

# 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:

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

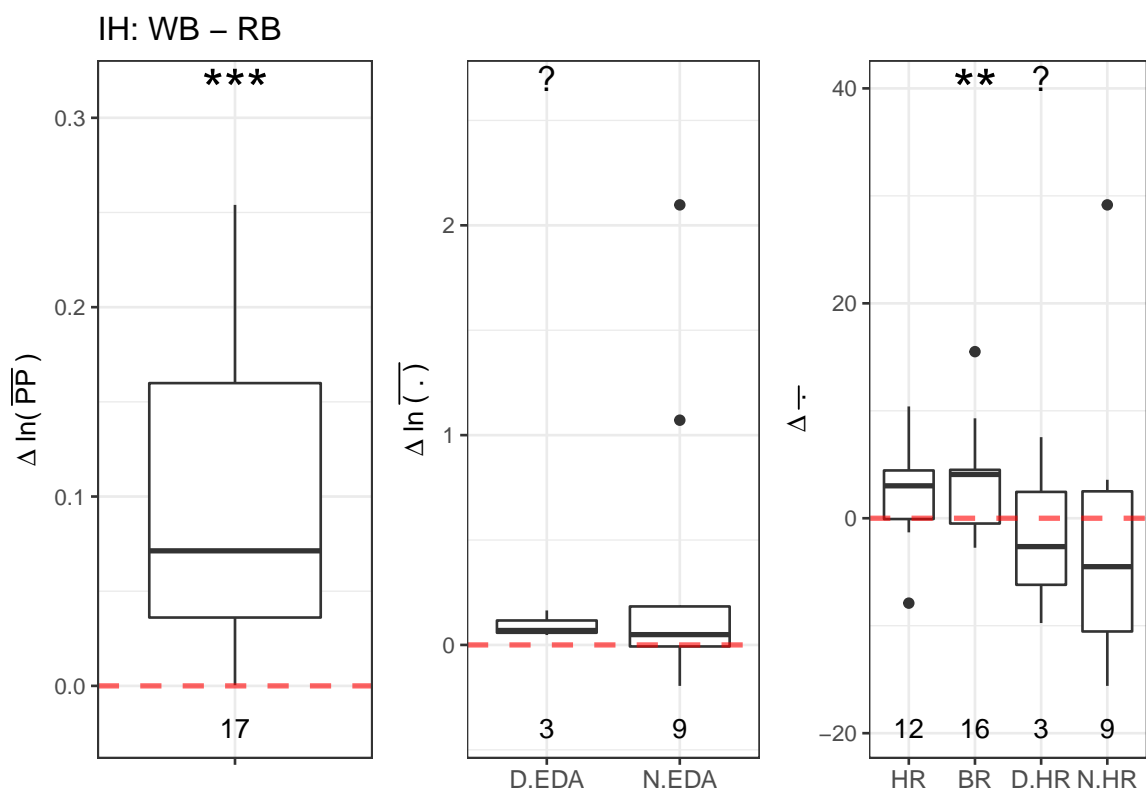
**\*\*** =  $0.001 < p \leq 0.01$

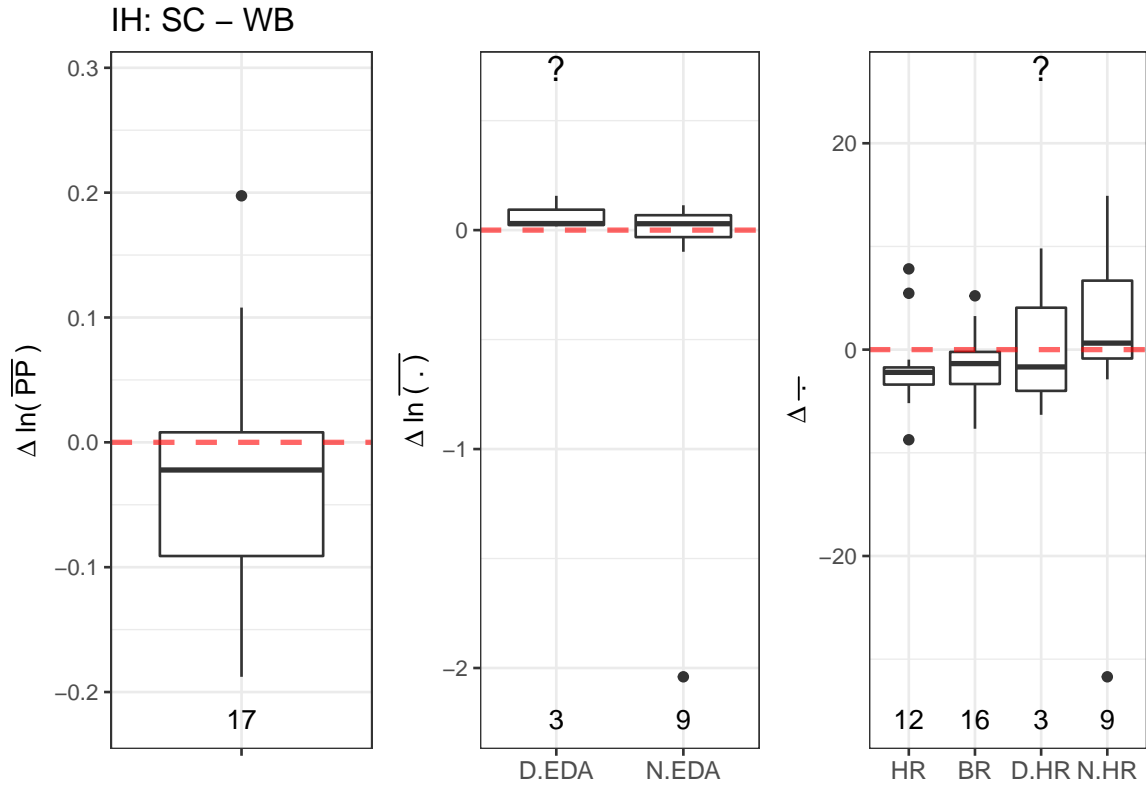
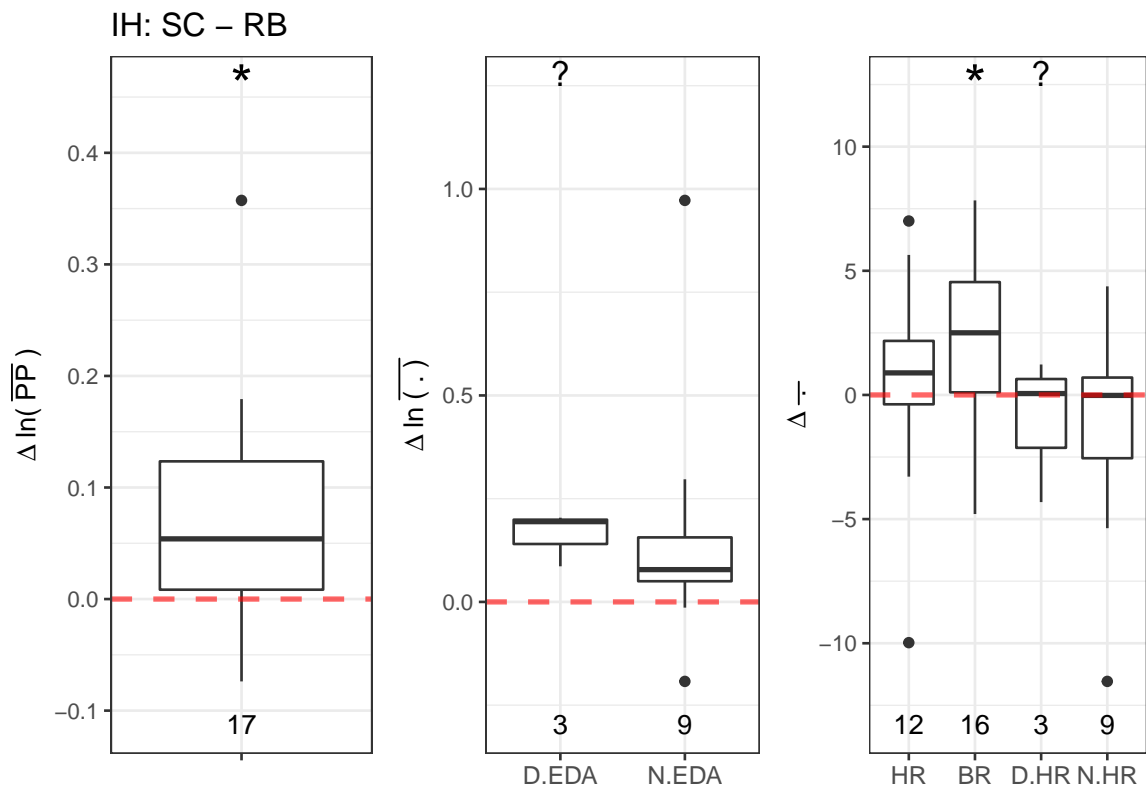
**\*\*\*** =  $p \leq 0.001$

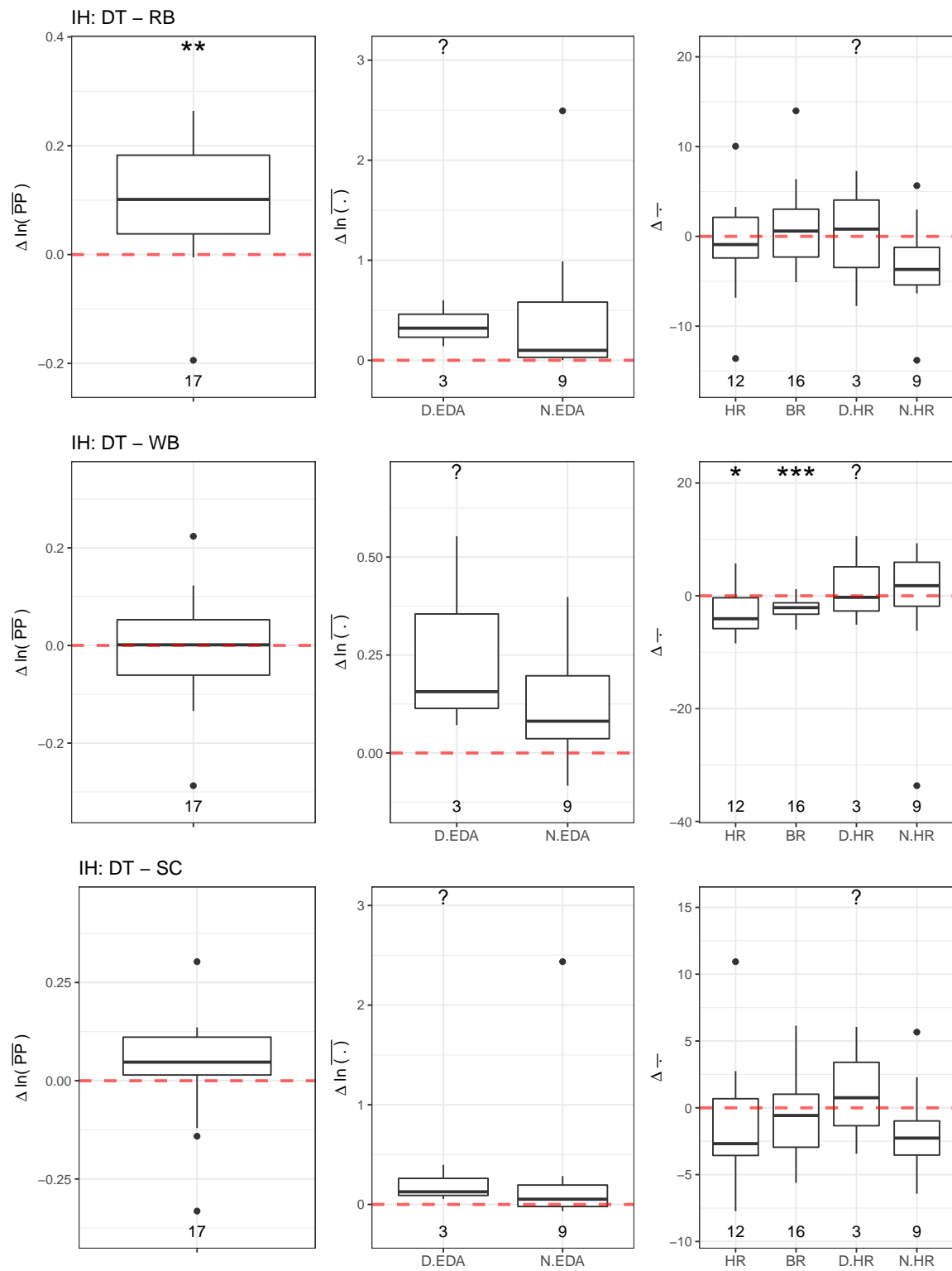
**?** = Did not run statistical test ( $n < 7$ )

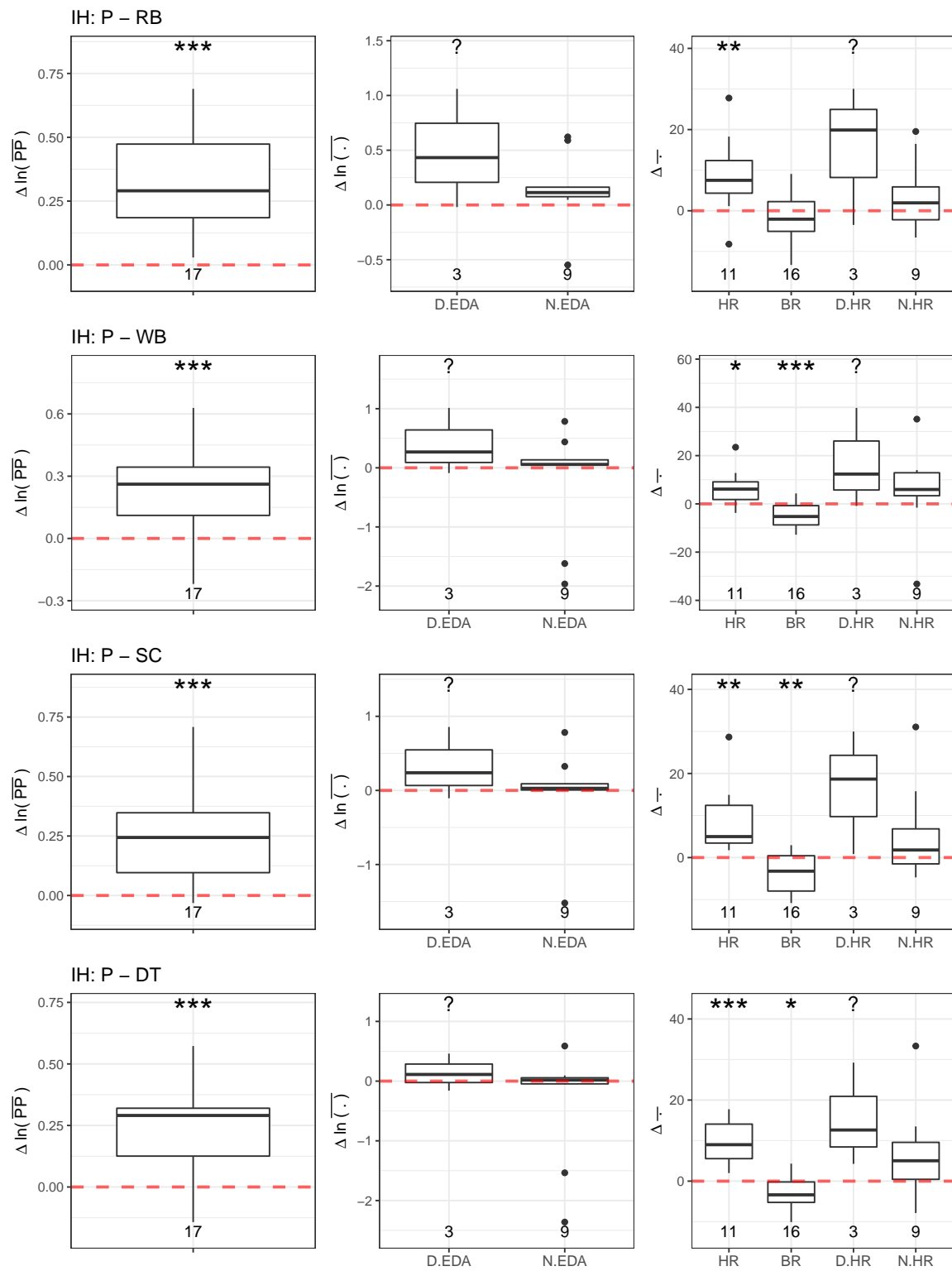
**Intermittent-High (IH)**

## Sensor Channels per Activity

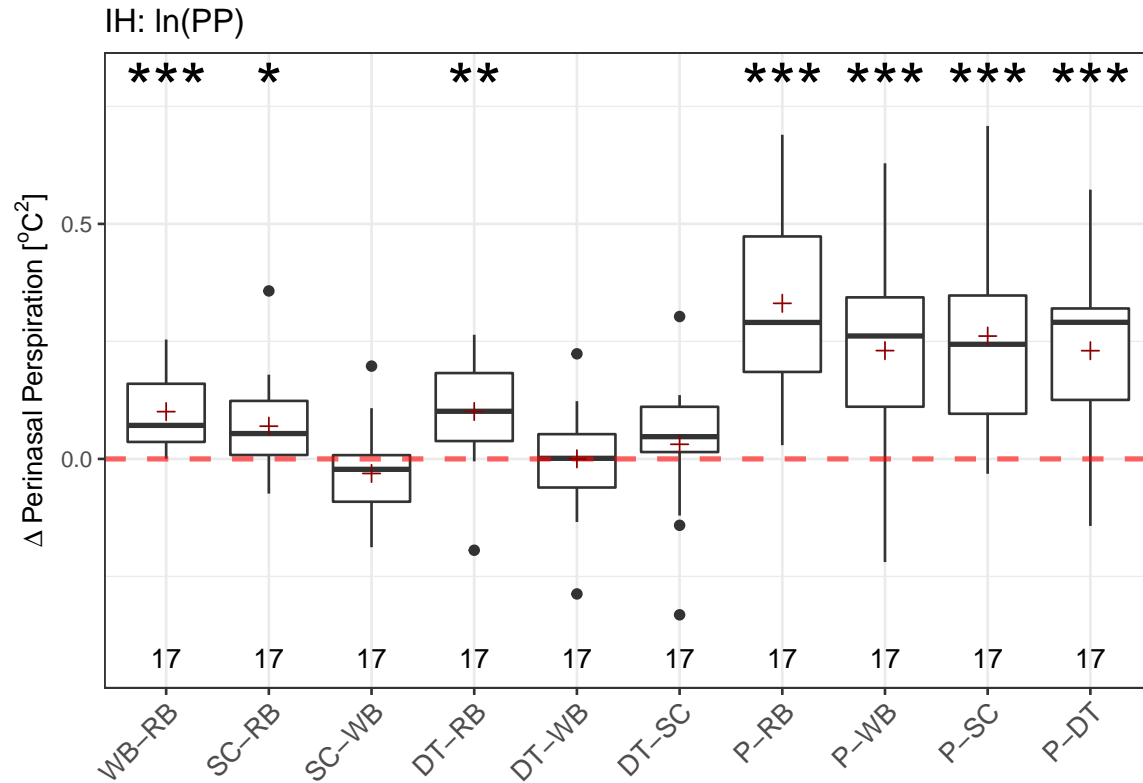








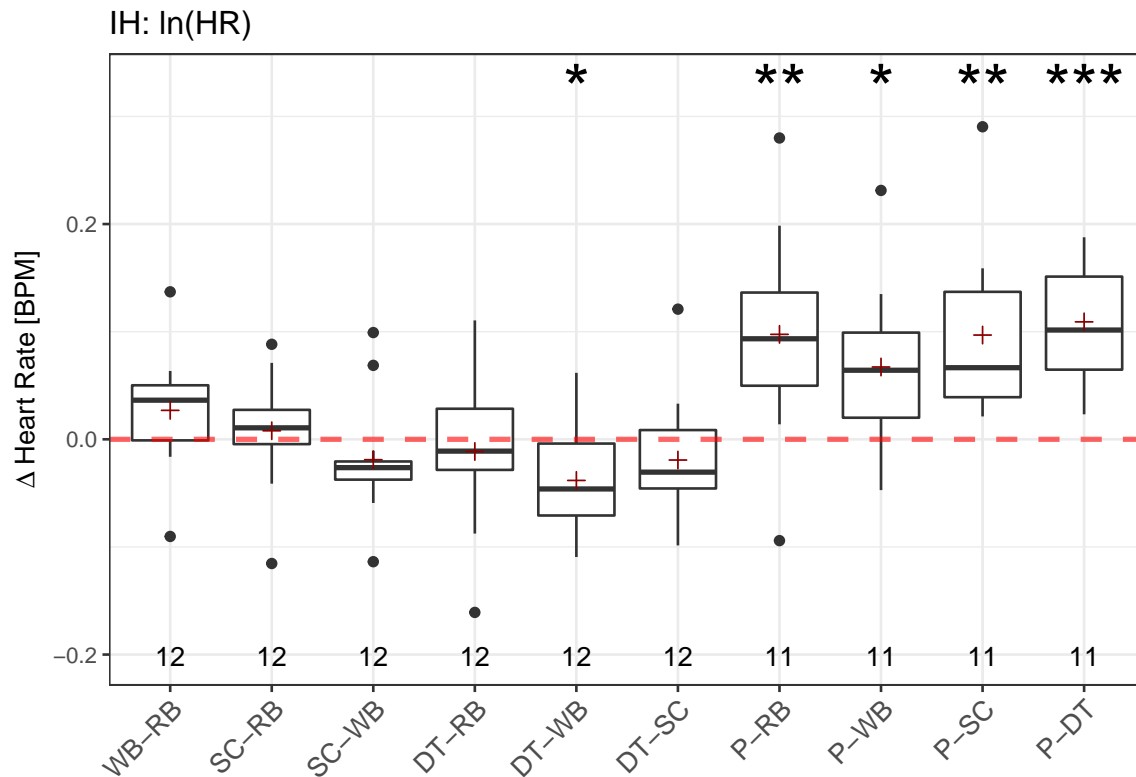
## Sensor Channel across Activities



```
## In the following tests, we applied ln(PP).
##
## Writing Baseline - Resting Baseline
## Transformed t-test p = 1e-04 < 0.001 ***
##
## Stress Condition - Resting Baseline
## Transformed t-test p = 0.0145 < 0.05 *
##
## StressCondition - Writing Baseline
## Transformed t-test p = 0.2084 > 0.05
##
## Dual Task - Resting Baseline
## Transformed t-test p = 0.0016 < 0.01 **
##
## Dual Task - Writing Baseline
## Transformed t-test p = 0.9946 > 0.05
##
## Dual Task - Stress Condition
## Transformed t-test p = 0.3697 > 0.05
##
## Presentation - Resting Baseline
## Transformed t-test p = 0 < 0.001 ***
##
```

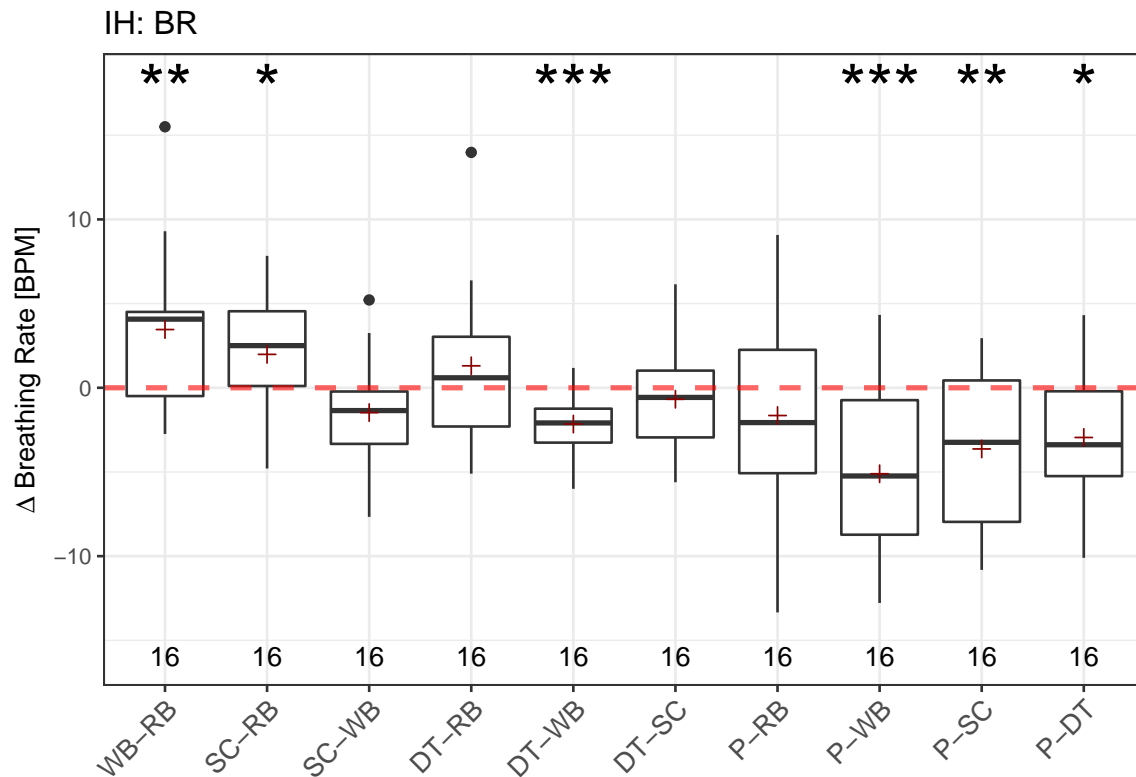
```
## Presentation - Writing Baseline
## Transformed t-test p = 2e-04 < 0.001 ***
##
## Presentation - Stress Condition
## Transformed t-test p = 1e-04 < 0.001 ***
##
## Presentation - Dual Task
## Transformed t-test p = 2e-04 < 0.001 ***
```





```
## Writing Baseline - Resting Baseline
## Transformed t-test p = 0.1185 > 0.05
##
## Stress Condition - Resting Baseline
## Transformed t-test p = 0.6095 > 0.05
##
## StressCondition - Writing Baseline
## Transformed t-test p = 0.2597 > 0.05
##
## Dual Task - Resting Baseline
## Transformed t-test p = 0.5735 > 0.05
##
## Dual Task - Writing Baseline
## Transformed t-test p = 0.0172 < 0.05  *
##
## Dual Task - Stress Condition
## Transformed t-test p = 0.2853 > 0.05
##
## Presentation - Resting Baseline
## Transformed t-test p = 0.0079 < 0.01  **
##
## Presentation - Writing Baseline
## Transformed t-test p = 0.0153 < 0.05  *
##
## Presentation - Stress Condition
## Transformed t-test p = 0.0026 < 0.01  **
```

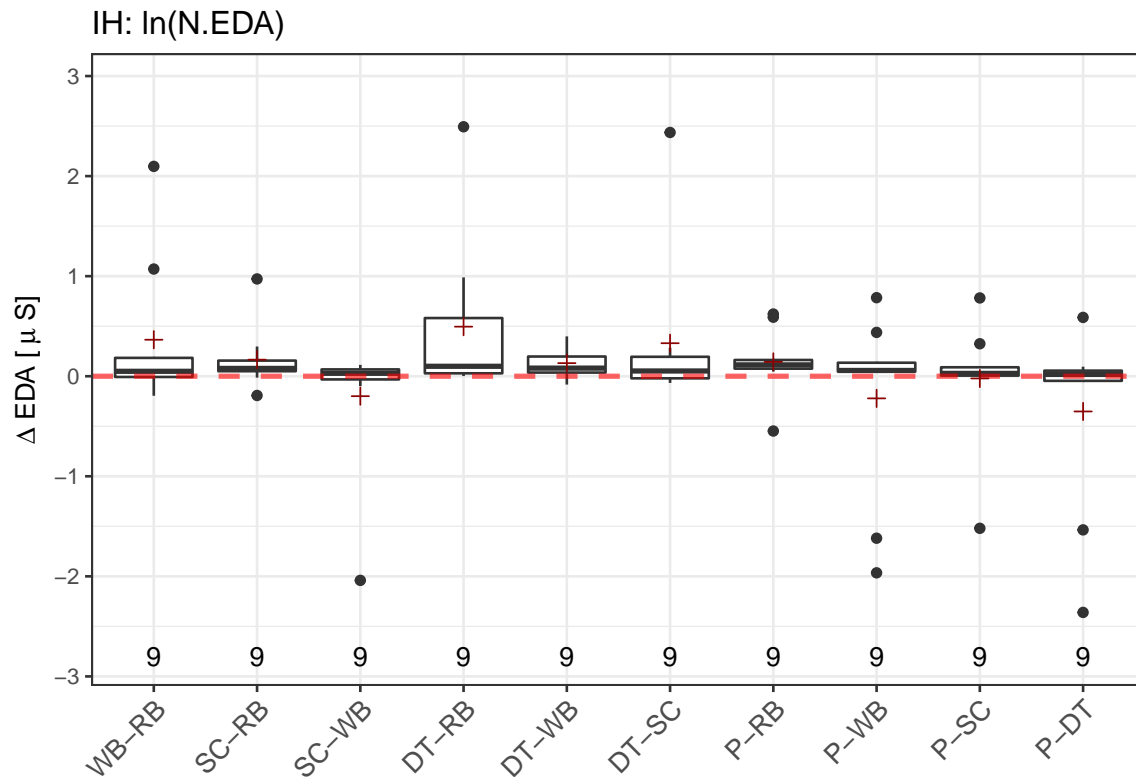
```
##  
## Presentation - Dual Task  
## Transformed t-test  $p = 0 < 0.001$  ***
```



```
## Writing Baseline - Resting Baseline
## t-test p = 0.0086 < 0.01 **
##
## Stress Condition - Resting Baseline
## t-test p = 0.0455 < 0.05 *
##
## StressCondition - Writing Baseline
## t-test p = 0.0933 > 0.05
##
## Dual Task - Resting Baseline
## t-test p = 0.2969 > 0.05
##
## Dual Task - Writing Baseline
## t-test p = 5e-04 < 0.001 ***
##
## Dual Task - Stress Condition
## t-test p = 0.3543 > 0.05
##
## Presentation - Resting Baseline
## t-test p = 0.2723 > 0.05
##
## Presentation - Writing Baseline
## t-test p = 9e-04 < 0.001 ***
##
## Presentation - Stress Condition
## t-test p = 0.0066 < 0.01 **
```

```
##  
## Presentation - Dual Task  
## t-test  $p = 0.0132 < 0.05$  *
```

```
## 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  $p = 0.1796 > 0.05$

##

## Stress Condition - Resting Baseline

## Transformed t-test  $p = 0.1701 > 0.05$

##

## StressCondition - Writing Baseline

## Transformed t-test  $p = 0.4137 > 0.05$

##

## Dual Task - Resting Baseline

## Transformed t-test  $p = 0.1074 > 0.05$

##

## Dual Task - Writing Baseline

## Transformed t-test  $p = 0.0502 > 0.05$

##

## Dual Task - Stress Condition

## Transformed t-test  $p = 0.25 > 0.05$

##

## Presentation - Resting Baseline

## Transformed t-test  $p = 0.2412 > 0.05$

##

## Presentation - Writing Baseline

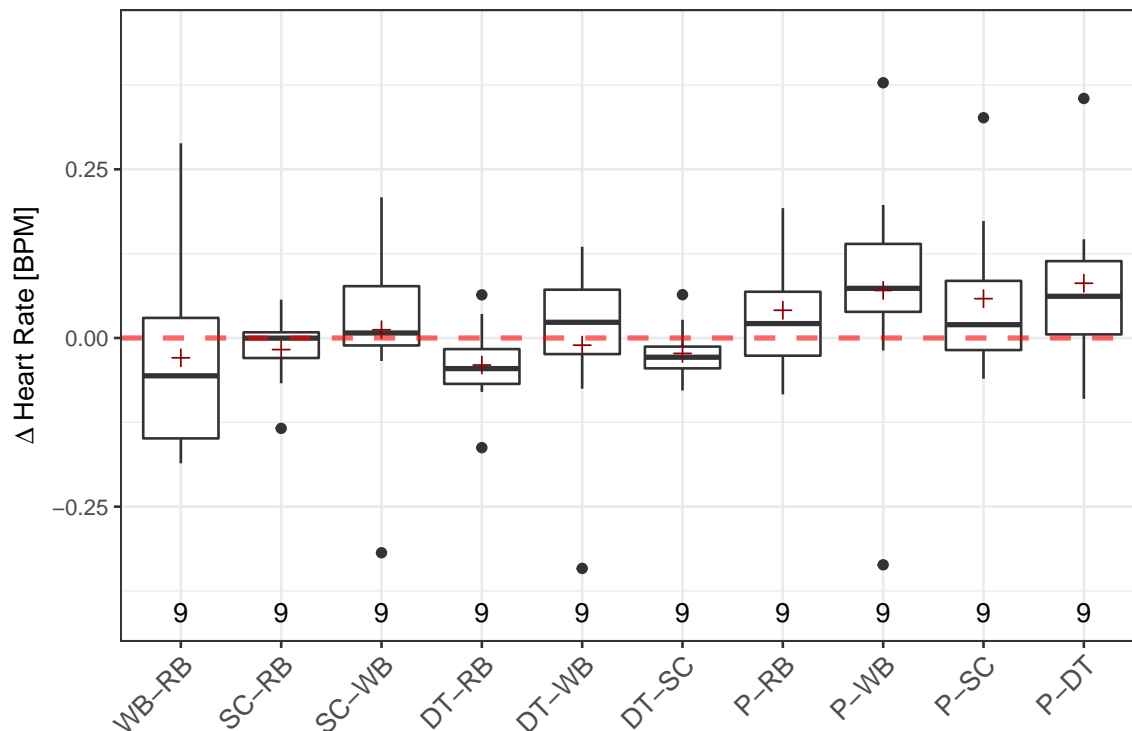
## Transformed t-test  $p = 0.494 > 0.05$

##

```
## Presentation - Stress Condition
## Transformed t-test p = 0.9167 > 0.05
##
## Presentation - Dual Task
## Transformed t-test p = 0.2971 > 0.05
```

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

IH: N.HR



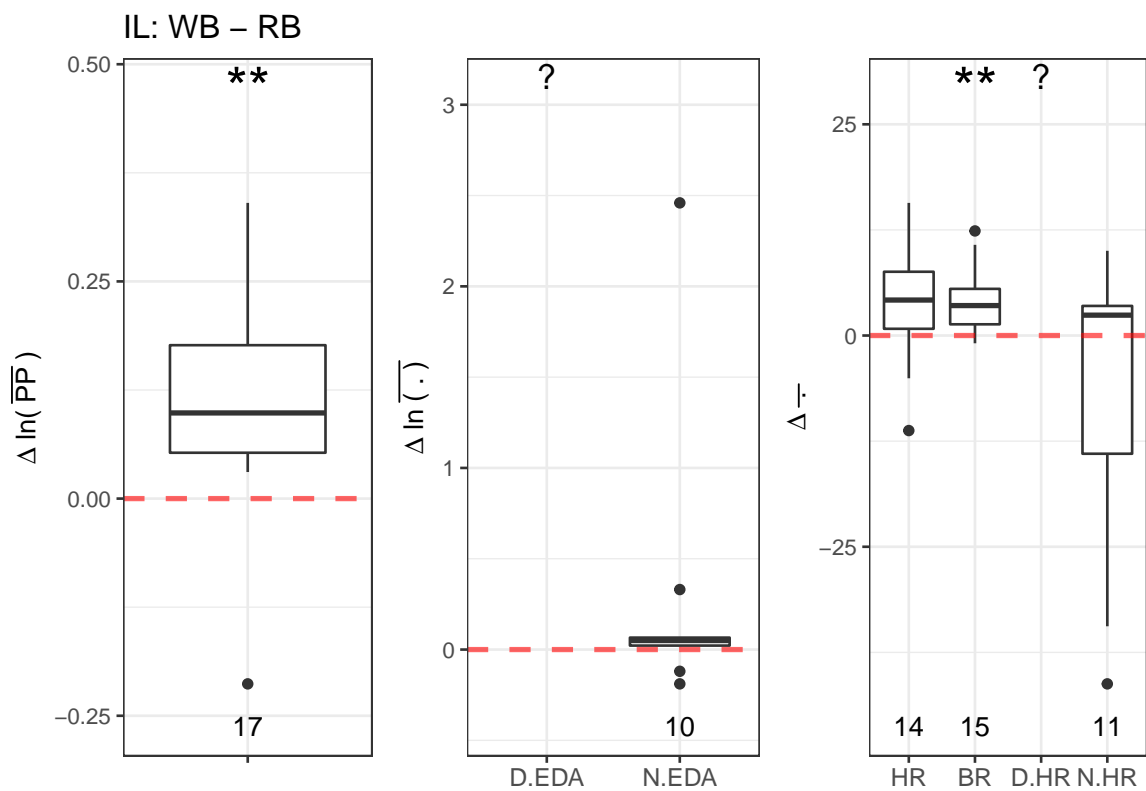
```
## In the following tests, we applied ln(N.HR).
##
## Writing Baseline - Resting Baseline
## Wilcoxon p = 0.3594 > 0.05
##
## Stress Condition - Resting Baseline
## Wilcoxon p = 0.6523 > 0.05
##
## StressCondition - Writing Baseline
## Wilcoxon p = 0.4961 > 0.05
##
## Dual Task - Resting Baseline
## Wilcoxon p = 0.1289 > 0.05
##
## Dual Task - Writing Baseline
## Wilcoxon p = 0.7344 > 0.05
##
## Dual Task - Stress Condition
## Wilcoxon p = 0.1641 > 0.05
##
## Presentation - Resting Baseline
## Wilcoxon p = 0.4258 > 0.05
##
## Presentation - Writing Baseline
## Wilcoxon p = 0.1289 > 0.05
##
```

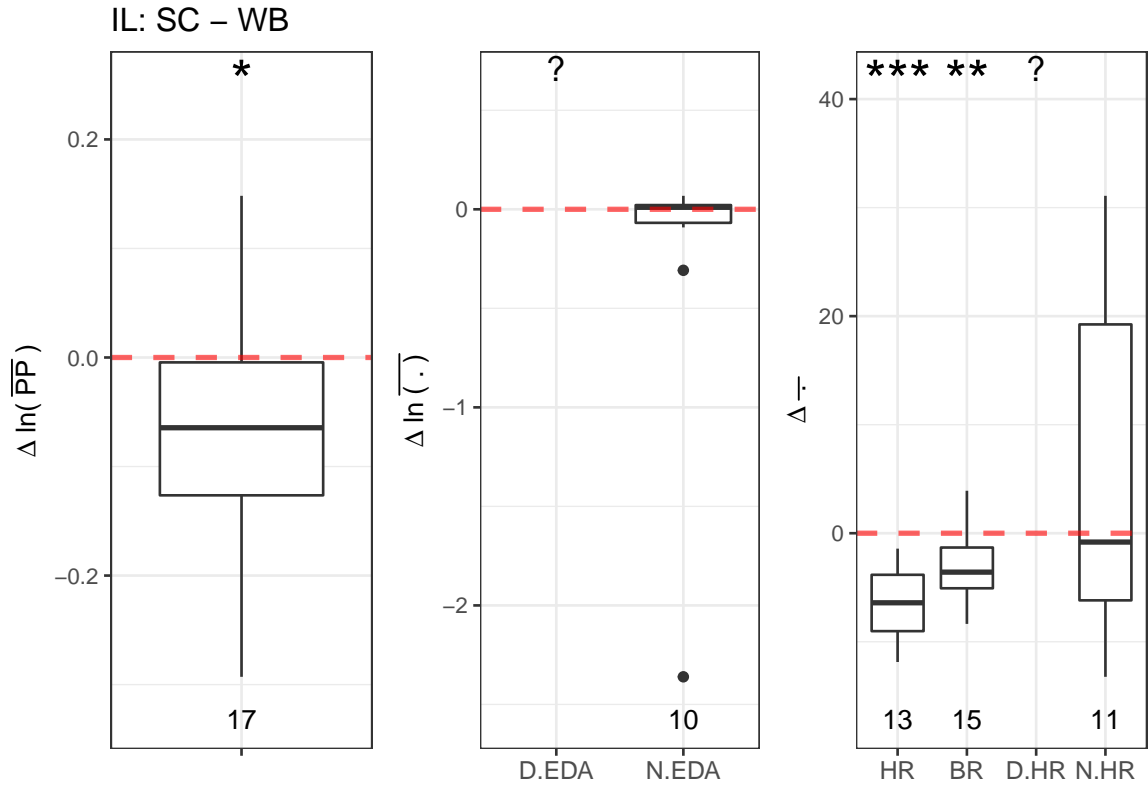
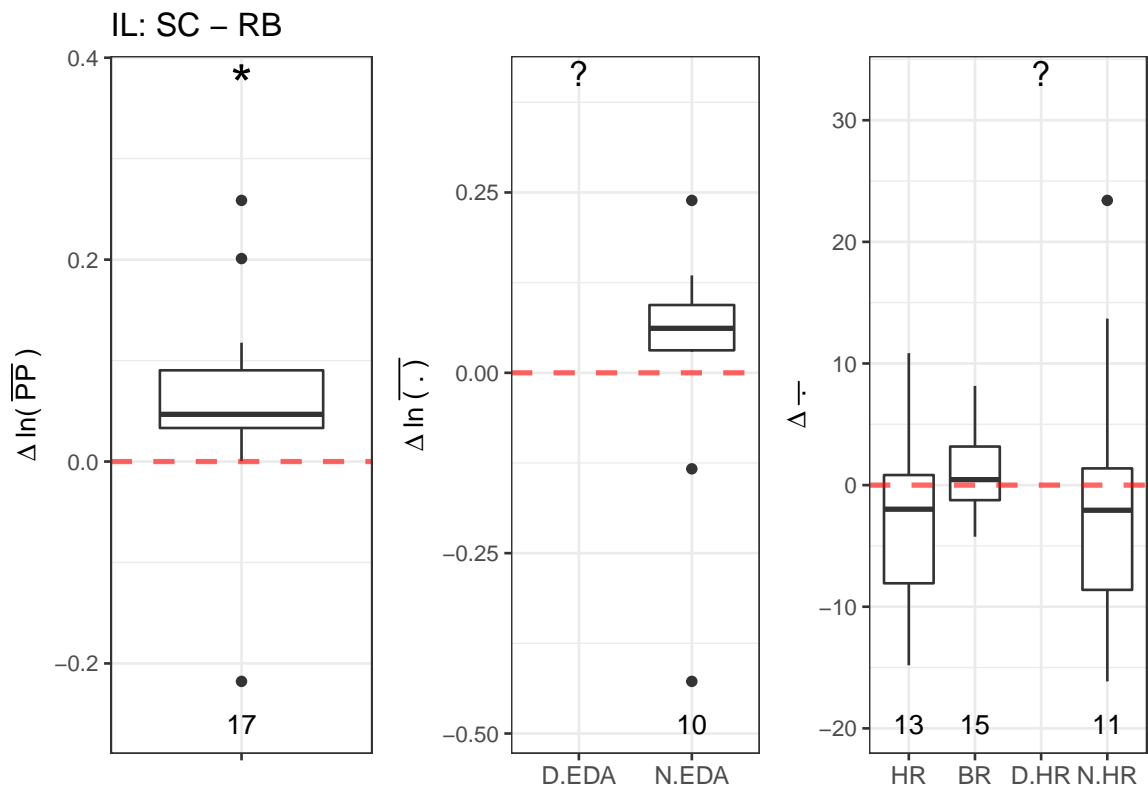
```
## Presentation - Stress Condition
## Wilcoxon p = 0.3008 > 0.05
##
## Presentation - Dual Task
## Wilcoxon p = 0.0742 > 0.05
```

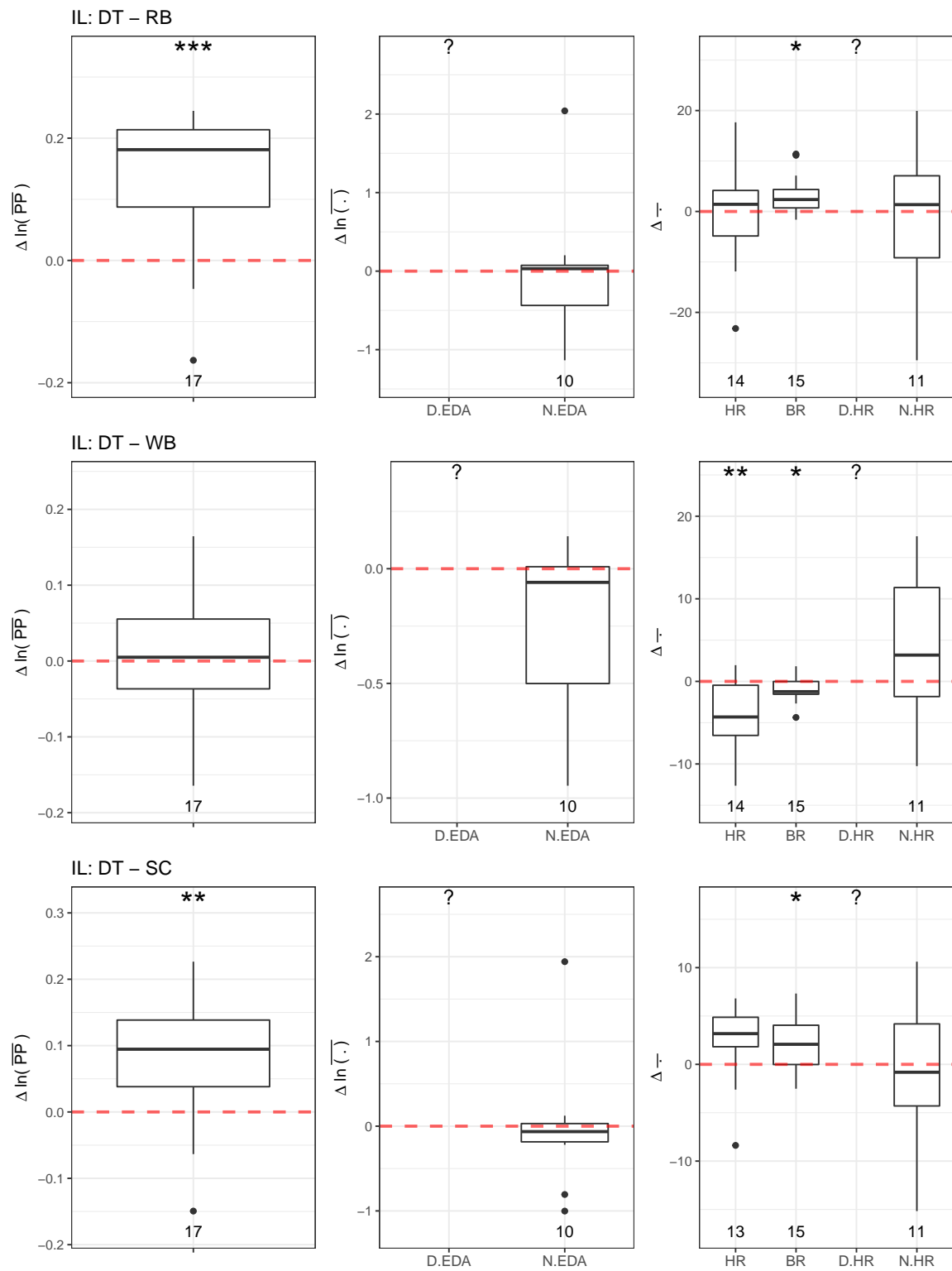


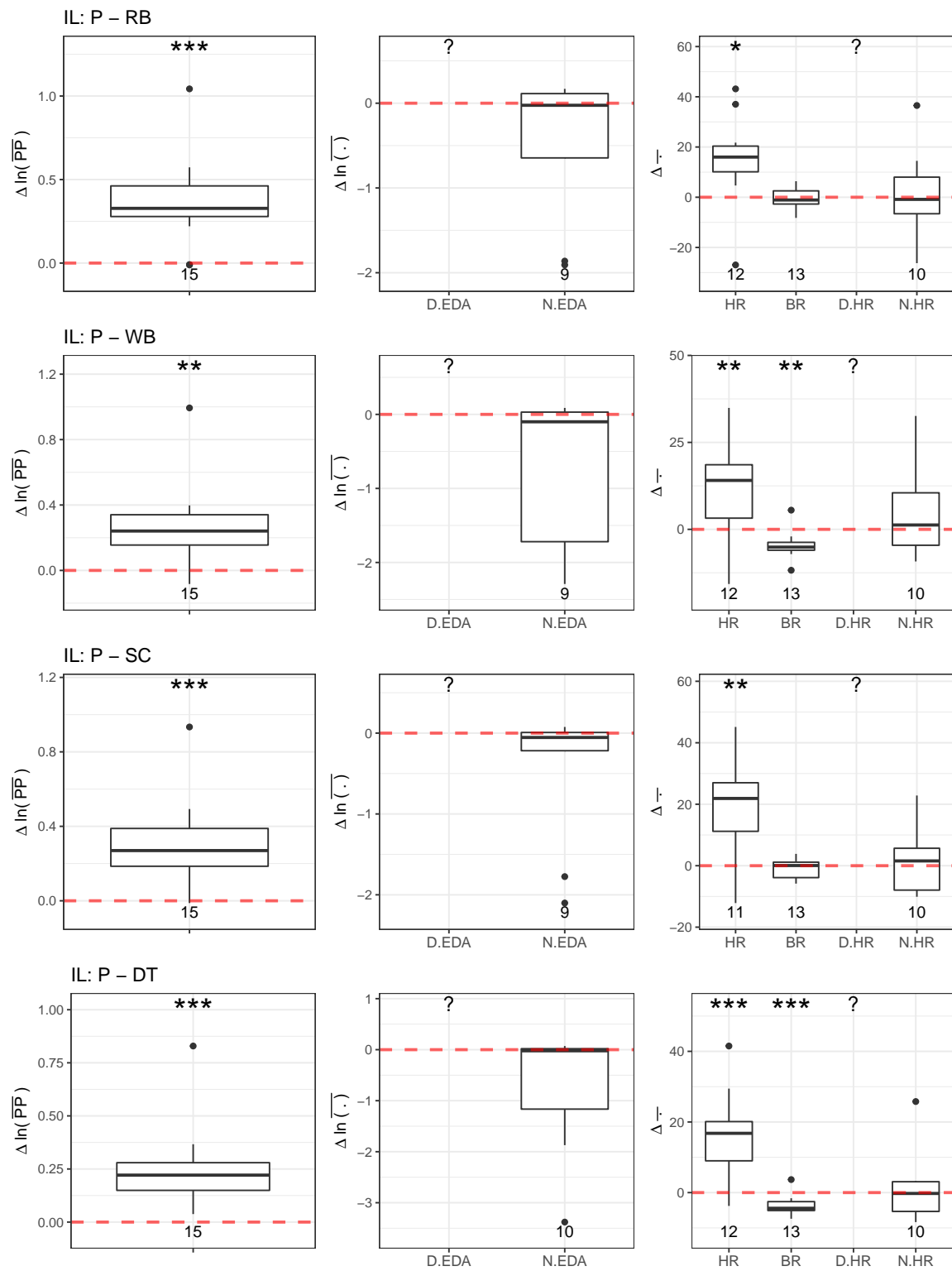
**Intermittent-Low (IL)**

## Sensor Channels per Activity

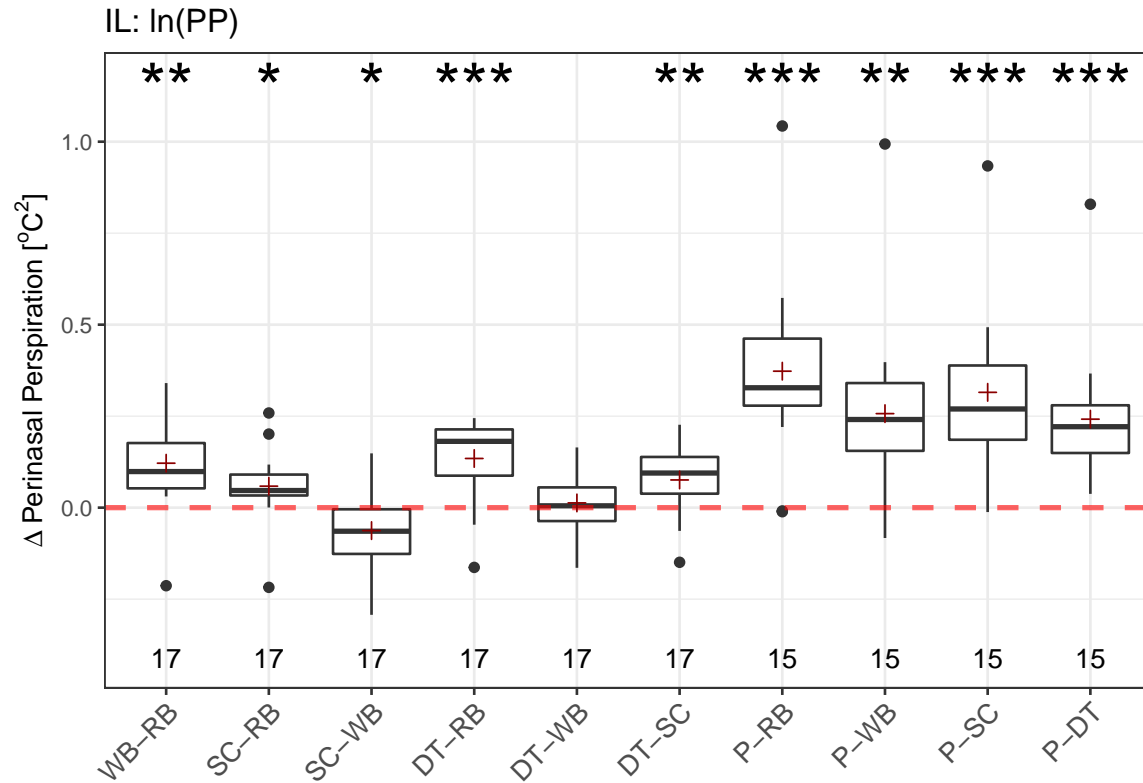






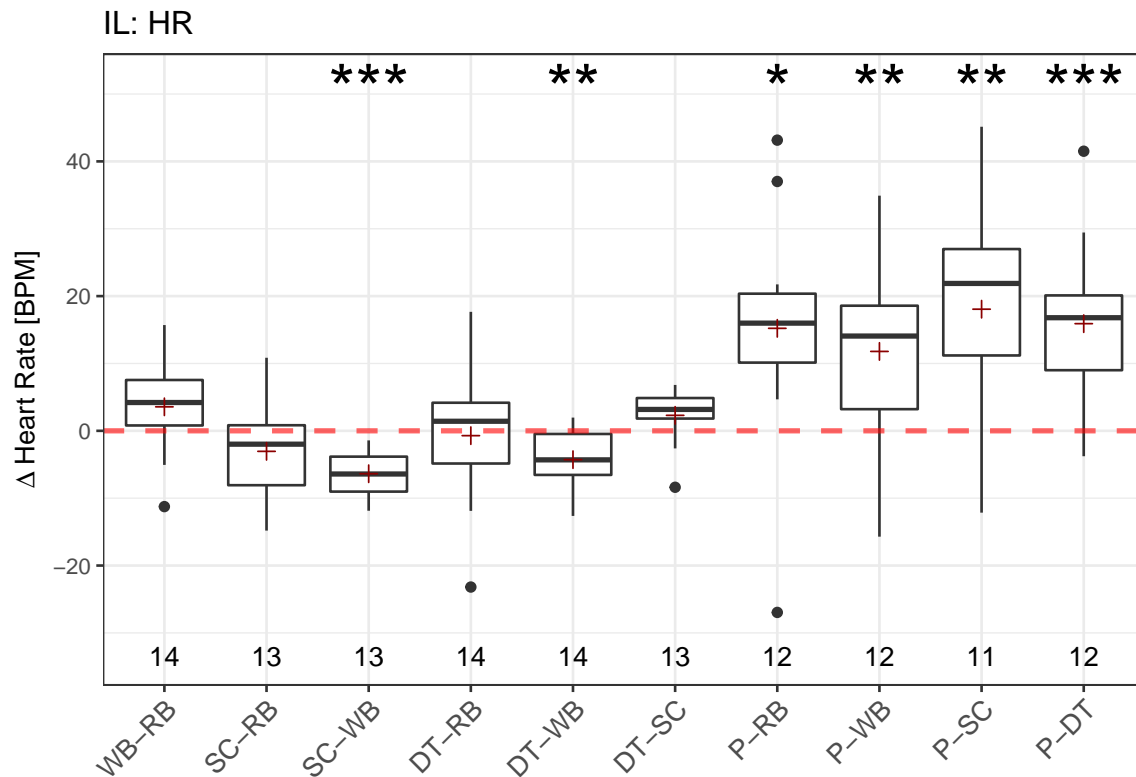


## Sensor Channel across Activities



```
## Writing Baseline - Resting Baseline
## Transformed t-test p = 0.0012 < 0.01  **
##
## Stress Condition - Resting Baseline
## Transformed t-test p = 0.0261 < 0.05  *
##
## StressCondition - Writing Baseline
## Transformed t-test p = 0.0272 < 0.05  *
##
## Dual Task - Resting Baseline
## Transformed t-test p = 2e-04 < 0.001  ***
##
## Dual Task - Writing Baseline
## Transformed t-test p = 0.561 > 0.05
##
## Dual Task - Stress Condition
## Transformed t-test p = 0.0054 < 0.01  **
##
## Presentation - Resting Baseline
## Transformed t-test p = 0 < 0.001  ***
##
## Presentation - Writing Baseline
## Transformed t-test p = 0.0013 < 0.01  **
```

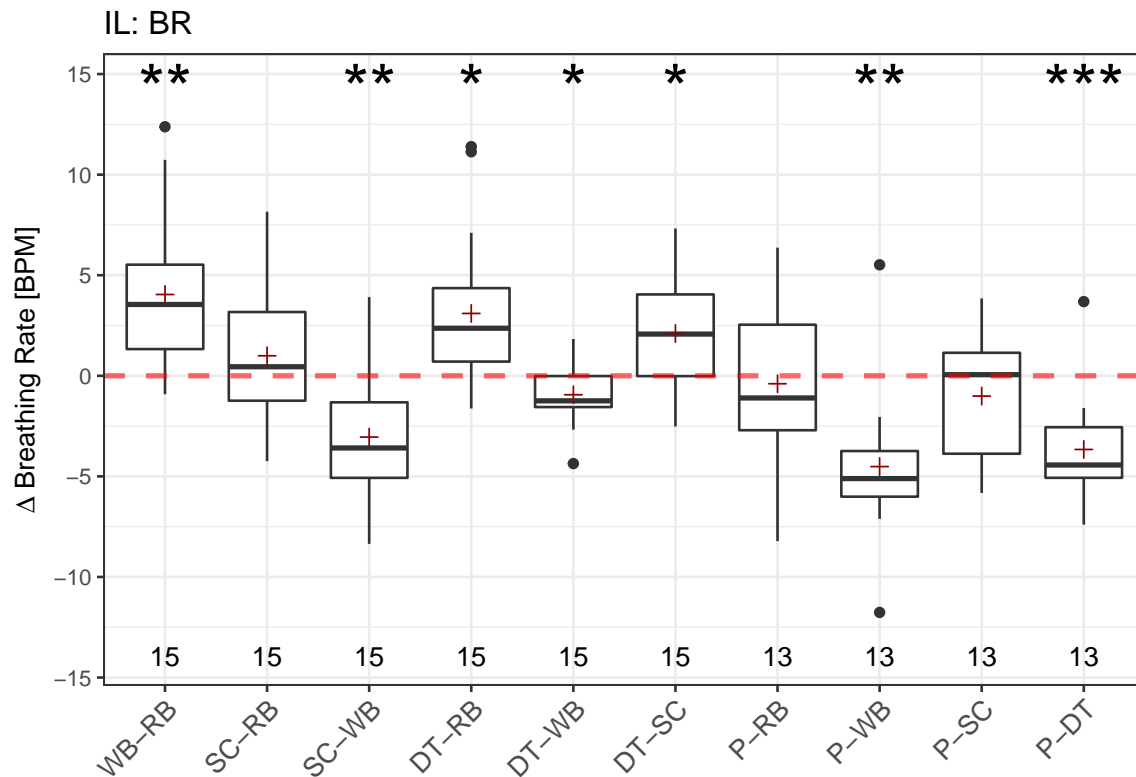
```
##
## Presentation - Stress Condition
## Transformed t-test p = 1e-04 < 0.001 ***
##
## Presentation - Dual Task
## Transformed t-test p = 2e-04 < 0.001 ***
```



```
## Writing Baseline - Resting Baseline
## t-test p = 0.0689 > 0.05
##
## Stress Condition - Resting Baseline
## t-test p = 0.1422 > 0.05
##
## StressCondition - Writing Baseline
## t-test p = 0 < 0.001 ***
##
## Dual Task - Resting Baseline
## t-test p = 0.7837 > 0.05
##
## Dual Task - Writing Baseline
## t-test p = 0.0043 < 0.01 **
##
## Dual Task - Stress Condition
## t-test p = 0.0676 > 0.05
##
## Presentation - Resting Baseline
## t-test p = 0.0111 < 0.05 *
##
## Presentation - Writing Baseline
## t-test p = 0.0089 < 0.01 **
##
## Presentation - Stress Condition
## t-test p = 0.0027 < 0.01 **
```



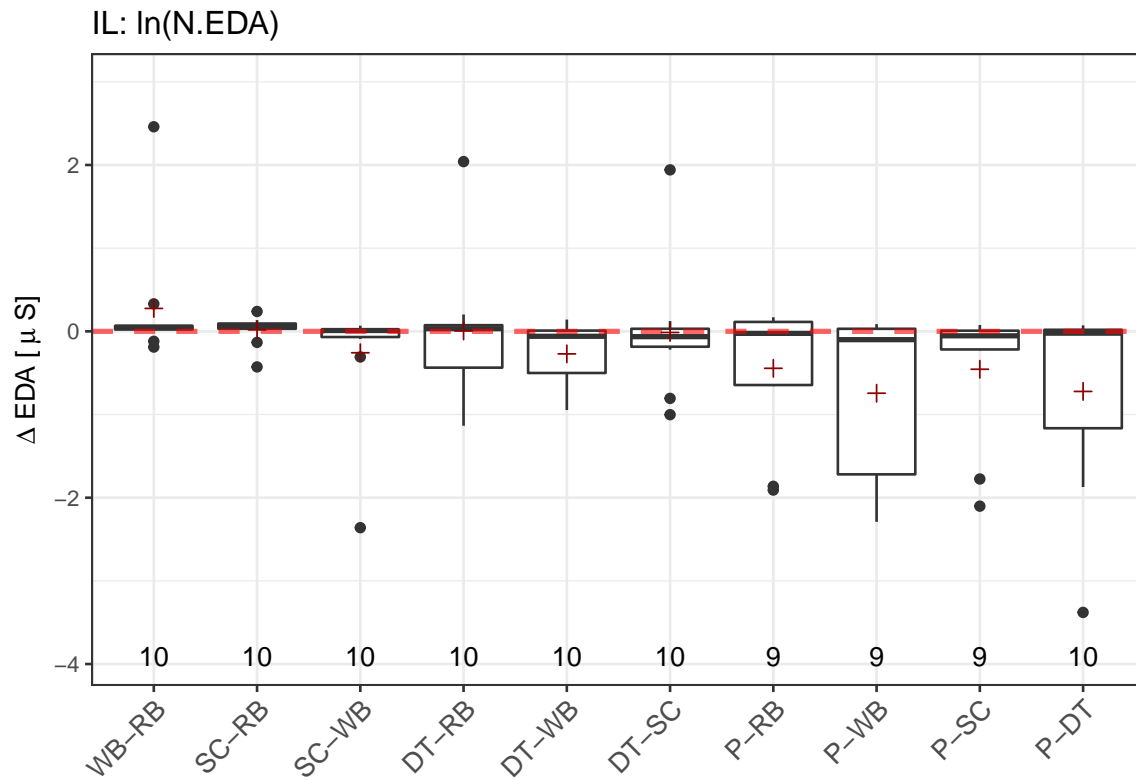
```
##  
## Presentation - Dual Task  
## t-test  $p = 0.001 < 0.001$  ***
```



```
## Writing Baseline - Resting Baseline
## t-test p = 0.0011 < 0.01 **
##
## Stress Condition - Resting Baseline
## t-test p = 0.2825 > 0.05
##
## StressCondition - Writing Baseline
## t-test p = 0.003 < 0.01 **
##
## Dual Task - Resting Baseline
## t-test p = 0.0104 < 0.05 *
##
## Dual Task - Writing Baseline
## t-test p = 0.0371 < 0.05 *
##
## Dual Task - Stress Condition
## t-test p = 0.0181 < 0.05 *
##
## Presentation - Resting Baseline
## t-test p = 0.7417 > 0.05
##
## Presentation - Writing Baseline
## t-test p = 0.0011 < 0.01 **
##
## Presentation - Stress Condition
## t-test p = 0.2559 > 0.05
```

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

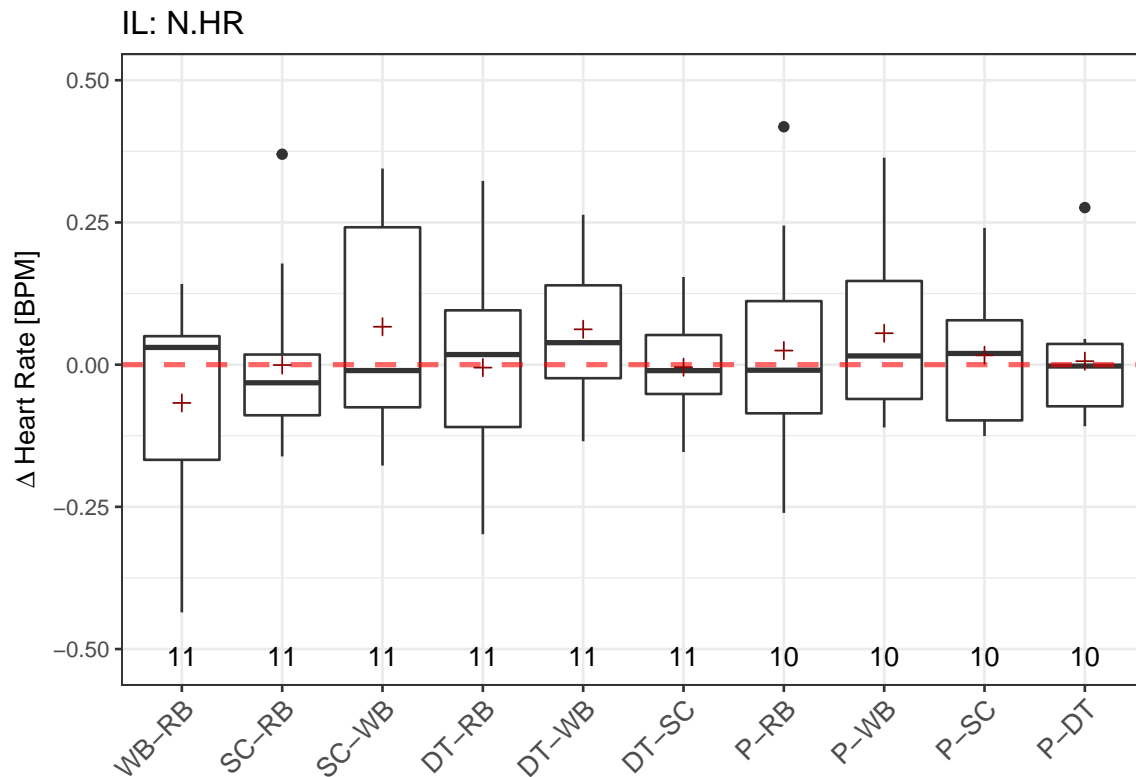
```
## IL has LESS than 7 subjects for D.EDA. Cannot continue with test.  
## -----
```



```
## Writing Baseline - Resting Baseline
## Transformed t-test p = 0.2924 > 0.05
##
## Stress Condition - Resting Baseline
## Transformed t-test p = 0.7611 > 0.05
##
## StressCondition - Writing Baseline
## Transformed t-test p = 0.3039 > 0.05
##
## Dual Task - Resting Baseline
## Transformed t-test p = 0.9865 > 0.05
##
## Dual Task - Writing Baseline
## Transformed t-test p = 0.0616 > 0.05
##
## Dual Task - Stress Condition
## Transformed t-test p = 0.9577 > 0.05
##
## Presentation - Resting Baseline
## Transformed t-test p = 0.1563 > 0.05
##
## Presentation - Writing Baseline
## Transformed t-test p = 0.0602 > 0.05
##
## Presentation - Stress Condition
## Transformed t-test p = 0.1459 > 0.05
```

```
##  
## Presentation - Dual Task  
## Transformed t-test  $p = 0.0791 > 0.05$ 
```

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



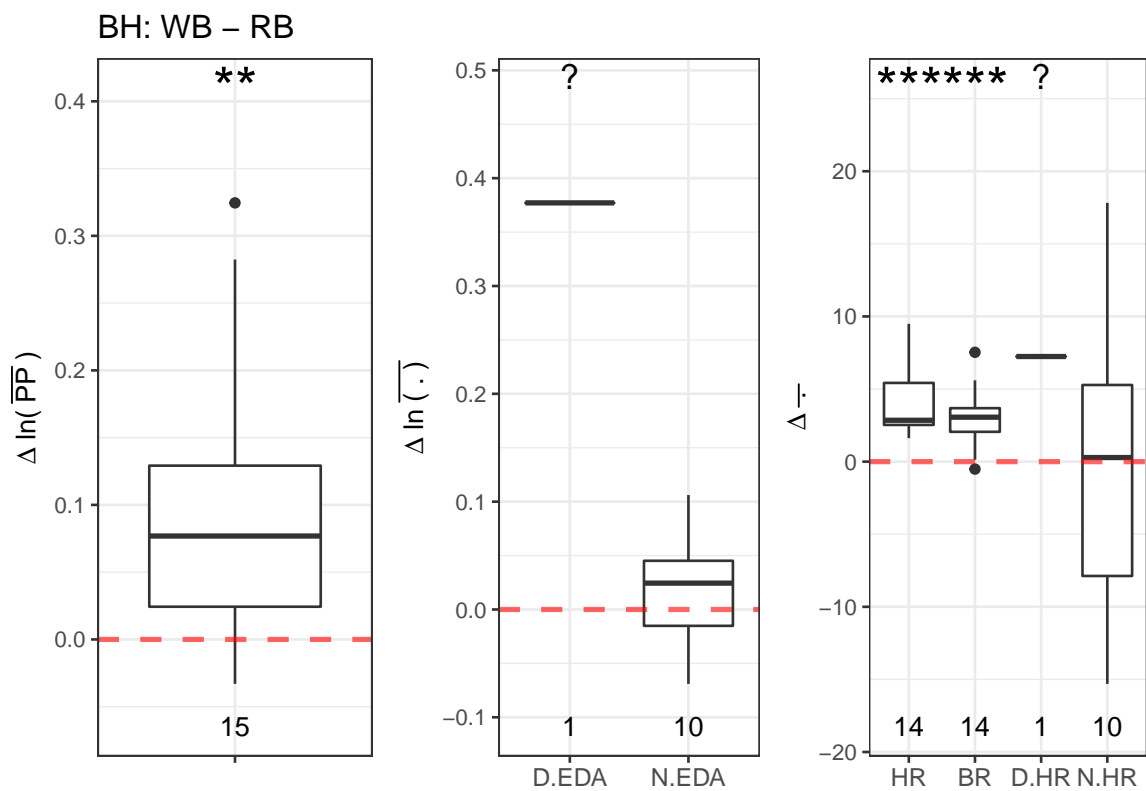
```
## Writing Baseline - Resting Baseline
## Wilcoxon p = 0.8984 > 0.05
##
## Stress Condition - Resting Baseline
## Wilcoxon p = 0.5195 > 0.05
##
## StressCondition - Writing Baseline
## Wilcoxon p = 0.4648 > 0.05
##
## Dual Task - Resting Baseline
## Wilcoxon p = 0.8311 > 0.05
##
## Dual Task - Writing Baseline
## Wilcoxon p = 0.1016 > 0.05
##
## Dual Task - Stress Condition
## Wilcoxon p = 1 > 0.05
##
## Presentation - Resting Baseline
## Wilcoxon p = 1 > 0.05
##
## Presentation - Writing Baseline
## Wilcoxon p = 0.375 > 0.05
##
## Presentation - Stress Condition
## Wilcoxon p = 0.8457 > 0.05
```

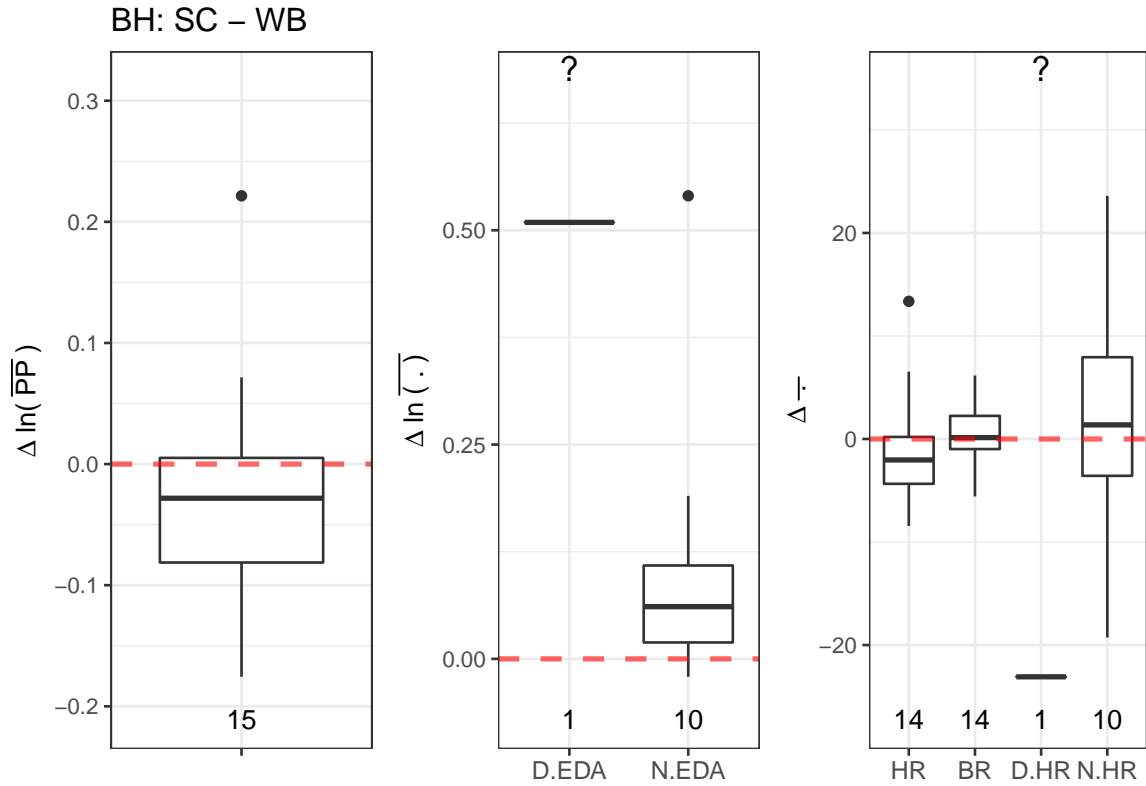
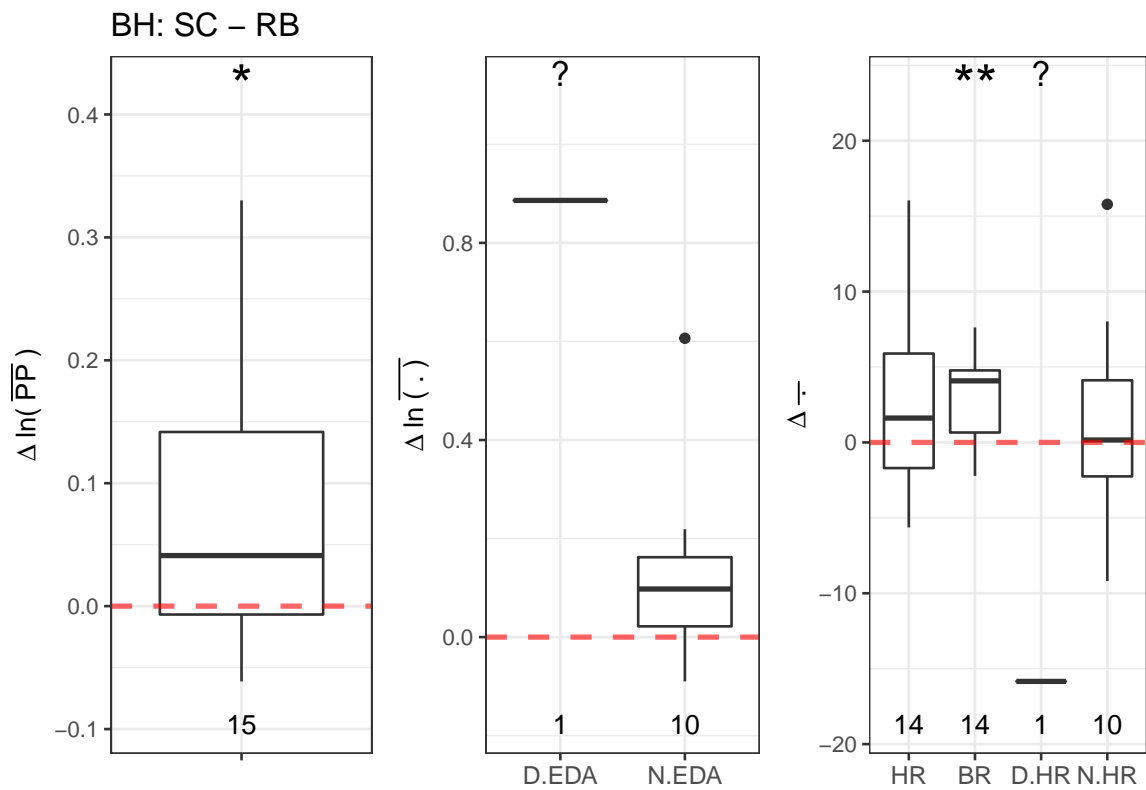
```
##  
## Presentation - Dual Task  
## Wilcoxon p = 0.6953 > 0.05
```

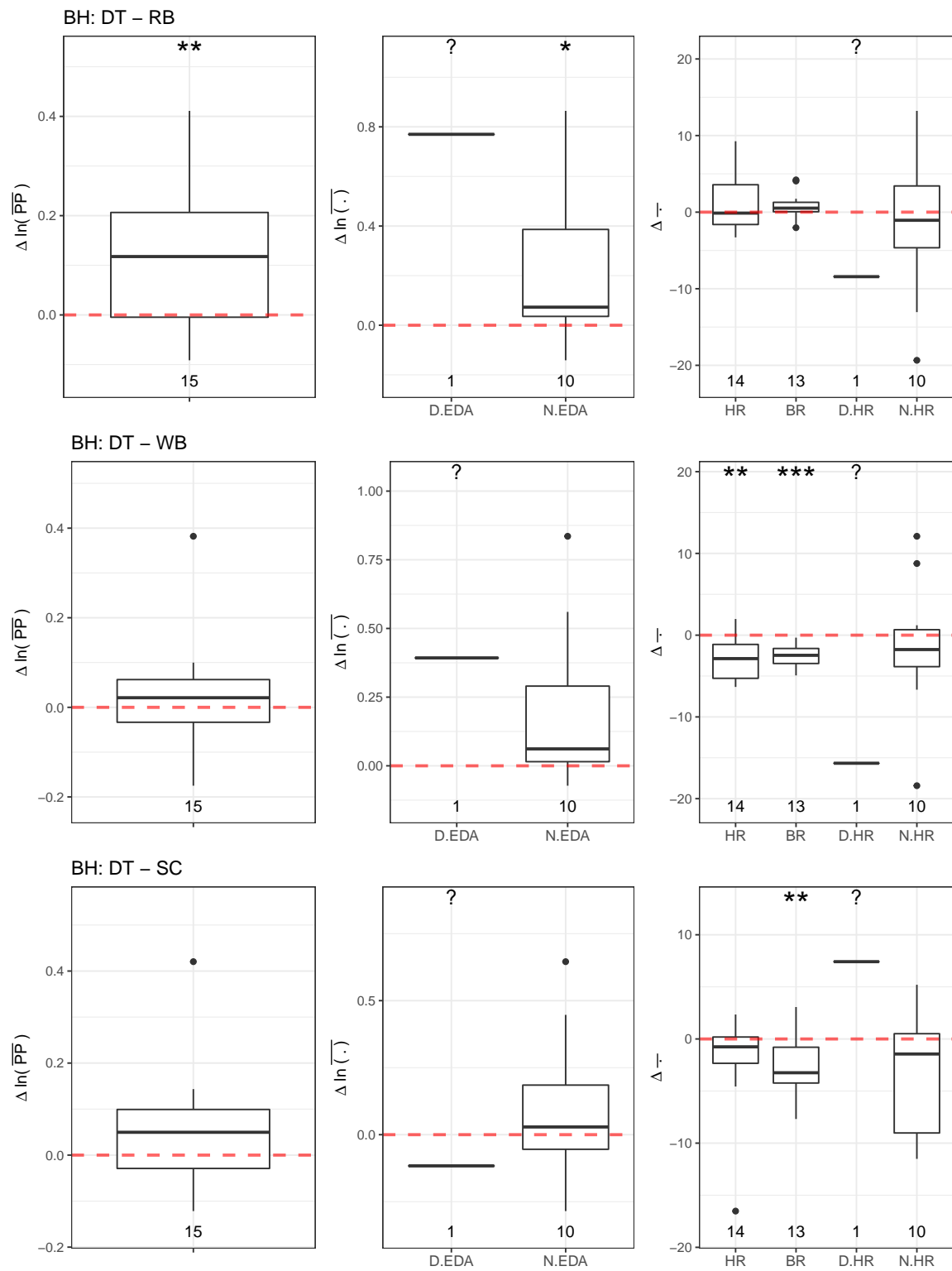
**Batch-High (BH)**

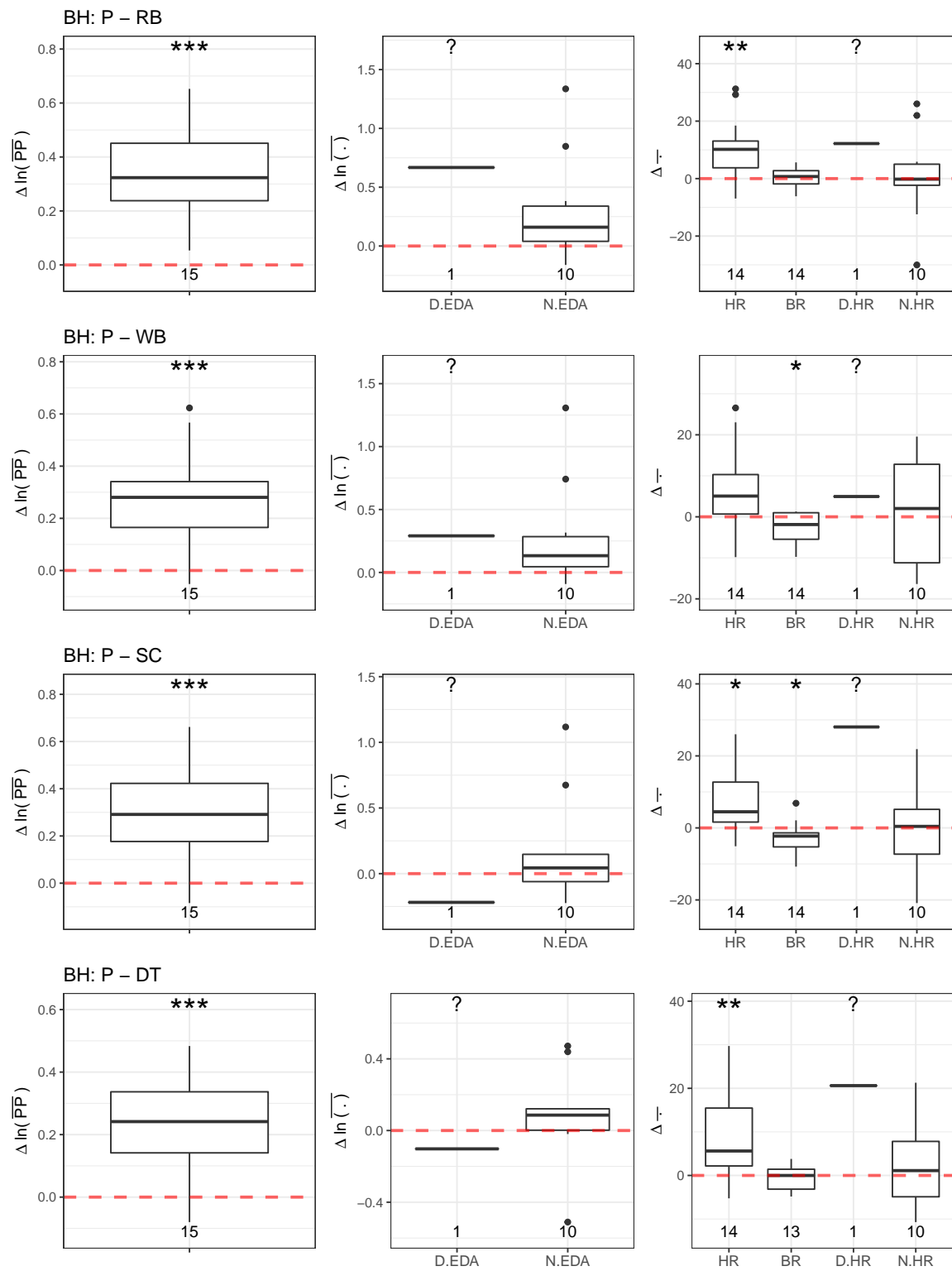


## Sensor Channels per Activity

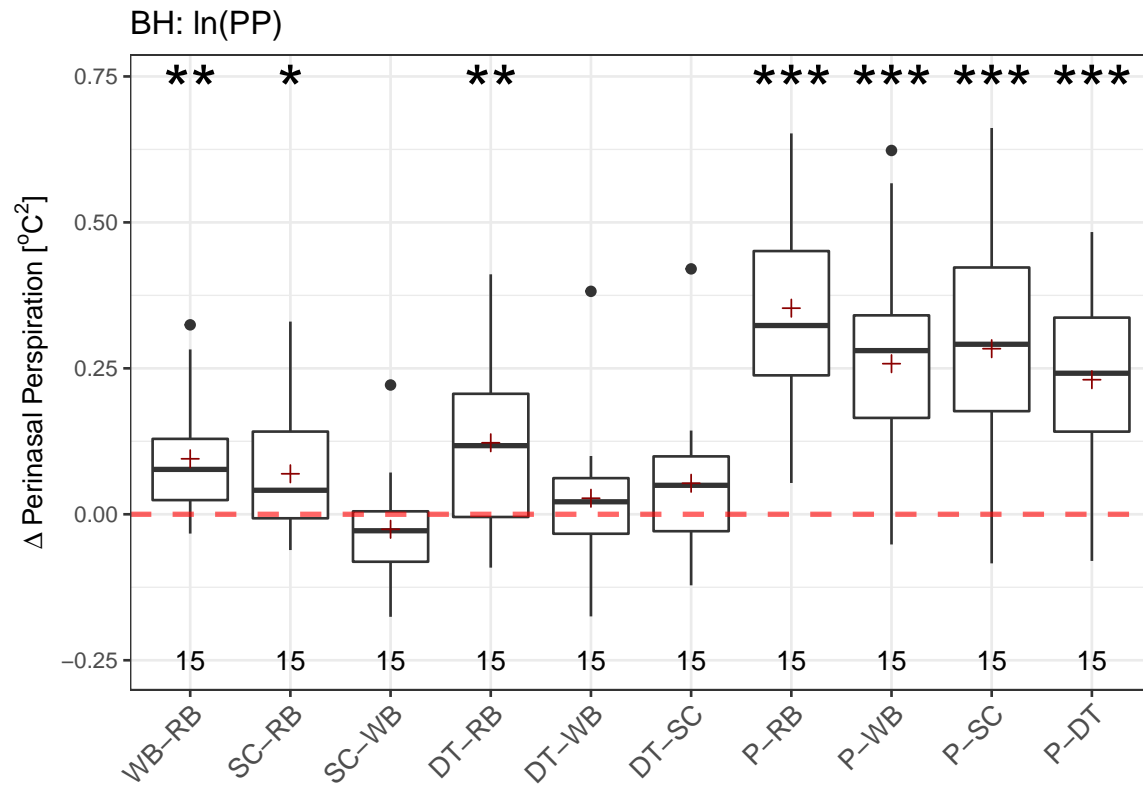






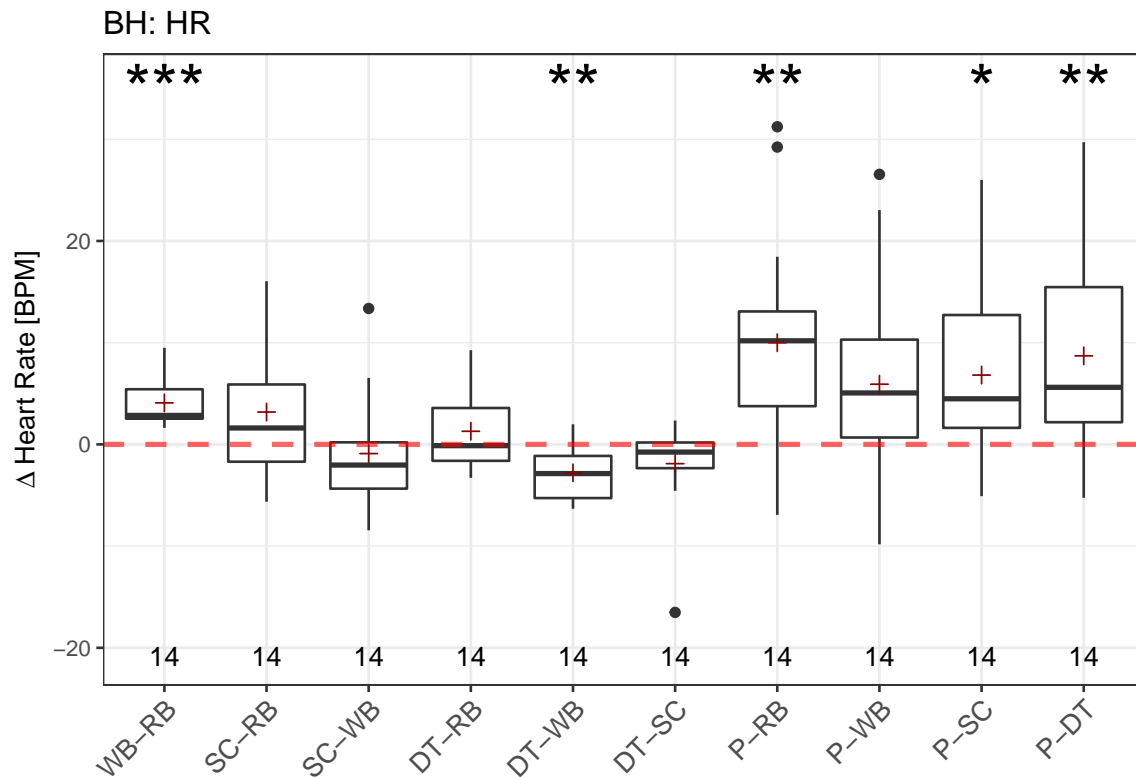


## Sensor Channel across Activities



```
## Writing Baseline - Resting Baseline
## Transformed t-test p = 0.0039 < 0.01  **
##
## Stress Condition - Resting Baseline
## Transformed t-test p = 0.0215 < 0.05  *
##
## StressCondition - Writing Baseline
## Transformed t-test p = 0.3011 > 0.05
##
## Dual Task - Resting Baseline
## Transformed t-test p = 0.0032 < 0.01  **
##
## Dual Task - Writing Baseline
## Transformed t-test p = 0.3915 > 0.05
##
## Dual Task - Stress Condition
## Transformed t-test p = 0.1264 > 0.05
##
## Presentation - Resting Baseline
## Transformed t-test p = 0 < 0.001  ***
##
## Presentation - Writing Baseline
## Transformed t-test p = 1e-04 < 0.001  ***
```

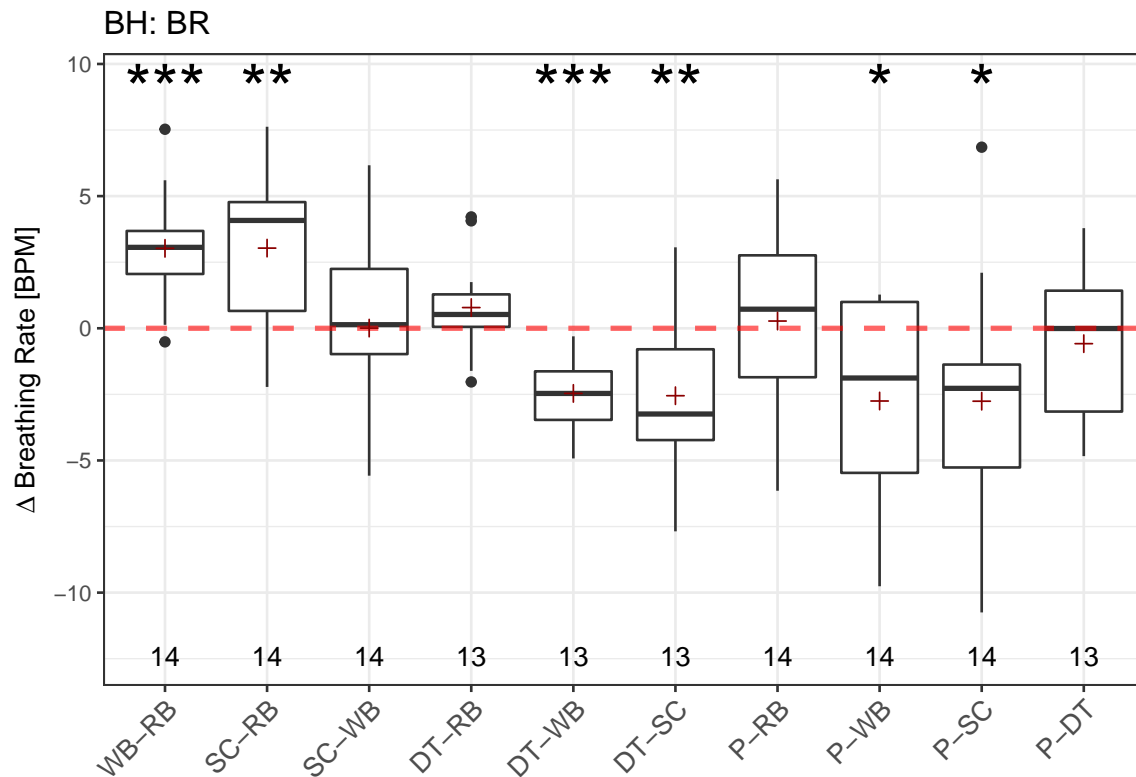
```
##  
## Presentation - Stress Condition  
## Transformed t-test p = 1e-04 < 0.001 ***  
##  
## Presentation - Dual Task  
## Transformed t-test p = 0 < 0.001 ***
```



```
## Writing Baseline - Resting Baseline
## t-test p = 0 < 0.001 ***
##
## Stress Condition - Resting Baseline
## t-test p = 0.0805 > 0.05
##
## StressCondition - Writing Baseline
## t-test p = 0.559 > 0.05
##
## Dual Task - Resting Baseline
## t-test p = 0.2422 > 0.05
##
## Dual Task - Writing Baseline
## t-test p = 0.0017 < 0.01 **
##
## Dual Task - Stress Condition
## t-test p = 0.1489 > 0.05
##
## Presentation - Resting Baseline
## t-test p = 0.0051 < 0.01 **
##
## Presentation - Writing Baseline
## t-test p = 0.05 > 0.05
##
## Presentation - Stress Condition
## t-test p = 0.0136 < 0.05 *
```

```
##  
## Presentation - Dual Task  
## t-test  $p = 0.0074 < 0.01$  **
```

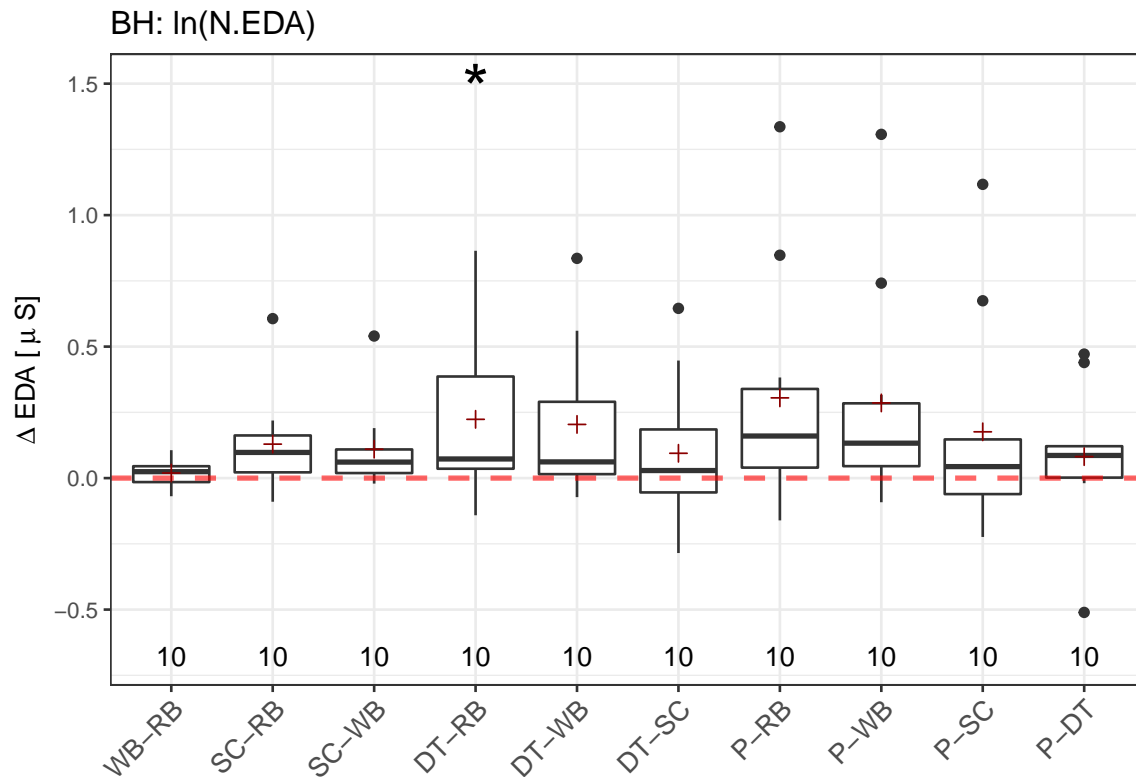




```
## Writing Baseline - Resting Baseline
## t-test p = 1e-04 < 0.001 ***
##
## Stress Condition - Resting Baseline
## t-test p = 0.0026 < 0.01 **
##
## StressCondition - Writing Baseline
## t-test p = 0.993 > 0.05
##
## Dual Task - Resting Baseline
## t-test p = 0.1451 > 0.05
##
## Dual Task - Writing Baseline
## t-test p = 0 < 0.001 ***
##
## Dual Task - Stress Condition
## t-test p = 0.0096 < 0.01 **
##
## Presentation - Resting Baseline
## t-test p = 0.774 > 0.05
##
## Presentation - Writing Baseline
## t-test p = 0.0211 < 0.05 *
##
## Presentation - Stress Condition
## t-test p = 0.0402 < 0.05 *
```

```
##  
## Presentation - Dual Task  
## t-test  $p = 0.4905 > 0.05$ 
```

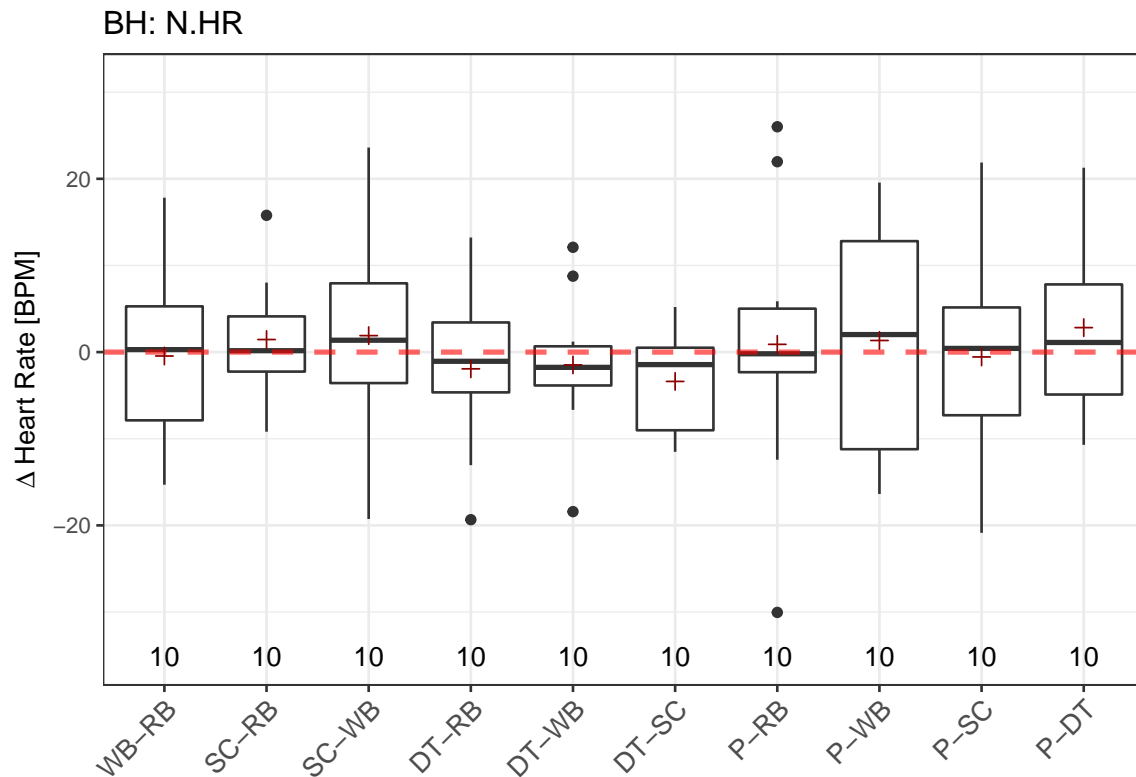
```
## BH has LESS than 7 subjects for D.EDA. Cannot continue with test.  
## -----
```



```
## Writing Baseline - Resting Baseline
## Transformed t-test p = 0.2534 > 0.05
##
## Stress Condition - Resting Baseline
## Transformed t-test p = 0.0609 > 0.05
##
## StressCondition - Writing Baseline
## Transformed t-test p = 0.0622 > 0.05
##
## Dual Task - Resting Baseline
## Transformed t-test p = 0.0463 < 0.05  *
##
## Dual Task - Writing Baseline
## Transformed t-test p = 0.0542 > 0.05
##
## Dual Task - Stress Condition
## Transformed t-test p = 0.3059 > 0.05
##
## Presentation - Resting Baseline
## Transformed t-test p = 0.062 > 0.05
##
## Presentation - Writing Baseline
## Transformed t-test p = 0.0625 > 0.05
##
## Presentation - Stress Condition
## Transformed t-test p = 0.2062 > 0.05
```

```
##  
## Presentation - Dual Task  
## Transformed t-test  $p = 0.3639 > 0.05$ 
```

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

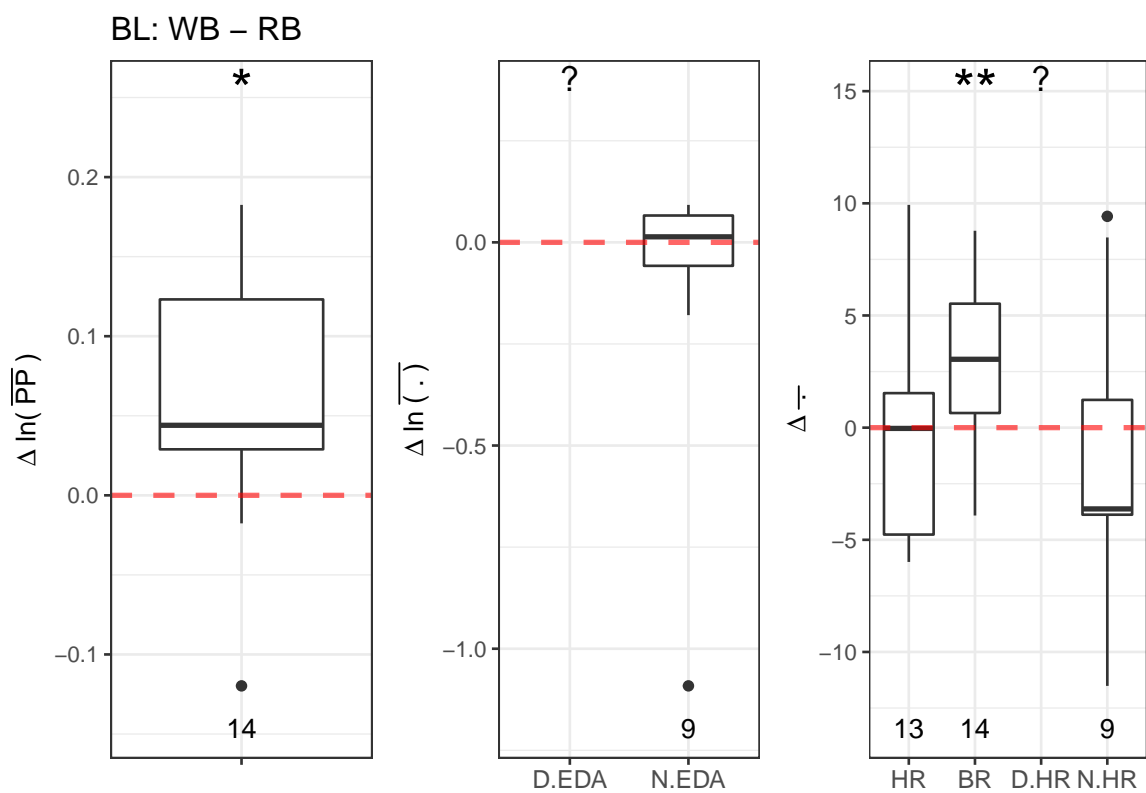


```
## Writing Baseline - Resting Baseline
## t-test p = 0.8962 > 0.05
##
## Stress Condition - Resting Baseline
## t-test p = 0.5287 > 0.05
##
## StressCondition - Writing Baseline
## t-test p = 0.6089 > 0.05
##
## Dual Task - Resting Baseline
## t-test p = 0.5231 > 0.05
##
## Dual Task - Writing Baseline
## t-test p = 0.5861 > 0.05
##
## Dual Task - Stress Condition
## t-test p = 0.0955 > 0.05
##
## Presentation - Resting Baseline
## t-test p = 0.8627 > 0.05
##
## Presentation - Writing Baseline
## t-test p = 0.7565 > 0.05
##
## Presentation - Stress Condition
## t-test p = 0.8971 > 0.05
```

```
##  
## Presentation - Dual Task  
## t-test  $p = 0.4014 > 0.05$ 
```

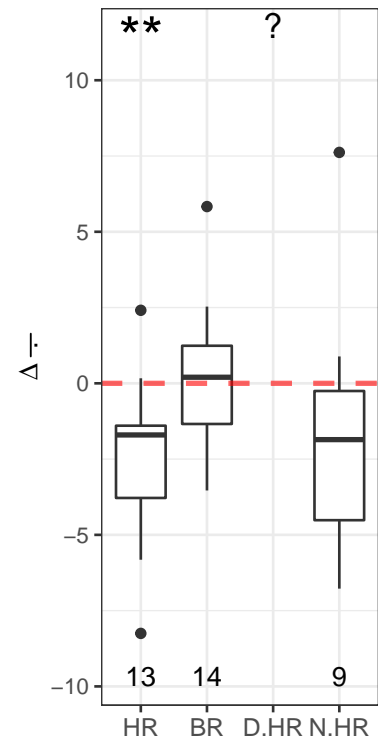
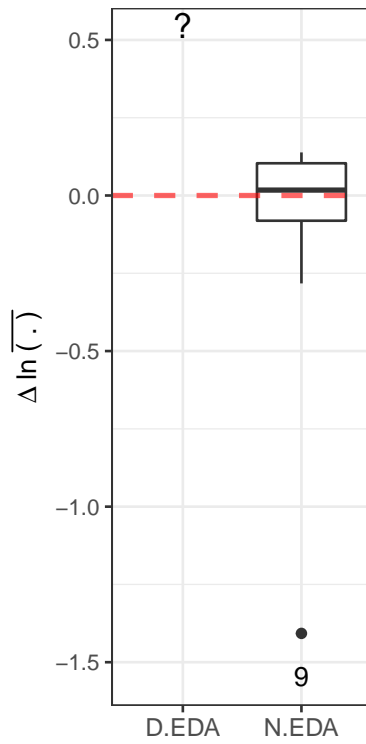
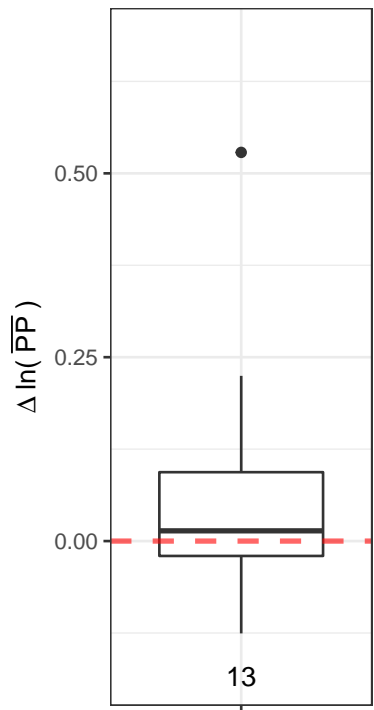
**Batch-Low (BL)**

## Sensor Channels per Activity

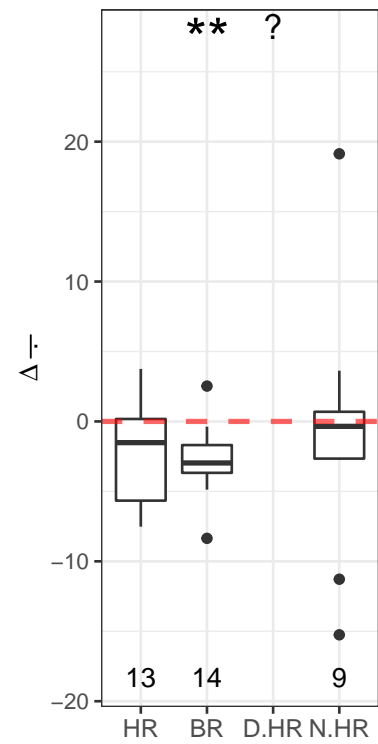
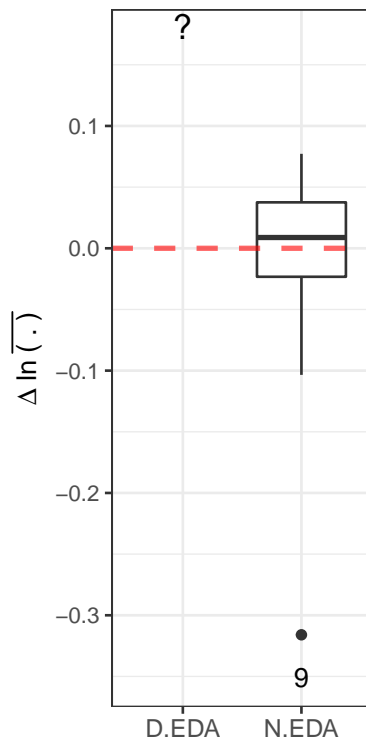
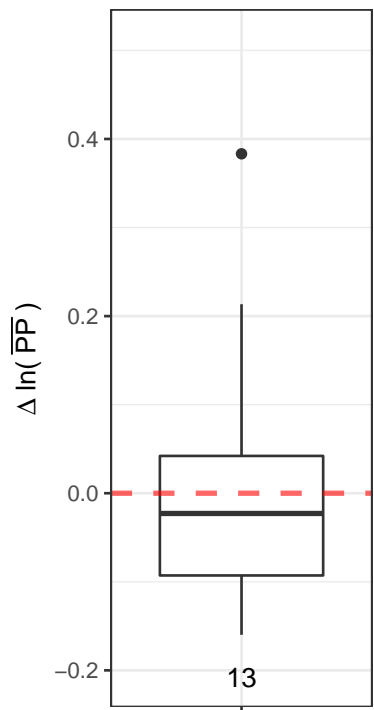


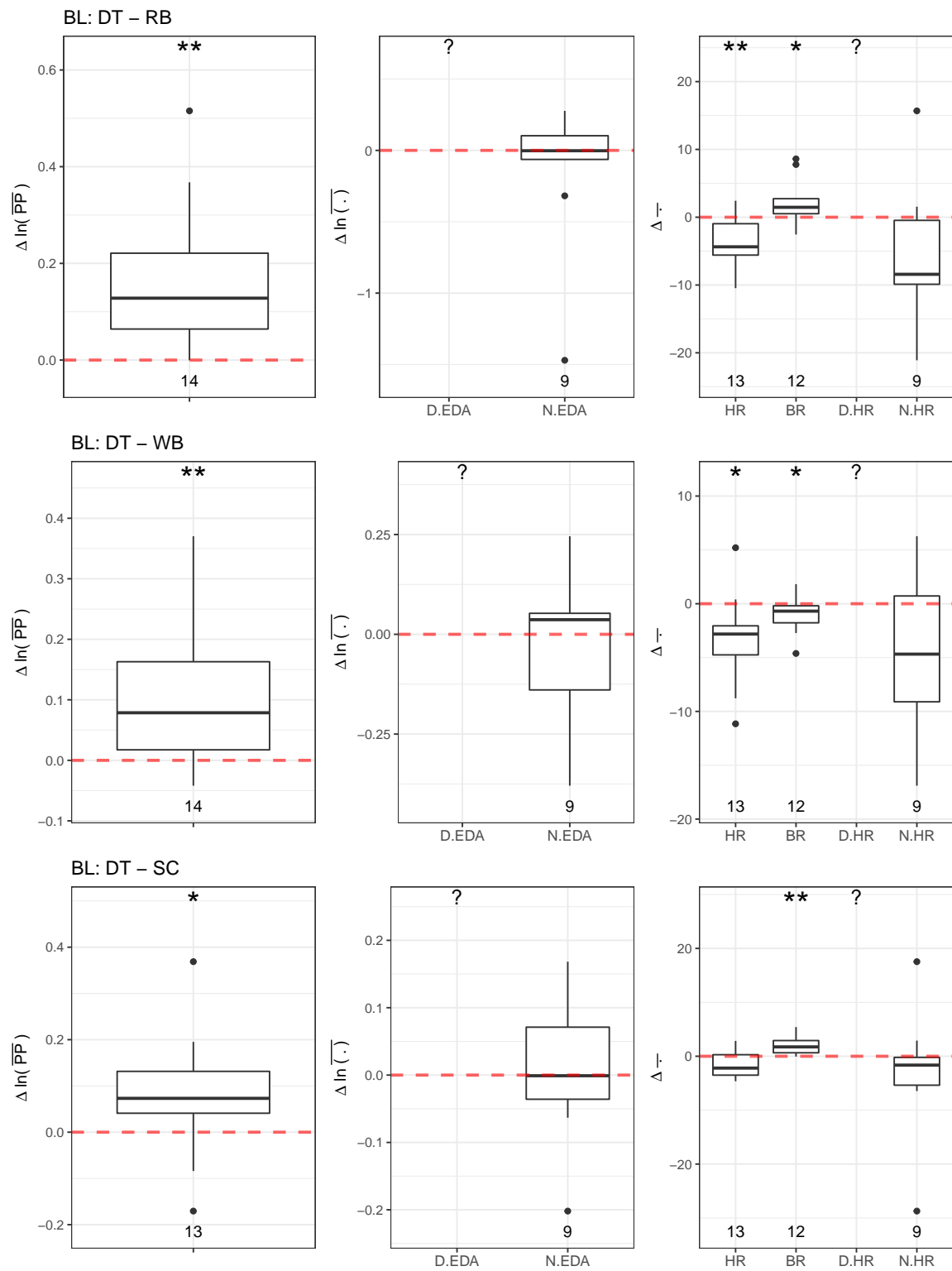


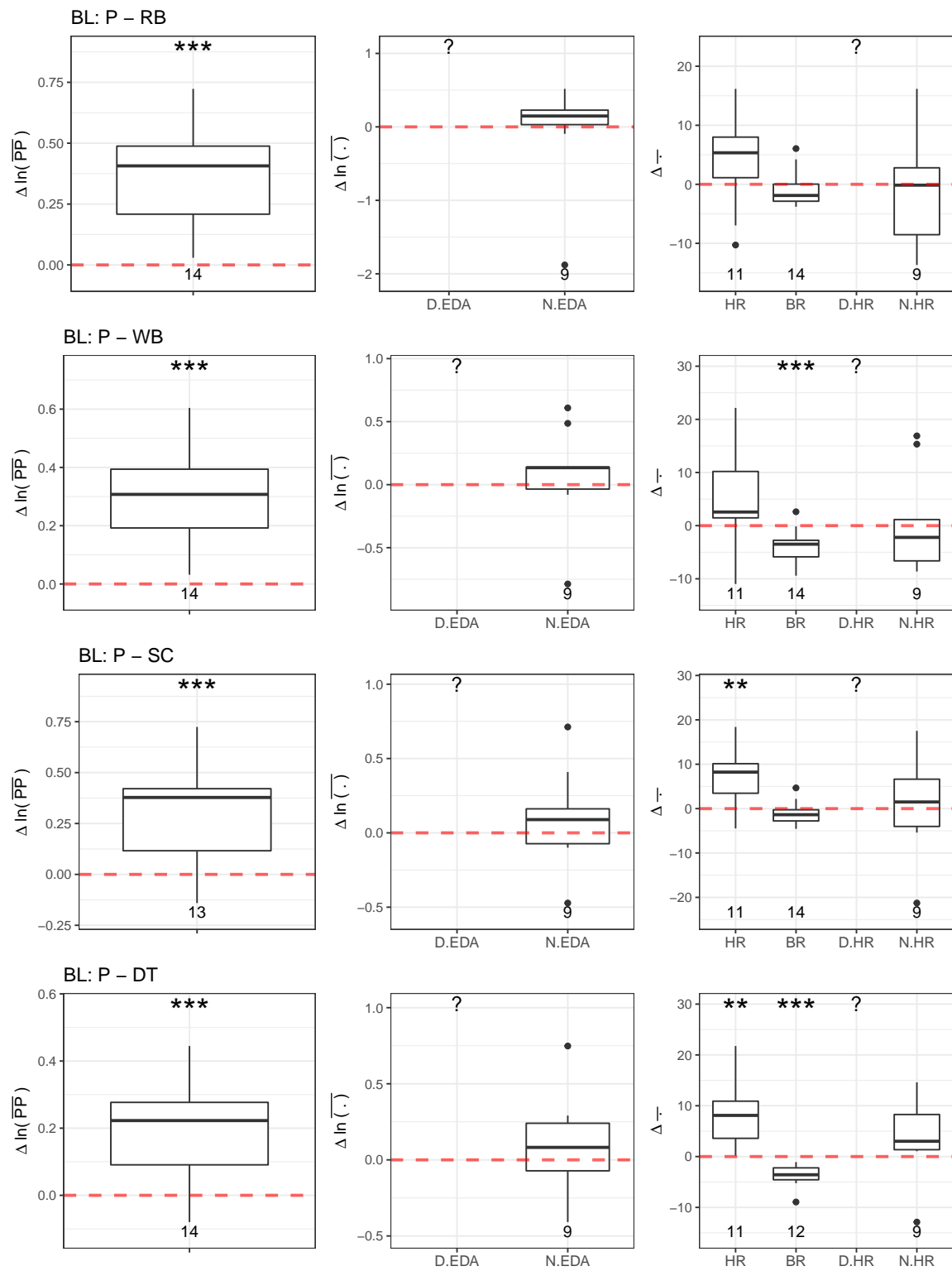
BL: SC – RB



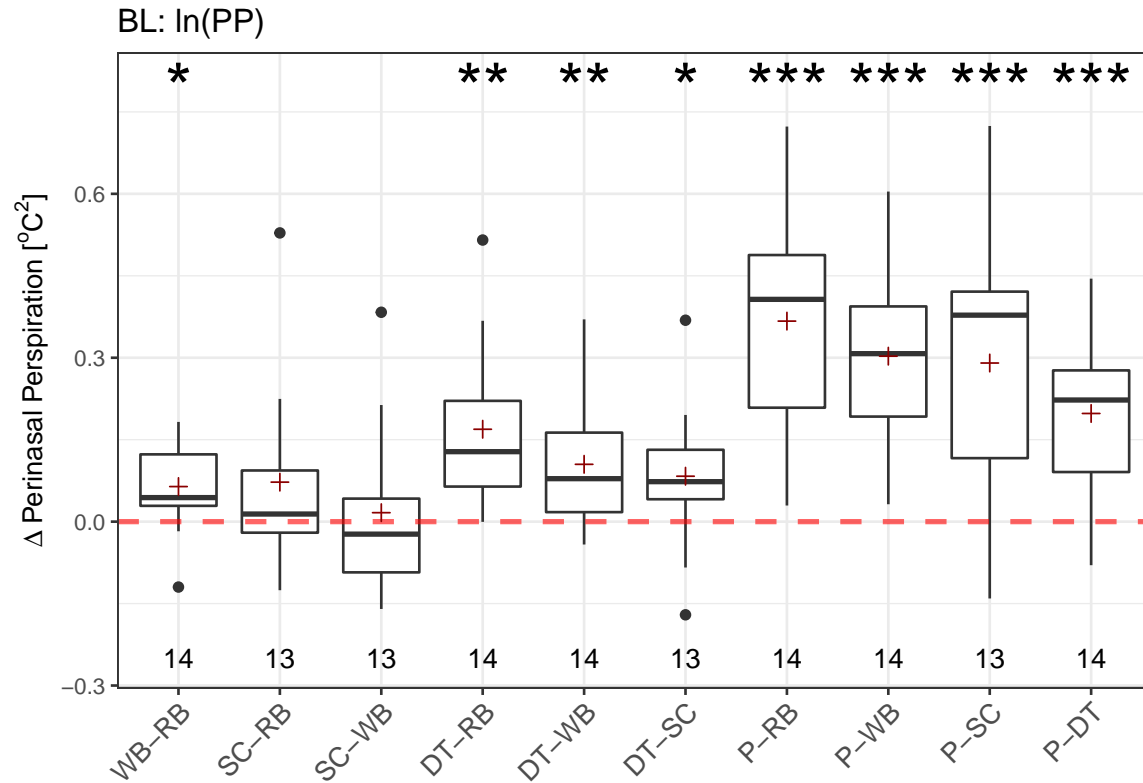
BL: SC – WB





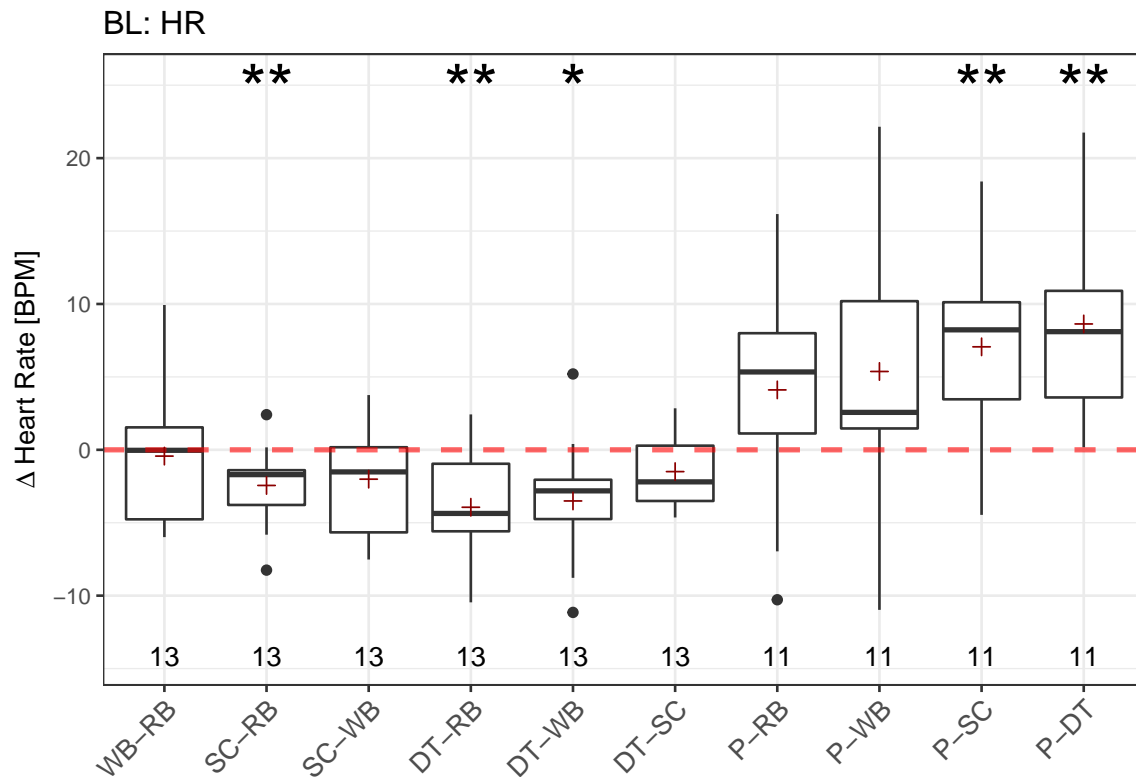


## Sensor Channel across Activities



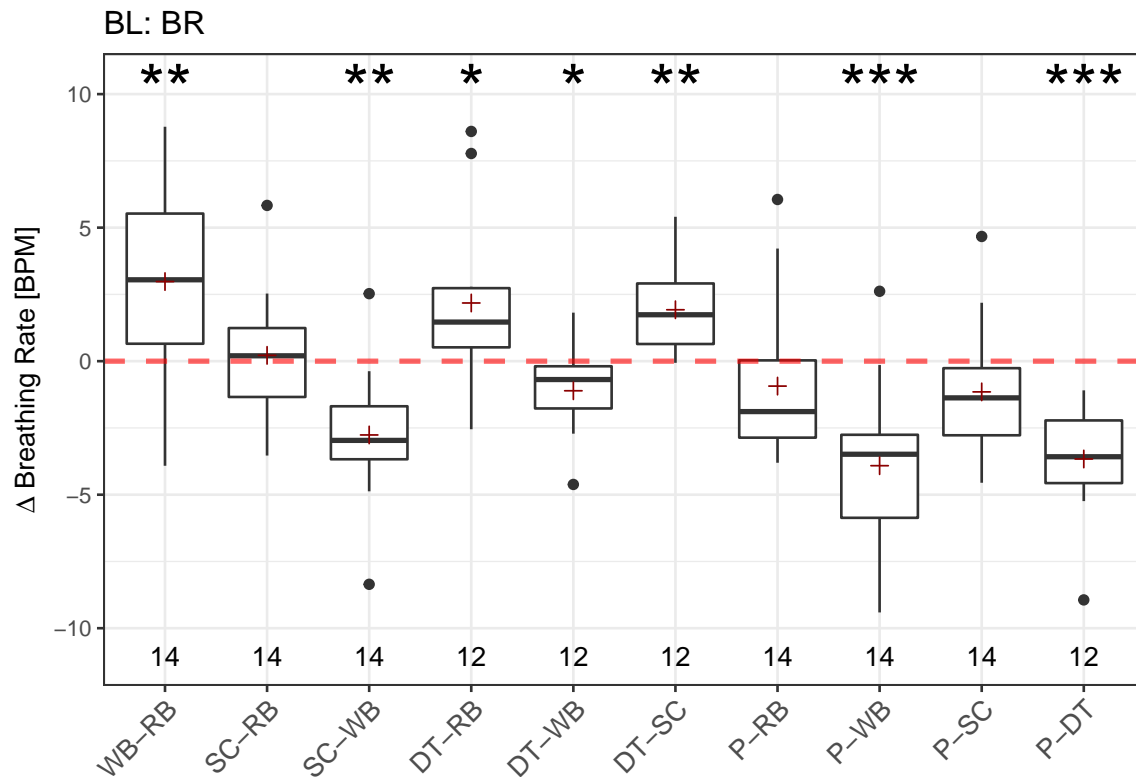
```
## Writing Baseline - Resting Baseline
## Transformed t-test p = 0.0129 < 0.05  *
##
## Stress Condition - Resting Baseline
## Transformed t-test p = 0.1391 > 0.05
##
## StressCondition - Writing Baseline
## Transformed t-test p = 0.7092 > 0.05
##
## Dual Task - Resting Baseline
## Transformed t-test p = 0.001 < 0.01  **
##
## Dual Task - Writing Baseline
## Transformed t-test p = 0.0063 < 0.01  **
##
## Dual Task - Stress Condition
## Transformed t-test p = 0.0466 < 0.05  *
##
## Presentation - Resting Baseline
## Transformed t-test p = 0 < 0.001  ***
##
## Presentation - Writing Baseline
## Transformed t-test p = 0 < 0.001  ***
```

```
##  
## Presentation - Stress Condition  
## Transformed t-test p = 8e-04 < 0.001 ***  
##  
## Presentation - Dual Task  
## Transformed t-test p = 3e-04 < 0.001 ***
```



```
## Writing Baseline - Resting Baseline
## t-test p = 0.7394 > 0.05
##
## Stress Condition - Resting Baseline
## t-test p = 0.0068 < 0.01 **
##
## StressCondition - Writing Baseline
## t-test p = 0.081 > 0.05
##
## Dual Task - Resting Baseline
## t-test p = 0.0028 < 0.01 **
##
## Dual Task - Writing Baseline
## t-test p = 0.0103 < 0.05 *
##
## Dual Task - Stress Condition
## t-test p = 0.0577 > 0.05
##
## Presentation - Resting Baseline
## t-test p = 0.1093 > 0.05
##
## Presentation - Writing Baseline
## t-test p = 0.0833 > 0.05
##
## Presentation - Stress Condition
## t-test p = 0.0069 < 0.01 **
```

```
##  
## Presentation - Dual Task  
## t-test  $p = 0.0019 < 0.01$  **
```

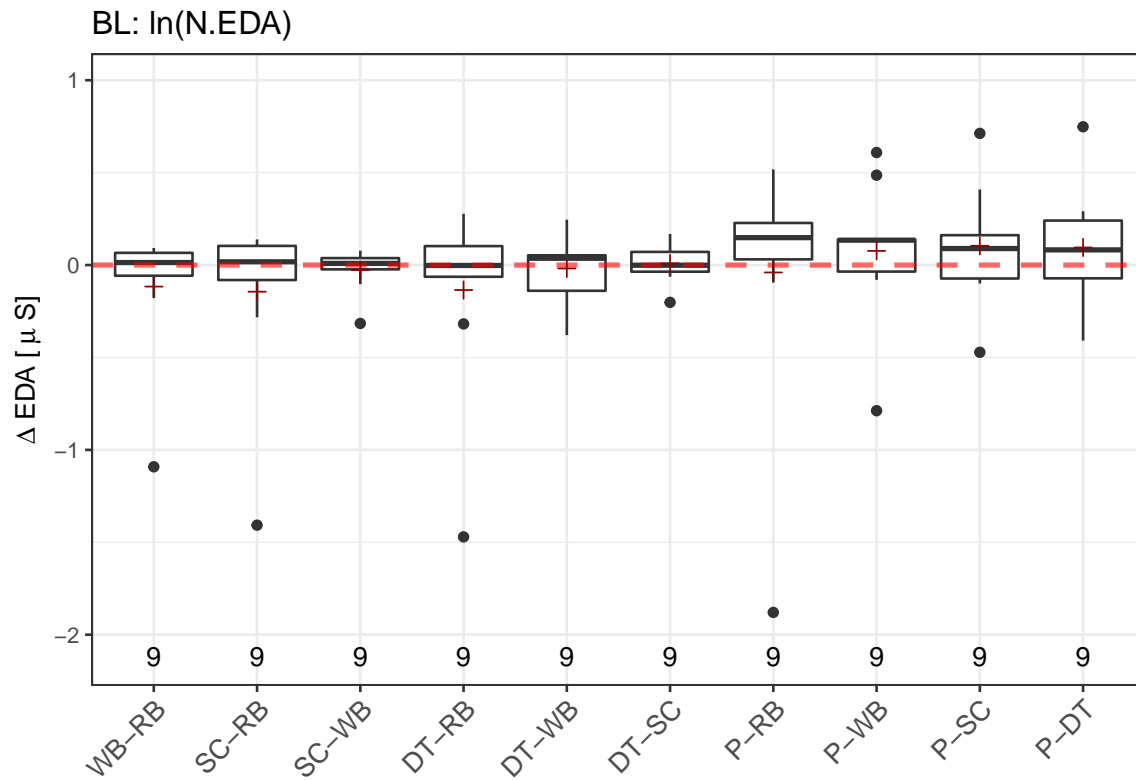


```
## Writing Baseline - Resting Baseline
## t-test p = 0.005 < 0.01 **
##
## Stress Condition - Resting Baseline
## t-test p = 0.7386 > 0.05
##
## StressCondition - Writing Baseline
## t-test p = 0.0012 < 0.01 **
##
## Dual Task - Resting Baseline
## t-test p = 0.0373 < 0.05 *
##
## Dual Task - Writing Baseline
## t-test p = 0.0368 < 0.05 *
##
## Dual Task - Stress Condition
## t-test p = 0.002 < 0.01 **
##
## Presentation - Resting Baseline
## t-test p = 0.2654 > 0.05
##
## Presentation - Writing Baseline
## t-test p = 3e-04 < 0.001 ***
##
## Presentation - Stress Condition
## t-test p = 0.0985 > 0.05
```



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

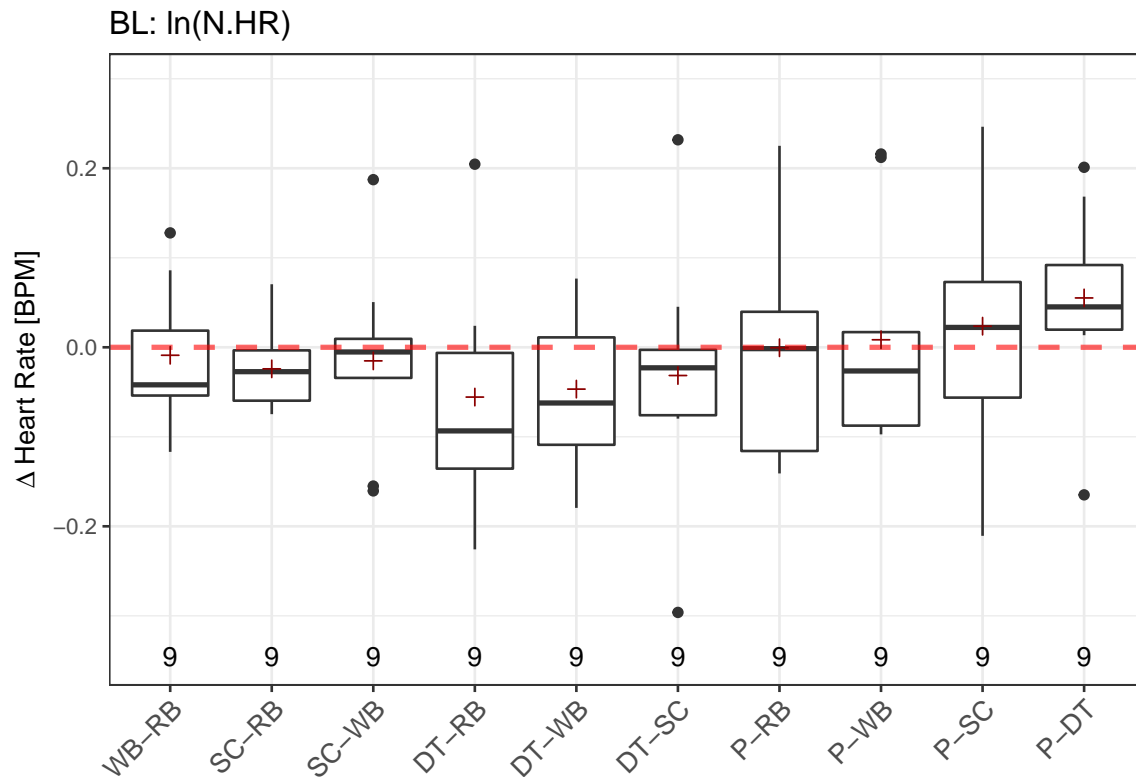
```
## BL has LESS than 7 subjects for D.EDA. Cannot continue with test.  
## -----
```



```
## Writing Baseline - Resting Baseline
## Transformed t-test p = 0.3792 > 0.05
##
## Stress Condition - Resting Baseline
## Transformed t-test p = 0.4047 > 0.05
##
## StressCondition - Writing Baseline
## Transformed t-test p = 0.5072 > 0.05
##
## Dual Task - Resting Baseline
## Transformed t-test p = 0.4654 > 0.05
##
## Dual Task - Writing Baseline
## Transformed t-test p = 0.7655 > 0.05
##
## Dual Task - Stress Condition
## Transformed t-test p = 0.8075 > 0.05
##
## Presentation - Resting Baseline
## Transformed t-test p = 0.871 > 0.05
##
## Presentation - Writing Baseline
## Transformed t-test p = 0.5772 > 0.05
##
## Presentation - Stress Condition
## Transformed t-test p = 0.3719 > 0.05
```

```
##  
## Presentation - Dual Task  
## Transformed t-test  $p = 0.3979 > 0.05$ 
```

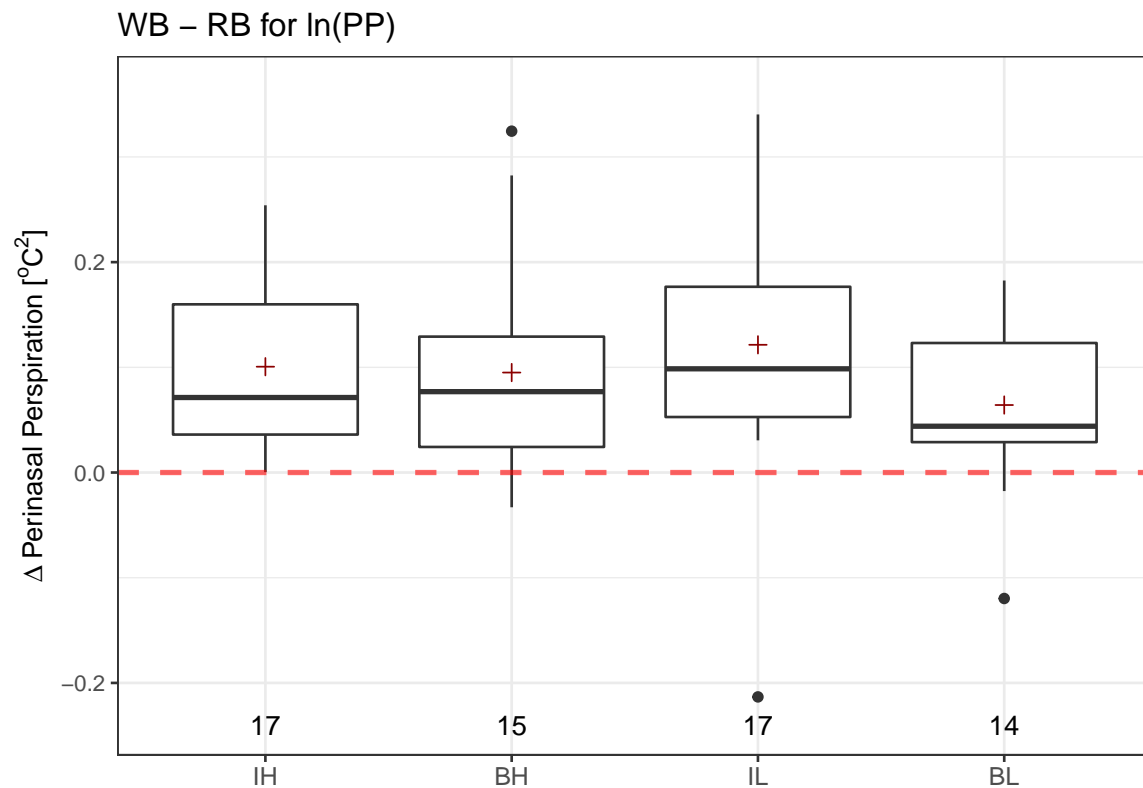
```
## BL has LESS than 7 subjects for D.HR. Cannot continue with test.  
## -----
```



```
## Writing Baseline - Resting Baseline
## Transformed t-test p = 0.7405 > 0.05
##
## Stress Condition - Resting Baseline
## Transformed t-test p = 0.1598 > 0.05
##
## StressCondition - Writing Baseline
## Transformed t-test p = 0.6748 > 0.05
##
## Dual Task - Resting Baseline
## Transformed t-test p = 0.2227 > 0.05
##
## Dual Task - Writing Baseline
## Transformed t-test p = 0.1265 > 0.05
##
## Dual Task - Stress Condition
## Transformed t-test p = 0.5114 > 0.05
##
## Presentation - Resting Baseline
## Transformed t-test p = 0.991 > 0.05
##
## Presentation - Writing Baseline
## Transformed t-test p = 0.842 > 0.05
##
## Presentation - Stress Condition
## Transformed t-test p = 0.6148 > 0.05
```

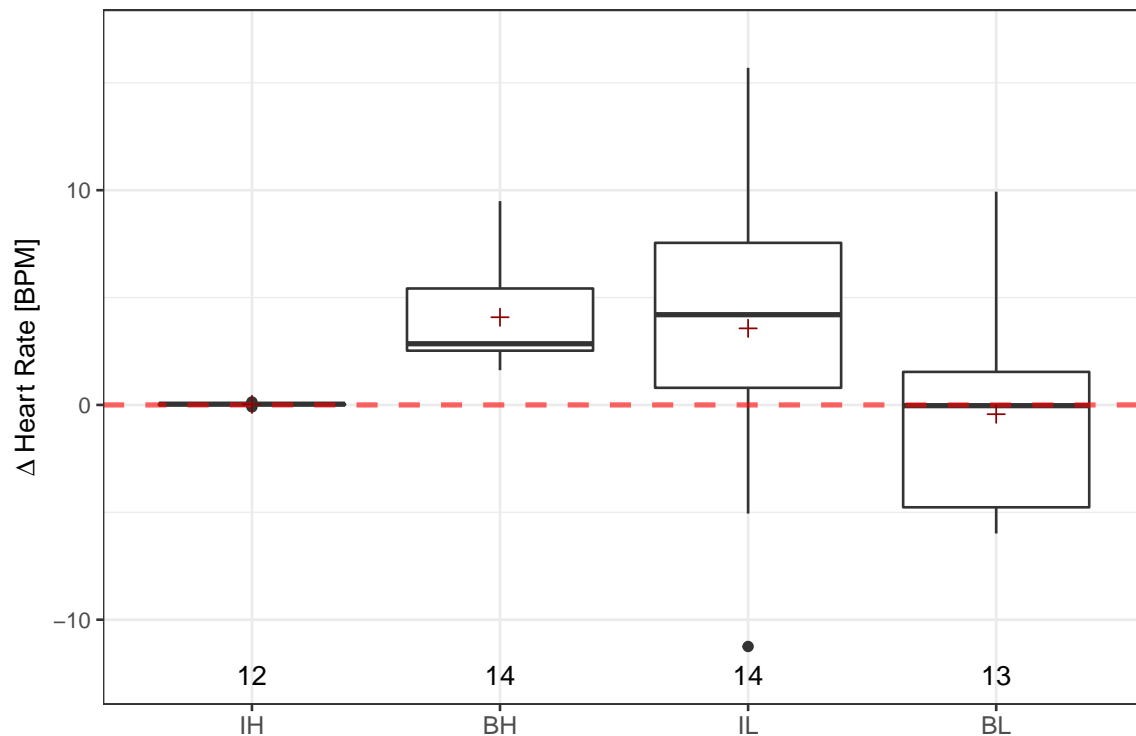
```
##  
## Presentation - Dual Task  
## Transformed t-test  $p = 0.154 > 0.05$ 
```

## Across Activities



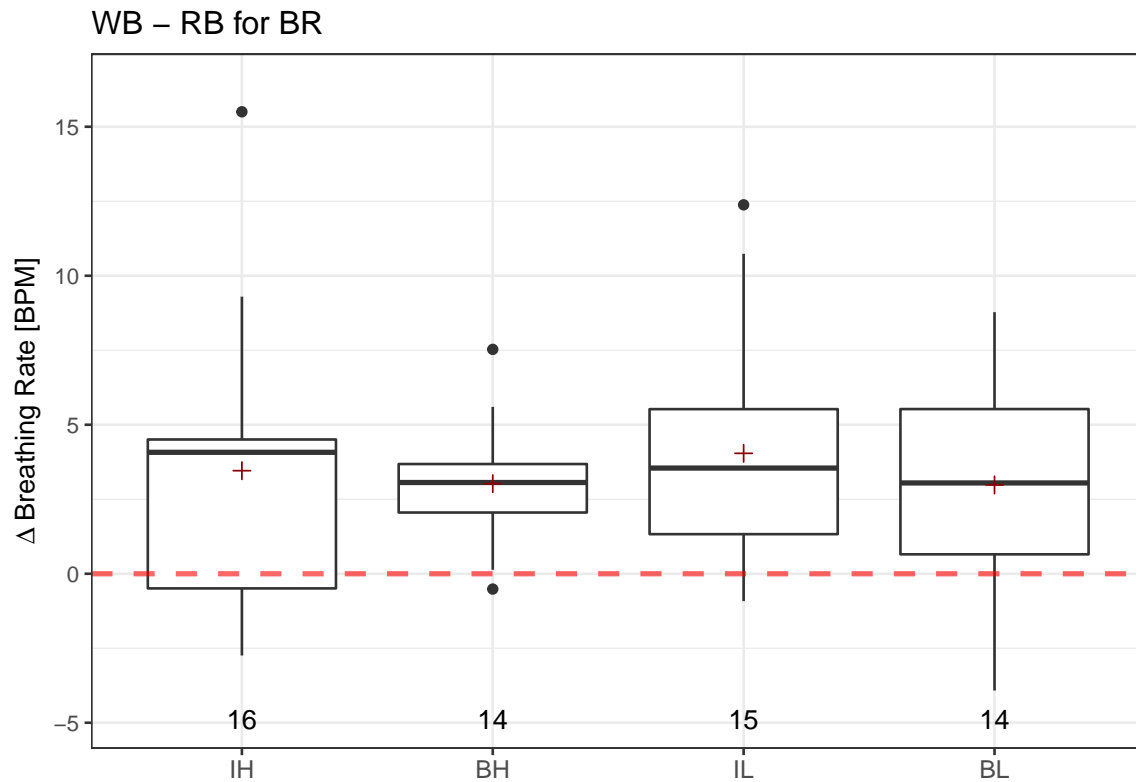
```
## ANOVA:
##           Df Sum Sq Mean Sq F value Pr(>F)
## Condition   3  0.0255  0.008496    0.82  0.488
## Residuals  59  0.6114  0.010363
##
## ---
##
##      Tukey multiple comparisons of means
##      95% family-wise confidence level
##
## Fit: aov(formula = formula(paste(diff, "~ Condition")), data = anova_df)
##
## $Condition
##           diff           lwr           upr          p adj
## BL-BH -0.030870000 -0.13088502  0.06914502  0.8466649
## IH-BH  0.005545339 -0.08979590  0.10088658  0.9986898
## IL-BH  0.026363800 -0.06897744  0.12170504  0.8842347
## IH-BL  0.036415339 -0.06071799  0.13354866  0.7550096
## IL-BL  0.057233800 -0.03989952  0.15436712  0.4103614
## IL-IH  0.020818461 -0.07149530  0.11313222  0.9328217
```

# WB – RB for HR

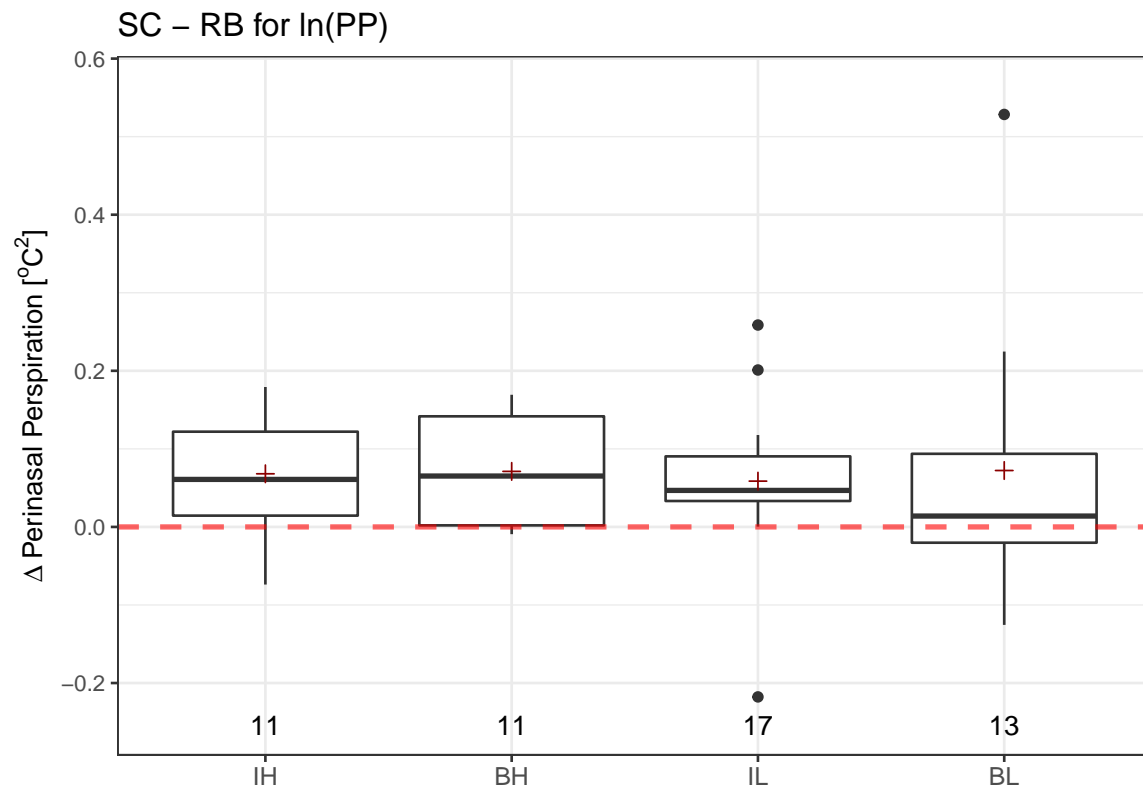


```
## ANOVA:
##           Df Sum Sq Mean Sq F value Pr(>F)
## Condition   3  218.3    72.78   3.859 0.0148 *
## Residuals  49  924.2    18.86
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## ---
##
##      Tukey multiple comparisons of means
##      95% family-wise confidence level
##
## Fit: aov(formula = formula(paste(diff, "~ Condition")), data = anova_df)
##
## $Condition
##           diff           lwr           upr         p adj
## BL-BH -4.5150752 -8.9637044 -0.06644587 0.0454590
## IH-BH -4.0565778 -8.6003031  0.48714741 0.0956057
## IL-BH -0.5178485 -4.8833185  3.84762155 0.9889938
## IH-BL  0.4584973 -4.1651823  5.08217695 0.9934941
## IL-BL  3.9972267 -0.4514026  8.44585599 0.0924940
## IL-IH  3.5387294 -1.0049959  8.08245462 0.1769057
```



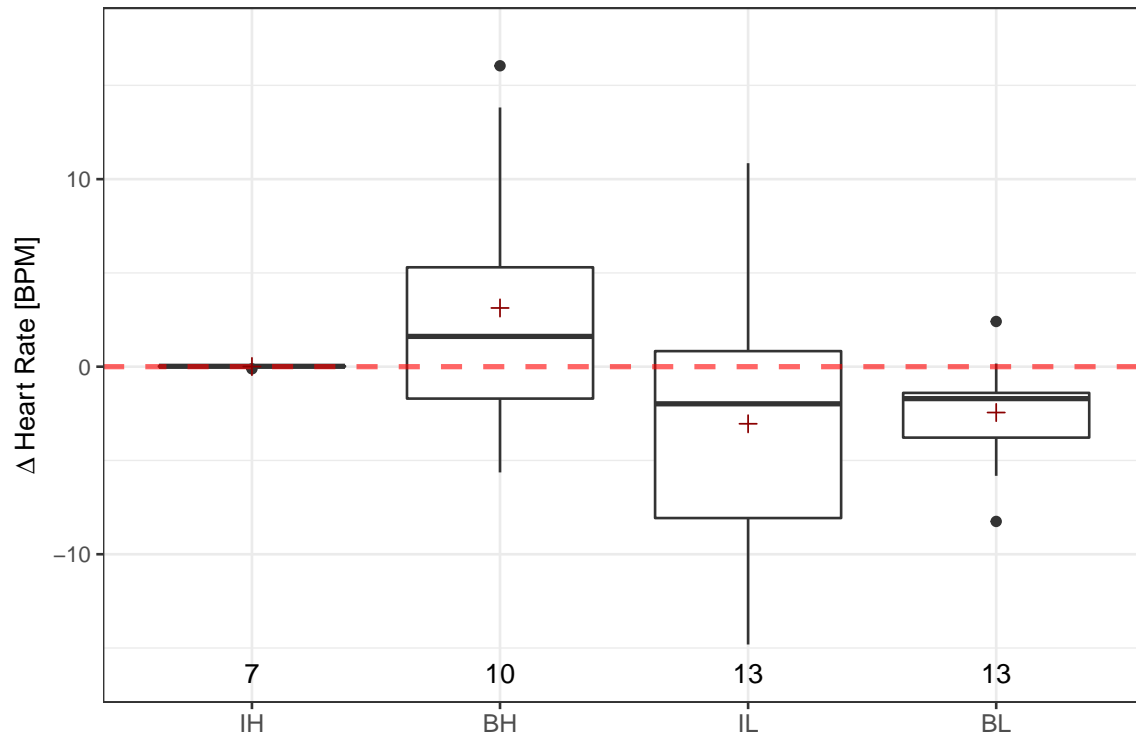


```
## ANOVA:
##           Df Sum Sq Mean Sq F value Pr(>F)
## Condition   3   10.6    3.548    0.272  0.845
## Residuals  55  717.2   13.039
##
## ---
##
##      Tukey multiple comparisons of means
##      95% family-wise confidence level
##
## Fit: aov(formula = formula(paste(diff, "~ Condition")), data = anova_df)
##
## $Condition
##           diff          lwr          upr          p adj
## BL-BH -0.04440632 -3.660343  3.571531  0.9999875
## IH-BH  0.43374662 -3.067369  3.934863  0.9876615
## IL-BH  1.01603998 -2.539121  4.571201  0.8732068
## IH-BL  0.47815294 -3.022963  3.979269  0.9836197
## IL-BL  1.06044630 -2.494714  4.615607  0.8585646
## IL-IH  0.58229337 -2.856017  4.020604  0.9696091
```

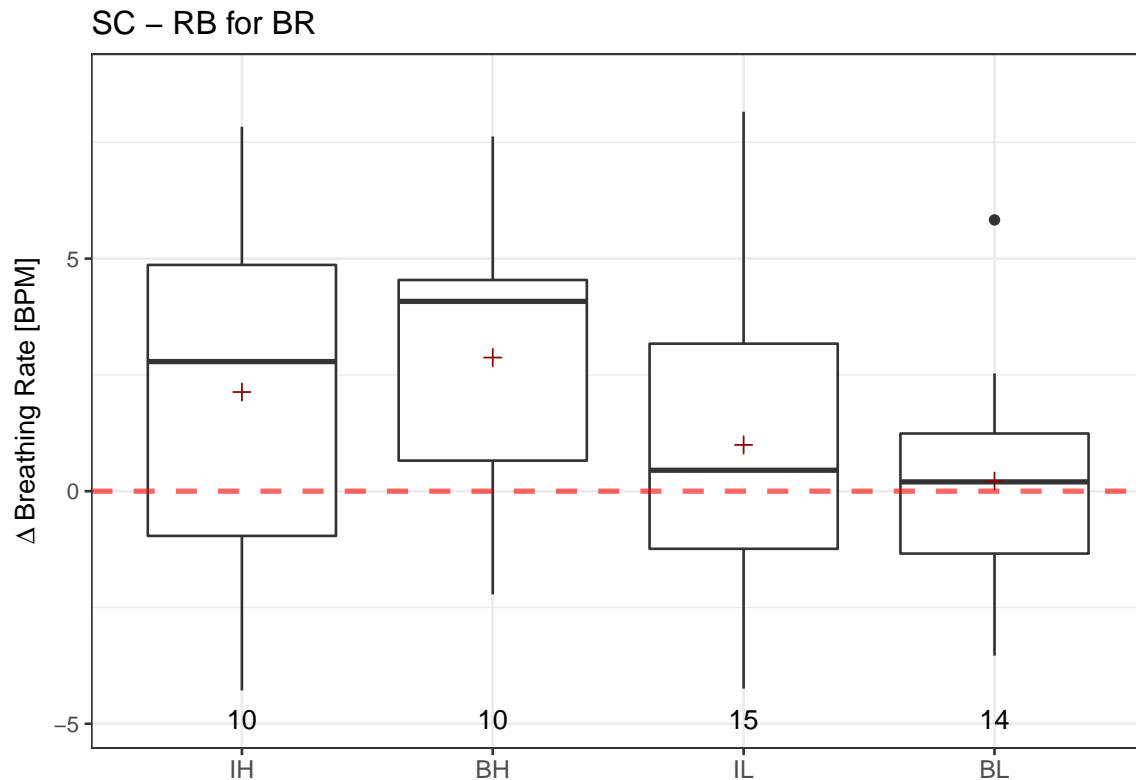


```
## [1] "Removed 12 subjects who had Stroop scores less than 30."
##
## ---
## ANOVA:
##           Df Sum Sq Mean Sq F value Pr(>F)
## Condition   3  0.0017  0.000579    0.047  0.986
## Residuals  48  0.5888  0.012268
##
## ---
##
##      Tukey multiple comparisons of means
##      95% family-wise confidence level
##
## Fit: aov(formula = formula(paste(diff, "~ Condition")), data = anova_df)
##
## $Condition
##           diff           lwr           upr      p adj
## BL-BH  0.001141547 -0.1196179  0.12190104  0.9999942
## IH-BH -0.003071433 -0.1287619  0.12261904  0.9998998
## IL-BH -0.012462191 -0.1265244  0.10160005  0.9913283
## IH-BL -0.004212980 -0.1249725  0.11654652  0.9997090
## IL-BL -0.013603738 -0.1222083  0.09500085  0.9870692
## IL-IH -0.009390758 -0.1234530  0.10467148  0.9962355
```

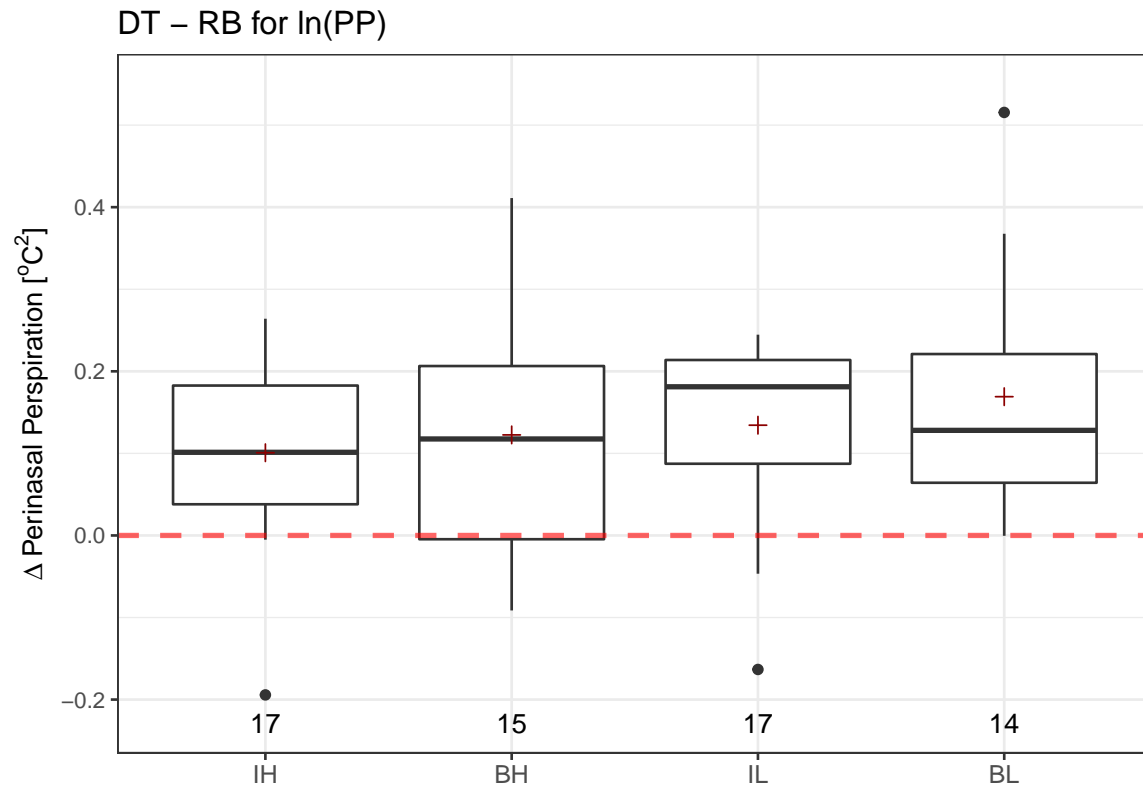
# SC – RB for HR



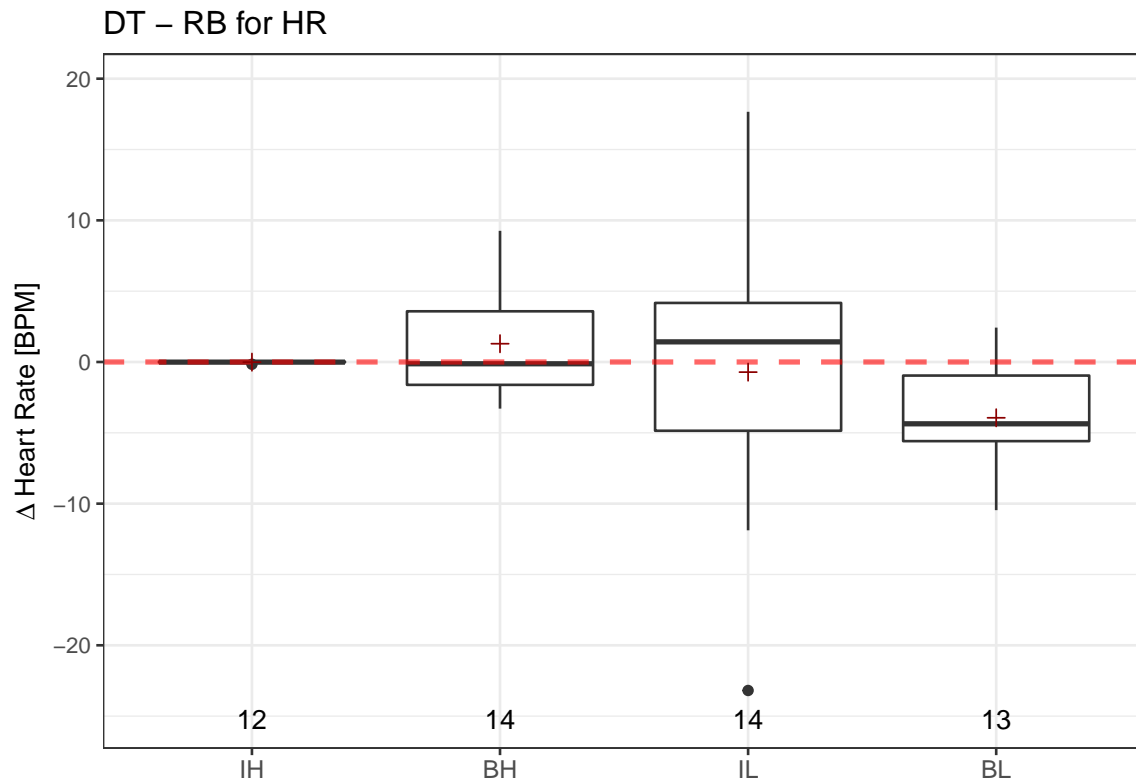
```
## [1] "Removed 12 subjects who had Stroop scores less than 30."
##
## ---
## ANOVA:
##           Df Sum Sq Mean Sq F value Pr(>F)
## Condition   3  258.9    86.31   3.017 0.0413 *
## Residuals  39 1115.9    28.61
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## ---
##
##      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 -5.5746473 -11.611956  0.4626614 0.0793904
## IH-BH -3.1233696 -10.196743  3.9500037 0.6398523
## IL-BH -6.1748009 -12.212110 -0.1374923 0.0433438
## IH-BL  2.4512777  -4.277644  9.1801988 0.7629449
## IL-BL -0.6001537  -6.229973  5.0296657 0.9917096
## IL-IH -3.0514313  -9.780353  3.6774898 0.6200825
```



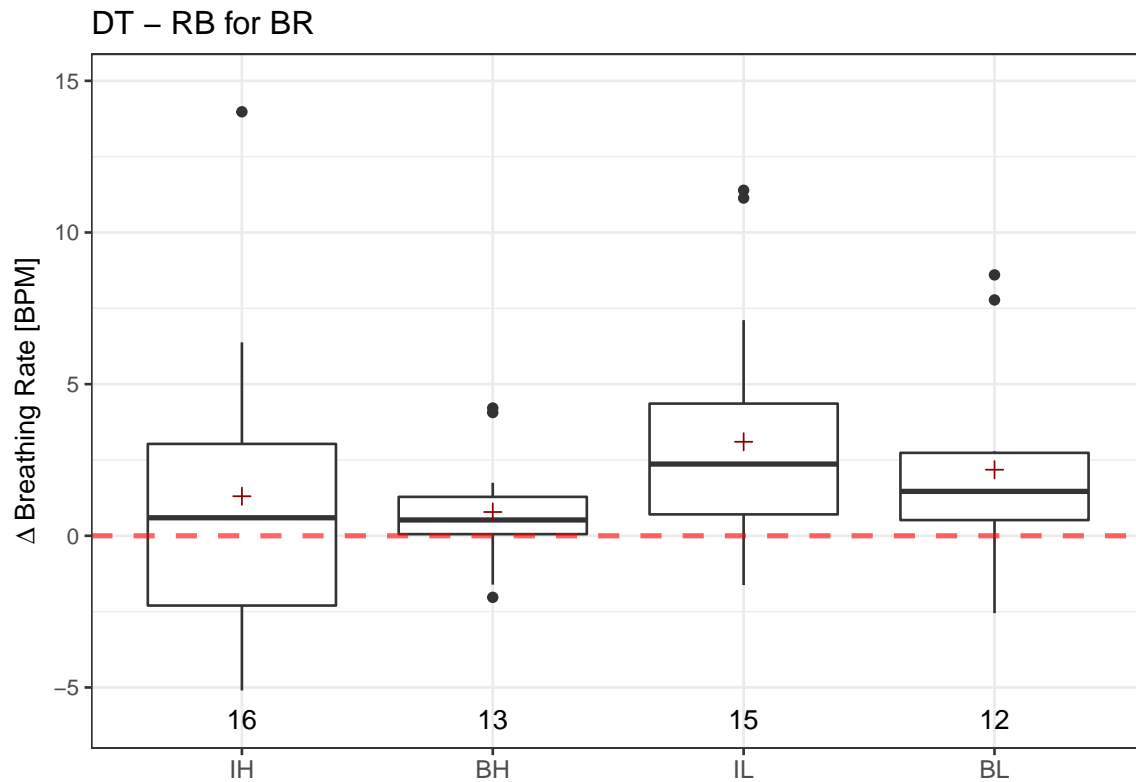
```
## [1] "Removed 12 subjects who had Stroop scores less than 30."
##
## ---
## ANOVA:
##           Df Sum Sq Mean Sq F value Pr(>F)
## Condition   3   49.1   16.36   1.568   0.21
## Residuals  45  469.5   10.43
##
## ---
##
##      Tukey multiple comparisons of means
##      95% family-wise confidence level
##
## Fit: aov(formula = formula(paste(diff, "~ Condition")), data = anova_df)
##
## $Condition
##           diff           lwr           upr           p adj
## BL-BH -2.6552271 -6.222829  0.9123747  0.2086310
## IH-BH -0.7405680 -4.594018  3.1128823  0.9556427
## IL-BH -1.8776268 -5.395330  1.6400759  0.4913870
## IH-BL  1.9146591 -1.652943  5.4822608  0.4866813
## IL-BL  0.7776002 -2.424420  3.9796208  0.9157556
## IL-IH -1.1370589 -4.654762  2.3806439  0.8241109
```



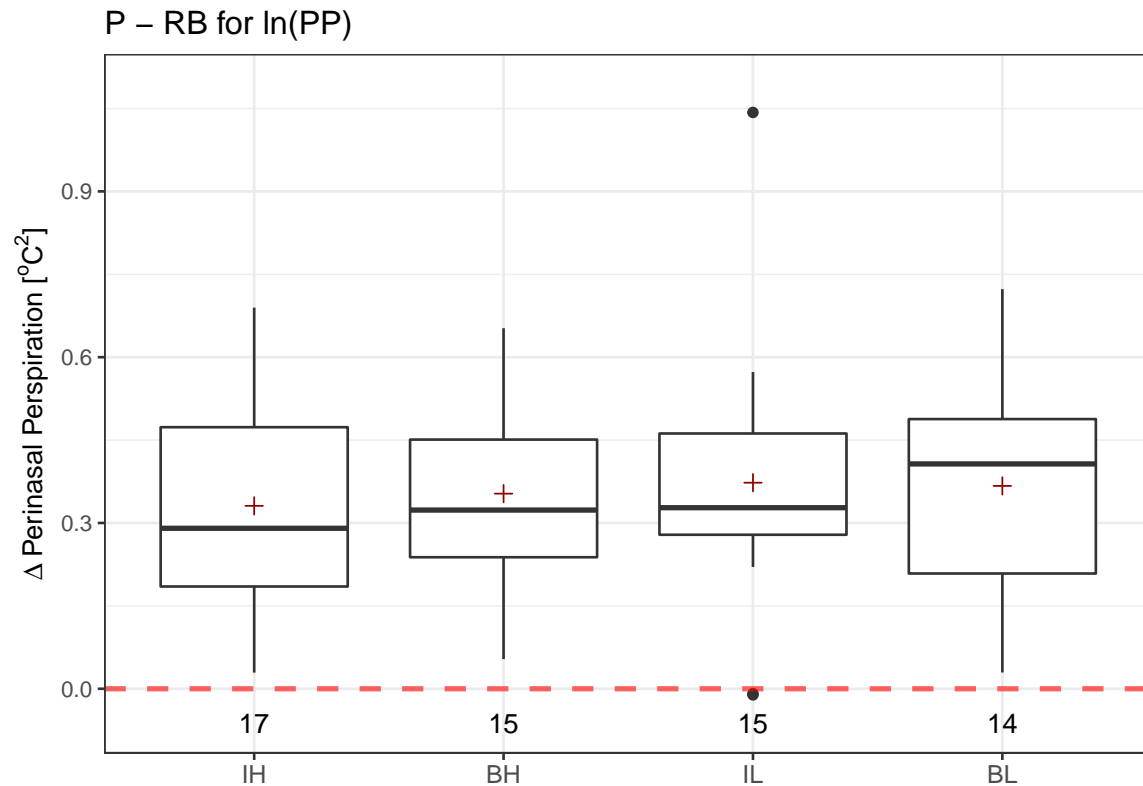
```
## ANOVA:
##           Df Sum Sq Mean Sq F value Pr(>F)
## Condition   3  0.0371  0.01235    0.768  0.516
## Residuals  59  0.9484  0.01607
##
## ---
##
##      Tukey multiple comparisons of means
##      95% family-wise confidence level
##
## Fit: aov(formula = formula(paste(diff, "~ Condition")), data = anova_df)
##
## $Condition
##           diff           lwr           upr          p adj
## BL-BH  0.04655998 -0.07800001  0.17111997  0.7566681
## IH-BH -0.02173941 -0.14047861  0.09699979  0.9623489
## IL-BH  0.01182058 -0.10691862  0.13055978  0.9935469
## IH-BL -0.06829939 -0.18927048  0.05267170  0.4483409
## IL-BL -0.03473940 -0.15571048  0.08623169  0.8723476
## IL-IH  0.03355999 -0.08140874  0.14852873  0.8668803
```



```
## ANOVA:
##           Df Sum Sq Mean Sq F value Pr(>F)
## Condition   3   196.9    65.62    2.061  0.118
## Residuals  49  1559.9    31.83
##
## ---
##
##      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 -5.2299412 -11.009325  0.5494428  0.0891252
## IH-BH -1.3023021  -7.205229  4.6006247  0.9356236
## IL-BH -2.0060477  -7.677396  3.6653009  0.7831604
## IH-BL  3.9276391  -2.079159  9.9344376  0.3150719
## IL-BL  3.2238935  -2.555490  9.0032775  0.4550405
## IL-IH -0.7037456  -6.606672  5.1991811  0.9888315
```

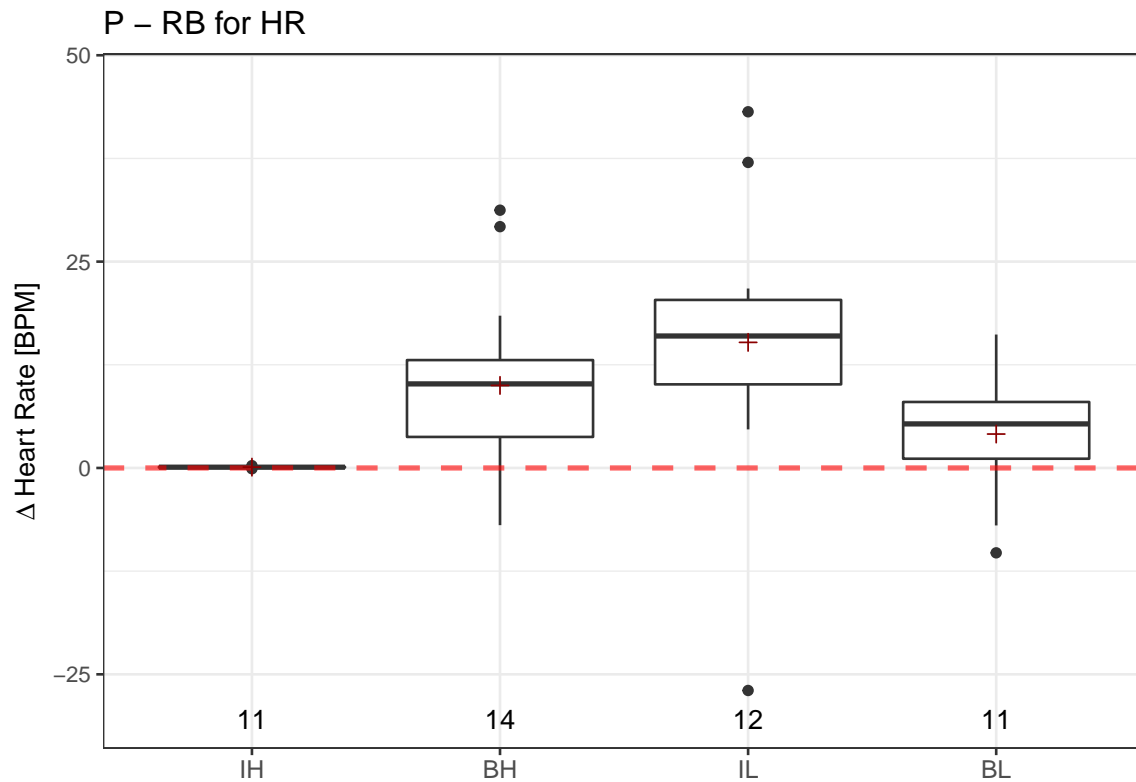


```
## ANOVA:
##           Df Sum Sq Mean Sq F value Pr(>F)
## Condition   3   44.2    14.75    1.049   0.379
## Residuals  52  731.2     14.06
##
## ---
##
##      Tukey multiple comparisons of means
##      95% family-wise confidence level
##
## Fit: aov(formula = formula(paste(diff, "~ Condition")), data = anova_df)
##
## $Condition
##           diff           lwr          upr          p adj
## BL-BH  1.3946829 -2.589543  5.378909  0.7894296
## IH-BH  0.5202144 -3.196024  4.236453  0.9823043
## IL-BH  2.3153538 -1.456006  6.086714  0.3714003
## IH-BL -0.8744686 -4.675178  2.926241  0.9282430
## IL-BL  0.9206709 -2.933952  4.775294  0.9206038
## IL-IH  1.7951394 -1.781799  5.372078  0.5471284
```

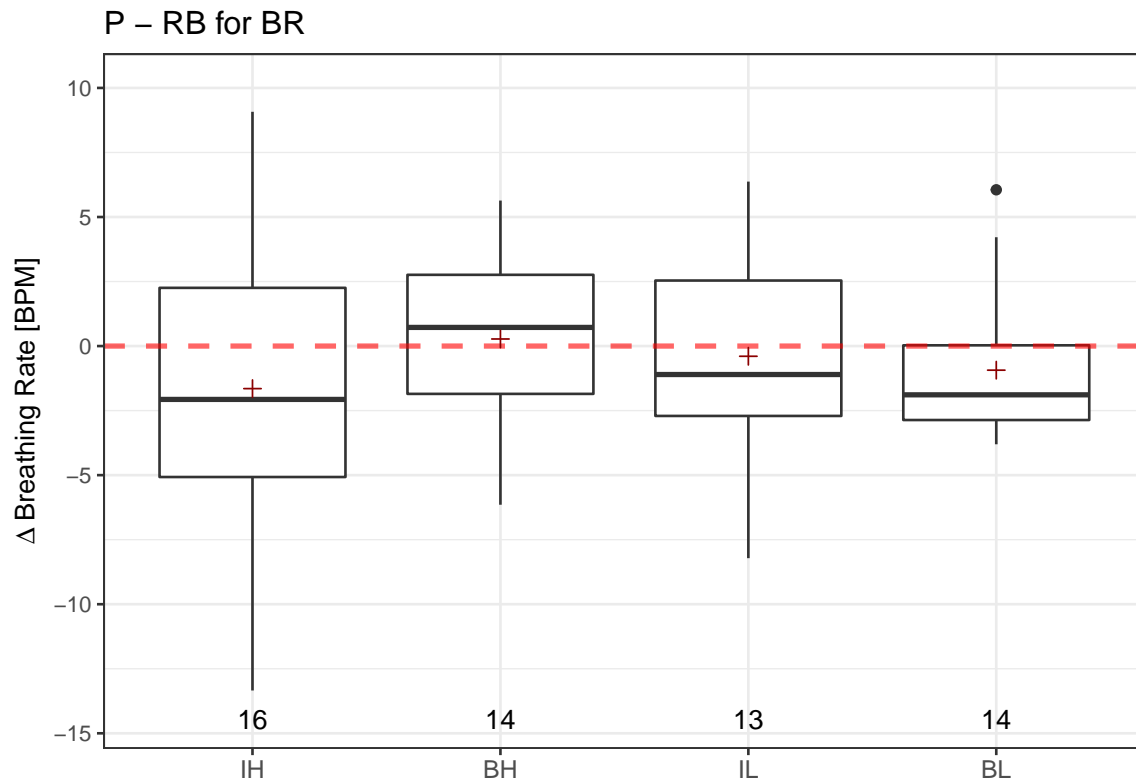


```
## ANOVA:
##           Df Sum Sq Mean Sq F value Pr(>F)
## Condition   3  0.0167  0.00556    0.12  0.948
## Residuals  57  2.6351  0.04623
##
## ---
##
##      Tukey multiple comparisons of means
##      95% family-wise confidence level
##
## Fit: aov(formula = formula(paste(diff, "~ Condition")), data = anova_df)
##
## $Condition
##           diff           lwr          upr      p adj
## BL-BH  0.014007429 -0.1974467  0.2254616  0.9980630
## IH-BH -0.022049201 -0.2236219  0.1795235  0.9914585
## IL-BH  0.019829526 -0.1879469  0.2276059  0.9942825
## IH-BL -0.036056630 -0.2414182  0.1693050  0.9664462
## IL-BL  0.005822097 -0.2056321  0.2172762  0.9998595
## IL-IH  0.041878727 -0.1596940  0.2434514  0.9462227
```





```
## ANOVA:
##           Df Sum Sq Mean Sq F value Pr(>F)
## Condition   3   1529    509.8   4.078 0.0122 *
## Residuals  44   5501    125.0
## ---
## 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 -5.891227 -17.919328  6.136874 0.5630282
## IH-BH -9.902191 -21.930292  2.125910 0.1396724
## IL-BH  5.215860  -6.528232 16.959952 0.6388917
## IH-BL -4.010964 -16.740309  8.718381 0.8344664
## IL-BL 11.107087  -1.354242 23.568416 0.0959908
## IL-IH 15.118051   2.656722 27.579380 0.0118054
```



```
## ANOVA:
##           Df Sum Sq Mean Sq F value Pr(>F)
## Condition   3   29.6    9.873    0.527  0.665
## Residuals  53  992.4   18.725
##
## ---
##
##      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 -1.2075156 -5.545666  3.130635  0.8811869
## IH-BH -1.9220536 -6.122450  2.278343  0.6209928
## IL-BH -0.6695722 -5.090362  3.751217  0.9778350
## IH-BL -0.7145380 -4.914934  3.485858  0.9691075
## IL-BL  0.5379434 -3.882846  4.958733  0.9882457
## IL-IH  1.2524814 -3.033211  5.538174  0.8653209
```

## Summary

Condition	Difference	Measure	p	Test	n	Significance
BH	WB - RB	PP	0.0038869	Transformed t-test	15	**
BH	WB - RB	HR	0.0000470	t-test	14	***
BH	WB - RB	BR	0.0000993	t-test	14	***
BH	WB - RB	N.EDA	0.2534179	Transformed t-test	10	
BH	WB - RB	N.HR	0.8962389	t-test	10	
BH	SC - RB	PP	0.0215038	Transformed t-test	15	*
BH	SC - RB	HR	0.0805282	t-test	14	
BH	SC - RB	BR	0.0026189	t-test	14	**
BH	SC - RB	N.EDA	0.0609244	Transformed t-test	10	
BH	SC - RB	N.HR	0.5286897	t-test	10	
BH	SC - WB	PP	0.3011111	Transformed t-test	15	
BH	SC - WB	HR	0.5589881	t-test	14	
BH	SC - WB	BR	0.9929885	t-test	14	
BH	SC - WB	N.EDA	0.0621603	Transformed t-test	10	
BH	SC - WB	N.HR	0.6088627	t-test	10	
BH	DT - RB	PP	0.0031738	Transformed t-test	15	**
BH	DT - RB	HR	0.2421935	t-test	14	
BH	DT - RB	BR	0.1450731	t-test	13	
BH	DT - RB	N.EDA	0.0462830	Transformed t-test	10	*
BH	DT - RB	N.HR	0.5231194	t-test	10	
BH	DT - WB	PP	0.3915045	Transformed t-test	15	
BH	DT - WB	HR	0.0017455	t-test	14	**
BH	DT - WB	BR	0.0000109	t-test	13	***
BH	DT - WB	N.EDA	0.0541748	Transformed t-test	10	
BH	DT - WB	N.HR	0.5861420	t-test	10	
BH	DT - SC	PP	0.1264163	Transformed t-test	15	
BH	DT - SC	HR	0.1489480	t-test	14	
BH	DT - SC	BR	0.0095733	t-test	13	**
BH	DT - SC	N.EDA	0.3059258	Transformed t-test	10	
BH	DT - SC	N.HR	0.0955421	t-test	10	
BH	P - RB	PP	0.0000019	Transformed t-test	15	***
BH	P - RB	HR	0.0051343	t-test	14	**
BH	P - RB	BR	0.7739637	t-test	14	
BH	P - RB	N.EDA	0.0619911	Transformed t-test	10	
BH	P - RB	N.HR	0.8626994	t-test	10	
BH	P - WB	PP	0.0001211	Transformed t-test	15	***
BH	P - WB	HR	0.0500403	t-test	14	
BH	P - WB	BR	0.0210557	t-test	14	*
BH	P - WB	N.EDA	0.0624879	Transformed t-test	10	
BH	P - WB	N.HR	0.7565417	t-test	10	
BH	P - SC	PP	0.0001008	Transformed t-test	15	***
BH	P - SC	HR	0.0135531	t-test	14	*
BH	P - SC	BR	0.0401917	t-test	14	*
BH	P - SC	N.EDA	0.2061865	Transformed t-test	10	
BH	P - SC	N.HR	0.8970905	t-test	10	

(continued)

Condition	Difference	Measure	p	Test	n	Significance
BH	P - DT	PP	0.0000374	Transformed t-test	15	***
BH	P - DT	HR	0.0073807	t-test	14	**
BH	P - DT	BR	0.4905062	t-test	13	
BH	P - DT	N.EDA	0.3638723	Transformed t-test	10	
BH	P - DT	N.HR	0.4013641	t-test	10	
BL	WB - RB	PP	0.0129487	Transformed t-test	14	*
BL	WB - RB	HR	0.7393780	t-test	13	
BL	WB - RB	BR	0.0050298	t-test	14	**
BL	WB - RB	N.EDA	0.3792453	Transformed t-test	9	
BL	WB - RB	N.HR	0.7404537	Transformed t-test	9	
BL	SC - RB	PP	0.1390646	Transformed t-test	13	
BL	SC - RB	HR	0.0068419	t-test	13	**
BL	SC - RB	BR	0.7386400	t-test	14	
BL	SC - RB	N.EDA	0.4047298	Transformed t-test	9	
BL	SC - RB	N.HR	0.1597781	Transformed t-test	9	
BL	SC - WB	PP	0.7092246	Transformed t-test	13	
BL	SC - WB	HR	0.0810305	t-test	13	
BL	SC - WB	BR	0.0012367	t-test	14	**
BL	SC - WB	N.EDA	0.5072284	Transformed t-test	9	
BL	SC - WB	N.HR	0.6747807	Transformed t-test	9	
BL	DT - RB	PP	0.0010125	Transformed t-test	14	**
BL	DT - RB	HR	0.0028318	t-test	13	**
BL	DT - RB	BR	0.0372882	t-test	12	*
BL	DT - RB	N.EDA	0.4653531	Transformed t-test	9	
BL	DT - RB	N.HR	0.2226714	Transformed t-test	9	
BL	DT - WB	PP	0.0063266	Transformed t-test	14	**
BL	DT - WB	HR	0.0103391	t-test	13	*
BL	DT - WB	BR	0.0368129	t-test	12	*
BL	DT - WB	N.EDA	0.7654619	Transformed t-test	9	
BL	DT - WB	N.HR	0.1264823	Transformed t-test	9	
BL	DT - SC	PP	0.0465502	Transformed t-test	13	*
BL	DT - SC	HR	0.0577026	t-test	13	
BL	DT - SC	BR	0.0020040	t-test	12	**
BL	DT - SC	N.EDA	0.8074815	Transformed t-test	9	
BL	DT - SC	N.HR	0.5114400	Transformed t-test	9	
BL	P - RB	PP	0.0000257	Transformed t-test	14	***
BL	P - RB	HR	0.1092566	t-test	11	
BL	P - RB	BR	0.2654059	t-test	14	
BL	P - RB	N.EDA	0.8709596	Transformed t-test	9	
BL	P - RB	N.HR	0.9909984	Transformed t-test	9	
BL	P - WB	PP	0.0000187	Transformed t-test	14	***
BL	P - WB	HR	0.0833217	t-test	11	
BL	P - WB	BR	0.0002977	t-test	14	***
BL	P - WB	N.EDA	0.5771550	Transformed t-test	9	
BL	P - WB	N.HR	0.8419592	Transformed t-test	9	
BL	P - SC	PP	0.0008398	Transformed t-test	13	***
BL	P - SC	HR	0.0068502	t-test	11	**

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Condition	Difference	Measure	p	Test	n	Significance
BL	P - SC	BR	0.0985488	t-test	14	
BL	P - SC	N.EDA	0.3719449	Transformed t-test	9	
BL	P - SC	N.HR	0.6148086	Transformed t-test	9	
BL	P - DT	PP	0.0002748	Transformed t-test	14	***
BL	P - DT	HR	0.0019303	t-test	11	**
BL	P - DT	BR	0.0001318	t-test	12	***
BL	P - DT	N.EDA	0.3979300	Transformed t-test	9	
BL	P - DT	N.HR	0.1540491	Transformed t-test	9	
IH	WB - RB	PP	0.0000999	Transformed t-test	17	***
IH	WB - RB	HR	0.1185091	Transformed t-test	12	
IH	WB - RB	BR	0.0086109	t-test	16	**
IH	WB - RB	N.EDA	0.1796233	Transformed t-test	9	
IH	WB - RB	N.HR	0.3593750	Wilcoxon	9	
IH	SC - RB	PP	0.0145060	Transformed t-test	17	*
IH	SC - RB	HR	0.6094900	Transformed t-test	12	
IH	SC - RB	BR	0.0454605	t-test	16	*
IH	SC - RB	N.EDA	0.1701327	Transformed t-test	9	
IH	SC - RB	N.HR	0.6523438	Wilcoxon	9	
IH	SC - WB	PP	0.2084476	Transformed t-test	17	
IH	SC - WB	HR	0.2597084	Transformed t-test	12	
IH	SC - WB	BR	0.0933387	t-test	16	
IH	SC - WB	N.EDA	0.4136931	Transformed t-test	9	
IH	SC - WB	N.HR	0.4960938	Wilcoxon	9	
IH	DT - RB	PP	0.0016239	Transformed t-test	17	**
IH	DT - RB	HR	0.5734584	Transformed t-test	12	
IH	DT - RB	BR	0.2969312	t-test	16	
IH	DT - RB	N.EDA	0.1074189	Transformed t-test	9	
IH	DT - RB	N.HR	0.1289062	Wilcoxon	9	
IH	DT - WB	PP	0.9946474	Transformed t-test	17	
IH	DT - WB	HR	0.0171595	Transformed t-test	12	*
IH	DT - WB	BR	0.0005234	t-test	16	***
IH	DT - WB	N.EDA	0.0501999	Transformed t-test	9	
IH	DT - WB	N.HR	0.7343750	Wilcoxon	9	
IH	DT - SC	PP	0.3697148	Transformed t-test	17	
IH	DT - SC	HR	0.2853287	Transformed t-test	12	
IH	DT - SC	BR	0.3543299	t-test	16	
IH	DT - SC	N.EDA	0.2500363	Transformed t-test	9	
IH	DT - SC	N.HR	0.1640625	Wilcoxon	9	
IH	P - RB	PP	0.0000079	Transformed t-test	17	***
IH	P - RB	HR	0.0079289	Transformed t-test	11	**
IH	P - RB	BR	0.2723250	t-test	16	
IH	P - RB	N.EDA	0.2412087	Transformed t-test	9	
IH	P - RB	N.HR	0.4257812	Wilcoxon	9	
IH	P - WB	PP	0.0002411	Transformed t-test	17	***
IH	P - WB	HR	0.0152592	Transformed t-test	11	*
IH	P - WB	BR	0.0008811	t-test	16	***
IH	P - WB	N.EDA	0.4940290	Transformed t-test	9	

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Condition	Difference	Measure	p	Test	n	Significance
IH	P - WB	N.HR	0.1289062	Wilcoxon	9	
IH	P - SC	PP	0.0000697	Transformed t-test	17	***
IH	P - SC	HR	0.0026035	Transformed t-test	11	**
IH	P - SC	BR	0.0065963	t-test	16	**
IH	P - SC	N.EDA	0.9167294	Transformed t-test	9	
IH	P - SC	N.HR	0.3007812	Wilcoxon	9	
IH	P - DT	PP	0.0001591	Transformed t-test	17	***
IH	P - DT	HR	0.0000458	Transformed t-test	11	***
IH	P - DT	BR	0.0131870	t-test	16	*
IH	P - DT	N.EDA	0.2971289	Transformed t-test	9	
IH	P - DT	N.HR	0.0742188	Wilcoxon	9	
IL	WB - RB	PP	0.0011525	Transformed t-test	17	**
IL	WB - RB	HR	0.0688632	t-test	14	
IL	WB - RB	BR	0.0011096	t-test	15	**
IL	WB - RB	N.EDA	0.2923648	Transformed t-test	10	
IL	WB - RB	N.HR	0.8984375	Wilcoxon	11	
IL	SC - RB	PP	0.0261497	Transformed t-test	17	*
IL	SC - RB	HR	0.1422368	t-test	13	
IL	SC - RB	BR	0.2825139	t-test	15	
IL	SC - RB	N.EDA	0.7611158	Transformed t-test	10	
IL	SC - RB	N.HR	0.5195312	Wilcoxon	11	
IL	SC - WB	PP	0.0272285	Transformed t-test	17	*
IL	SC - WB	HR	0.0000090	t-test	13	***
IL	SC - WB	BR	0.0029752	t-test	15	**
IL	SC - WB	N.EDA	0.3039120	Transformed t-test	10	
IL	SC - WB	N.HR	0.4648437	Wilcoxon	11	
IL	DT - RB	PP	0.0001960	Transformed t-test	17	***
IL	DT - RB	HR	0.7836686	t-test	14	
IL	DT - RB	BR	0.0103798	t-test	15	*
IL	DT - RB	N.EDA	0.9865451	Transformed t-test	10	
IL	DT - RB	N.HR	0.8310547	Wilcoxon	11	
IL	DT - WB	PP	0.5609825	Transformed t-test	17	
IL	DT - WB	HR	0.0043171	t-test	14	**
IL	DT - WB	BR	0.0371126	t-test	15	*
IL	DT - WB	N.EDA	0.0615881	Transformed t-test	10	
IL	DT - WB	N.HR	0.1015625	Wilcoxon	11	
IL	DT - SC	PP	0.0053685	Transformed t-test	17	**
IL	DT - SC	HR	0.0676031	t-test	13	
IL	DT - SC	BR	0.0180613	t-test	15	*
IL	DT - SC	N.EDA	0.9576964	Transformed t-test	10	
IL	DT - SC	N.HR	1.0000000	Wilcoxon	11	
IL	P - RB	PP	0.0000487	Transformed t-test	15	***
IL	P - RB	HR	0.0110591	t-test	12	*
IL	P - RB	BR	0.7416909	t-test	13	
IL	P - RB	N.EDA	0.1562724	Transformed t-test	9	
IL	P - RB	N.HR	1.0000000	Wilcoxon	10	
IL	P - WB	PP	0.0012790	Transformed t-test	15	**

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Condition	Difference	Measure	p	Test	n	Significance
IL	P - WB	HR	0.0089131	t-test	12	**
IL	P - WB	BR	0.0011186	t-test	13	**
IL	P - WB	N.EDA	0.0601615	Transformed t-test	9	
IL	P - WB	N.HR	0.3750000	Wilcoxon	10	
IL	P - SC	PP	0.0000712	Transformed t-test	15	***
IL	P - SC	HR	0.0026560	t-test	11	**
IL	P - SC	BR	0.2559094	t-test	13	
IL	P - SC	N.EDA	0.1458993	Transformed t-test	9	
IL	P - SC	N.HR	0.8457031	Wilcoxon	10	
IL	P - DT	PP	0.0002236	Transformed t-test	15	***
IL	P - DT	HR	0.0009767	t-test	12	***
IL	P - DT	BR	0.0003885	t-test	13	***
IL	P - DT	N.EDA	0.0791417	Transformed t-test	10	
IL	P - DT	N.HR	0.6953125	Wilcoxon	10	