

# Advanced Analysis

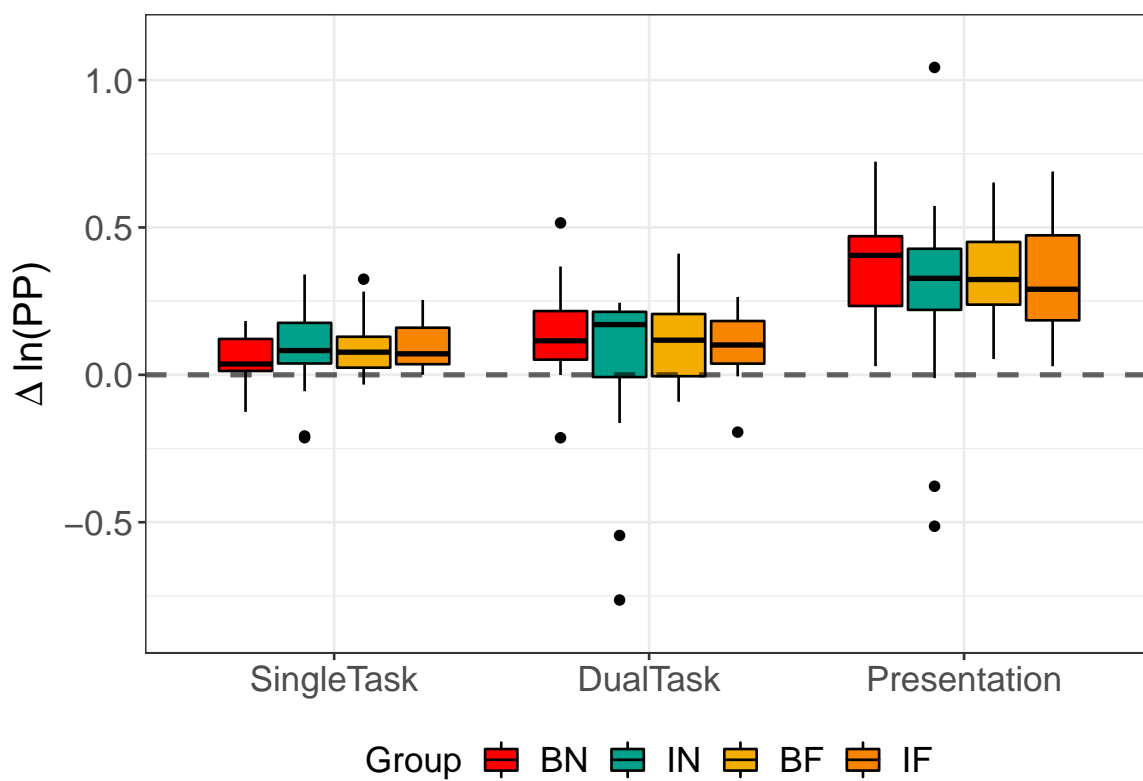
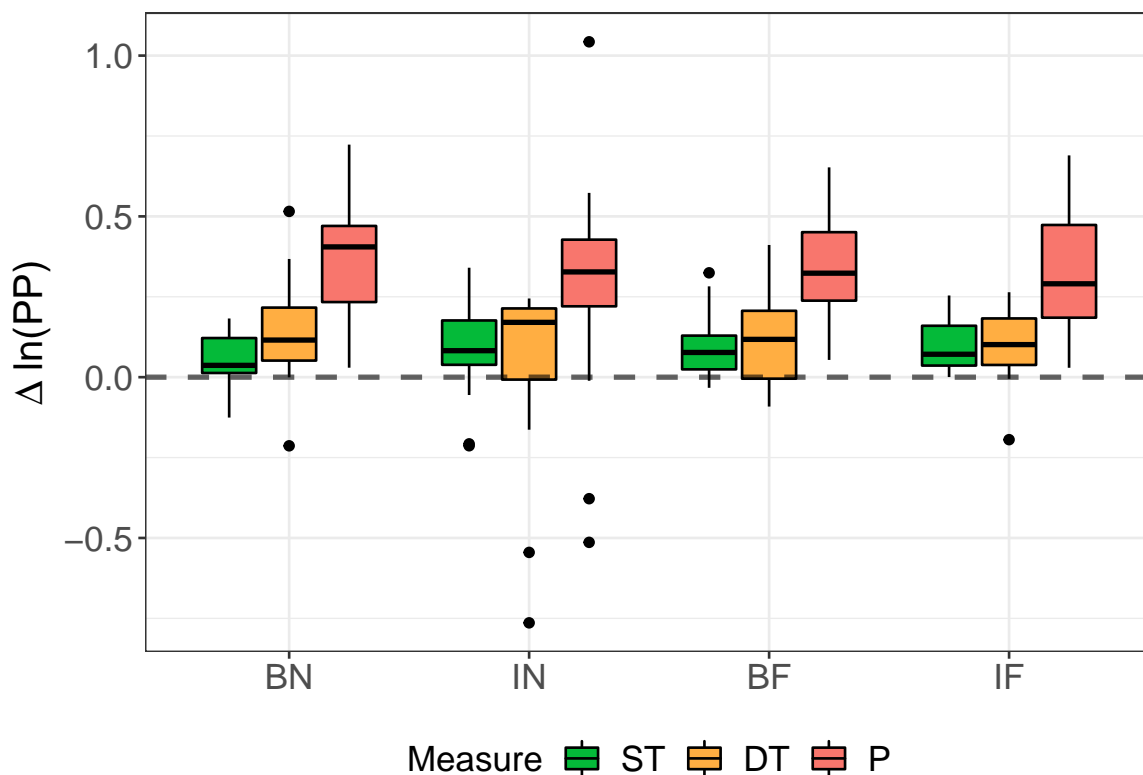
**PP, 4 Groups:**

## Stress Levels Across Activities

Our Linear Model:

$$\Delta \ln(\bar{P}P) = 1 + \text{Group} + \text{Activity} + 1|\text{Subject}$$

```
## Linear mixed-effects model fit by REML
## Data: diff_df
##      AIC      BIC    logLik
##   -178.948 -147.112  98.47402
##
## Random effects:
## Formula: ~1 | Subject
##      (Intercept) Residual
## StdDev:      0.138271 0.1254413
##
## Fixed effects: PP ~ 1 + Group + Activity
##              Value Std.Error DF   t-value p-value
## (Intercept)  0.10039584 0.04146835 192   2.421023  0.0164
## GroupIN      -0.04785667 0.05256399  62  -0.910446  0.3661
## GroupBF       0.00482909 0.05549157  62   0.087024  0.9309
## GroupIF      -0.00466546 0.05383780  62  -0.086658  0.9312
## ActivityB    -0.03929932 0.02194253 192  -1.791012  0.0749
## ActivityDT    0.01469432 0.02183652 192   0.672924  0.5018
## ActivityP     0.24369816 0.02205159 192  11.051272  0.0000
## Correlation:
##      (Intr) GropIN GropBF GropIF ActvtB ActvDT
## GroupIN    -0.708
## GroupBF    -0.670  0.529
## GroupIF    -0.690  0.545  0.516
## ActivityB  -0.258 -0.004 -0.004 -0.004
## ActivityDT -0.263  0.000  0.000  0.000  0.498
## ActivityP  -0.263  0.007  0.000  0.000  0.493  0.495
##
## Standardized Within-Group Residuals:
##      Min      Q1      Med      Q3      Max
## -3.69297959 -0.40330059 -0.04953458  0.42425698  4.32262164
##
## Number of Observations: 261
## Number of Groups: 66
```

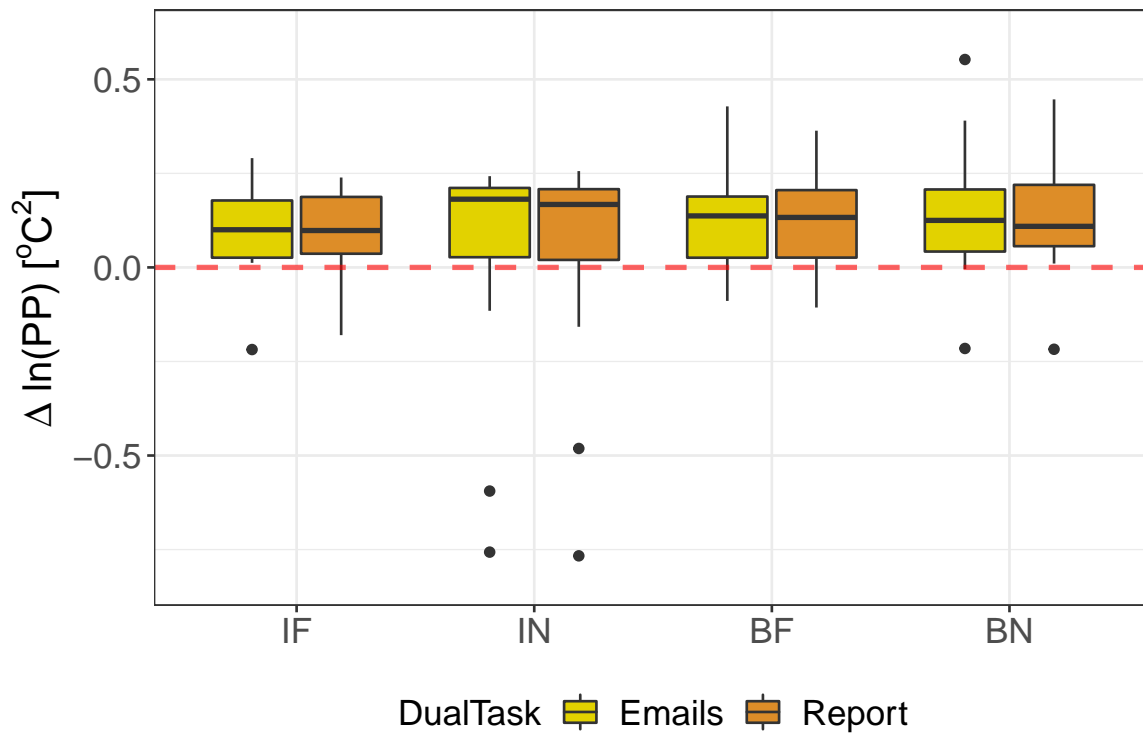


## Stress Levels for Dual Task

Our Linear Model:

$$\Delta \ln(\bar{P}P) = 1 + \text{Group} + \text{DualTask} + 1|\text{Subject}$$

```
## Linear mixed-effects model fit by REML
## Data: total_df
##      AIC      BIC    logLik
## -238.7776 -218.9794 126.3888
##
## Random effects:
## Formula: ~1 | Subject
##      (Intercept)  Residual
## StdDev:    0.1872633 0.02677144
##
## Fixed effects: PP ~ 1 + Group + DualTask
##              Value Std.Error DF   t-value p-value
## (Intercept)  0.14163189 0.04865428 64   2.9109850  0.0050
## GroupIN      -0.08806844 0.06500959 61  -1.3546992  0.1805
## GroupBF      -0.01400555 0.06994389 61  -0.2002397  0.8420
## GroupIF      -0.04123247 0.06667535 61  -0.6184065  0.5386
## DualTaskReport -0.00249349 0.00469602 64  -0.5309799  0.5973
## Correlation:
##      (Intr) GropIN GropBF GropIF
## GroupIN      -0.747
## GroupBF      -0.694  0.519
## GroupIF      -0.728  0.545  0.506
## DualTaskReport -0.048  0.000  0.000  0.000
##
## Standardized Within-Group Residuals:
##      Min      Q1      Med      Q3      Max
## -2.383599e+00 -4.505942e-01 -1.059742e-05  3.762150e-01  2.069535e+00
##
## Number of Observations: 130
## Number of Groups: 65
```



```
## Paired t-test
## For IF, p = 0.674 > 0.05

## Paired t-test
## For IN, p = 0.744 > 0.05

## Paired t-test
## For BF, p = 0.4738 > 0.05

## Paired t-test
## For BN, p = 0.4718 > 0.05
```

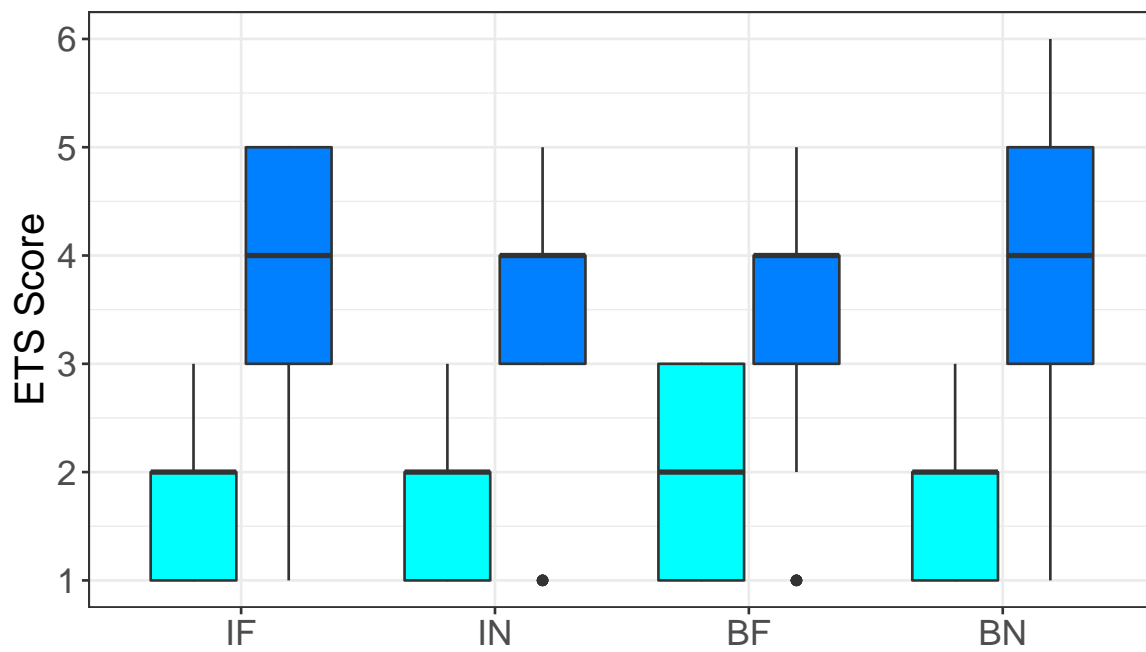
## Linear Modelling for Writing Quality

Our Linear Model:

$$WritingQuality = 1 + Group + Activity + 1|Subject$$

---

```
## Linear mixed-effects model fit by REML
## Data: full_df
##      AIC      BIC    logLik
##  1102.172 1132.016 -544.0862
##
## Random effects:
## Formula: ~1 | Subject
##      (Intercept)  Residual
## StdDev:      0.815559 0.5654234
##
## Fixed effects: Score ~ 1 + Group + Activity
##              Value Std.Error DF  t-value p-value
## (Intercept) 1.9320463 0.21820388 464  8.85432 0.0000
## GroupIN      0.0734389 0.29057887  61  0.25273 0.8013
## GroupBF      0.0258916 0.31216072  61  0.08294 0.9342
## GroupIF      0.0881311 0.29856835  61  0.29518 0.7689
## ActivityDT   1.7245283 0.04912084 464 35.10787 0.0000
## Correlation:
##      (Intr) GropIN GropBF GropIF
## GroupIN    -0.741
## GroupBF    -0.690  0.518
## GroupIF    -0.722  0.542  0.504
## ActivityDT -0.113  0.000  0.000  0.000
##
## Standardized Within-Group Residuals:
##      Min      Q1      Med      Q3      Max
## -2.5214114 -0.5577613 -0.0315706  0.5336138  2.3043000
##
## Number of Observations: 530
## Number of Groups: 65
```



Activity ■ ST ■ DT

Activity	Group	n
ST	BN	63
ST	IN	81
ST	BF	58
ST	IF	63
DT	BN	63
DT	IN	81
DT	BF	58
DT	IF	63



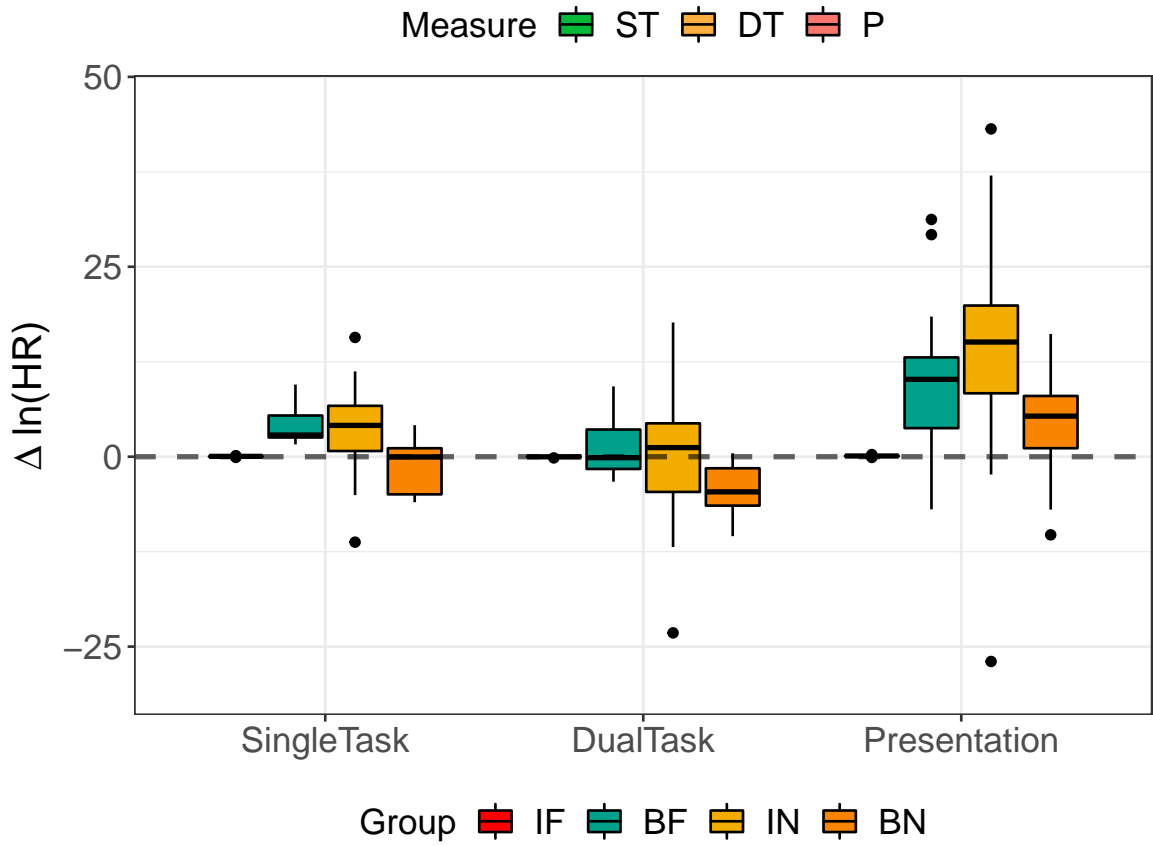
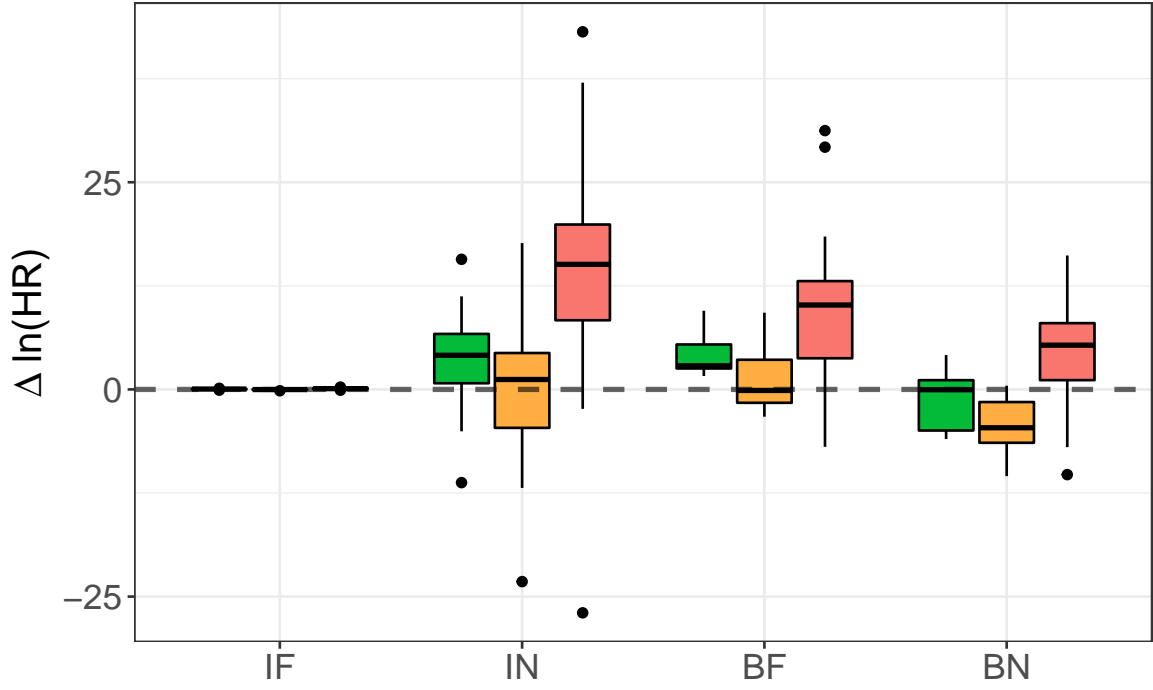
**HR, 4 Groups:**

## Stress Levels Across Activities

Our Linear Model:

$$\Delta \bar{H}R = 1 + \text{Group} + \text{Activity} + 1|\text{Subject}$$

```
## Linear mixed-effects model fit by REML
## Data: diff_df
##      AIC      BIC    logLik
## 1397.593 1427.544 -689.7966
##
## Random effects:
## Formula: ~1 | Subject
##      (Intercept) Residual
## StdDev:      4.7485 5.453409
##
## Fixed effects: HR ~ 1 + Group + Activity
##              Value Std.Error DF   t-value p-value
## (Intercept) -0.558257  1.652845 155 -0.337755  0.7360
## GroupIN      3.792501  2.060187  51  1.840853  0.0715
## GroupBF      5.188135  2.115775  51  2.452120  0.0177
## GroupIF      0.718798  2.201960  51  0.326435  0.7454
## ActivityB    -2.449953  1.045858 155 -2.342529  0.0204
## ActivityDT   -2.983310  1.039924 155 -2.868776  0.0047
## ActivityP     5.470081  1.078582 155  5.071547  0.0000
## Correlation:
##      (Intr) GropIN GropBF GropIF ActvtB ActvDT
## GroupIN    -0.687
## GroupBF    -0.666  0.535
## GroupIF    -0.640  0.514  0.501
## ActivityB  -0.315  0.005  0.000  0.000
## ActivityDT -0.315  0.000  0.000  0.000  0.497
## ActivityP  -0.299  0.003 -0.013 -0.006  0.479  0.482
##
## Standardized Within-Group Residuals:
##      Min      Q1      Med      Q3      Max
## -3.46501284 -0.47250644  0.06466967  0.43791557  5.00418600
##
## Number of Observations: 213
## Number of Groups: 55
```

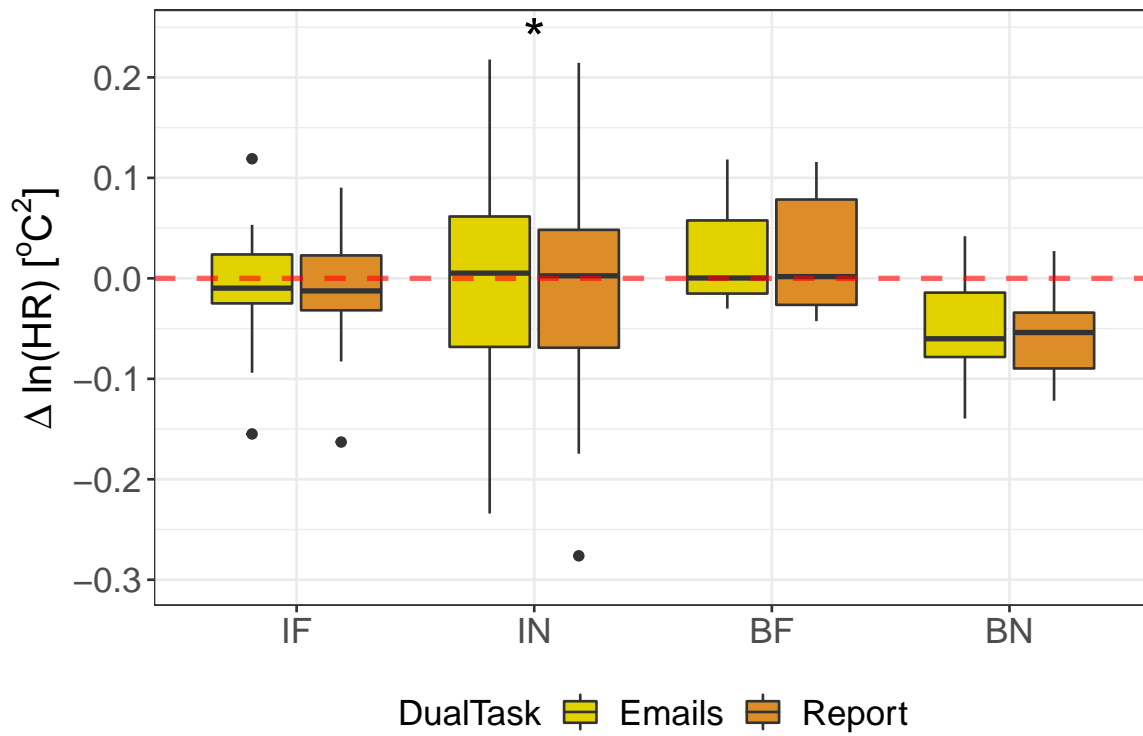


## Stress Levels for Dual Task

Our Linear Model:

$$\Delta \bar{HR} = 1 + Group + DualTask + 1|Subject$$

```
## Linear mixed-effects model fit by REML
## Data: total_df
##      AIC      BIC    logLik
## -344.4591 -326.016 179.2295
##
## Random effects:
## Formula: ~1 | Subject
##      (Intercept)  Residual
## StdDev:  0.07447717 0.01528277
##
## Fixed effects: HR ~ 1 + Group + DualTask
##              Value Std.Error DF   t-value p-value
## (Intercept) -0.04759271 0.020924305 53 -2.274518  0.0270
## GroupIN      0.03980732 0.028100549 50  1.416603  0.1628
## GroupBF      0.07322944 0.029518263 50  2.480818  0.0165
## GroupIF      0.03915708 0.030126951 50  1.299736  0.1997
## DualTaskReport -0.00555952 0.002941171 53 -1.890241  0.0642
## Correlation:
##      (Intr) GropIN GropBF GropIF
## GroupIN      -0.741
## GroupBF      -0.705  0.525
## GroupIF      -0.691  0.515  0.490
## DualTaskReport -0.070  0.000  0.000  0.000
##
## Standardized Within-Group Residuals:
##      Min      Q1      Med      Q3      Max
## -1.90592838 -0.38237059  0.04371162  0.38197252  2.07495035
##
## Number of Observations: 108
## Number of Groups: 54
```



```
## Paired t-test
## For IF, p = 0.4269 > 0.05

## Paired t-test
## For IN, p = 0.0397 < 0.05  *

## Paired t-test
## For BF, p = 0.8595 > 0.05

## Paired t-test
## For BN, p = 0.573 > 0.05
```

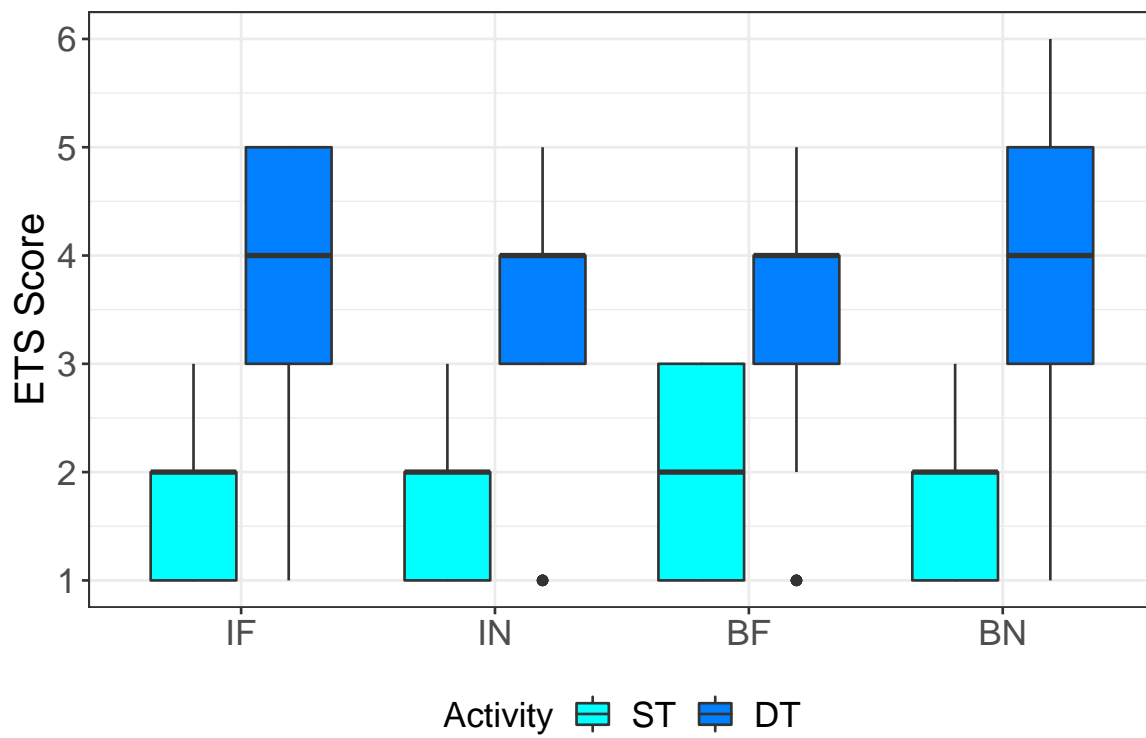
## Linear Modelling for Writing Quality

Our Linear Model:

$$WritingQuality = 1 + Group + Activity + 1|Subject$$

---

```
## Linear mixed-effects model fit by REML
## Data: full_df
##      AIC      BIC    logLik
##  1102.172 1132.016 -544.0862
##
## Random effects:
## Formula: ~1 | Subject
##      (Intercept) Residual
## StdDev:      0.815559 0.5654234
##
## Fixed effects: Score ~ 1 + Group + Activity
##              Value Std.Error DF t-value p-value
## (Intercept) 1.9320463 0.21820388 464  8.85432  0.0000
## GroupIN      0.0734389 0.29057887  61  0.25273  0.8013
## GroupBF      0.0258916 0.31216072  61  0.08294  0.9342
## GroupIF      0.0881311 0.29856835  61  0.29518  0.7689
## ActivityDT   1.7245283 0.04912084 464 35.10787  0.0000
## Correlation:
##      (Intr) GropIN GropBF GropIF
## GroupIN    -0.741
## GroupBF    -0.690  0.518
## GroupIF    -0.722  0.542  0.504
## ActivityDT -0.113  0.000  0.000  0.000
##
## Standardized Within-Group Residuals:
##      Min      Q1      Med      Q3      Max
## -2.5214114 -0.5577613 -0.0315706  0.5336138  2.3043000
##
## Number of Observations: 530
## Number of Groups: 65
```



Activity	Group	n
ST	BN	63
ST	IN	81
ST	BF	58
ST	IF	63
DT	BN	63
DT	IN	81
DT	BF	58
DT	IF	63

**PP, 2 Groups:**

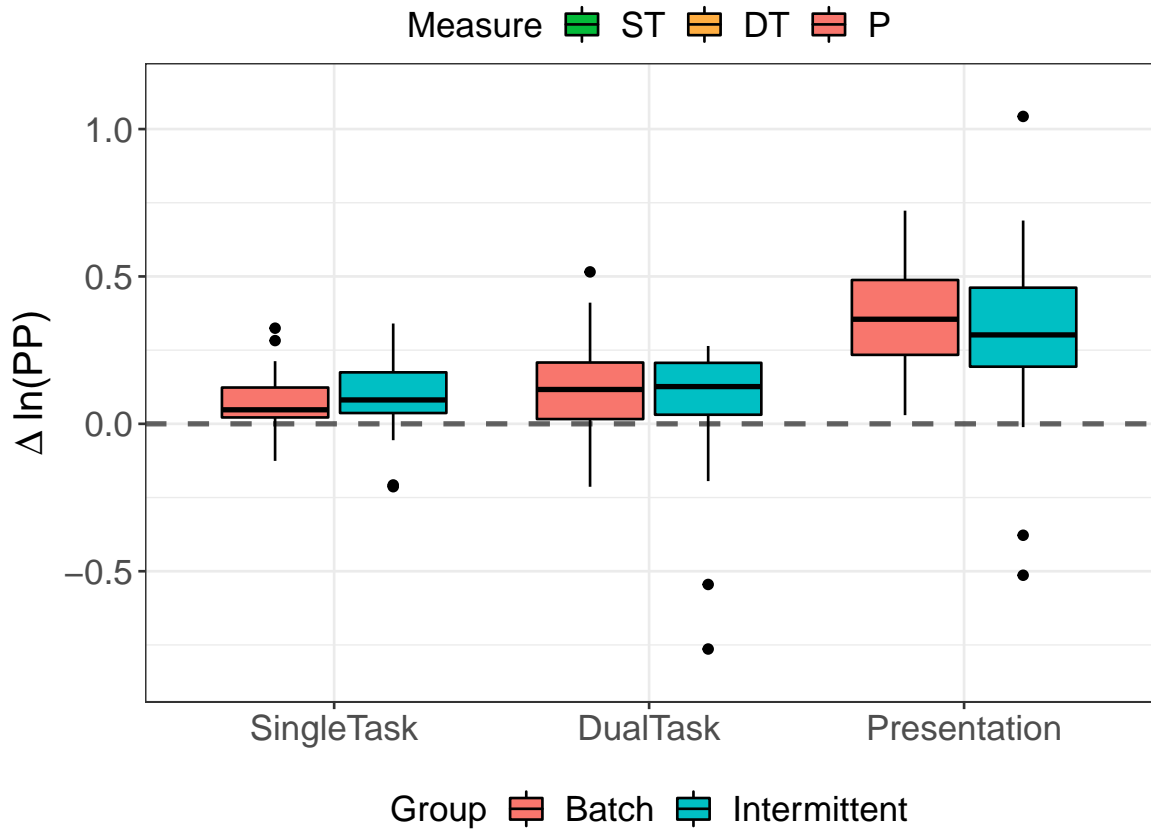
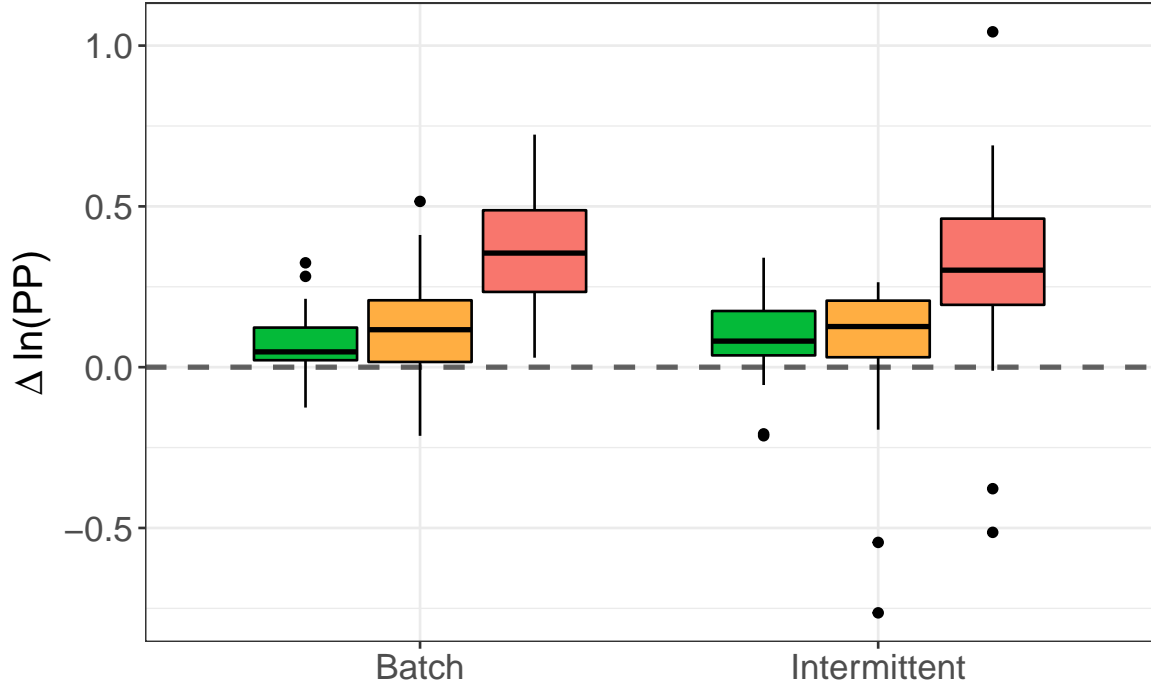


## Stress Levels Across Activities

Our Linear Model:

$$\Delta \ln(\bar{P}P) = 1 + \text{Group} + \text{Activity} + 1|\text{Subject}$$

```
## Linear mixed-effects model fit by REML
## Data: diff_df
##      AIC      BIC    logLik
## -190.2974 -165.4812 102.1487
##
## Random effects:
## Formula: ~1 | Subject
##      (Intercept) Residual
## StdDev:    0.1366331 0.1254346
##
## Fixed effects: PP ~ 1 + Group + Activity
##              Value Std.Error DF   t-value p-value
## (Intercept)   0.10277792 0.03054843 192   3.364426  0.0009
## GroupIntermittent -0.02981584 0.03721068 64  -0.801271  0.4259
## ActivityB        -0.03929974 0.02194106 192  -1.791151  0.0748
## ActivityDT        0.01469432 0.02183537 192   0.672960  0.5018
## ActivityP        0.24382752 0.02204962 192  11.058130  0.0000
## Correlation:
##              (Intr) GrpInt ActvtB ActvDT
## GroupIntermittent -0.664
## ActivityB          -0.354 -0.003
## ActivityDT          -0.357  0.000  0.498
## ActivityP          -0.357  0.005  0.493  0.495
##
## Standardized Within-Group Residuals:
##      Min      Q1      Med      Q3      Max
## -3.7336040 -0.4020245 -0.0522257  0.4340779  4.3003452
##
## Number of Observations: 261
## Number of Groups: 66
```

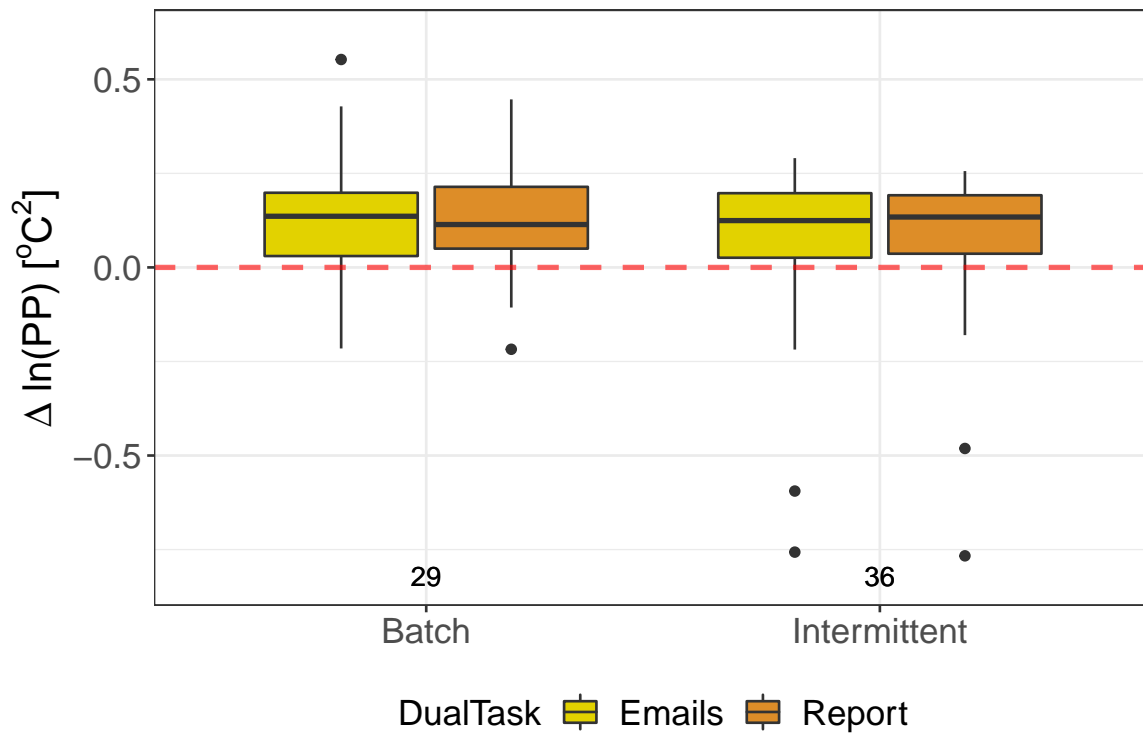


## Stress Levels for Dual Task

Our Linear Model:

$$\Delta \ln(\bar{P}\bar{P}) = 1 + \text{Group} + \text{DualTask} + 1|\text{Subject}$$

```
## Linear mixed-effects model fit by REML
## Data: total_df
##      AIC      BIC    logLik
## -249.3766 -235.1557 129.6883
##
## Random effects:
## Formula: ~1 | Subject
##      (Intercept)  Residual
## StdDev:    0.1851428 0.02677144
##
## Fixed effects: PP ~ 1 + Group + DualTask
##              Value Std.Error DF   t-value p-value
## (Intercept)    0.13487059 0.03463907 64   3.893597  0.0002
## GroupIntermittent -0.05919015 0.04643780 63  -1.274612  0.2071
## DualTaskReport    -0.00249349 0.00469602 64  -0.530980  0.5973
## Correlation:
##              (Intr) GrpInt
## GroupIntermittent -0.742
## DualTaskReport    -0.068  0.000
##
## Standardized Within-Group Residuals:
##      Min      Q1      Med      Q3      Max
## -2.397230806 -0.449512451  0.006490064  0.371394466  2.075242947
##
## Number of Observations: 130
## Number of Groups: 65
```



```
## Paired t-test
## For Batch, p = 0.2975 > 0.05

## Paired t-test
## For Intermittent, p = 0.6066 > 0.05
```

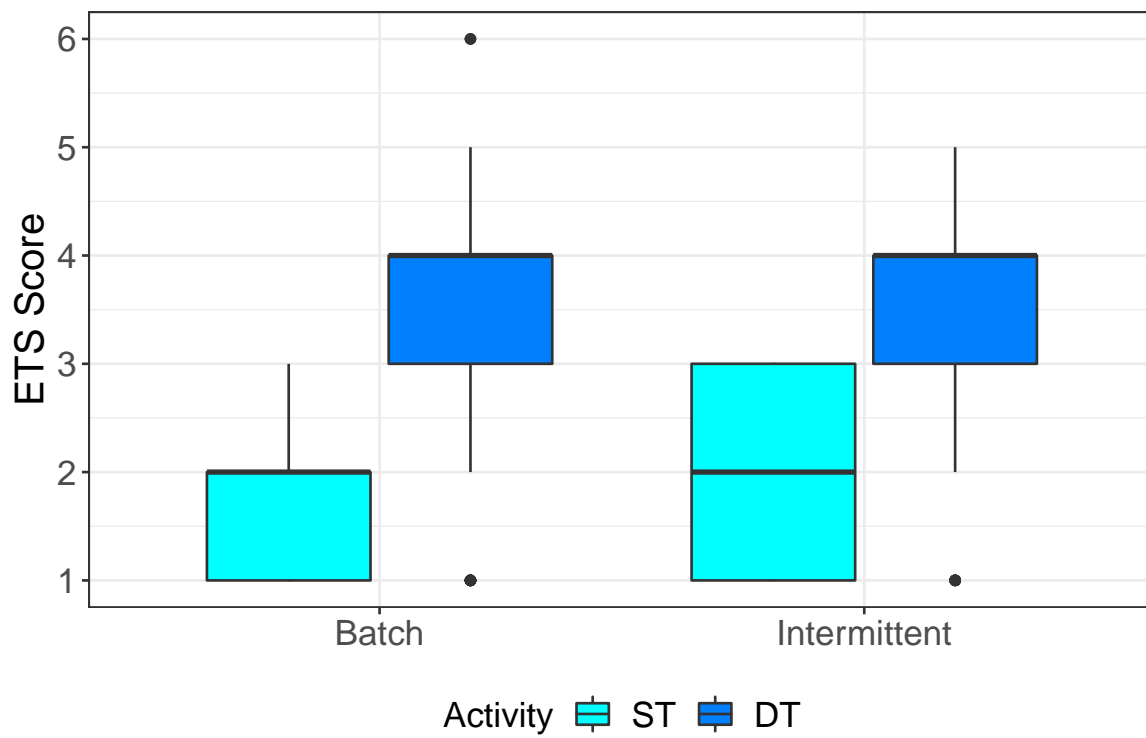
## Linear Modelling for Writing Quality

Our Linear Model:

$$WritingQuality = 1 + Group + Activity + 1|Subject$$

---

```
## Linear mixed-effects model fit by REML
## Data: full_df
##      AIC      BIC    logLik
## 1097.074 1118.41 -543.5368
##
## Random effects:
## Formula: ~1 | Subject
##      (Intercept)  Residual
## StdDev:      0.80255 0.5654072
##
## Fixed effects: Score ~ 1 + Group + Activity
##              Value Std.Error DF t-value p-value
## (Intercept)  1.9728343 0.14429314 464 13.67241 0.0000
## GroupIntermittent 0.0189786 0.20613928 63 0.09207 0.9269
## ActivityDT      1.7245283 0.04911944 464 35.10887 0.0000
## Correlation:
##              (Intr) GrpInt
## GroupIntermittent -0.68
## ActivityDT      -0.17  0.00
##
## Standardized Within-Group Residuals:
##      Min      Q1      Med      Q3      Max
## -2.52259635 -0.55343079 -0.01988021 0.52746772 2.29769169
##
## Number of Observations: 530
## Number of Groups: 65
```



Activity	Group	n
ST	Batch	144
ST	Intermittent	121
DT	Batch	144
DT	Intermittent	121

**HR, 2 Groups:**

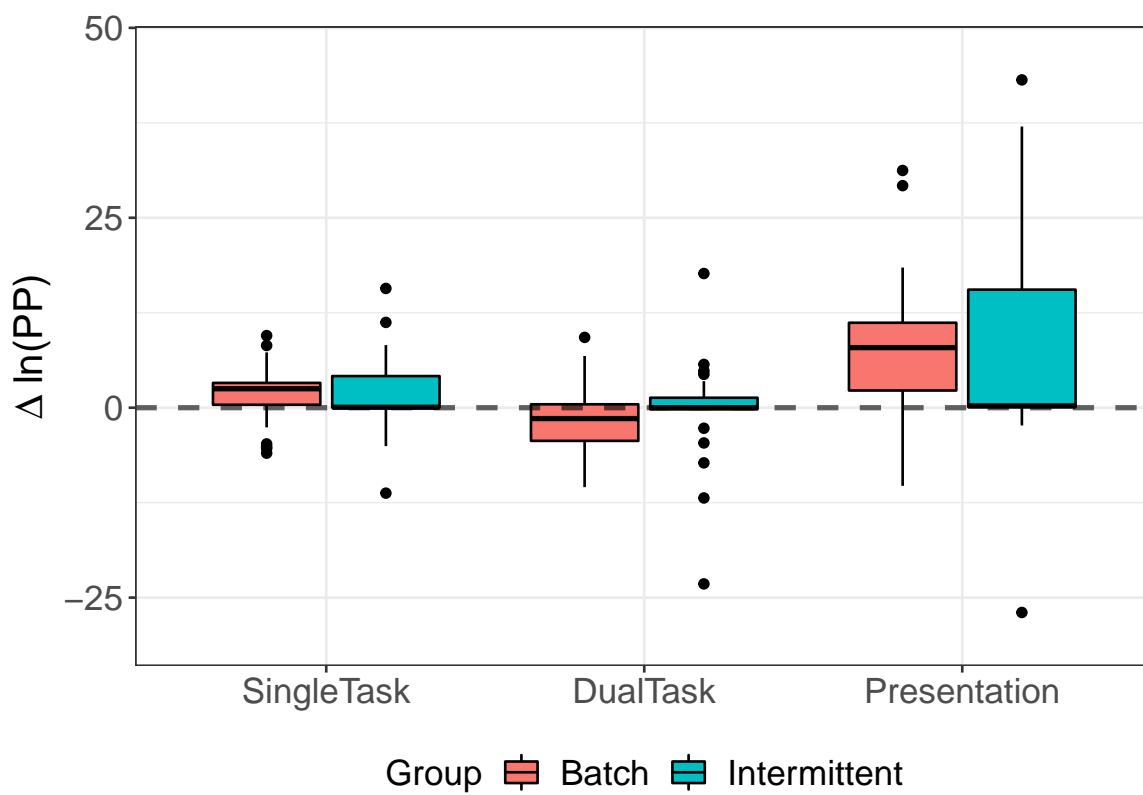
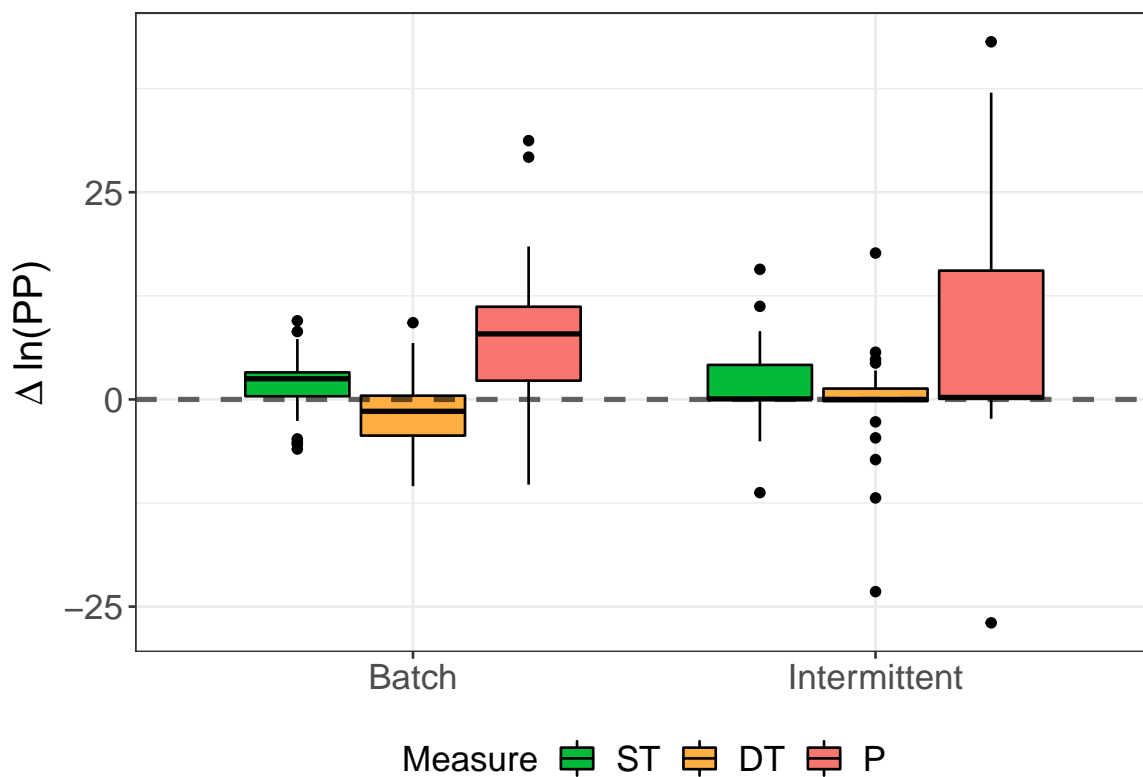
## Stress Levels Across Activities

Our Linear Model:

$$\Delta \bar{H}R = 1 + \text{Group} + \text{Activity} + 1|\text{Subject}$$

```
## Linear mixed-effects model fit by REML
## Data: diff_df
##      AIC      BIC    logLik
## 1408.064 1431.427 -697.0319
##
## Random effects:
## Formula: ~1 | Subject
##      (Intercept) Residual
## StdDev:      5.107801 5.452549
##
## Fixed effects: HR ~ 1 + Group + Activity
##              Value Std.Error DF   t-value p-value
## (Intercept)   2.143937  1.285510 155   1.667771  0.0974
## GroupIntermittent -0.238614  1.568514  53  -0.152127  0.8797
## ActivityB        -2.454762  1.045728 155  -2.347419  0.0202
## ActivityDT        -2.983310  1.039760 155  -2.869229  0.0047
## ActivityP         5.491541  1.078591 155   5.091401  0.0000
## Correlation:
##              (Intr) GrpInt ActvtB ActvDT
## GroupIntermittent -0.621
## ActivityB          -0.404  0.004
## ActivityDT          -0.404  0.000  0.497
## ActivityP          -0.395  0.008  0.479  0.482
##
## Standardized Within-Group Residuals:
##              Min              Q1              Med              Q3              Max
## -3.307528856 -0.434774431  0.008940345  0.374207295  5.009845308
##
## Number of Observations: 213
## Number of Groups: 55
```



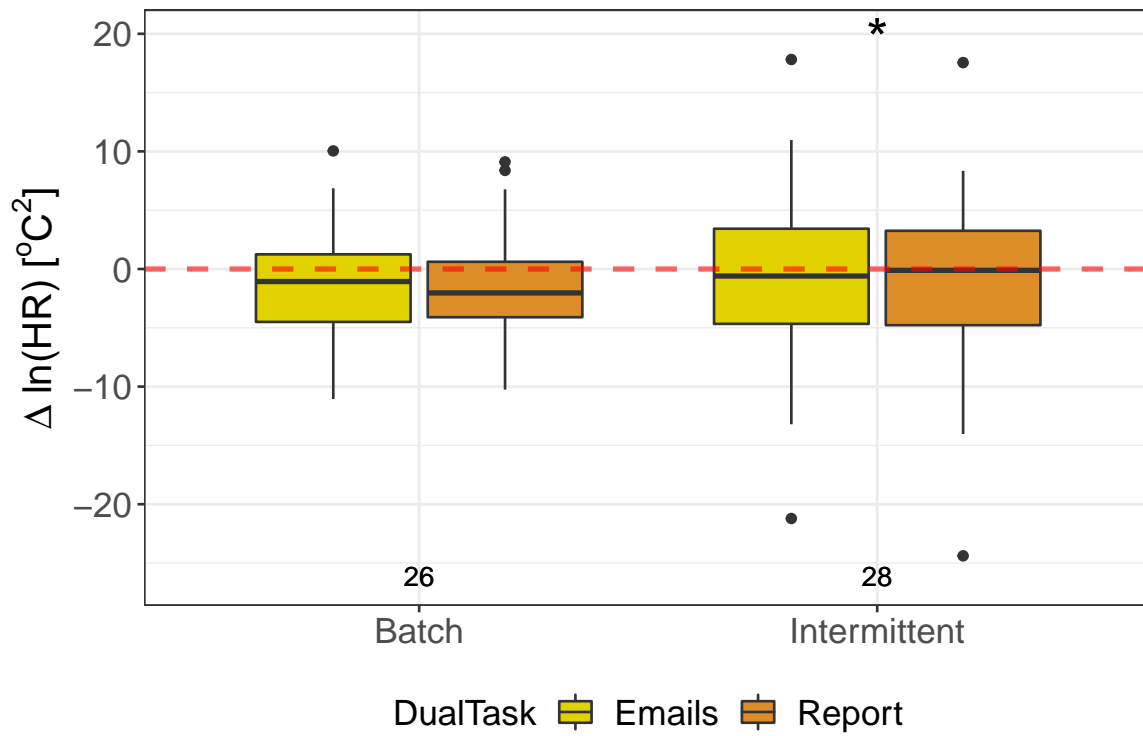


## Stress Levels for Dual Task

Our Linear Model:

$$\Delta \bar{HR} = 1 + Group + DualTask + 1|Subject$$

```
## Linear mixed-effects model fit by REML
## Data: total_df
##      AIC      BIC    logLik
## 564.7997 578.0695 -277.3999
##
## Random effects:
## Formula: ~1 | Subject
##      (Intercept) Residual
## StdDev:      6.339725 1.169079
##
## Fixed effects: HR ~ 1 + Group + DualTask
##              Value Std.Error DF   t-value p-value
## (Intercept)  -0.9641354 1.2588841 53 -0.7658651 0.4472
## GroupIntermittent 0.0997138 1.7412561 52 0.0572655 0.9546
## DualTaskReport  -0.3896584 0.2249894 53 -1.7318966 0.0891
## Correlation:
##              (Intr) GrpInt
## GroupIntermittent -0.717
## DualTaskReport  -0.089 0.000
##
## Standardized Within-Group Residuals:
##      Min      Q1      Med      Q3      Max
## -2.08303345 -0.40857887 0.05106419 0.38434907 2.30886567
##
## Number of Observations: 108
## Number of Groups: 54
```



```
## Paired t-test
## For Batch, p = 0.6287 > 0.05

## Paired t-test
## For Intermittent, p = 0.0401 < 0.05 *
```

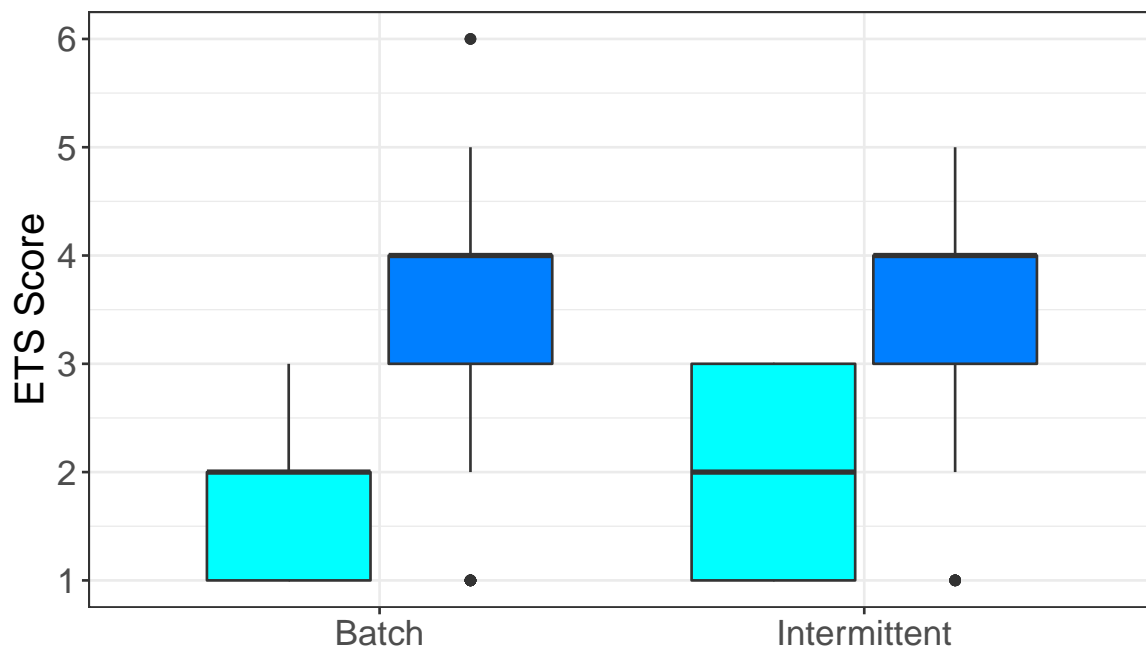
## Linear Modelling for Writing Quality

Our Linear Model:

$$WritingQuality = 1 + Group + Activity + 1|Subject$$

---

```
## Linear mixed-effects model fit by REML
## Data: full_df
##      AIC      BIC    logLik
##  1097.074 1118.41 -543.5368
##
## Random effects:
## Formula: ~1 | Subject
##      (Intercept)  Residual
## StdDev:      0.80255 0.5654072
##
## Fixed effects: Score ~ 1 + Group + Activity
##              Value Std.Error DF  t-value p-value
## (Intercept)   1.9728343 0.14429314 464 13.67241 0.0000
## GroupIntermittent 0.0189786 0.20613928 63 0.09207 0.9269
## ActivityDT       1.7245283 0.04911944 464 35.10887 0.0000
## Correlation:
##              (Intr) GrpInt
## GroupIntermittent -0.68
## ActivityDT        -0.17  0.00
##
## Standardized Within-Group Residuals:
##      Min      Q1      Med      Q3      Max
## -2.52259635 -0.55343079 -0.01988021 0.52746772 2.29769169
##
## Number of Observations: 530
## Number of Groups: 65
```



Activity ■ ST ■ DT

Activity	Group	n
ST	Batch	144
ST	Intermittent	121
DT	Batch	144
DT	Intermittent	121

## Let's Get to 10 ★ with Four Groups

Our Linear Model:

$$\Delta \ln(\bar{PP}) = 1 + ETSScore + Group + Activity + 1|Subject$$

---

```
## Linear mixed-effects model fit by REML
## Data: full_df
##      AIC      BIC    logLik
##   -97.37338 -74.68312 56.68669
##
## Random effects:
## Formula: ~1 | Subject
##      (Intercept) Residual
## StdDev:    0.1160218 0.1047286
##
## Fixed effects: PP ~ 1 + ETSScore + Group + Activity
##              Value Std.Error DF   t-value p-value
## (Intercept)  0.07830843 0.04478419 65  1.7485732  0.0851
## ETSScore      0.00632252 0.01347347 65  0.4692574  0.6405
## GroupIN       -0.02413960 0.04745506 61 -0.5086834  0.6128
## GroupBF       -0.00071965 0.05114987 61 -0.0140695  0.9888
## GroupIF        0.00261483 0.04877144 61  0.0536139  0.9574
## ActivityDT     0.00308268 0.03020997 65  0.1020418  0.9190
## Correlation:
##      (Intr) ETSScr GropIN GropBF GropIF
## ETSScore   -0.573
## GroupIN     -0.584 -0.017
## GroupBF     -0.548 -0.006  0.520
## GroupIF     -0.565 -0.023  0.546  0.506
## ActivityDT  0.334 -0.797  0.014  0.005  0.018
##
## Standardized Within-Group Residuals:
##      Min      Q1      Med      Q3      Max
## -4.25944641 -0.30605522 -0.01964231  0.33825689  2.33237928
##
## Number of Observations: 132
## Number of Groups: 65
```

## Hey! Let's ANOVA!

Our ANOVA Model:

$$\Delta \ln(\bar{P}P) = 1 + \textit{StressFactor} + \textit{IntermittentFactor}$$

---

```
##              Df Sum Sq Mean Sq F value Pr(>F)
## StressFactor    1  0.0059  0.00592    0.166   0.685
## IntermittentFactor 1  0.0548  0.05480    1.540   0.219
## Residuals      63  2.2425  0.03560

##   Tukey multiple comparisons of means
##     95% family-wise confidence level
##
## Fit: aov(formula = PP ~ 1 + StressFactor + IntermittentFactor, data = diff_df, na.action = na.omit)
##
## $StressFactor
##              diff              lwr              upr              p adj
## High-Low 0.01895161 -0.07390701 0.1118102 0.6847714
##
## $IntermittentFactor
##              diff              lwr              upr              p adj
## Intermittent-Non-Intermittent -0.05784808 -0.15105 0.03535383 0.2194568
```

## Now a Linear Model Very Close to the ANOVA One Above:

Our Linear Model:

$$\Delta \ln(\bar{PP}) = 1 + \text{StressIndicator} + \text{IntermittencyIndicator} + 1|\text{Subjects}$$

---

```
## Linear mixed-effects model fit by REML
## Data: diff_df
##      AIC      BIC  logLik
##   -11.56681 -0.8511323 10.7834
##
## Random effects:
## Formula: ~1 | Subject
##      (Intercept)  Residual
## StdDev:    0.1766541 0.06624529
##
## Fixed effects: PP ~ 1 + StressFactor + IntermittentFactor
##                                     Value Std.Error DF   t-value
## (Intercept)                0.12437204 0.04155398 63   2.9930235
## StressFactorHigh            0.01735531 0.04648567 63   0.3733476
## IntermittentFactorIntermittent -0.05789242 0.04665752 63  -1.2407949
##                                     p-value
## (Intercept)                0.0039
## StressFactorHigh            0.7101
## IntermittentFactorIntermittent 0.2193
## Correlation:
##                                     (Intr) StrsFH
## StressFactorHigh                -0.559
## IntermittentFactorIntermittent -0.627  0.028
##
## Standardized Within-Group Residuals:
##      Min      Q1      Med      Q3      Max
## -1.54542253 -0.12218771  0.03174836  0.21097440  0.72781883
##
## Number of Observations: 66
## Number of Groups: 66
```



## Hey! Let's ANOVA 2: With Interaction Effects

Our ANOVA Model:

$$\Delta \ln(\bar{P}P) = 1 + \text{StressFactor} + \text{IntermittentFactor} + \text{StressFactor} * \text{IntermittentFactor}$$

---

```
##              Df Sum Sq Mean Sq F value Pr(>F)
## StressFactor      1 0.0059 0.00592   0.165  0.686
## IntermittentFactor 1 0.0548 0.05480   1.529  0.221
## StressFactor:IntermittentFactor 1 0.0203 0.02032   0.567  0.454
## Residuals        62 2.2222 0.03584

## Tukey multiple comparisons of means
## 95% family-wise confidence level
##
## Fit: aov(formula = PP ~ 1 + StressFactor * IntermittentFactor, data = diff_df, na.action = na.omit)
##
## $StressFactor
##           diff           lwr           upr           p adj
## High-Low 0.01895161 -0.0742573 0.1121605 0.6858197
##
## $IntermittentFactor
##           diff           lwr           upr           p adj
## Intermittent-Non-Intermittent -0.05784808 -0.1514016 0.03570542 0.2211031
##
## $`StressFactor:IntermittentFactor`
##           diff           lwr
## High:Non-Intermittent-Low:Non-Intermittent -0.02105726 -0.2035659
## Low:Intermittent-Low:Non-Intermittent -0.09226156 -0.2648975
## High:Intermittent-Low:Non-Intermittent -0.04279667 -0.2198561
## Low:Intermittent-High:Non-Intermittent -0.07120430 -0.2438402
## High:Intermittent-High:Non-Intermittent -0.02173941 -0.1987988
## High:Intermittent-Low:Intermittent 0.04946489 -0.1173997
##           upr           p adj
## High:Non-Intermittent-Low:Non-Intermittent 0.16145142 0.9900928
## Low:Intermittent-Low:Non-Intermittent 0.08037437 0.4974272
## High:Intermittent-Low:Non-Intermittent 0.13426276 0.9192577
## Low:Intermittent-High:Non-Intermittent 0.10143163 0.6975664
## High:Intermittent-High:Non-Intermittent 0.15532002 0.9881176
## High:Intermittent-Low:Intermittent 0.21632947 0.8620509
```

## Appendix

### Dual Task Split into Four Equal Sessions

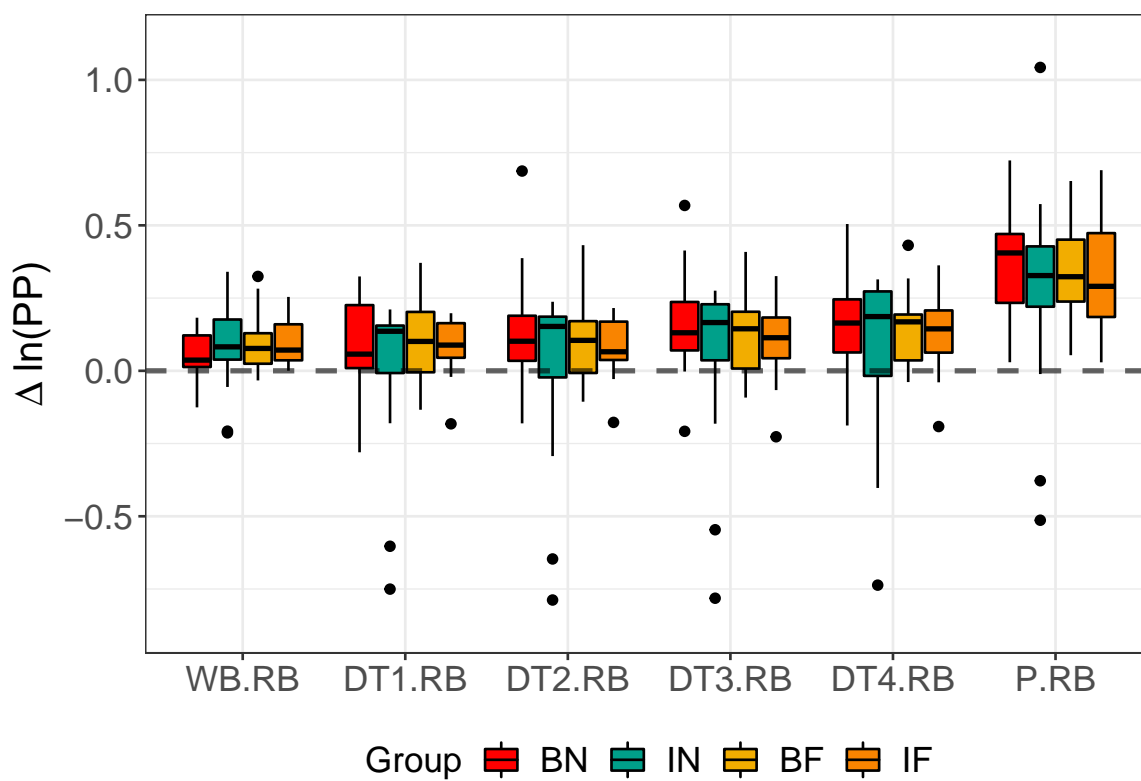
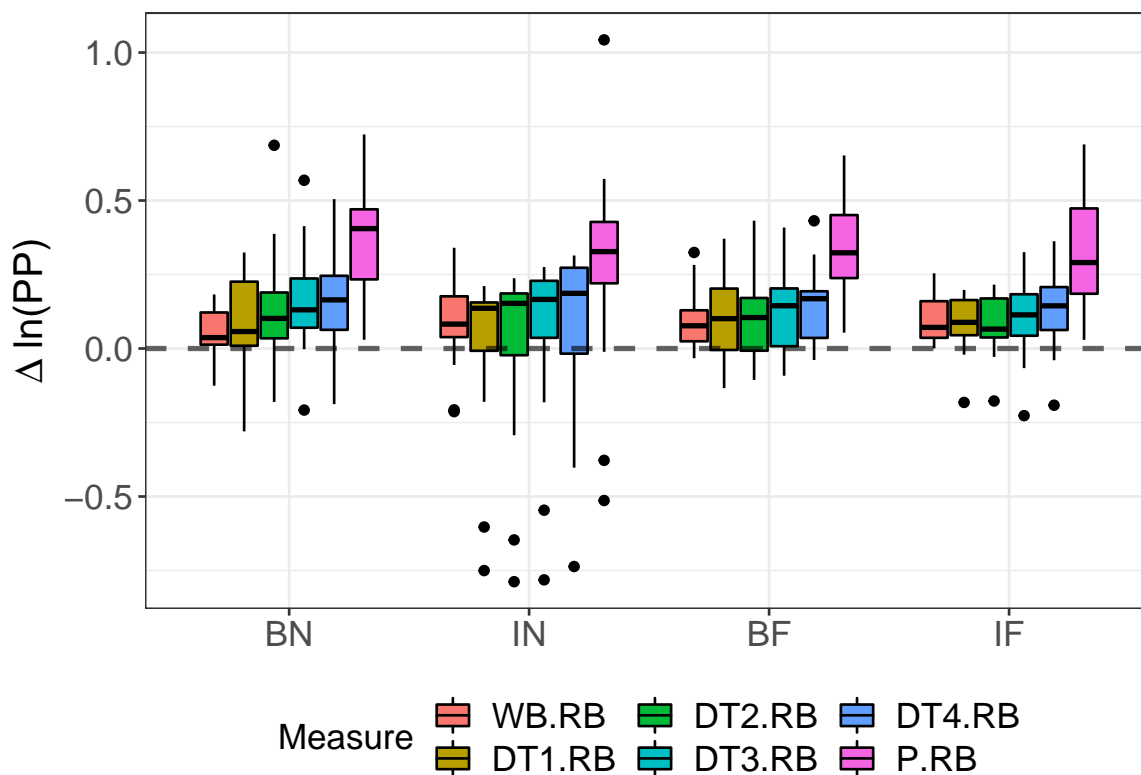
**PP, 4 Groups, 4 Dual Task Sessions:**

## Stress Levels Across Activities

Our Linear Model:

$$\Delta \ln(\bar{P}P) = 1 + \text{Group} + \text{Activity} + 1|\text{Subject}$$

```
## Linear mixed-effects model fit by REML
## Data: diff_df
##      AIC      BIC logLik
## -514.558 -465.2737 269.279
##
## Random effects:
## Formula: ~1 | Subject
##      (Intercept) Residual
## StdDev:      0.160025 0.1040444
##
## Fixed effects: PP ~ 1 + Group + Activity
##              Value Std.Error DF   t-value p-value
## (Intercept)  0.11274189 0.04417801 387   2.551991  0.0111
## GroupIN      -0.06727279 0.05693946  62  -1.181479  0.2419
## GroupBF      -0.00619599 0.06018096  62  -0.102956  0.9183
## GroupIF      -0.02116881 0.05838469  62  -0.362575  0.7182
## ActivityB     -0.03824376 0.01819217 387  -2.102210  0.0362
## ActivityDT1   -0.01674747 0.01811180 387  -0.924672  0.3557
## ActivityDT2    0.00226400 0.01811180 387   0.125001  0.9006
## ActivityDT3    0.02582538 0.01811180 387   1.425887  0.1547
## ActivityDT4    0.04303147 0.01811180 387   2.375881  0.0180
## ActivityP      0.24418330 0.01827472 387  13.361812  0.0000
## Correlation:
##      (Intr) GropIN GropBF GropIF ActvtB ActDT1 ActDT2 ActDT3 ActDT4
## GroupIN      -0.720
## GroupBF      -0.681  0.529
## GroupIF      -0.702  0.545  0.516
## ActivityB     -0.202 -0.002 -0.002 -0.002
## ActivityDT1   -0.205  0.000  0.000  0.000  0.498
## ActivityDT2   -0.205  0.000  0.000  0.000  0.498  0.500
## ActivityDT3   -0.205  0.000  0.000  0.000  0.498  0.500  0.500
## ActivityDT4   -0.205  0.000  0.000  0.000  0.498  0.500  0.500  0.500
## ActivityP     -0.204  0.003  0.000  0.000  0.493  0.496  0.496  0.496  0.496
##
## Standardized Within-Group Residuals:
##      Min      Q1      Med      Q3      Max
## -3.220899256 -0.398261303 -0.003535388  0.403678068  5.337889724
##
## Number of Observations: 459
## Number of Groups: 66
```



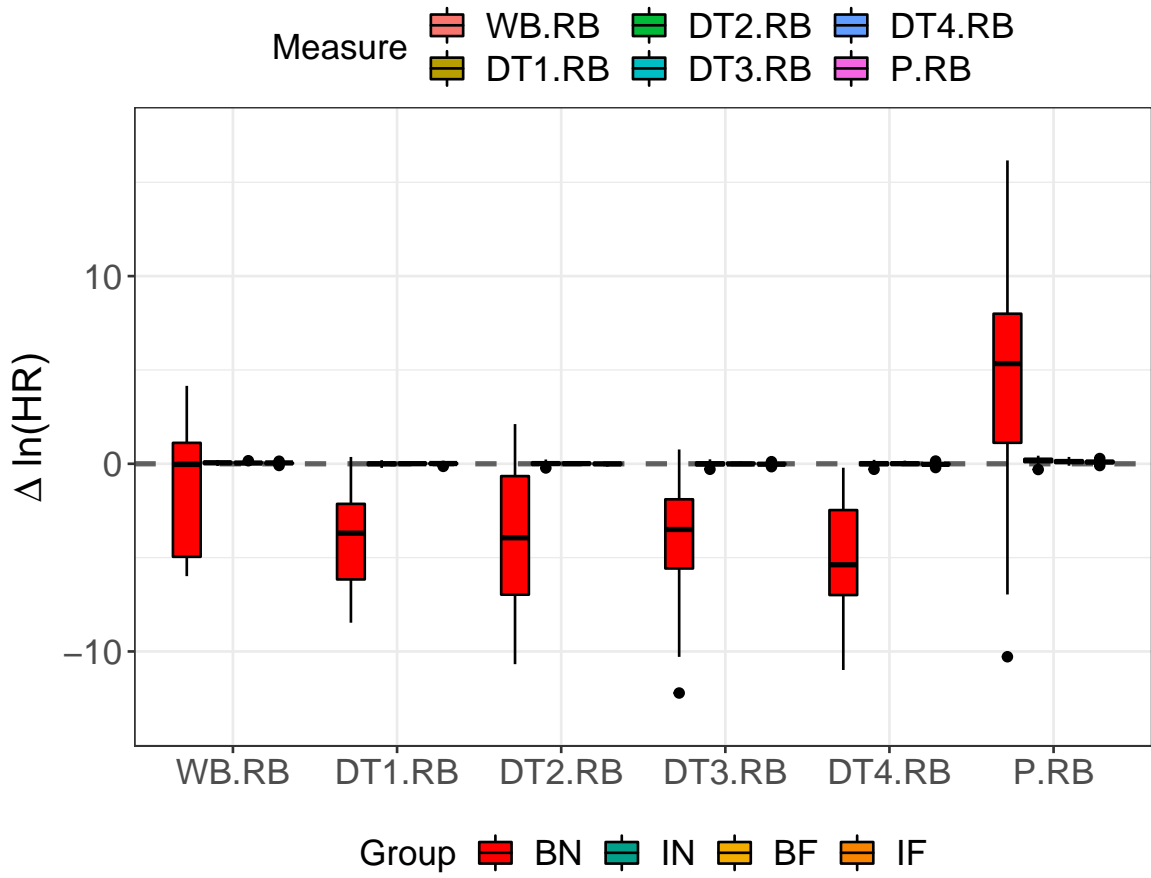
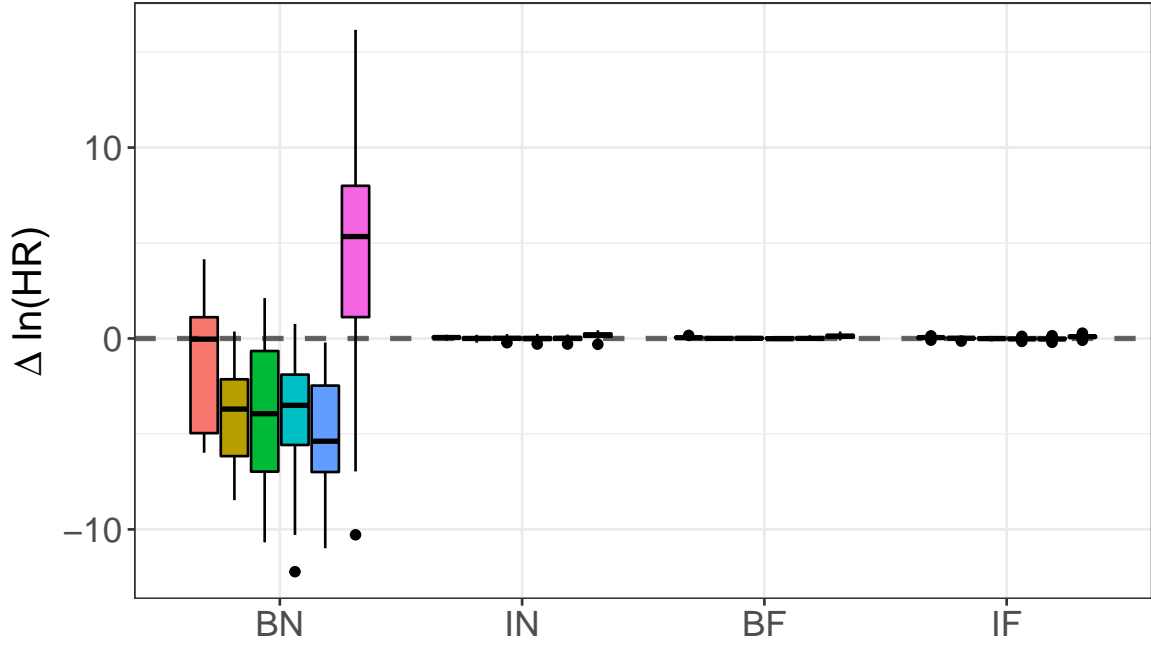
**HR, 4 Groups, 4 Dual Task Sessions:**

## Stress Levels Across Activities

Our Linear Model:

$$\Delta \ln(\bar{H}R) = 1 + \text{Group} + \text{Activity} + 1|\text{Subject}$$

```
## Linear mixed-effects model fit by REML
## Data: diff_df
##      AIC      BIC    logLik
## 1696.624 1743.521 -836.3122
##
## Random effects:
## Formula: ~1 | Subject
##      (Intercept) Residual
## StdDev:      1.442591 2.001444
##
## Fixed effects: HR ~ 1 + Group + Activity
##              Value Std.Error DF   t-value p-value
## (Intercept) -1.7331919 0.5170360 317 -3.352168 0.0009
## GroupIN      2.1965517 0.6103182  51  3.599027 0.0007
## GroupBF      2.1762058 0.6283020  51  3.463630 0.0011
## GroupIF      2.1655890 0.6534200  51  3.314237 0.0017
## ActivityB    -0.5067140 0.3836484 317 -1.320777 0.1875
## ActivityDT1  -0.7812171 0.3816605 317 -2.046890 0.0415
## ActivityDT2  -0.8094964 0.3816605 317 -2.120986 0.0347
## ActivityDT3  -0.8612113 0.3816605 317 -2.256485 0.0247
## ActivityDT4  -1.0028747 0.3816605 317 -2.627662 0.0090
## ActivityP     1.1608166 0.3946240 317  2.941577 0.0035
## Correlation:
##      (Intr) GropIN GropBF GropIF ActvtB ActDT1 ActDT2 ActDT3 ActDT4
## GroupIN    -0.651
## GroupBF    -0.631  0.535
## GroupIF    -0.607  0.515  0.500
## ActivityB   -0.368  0.003  0.000  0.000
## ActivityDT1 -0.369  0.000  0.000  0.000  0.497
## ActivityDT2 -0.369  0.000  0.000  0.000  0.497  0.500
## ActivityDT3 -0.369  0.000  0.000  0.000  0.497  0.500  0.500
## ActivityDT4 -0.369  0.000  0.000  0.000  0.497  0.500  0.500  0.500
## ActivityP   -0.354  0.002 -0.008 -0.004  0.481  0.484  0.484  0.484  0.484
##
## Standardized Within-Group Residuals:
##      Min      Q1      Med      Q3      Max
## -2.6694013 -0.2053165  0.1564976  0.2123404  8.3328251
##
## Number of Observations: 378
## Number of Groups: 55
```





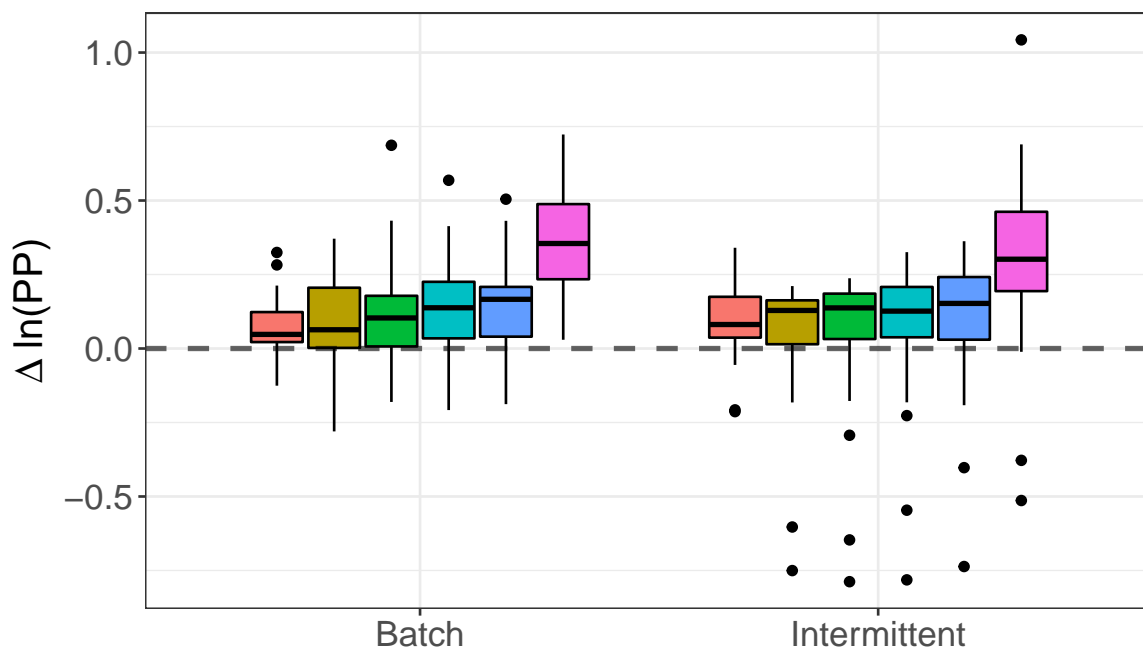
**PP, 2 Groups, 4 Dual Task Sessions:**

## Stress Levels Across Activities

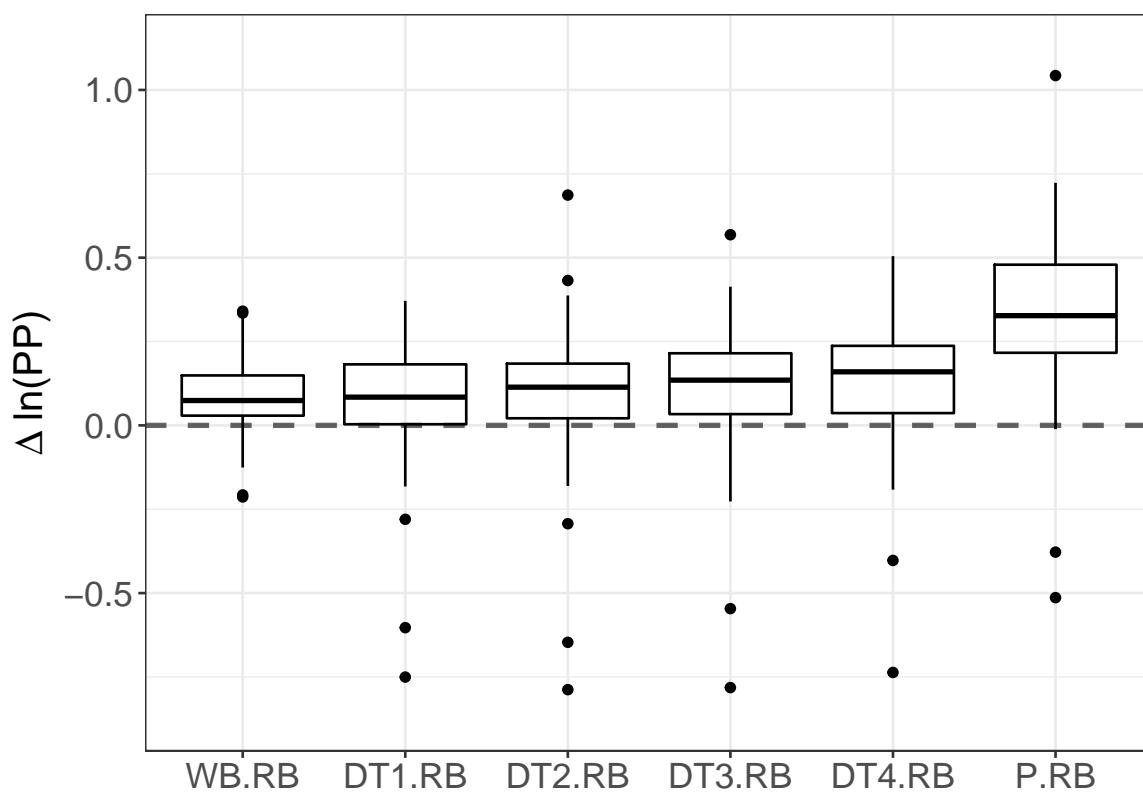
Our Linear Model:

$$\Delta \ln(\bar{P}P) = 1 + \text{Group} + \text{Activity} + 1|\text{Subject}$$

```
## Linear mixed-effects model fit by REML
## Data: diff_df
##      AIC      BIC    logLik
## -525.6034 -484.4887 272.8017
##
## Random effects:
## Formula: ~1 | Subject
##      (Intercept) Residual
## StdDev:    0.1583124 0.104044
##
## Fixed effects: PP ~ 1 + Group + Activity
##              Value Std.Error DF   t-value p-value
## (Intercept)   0.10963678 0.03205883 387   3.419862  0.0007
## GroupIntermittent -0.04239041 0.04033383 64  -1.050989  0.2972
## ActivityB       -0.03825051 0.01819206 387  -2.102594  0.0361
## ActivityDT1     -0.01674747 0.01811173 387  -0.924676  0.3557
## ActivityDT2      0.00226400 0.01811173 387   0.125002  0.9006
## ActivityDT3      0.02582538 0.01811173 387   1.425893  0.1547
## ActivityDT4      0.04303147 0.01811173 387   2.375890  0.0180
## ActivityP        0.24422507 0.01827454 387  13.364228  0.0000
## Correlation:
##              (Intr) GrpInt ActvtB ActDT1 ActDT2 ActDT3 ActDT4
## GroupIntermittent -0.686
## ActivityB          -0.280 -0.001
## ActivityDT1        -0.282  0.000  0.498
## ActivityDT2        -0.282  0.000  0.498  0.500
## ActivityDT3        -0.282  0.000  0.498  0.500  0.500
## ActivityDT4        -0.282  0.000  0.498  0.500  0.500  0.500
## ActivityP          -0.281  0.002  0.493  0.496  0.496  0.496  0.496
##
## Standardized Within-Group Residuals:
##      Min      Q1      Med      Q3      Max
## -3.2389973798 -0.4050830560  0.0009535463  0.4029666321  5.3277415821
##
## Number of Observations: 459
## Number of Groups: 66
```



Measure    WB.RB    DT2.RB    DT4.RB  
               DT1.RB    DT3.RB    P.RB



**HR, 2 Groups, 4 Dual Task Sessions:**

## Stress Levels Across Activities

Our Linear Model:

$$\Delta \ln(\bar{H}R) = 1 + \text{Group} + \text{Activity} + 1|\text{Subject}$$

```
## Linear mixed-effects model fit by REML
## Data: diff_df
##      AIC      BIC    logLik
## 1705.556 1744.691 -842.7781
##
## Random effects:
## Formula: ~1 | Subject
##      (Intercept) Residual
## StdDev:      1.610719 2.000815
##
## Fixed effects: HR ~ 1 + Group + Activity
##              Value Std.Error DF   t-value p-value
## (Intercept)  -0.6031149 0.4241241 317 -1.422025  0.1560
## GroupIntermittent  1.0515909 0.4808432  53  2.186972  0.0332
## ActivityB        -0.5068236 0.3835369 317 -1.321447  0.1873
## ActivityDT1       -0.7812171 0.3815404 317 -2.047535  0.0414
## ActivityDT2       -0.8094964 0.3815404 317 -2.121653  0.0346
## ActivityDT3       -0.8612113 0.3815404 317 -2.257195  0.0247
## ActivityDT4      -1.0028747 0.3815404 317 -2.628489  0.0090
## ActivityP         1.1749019 0.3945519 317  2.977813  0.0031
## Correlation:
##              (Intr) GrpInt ActvtB ActDT1 ActDT2 ActDT3 ActDT4
## GroupIntermittent -0.577
## ActivityB          -0.449  0.002
## ActivityDT1        -0.450  0.000  0.497
## ActivityDT2        -0.450  0.000  0.497  0.500
## ActivityDT3        -0.450  0.000  0.497  0.500  0.500
## ActivityDT4        -0.450  0.000  0.497  0.500  0.500  0.500
## ActivityP          -0.438  0.005  0.481  0.484  0.484  0.484  0.484
##
## Standardized Within-Group Residuals:
##      Min      Q1      Med      Q3      Max
## -2.8090128 -0.2010762  0.1653217  0.2745802  8.2258771
##
## Number of Observations: 378
## Number of Groups: 55
```

