Hypothesis Testing for NSF Office Stress Project - Full Sensor Set

Below are the test results for each of the Conditions that had n >= 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:

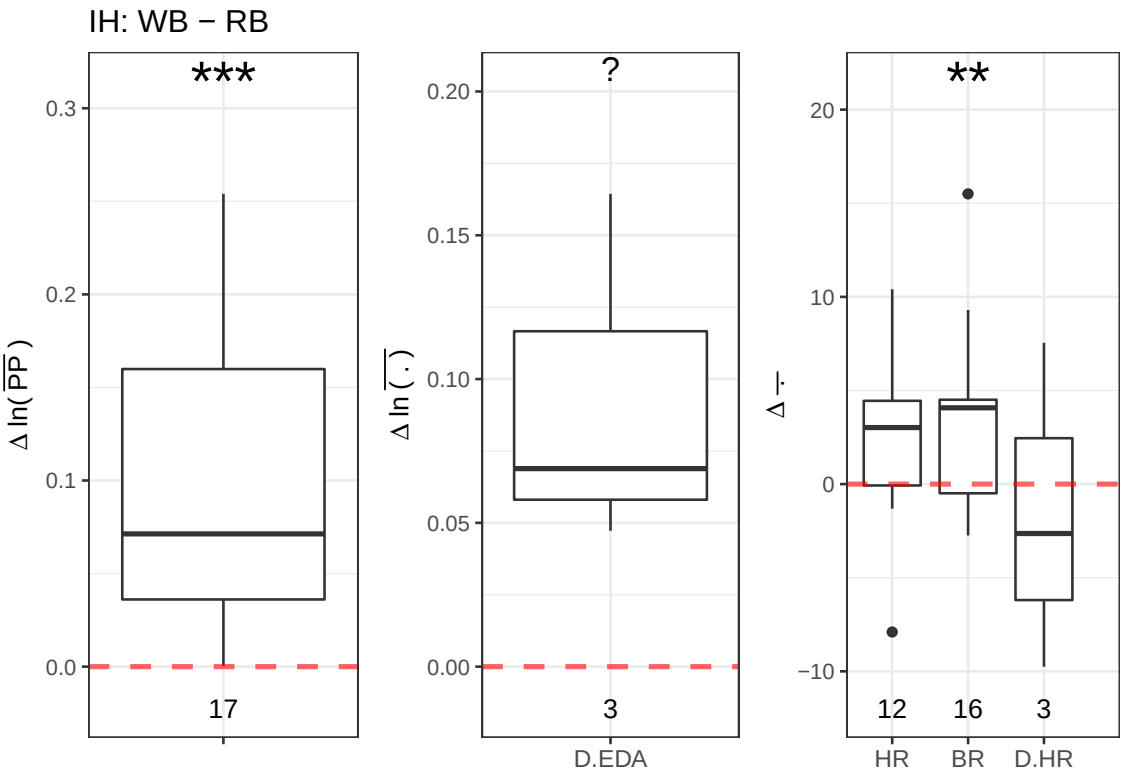
WB-RB = Writing Baseline - Resting Baseline
SC-RB = Stress Condition - Resting Baseline
SC-WB = Stress Condition - Writing Baseline
DT-RB = Dual Task - Resting Baseline
DT-WB = Dual Task - Writing Baseline
DT-SC = Dual Task - Stress Condition
P-RB = Presentation - Resting Baseline
P-WB = Presentation - Writing Baseline
P-SC = Presentation - Stress Condition
P-DT = Presentation - Dual Task

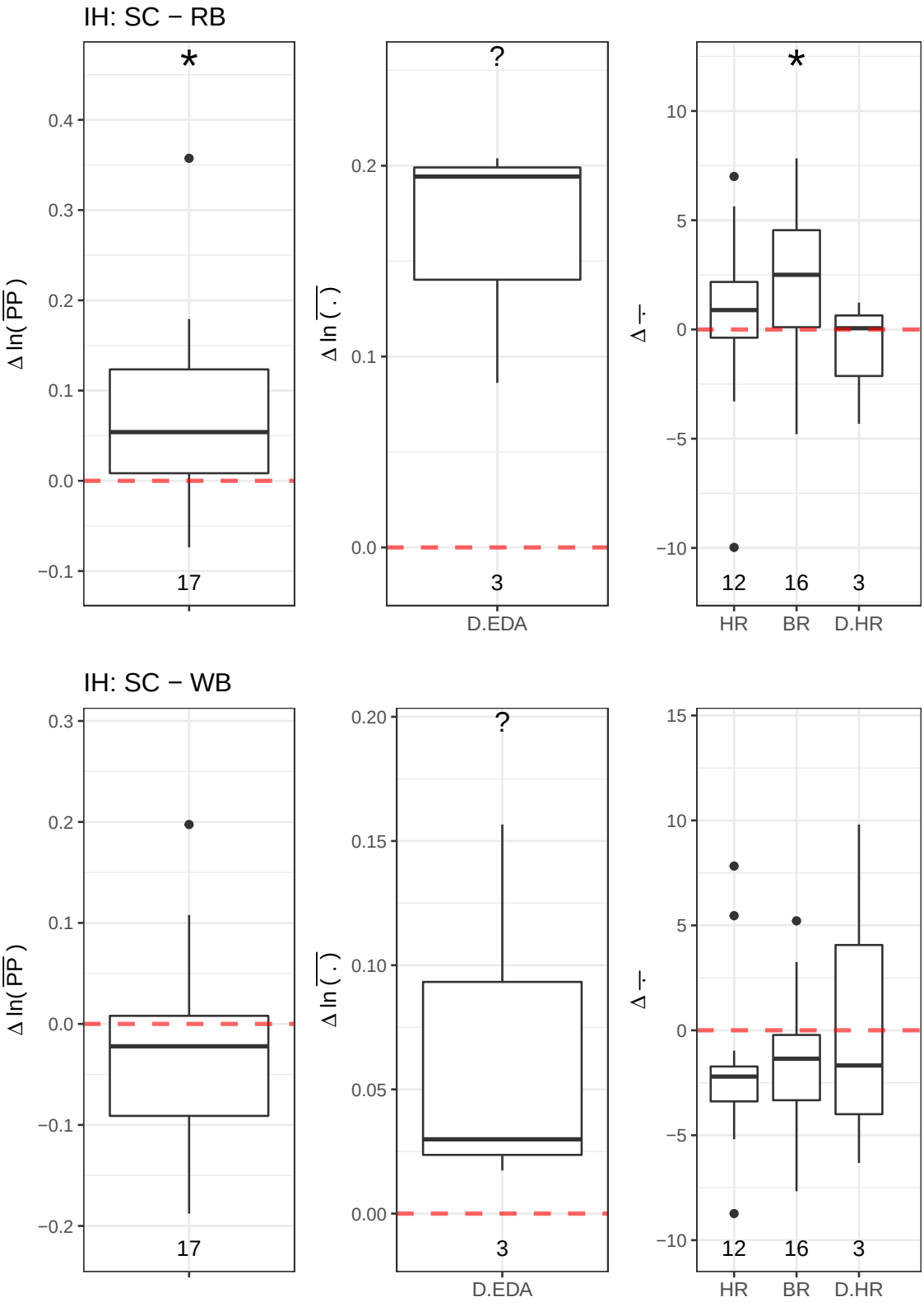
For each of the graphs, let:

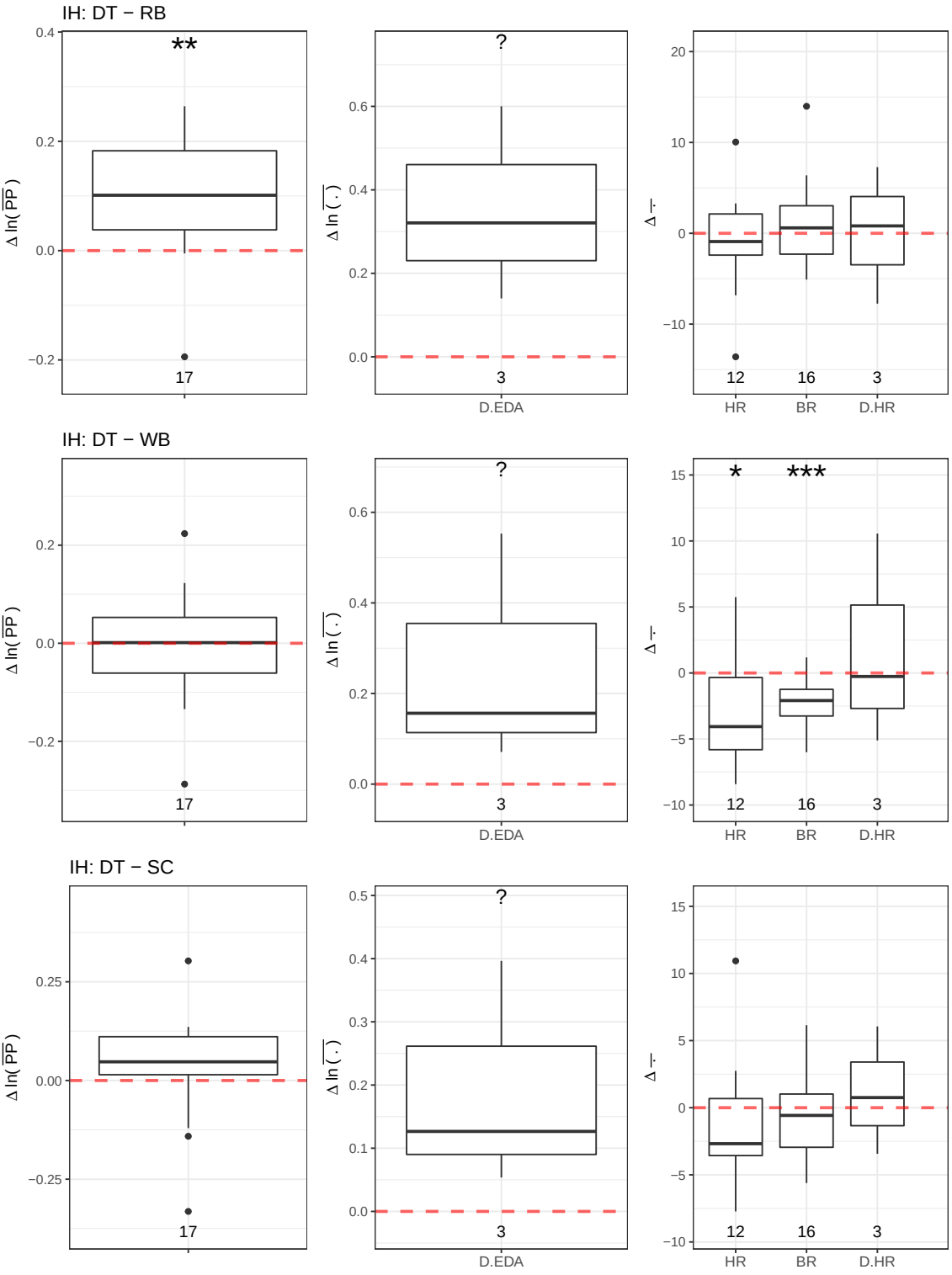
* = 0.01 < p <= 0.05
** = 0.001 < p <= 0.01
*** = p <= 0.001
? = Did not run statistical test ($n < 7$)

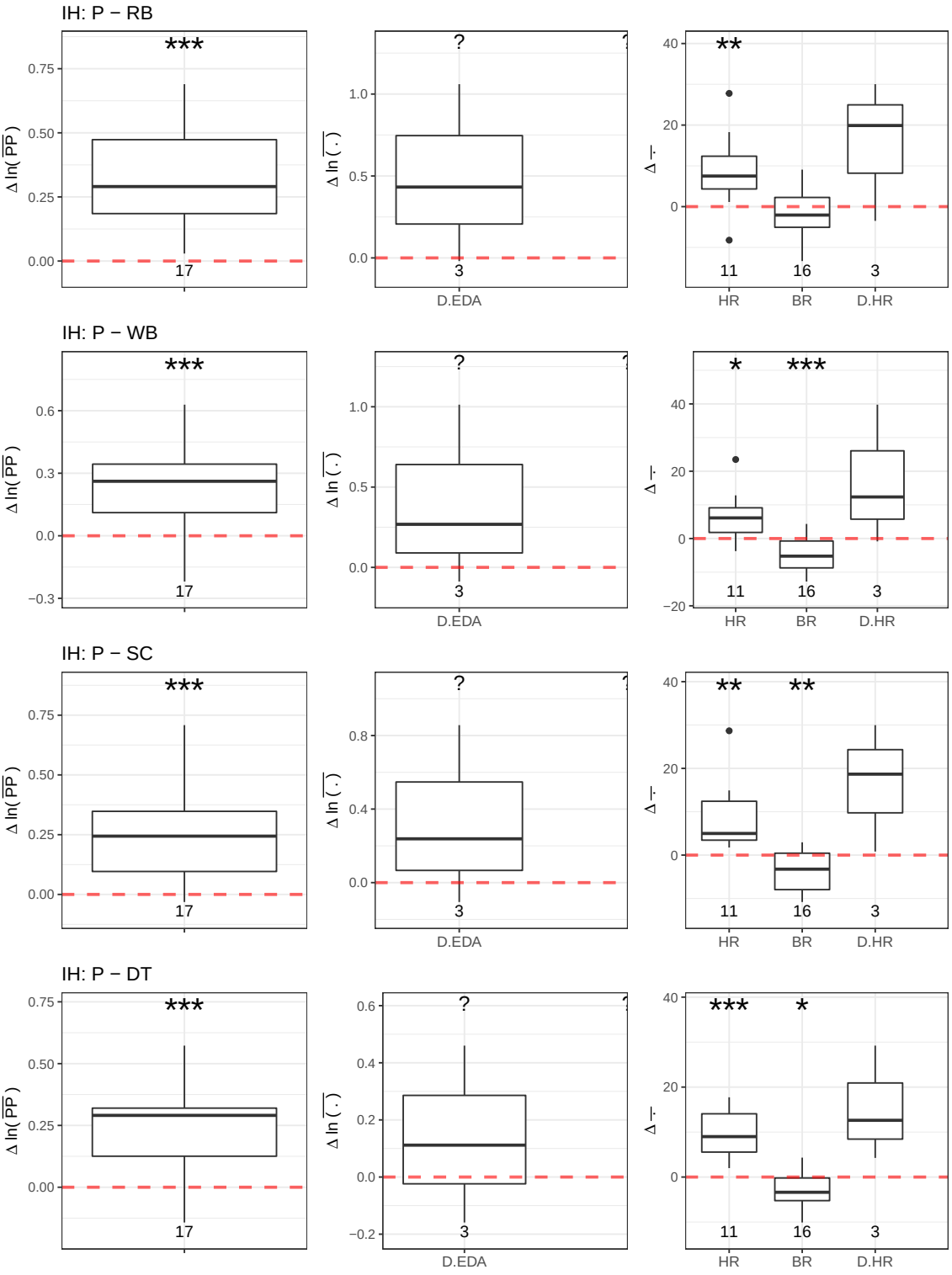
Intermittent-High (IH)

Sensor Channels per Activity

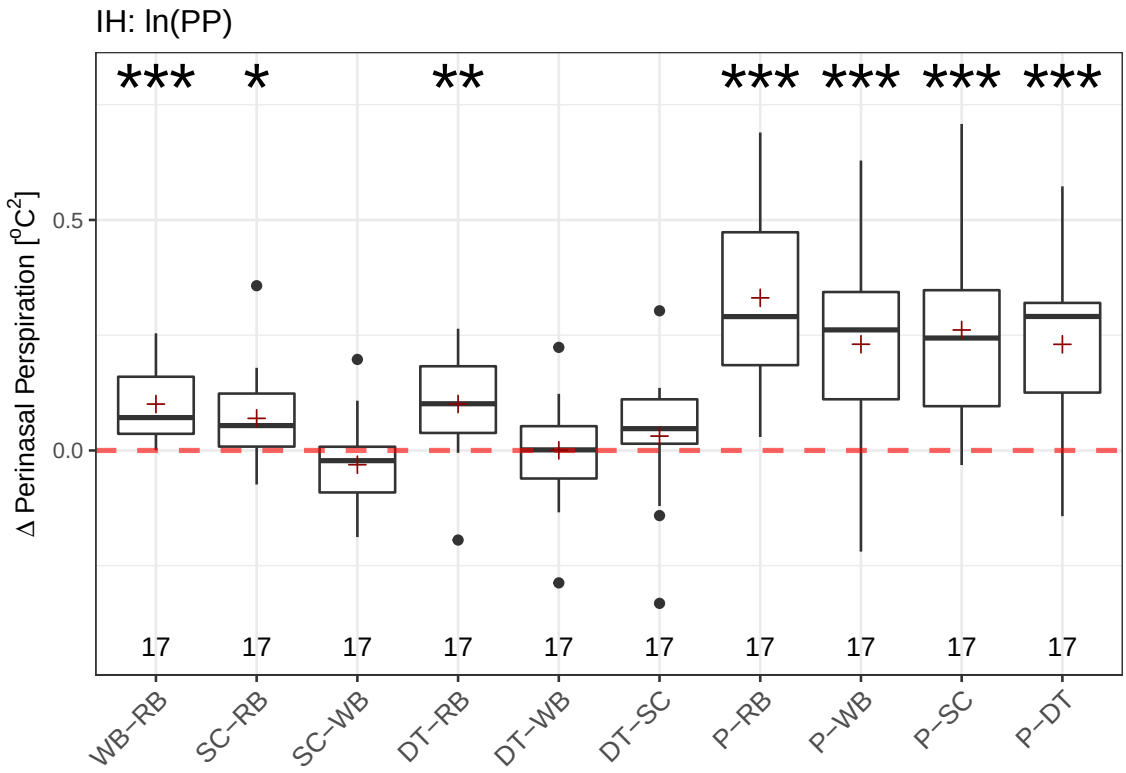



IH: SC − RB
*
?
*
Δ ln(PP)
Δ ln(.)
Δ –.
0.4
0.3
0.2
0.1
0.0
−0.1
0.2
0.1
0.0
10
5
0
−5
−10
17
3
12
16
3
D.EDA
HR
BR
D.HR
IH: SC − WB
?
0.3
0.2
0.1
0.0
−0.1
−0.2
0.20
0.15
0.10
0.05
0.00
15
10
5
0
−5
−10


IH: DT − RB
**
?
17
3
D.EDA
12
16
3
HR
BR
D.HR
IH: DT − WB
*
***
?
17
3
D.EDA
12
16
3
HR
BR
D.HR
IH: DT − SC
?
17
3
D.EDA
12
16
3
HR
BR
D.HR

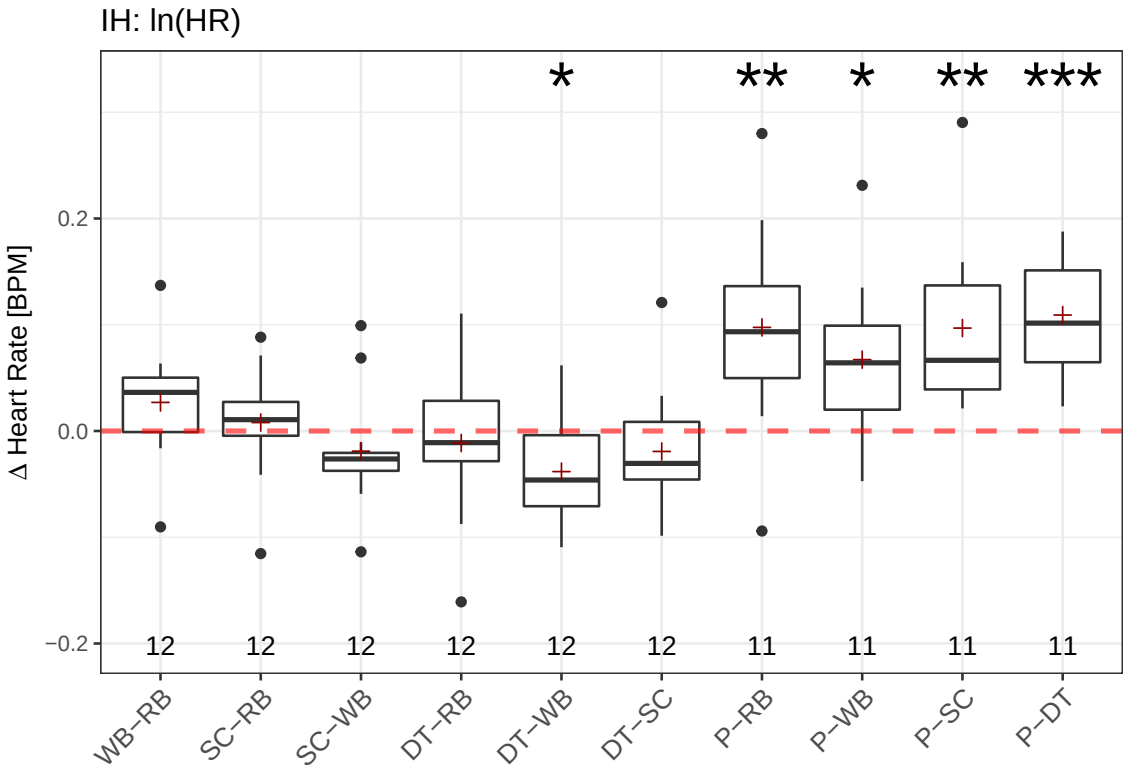

IH: P − RB
IH: P − WB
IH: P − SC
IH: P − DT
Δ ln(PP)
Δ ln(.)
Δ --
***
**
*
?
17
3
11
16
HR
BR
D.HR
D.EDA

Sensor Channel across Activities



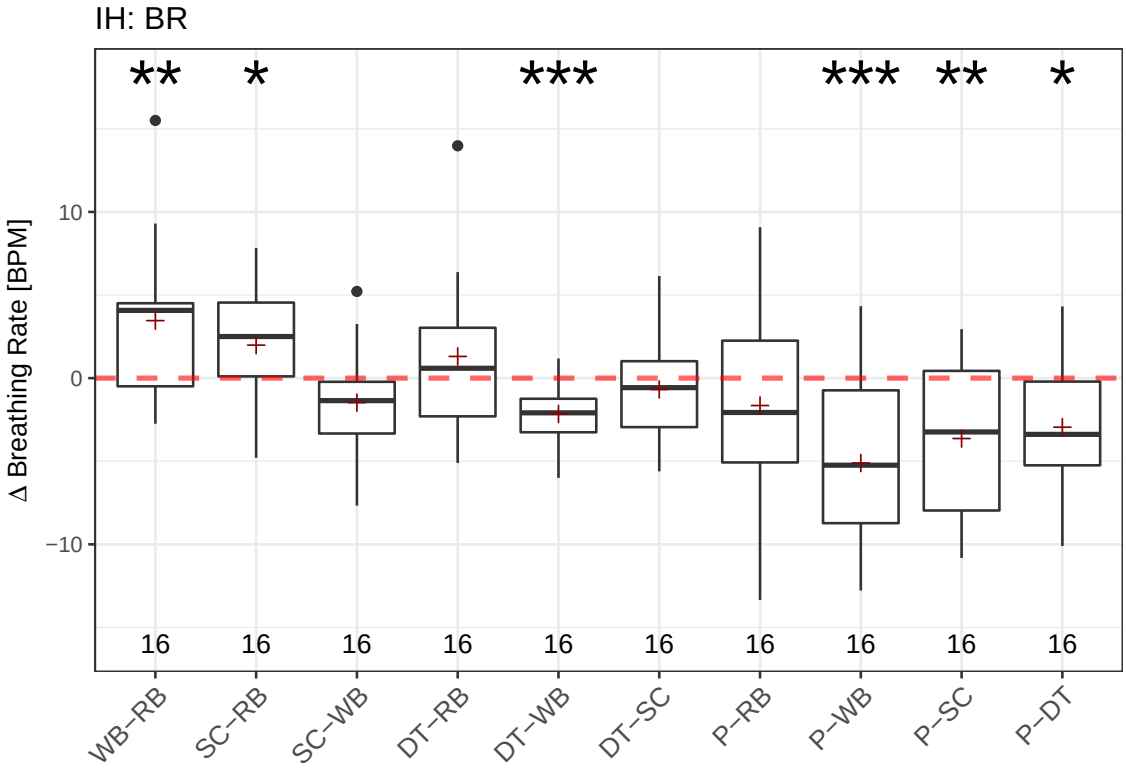

```
## In the following tests, we applied ln(PP).
##
## Writing Baseline - Resting Baseline
## Transformed t-test p = 1e-04 < 0.001  ***
##
## Stress Condition - Resting Baseline
## Transformed t-test p = 0.0145 < 0.05  *
##
## StressCondition - Writing Baseline
## Transformed t-test p = 0.2084 > 0.05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



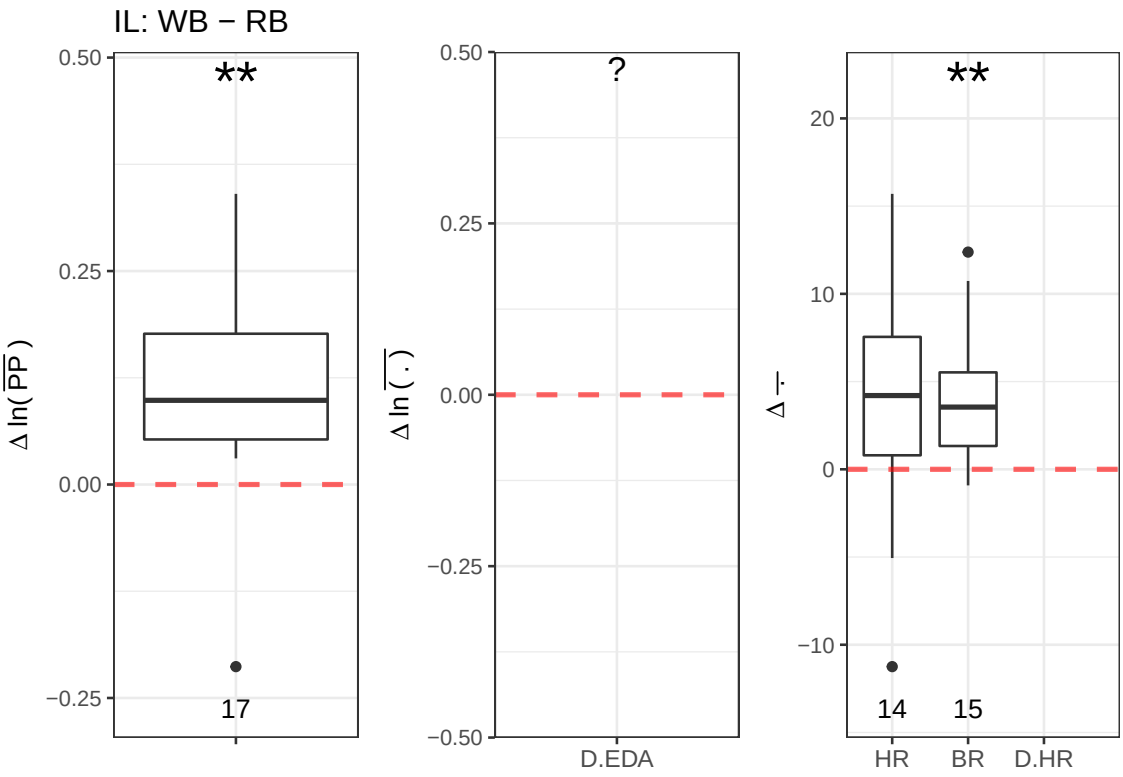

```
## Writing Baseline - Resting Baseline
## t-test p = 0.0086 < 0.01  **
##
## Stress Condition - Resting Baseline
## t-test p = 0.0455 < 0.05  *
##
## StressCondition - Writing Baseline
## t-test p = 0.0933 > 0.05
##
## Dual Task - Resting Baseline
## t-test p = 0.2969 > 0.05
##
## Dual Task - Writing 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
```

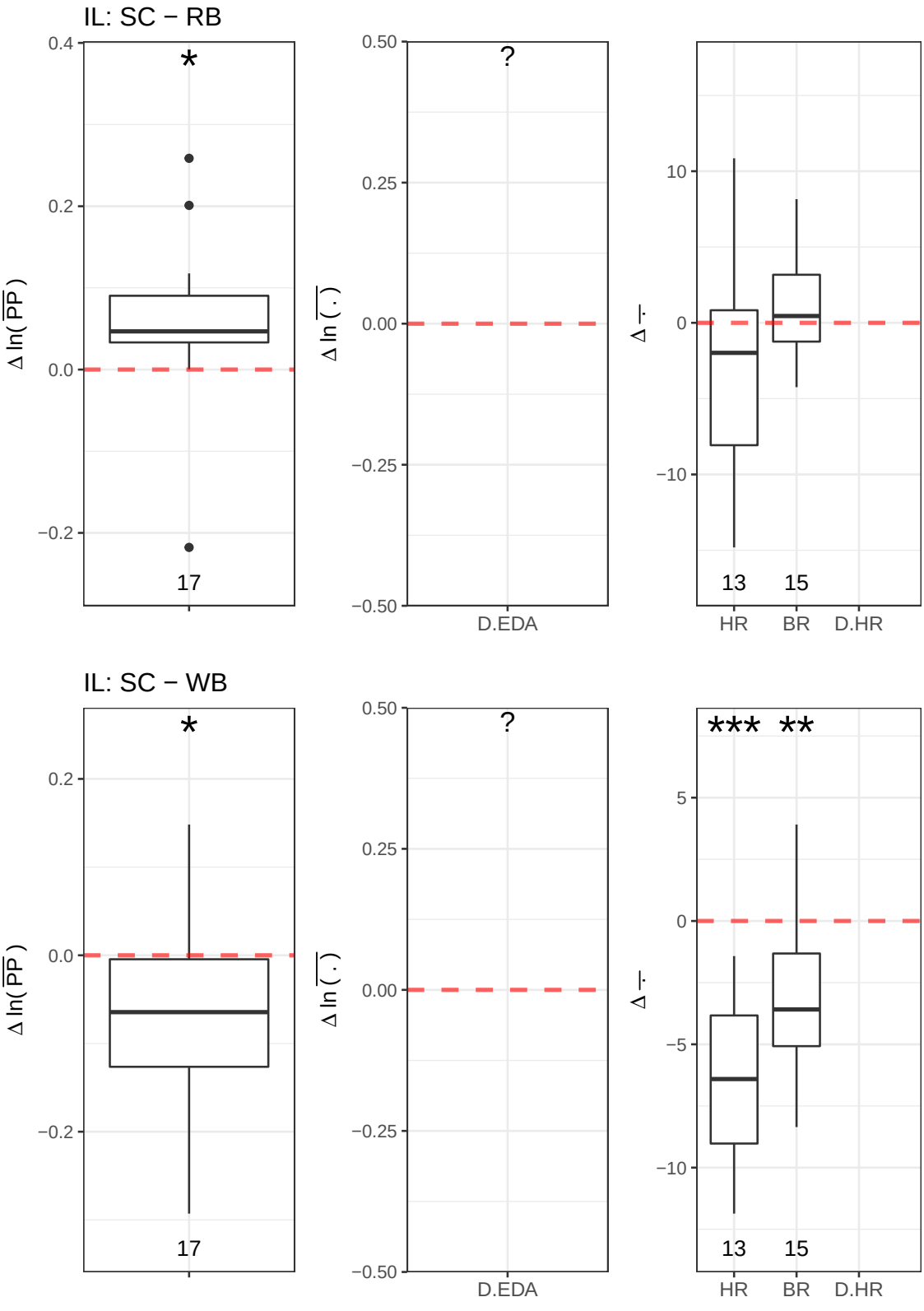
```
## t-test p = 0.0066 < 0.01  **
##
## Presentation - Dual Task
## t-test p = 0.0132 < 0.05  *
```

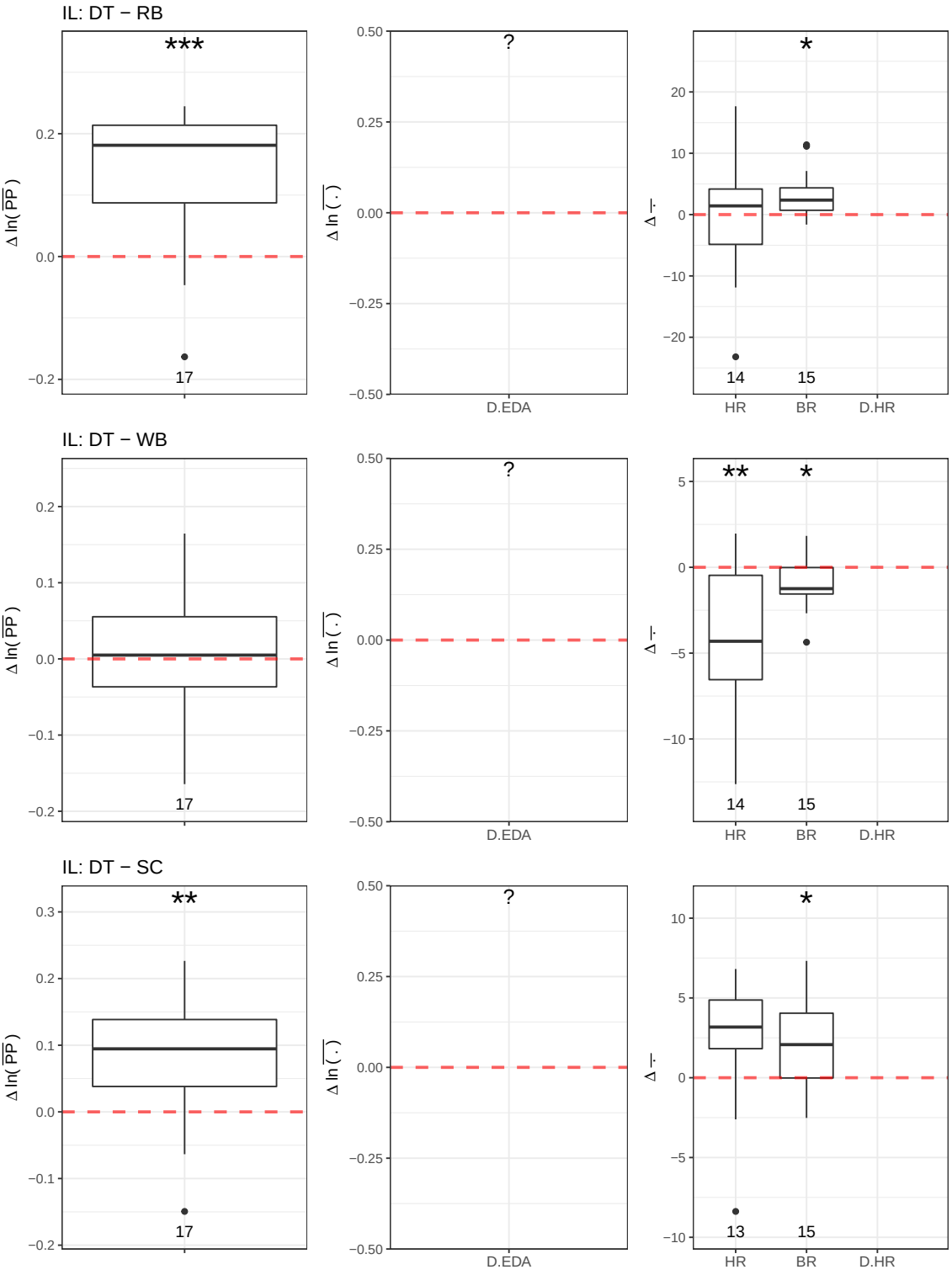
```
## IH has LESS than 7 subjects for D.EDA. Cannot continue with test.
## -----
## IH has LESS than 7 subjects for D.HR. Cannot continue with test.
## -----
```

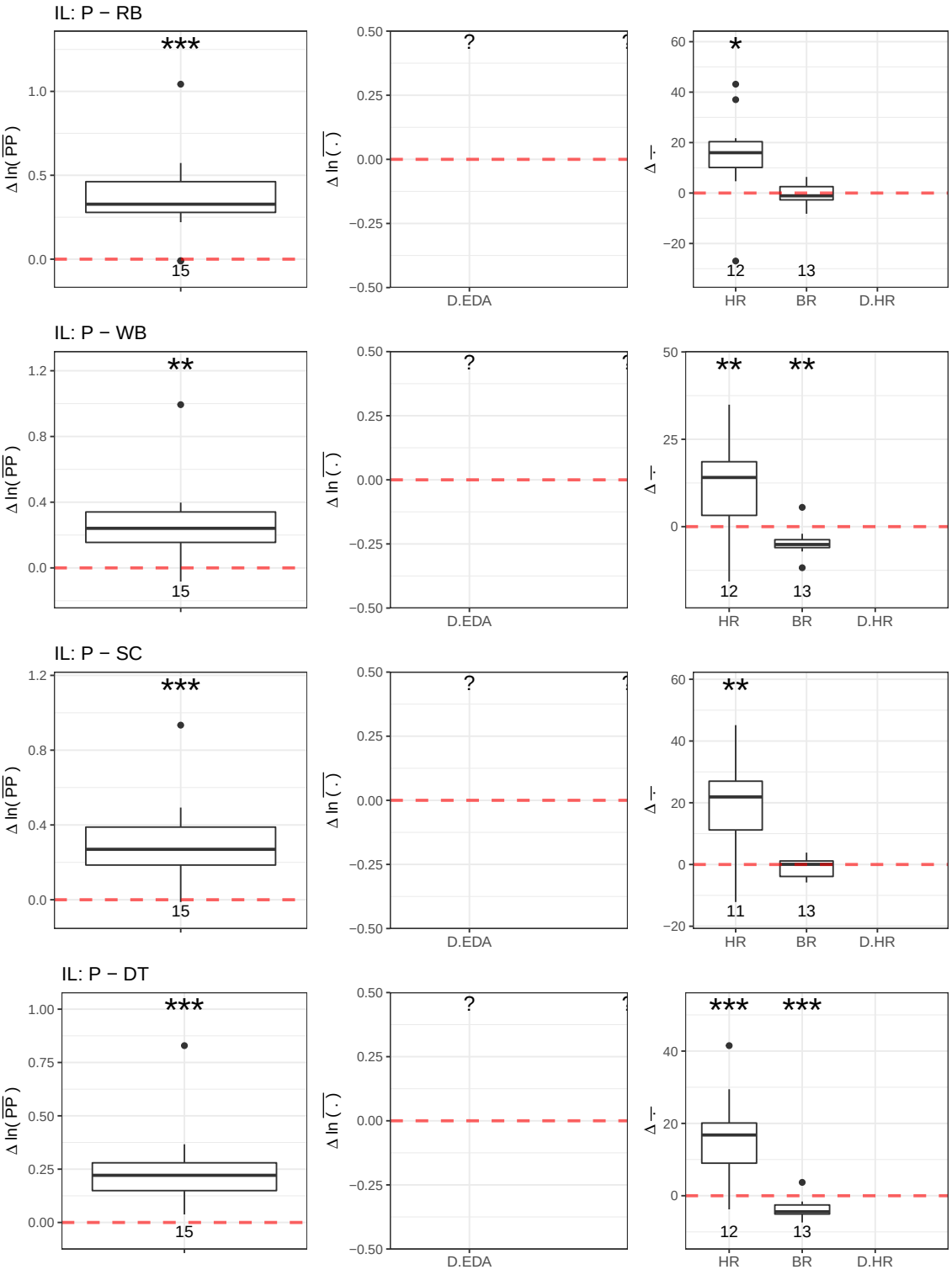
Intermittent-Low (IL)

Sensor Channels per Activity

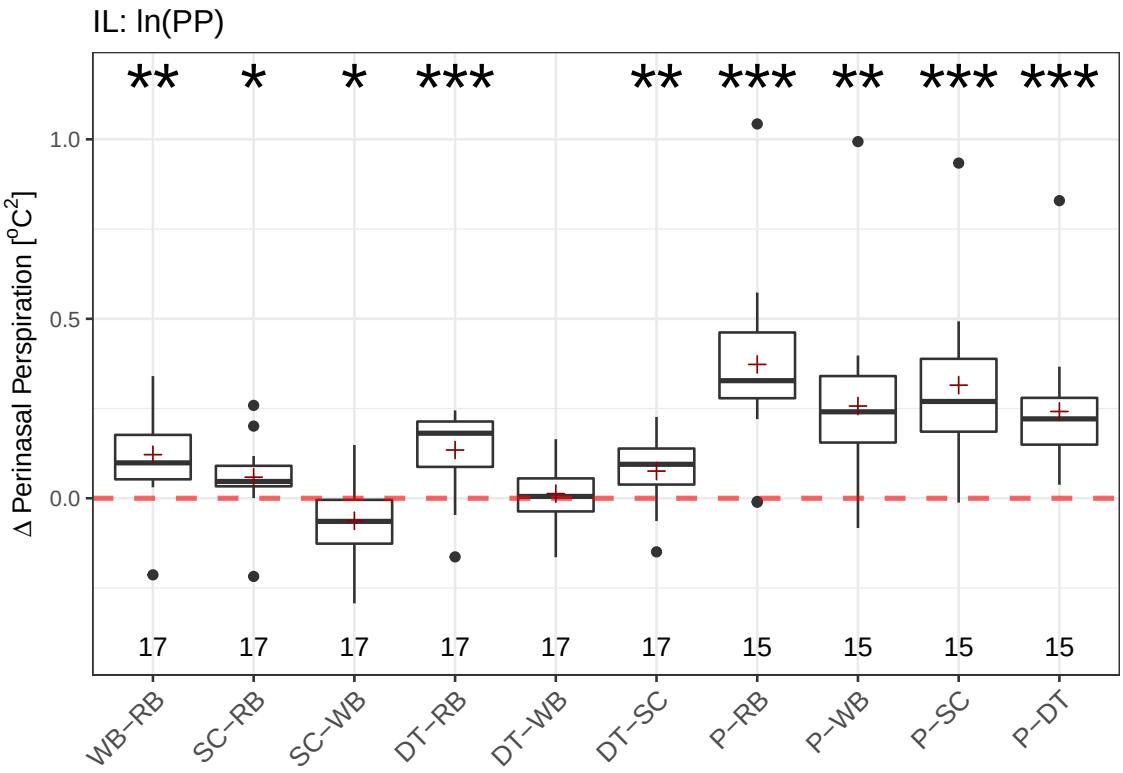



IL: SC − RB
*
?
17
D.EDA
13
15
HR
BR
D.HR
IL: SC − WB
*
?
***
**
17
D.EDA
13
15
HR
BR
D.HR


IL: DT − RB
***
?
*
Δ ln(PP)
Δ ln (.)
Δ --
17
14
15
D.EDA
HR
BR
D.HR
IL: DT − WB
**
*
?
17
14
15
D.EDA
HR
BR
D.HR
IL: DT − SC
**
*
?
17
13
15
D.EDA
HR
BR
D.HR

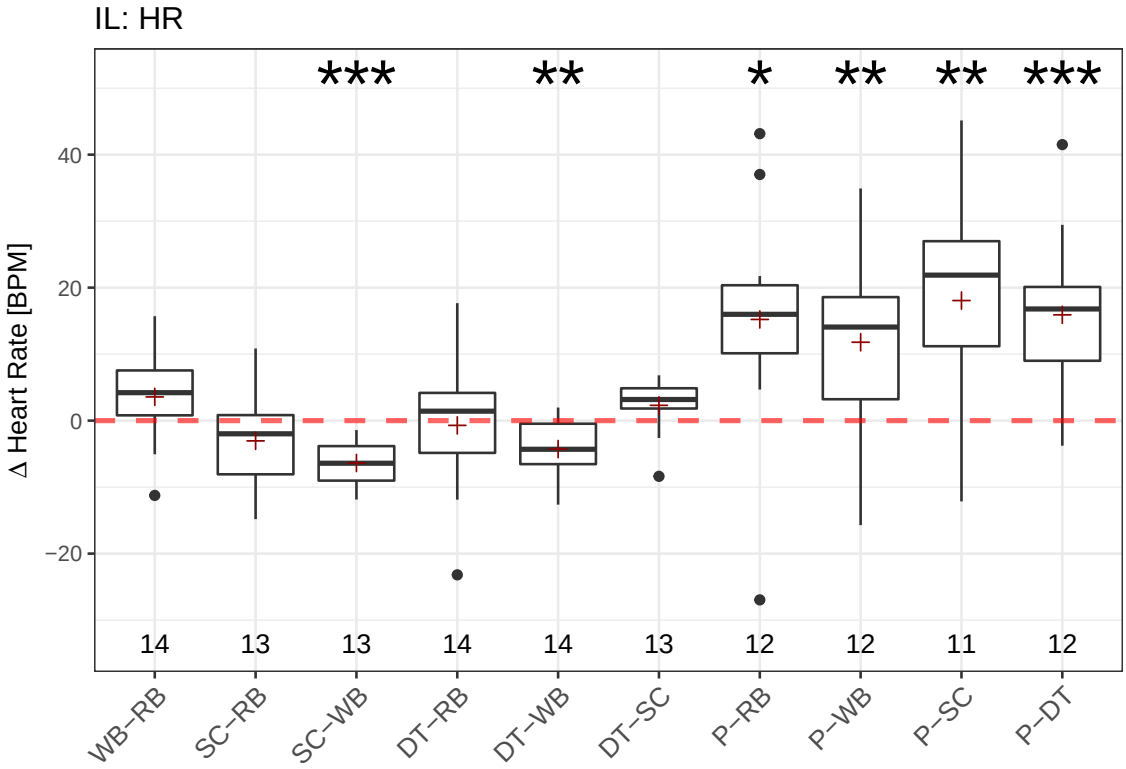

IL: P − RB
IL: P − WB
IL: P − SC
IL: P − DT
***
**
*
?
15
12
13
11
HR
BR
D.HR
D.EDA

Sensor Channel across Activities



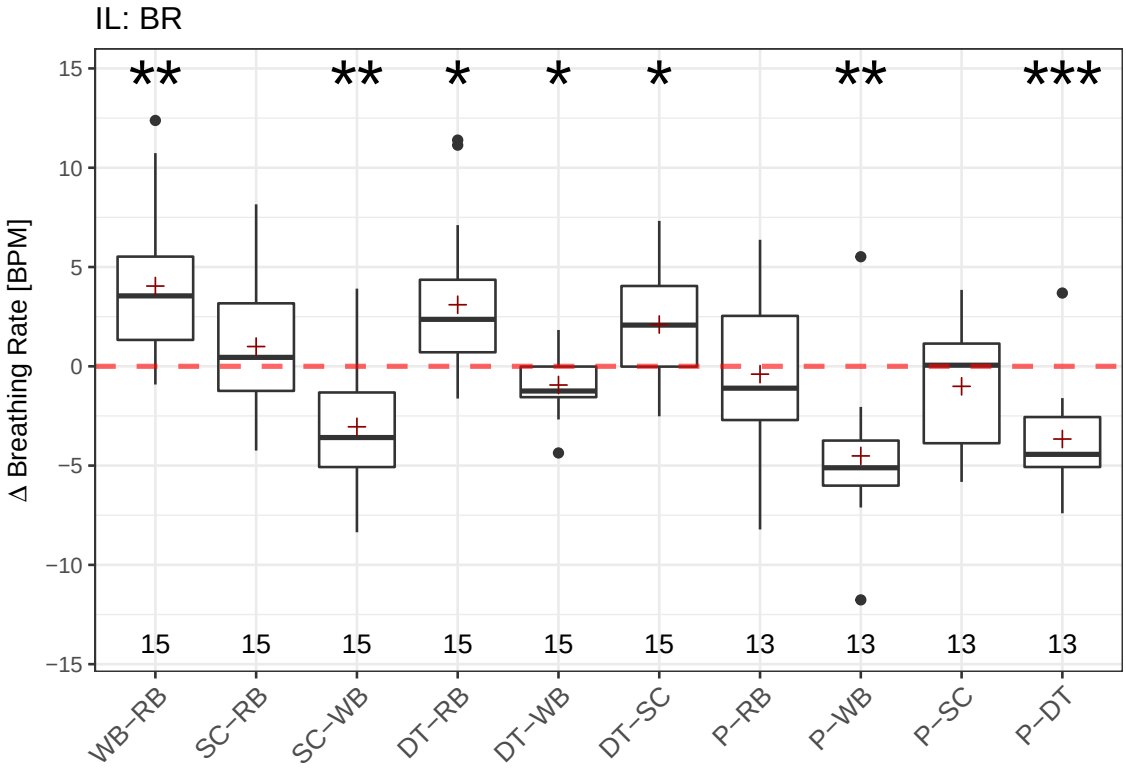

```
## Writing Baseline - Resting Baseline
## Transformed t-test p = 0.0012 < 0.01  **
##
## Stress Condition - Resting Baseline
## Transformed t-test p = 0.0261 < 0.05  *
##
## StressCondition - Writing Baseline
## Transformed t-test p = 0.0272 < 0.05  *
##
## Dual Task - Resting Baseline
## Transformed 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  ***
```



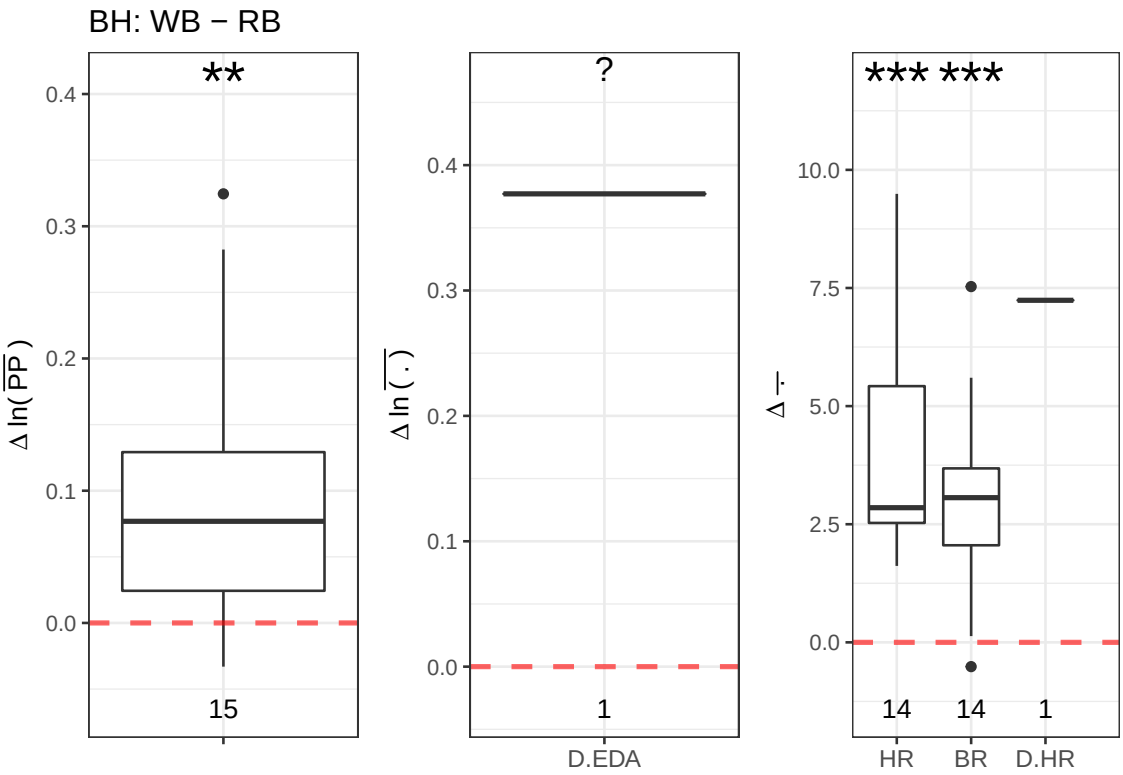

```
## Writing Baseline - Resting Baseline
## t-test p = 0.0011 < 0.01  **
##
## Stress Condition - Resting Baseline
## t-test p = 0.2825 > 0.05
##
## StressCondition - Writing Baseline
## t-test p = 0.003 < 0.01  **
##
## Dual Task - Resting Baseline
## t-test p = 0.0104 < 0.05  *
##
## Dual Task -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

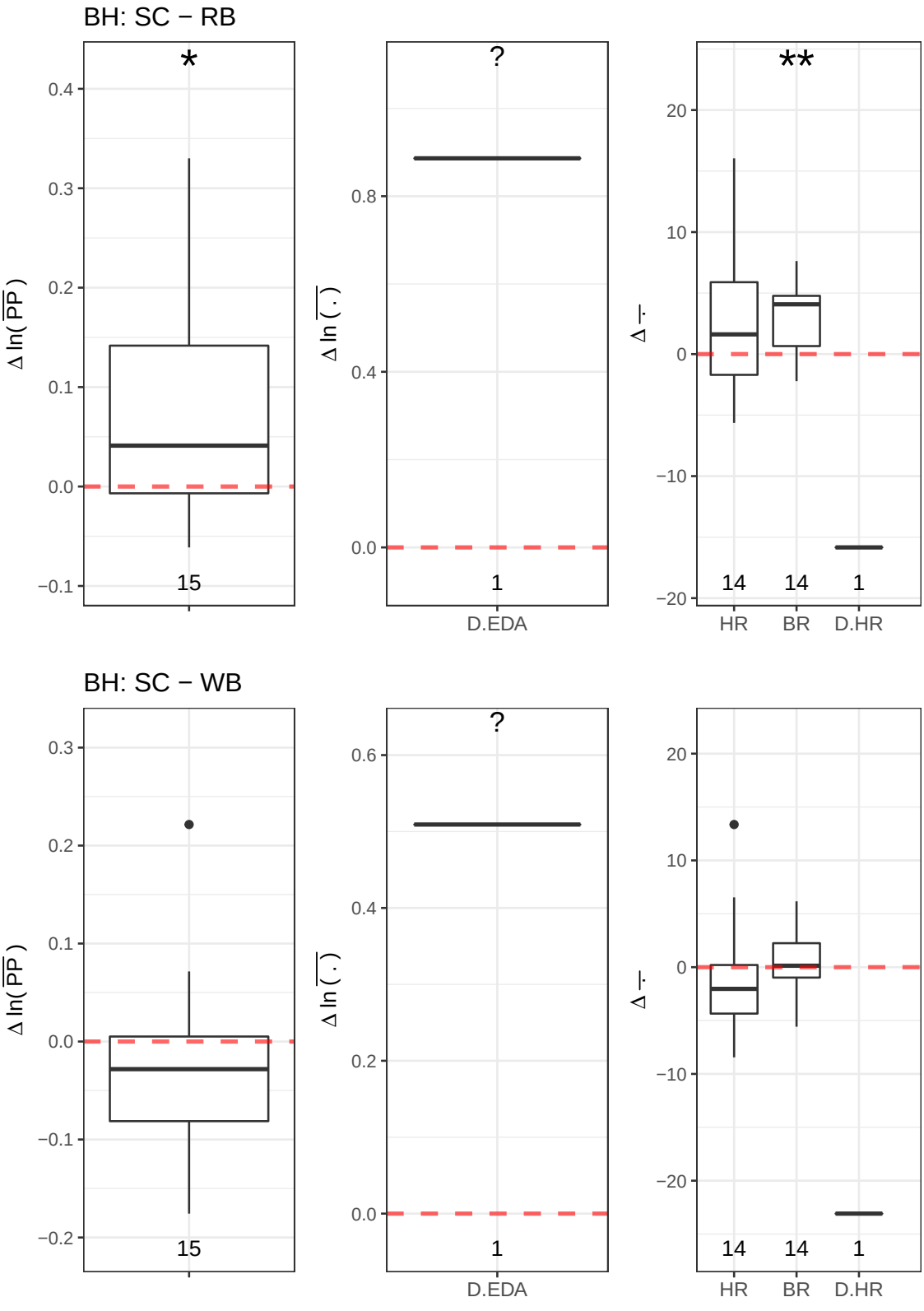
```
## t-test p = 0.2559 > 0.05
##
## Presentation - Dual Task
## t-test p = 4e-04 < 0.001  ***
```

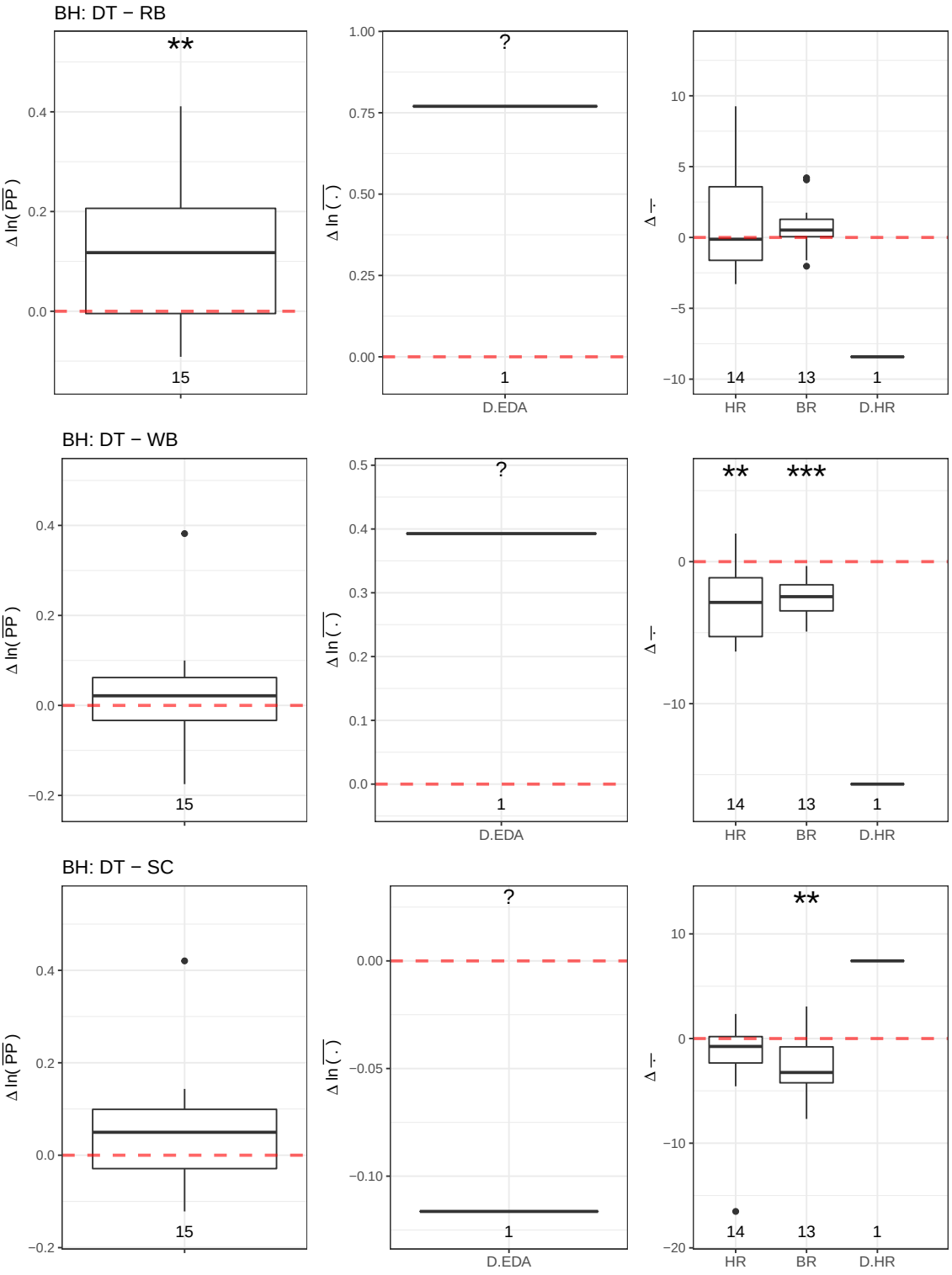
```
## IL has LESS than 7 subjects for D.EDA. Cannot continue with test.
## -----
## IL has LESS than 7 subjects for D.HR. Cannot continue with test.
## -----
```

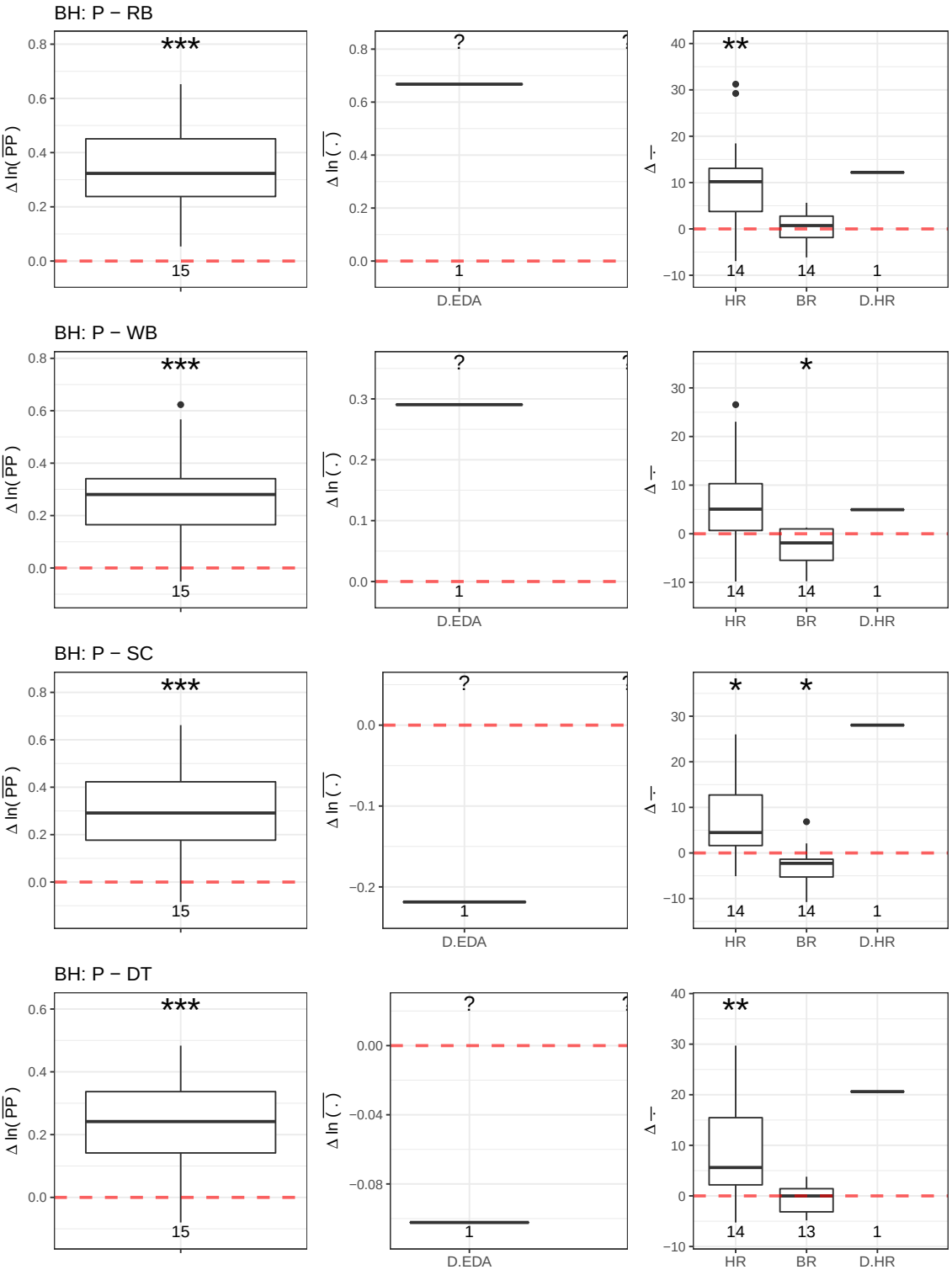
Batch-High (BH)

Sensor Channels per Activity

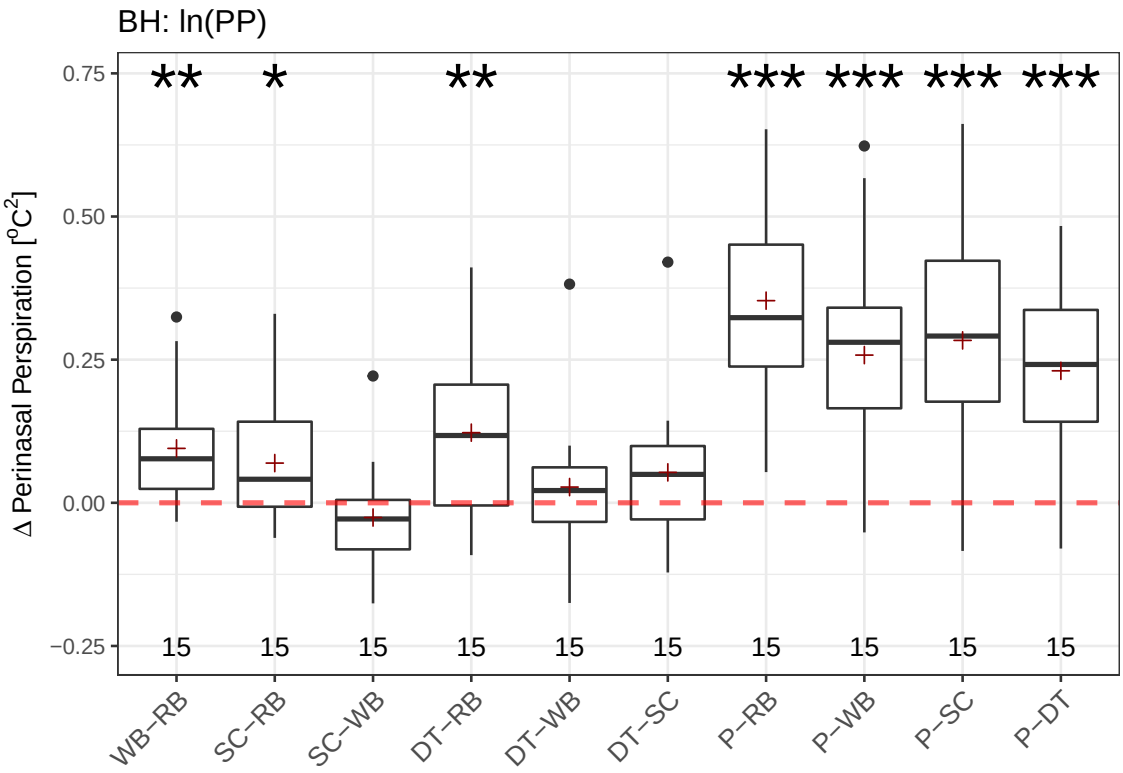



BH: SC − RB
*
?
**
Δ ln(PP)
Δ ln (.)
Δ –.
0.4
0.3
0.2
0.1
0.0
−0.1
0.8
0.4
0.0
20
10
0
−10
−20
15
1
14
14
1
D.EDA
HR
BR
D.HR
BH: SC − WB
?
0.3
0.2
0.1
0.0
−0.1
−0.2
0.6
0.4
0.2
0.0
20
10
0
−10
−20
15
1
14
14
1
D.EDA
HR
BR
D.HR


BH: DT − RB
**
?
15
1
14
13
1
D.EDA
HR
BR
D.HR
BH: DT − WB
**
***
?
15
1
14
13
1
D.EDA
HR
BR
D.HR
BH: DT − SC
**
?
15
1
14
13
1
D.EDA
HR
BR
D.HR

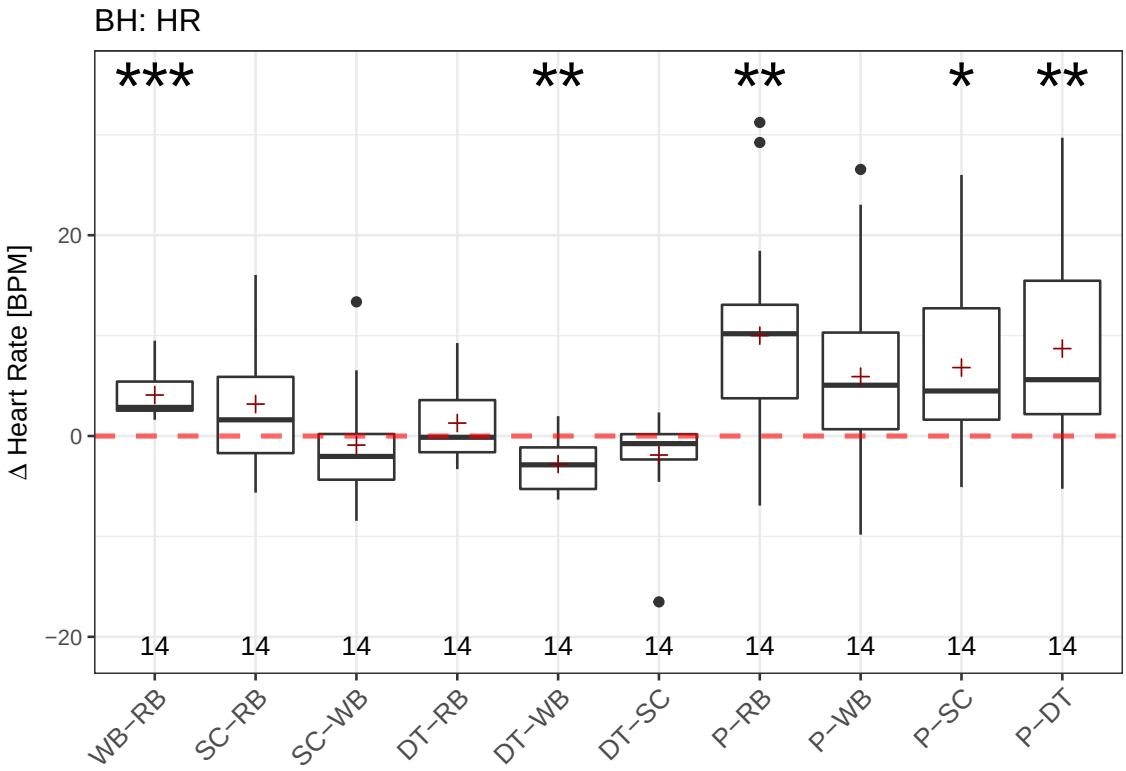

BH: P − RB
***
?
**
BH: P − WB
***
?
*
BH: P − SC
***
?
* *
BH: P − DT
***
?
**
Δ ln(PP)
Δ ln (.)
Δ --
15
1
14
13
D.EDA
HR
BR
D.HR

Sensor Channel across Activities



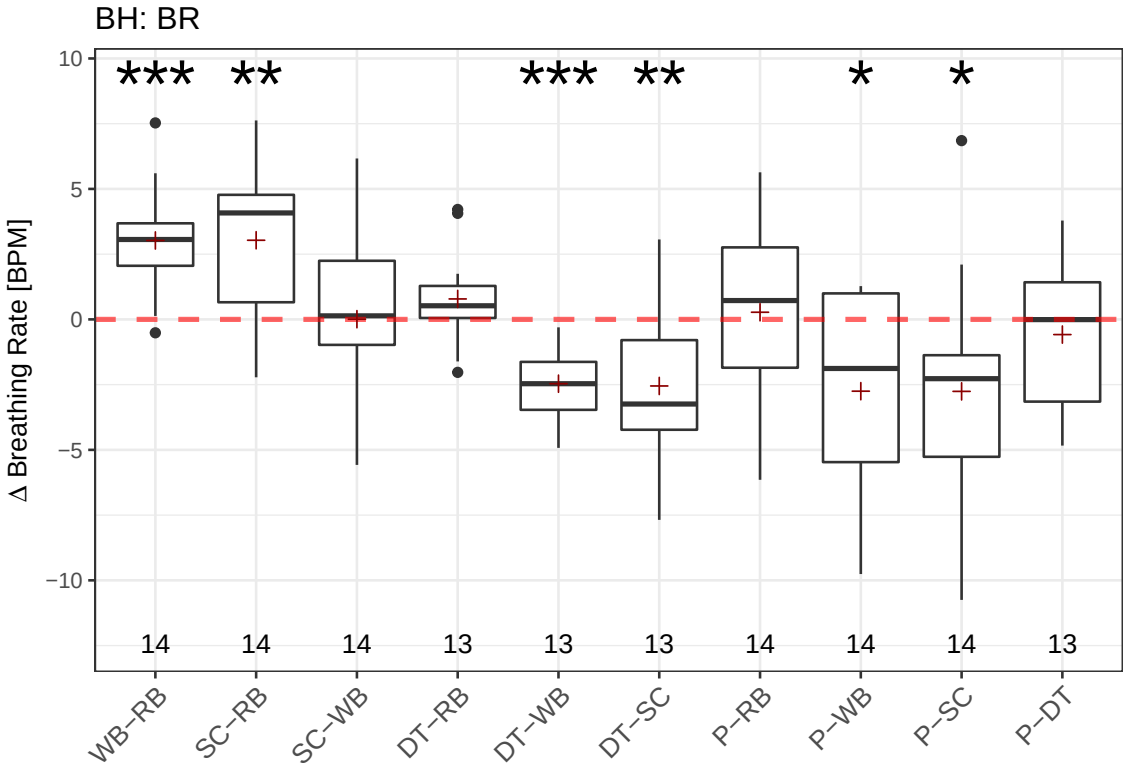

```
## Writing Baseline - Resting Baseline
## Transformed t-test p = 0.0039 < 0.01  **
##
## Stress Condition - Resting Baseline
## Transformed t-test p = 0.0215 < 0.05  *
##
## StressCondition - Writing Baseline
## Transformed t-test p = 0.3011 > 0.05
##
## Dual Task - Resting Baseline
## Transformed 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  **
```



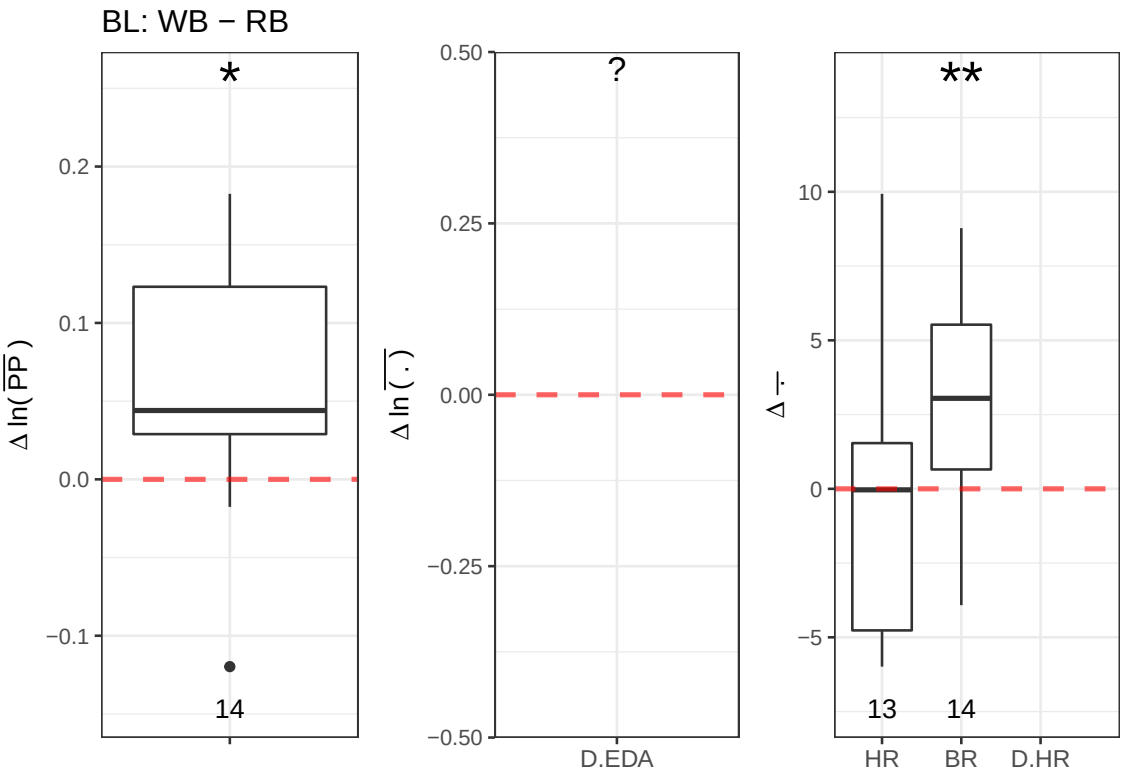

```
## Writing Baseline - Resting Baseline
## t-test p = 1e-04 < 0.001  ***
##
## Stress Condition - Resting Baseline
## t-test p = 0.0026 < 0.01  **
##
## StressCondition - Writing Baseline
## t-test p = 0.993 > 0.05
##
## Dual Task - Resting Baseline
## t-test p = 0.1451 > 0.05
##
## Dual Task - Writing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

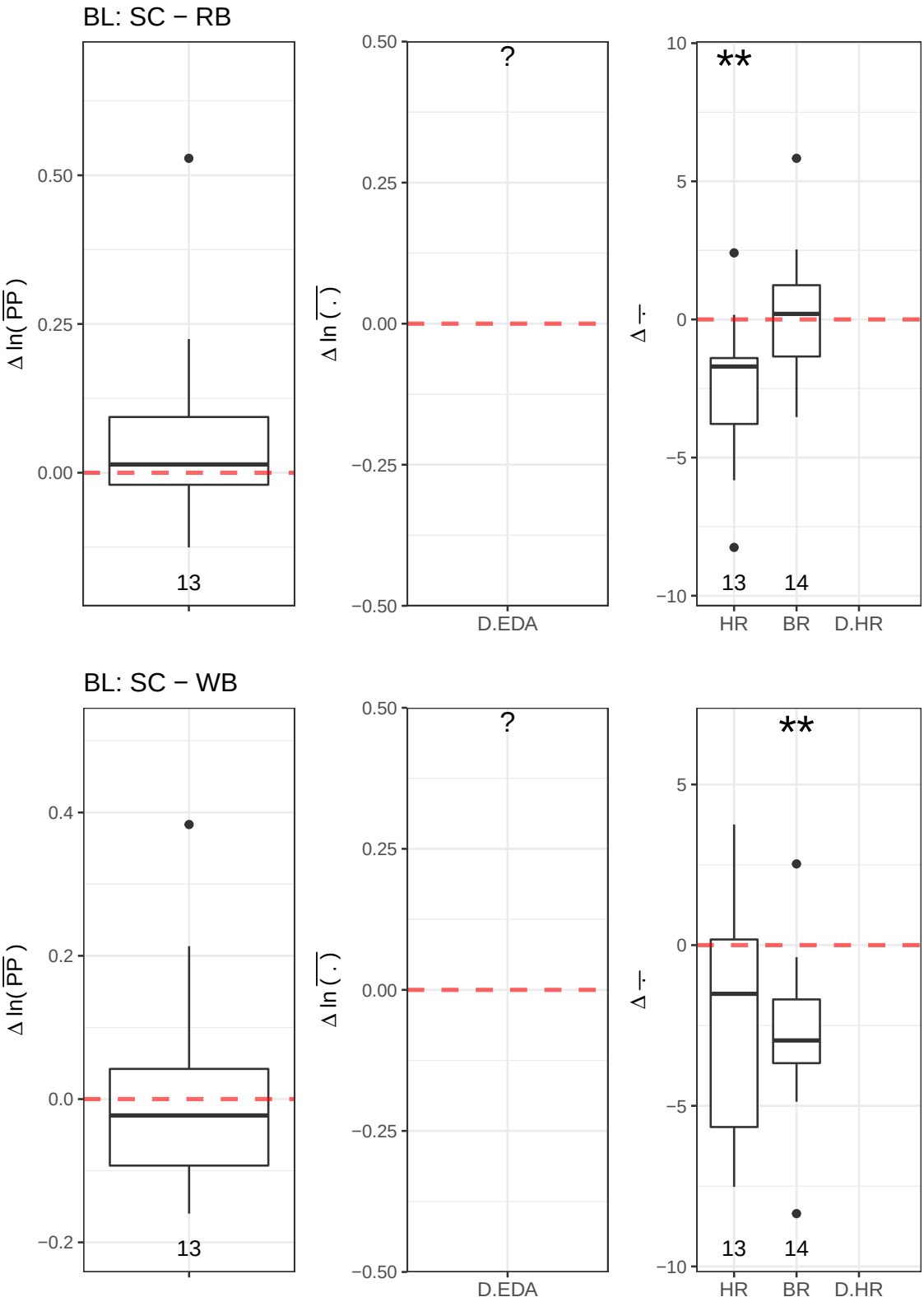
```
## t-test p = 0.0402 < 0.05  *
##
## Presentation - Dual Task
## t-test p = 0.4905 > 0.05
```

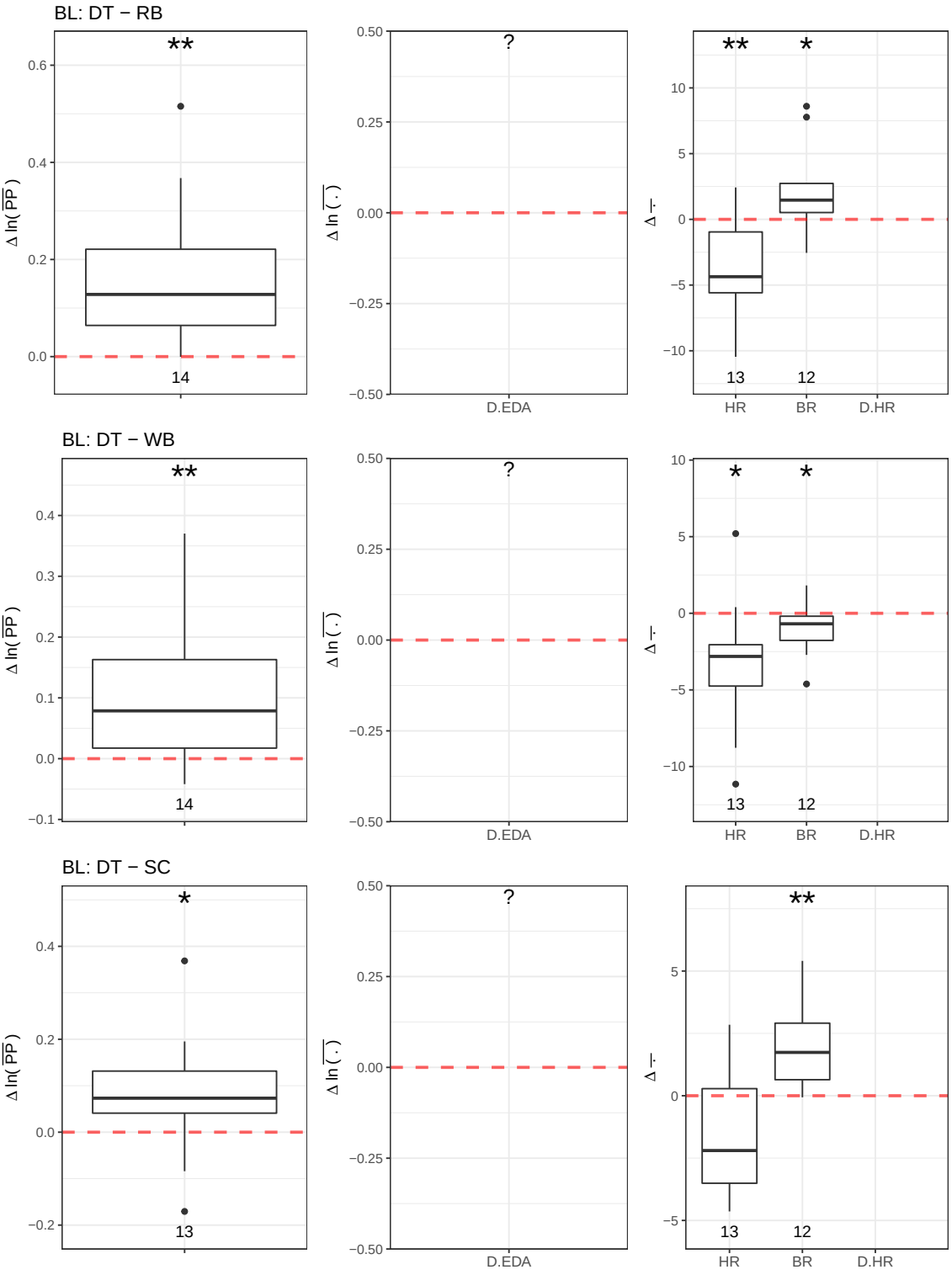
```
## BH has LESS than 7 subjects for D.EDA. Cannot continue with test.
## -----
## BH has LESS than 7 subjects for D.HR. Cannot continue with test.
## -----
```

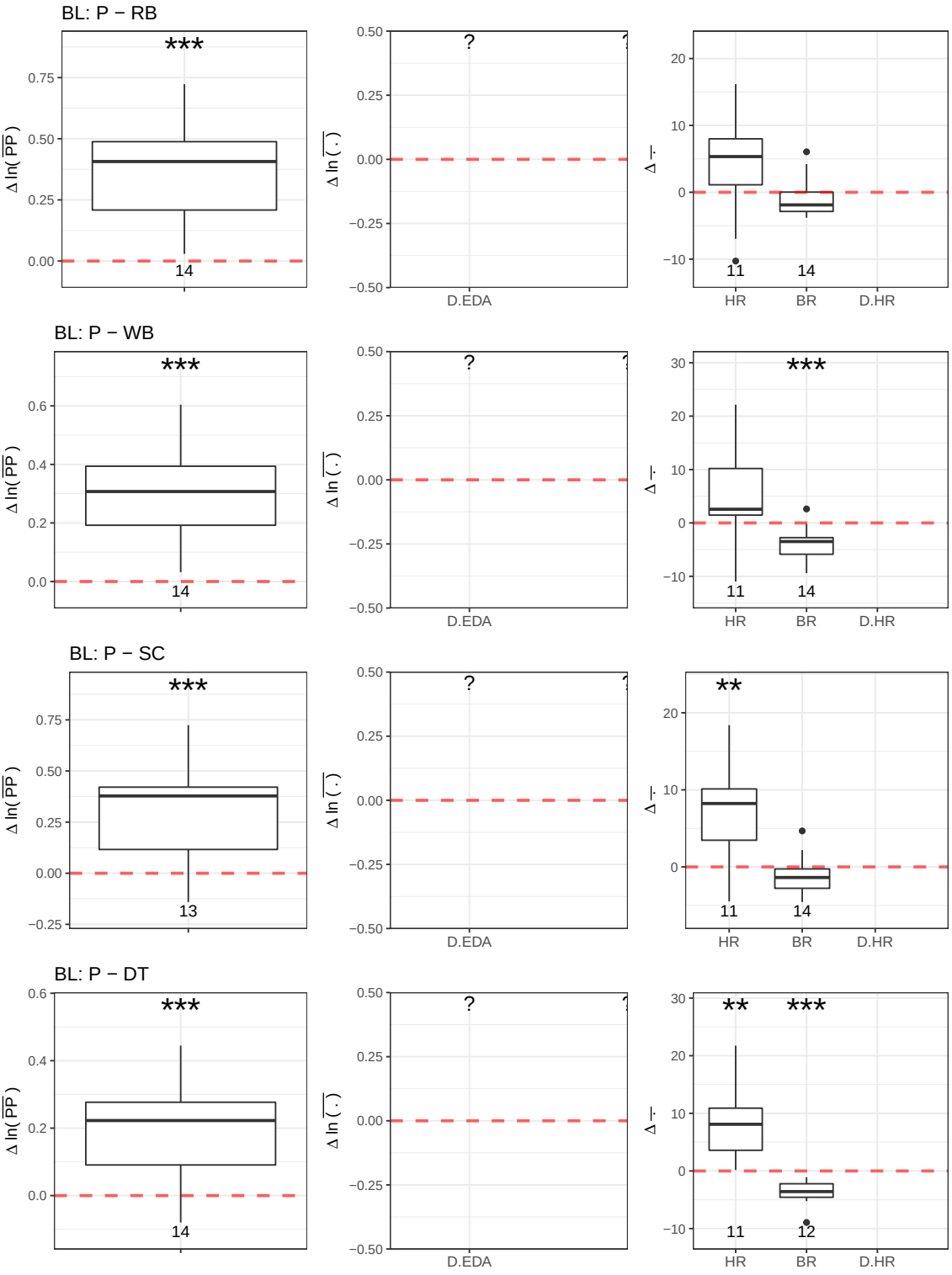
Batch-Low (BL)

Sensor Channels per Activity

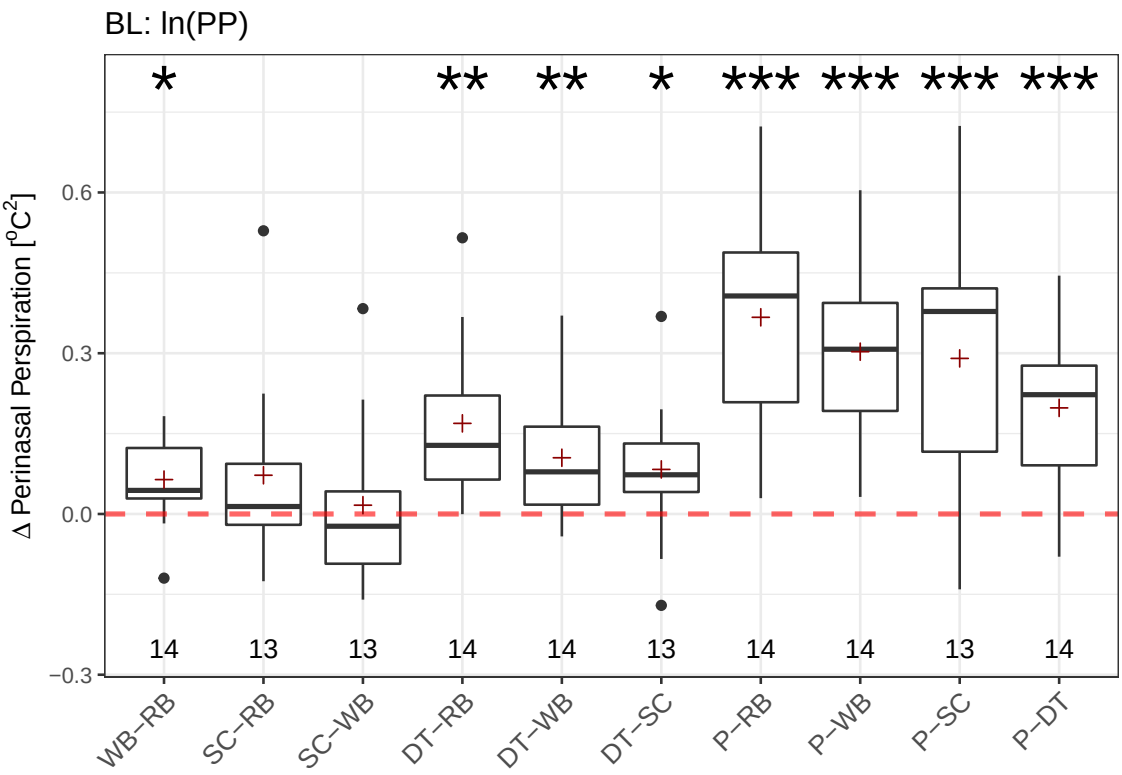



BL: SC − RB
Δ ln(PP)
0.50
0.25
0.00
13
Δ ln (.)
0.50
0.25
0.00
−0.25
−0.50
?
D.EDA
Δ –.
10
5
0
−5
−10
**
13
14
HR
BR
D.HR
BL: SC − WB
Δ ln(PP)
0.4
0.2
0.0
−0.2
13
Δ ln (.)
0.50
0.25
0.00
−0.25
−0.50
?
D.EDA
Δ –.
5
0
−5
−10
**
13
14
HR
BR
D.HR


BL: DT − RB
**
?
**
*
14
D.EDA
13
12
HR
BR
D.HR
BL: DT − WB
**
?
*
*
14
D.EDA
13
12
HR
BR
D.HR
BL: DT − SC
*
?
**
13
D.EDA
13
12
HR
BR
D.HR

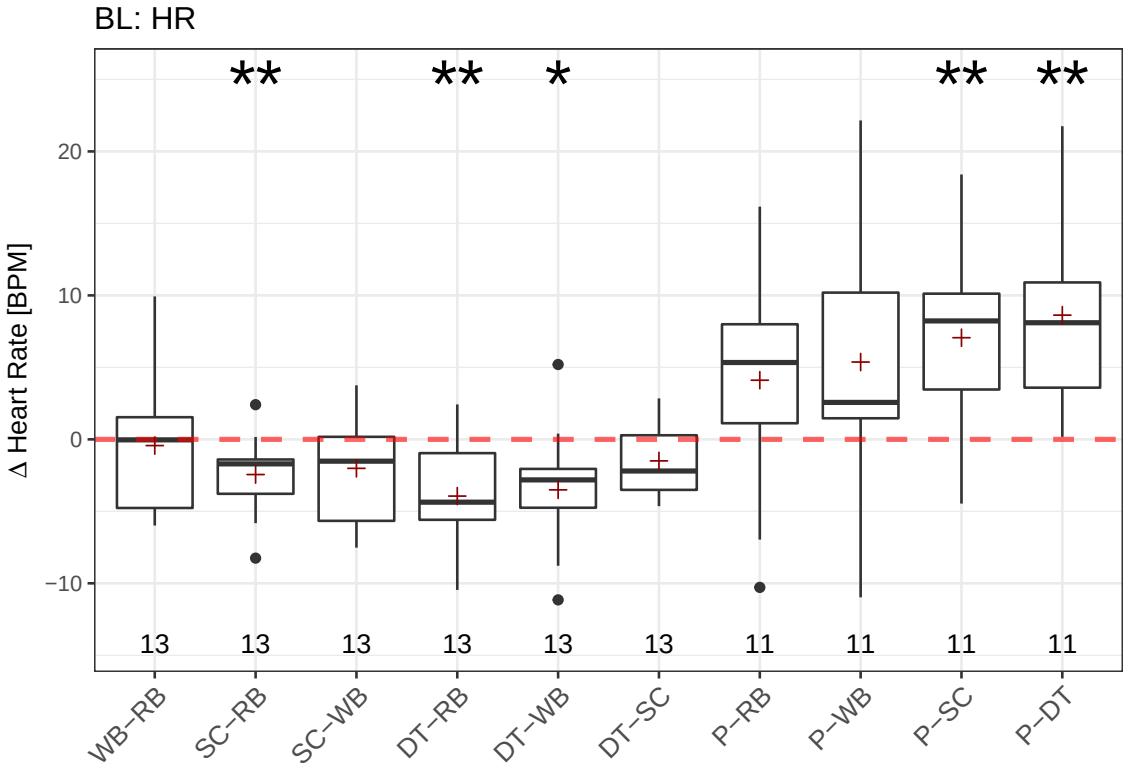

BL: P − RB
***
?
14
D.EDA
11
14
HR
BR
D.HR
BL: P − WB
***
?
***
14
D.EDA
11
14
HR
BR
D.HR
BL: P − SC
***
?
**
13
D.EDA
11
14
HR
BR
D.HR
BL: P − DT
***
?
**
***
14
D.EDA
11
12
HR
BR
D.HR

Sensor Channel across Activities



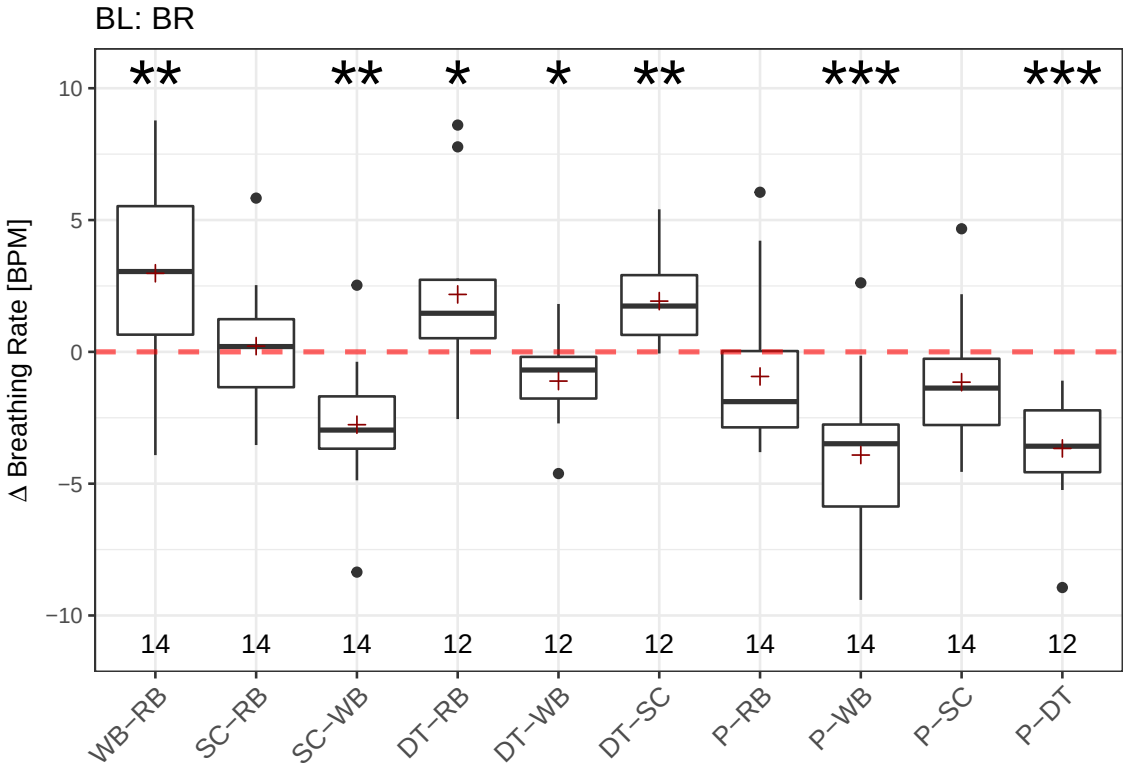

```
## Writing Baseline - Resting Baseline
## Transformed t-test p = 0.0129 < 0.05  *
##
## Stress Condition - Resting Baseline
## Transformed t-test p = 0.1391 > 0.05
##
## StressCondition - Writing Baseline
## Transformed t-test p = 0.7092 > 0.05
##
## Dual Task - Resting Baseline
## Transformed t-test 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  **
```

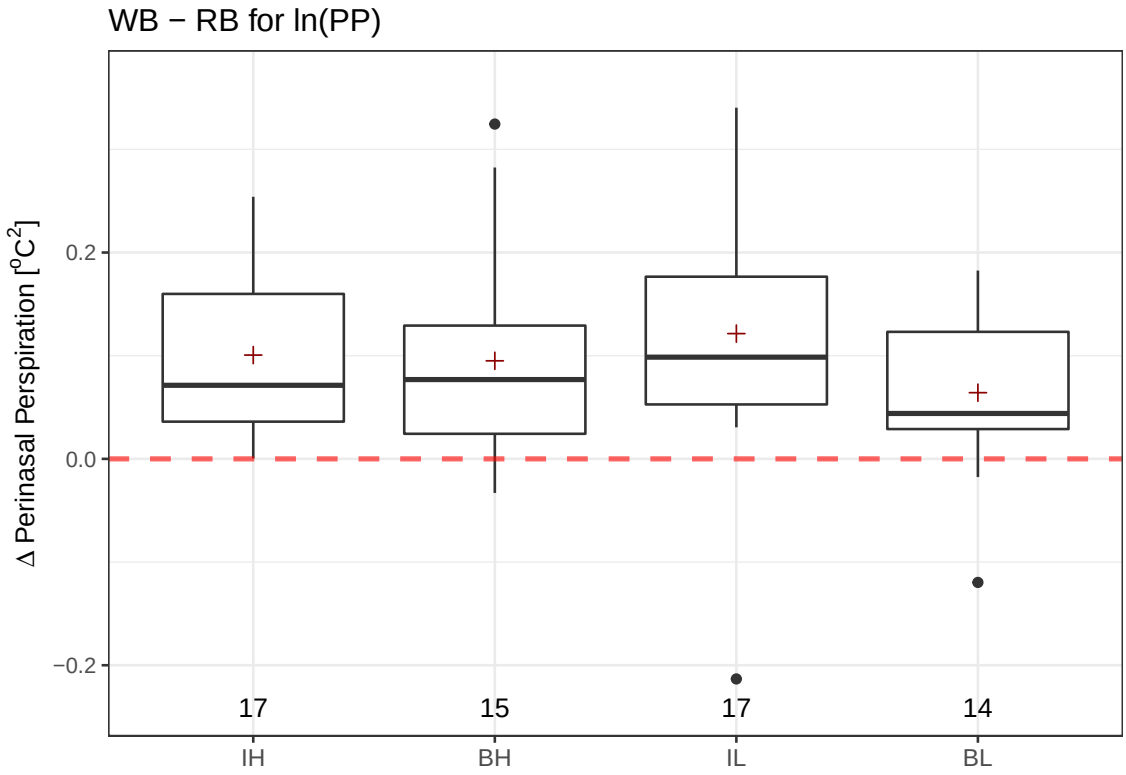



```
## Writing Baseline - Resting Baseline
## t-test p = 0.005 < 0.01  **
##
## Stress Condition - Resting Baseline
## t-test p = 0.7386 > 0.05
##
## StressCondition - Writing Baseline
## t-test p = 0.0012 < 0.01  **
##
## Dual Task - Resting Baseline
## t-test p = 0.0373 < 0.05  *
##
## Dual Task - 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
```

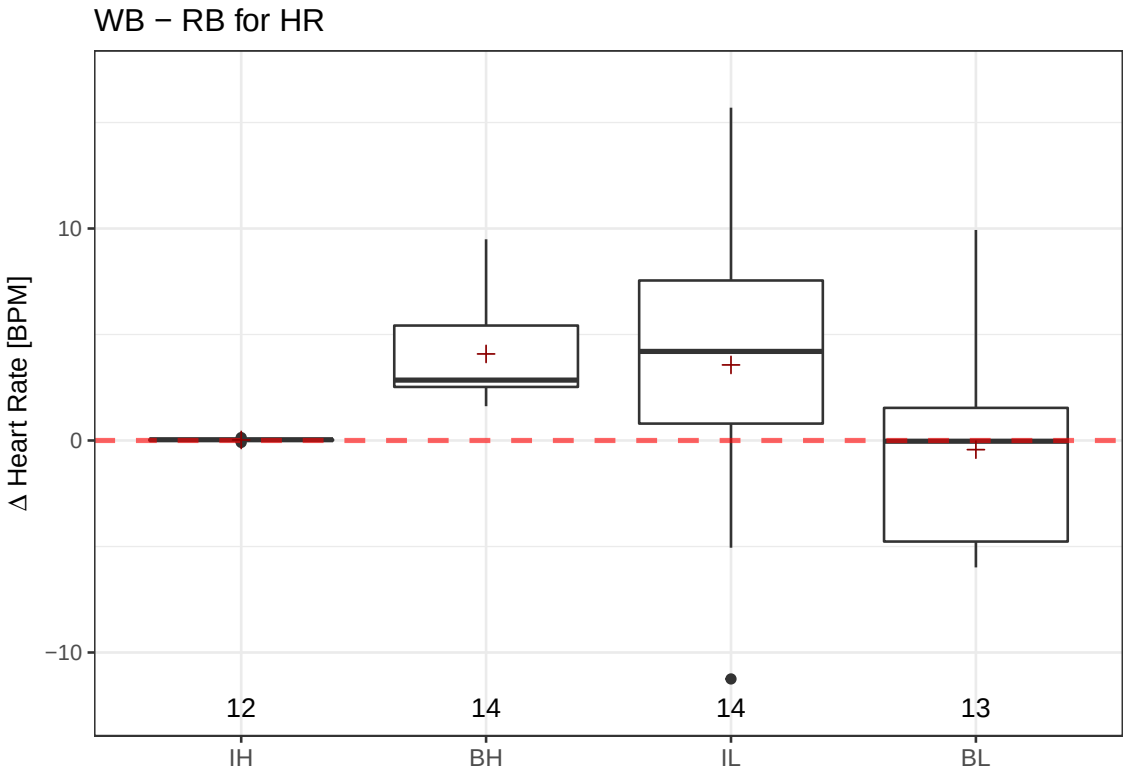
```
## t-test p = 0.0985 > 0.05
##
## Presentation - Dual Task
## t-test p = 1e-04 < 0.001  ***
```

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

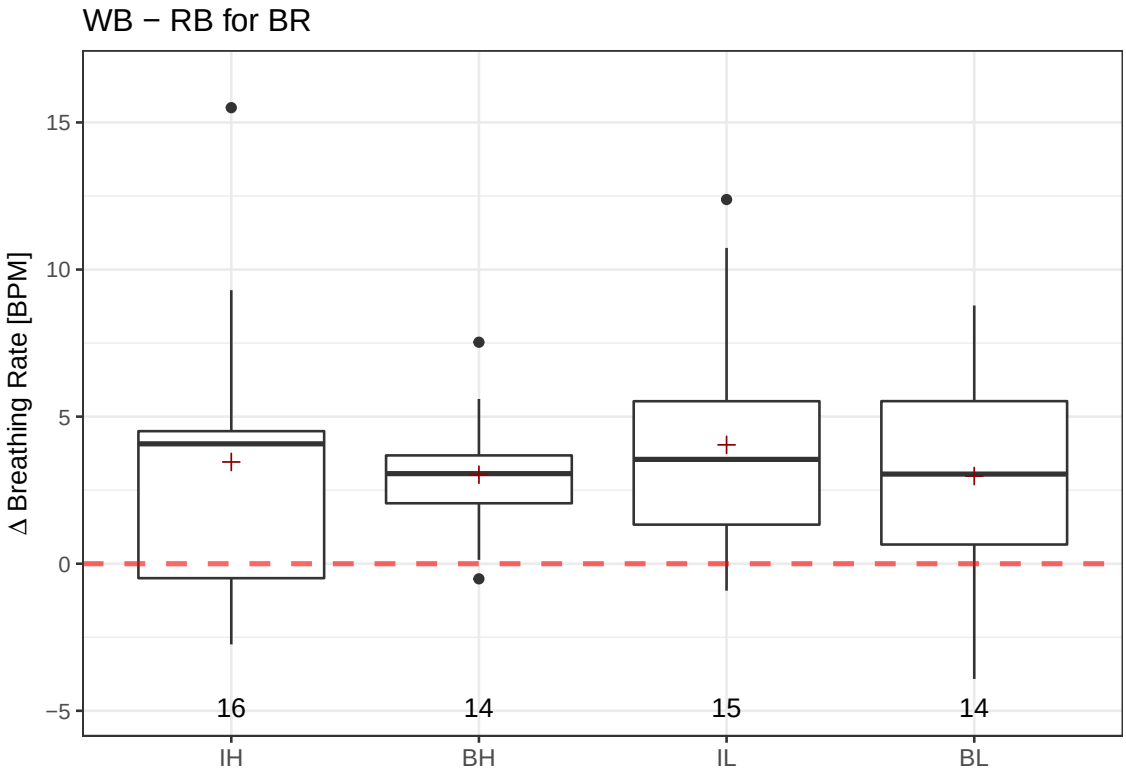
Across Activities



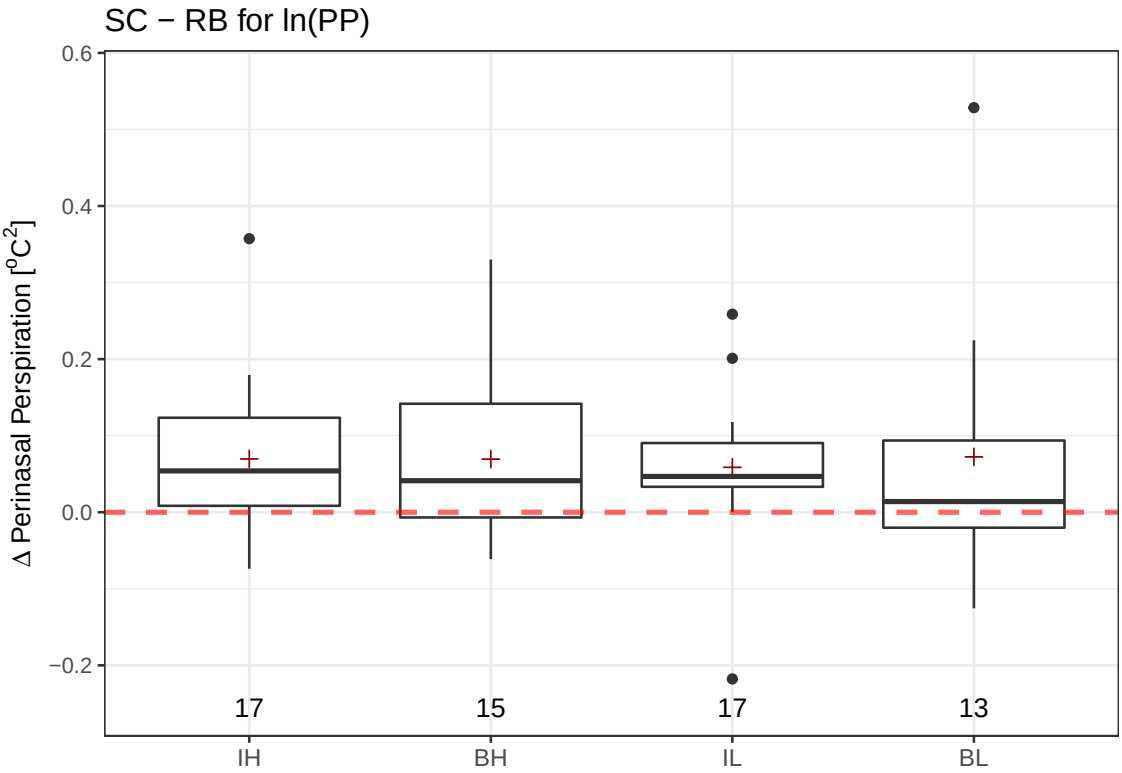

```
## ANOVA:
##             Df Sum Sq  Mean Sq F value Pr(>F)
## Condition    3 0.0255 0.008496    0.82  0.488
## Residuals   59 0.6114 0.010363
##
## ---
##
##     Tukey multiple comparisons of means
##     95% family-wise confidence level
##
## Fit: aov(formula = formula(paste(diff, "~ Condition")), 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
```



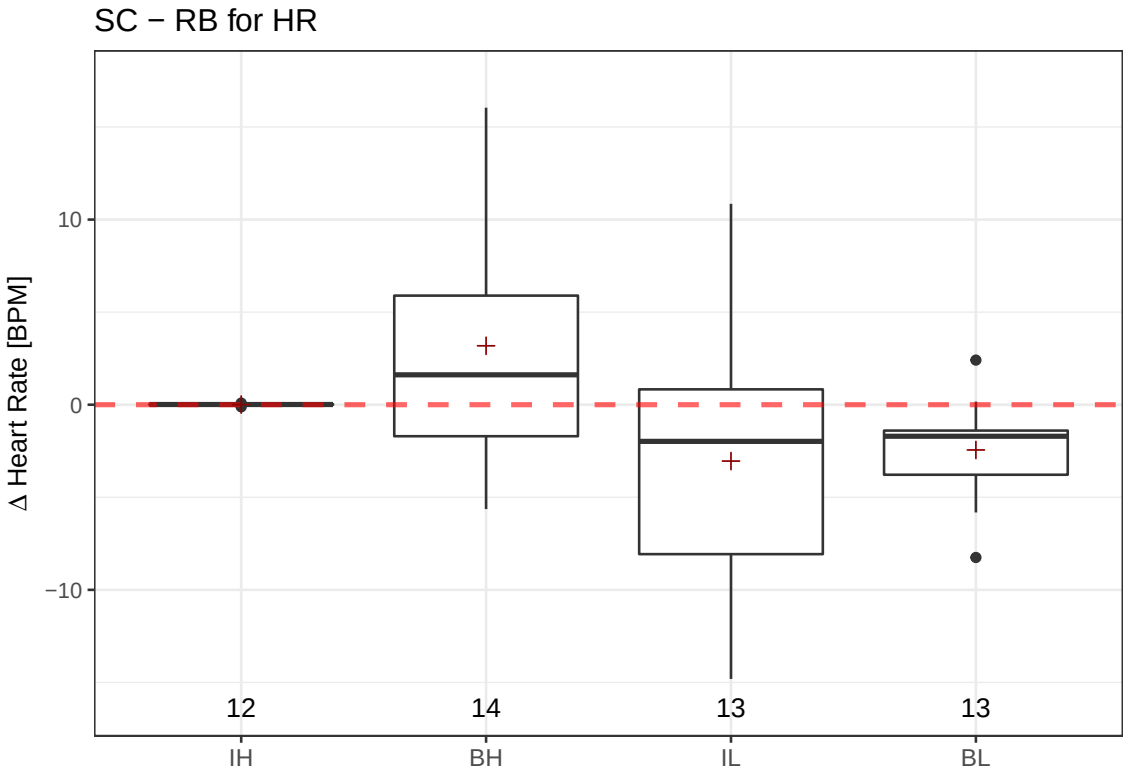

```
## ANOVA:
##             Df Sum Sq Mean Sq F value Pr(>F)
## Condition    3  218.3   72.78   3.859 0.0148 *
## Residuals   49  924.2   18.86
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## ---
##
##     Tukey multiple comparisons of means
##     95% family-wise confidence 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
```



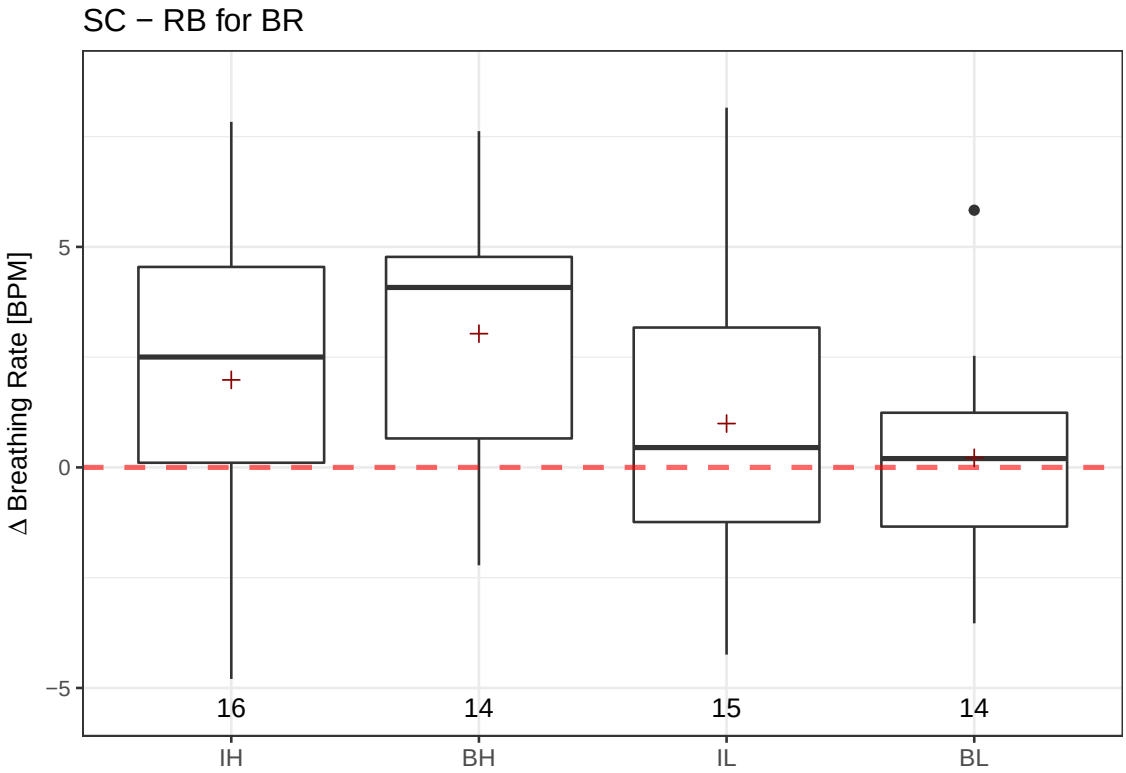

```
## ANOVA:
##             Df Sum Sq Mean Sq F value Pr(>F)
## Condition    3   10.6   3.548   0.272  0.845
## Residuals   55  717.2  13.039
##
## ---
##
##     Tukey multiple comparisons of means
##     95% family-wise confidence level
##
## Fit: aov(formula = formula(paste(diff, "~ Condition")), 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
```



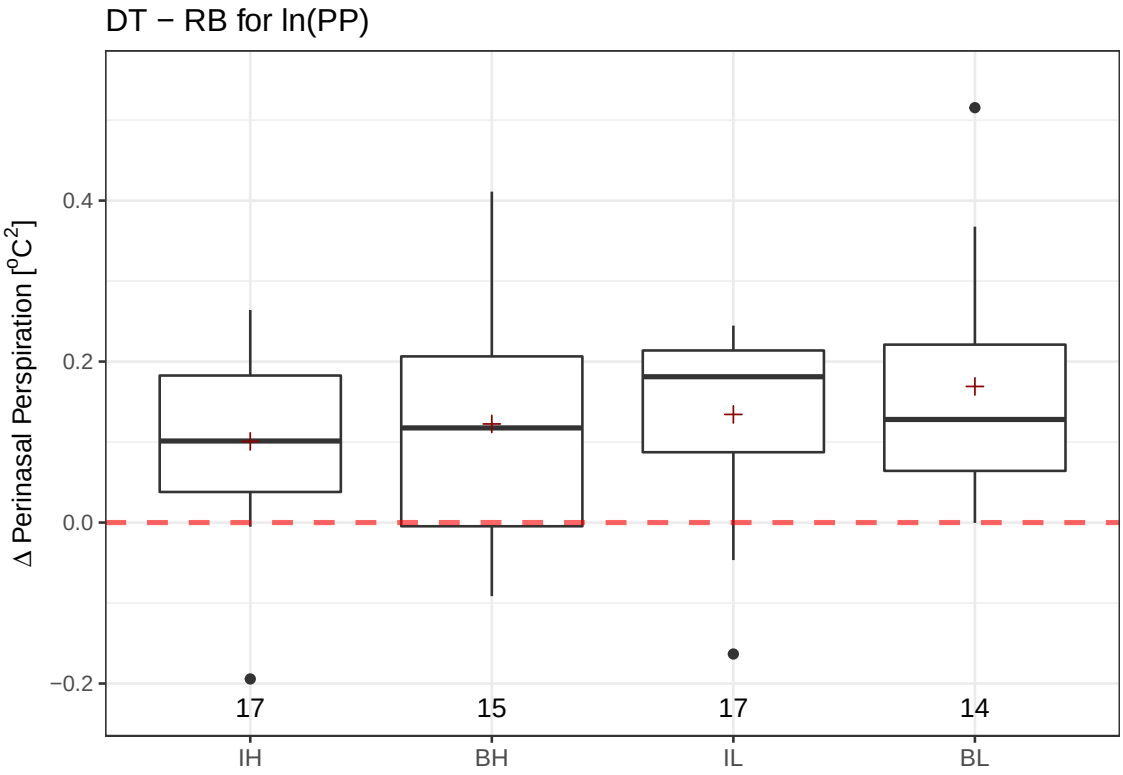

```
## [1] "Removed 0 subjects who had Stroop scores less than 0."
##
## ---
##   ANOVA:
##             Df Sum Sq  Mean Sq F value Pr(>F)
## Condition    3 0.0017 0.000581   0.042  0.989
## Residuals   58 0.8071 0.013916
##
## ---
##
##     Tukey multiple comparisons of means
##     95% family-wise confidence level
##
## Fit: aov(formula = formula(paste(diff, "~ Condition")), data = anova_df)
##
## $Condition
##                diff        lwr        upr     p adj
## BL-BH  0.0028961617 -0.1153422 0.12113454 0.9999012
## IH-BH  0.0002650717 -0.1102704 0.11080054 0.9999999
## IL-BH -0.0107075764 -0.1212430 0.09982789 0.9940359
## IH-BL -0.0026310900 -0.1175949 0.11233274 0.9999194
## IL-BL -0.0136037381 -0.1285676 0.10136009 0.9892655
## IL-IH -0.0109726481 -0.1179982 0.09605285 0.9929513
```



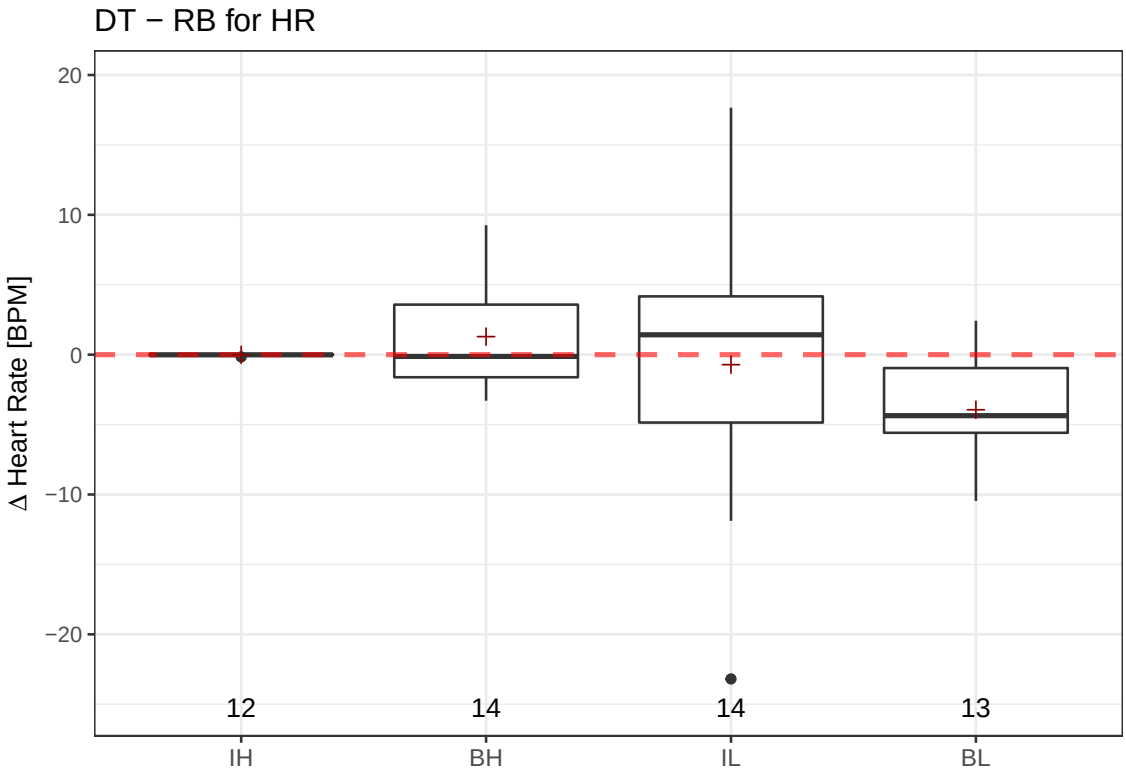

```
## [1] "Removed 0 subjects who had Stroop scores less than 0."
##
## ---
##   ANOVA:
##             Df Sum Sq Mean Sq F value  Pr(>F)
## Condition    3  326.3  108.75   4.397 0.00821 **
## Residuals   48 1187.2   24.73
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## ---
##
##     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 -5.6268272 -10.724702 -0.528952 0.0252515
## IH-BH -3.1742515  -8.381101  2.032598 0.3759612
## IL-BH -6.2269809 -11.324856 -1.129106 0.0109623
## IH-BL  2.4525757  -2.845897  7.751049 0.6099621
## IL-BL -0.6001537  -5.791576  4.591268 0.9897684
## IL-IH -3.0527294  -8.351202  2.245743 0.4260203
```



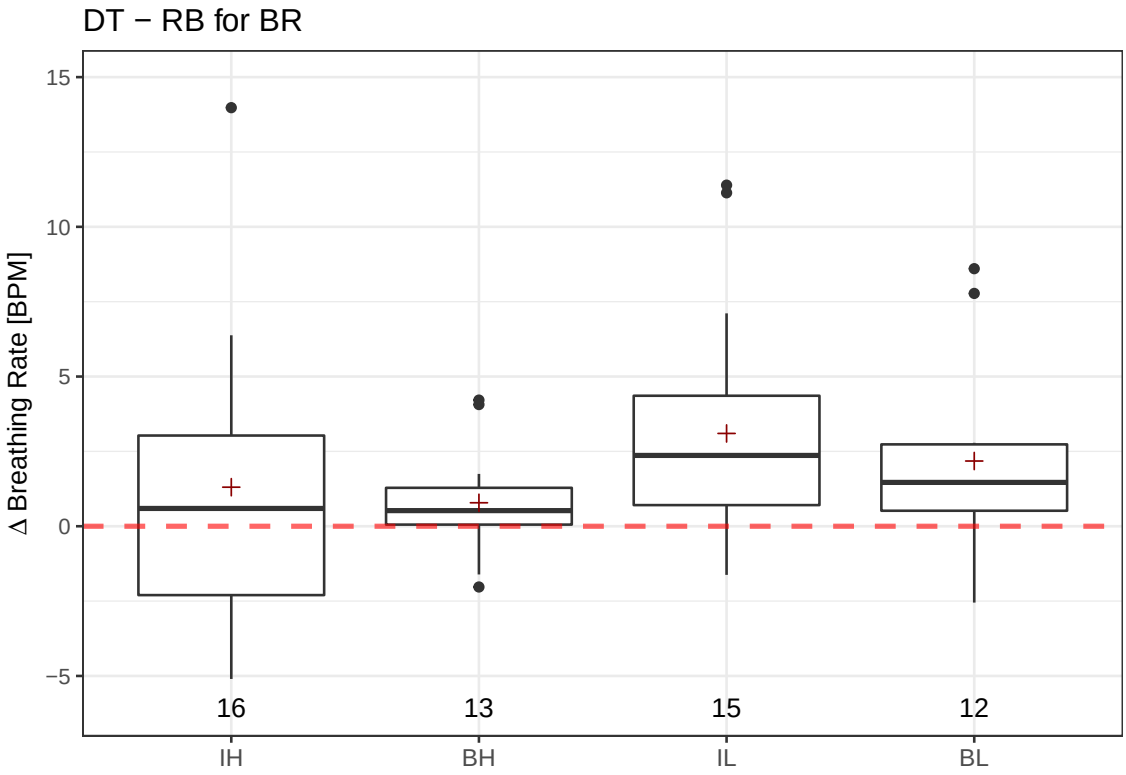

```
## [1] "Removed 0 subjects who had Stroop scores less than 0."
##
## ---
##   ANOVA:
##             Df Sum Sq Mean Sq F value Pr(>F)
## Condition    3   63.3   21.09    2.07  0.115
## Residuals   55  560.5   10.19
##
## ---
##
##     Tukey multiple comparisons of means
##     95% family-wise confidence level
##
## Fit: aov(formula = formula(paste(diff, "~ Condition")), data = anova_df)
##
## $Condition
##             diff       lwr       upr     p adj
## BL-BH -2.8155027 -6.012142 0.3811366 0.1028598
## IH-BH -1.0483755 -4.143508 2.0467572 0.8062112
## IL-BH -2.0379024 -5.180813 1.1050080 0.3243938
## IH-BL  1.7671272 -1.328005 4.8622598 0.4370443
## IL-BL  0.7776002 -2.365310 3.9205106 0.9131739
## IL-IH -0.9895270 -4.029137 2.0500831 0.8240506
```



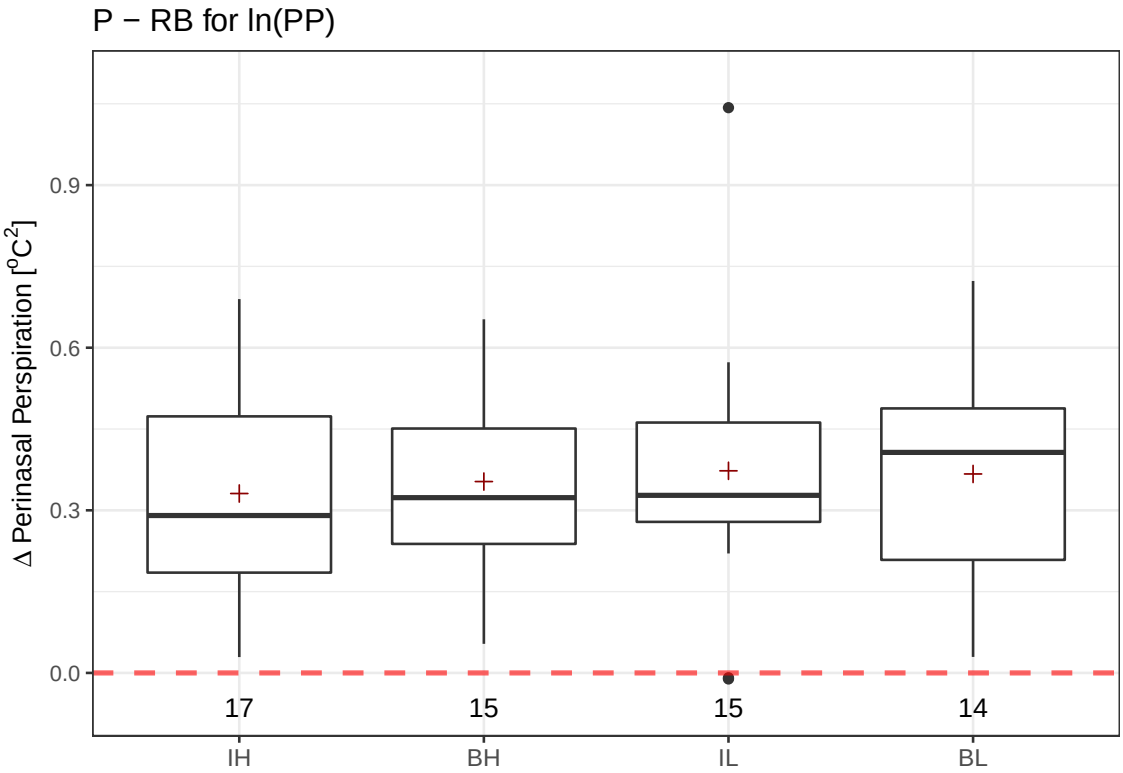

```
## ANOVA:
##             Df Sum Sq Mean Sq F value Pr(>F)
## Condition    3 0.0371 0.01235   0.768  0.516
## Residuals   59 0.9484 0.01607
##
## ---
##
##     Tukey multiple comparisons of means
##     95% family-wise confidence level
##
## Fit: aov(formula = formula(paste(diff, "~ Condition")), 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
```



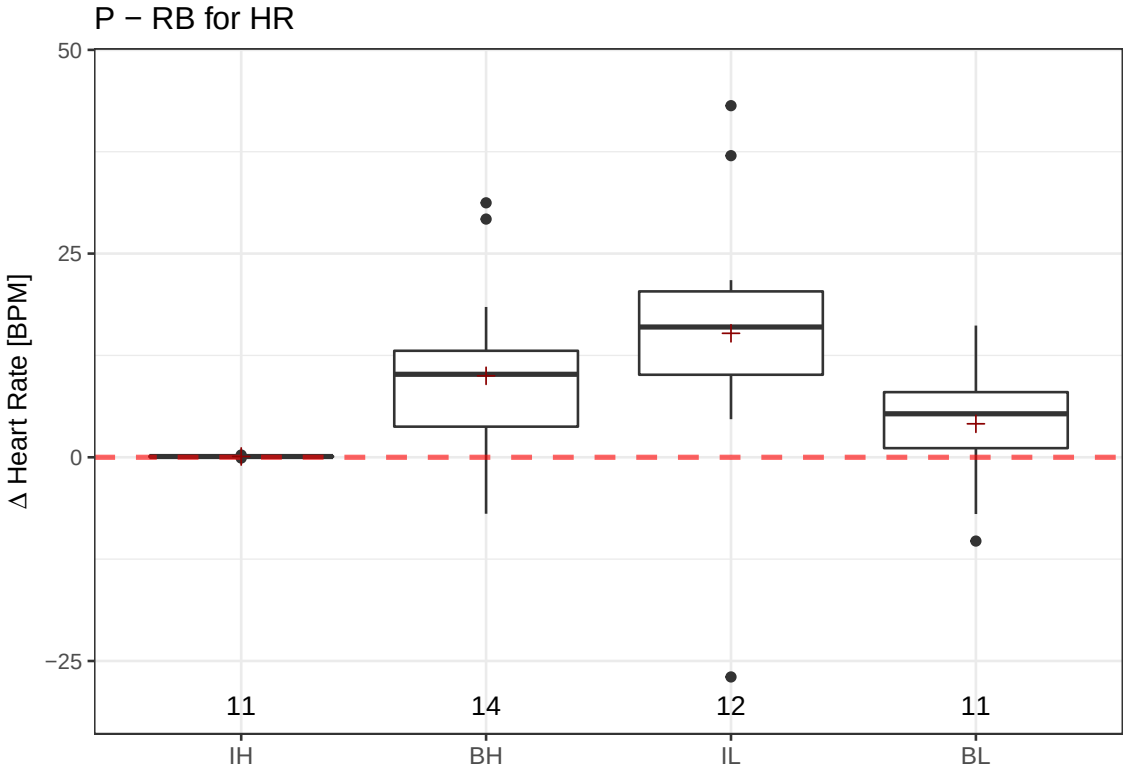

```
## ANOVA:
##             Df Sum Sq Mean Sq F value Pr(>F)
## Condition    3  196.9   65.62   2.061  0.118
## Residuals   49 1559.9   31.83
##
## ---
##
##     Tukey multiple comparisons of means
##     95% family-wise confidence level
##
## Fit: aov(formula = formula(paste(diff, "~ Condition")), 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
```



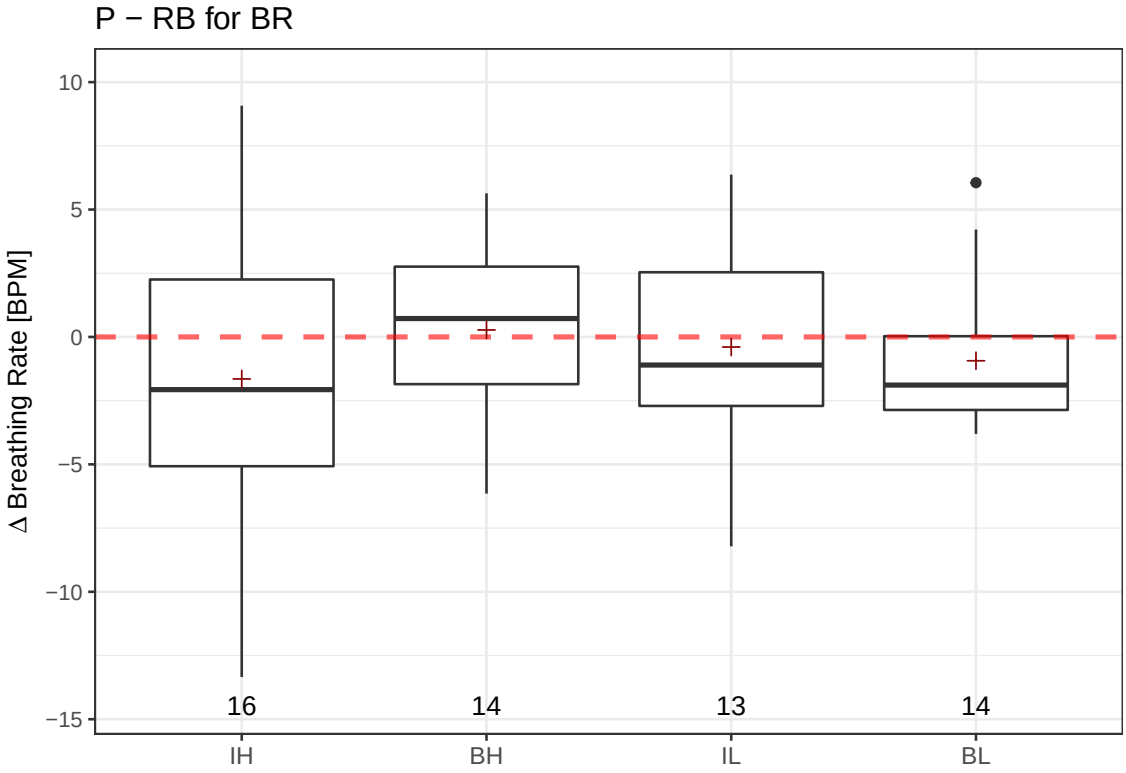

```
## ANOVA:
##             Df Sum Sq Mean Sq F value Pr(>F)
## Condition    3   44.2   14.75   1.049  0.379
## Residuals   52  731.2   14.06
##
## ---
##
##     Tukey multiple comparisons of means
##     95% family-wise confidence level
##
## Fit: aov(formula = formula(paste(diff, "~ Condition")), 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	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 - 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	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 - 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 - 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	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 - 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 - 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 - 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	
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	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 - 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	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 - 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	*

(continued)

Condition	Difference	Measure	p	Test	n	Significance
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	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 - 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 - SC	PP	0.0008398	Transformed t-test	13	***
BL	P - SC	HR	0.0068502	t-test	11	**
BL	P - SC	BR	0.0985488	t-test	14	
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	***
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	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 - 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	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 - 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 - 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	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 - 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 - 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 - 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	*
IL	WB - RB	PP	0.0011525	Transformed t-test	17	**
IL	WB - RB	HR	0.0688632	t-test	14	

(continued)

Condition	Difference	Measure	p	Test	n	Significance
IL	WB - RB	BR	0.0011096	t-test	15	**
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 - 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	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 - 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 - 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	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 - WB	PP	0.0012790	Transformed t-test	15	**
IL	P - WB	HR	0.0089131	t-test	12	**
IL	P - WB	BR	0.0011186	t-test	13	**
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 - 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	***