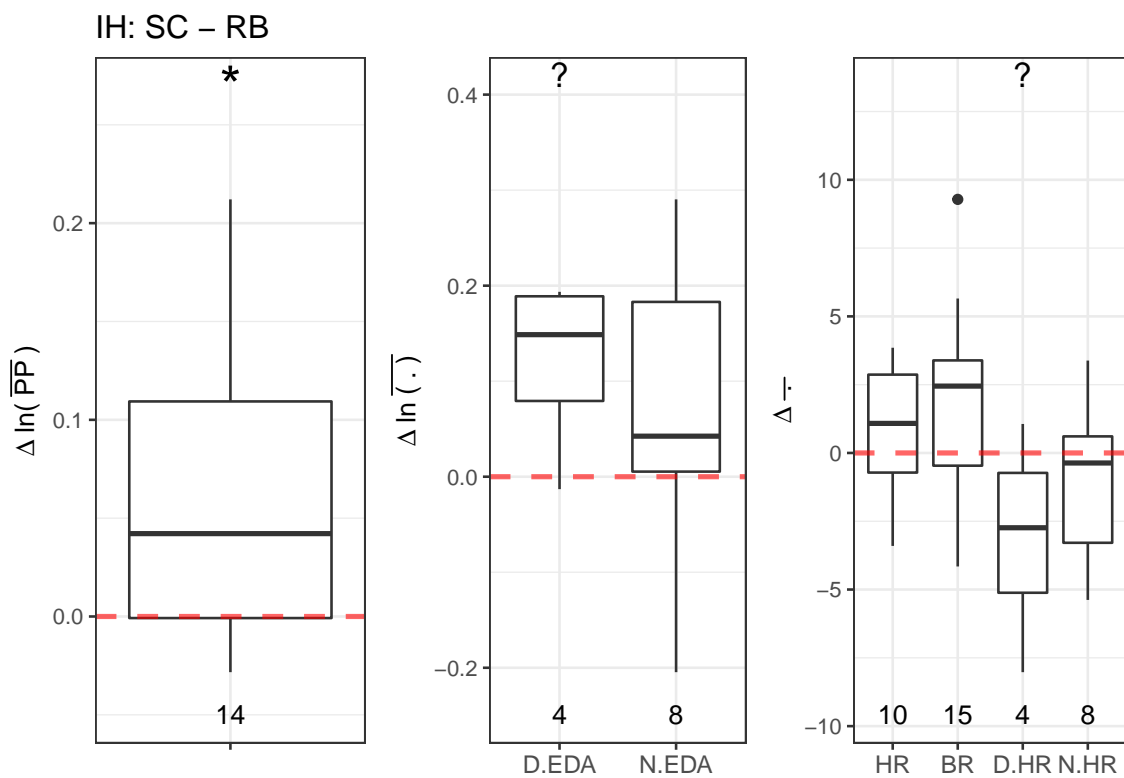
******* = $p \leq 0.001$

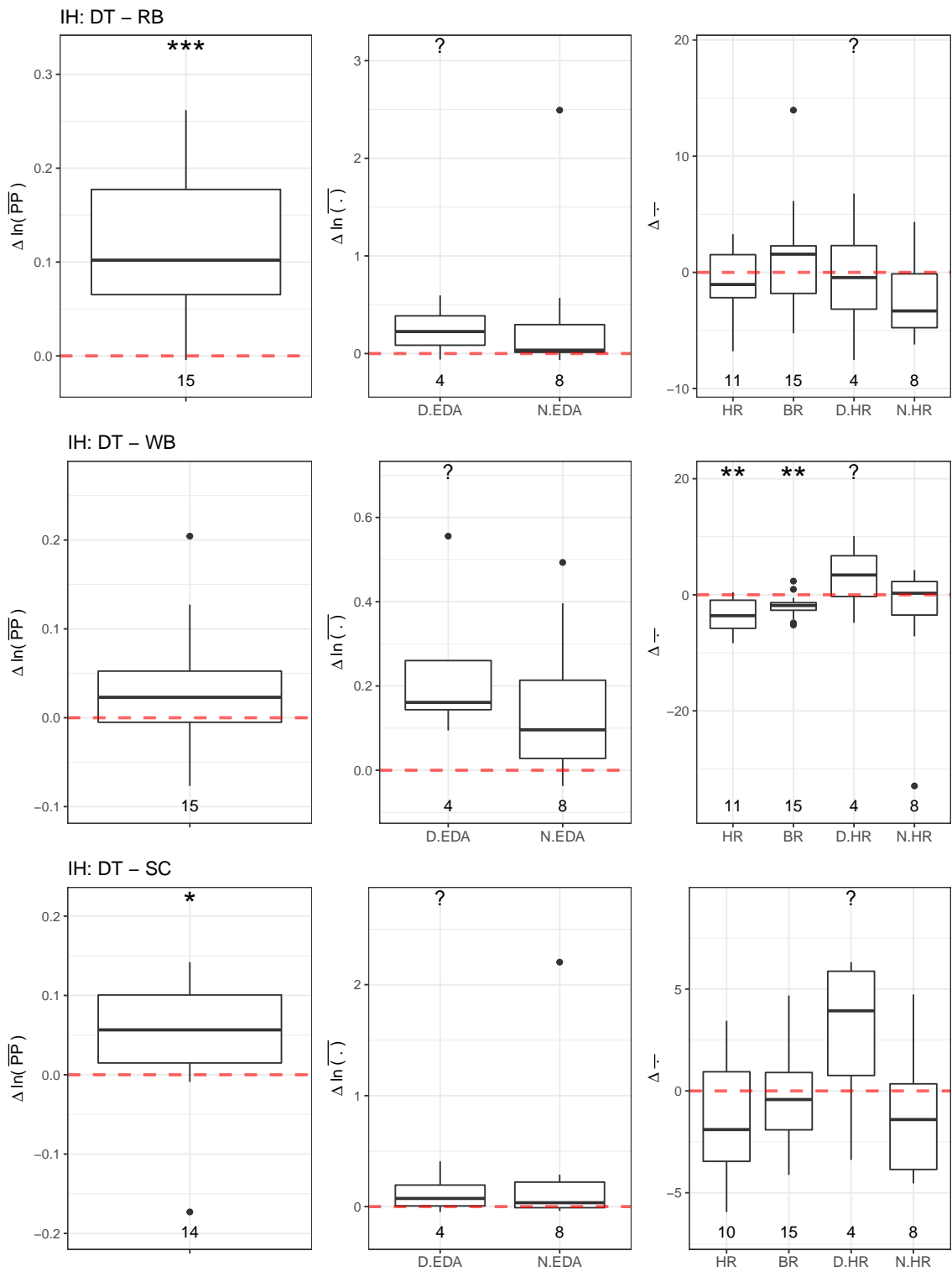
? = Did not run statistical test ($n < 7$)

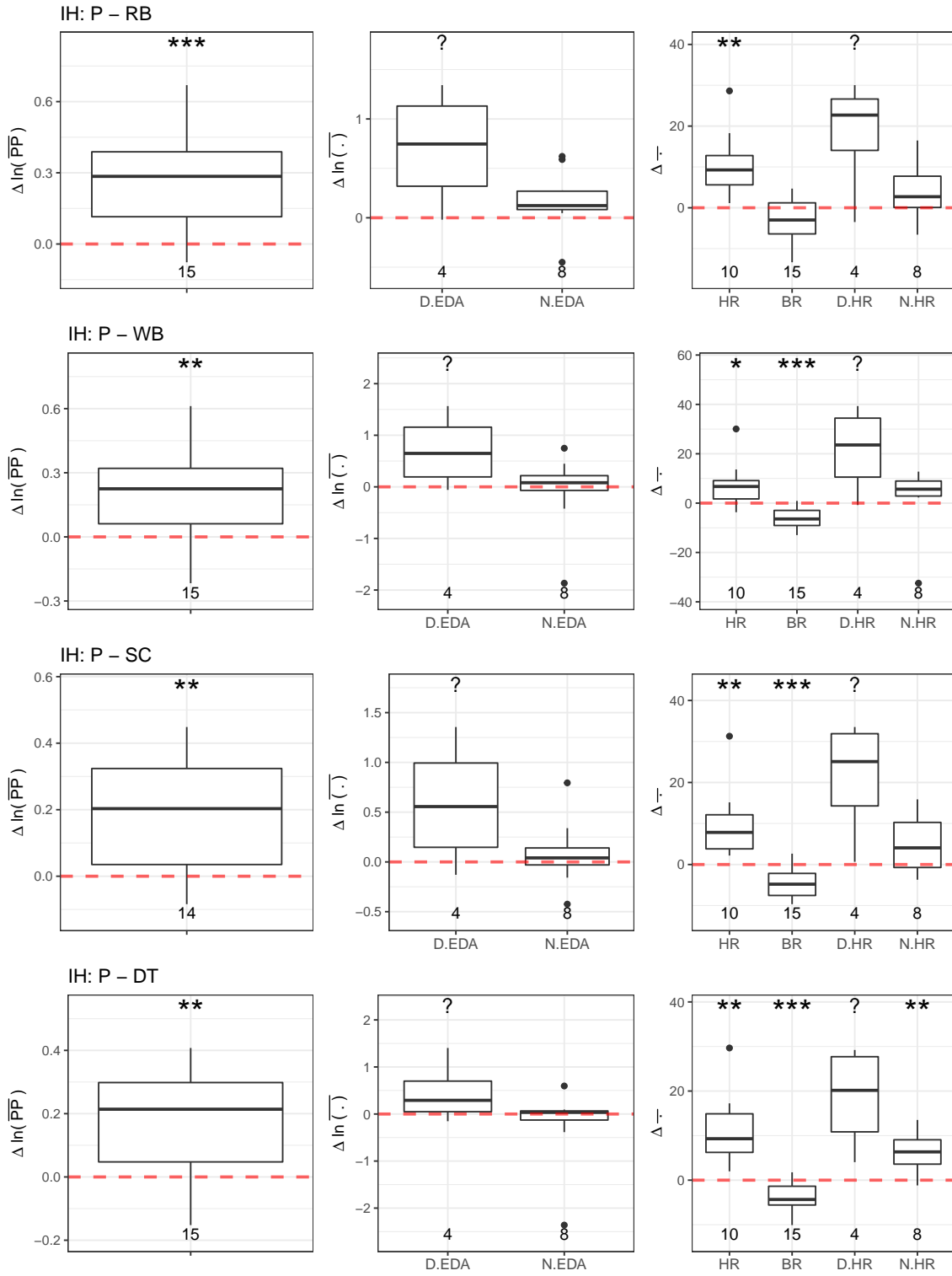
Intermittent-High (IH)

Sensor Channels per Activity

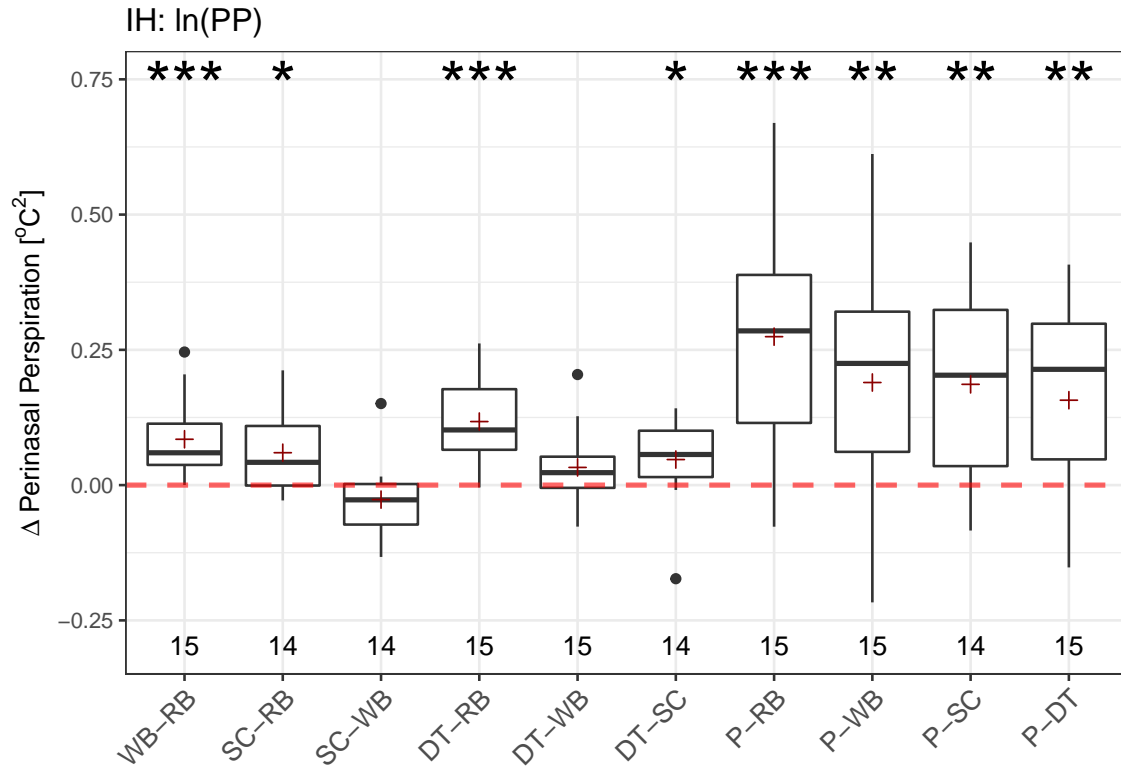






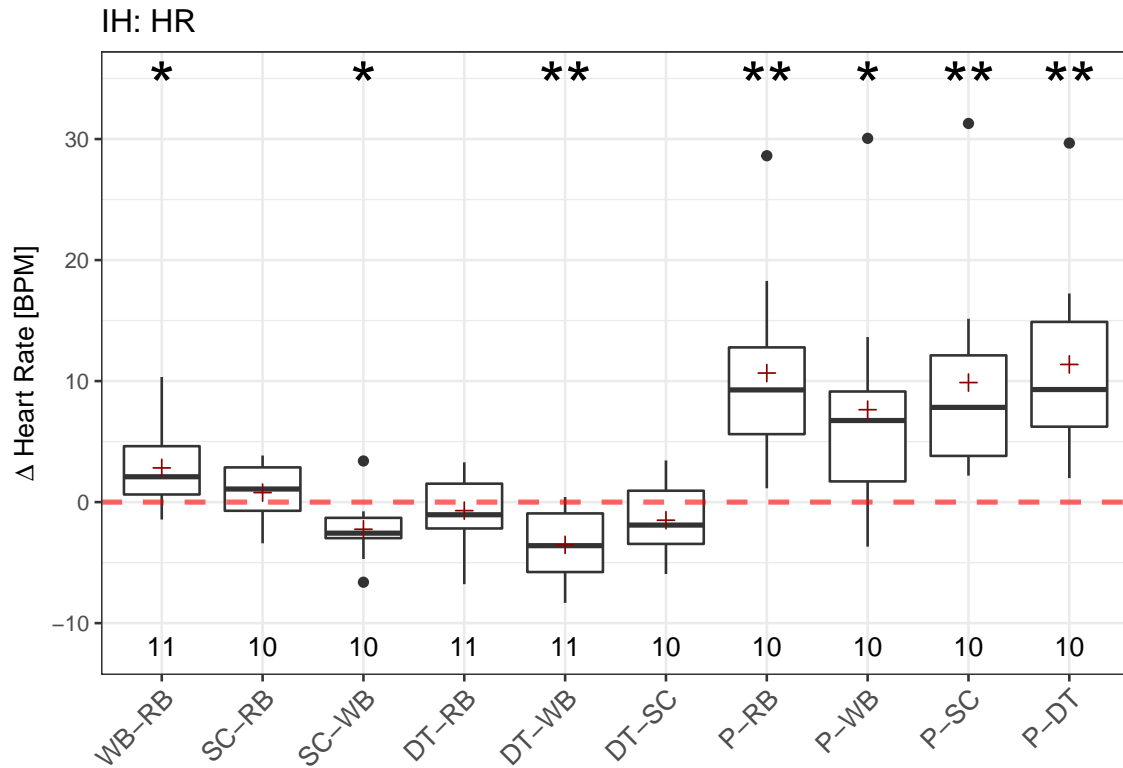


Sensor Channel across Activities



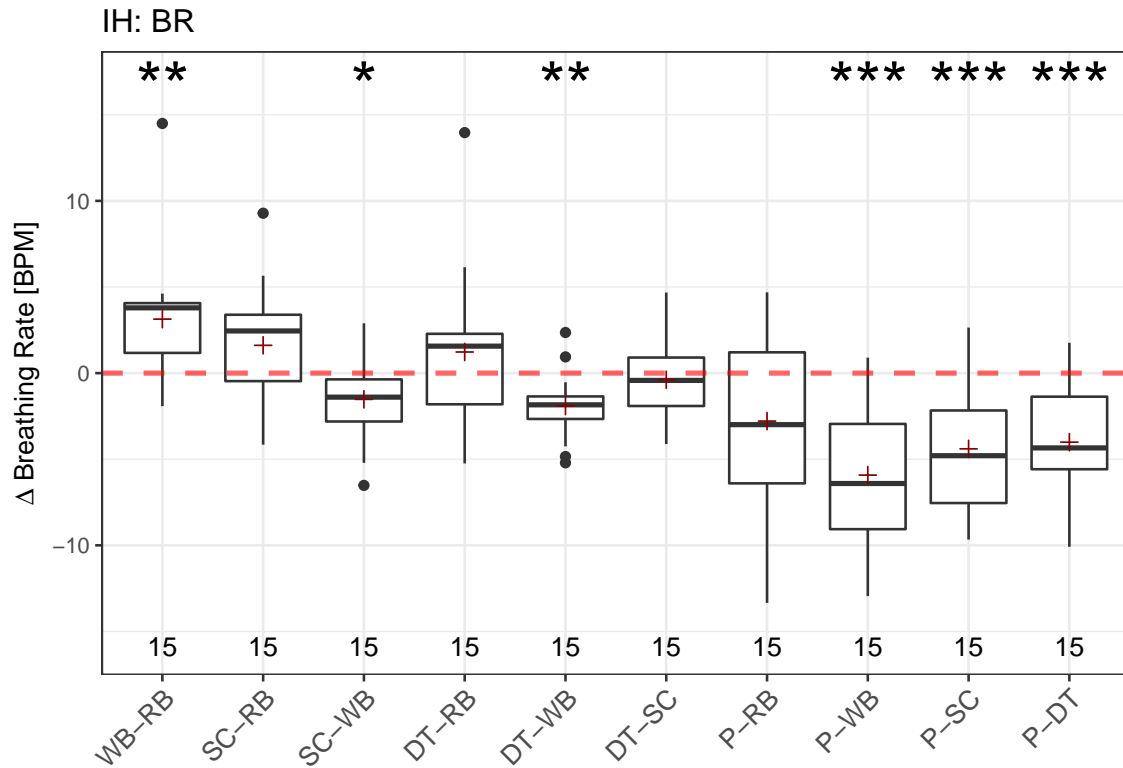
```
## In the following tests, we applied ln(PP).
##
## Writing Baseline - Resting Baseline
## Transformed t-test p = 5e-04 < 0.001 ***
##
## Stress Condition - Resting Baseline
## Transformed t-test p = 0.0123 < 0.05 *
##
## StressCondition - Writing Baseline
## Transformed t-test p = 0.1695 > 0.05
##
## Dual Task - Resting Baseline
## Transformed t-test p = 0 < 0.001 ***
##
## Dual Task - Writing Baseline
## Transformed t-test p = 0.1077 > 0.05
##
## Dual Task - Stress Condition
## Transformed t-test p = 0.0438 < 0.05 *
##
## Presentation - Resting Baseline
## Transformed t-test p = 2e-04 < 0.001 ***
##
```

```
## Presentation - Writing Baseline
## Transformed t-test  $p = 0.0036 < 0.01$  **
##
## Presentation - Stress Condition
## Transformed t-test  $p = 0.0016 < 0.01$  **
##
## Presentation - Dual Task
## Transformed t-test  $p = 0.0049 < 0.01$  **
```

```
## Writing Baseline - Resting Baseline
## t-test p = 0.0188 < 0.05  *
##
## Stress Condition - Resting Baseline
## t-test p = 0.3553 > 0.05
##
## StressCondition - Writing Baseline
## t-test p = 0.0243 < 0.05  *
##
## Dual Task - Resting Baseline
## t-test p = 0.4335 > 0.05
##
## Dual Task - Writing Baseline
## t-test p = 0.0036 < 0.01  **
##
## Dual Task - Stress Condition
## t-test p = 0.1614 > 0.05
##
## Presentation - Resting Baseline
## t-test p = 0.0024 < 0.01  **
##
## Presentation - Writing Baseline
## t-test p = 0.0289 < 0.05  *
##
## Presentation - Stress Condition
```

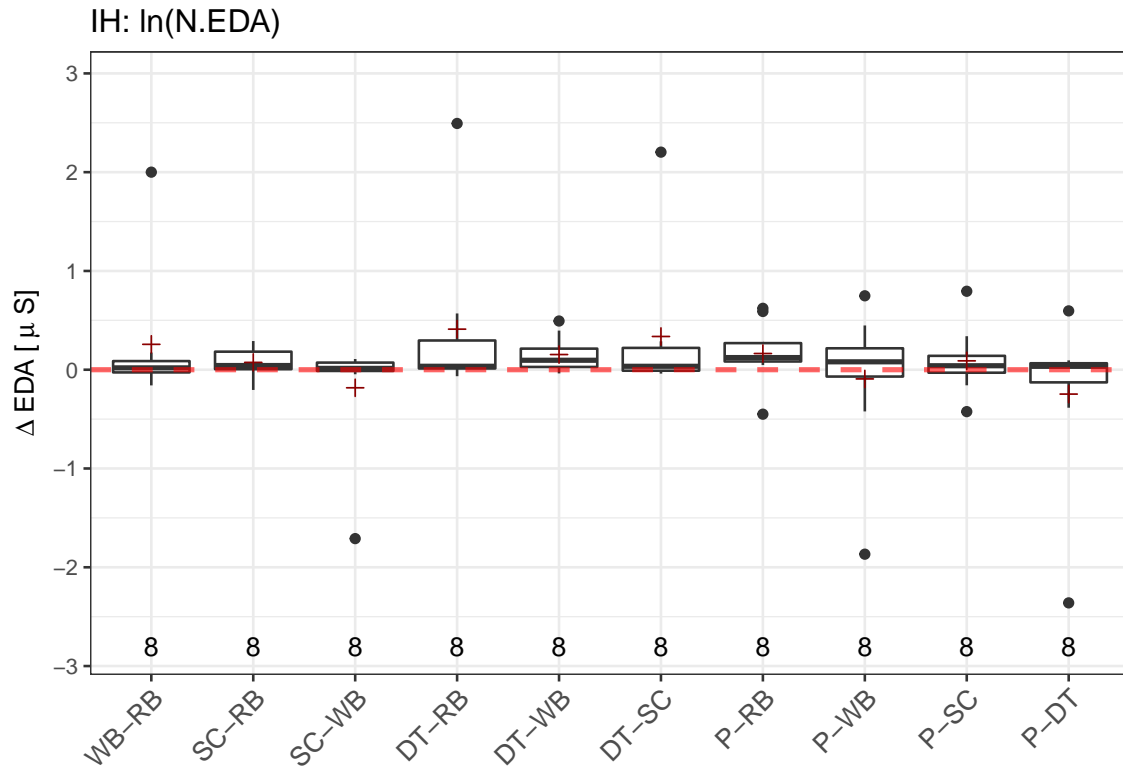
```
## t-test p = 0.0063 < 0.01 **  
##  
## Presentation - Dual Task  
## t-test p = 0.0015 < 0.01 **
```



```
## Writing Baseline - Resting Baseline
## t-test p = 0.0075 < 0.01 **
##
## Stress Condition - Resting Baseline
## t-test p = 0.1189 > 0.05
##
## StressCondition - Writing Baseline
## t-test p = 0.0318 < 0.05 *
##
## Dual Task - Resting Baseline
## t-test p = 0.3323 > 0.05
##
## Dual Task - Writing Baseline
## t-test p = 0.0023 < 0.01 **
##
## Dual Task - Stress Condition
## t-test p = 0.5106 > 0.05
##
## Presentation - Resting Baseline
## t-test p = 0.0545 > 0.05
##
## Presentation - Writing Baseline
## t-test p = 1e-04 < 0.001 ***
##
## Presentation - Stress Condition
```

```
## t-test p = 4e-04 < 0.001 ***  
##  
## Presentation - Dual Task  
## t-test p = 5e-04 < 0.001 ***
```

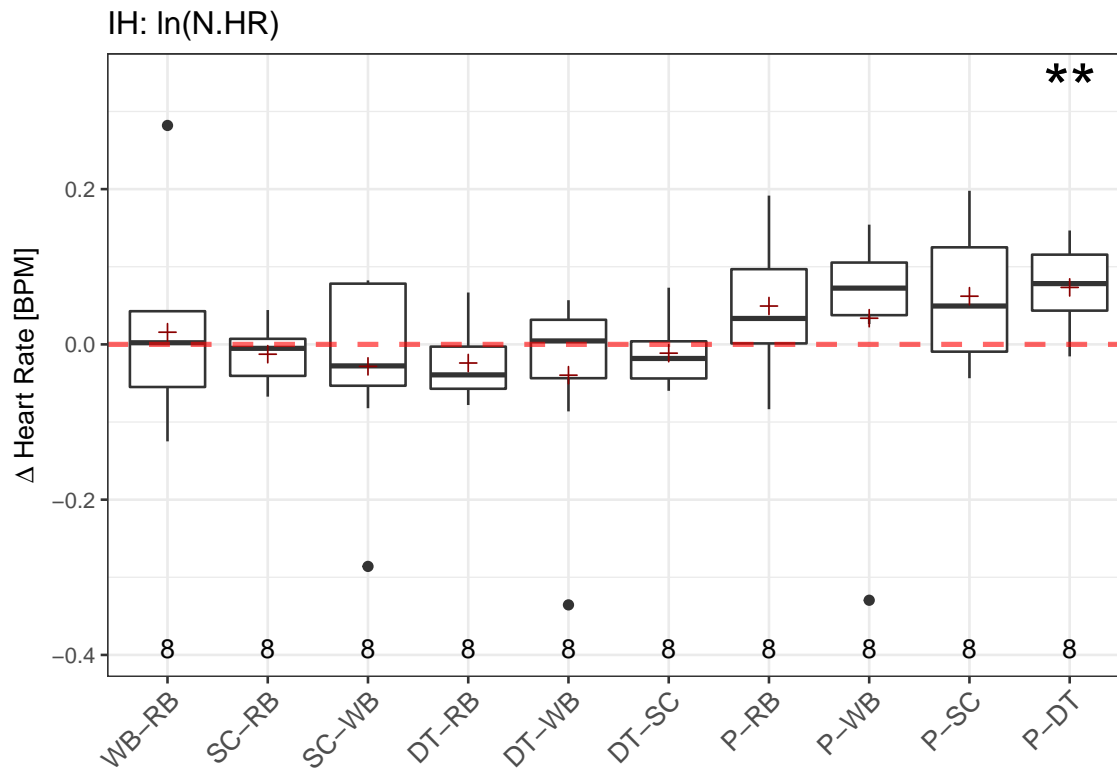
```
## IH has LESS than 7 subjects for D.EDA. Cannot continue with test.  
## -----
```



```
## In the following tests, we applied ln(N.EDA).
##
## Writing Baseline - Resting Baseline
## Transformed t-test p = 0.3403 > 0.05
##
## Stress Condition - Resting Baseline
## Transformed t-test p = 0.243 > 0.05
##
## StressCondition - Writing Baseline
## Transformed t-test p = 0.4308 > 0.05
##
## Dual Task - Resting Baseline
## Transformed t-test p = 0.2214 > 0.05
##
## Dual Task - Writing Baseline
## Transformed t-test p = 0.0592 > 0.05
##
## Dual Task - Stress Condition
## Transformed t-test p = 0.2522 > 0.05
##
## Presentation - Resting Baseline
## Transformed t-test p = 0.2098 > 0.05
##
## Presentation - Writing Baseline
## Transformed t-test p = 0.7495 > 0.05
```

```
##
## Presentation - Stress Condition
## Transformed t-test p = 0.5001 > 0.05
##
## Presentation - Dual Task
## Transformed t-test p = 0.4611 > 0.05
```

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

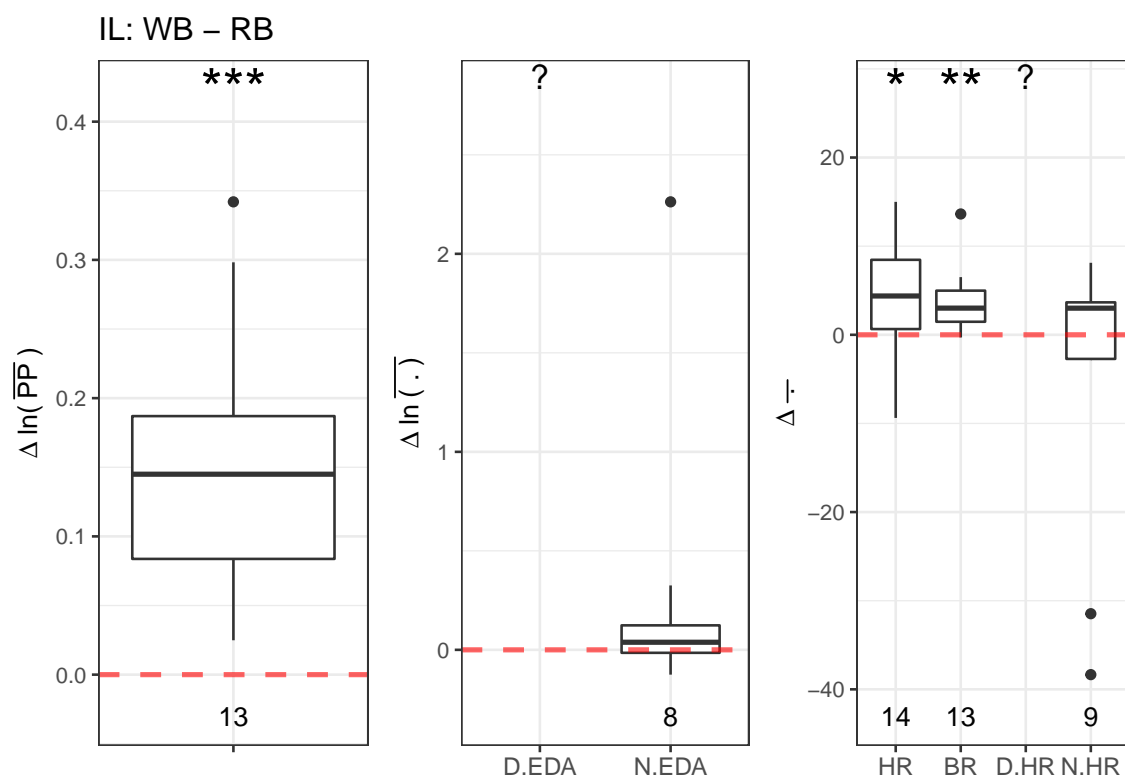


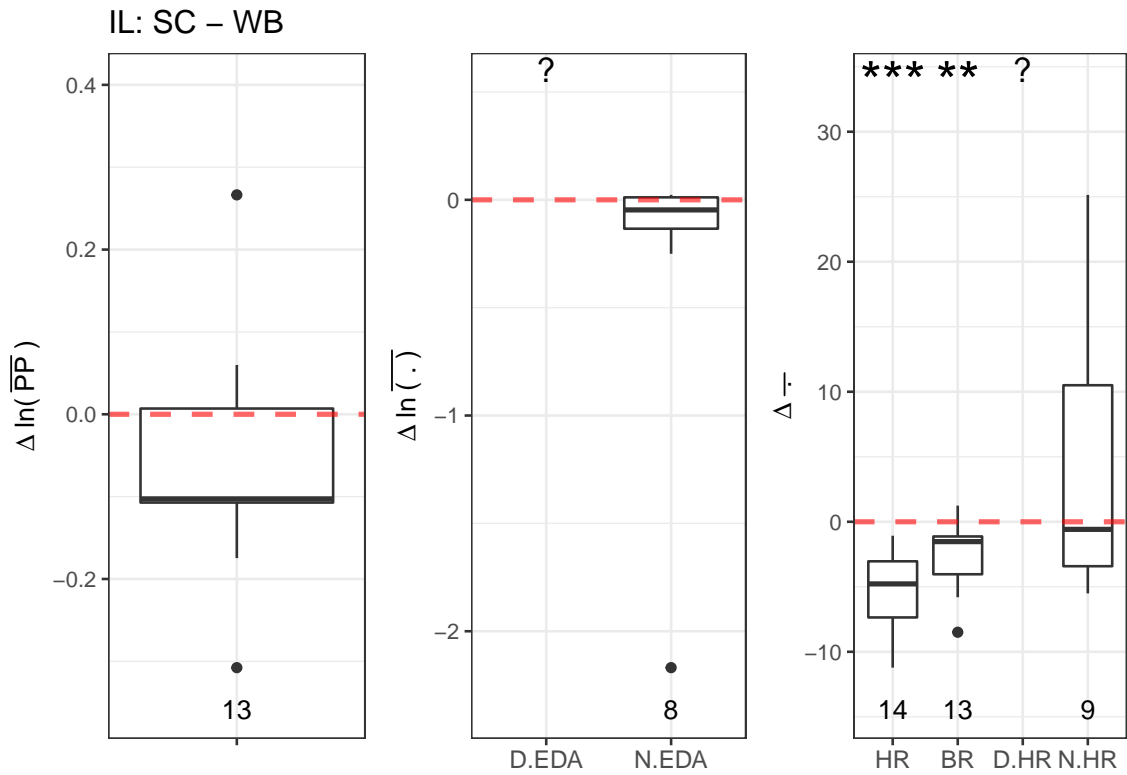
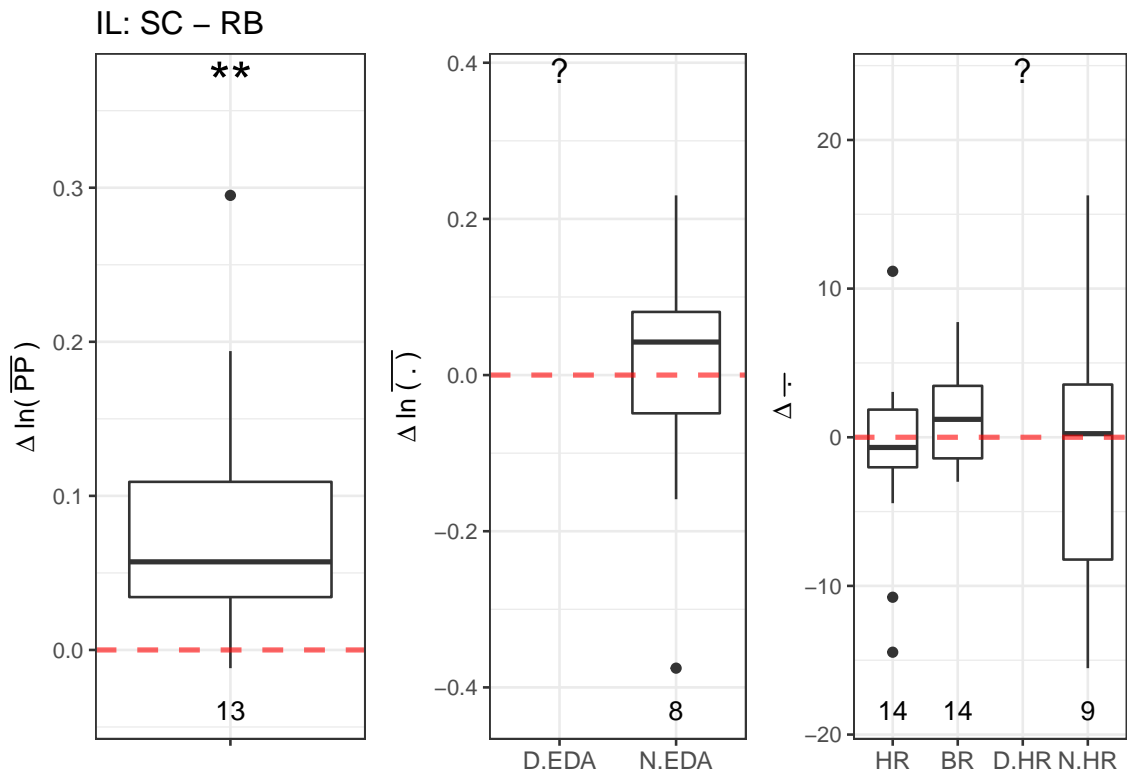
```
## Writing Baseline - Resting Baseline
## Transformed t-test p = 0.7304 > 0.05
##
## Stress Condition - Resting Baseline
## Transformed t-test p = 0.3455 > 0.05
##
## StressCondition - Writing Baseline
## Transformed t-test p = 0.5336 > 0.05
##
## Dual Task - Resting Baseline
## Transformed t-test p = 0.2237 > 0.05
##
## Dual Task - Writing Baseline
## Transformed t-test p = 0.409 > 0.05
##
## Dual Task - Stress Condition
## Transformed t-test p = 0.492 > 0.05
##
## Presentation - Resting Baseline
## Transformed t-test p = 0.1963 > 0.05
##
## Presentation - Writing Baseline
## Transformed t-test p = 0.5533 > 0.05
##
## Presentation - Stress Condition
```

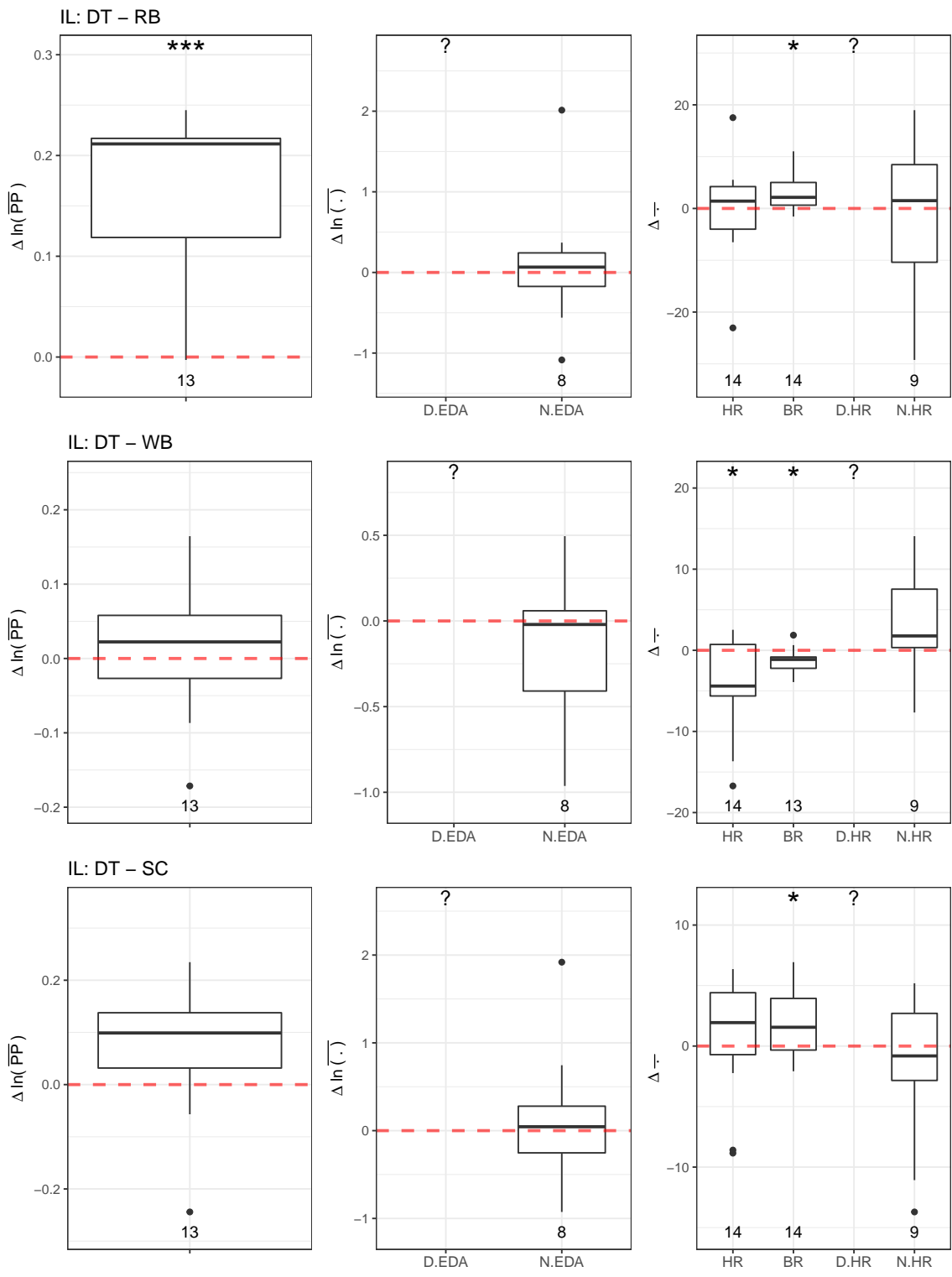
```
## Transformed t-test p = 0.1035 > 0.05
##
## Presentation - Dual Task
## Transformed t-test p = 0.0084 < 0.01  **
```

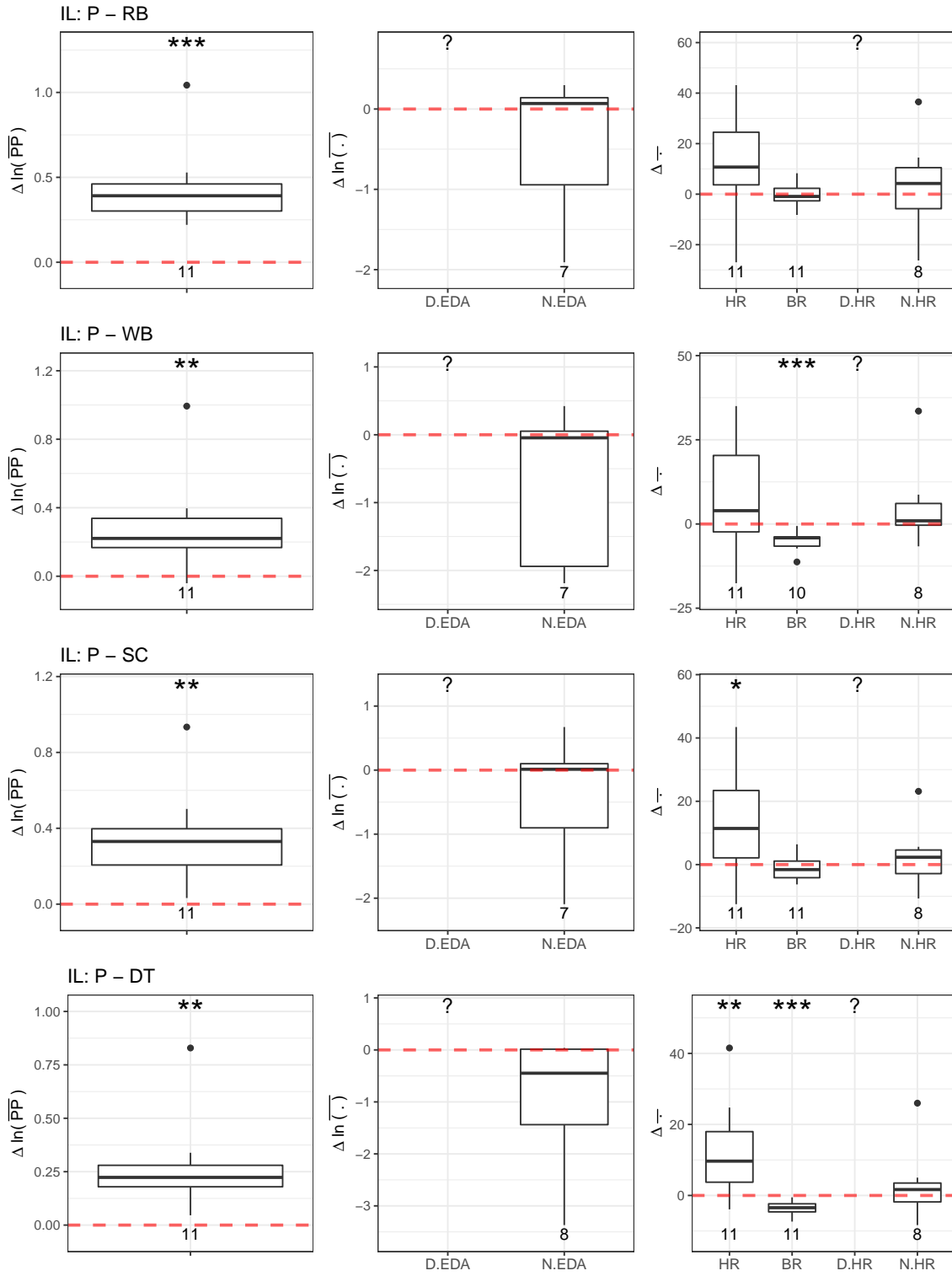

Intermittent-Low (IL)

Sensor Channels per Activity

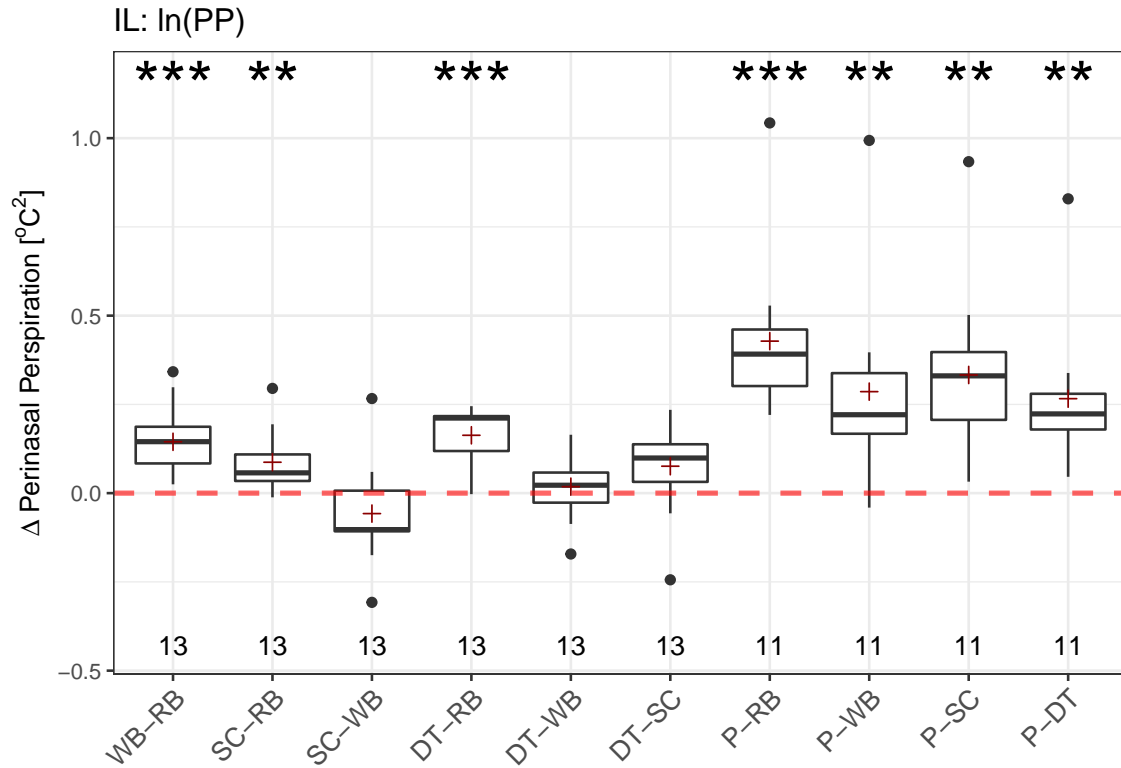






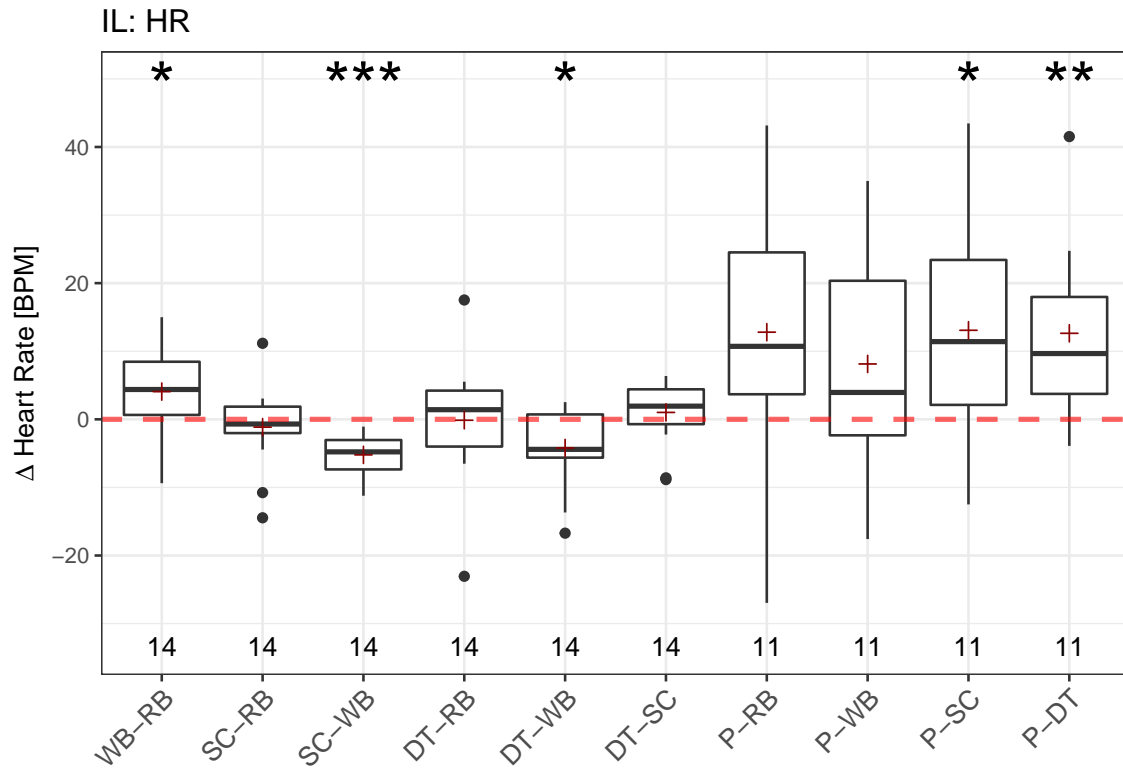


Sensor Channel across Activities



```
## Writing Baseline - Resting Baseline
## Transformed t-test p = 2e-04 < 0.001 ***
##
## Stress Condition - Resting Baseline
## Transformed t-test p = 0.0048 < 0.01 **
##
## StressCondition - Writing Baseline
## Transformed t-test p = 0.1501 > 0.05
##
## Dual Task - Resting Baseline
## Transformed t-test p = 0 < 0.001 ***
##
## Dual Task - Writing Baseline
## Transformed t-test p = 0.4898 > 0.05
##
## Dual Task - Stress Condition
## Transformed t-test p = 0.0502 > 0.05
##
## Presentation - Resting Baseline
## Transformed t-test p = 1e-04 < 0.001 ***
##
## Presentation - Writing Baseline
## Transformed t-test p = 0.0054 < 0.01 **
```

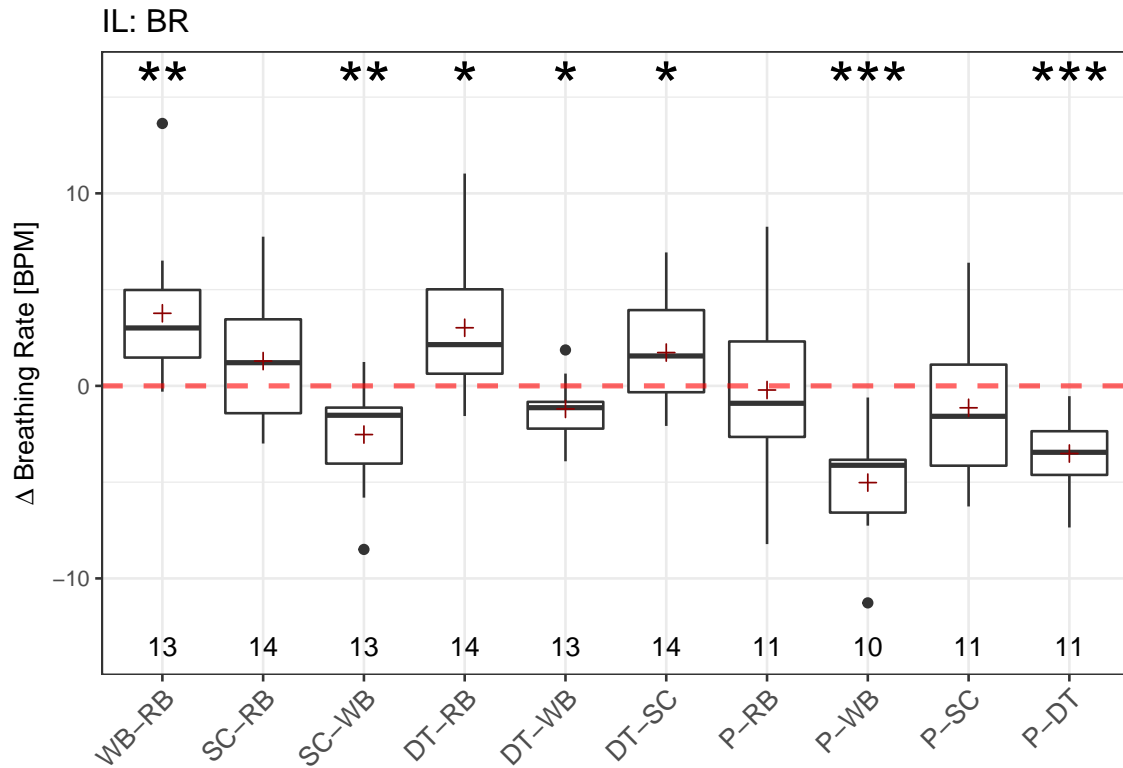
```
##  
## Presentation - Stress Condition  
## Transformed t-test  $p = 0.0012 < 0.01$  **  
##  
## Presentation - Dual Task  
## Transformed t-test  $p = 0.0016 < 0.01$  **
```



```
## Writing Baseline - Resting Baseline
## t-test p = 0.0318 < 0.05  *
##
## Stress Condition - Resting Baseline
## t-test p = 0.4931 > 0.05
##
## StressCondition - Writing Baseline
## t-test p = 0 < 0.001  ***
##
## Dual Task - Resting Baseline
## t-test p = 0.9564 > 0.05
##
## Dual Task - Writing Baseline
## t-test p = 0.0154 < 0.05  *
##
## Dual Task - Stress Condition
## t-test p = 0.4432 > 0.05
##
## Presentation - Resting Baseline
## t-test p = 0.0552 > 0.05
##
## Presentation - Writing Baseline
## t-test p = 0.1202 > 0.05
##
## Presentation - Stress Condition
```



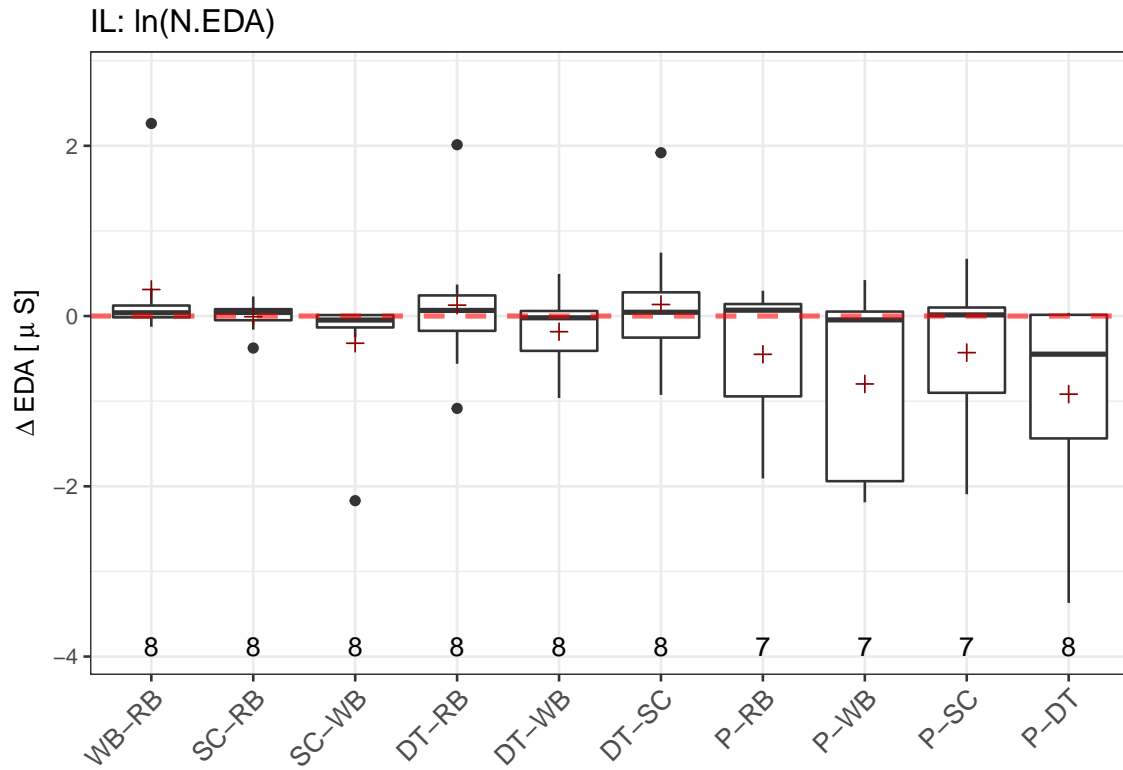
```
## t-test p = 0.0209 < 0.05  *  
##  
## Presentation - Dual Task  
## t-test p = 0.0094 < 0.01  **
```



```
## Writing Baseline - Resting Baseline
## t-test p = 0.0029 < 0.01 **
##
## Stress Condition - Resting Baseline
## t-test p = 0.1716 > 0.05
##
## StressCondition - Writing Baseline
## t-test p = 0.0057 < 0.01 **
##
## Dual Task - Resting Baseline
## t-test p = 0.011 < 0.05 *
##
## Dual Task - Writing Baseline
## t-test p = 0.0141 < 0.05 *
##
## Dual Task - Stress Condition
## t-test p = 0.0397 < 0.05 *
##
## Presentation - Resting Baseline
## t-test p = 0.8862 > 0.05
##
## Presentation - Writing Baseline
## t-test p = 4e-04 < 0.001 ***
##
## Presentation - Stress Condition
```

```
## t-test p = 0.3486 > 0.05
##
## Presentation - Dual Task
## t-test p = 2e-04 < 0.001 ***
```

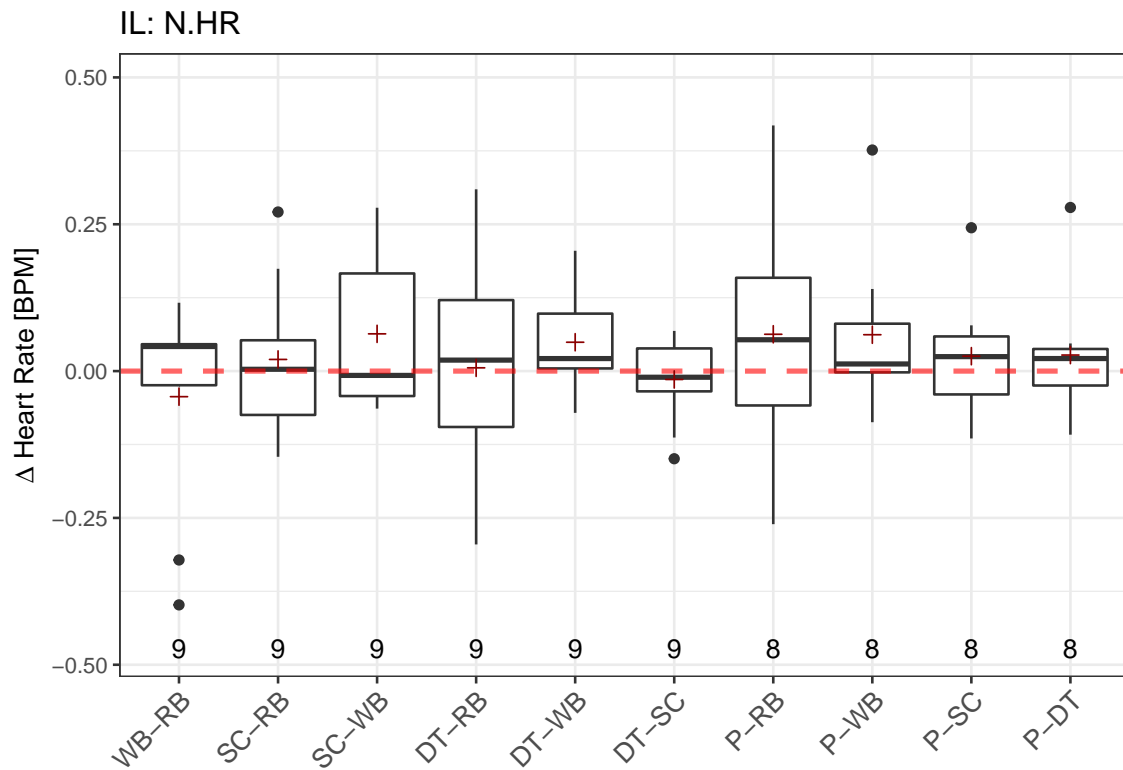
```
## IL has LESS than 7 subjects for D.EDA. Cannot continue with test.
## -----
```



```
## Writing Baseline - Resting Baseline
## Transformed t-test p = 0.3071 > 0.05
##
## Stress Condition - Resting Baseline
## Transformed t-test p = 0.9091 > 0.05
##
## StressCondition - Writing Baseline
## Transformed t-test p = 0.2689 > 0.05
##
## Dual Task - Resting Baseline
## Transformed t-test p = 0.6976 > 0.05
##
## Dual Task - Writing Baseline
## Transformed t-test p = 0.3365 > 0.05
##
## Dual Task - Stress Condition
## Transformed t-test p = 0.6807 > 0.05
##
## Presentation - Resting Baseline
## Transformed t-test p = 0.273 > 0.05
##
## Presentation - Writing Baseline
## Transformed t-test p = 0.119 > 0.05
##
## Presentation - Stress Condition
```

```
## Transformed t-test p = 0.3207 > 0.05
##
## Presentation - Dual Task
## Transformed t-test p = 0.0707 > 0.05
```

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

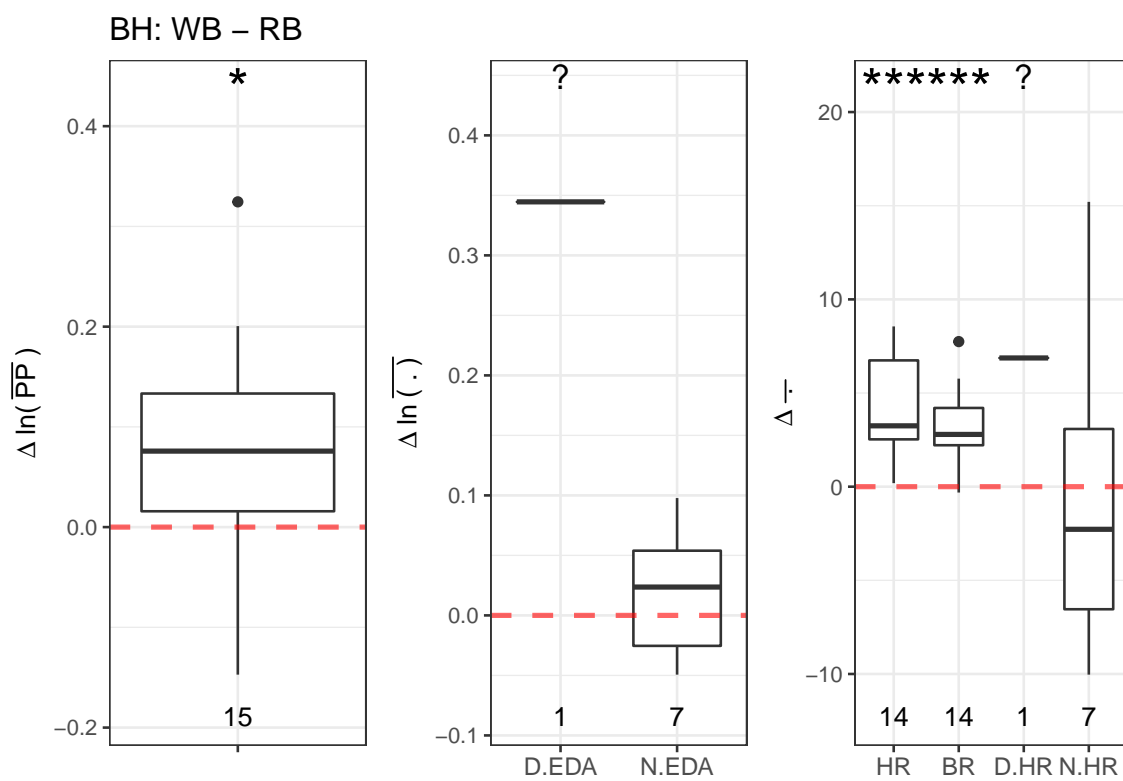


```
## Writing Baseline - Resting Baseline
## Wilcoxon p = 0.8203 > 0.05
##
## Stress Condition - Resting Baseline
## Wilcoxon p = 0.8203 > 0.05
##
## StressCondition - Writing Baseline
## Wilcoxon p = 0.4258 > 0.05
##
## Dual Task - Resting Baseline
## Wilcoxon p = 0.7344 > 0.05
##
## Dual Task - Writing Baseline
## Wilcoxon p = 0.2031 > 0.05
##
## Dual Task - Stress Condition
## Wilcoxon p = 0.9102 > 0.05
##
## Presentation - Resting Baseline
## Wilcoxon p = 0.4609 > 0.05
##
## Presentation - Writing Baseline
## Wilcoxon p = 0.3125 > 0.05
##
## Presentation - Stress Condition
```

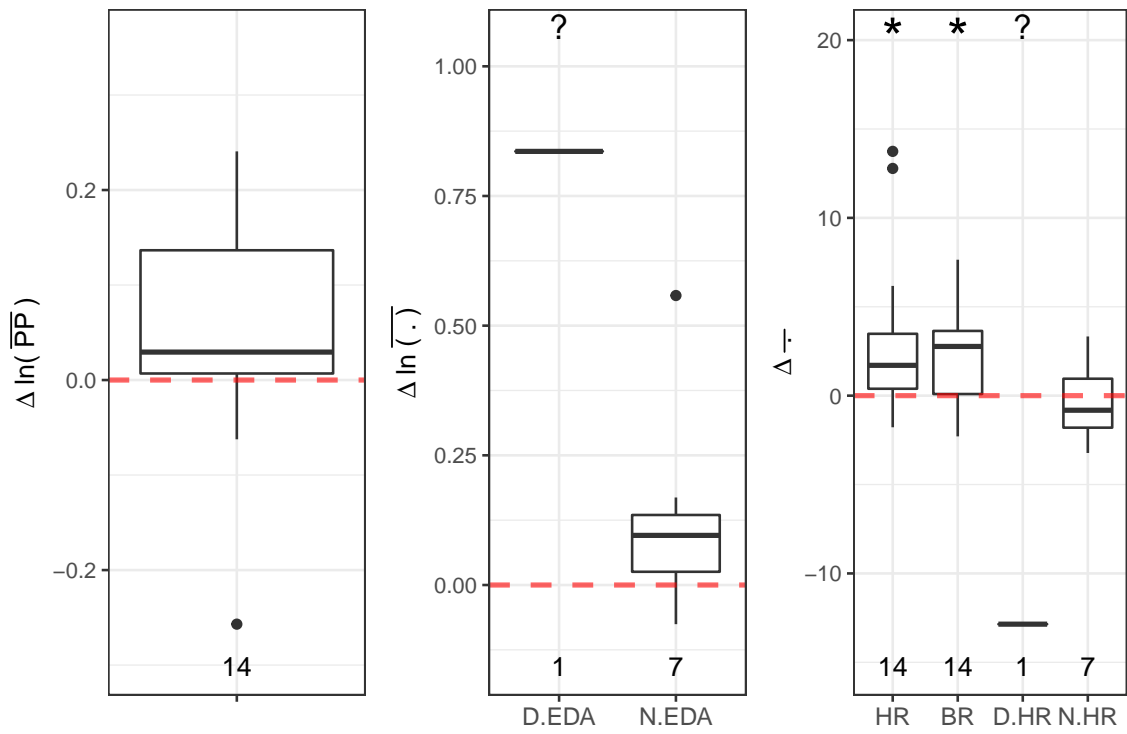
```
## Wilcoxon p = 0.7422 > 0.05
##
## Presentation - Dual Task
## Wilcoxon p = 0.7422 > 0.05
```

Batch-High (BH)

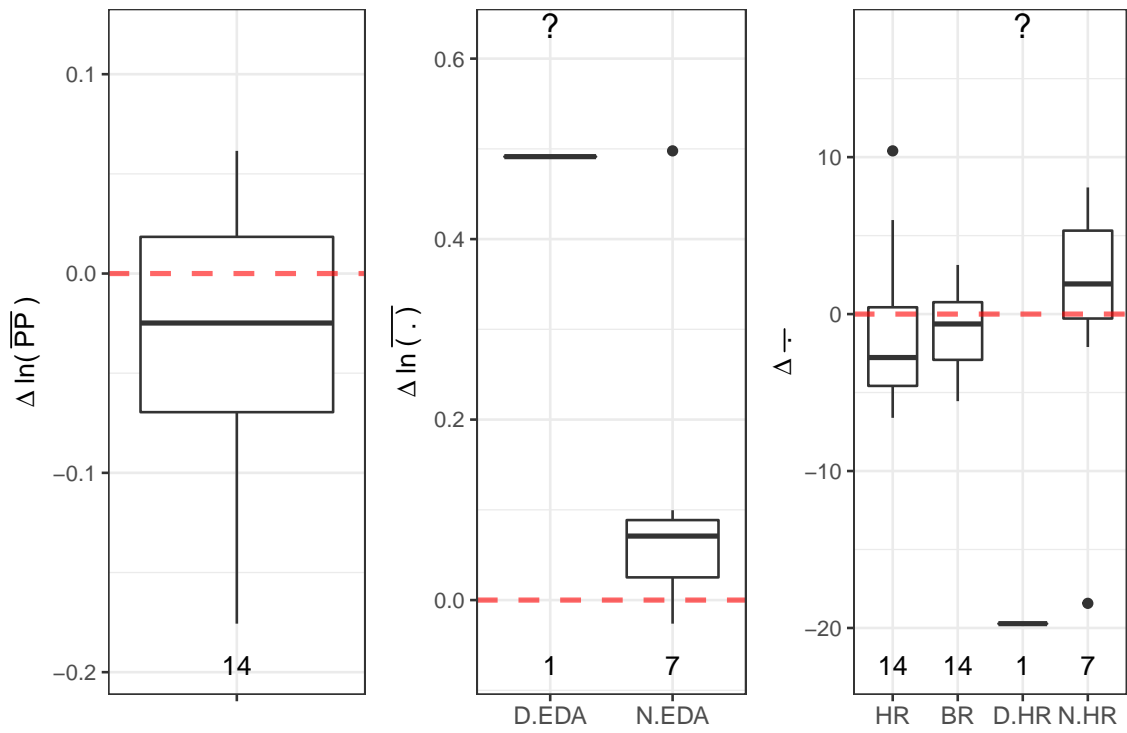
Sensor Channels per Activity

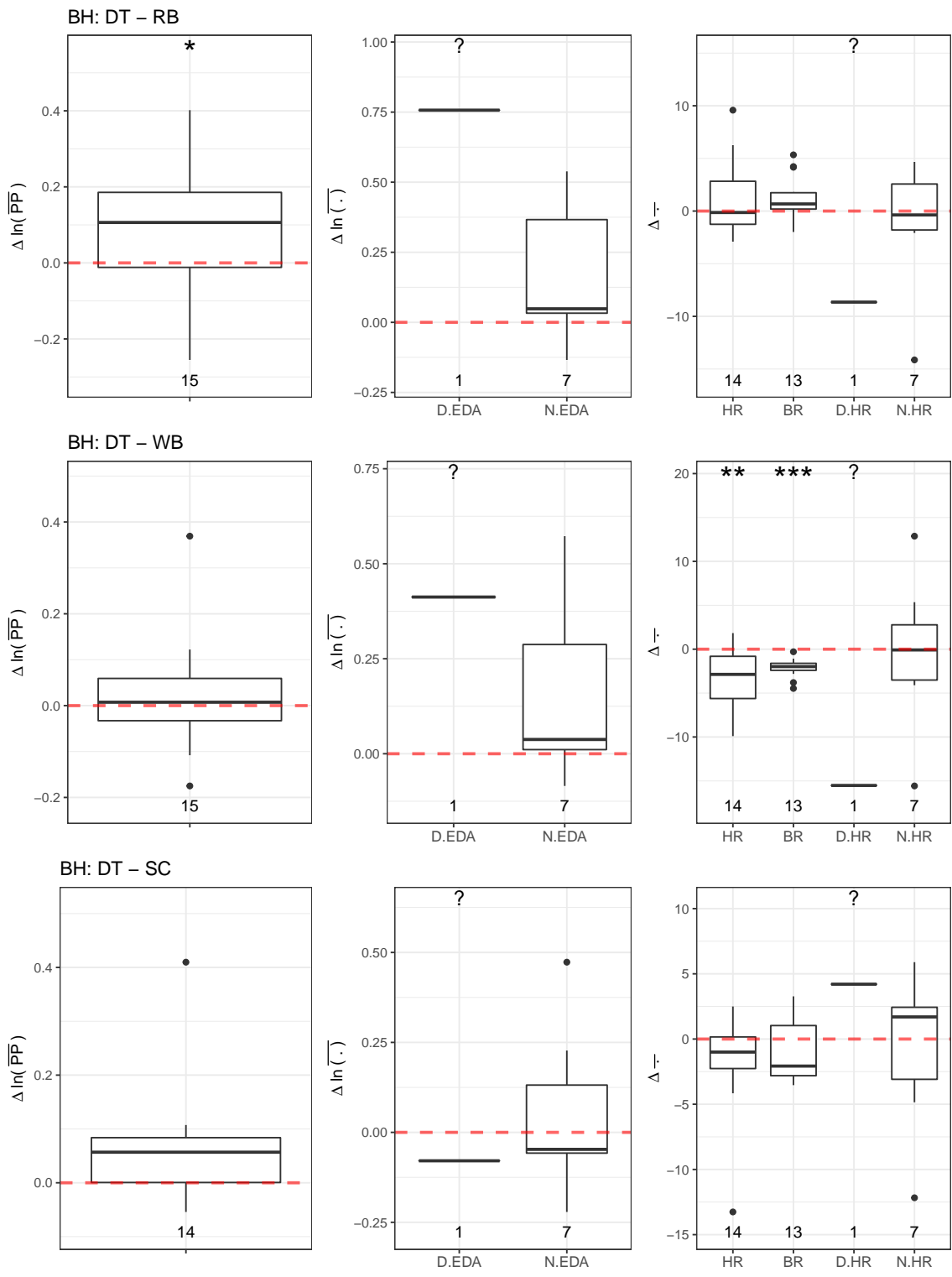


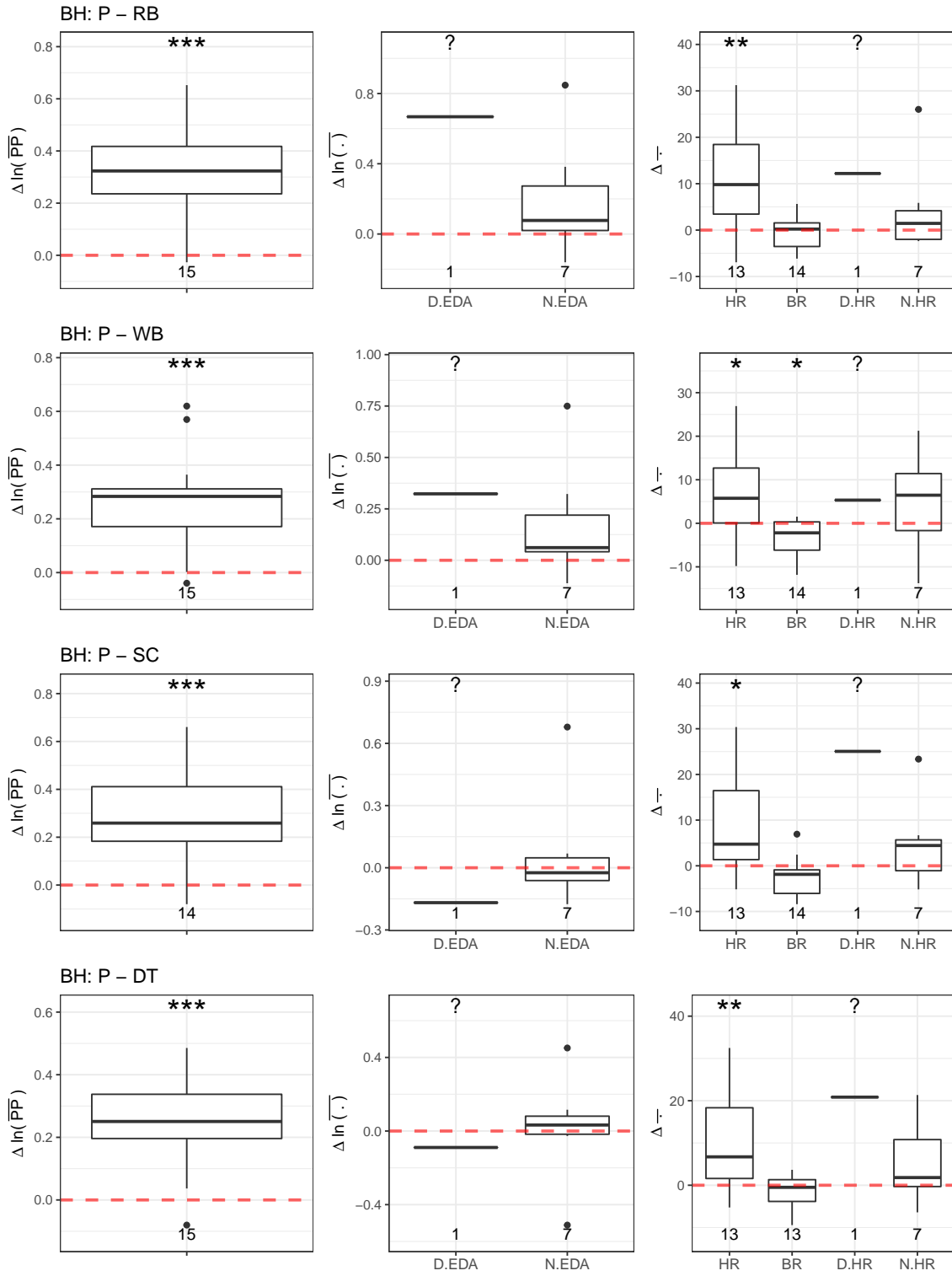
BH: SC – RB



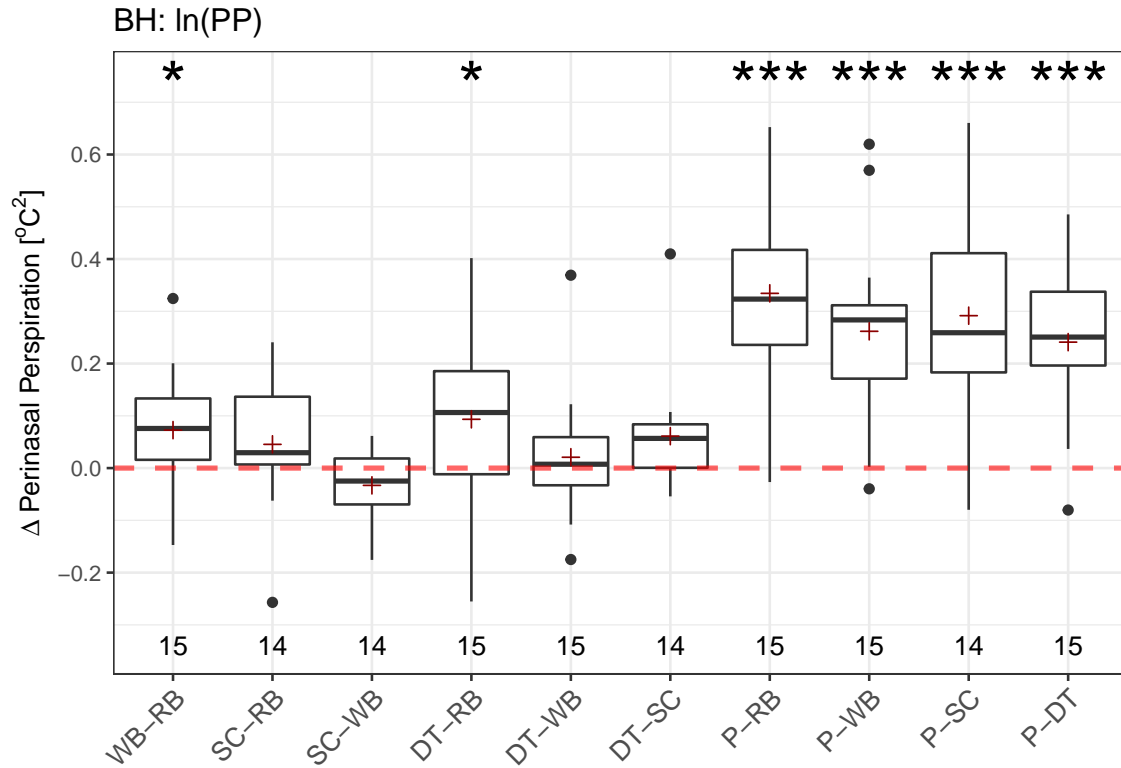
BH: SC – WB





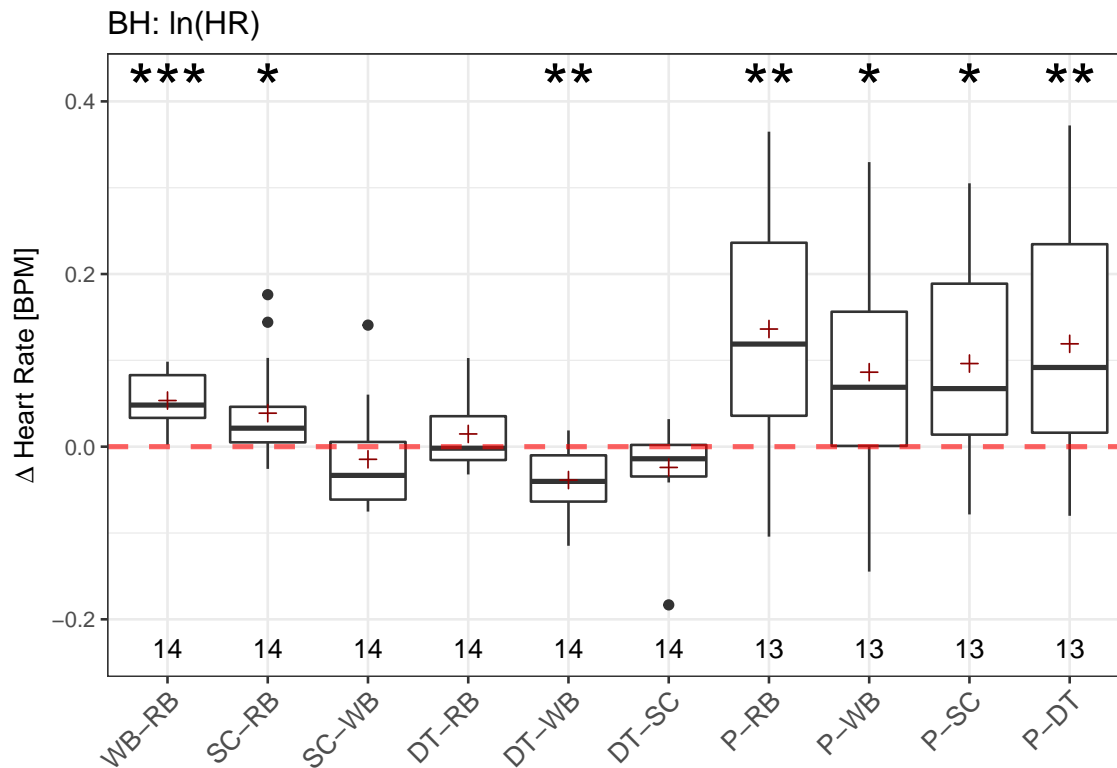


Sensor Channel across Activities



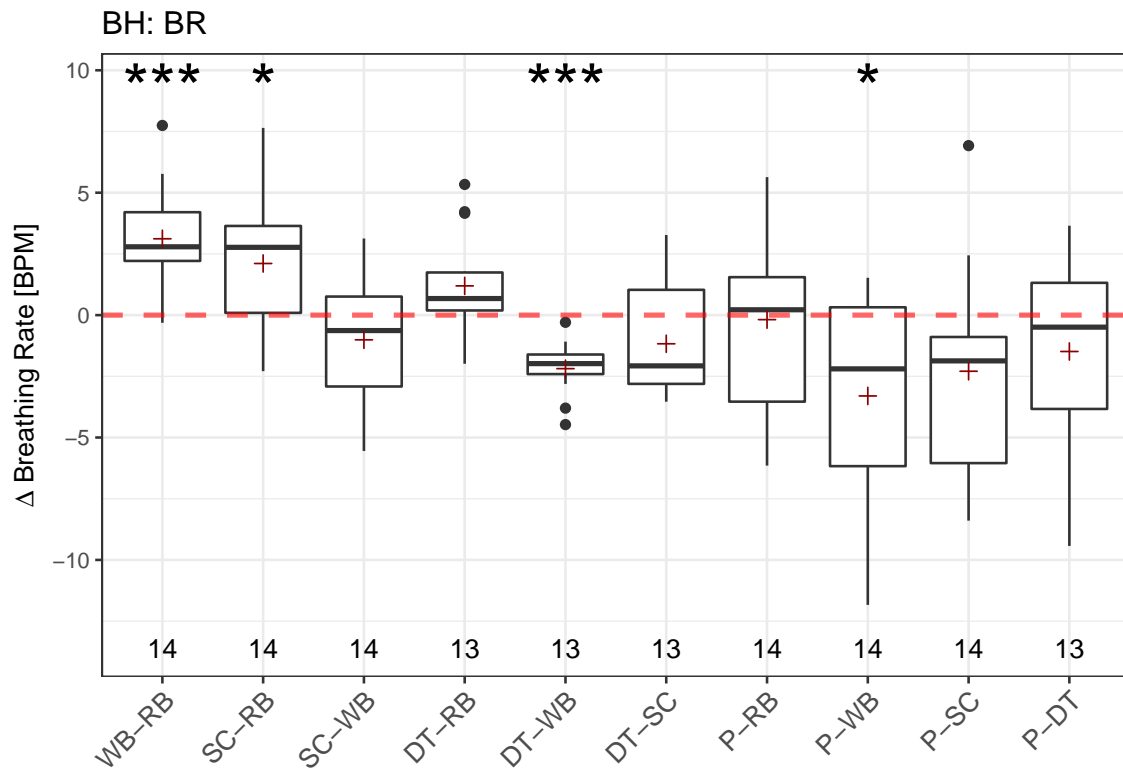
```
## Writing Baseline - Resting Baseline
## Transformed t-test p = 0.0219 < 0.05  *
##
## Stress Condition - Resting Baseline
## Transformed t-test p = 0.1778 > 0.05
##
## StressCondition - Writing Baseline
## Transformed t-test p = 0.0974 > 0.05
##
## Dual Task - Resting Baseline
## Transformed t-test p = 0.0363 < 0.05  *
##
## Dual Task - Writing Baseline
## Transformed t-test p = 0.526 > 0.05
##
## Dual Task - Stress Condition
## Transformed t-test p = 0.063 > 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 = 1e-04 < 0.001 ***  
##  
## Presentation - Dual Task  
## Transformed t-test p = 0 < 0.001 ***
```



```
## Writing Baseline - Resting Baseline
## Transformed t-test p = 0 < 0.001 ***
##
## Stress Condition - Resting Baseline
## Transformed t-test p = 0.0327 < 0.05 *
##
## StressCondition - Writing Baseline
## Transformed t-test p = 0.3941 > 0.05
##
## Dual Task - Resting Baseline
## Transformed t-test p = 0.2172 > 0.05
##
## Dual Task - Writing Baseline
## Transformed t-test p = 0.0025 < 0.01 **
##
## Dual Task - Stress Condition
## Transformed t-test p = 0.0971 > 0.05
##
## Presentation - Resting Baseline
## Transformed t-test p = 0.0048 < 0.01 **
##
## Presentation - Writing Baseline
## Transformed t-test p = 0.0411 < 0.05 *
##
## Presentation - Stress Condition
```

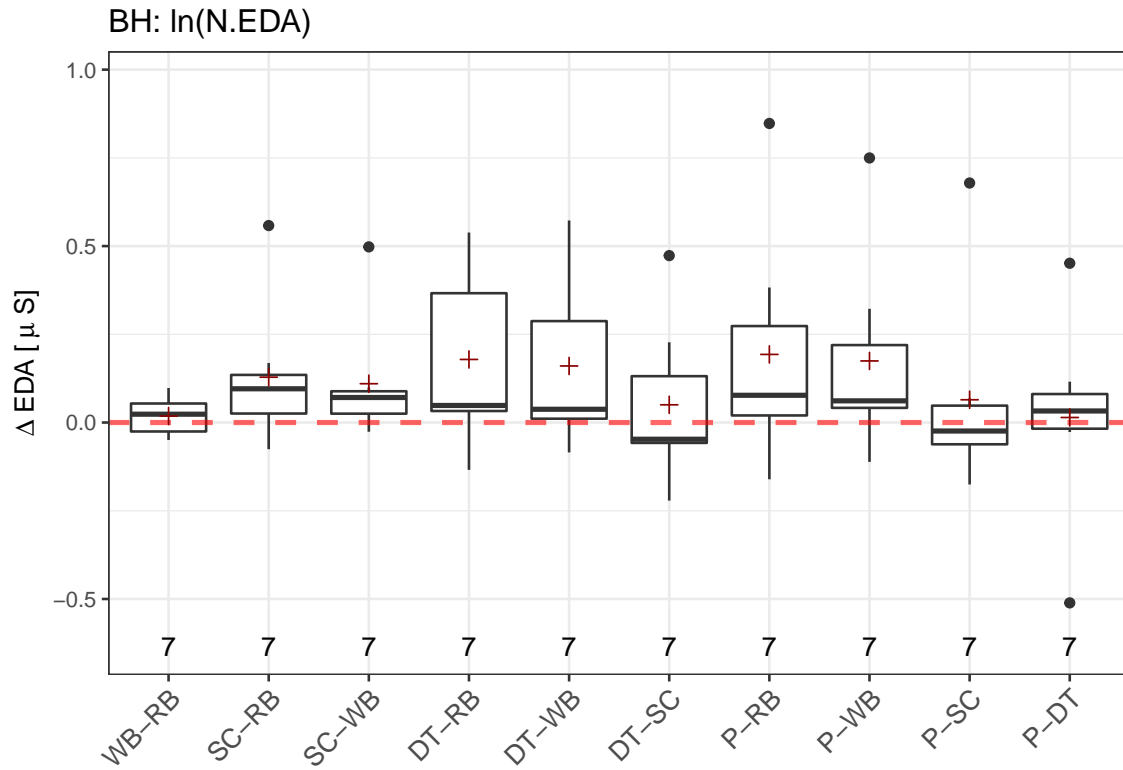
```
## Transformed t-test p = 0.0162 < 0.05  *  
##  
## Presentation - Dual Task  
## Transformed t-test p = 0.0095 < 0.01  **
```

```
## Writing Baseline - Resting Baseline
## t-test p = 1e-04 < 0.001 ***
##
## Stress Condition - Resting Baseline
## t-test p = 0.0167 < 0.05 *
##
## StressCondition - Writing Baseline
## t-test p = 0.1543 > 0.05
##
## Dual Task - Resting Baseline
## t-test p = 0.0745 > 0.05
##
## Dual Task - Writing Baseline
## t-test p = 0 < 0.001 ***
##
## Dual Task - Stress Condition
## t-test p = 0.1009 > 0.05
##
## Presentation - Resting Baseline
## t-test p = 0.847 > 0.05
##
## Presentation - Writing Baseline
## t-test p = 0.014 < 0.05 *
##
## Presentation - Stress Condition
```

```
## t-test p = 0.0649 > 0.05
##
## Presentation - Dual Task
## t-test p = 0.1687 > 0.05
```

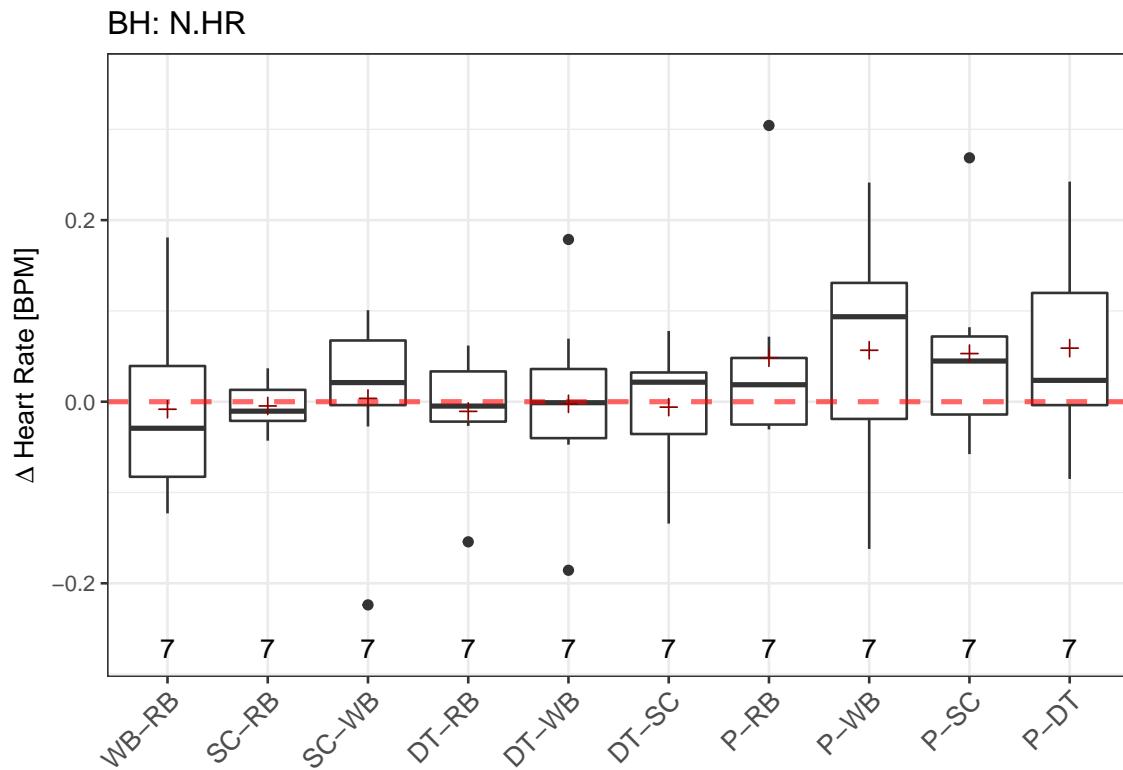
```
## BH has LESS than 7 subjects for D.EDA. Cannot continue with test.
## -----
```



```
## Writing Baseline - Resting Baseline
## Transformed t-test p = 0.401 > 0.05
##
## Stress Condition - Resting Baseline
## Transformed t-test p = 0.1497 > 0.05
##
## StressCondition - Writing Baseline
## Transformed t-test p = 0.1503 > 0.05
##
## Dual Task - Resting Baseline
## Transformed t-test p = 0.1015 > 0.05
##
## Dual Task - Writing Baseline
## Transformed t-test p = 0.1171 > 0.05
##
## Dual Task - Stress Condition
## Transformed t-test p = 0.5837 > 0.05
##
## Presentation - Resting Baseline
## Transformed t-test p = 0.1756 > 0.05
##
## Presentation - Writing Baseline
## Transformed t-test p = 0.1559 > 0.05
##
## Presentation - Stress Condition
```

```
## Transformed t-test p = 0.5671 > 0.05
##
## Presentation - Dual Task
## Transformed t-test p = 0.8984 > 0.05
```

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

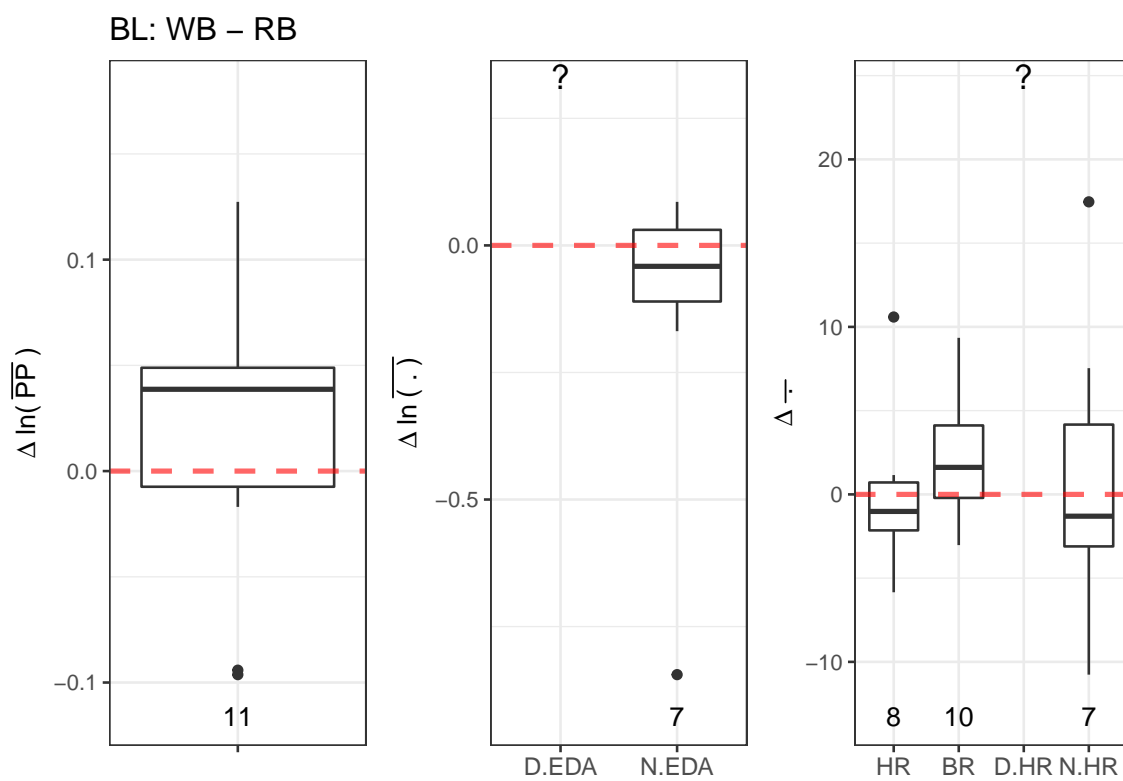


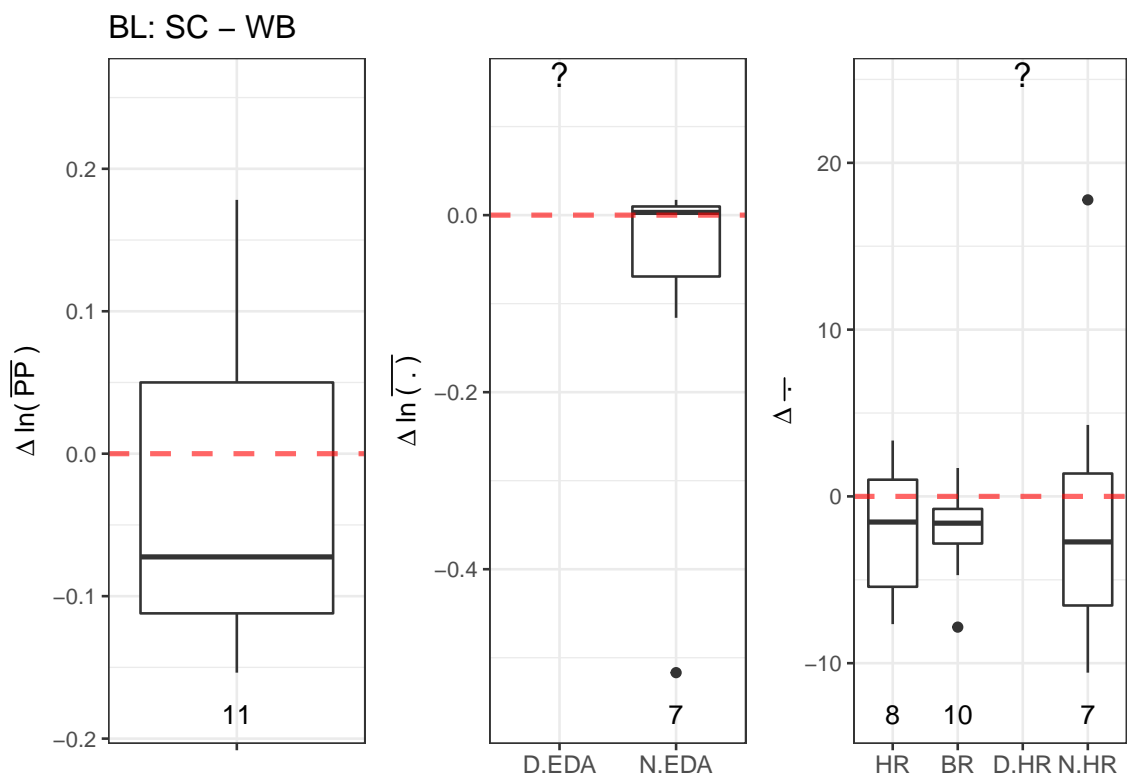
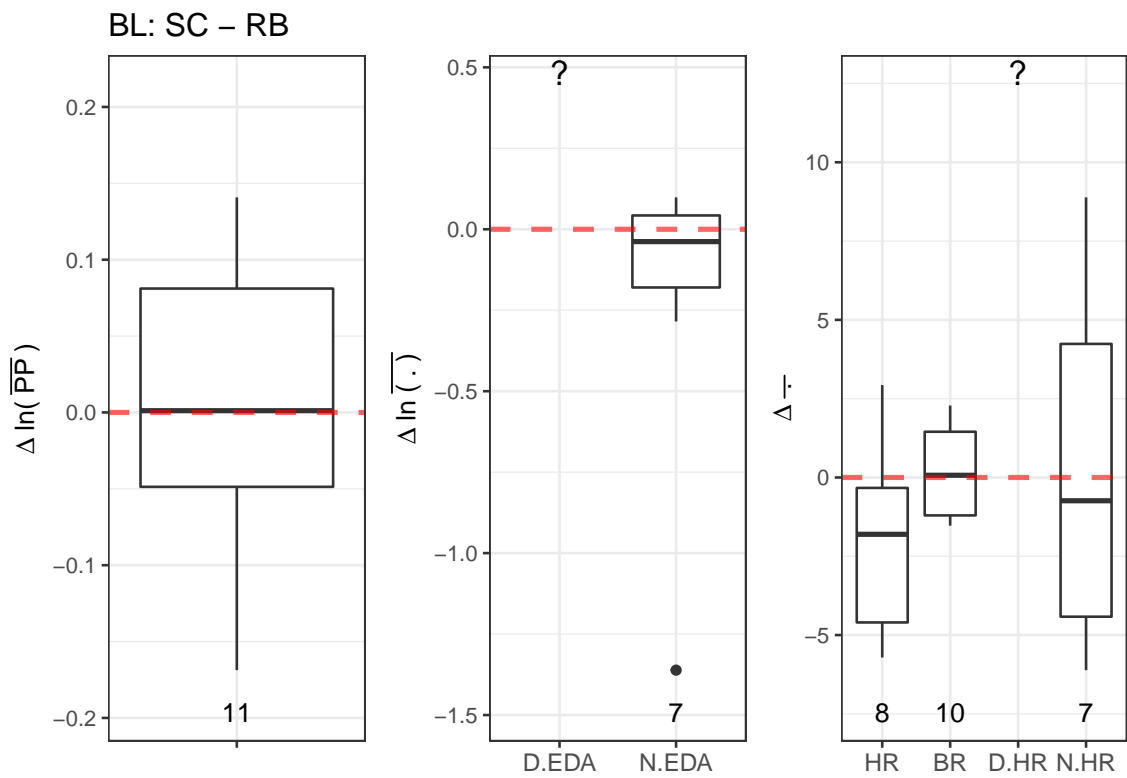
```
## Writing Baseline - Resting Baseline
## Wilcoxon p = 0.8125 > 0.05
##
## Stress Condition - Resting Baseline
## Wilcoxon p = 0.6875 > 0.05
##
## StressCondition - Writing Baseline
## Wilcoxon p = 0.5781 > 0.05
##
## Dual Task - Resting Baseline
## Wilcoxon p = 0.9375 > 0.05
##
## Dual Task - Writing Baseline
## Wilcoxon p = 0.9375 > 0.05
##
## Dual Task - Stress Condition
## Wilcoxon p = 0.9375 > 0.05
##
## Presentation - Resting Baseline
## Wilcoxon p = 0.6875 > 0.05
##
## Presentation - Writing Baseline
## Wilcoxon p = 0.4688 > 0.05
##
## Presentation - Stress Condition
```

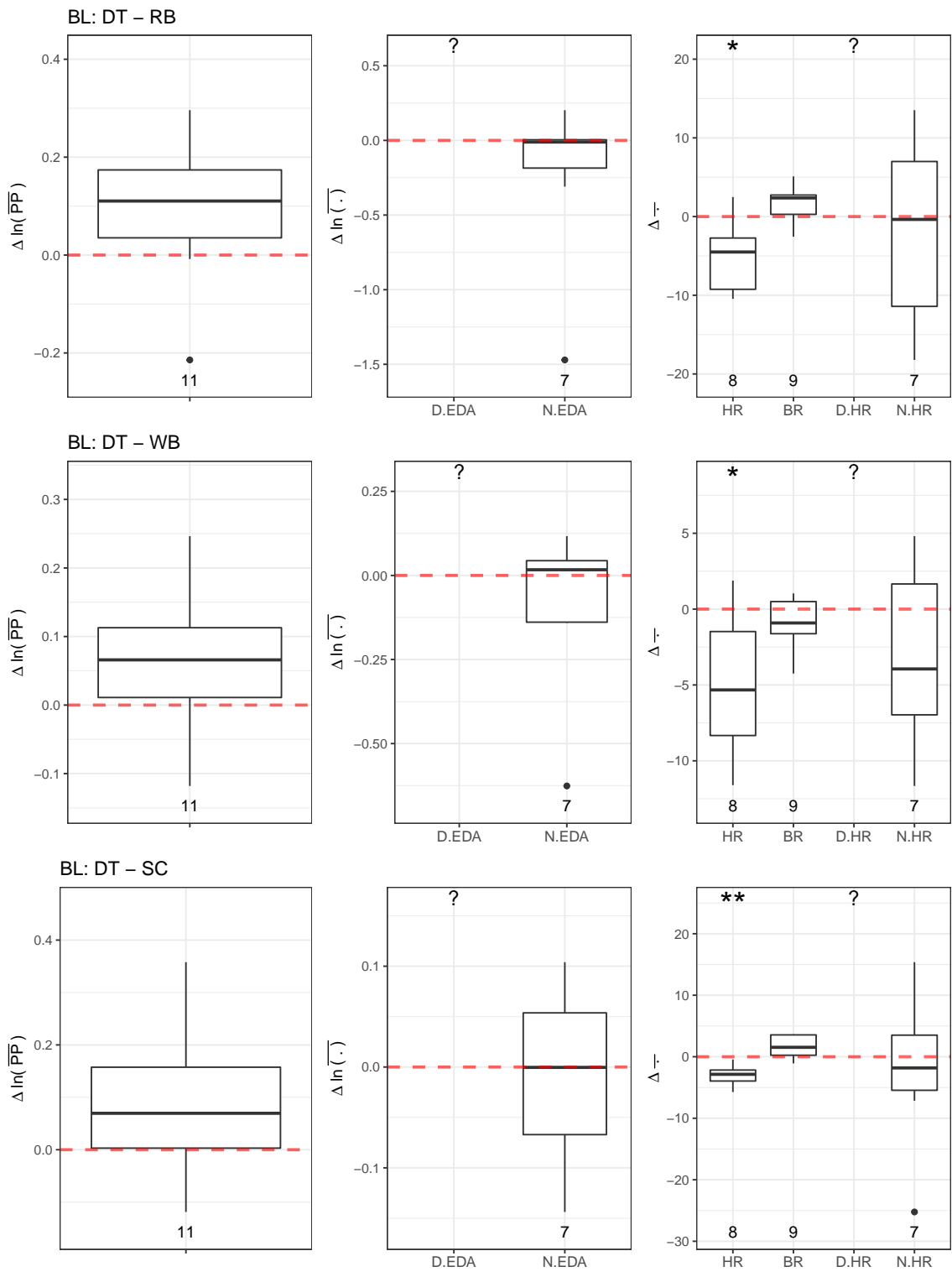
```
## Wilcoxon p = 0.2969 > 0.05
##
## Presentation - Dual Task
## Wilcoxon p = 0.375 > 0.05
```

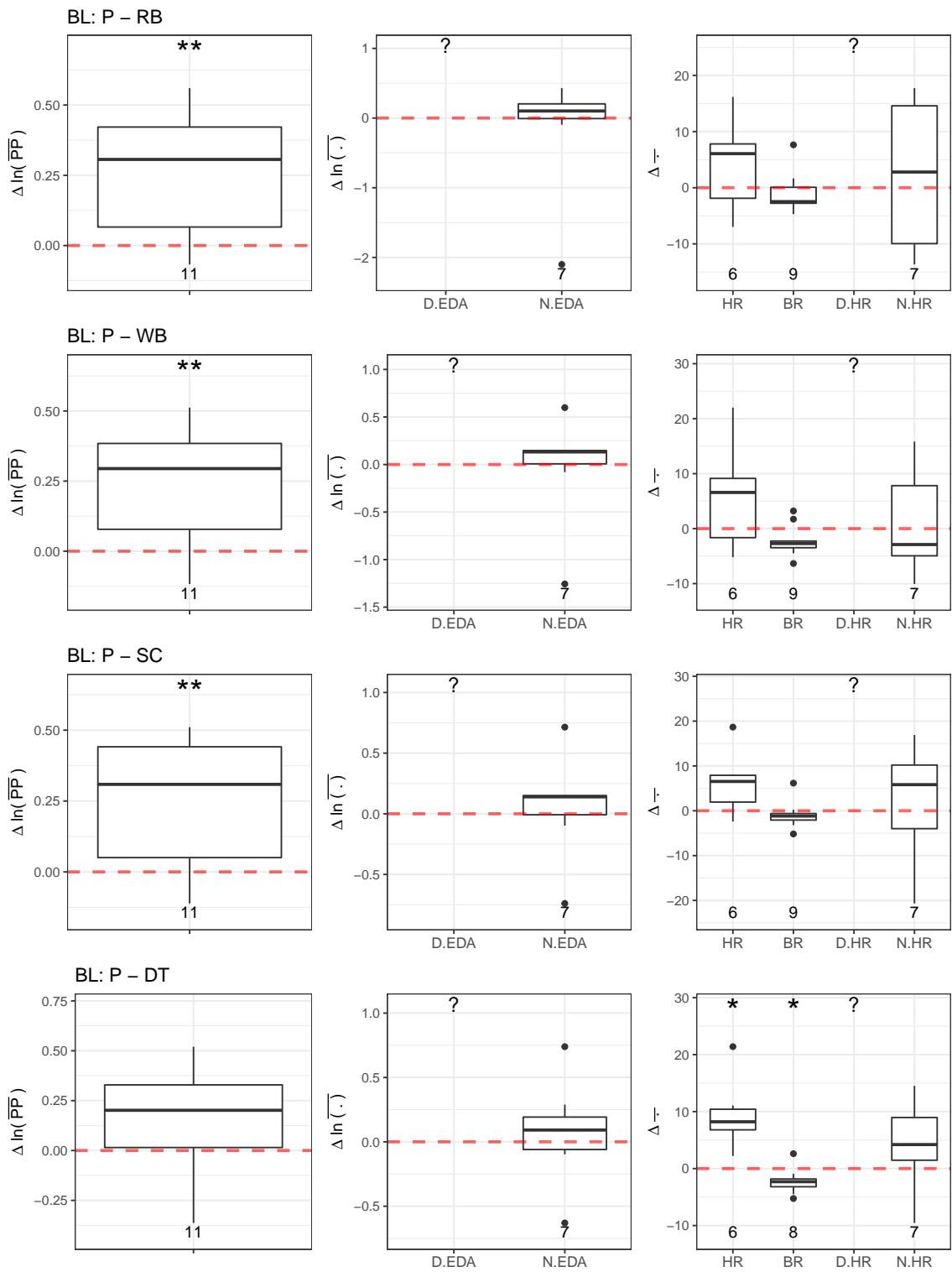
Batch-Low (BL)

Sensor Channels per Activity

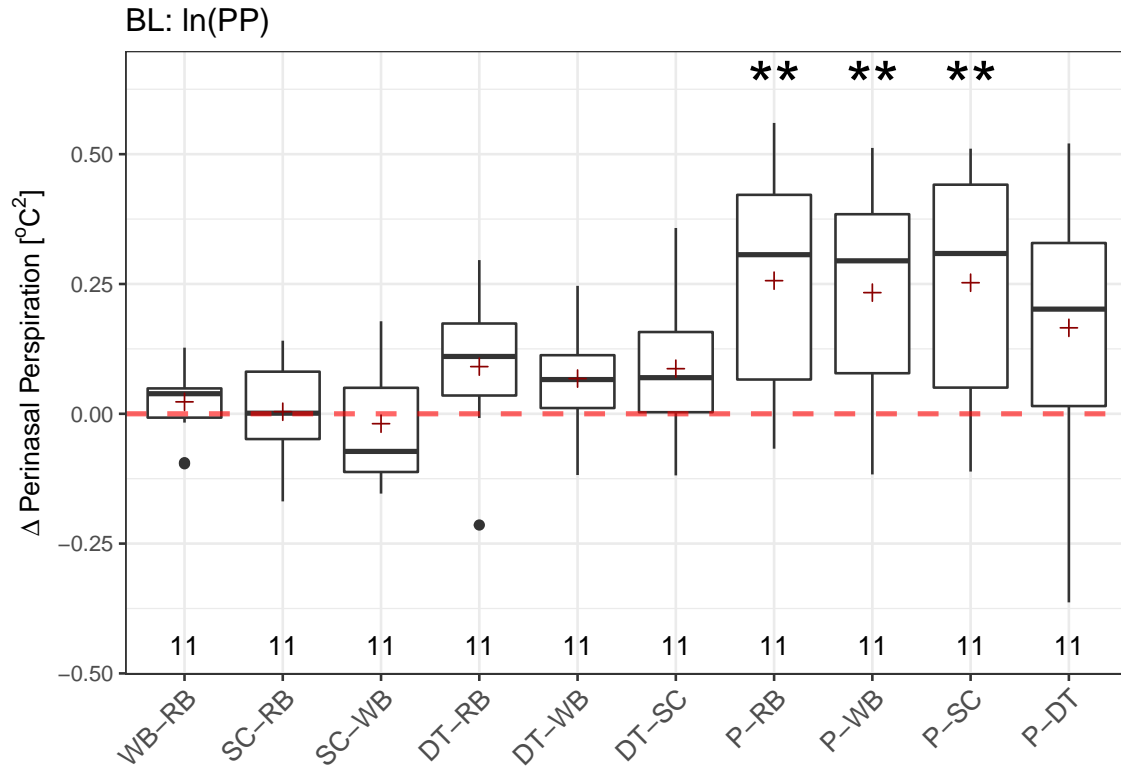






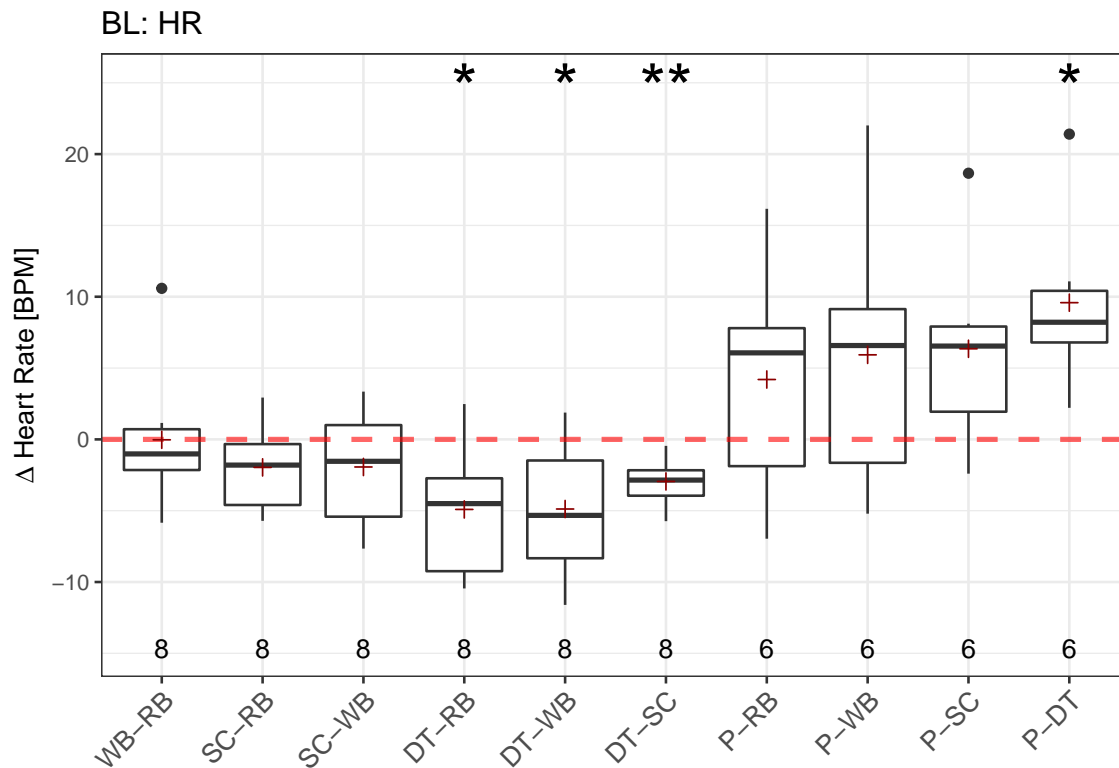


Sensor Channel across Activities



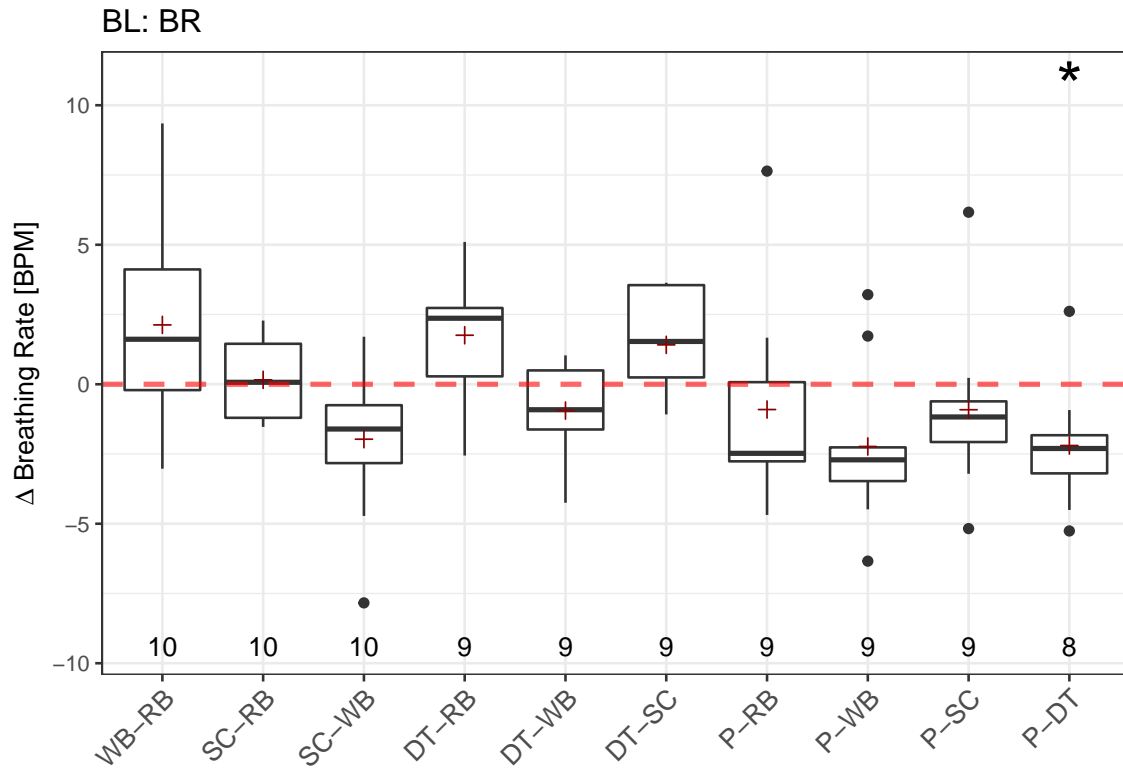
```
## Writing Baseline - Resting Baseline
## Transformed t-test p = 0.3115 > 0.05
##
## Stress Condition - Resting Baseline
## Transformed t-test p = 0.8923 > 0.05
##
## StressCondition - Writing Baseline
## Transformed t-test p = 0.5912 > 0.05
##
## Dual Task - Resting Baseline
## Transformed t-test p = 0.0525 > 0.05
##
## Dual Task - Writing Baseline
## Transformed t-test p = 0.068 > 0.05
##
## Dual Task - Stress Condition
## Transformed t-test p = 0.0607 > 0.05
##
## Presentation - Resting Baseline
## Transformed t-test p = 0.0026 < 0.01  **
##
## Presentation - Writing Baseline
## Transformed t-test p = 0.003 < 0.01  **
```

```
##  
## Presentation - Stress Condition  
## Transformed t-test p = 0.0039 < 0.01  **  
##  
## Presentation - Dual Task  
## Transformed t-test p = 0.0575 > 0.05
```



```
## Writing Baseline - Resting Baseline
## t-test p = 0.9869 > 0.05
##
## Stress Condition - Resting Baseline
## t-test p = 0.1034 > 0.05
##
## StressCondition - Writing Baseline
## t-test p = 0.217 > 0.05
##
## Dual Task - Resting Baseline
## t-test p = 0.02 < 0.05  *
##
## Dual Task - Writing Baseline
## t-test p = 0.023 < 0.05  *
##
## Dual Task - Stress Condition
## t-test p = 0.0024 < 0.01  **
##
## Presentation - Resting Baseline
## t-test p = 0.2801 > 0.05
##
## Presentation - Writing Baseline
## t-test p = 0.2075 > 0.05
##
## Presentation - Stress Condition
```

```
## t-test p = 0.0855 > 0.05
##
## Presentation - Dual Task
## t-test p = 0.0152 < 0.05  *
```

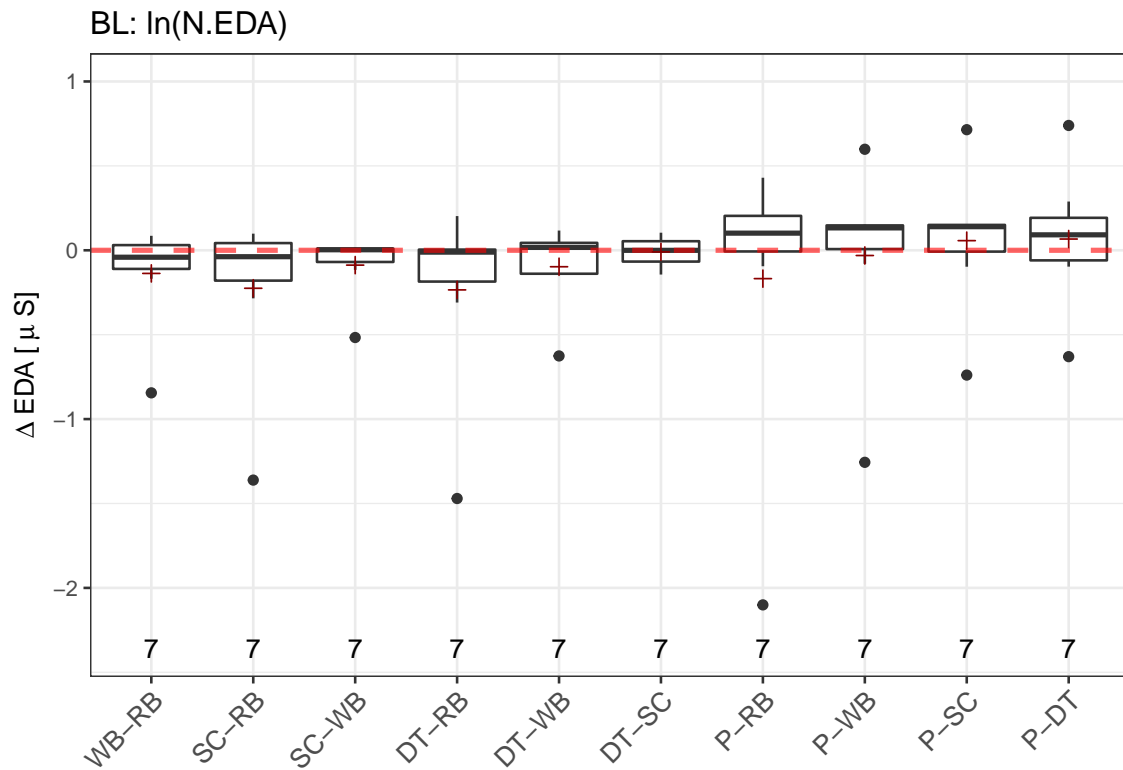


```
## Writing Baseline - Resting Baseline
## t-test p = 0.0916 > 0.05
##
## Stress Condition - Resting Baseline
## t-test p = 0.7428 > 0.05
##
## StressCondition - Writing Baseline
## t-test p = 0.0548 > 0.05
##
## Dual Task - Resting Baseline
## t-test p = 0.0695 > 0.05
##
## Dual Task - Writing Baseline
## t-test p = 0.1269 > 0.05
##
## Dual Task - Stress Condition
## t-test p = 0.0515 > 0.05
##
## Presentation - Resting Baseline
## t-test p = 0.4879 > 0.05
##
## Presentation - Writing Baseline
## t-test p = 0.0536 > 0.05
##
## Presentation - Stress Condition
```



```
## t-test p = 0.4023 > 0.05
##
## Presentation - Dual Task
## t-test p = 0.0352 < 0.05  *
```

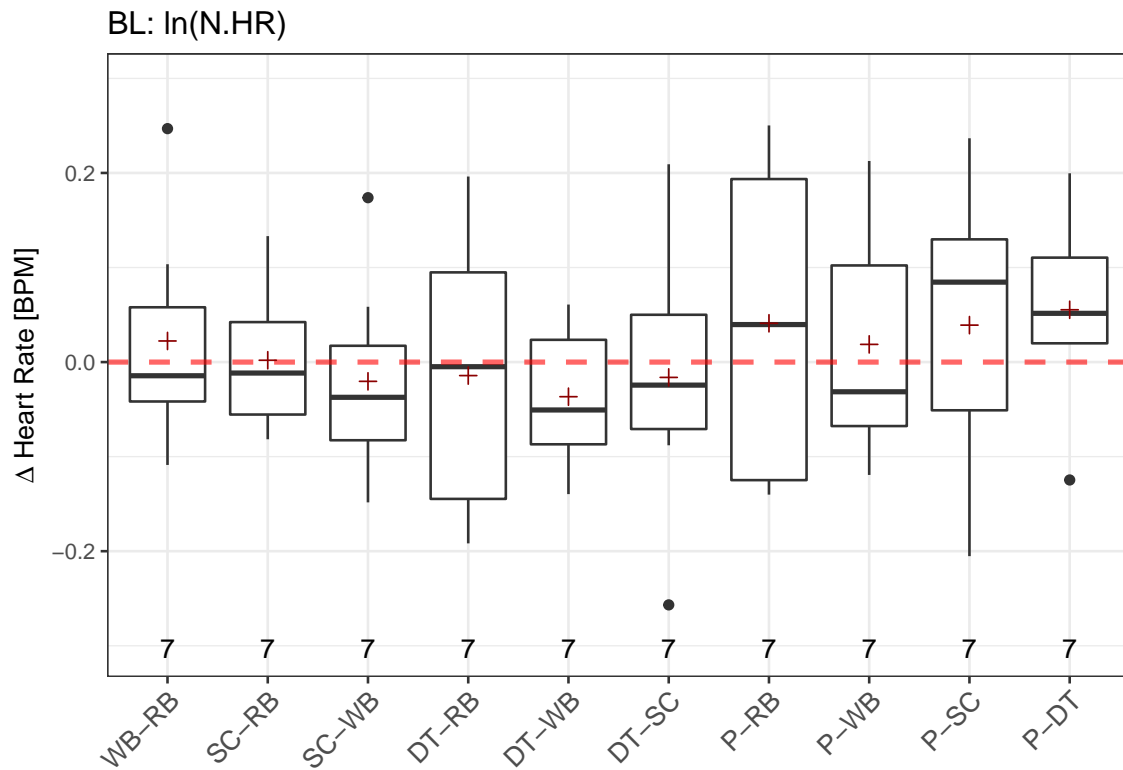
```
## BL has LESS than 7 subjects for D.EDA. Cannot continue with test.
## -----
```



```
## Writing Baseline - Resting Baseline
## Transformed t-test p = 0.3052 > 0.05
##
## Stress Condition - Resting Baseline
## Transformed t-test p = 0.2933 > 0.05
##
## StressCondition - Writing Baseline
## Transformed t-test p = 0.2771 > 0.05
##
## Dual Task - Resting Baseline
## Transformed t-test p = 0.3145 > 0.05
##
## Dual Task - Writing Baseline
## Transformed t-test p = 0.3459 > 0.05
##
## Dual Task - Stress Condition
## Transformed t-test p = 0.7903 > 0.05
##
## Presentation - Resting Baseline
## Transformed t-test p = 0.6265 > 0.05
##
## Presentation - Writing Baseline
## Transformed t-test p = 0.8921 > 0.05
##
## Presentation - Stress Condition
```

```
## Transformed t-test p = 0.7383 > 0.05
##
## Presentation - Dual Task
## Transformed t-test p = 0.6848 > 0.05
```

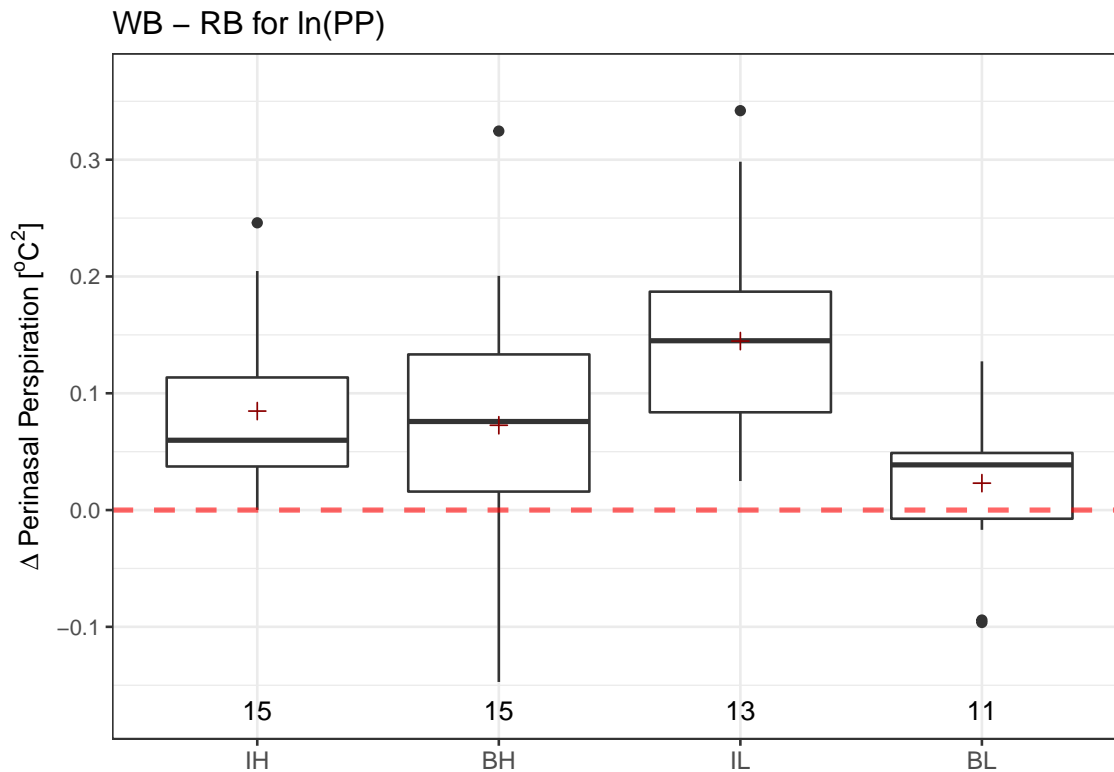
```
## BL has LESS than 7 subjects for D.HR. Cannot continue with test.
## -----
```



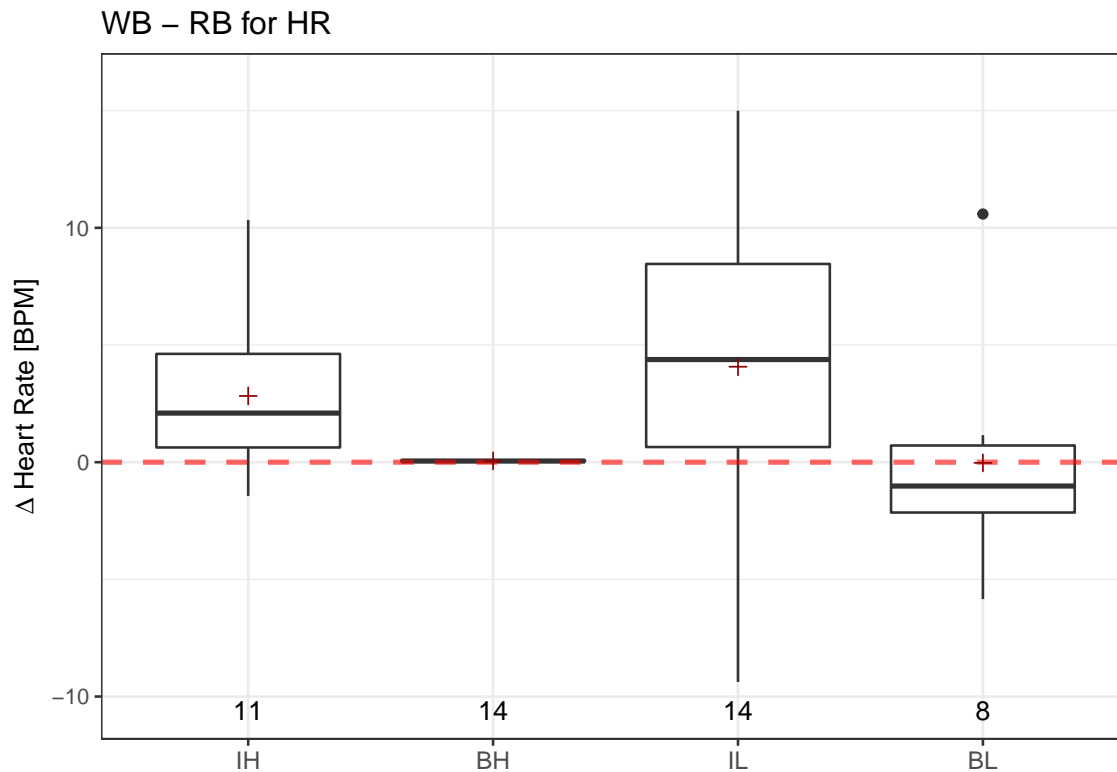
```
## Writing Baseline - Resting Baseline
## Transformed t-test p = 0.6353 > 0.05
##
## Stress Condition - Resting Baseline
## Transformed t-test p = 0.949 > 0.05
##
## StressCondition - Writing Baseline
## Transformed t-test p = 0.6362 > 0.05
##
## Dual Task - Resting Baseline
## Transformed t-test p = 0.815 > 0.05
##
## Dual Task - Writing Baseline
## Transformed t-test p = 0.2386 > 0.05
##
## Dual Task - Stress Condition
## Transformed t-test p = 0.7756 > 0.05
##
## Presentation - Resting Baseline
## Transformed t-test p = 0.5543 > 0.05
##
## Presentation - Writing Baseline
## Transformed t-test p = 0.7244 > 0.05
##
## Presentation - Stress Condition
```

```
## Transformed t-test p = 0.5154 > 0.05
##
## Presentation - Dual Task
## Transformed t-test p = 0.219 > 0.05
```

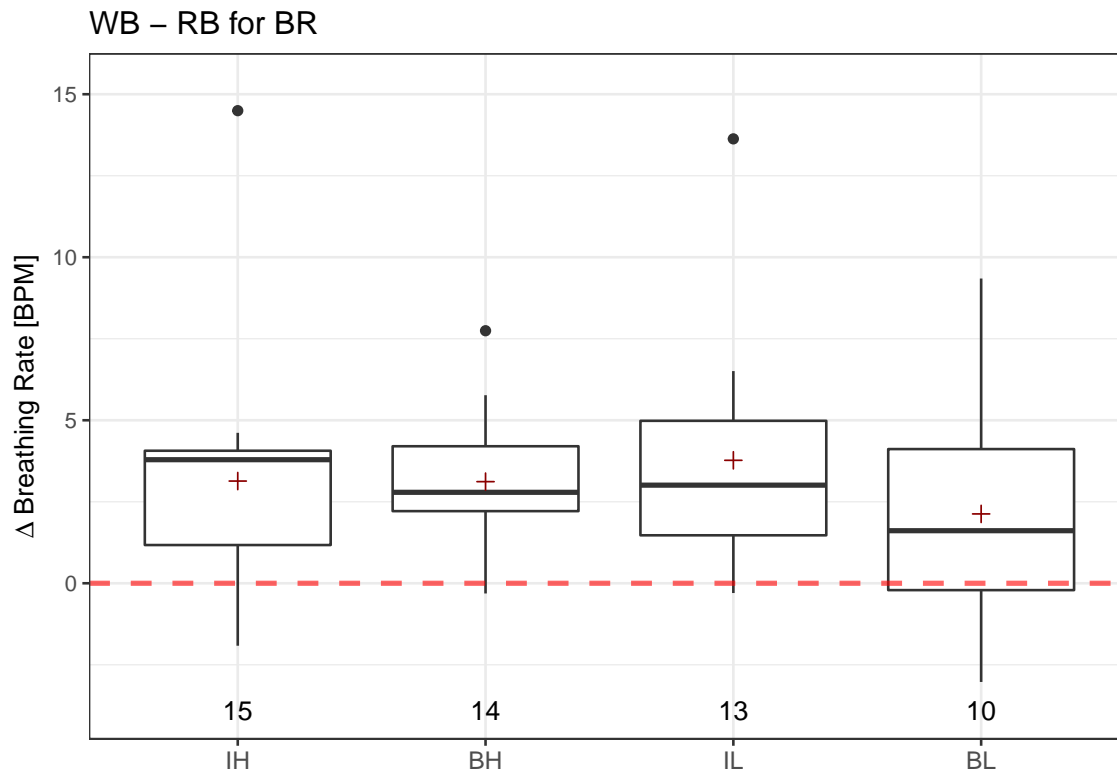
Across Activities



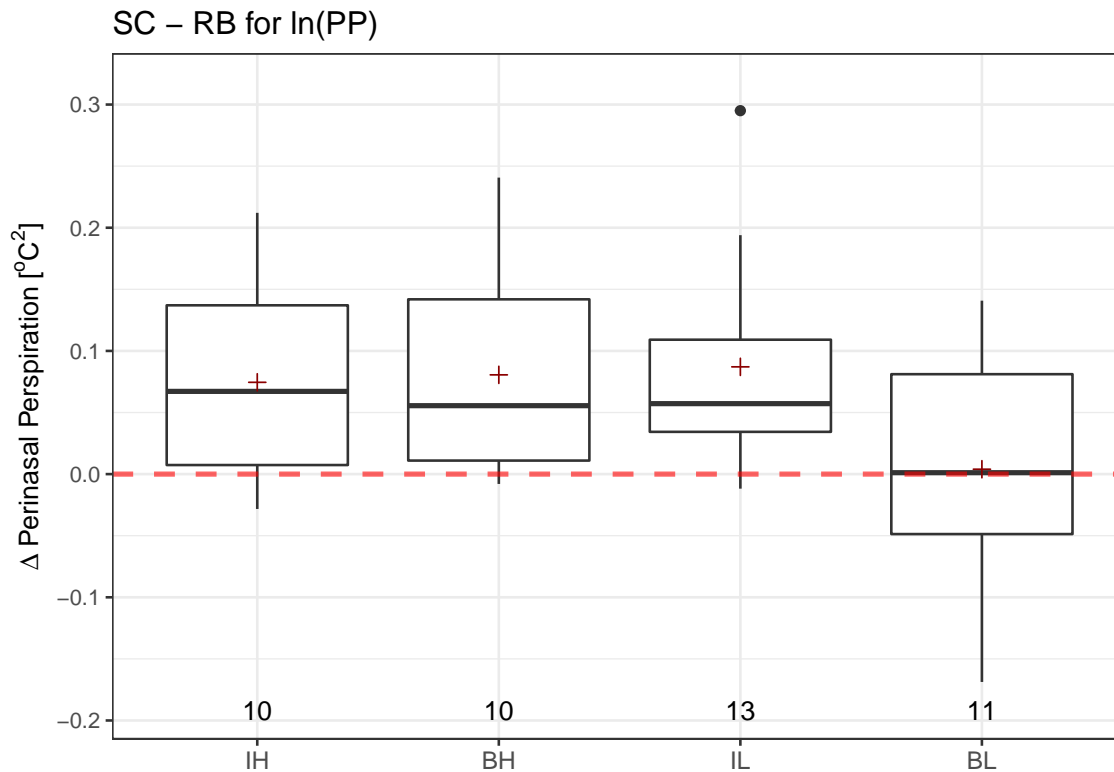
```
## ANOVA:
##           Df Sum Sq Mean Sq F value Pr(>F)
## Condition   3  0.0907  0.030226   3.733  0.0169 *
## Residuals  50  0.4049  0.008098
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## ---
##
##      Tukey multiple comparisons of means
##      95% family-wise confidence level
##
## Fit: aov(formula = formula(paste(diff, "~ Condition")), data = anova_df)
##
## $Condition
##           diff           lwr           upr           p adj
## BL-BH -0.04958842 -0.14452041  0.04534358  0.5125310
## IH-BH  0.01212856 -0.07519617  0.09945330  0.9826277
## IL-BH  0.07206111 -0.01856005  0.16268227  0.1629306
## IH-BL  0.06171698 -0.03321502  0.15664897  0.3204130
## IL-BL  0.12164952  0.02367673  0.21962232  0.0093801
## IL-IH  0.05993255 -0.03068862  0.15055371  0.3056628
```



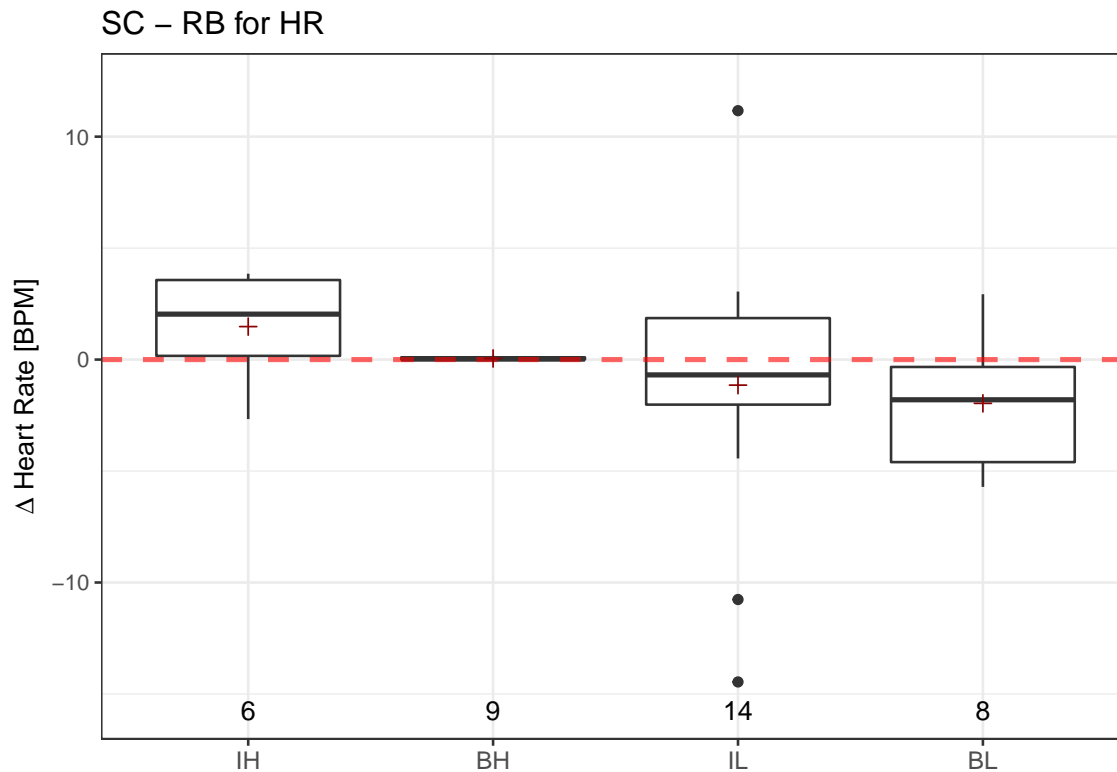
```
## ANOVA:
##           Df Sum Sq Mean Sq F value Pr(>F)
## Condition   3  153.1    51.03   2.755 0.0539 .
## Residuals  43   796.4    18.52
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## ---
##
##      Tukey multiple comparisons of means
##      95% family-wise confidence level
##
## Fit: aov(formula = formula(paste(diff, "~ Condition")), data = anova_df)
##
## $Condition
##           diff           lwr           upr           p adj
## BL-BH -0.0822899 -5.1794833  5.014903  0.9999707
## IH-BH  2.7736269 -1.8601852  7.407439  0.3896104
## IL-BH  4.0201097 -0.3267914  8.367011  0.0789812
## IH-BL  2.8559168 -2.4880560  8.199890  0.4891277
## IL-BL  4.1023996 -0.9947938  9.199593  0.1536400
## IL-IH  1.2464827 -3.3873294  5.880295  0.8890448
```

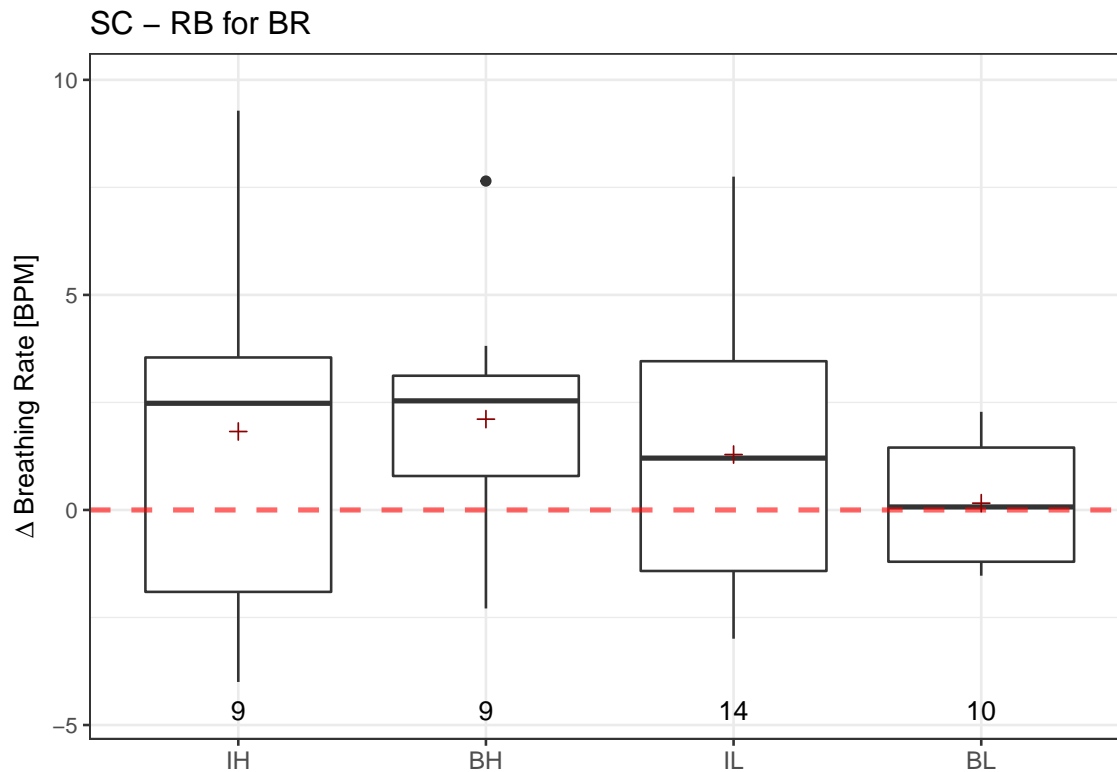
```
## ANOVA:
##           Df Sum Sq Mean Sq F value Pr(>F)
## Condition   3   15.4    5.118    0.45  0.719
## Residuals  48  546.1   11.378
##
## ---
##
##      Tukey multiple comparisons of means
##      95% family-wise confidence level
##
## Fit: aov(formula = formula(paste(diff, "~ Condition")), data = anova_df)
##
## $Condition
##           diff          lwr          upr          p adj
## BL-BH -0.99024685 -4.707155  2.726661  0.8930296
## IH-BH  0.01798573 -3.318041  3.354013  0.9999989
## IL-BH  0.65437408 -2.803318  4.112067  0.9578191
## IH-BL  1.00823258 -2.656688  4.673153  0.8836923
## IL-BL  1.64462094 -2.131383  5.420625  0.6551310
## IL-IH  0.63638836 -2.765358  4.038134  0.9591648
```



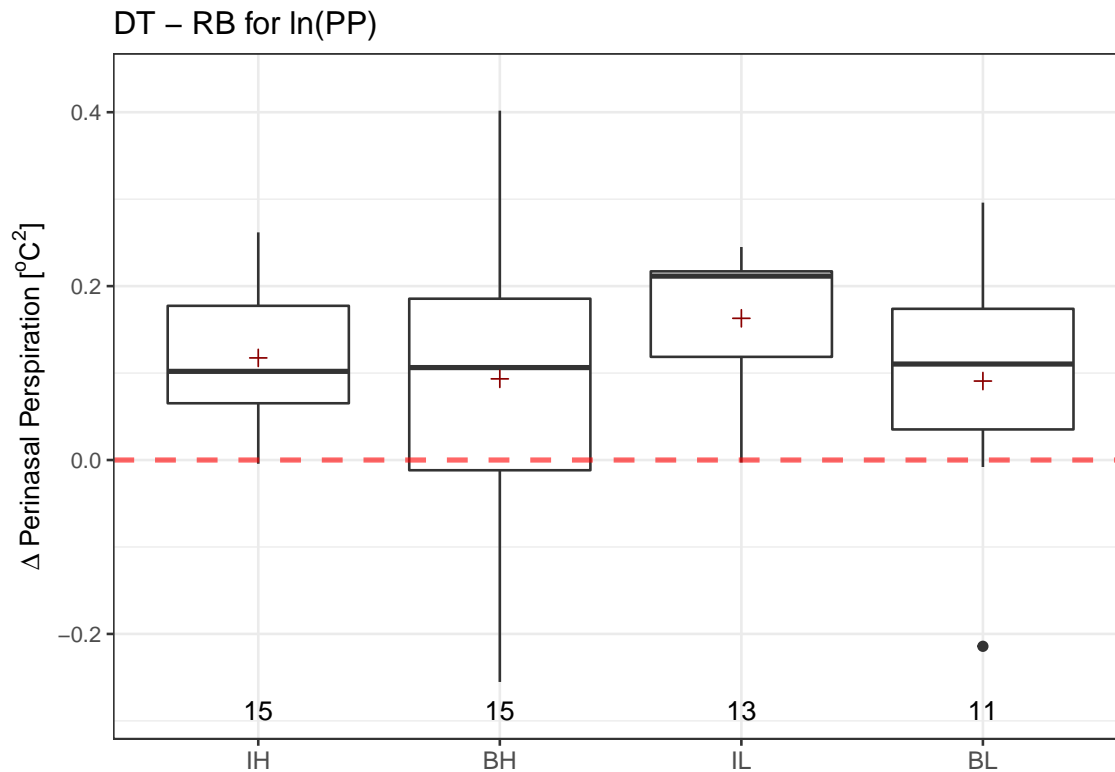
```
## [1] "Removed 12 subjects who had Stroop scores less than 30."
##
## ---
## ANOVA:
##           Df Sum Sq Mean Sq F value Pr(>F)
## Condition   3  0.0502  0.016750    2.117  0.113
## Residuals  40  0.3165  0.007913
##
## ---
##
## Tukey multiple comparisons of means
## 95% family-wise confidence level
##
## Fit: aov(formula = formula(paste(diff, "~ Condition")), data = anova_df)
##
## $Condition
##           diff           lwr           upr           p adj
## BL-BH -0.076626057 -0.18080660  0.02755449  0.2157675
## IH-BH -0.006078721 -0.11271091  0.10055347  0.9987070
## IL-BH  0.006491587 -0.09380024  0.10678342  0.9981124
## IH-BL  0.070547336 -0.03363321  0.17472788  0.2814130
## IL-BL  0.083117644 -0.01456354  0.18079883  0.1196966
## IL-IH  0.012570308 -0.08772152  0.11286214  0.9867405
```



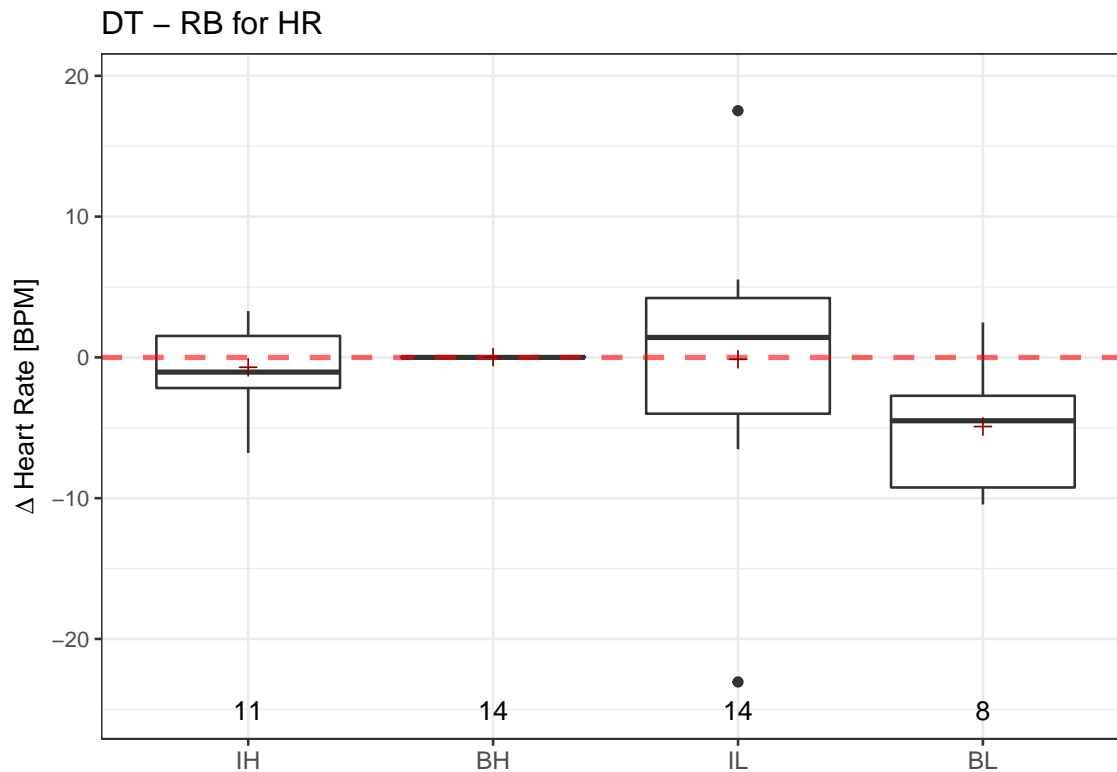
```
## [1] "Removed 12 subjects who had Stroop scores less than 30."
##
## ---
## ANOVA:
##           Df Sum Sq Mean Sq F value Pr(>F)
## Condition   3   48.8   16.27    0.932  0.436
## Residuals  33  576.0   17.45
##
## ---
##
## Tukey multiple comparisons of means
## 95% family-wise confidence level
##
## Fit: aov(formula = formula(paste(diff, "~ Condition")), data = anova_df)
##
## $Condition
##           diff           lwr          upr          p adj
## BL-BH -2.0133160 -7.504415  3.477783  0.7550819
## IH-BH  1.4303974 -4.525536  7.386331  0.9149259
## IL-BH -1.1960968 -6.024235  3.632042  0.9076004
## IH-BL  3.4437134 -2.659302  9.546729  0.4338003
## IL-BL  0.8172192 -4.191231  5.825670  0.9708163
## IL-IH -2.6264942 -8.140617  2.887629  0.5765866
```



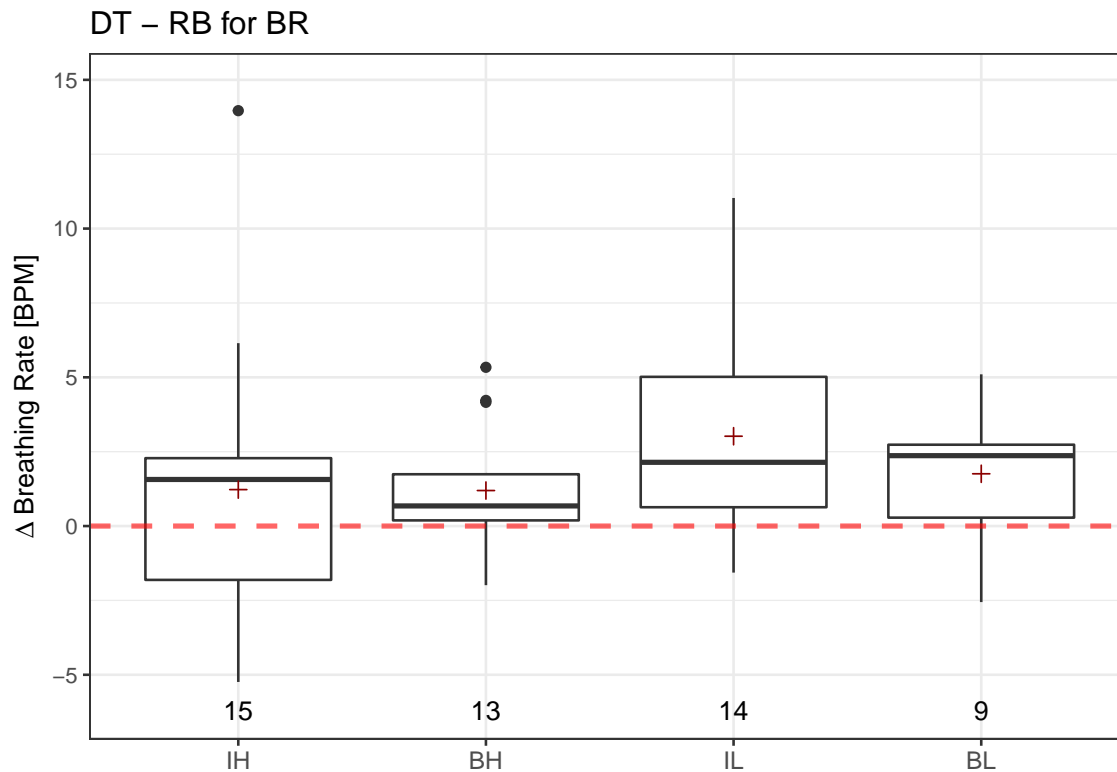
```
## [1] "Removed 12 subjects who had Stroop scores less than 30."
##
## ---
## ANOVA:
##           Df Sum Sq Mean Sq F value Pr(>F)
## Condition   3   21.4    7.149   0.704  0.555
## Residuals  38  385.8   10.153
##
## ---
##
## Tukey multiple comparisons of means
## 95% family-wise confidence level
##
## Fit: aov(formula = formula(paste(diff, "~ Condition")), data = anova_df)
##
## $Condition
##           diff           lwr          upr         p adj
## BL-BH -1.9538117 -5.886873  1.979250  0.5472353
## IH-BH -0.2871680 -4.322404  3.748068  0.9974784
## IL-BH -0.8231676 -4.480411  2.834076  0.9299641
## IH-BL  1.6666437 -2.266418  5.599705  0.6684465
## IL-BL  1.1306441 -2.413545  4.674833  0.8267114
## IL-IH -0.5359996 -4.193243  3.121244  0.9789960
```



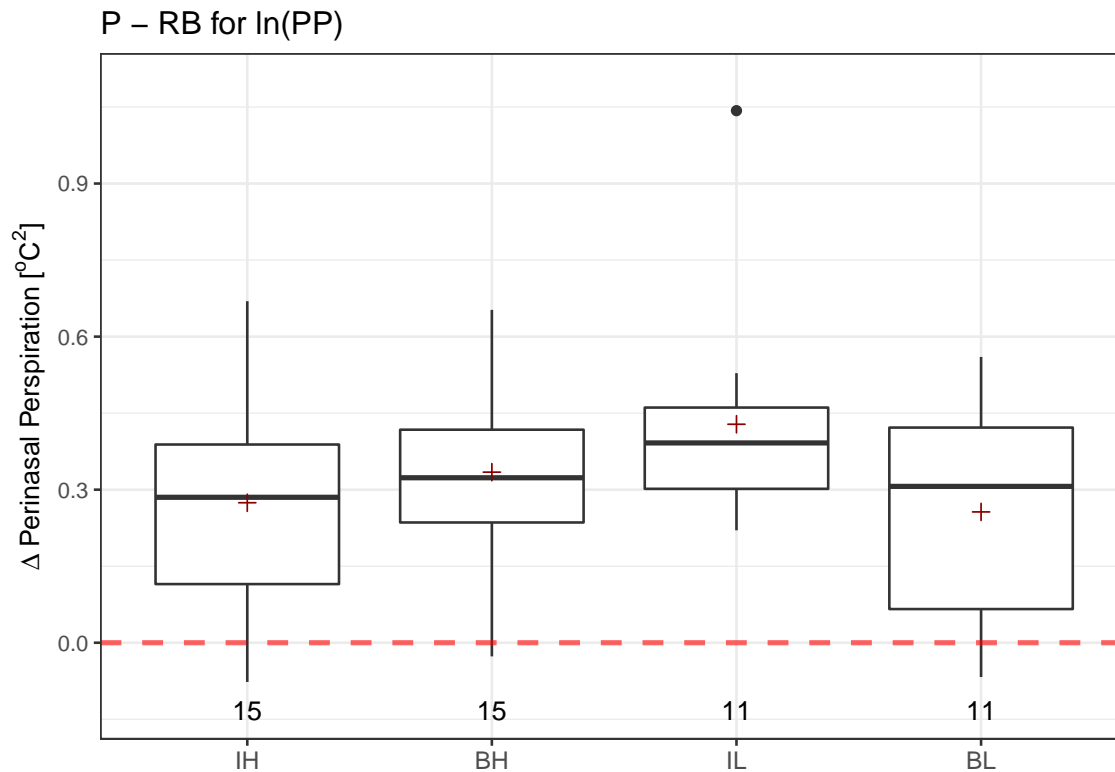
```
## ANOVA:
##           Df Sum Sq Mean Sq F value Pr(>F)
## Condition   3  0.0434  0.01445    1.047   0.38
## Residuals  50  0.6903  0.01381
##
## ---
##
##      Tukey multiple comparisons of means
##      95% family-wise confidence level
##
## Fit: aov(formula = formula(paste(diff, "~ Condition")), data = anova_df)
##
## $Condition
##           diff           lwr           upr           p adj
## BL-BH -0.002520434 -0.12647497  0.1214341  0.9999425
## IH-BH  0.024093888 -0.08992770  0.1381155  0.9429316
## IL-BH  0.069611785 -0.04871401  0.1879376  0.4084248
## IH-BL  0.026614322 -0.09734021  0.1505689  0.9403670
## IL-BL  0.072132219 -0.05579275  0.2000572  0.4460204
## IL-IH  0.045517897 -0.07280789  0.1638437  0.7372276
```



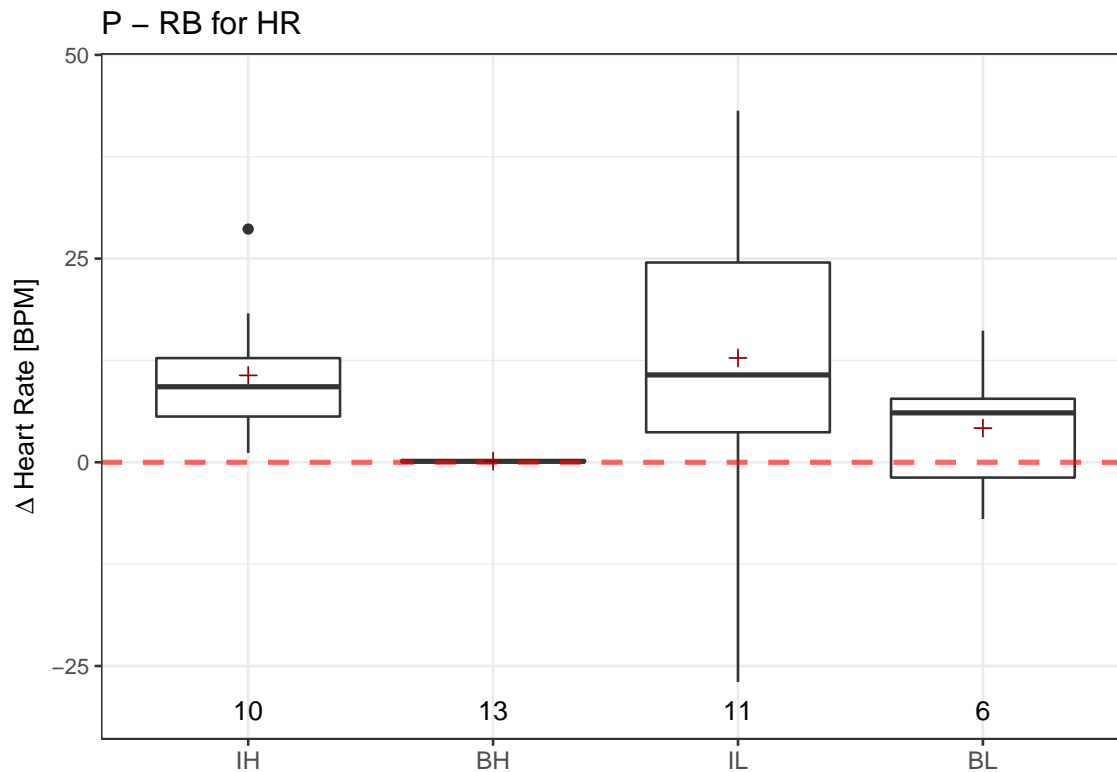
```
## ANOVA:
##           Df Sum Sq Mean Sq F value Pr(>F)
## Condition   3  148.2    49.4    1.669  0.188
## Residuals  43 1272.7    29.6
##
## ---
##
##      Tukey multiple comparisons of means
##      95% family-wise confidence level
##
## Fit: aov(formula = formula(paste(diff, "~ Condition")), data = anova_df)
##
## $Condition
##           diff           lwr           upr           p adj
## BL-BH -4.9257293 -11.369363  1.517905  0.1885296
## IH-BH -0.7186071  -6.576456  5.139242  0.9876655
## IL-BH -0.1479398  -5.643089  5.347210  0.9998642
## IH-BL  4.2071221  -2.548479 10.962723  0.3547230
## IL-BL  4.7777895  -1.665844 11.221423  0.2107991
## IL-IH  0.5706674  -5.287182  6.428516  0.9937245
```



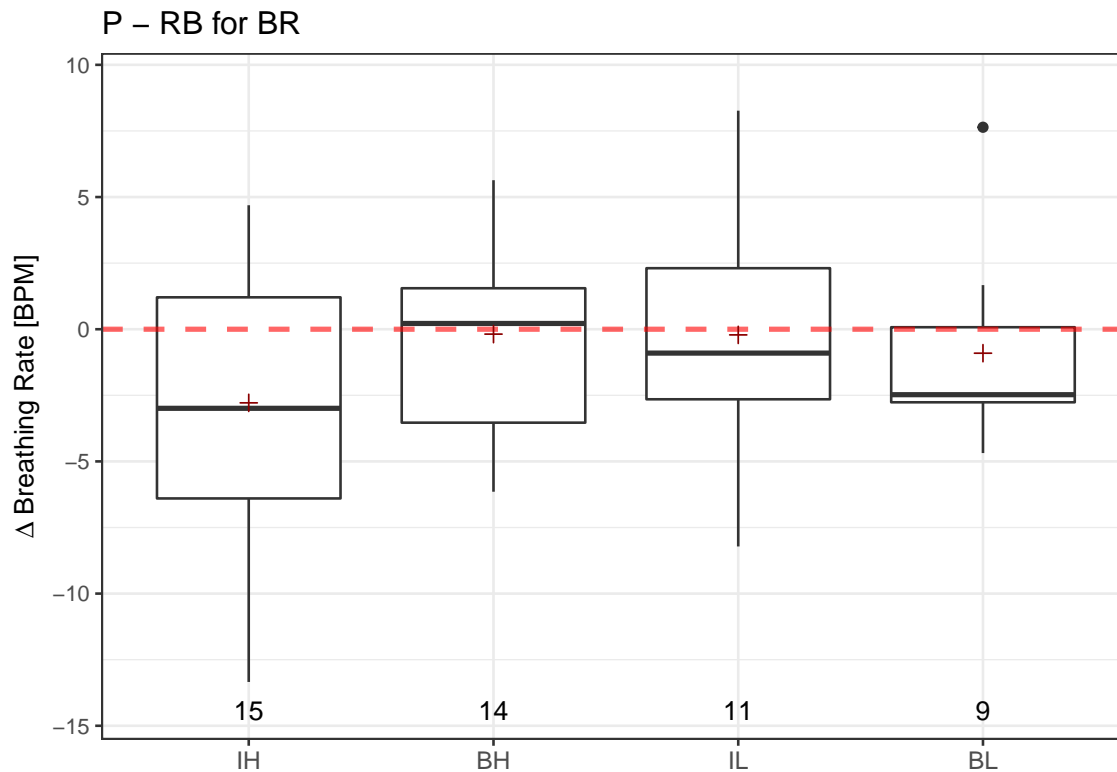
```
## ANOVA:
##           Df Sum Sq Mean Sq F value Pr(>F)
## Condition   3   30.6   10.19    0.785  0.508
## Residuals  47  610.3    12.98
##
## ---
##
##      Tukey multiple comparisons of means
##      95% family-wise confidence level
##
## Fit: aov(formula = formula(paste(diff, "~ Condition")), data = anova_df)
##
## $Condition
##           diff           lwr           upr           p adj
## BL-BH  0.56288206 -3.598925  4.724689  0.9837998
## IH-BH  0.03130078 -3.605548  3.668149  0.9999956
## IL-BH  1.82566162 -1.871000  5.522323  0.5579624
## IH-BL -0.53158128 -4.578293  3.515130  0.9851142
## IL-BL  1.26277956 -2.837771  5.363330  0.8446226
## IL-IH  1.79436084 -1.772226  5.360948  0.5426749
```



```
## ANOVA:
##           Df Sum Sq Mean Sq F value Pr(>F)
## Condition   3  0.2077  0.06923    1.682  0.183
## Residuals  48  1.9759  0.04117
##
## ---
##
##      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 -0.07795670 -0.29230233  0.1363889  0.7681789
## IH-BH -0.05996856 -0.25713786  0.1372007  0.8496836
## IL-BH  0.09389197 -0.12045366  0.3082376  0.6510356
## IH-BL  0.01798814 -0.19635749  0.2323338  0.9960160
## IL-BL  0.17184867 -0.05839547  0.4020928  0.2073596
## IL-IH  0.15386053 -0.06048510  0.3682062  0.2373514
```

```
## ANOVA:
##           Df Sum Sq Mean Sq F value Pr(>F)
## Condition   3   1163   387.7    2.922 0.0471 *
## Residuals  36   4777   132.7
## ---
## 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  4.061217 -11.25116681  19.37360 0.8907643
## IH-BH 10.527892  -2.52195840  23.57774 0.1503088
## IL-BH 12.663910  -0.04624692  25.37407 0.0511343
## IH-BL  6.466676  -9.55462121  22.48797 0.6995544
## IL-BL  8.602693  -7.14314547  24.34853 0.4647807
## IL-IH  2.136017 -11.41982783  15.69186 0.9739392
```



```
## ANOVA:
##           Df Sum Sq Mean Sq F value Pr(>F)
## Condition   3   63.3    21.09    1.082  0.366
## Residuals  45  876.8    19.48
##
## ---
##
##      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 -0.72180374 -5.752764  4.309156  0.9806847
## IH-BH -2.60029235 -6.976134  1.775549  0.3971253
## IL-BH -0.02966783 -4.774074  4.714738  0.9999983
## IH-BL -1.87848862 -6.843394  3.086417  0.7448135
## IL-BL  0.69213590 -4.600471  5.984743  0.9852291
## IL-IH  2.57062452 -2.103679  7.244928  0.4654356
```

Summary

Condition	Difference	Measure	p	Test	n	Significance
BH	WB - RB	PP	0.0219462	Transformed t-test	15	*
BH	WB - RB	HR	0.0000130	Transformed t-test	14	***
BH	WB - RB	BR	0.0001138	t-test	14	***
BH	WB - RB	N.EDA	0.4010163	Transformed t-test	7	
BH	WB - RB	N.HR	0.8125000	Wilcoxon	7	
BH	SC - RB	PP	0.1778303	Transformed t-test	14	
BH	SC - RB	HR	0.0327106	Transformed t-test	14	*
BH	SC - RB	BR	0.0167176	t-test	14	*
BH	SC - RB	N.EDA	0.1496509	Transformed t-test	7	
BH	SC - RB	N.HR	0.6875000	Wilcoxon	7	
BH	SC - WB	PP	0.0973689	Transformed t-test	14	
BH	SC - WB	HR	0.3940901	Transformed t-test	14	
BH	SC - WB	BR	0.1543122	t-test	14	
BH	SC - WB	N.EDA	0.1503231	Transformed t-test	7	
BH	SC - WB	N.HR	0.5781250	Wilcoxon	7	
BH	DT - RB	PP	0.0363198	Transformed t-test	15	*
BH	DT - RB	HR	0.2171923	Transformed t-test	14	
BH	DT - RB	BR	0.0744732	t-test	13	
BH	DT - RB	N.EDA	0.1015420	Transformed t-test	7	
BH	DT - RB	N.HR	0.9375000	Wilcoxon	7	
BH	DT - WB	PP	0.5259981	Transformed t-test	15	
BH	DT - WB	HR	0.0024620	Transformed t-test	14	**
BH	DT - WB	BR	0.0000095	t-test	13	***
BH	DT - WB	N.EDA	0.1170956	Transformed t-test	7	
BH	DT - WB	N.HR	0.9375000	Wilcoxon	7	
BH	DT - SC	PP	0.0629673	Transformed t-test	14	
BH	DT - SC	HR	0.0971471	Transformed t-test	14	
BH	DT - SC	BR	0.1008707	t-test	13	
BH	DT - SC	N.EDA	0.5837117	Transformed t-test	7	
BH	DT - SC	N.HR	0.9375000	Wilcoxon	7	
BH	P - RB	PP	0.0000026	Transformed t-test	15	***
BH	P - RB	HR	0.0047967	Transformed t-test	13	**
BH	P - RB	BR	0.8470484	t-test	14	
BH	P - RB	N.EDA	0.1756011	Transformed t-test	7	
BH	P - RB	N.HR	0.6875000	Wilcoxon	7	
BH	P - WB	PP	0.0000551	Transformed t-test	15	***
BH	P - WB	HR	0.0411070	Transformed t-test	13	*
BH	P - WB	BR	0.0139962	t-test	14	*
BH	P - WB	N.EDA	0.1558886	Transformed t-test	7	
BH	P - WB	N.HR	0.4687500	Wilcoxon	7	
BH	P - SC	PP	0.0000624	Transformed t-test	14	***
BH	P - SC	HR	0.0161774	Transformed t-test	13	*
BH	P - SC	BR	0.0649132	t-test	14	
BH	P - SC	N.EDA	0.5670972	Transformed t-test	7	
BH	P - SC	N.HR	0.2968750	Wilcoxon	7	

(continued)

Condition	Difference	Measure	p	Test	n	Significance
BH	P - DT	PP	0.0000121	Transformed t-test	15	***
BH	P - DT	HR	0.0094598	Transformed t-test	13	**
BH	P - DT	BR	0.1686709	t-test	13	
BH	P - DT	N.EDA	0.8984151	Transformed t-test	7	
BH	P - DT	N.HR	0.3750000	Wilcoxon	7	
BL	WB - RB	PP	0.3115380	Transformed t-test	11	
BL	WB - RB	HR	0.9869320	t-test	8	
BL	WB - RB	BR	0.0915679	t-test	10	
BL	WB - RB	N.EDA	0.3051551	Transformed t-test	7	
BL	WB - RB	N.HR	0.6352867	Transformed t-test	7	
BL	SC - RB	PP	0.8923279	Transformed t-test	11	
BL	SC - RB	HR	0.1034335	t-test	8	
BL	SC - RB	BR	0.7428199	t-test	10	
BL	SC - RB	N.EDA	0.2933096	Transformed t-test	7	
BL	SC - RB	N.HR	0.9490450	Transformed t-test	7	
BL	SC - WB	PP	0.5912498	Transformed t-test	11	
BL	SC - WB	HR	0.2170117	t-test	8	
BL	SC - WB	BR	0.0548135	t-test	10	
BL	SC - WB	N.EDA	0.2771255	Transformed t-test	7	
BL	SC - WB	N.HR	0.6361583	Transformed t-test	7	
BL	DT - RB	PP	0.0525337	Transformed t-test	11	
BL	DT - RB	HR	0.0200050	t-test	8	*
BL	DT - RB	BR	0.0694710	t-test	9	
BL	DT - RB	N.EDA	0.3144819	Transformed t-test	7	
BL	DT - RB	N.HR	0.8150155	Transformed t-test	7	
BL	DT - WB	PP	0.0679895	Transformed t-test	11	
BL	DT - WB	HR	0.0230059	t-test	8	*
BL	DT - WB	BR	0.1268540	t-test	9	
BL	DT - WB	N.EDA	0.3459481	Transformed t-test	7	
BL	DT - WB	N.HR	0.2385658	Transformed t-test	7	
BL	DT - SC	PP	0.0607361	Transformed t-test	11	
BL	DT - SC	HR	0.0023709	t-test	8	**
BL	DT - SC	BR	0.0515357	t-test	9	
BL	DT - SC	N.EDA	0.7902806	Transformed t-test	7	
BL	DT - SC	N.HR	0.7756201	Transformed t-test	7	
BL	P - RB	PP	0.0026388	Transformed t-test	11	**
BL	P - RB	HR	0.2800986	t-test	6	
BL	P - RB	BR	0.4878811	t-test	9	
BL	P - RB	N.EDA	0.6265201	Transformed t-test	7	
BL	P - RB	N.HR	0.5543464	Transformed t-test	7	
BL	P - WB	PP	0.0030397	Transformed t-test	11	**
BL	P - WB	HR	0.2075354	t-test	6	
BL	P - WB	BR	0.0535812	t-test	9	
BL	P - WB	N.EDA	0.8920899	Transformed t-test	7	
BL	P - WB	N.HR	0.7244497	Transformed t-test	7	
BL	P - SC	PP	0.0038631	Transformed t-test	11	**
BL	P - SC	HR	0.0855441	t-test	6	

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Condition	Difference	Measure	p	Test	n	Significance
BL	P - SC	BR	0.4022510	t-test	9	
BL	P - SC	N.EDA	0.7382911	Transformed t-test	7	
BL	P - SC	N.HR	0.5154267	Transformed t-test	7	
BL	P - DT	PP	0.0575016	Transformed t-test	11	
BL	P - DT	HR	0.0152101	t-test	6	*
BL	P - DT	BR	0.0351610	t-test	8	*
BL	P - DT	N.EDA	0.6847513	Transformed t-test	7	
BL	P - DT	N.HR	0.2190368	Transformed t-test	7	
IH	WB - RB	PP	0.0004610	Transformed t-test	15	***
IH	WB - RB	HR	0.0188344	t-test	11	*
IH	WB - RB	BR	0.0074935	t-test	15	**
IH	WB - RB	N.EDA	0.3403120	Transformed t-test	8	
IH	WB - RB	N.HR	0.7303749	Transformed t-test	8	
IH	SC - RB	PP	0.0122546	Transformed t-test	14	*
IH	SC - RB	HR	0.3552732	t-test	10	
IH	SC - RB	BR	0.1188954	t-test	15	
IH	SC - RB	N.EDA	0.2429520	Transformed t-test	8	
IH	SC - RB	N.HR	0.3455392	Transformed t-test	8	
IH	SC - WB	PP	0.1694595	Transformed t-test	14	
IH	SC - WB	HR	0.0243429	t-test	10	*
IH	SC - WB	BR	0.0317792	t-test	15	*
IH	SC - WB	N.EDA	0.4308000	Transformed t-test	8	
IH	SC - WB	N.HR	0.5336331	Transformed t-test	8	
IH	DT - RB	PP	0.0000487	Transformed t-test	15	***
IH	DT - RB	HR	0.4334571	t-test	11	
IH	DT - RB	BR	0.3322883	t-test	15	
IH	DT - RB	N.EDA	0.2213848	Transformed t-test	8	
IH	DT - RB	N.HR	0.2236593	Transformed t-test	8	
IH	DT - WB	PP	0.1077157	Transformed t-test	15	
IH	DT - WB	HR	0.0035532	t-test	11	**
IH	DT - WB	BR	0.0022952	t-test	15	**
IH	DT - WB	N.EDA	0.0592213	Transformed t-test	8	
IH	DT - WB	N.HR	0.4089959	Transformed t-test	8	
IH	DT - SC	PP	0.0437527	Transformed t-test	14	*
IH	DT - SC	HR	0.1613719	t-test	10	
IH	DT - SC	BR	0.5106319	t-test	15	
IH	DT - SC	N.EDA	0.2521891	Transformed t-test	8	
IH	DT - SC	N.HR	0.4920073	Transformed t-test	8	
IH	P - RB	PP	0.0001504	Transformed t-test	15	***
IH	P - RB	HR	0.0023820	t-test	10	**
IH	P - RB	BR	0.0545015	t-test	15	
IH	P - RB	N.EDA	0.2098217	Transformed t-test	8	
IH	P - RB	N.HR	0.1963474	Transformed t-test	8	
IH	P - WB	PP	0.0036183	Transformed t-test	15	**
IH	P - WB	HR	0.0288561	t-test	10	*
IH	P - WB	BR	0.0000713	t-test	15	***
IH	P - WB	N.EDA	0.7494501	Transformed t-test	8	

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Condition	Difference	Measure	p	Test	n	Significance
IH	P - WB	N.HR	0.5532956	Transformed t-test	8	
IH	P - SC	PP	0.0016492	Transformed t-test	14	**
IH	P - SC	HR	0.0063270	t-test	10	**
IH	P - SC	BR	0.0003555	t-test	15	***
IH	P - SC	N.EDA	0.5000502	Transformed t-test	8	
IH	P - SC	N.HR	0.1035174	Transformed t-test	8	
IH	P - DT	PP	0.0049110	Transformed t-test	15	**
IH	P - DT	HR	0.0014945	t-test	10	**
IH	P - DT	BR	0.0005129	t-test	15	***
IH	P - DT	N.EDA	0.4611354	Transformed t-test	8	
IH	P - DT	N.HR	0.0084480	Transformed t-test	8	**
IL	WB - RB	PP	0.0001706	Transformed t-test	13	***
IL	WB - RB	HR	0.0318164	t-test	14	*
IL	WB - RB	BR	0.0029280	t-test	13	**
IL	WB - RB	N.EDA	0.3070520	Transformed t-test	8	
IL	WB - RB	N.HR	0.8203125	Wilcoxon	9	
IL	SC - RB	PP	0.0047788	Transformed t-test	13	**
IL	SC - RB	HR	0.4931241	t-test	14	
IL	SC - RB	BR	0.1716031	t-test	14	
IL	SC - RB	N.EDA	0.9091386	Transformed t-test	8	
IL	SC - RB	N.HR	0.8203125	Wilcoxon	9	
IL	SC - WB	PP	0.1501126	Transformed t-test	13	
IL	SC - WB	HR	0.0000160	t-test	14	***
IL	SC - WB	BR	0.0056543	t-test	13	**
IL	SC - WB	N.EDA	0.2689461	Transformed t-test	8	
IL	SC - WB	N.HR	0.4257812	Wilcoxon	9	
IL	DT - RB	PP	0.0000074	Transformed t-test	13	***
IL	DT - RB	HR	0.9564261	t-test	14	
IL	DT - RB	BR	0.0109817	t-test	14	*
IL	DT - RB	N.EDA	0.6976424	Transformed t-test	8	
IL	DT - RB	N.HR	0.7343750	Wilcoxon	9	
IL	DT - WB	PP	0.4897627	Transformed t-test	13	
IL	DT - WB	HR	0.0153782	t-test	14	*
IL	DT - WB	BR	0.0141019	t-test	13	*
IL	DT - WB	N.EDA	0.3364517	Transformed t-test	8	
IL	DT - WB	N.HR	0.2031250	Wilcoxon	9	
IL	DT - SC	PP	0.0502407	Transformed t-test	13	
IL	DT - SC	HR	0.4432256	t-test	14	
IL	DT - SC	BR	0.0396767	t-test	14	*
IL	DT - SC	N.EDA	0.6807010	Transformed t-test	8	
IL	DT - SC	N.HR	0.9101562	Wilcoxon	9	
IL	P - RB	PP	0.0000892	Transformed t-test	11	***
IL	P - RB	HR	0.0552440	t-test	11	
IL	P - RB	BR	0.8861670	t-test	11	
IL	P - RB	N.EDA	0.2730305	Transformed t-test	7	
IL	P - RB	N.HR	0.4609375	Wilcoxon	8	
IL	P - WB	PP	0.0054046	Transformed t-test	11	**

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Condition	Difference	Measure	p	Test	n	Significance
IL	P - WB	HR	0.1202428	t-test	11	
IL	P - WB	BR	0.0004079	t-test	10	***
IL	P - WB	N.EDA	0.1190078	Transformed t-test	7	
IL	P - WB	N.HR	0.3125000	Wilcoxon	8	
IL	P - SC	PP	0.0011554	Transformed t-test	11	**
IL	P - SC	HR	0.0209275	t-test	11	*
IL	P - SC	BR	0.3485936	t-test	11	
IL	P - SC	N.EDA	0.3206676	Transformed t-test	7	
IL	P - SC	N.HR	0.7421875	Wilcoxon	8	
IL	P - DT	PP	0.0015878	Transformed t-test	11	**
IL	P - DT	HR	0.0093801	t-test	11	**
IL	P - DT	BR	0.0001746	t-test	11	***
IL	P - DT	N.EDA	0.0707182	Transformed t-test	8	
IL	P - DT	N.HR	0.7421875	Wilcoxon	8	