

Advanced Analysis

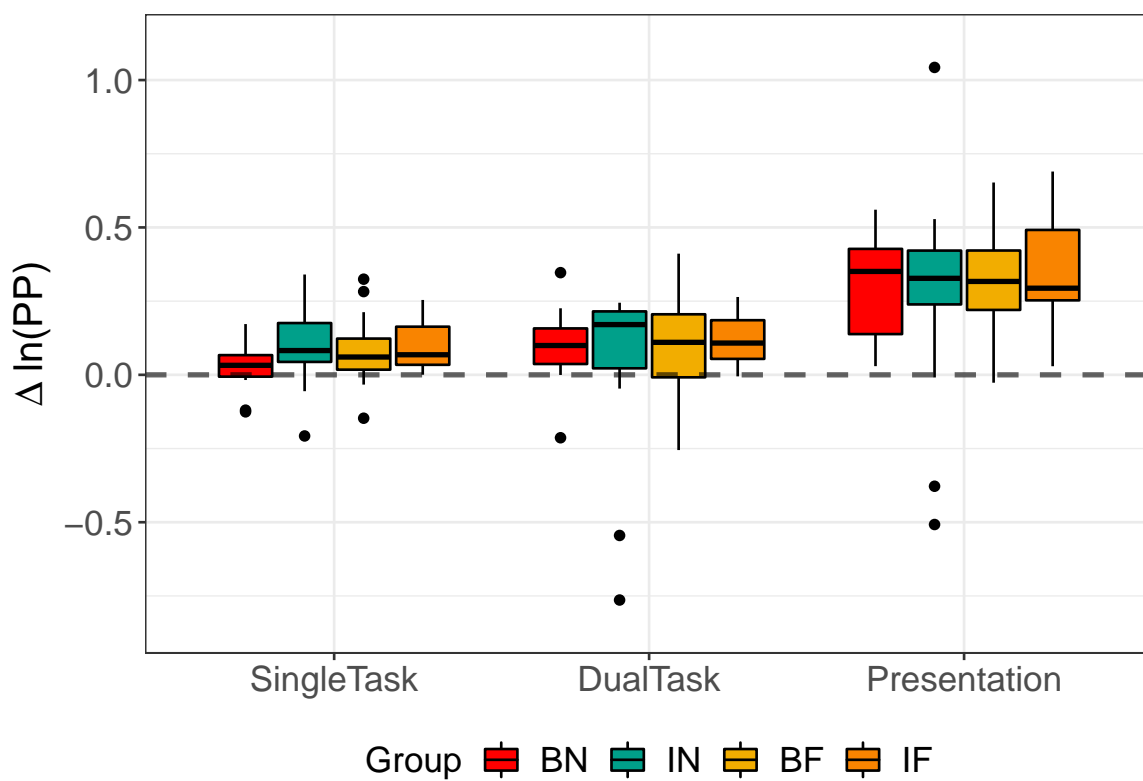
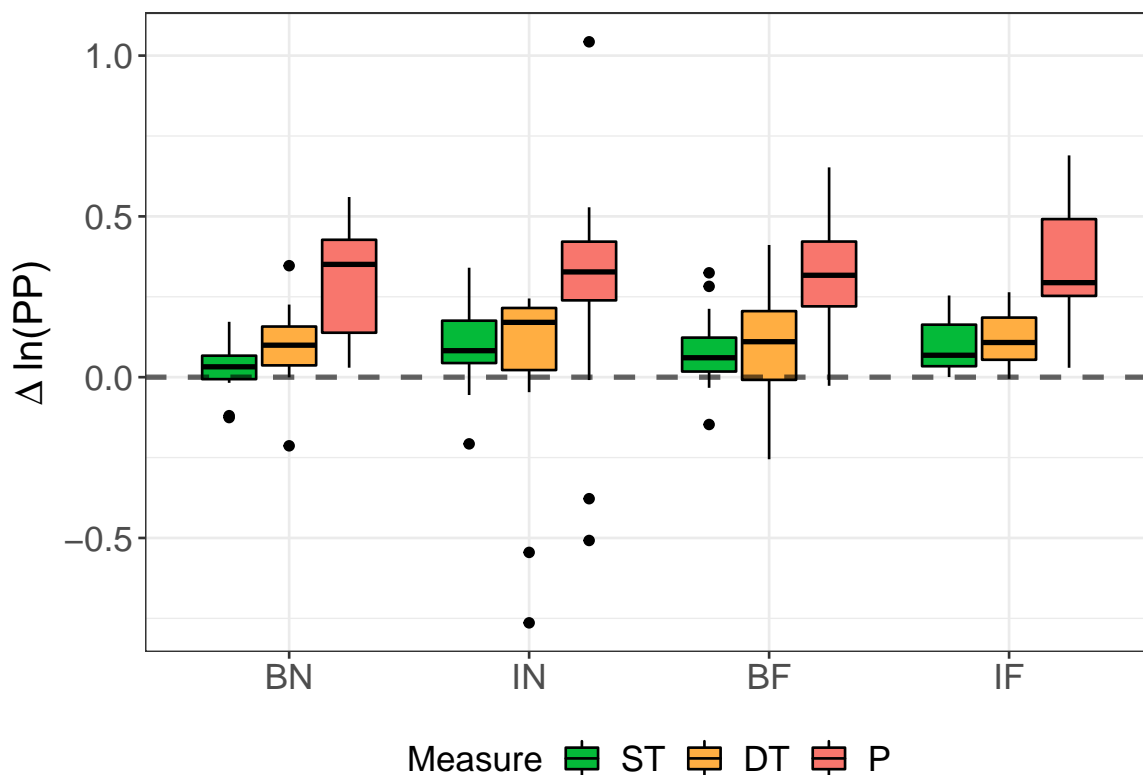
PP, 4 Groups:

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
## -164.0176 -132.9969 91.00879
##
## Random effects:
## Formula: ~1 | Subject
##      (Intercept) Residual
## StdDev:    0.1350202 0.1251077
##
## Fixed effects: PP ~ 1 + Group + Activity
##              Value Std.Error DF   t-value p-value
## (Intercept)  0.05675195 0.04518058 176   1.256114  0.2107
## GroupIN      0.00225501 0.05686965   56   0.039652  0.9685
## GroupBF      0.03362415 0.05682650   56   0.591698  0.5564
## GroupIF      0.05455497 0.05682650   56   0.960027  0.3412
## ActivityB    -0.04699852 0.02284144 176  -2.057599  0.0411
## ActivityDT    0.00841038 0.02284144 176   0.368207  0.7132
## ActivityP     0.23390950 0.02296330 176  10.186233  0.0000
## Correlation:
##      (Intr) GropIN GropBF GropIF ActvtB ActvDT
## GroupIN   -0.719
## GroupBF   -0.719  0.571
## GroupIF   -0.719  0.571  0.571
## ActivityB -0.253  0.000  0.000  0.000
## ActivityDT -0.253  0.000  0.000  0.000  0.500
## ActivityP -0.253  0.004  0.000  0.000  0.497  0.497
##
## Standardized Within-Group Residuals:
##      Min      Q1      Med      Q3      Max
## -3.65611093 -0.38824321 -0.05856128  0.43310320  4.37609008
##
## Number of Observations: 239
## Number of Groups: 60
```

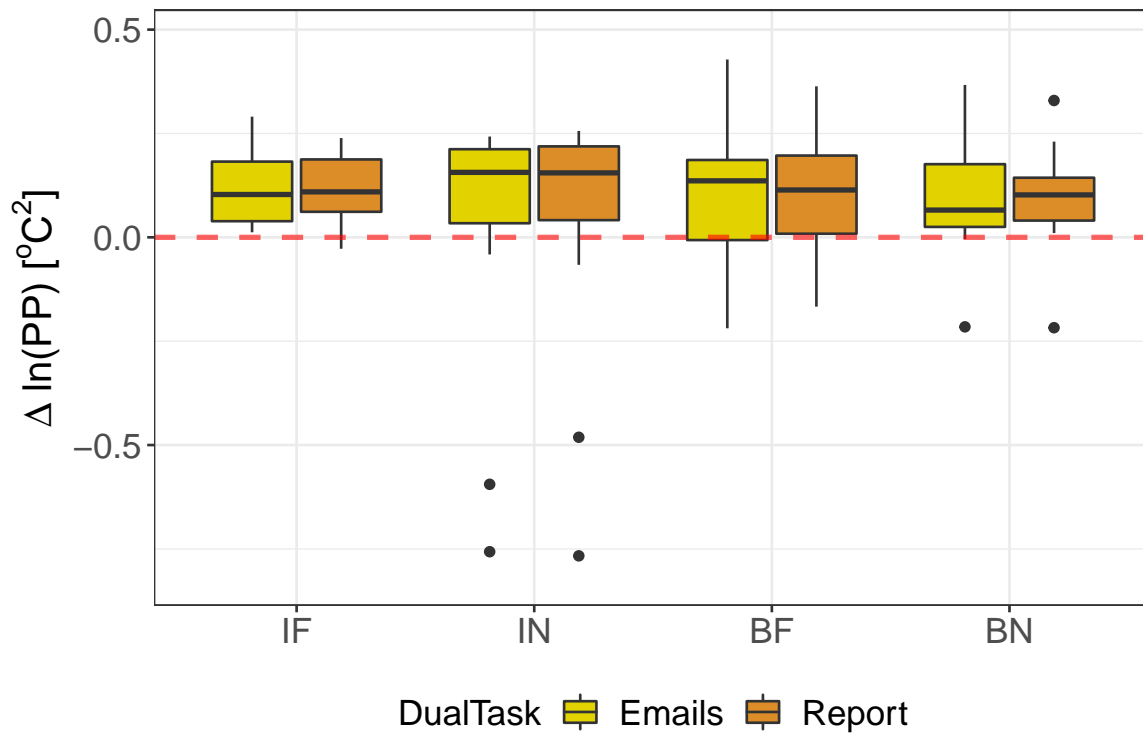


Stress Levels for Dual Task

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
## -219.8249 -200.7332 116.9124
##
## Random effects:
## Formula: ~1 | Subject
##      (Intercept)  Residual
## StdDev:    0.1837314 0.02592463
##
## Fixed effects: PP ~ 1 + Group + DualTask
##              Value Std.Error DF   t-value p-value
## (Intercept)  0.09123570 0.05335544 58  1.7099606  0.0926
## GroupIN      -0.04546389 0.07051197 55 -0.6447685  0.5218
## GroupBF       0.01335891 0.07151219 55  0.1868060  0.8525
## GroupIF       0.02606173 0.07051197 55  0.3696073  0.7131
## DualTaskReport 0.00100238 0.00477311 58  0.2100049  0.8344
## Correlation:
##      (Intr) GropIN GropBF GropIF
## GroupIN      -0.755
## GroupBF      -0.745  0.563
## GroupIF      -0.755  0.571  0.563
## DualTaskReport -0.045  0.000  0.000  0.000
##
## Standardized Within-Group Residuals:
##      Min      Q1      Med      Q3      Max
## -2.38583941 -0.40862664 -0.01758885  0.36225199  1.94166440
##
## Number of Observations: 118
## Number of Groups: 59
```



```
## Paired t-test
## For IF, p = 0.9543 > 0.05

## Paired t-test
## For IN, p = 0.5189 > 0.05

## Paired t-test
## For BF, p = 0.6713 > 0.05

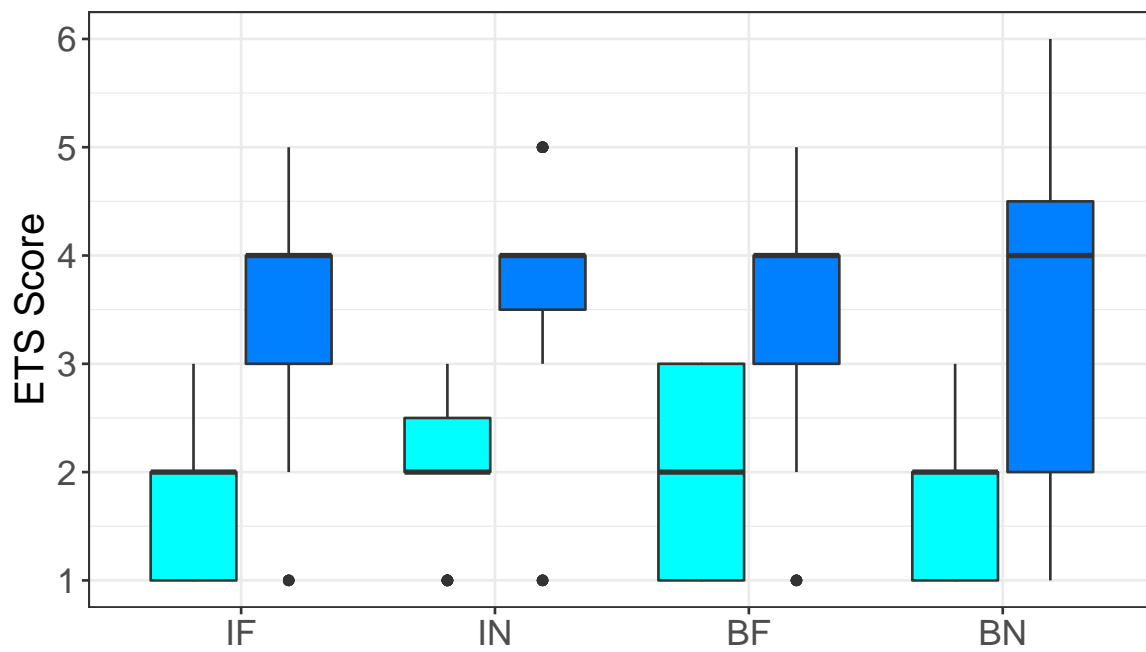
## Paired t-test
## For BN, p = 0.7343 > 0.05
```

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
##  981.0689 1009.628 -483.5344
##
## Random effects:
## Formula: ~1 | Subject
##      (Intercept)  Residual
## StdDev:      0.814411 0.6087496
##
## Fixed effects: Score ~ 1 + Group + Activity
##              Value Std.Error   DF    t-value p-value
## (Intercept) 1.7429787 0.2554519 386   6.823119  0.0000
## GroupIN      0.3174245 0.3342912  51   0.949545  0.3468
## GroupBF      0.2359883 0.3395694  51   0.694963  0.4902
## GroupIF      0.1486021 0.3356527  51   0.442726  0.6598
## ActivityDT   1.6787330 0.0579105 386  28.988391  0.0000
## Correlation:
##      (Intr) GropIN GropBF GropIF
## GroupIN    -0.754
## GroupBF    -0.743  0.567
## GroupIF    -0.751  0.574  0.565
## ActivityDT -0.113  0.000  0.000  0.000
##
## Standardized Within-Group Residuals:
##      Min      Q1      Med      Q3      Max
## -2.321866709 -0.505306825 -0.003345496  0.530827311  2.106111034
##
## Number of Observations: 442
## Number of Groups: 55
```



Activity ■ ST ■ DT

Activity	Group	n
ST	BN	47
ST	IN	63
ST	BF	56
ST	IF	55
DT	BN	47
DT	IN	63
DT	BF	56
DT	IF	55

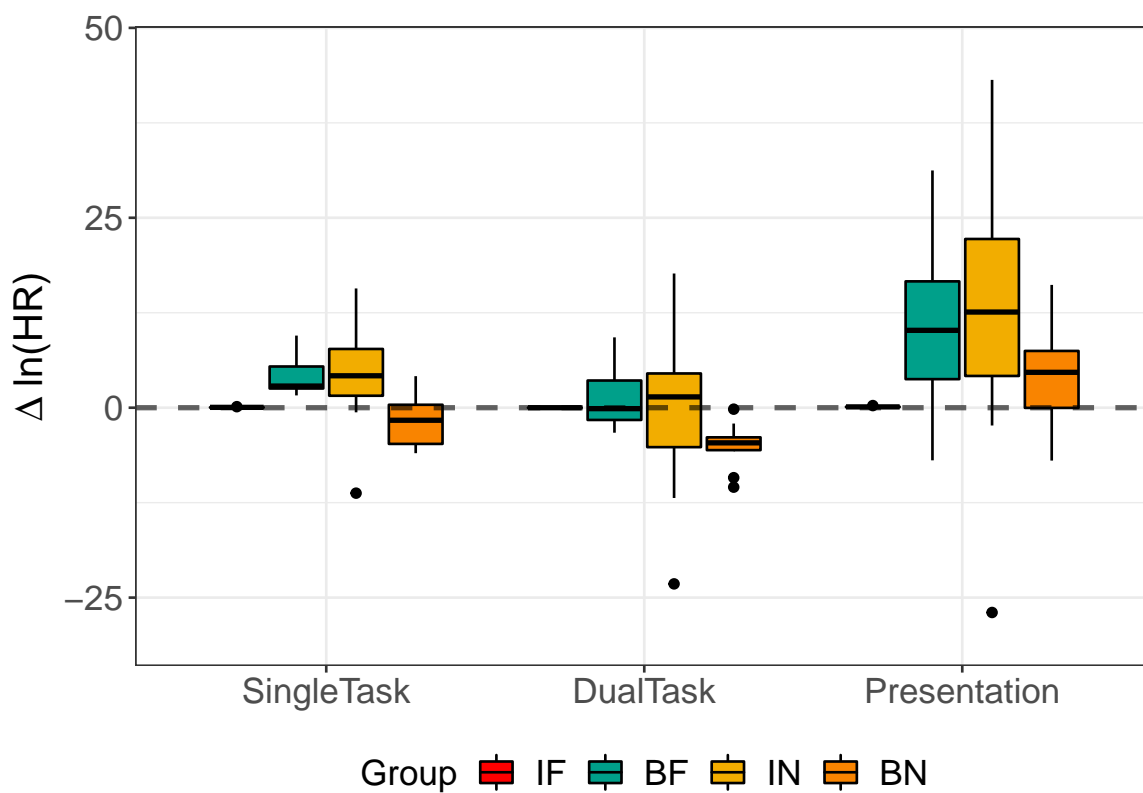
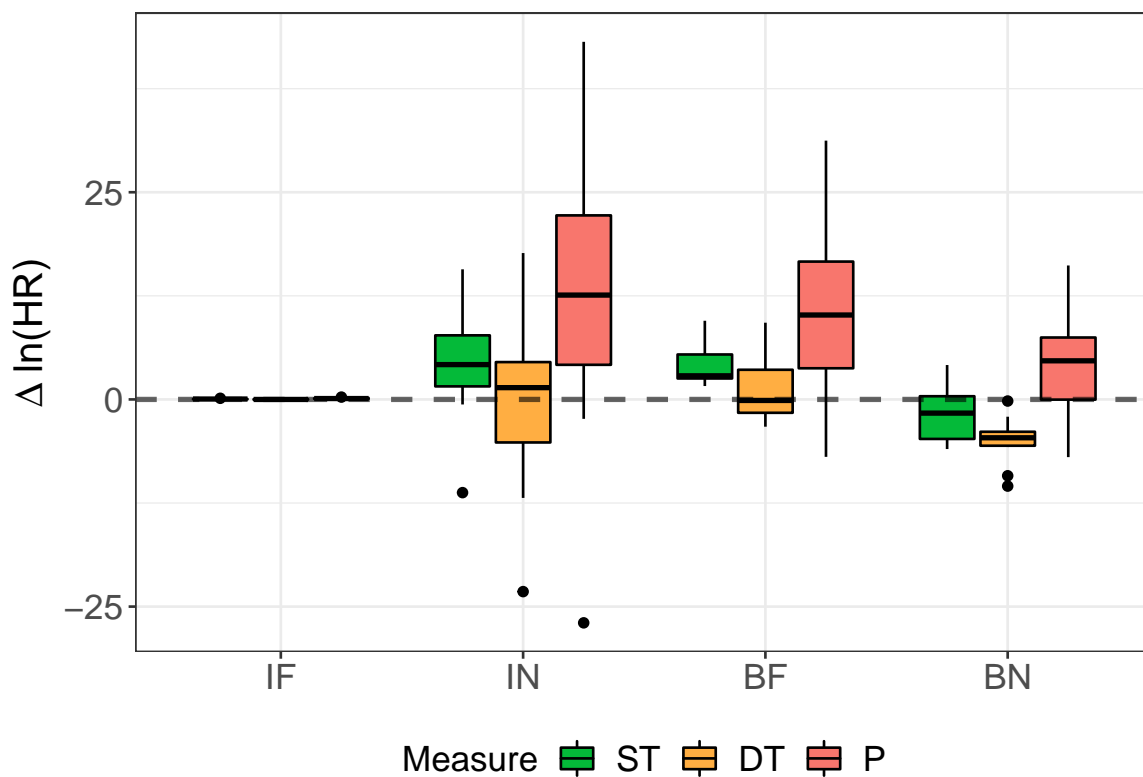
HR, 4 Groups:

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
## 1296.409 1325.537 -639.2047
##
## Random effects:
## Formula: ~1 | Subject
##      (Intercept) Residual
## StdDev:      4.880536 5.750247
##
## Fixed effects: HR ~ 1 + Group + Activity
##              Value Std.Error DF   t-value p-value
## (Intercept) -0.743933  1.930037 142 -0.385450  0.7005
## GroupIN      4.233645  2.356335  46  1.796708  0.0789
## GroupBF      5.710611  2.320482  46  2.460960  0.0177
## GroupIF      0.986953  2.484393  46  0.397261  0.6930
## ActivityB    -2.489561  1.150049 142 -2.164743  0.0321
## ActivityDT   -3.145336  1.150049 142 -2.734958  0.0070
## ActivityP     5.448302  1.188657 142  4.583577  0.0000
## Correlation:
##      (Intr) GropIN GropBF GropIF ActvtB ActvDT
## GroupIN    -0.712
## GroupBF    -0.722  0.591
## GroupIF    -0.674  0.552  0.561
## ActivityB  -0.298  0.000  0.000  0.000
## ActivityDT -0.298  0.000  0.000  0.000  0.500
## ActivityP  -0.288  0.003 -0.003 -0.001  0.484  0.484
##
## Standardized Within-Group Residuals:
##      Min      Q1      Med      Q3      Max
## -3.33847227 -0.46637341  0.02242794  0.41112262  4.74698594
##
## Number of Observations: 195
## Number of Groups: 50
```

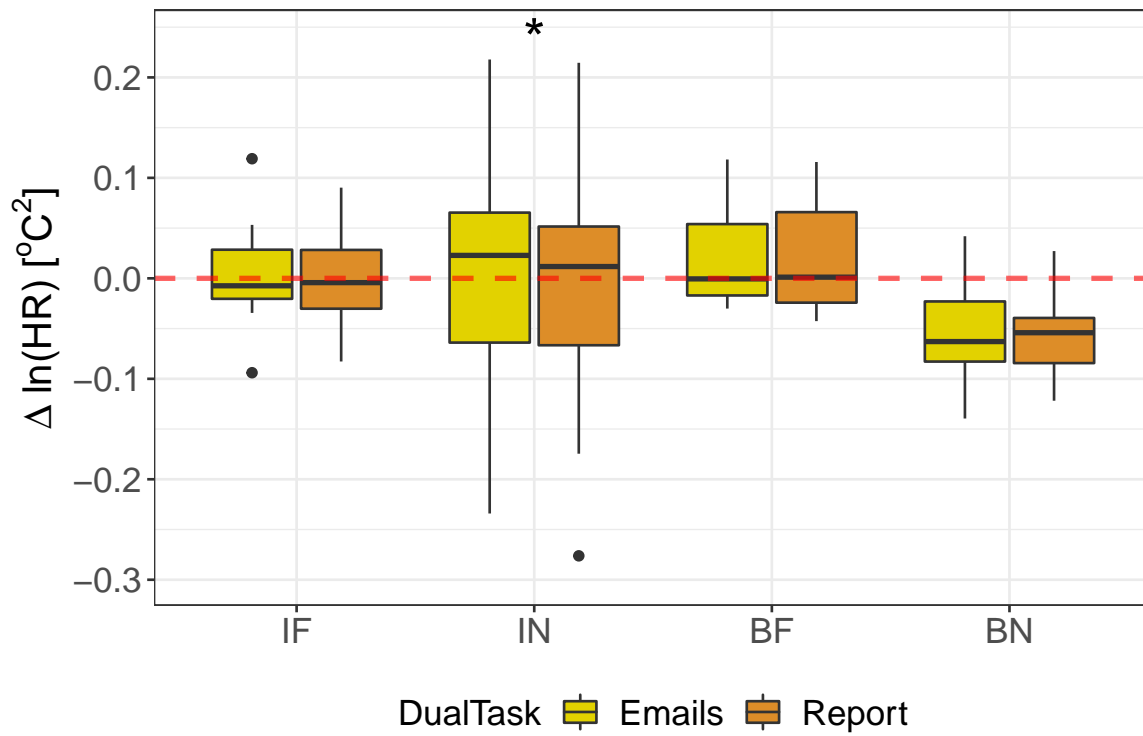


Stress Levels for Dual Task

Our Linear Model:

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

```
## Linear mixed-effects model fit by REML
## Data: total_df
##      AIC      BIC    logLik
## -307.1486 -289.4204 160.5743
##
## Random effects:
## Formula: ~1 | Subject
##      (Intercept)  Residual
## StdDev:  0.07321737 0.01583616
##
## Fixed effects: HR ~ 1 + Group + DualTask
##              Value Std.Error DF   t-value p-value
## (Intercept) -0.05379215 0.02347715 48 -2.291256  0.0264
## GroupIN      0.05116138 0.03066736 45  1.668268  0.1022
## GroupBF      0.07642950 0.03066736 45  2.492210  0.0164
## GroupIF      0.05853161 0.03236295 45  1.808599  0.0772
## DualTaskReport -0.00505697 0.00319939 48 -1.580607  0.1205
## Correlation:
##      (Intr) GropIN GropBF GropIF
## GroupIN      -0.762
## GroupBF      -0.762  0.583
## GroupIF      -0.722  0.553  0.553
## DualTaskReport -0.068  0.000  0.000  0.000
##
## Standardized Within-Group Residuals:
##      Min      Q1      Med      Q3      Max
## -1.81064732 -0.37964397  0.05307473  0.37177422  1.99938726
##
## Number of Observations: 98
## Number of Groups: 49
```



```
## Paired t-test
## For IF, p = 0.5041 > 0.05

## Paired t-test
## For IN, p = 0.0451 < 0.05  *

## Paired t-test
## For BF, p = 0.8961 > 0.05

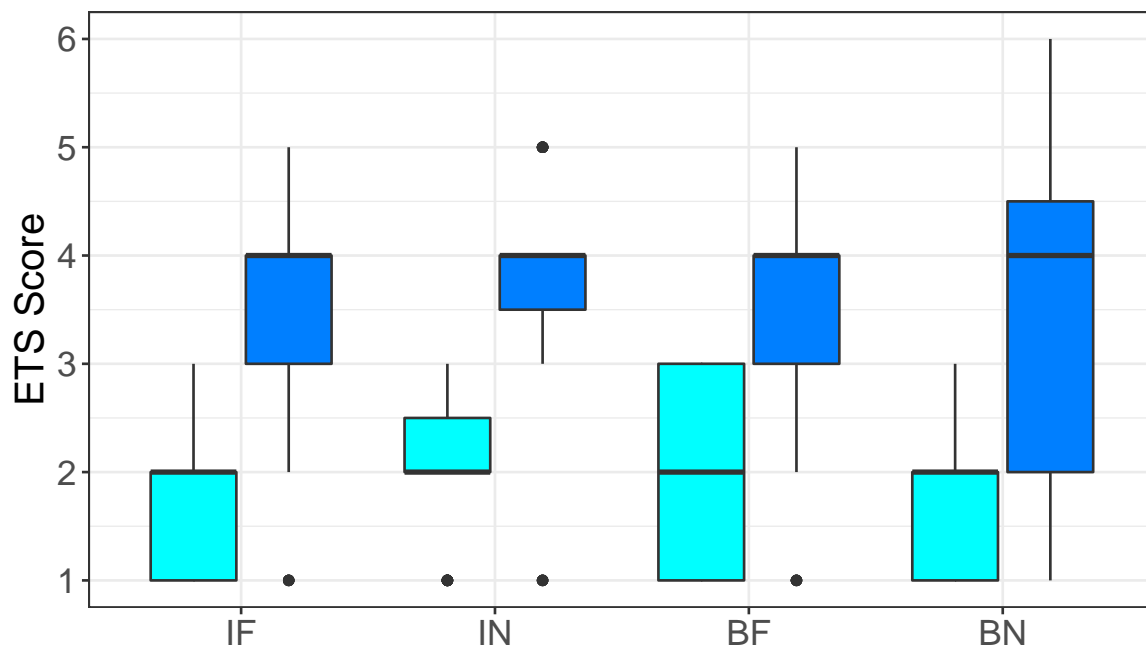
## Paired t-test
## For BN, p = 0.8016 > 0.05
```

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
##  981.0689 1009.628 -483.5344
##
## Random effects:
## Formula: ~1 | Subject
##      (Intercept)  Residual
## StdDev:      0.814411 0.6087496
##
## Fixed effects: Score ~ 1 + Group + Activity
##              Value Std.Error   DF   t-value p-value
## (Intercept) 1.7429787 0.2554519 386   6.823119  0.0000
## GroupIN      0.3174245 0.3342912  51   0.949545  0.3468
## GroupBF      0.2359883 0.3395694  51   0.694963  0.4902
## GroupIF      0.1486021 0.3356527  51   0.442726  0.6598
## ActivityDT   1.6787330 0.0579105 386  28.988391  0.0000
## Correlation:
##      (Intr) GropIN GropBF GropIF
## GroupIN    -0.754
## GroupBF    -0.743  0.567
## GroupIF    -0.751  0.574  0.565
## ActivityDT -0.113  0.000  0.000  0.000
##
## Standardized Within-Group Residuals:
##      Min      Q1      Med      Q3      Max
## -2.321866709 -0.505306825 -0.003345496  0.530827311  2.106111034
##
## Number of Observations: 442
## Number of Groups: 55
```



Activity ■ ST ■ DT

Activity	Group	n
ST	BN	47
ST	IN	63
ST	BF	56
ST	IF	55
DT	BN	47
DT	IN	63
DT	BF	56
DT	IF	55

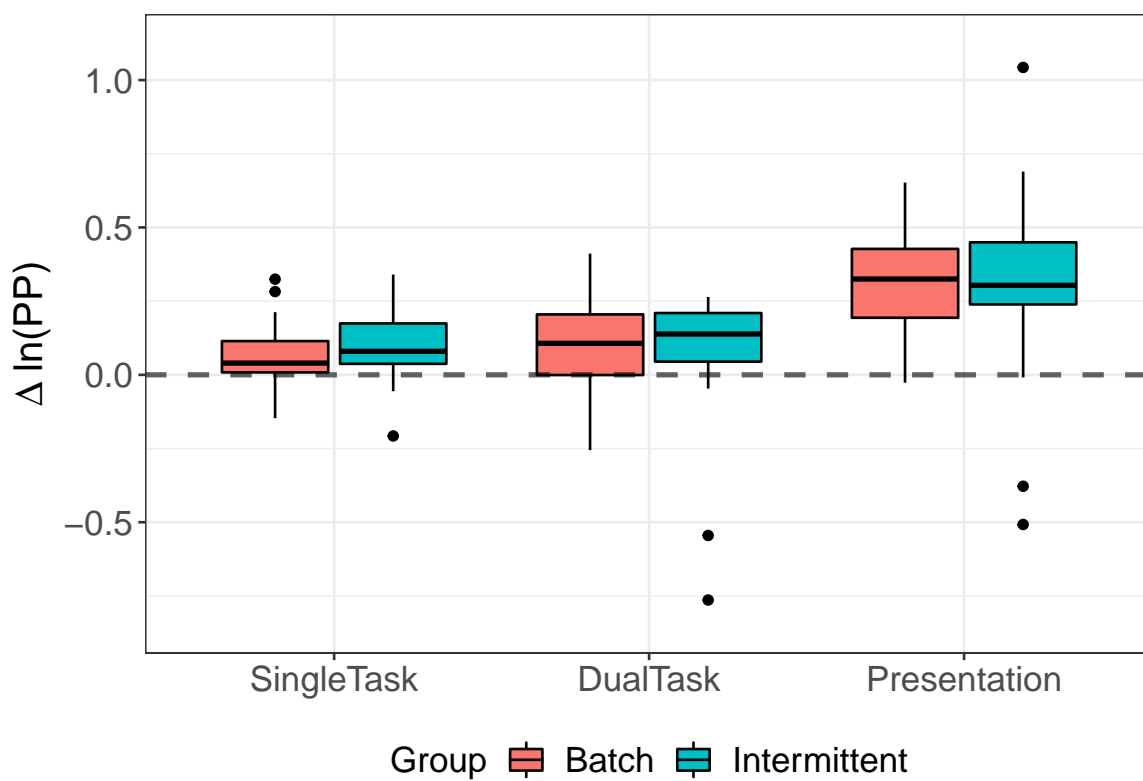
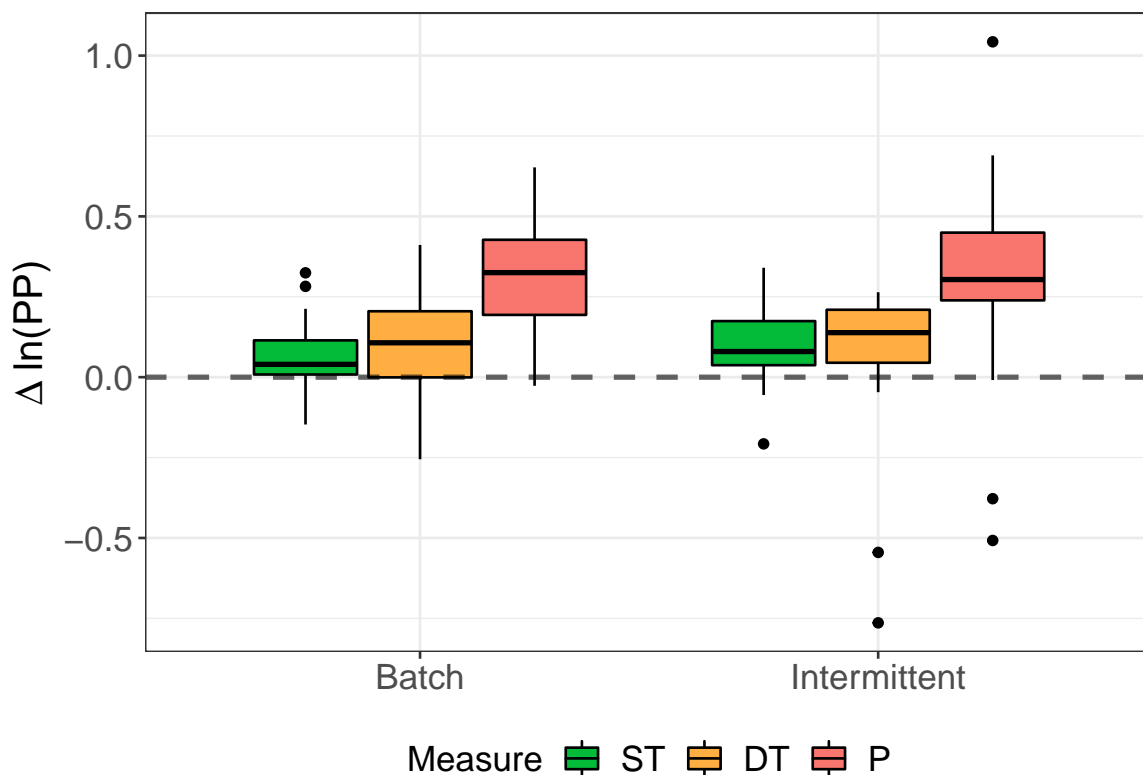
PP, 2 Groups:

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
## -174.6324 -150.4451 94.31618
##
## Random effects:
## Formula: ~1 | Subject
##      (Intercept) Residual
## StdDev:    0.1340924 0.1251043
##
## Fixed effects: PP ~ 1 + Group + Activity
##              Value Std.Error DF   t-value p-value
## (Intercept)  0.07594154 0.03127138 176   2.428468  0.0162
## GroupIntermittent 0.00923660 0.03830548  58   0.241130  0.8103
## ActivityB      -0.04699852 0.02284082 176  -2.057655  0.0411
## ActivityDT      0.00841038 0.02284082 176   0.368217  0.7132
## ActivityP       0.23400636 0.02296238 176  10.190857  0.0000
## Correlation:
##              (Intr) GrpInt ActvtB ActvDT
## GroupIntermittent -0.653
## ActivityB          -0.365  0.000
## ActivityDT          -0.365  0.000  0.500
## ActivityP          -0.365  0.003  0.497  0.497
##
## Standardized Within-Group Residuals:
##      Min      Q1      Med      Q3      Max
## -3.70090206 -0.38874392 -0.05276656  0.43831677  4.34215210
##
## Number of Observations: 239
## Number of Groups: 60
```

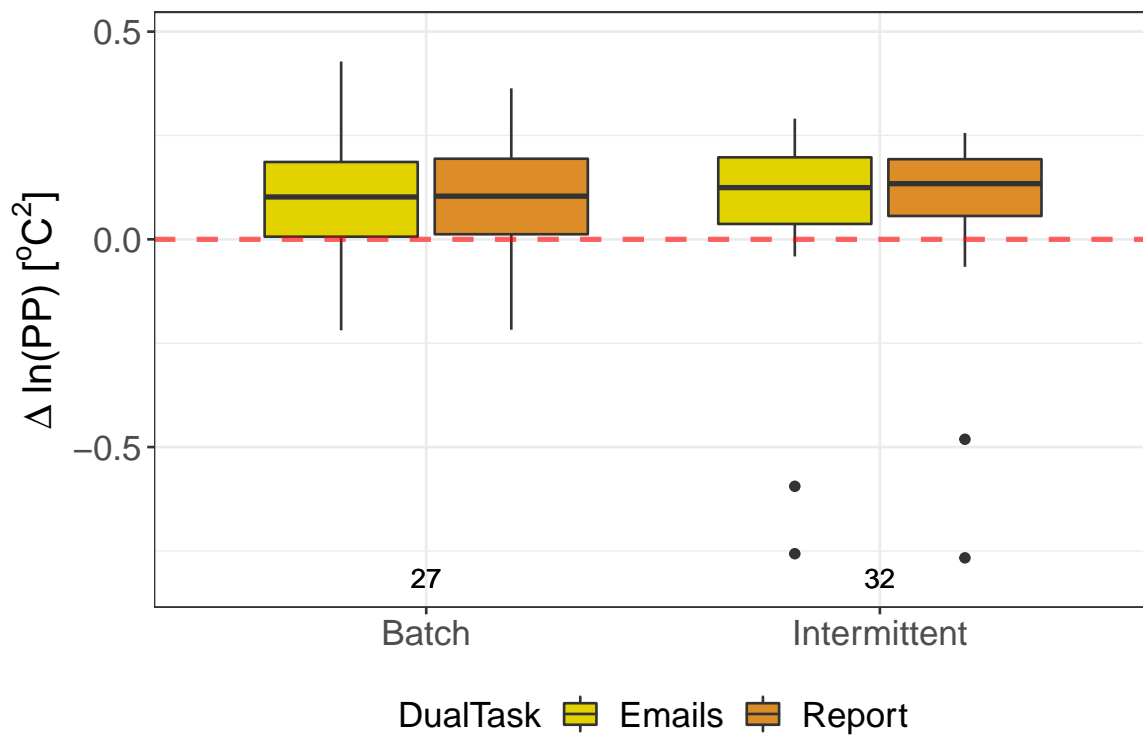


Stress Levels for Dual Task

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
## -229.6528 -215.9282 119.8264
##
## Random effects:
## Formula: ~1 | Subject
##      (Intercept)  Residual
## StdDev:    0.1824825 0.02592463
##
## Fixed effects: PP ~ 1 + Group + DualTask
##              Value Std.Error DF   t-value p-value
## (Intercept)    0.09865731 0.03537612 58  2.7888109  0.0071
## GroupIntermittent -0.01712269 0.04792595 57 -0.3572740  0.7222
## DualTaskReport    0.00100238 0.00477311 58  0.2100048  0.8344
## Correlation:
##              (Intr) GrpInt
## GroupIntermittent -0.735
## DualTaskReport    -0.067  0.000
##
## Standardized Within-Group Residuals:
##      Min      Q1      Med      Q3      Max
## -2.40264073 -0.41511733 -0.01463149  0.36467698  1.92486177
##
## Number of Observations: 118
## Number of Groups: 59
```



```
## Paired t-test
## For Batch, p = 0.8458 > 0.05

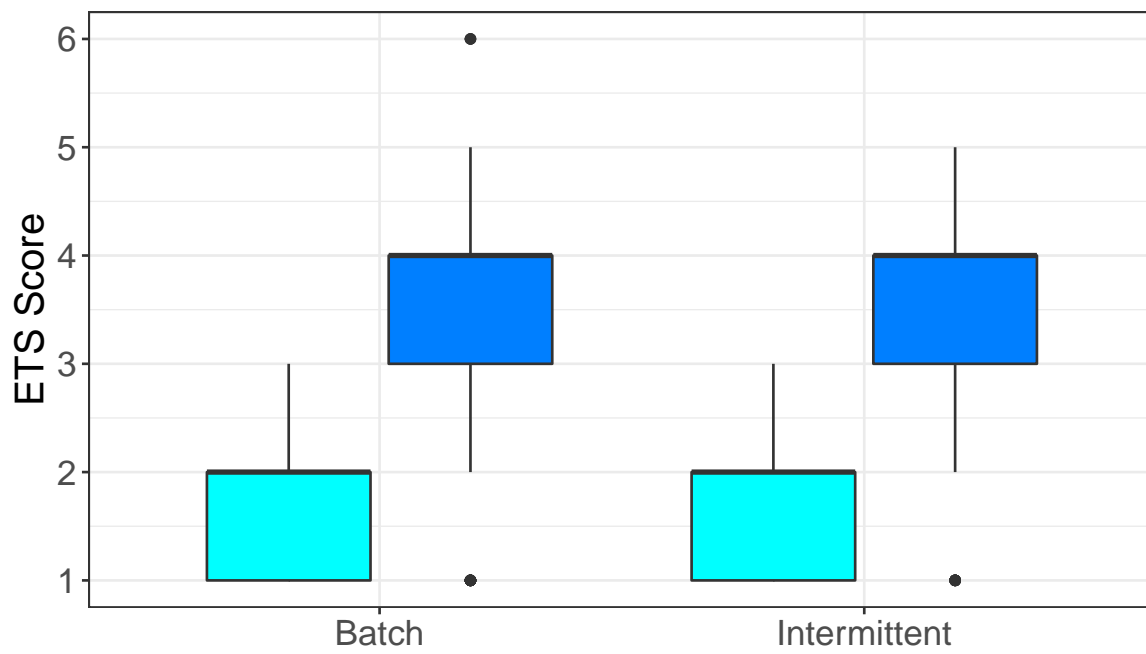
## Paired t-test
## For Intermittent, p = 0.5569 > 0.05
```

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
##  977.2116 997.6341 -483.6058
##
## Random effects:
## Formula: ~1 | Subject
##      (Intercept)  Residual
## StdDev:    0.8064131 0.6087033
##
## Fixed effects: Score ~ 1 + Group + Activity
##              Value Std.Error DF   t-value p-value
## (Intercept)   1.9258824 0.16620476 386 11.587408 0.0000
## GroupIntermittent 0.0081728 0.22606216 53  0.036153 0.9713
## ActivityDT       1.6787330 0.05790613 386 28.990593 0.0000
## Correlation:
##              (Intr) GrpInt
## GroupIntermittent -0.713
## ActivityDT        -0.174 0.000
##
## Standardized Within-Group Residuals:
##      Min      Q1      Med      Q3      Max
## -2.31313111 -0.49317975 -0.01265276  0.52538636  2.08831290
##
## Number of Observations: 442
## Number of Groups: 55
```



Activity  ST  DT

Activity	Group	n
ST	Batch	110
ST	Intermittent	111
DT	Batch	110
DT	Intermittent	111

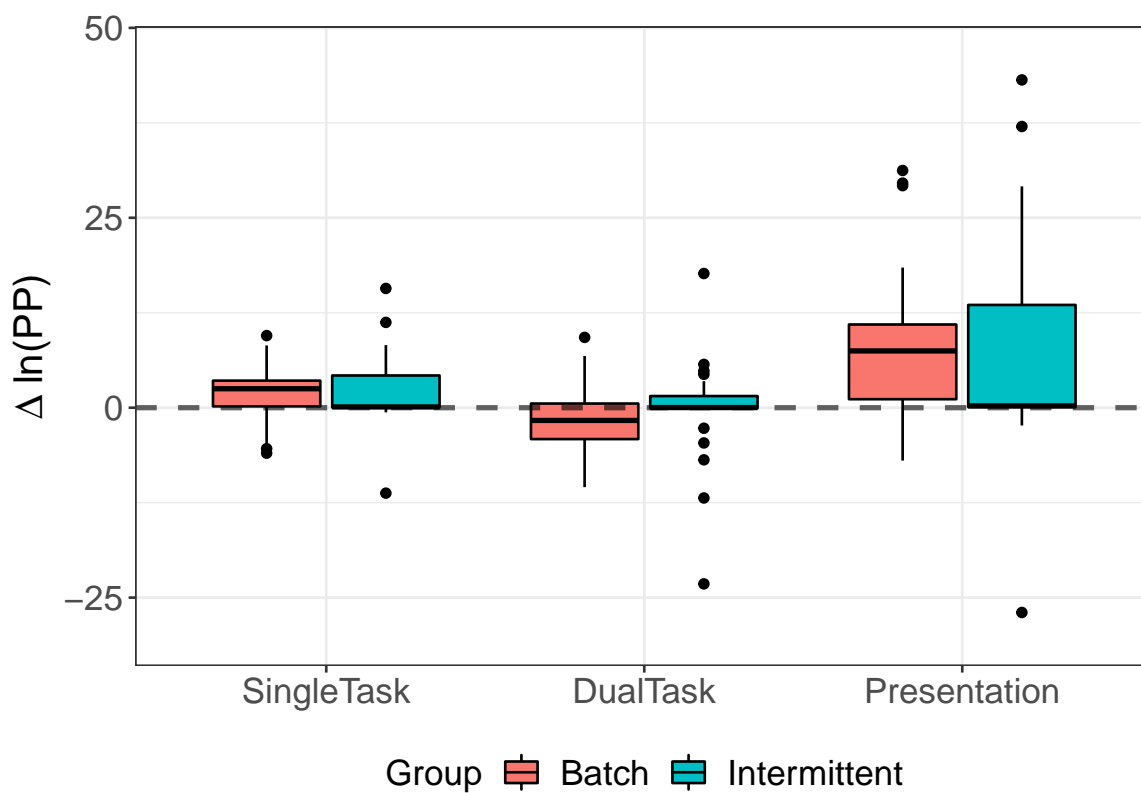
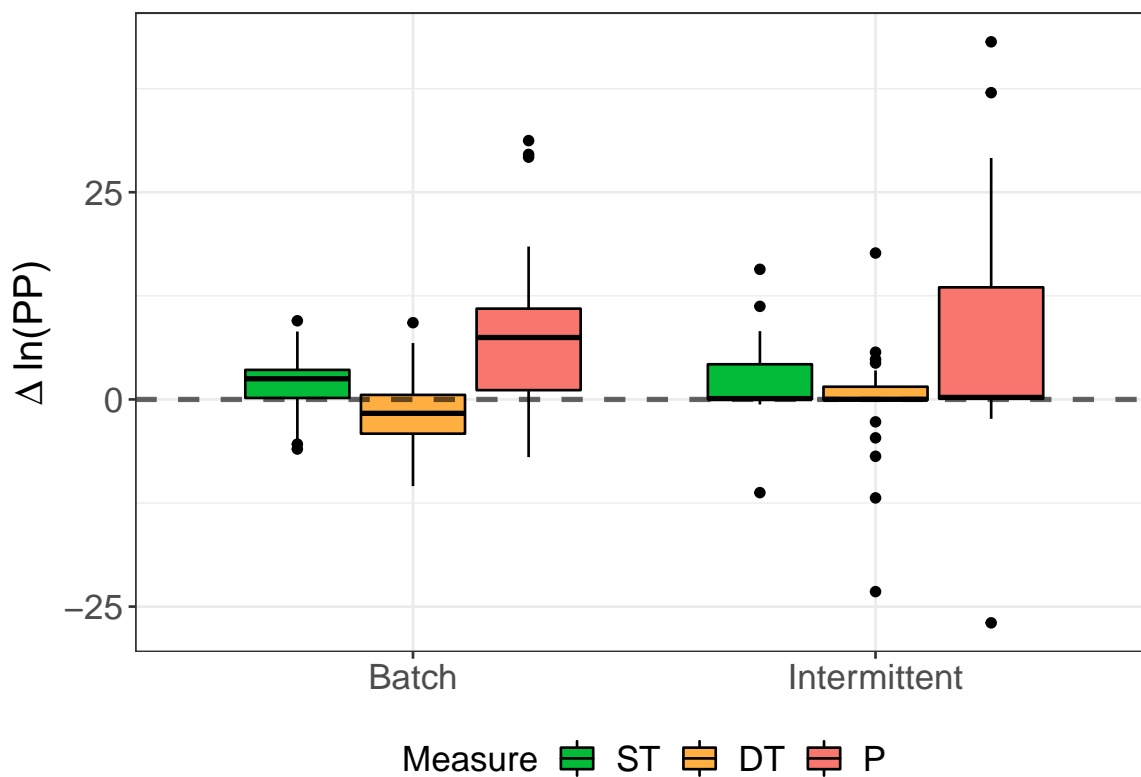
HR, 2 Groups:

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
## 1307.122 1329.852 -646.5612
##
## Random effects:
## Formula: ~1 | Subject
##      (Intercept) Residual
## StdDev:      5.288851 5.748322
##
## Fixed effects: HR ~ 1 + Group + Activity
##              Value Std.Error DF   t-value p-value
## (Intercept)   2.687030  1.396473 142   1.924155  0.0563
## GroupIntermittent -0.630458  1.708605  48  -0.368990  0.7138
## ActivityB        -2.489561  1.149665 142  -2.165468  0.0320
## ActivityDT        -3.145336  1.149665 142  -2.735873  0.0070
## ActivityP         5.453503  1.188591 142   4.588209  0.0000
## Correlation:
##              (Intr) GrpInt ActvtB ActvDT
## GroupIntermittent -0.612
## ActivityB          -0.412  0.000
## ActivityDT         -0.412  0.000  0.500
## ActivityP          -0.401  0.005  0.484  0.484
##
## Standardized Within-Group Residuals:
##      Min      Q1      Med      Q3      Max
## -3.16749184 -0.43984930 -0.01692908  0.34907583  4.75663392
##
## Number of Observations: 195
## Number of Groups: 50
```

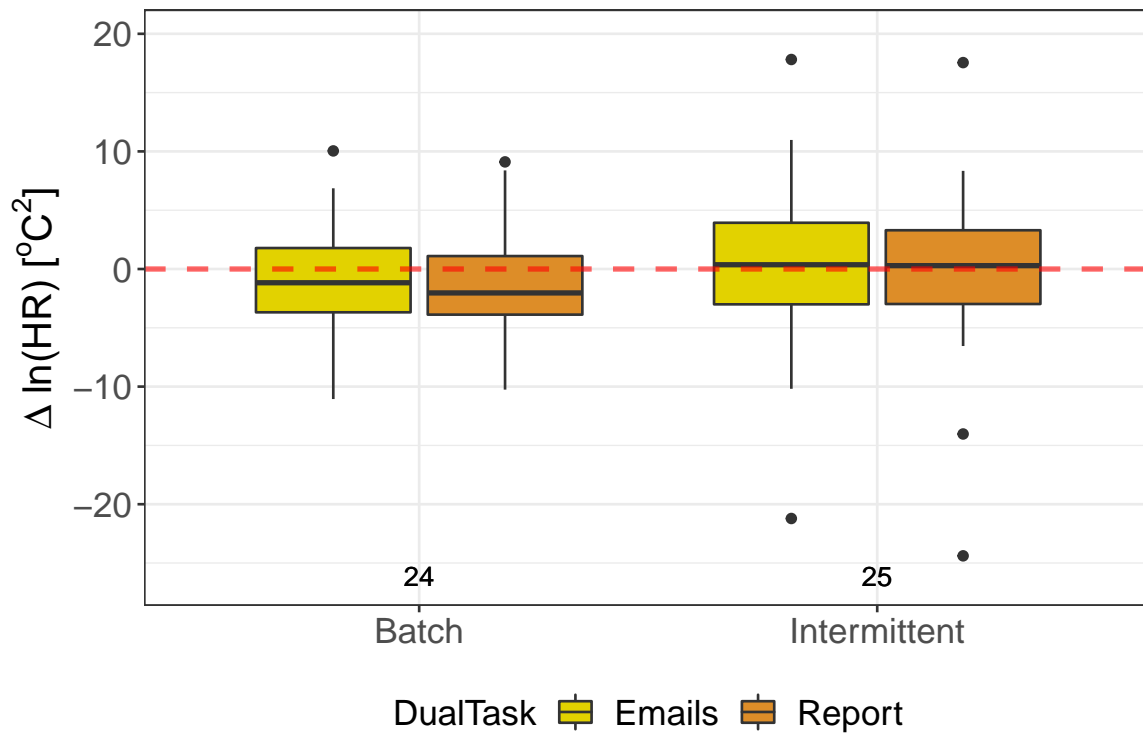



Stress Levels for Dual Task

Our Linear Model:

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

```
## Linear mixed-effects model fit by REML
## Data: total_df
##      AIC      BIC    logLik
##  515.109 527.8784 -252.5545
##
## Random effects:
## Formula: ~1 | Subject
##      (Intercept) Residual
## StdDev:      6.261633 1.214272
##
## Fixed effects: HR ~ 1 + Group + DualTask
##              Value Std.Error DF   t-value p-value
## (Intercept)  -0.8172903 1.2959290 48 -0.6306598  0.5313
## GroupIntermittent  0.6449150 1.8061555 47  0.3570651  0.7226
## DualTaskReport   -0.3475312 0.2453199 48 -1.4166449  0.1630
## Correlation:
##              (Intr) GrpInt
## GroupIntermittent -0.711
## DualTaskReport   -0.095  0.000
##
## Standardized Within-Group Residuals:
##      Min      Q1      Med      Q3      Max
## -1.97941501 -0.39621002  0.02999632  0.36759267  2.21433516
##
## Number of Observations: 98
## Number of Groups: 49
```



```
## Paired t-test
## For Batch, p = 0.8238 > 0.05

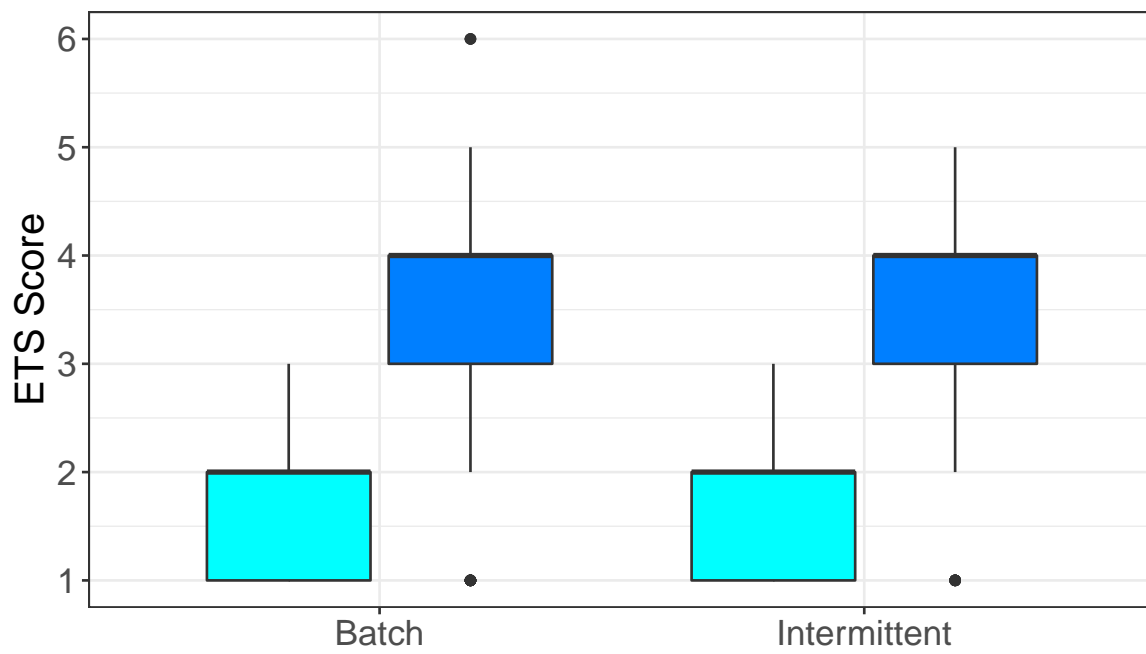
## Paired t-test
## For Intermittent, p = 0.0568 > 0.05
```

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
##  977.2116 997.6341 -483.6058
##
## Random effects:
## Formula: ~1 | Subject
##      (Intercept) Residual
## StdDev:   0.8064131 0.6087033
##
## Fixed effects: Score ~ 1 + Group + Activity
##              Value Std.Error DF   t-value p-value
## (Intercept)   1.9258824 0.16620476 386 11.587408  0.0000
## GroupIntermittent 0.0081728 0.22606216  53  0.036153  0.9713
## ActivityDT      1.6787330 0.05790613 386 28.990593  0.0000
## Correlation:
##              (Intr) GrpInt
## GroupIntermittent -0.713
## ActivityDT        -0.174  0.000
##
## Standardized Within-Group Residuals:
##      Min      Q1      Med      Q3      Max
## -2.31313111 -0.49317975 -0.01265276  0.52538636  2.08831290
##
## Number of Observations: 442
## Number of Groups: 55
```



Activity ■ ST ■ DT

Activity	Group	n
ST	Batch	110
ST	Intermittent	111
DT	Batch	110
DT	Intermittent	111

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
##   -76.50526 -55.35014 46.25263
##
## Random effects:
## Formula: ~1 | Subject
##      (Intercept) Residual
## StdDev:    0.1164717 0.1029231
##
## Fixed effects: PP ~ 1 + ETSScore + Group + Activity
##              Value Std.Error DF   t-value p-value
## (Intercept)  0.04374639 0.04897322 53  0.8932717  0.3757
## ETSScore    -0.00201482 0.01403069 53 -0.1436011  0.8864
## GroupIN      0.02821115 0.05469037 51  0.5158339  0.6082
## GroupBF      0.03893072 0.05543023 51  0.7023372  0.4857
## GroupIF      0.06249255 0.05455477 51  1.1455012  0.2573
## ActivityDT   0.00815219 0.03118546 53  0.2614101  0.7948
## Correlation:
##      (Intr) ETSScr GropIN GropBF GropIF
## ETSScore   -0.495
## GroupIN    -0.601 -0.079
## GroupBF    -0.603 -0.058  0.570
## GroupIF    -0.624 -0.037  0.578  0.569
## ActivityDT  0.258 -0.777  0.062  0.045  0.028
##
## Standardized Within-Group Residuals:
##      Min      Q1      Med      Q3      Max
## -4.24667880 -0.25108095 -0.01988641  0.36841233  2.19759445
##
## Number of Observations: 110
## Number of Groups: 55
```

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 0.0269  0.02686    0.776   0.382
## IntermittentFactor 1 0.0019  0.00189    0.055   0.816
## Residuals      57 1.9716  0.03459

##  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 0.04240834 -0.05396565 0.1387823 0.3819299
##
## $IntermittentFactor
##           diff           lwr           upr           p adj
## Intermittent-Non-Intermittent -0.01121741 -0.1075914 0.08515658 0.8165372
```

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

Our Linear Model:

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

```
## Linear mixed-effects model fit by REML
## Data: diff_df
##      AIC      BIC logLik
## -10.504 -0.2887397 10.252
##
## Random effects:
## Formula: ~1 | Subject
##      (Intercept)  Residual
## StdDev:    0.1741412 0.06530311
##
## Fixed effects: PP ~ 1 + StressFactor + IntermittentFactor
##              Value Std.Error DF   t-value
## (Intercept)    0.07310314 0.04467167 57  1.6364543
## StressFactorHigh    0.04160299 0.04825092 57  0.8622218
## IntermittentFactorIntermittent -0.01127494 0.04825092 57 -0.2336731
##              p-value
## (Intercept)    0.1073
## StressFactorHigh    0.3922
## IntermittentFactorIntermittent 0.8161
## Correlation:
##              (Intr) StrsFH
## StressFactorHigh    -0.617
## IntermittentFactorIntermittent -0.617 0.071
##
## Standardized Within-Group Residuals:
##      Min      Q1      Med      Q3      Max
## -1.55894398 -0.12779499 0.05703779 0.21015290 0.55957653
##
## Number of Observations: 60
## Number of Groups: 60
```


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 0.0269 0.02686   0.770  0.384
## IntermittentFactor            1 0.0019 0.00189   0.054  0.817
## StressFactor:IntermittentFactor 1 0.0173 0.01729   0.496  0.484
## Residuals                     56 1.9543 0.03490

## 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 0.04240834 -0.05443244 0.1392491 0.3840959
##
## $IntermittentFactor
##           diff           lwr           upr           p adj
## Intermittent-Non-Intermittent -0.01121741 -0.1080582 0.08562337 0.8173509
##
## $`StressFactor:IntermittentFactor`
##           diff           lwr
## High:Non-Intermittent-Low:Non-Intermittent 0.004751779 -0.1841480
## Low:Intermittent-Low:Non-Intermittent -0.048126152 -0.2370259
## High:Intermittent-Low:Non-Intermittent 0.025063592 -0.1638362
## Low:Intermittent-High:Non-Intermittent -0.052877931 -0.2277651
## High:Intermittent-High:Non-Intermittent 0.020311813 -0.1545754
## High:Intermittent-Low:Intermittent 0.073189744 -0.1016975
##           upr           p adj
## High:Non-Intermittent-Low:Non-Intermittent 0.1936516 0.9998926
## Low:Intermittent-Low:Non-Intermittent 0.1407736 0.9062671
## High:Intermittent-Low:Non-Intermittent 0.2139634 0.9849637
## Low:Intermittent-High:Non-Intermittent 0.1220093 0.8538386
## High:Intermittent-High:Non-Intermittent 0.1951990 0.9898006
## High:Intermittent-Low:Intermittent 0.2480770 0.6860706
```

Appendix

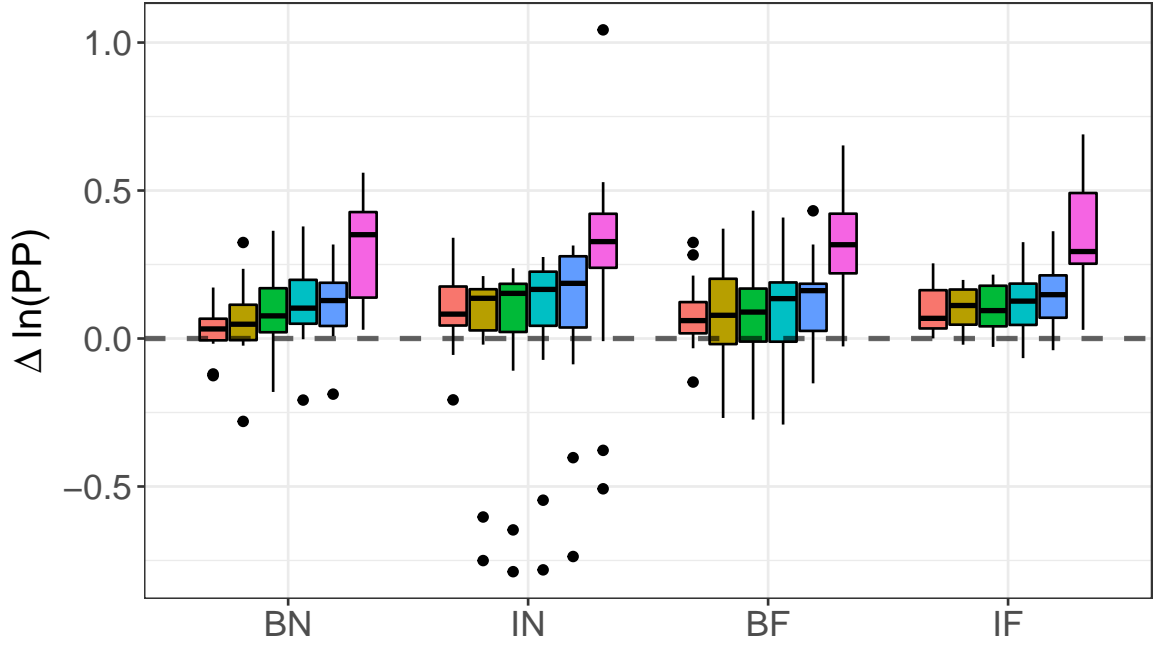
PP, 4 Groups, 4 Dual Task Sessions:

Stress Levels Across Activities

Our Linear Model:

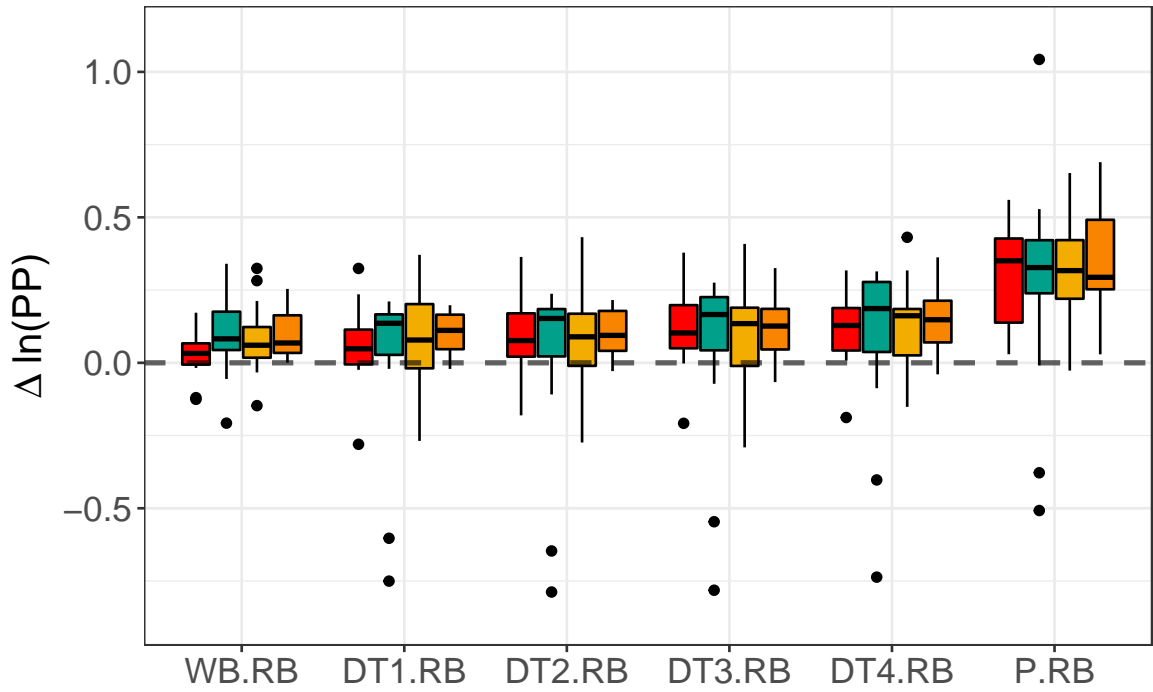
$$\Delta \ln(\bar{P}P) = 1 + \text{Group} + \text{Activity} + 1|\text{Subject}$$

```
## Linear mixed-effects model fit by REML
## Data: diff_df
##      AIC      BIC    logLik
## -477.5165 -429.3519 250.7583
##
## Random effects:
## Formula: ~1 | Subject
##      (Intercept) Residual
## StdDev:    0.1569978 0.1025041
##
## Fixed effects: PP ~ 1 + Group + Activity
##              Value Std.Error DF   t-value p-value
## (Intercept)  0.06909868 0.04826265 353   1.431722  0.1531
## GroupIN      -0.01965264 0.06176107  56  -0.318204  0.7515
## GroupBF       0.02185430 0.06175310  56   0.353898  0.7247
## GroupIF       0.04193225 0.06175310  56   0.679031  0.4999
## ActivityB     -0.04699852 0.01871461 353  -2.511328  0.0125
## ActivityDT1   -0.01585108 0.01871461 353  -0.846990  0.3976
## ActivityDT2   -0.00652683 0.01871461 353  -0.348756  0.7275
## ActivityDT3    0.01518141 0.01871461 353   0.811207  0.4178
## ActivityDT4    0.03806629 0.01871461 353   2.034041  0.0427
## ActivityP      0.23395609 0.01880606 353  12.440460  0.0000
## Correlation:
##      (Intr) GroptIN GroptBF GroptIF ActvtB ActDT1 ActDT2 ActDT3 ActDT4
## GroupIN      -0.731
## GroupBF      -0.731  0.571
## GroupIF      -0.731  0.571  0.571
## ActivityB     -0.194  0.000  0.000  0.000
## ActivityDT1   -0.194  0.000  0.000  0.000  0.500
## ActivityDT2   -0.194  0.000  0.000  0.000  0.500  0.500
## ActivityDT3   -0.194  0.000  0.000  0.000  0.500  0.500  0.500
## ActivityDT4   -0.194  0.000  0.000  0.000  0.500  0.500  0.500  0.500
## ActivityP     -0.193  0.002  0.000  0.000  0.498  0.498  0.498  0.498  0.498
##
## Standardized Within-Group Residuals:
##      Min      Q1      Med      Q3      Max
## -3.180577387 -0.411127070 -0.003950401  0.375143350  5.460754174
##
## Number of Observations: 419
## Number of Groups: 60
```



Measure

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



Group

- BN
- IN
- BF
- IF

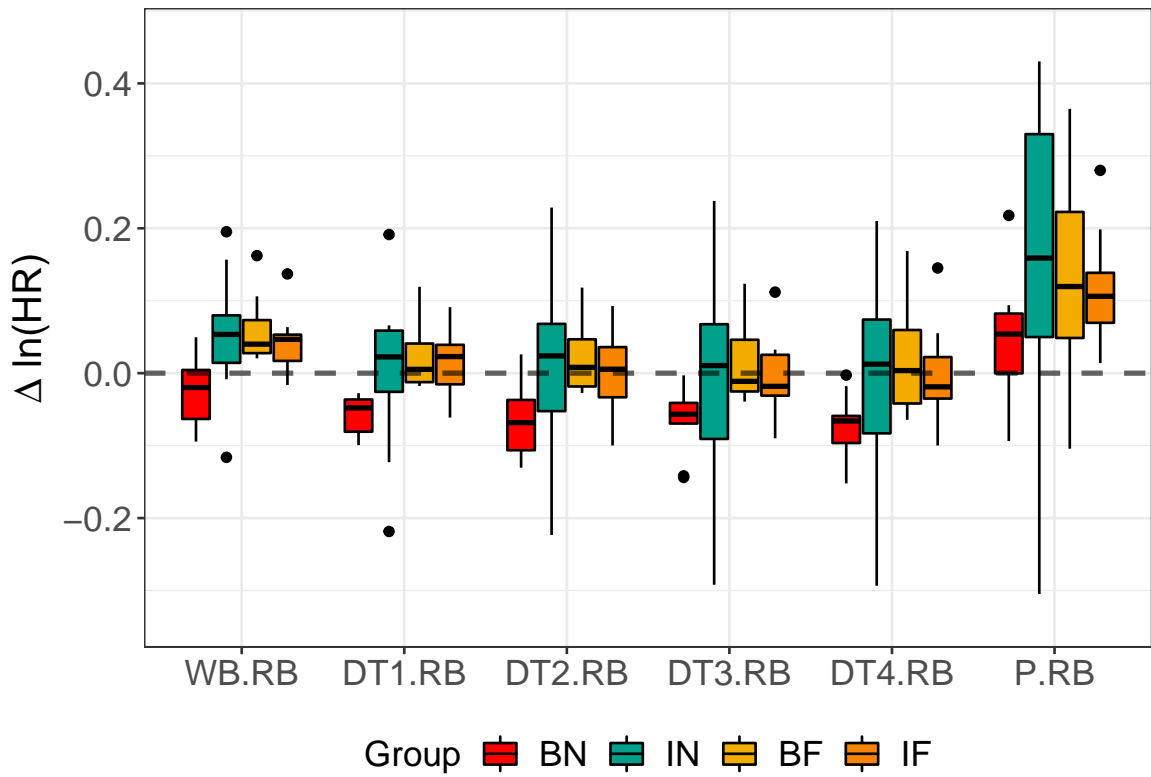
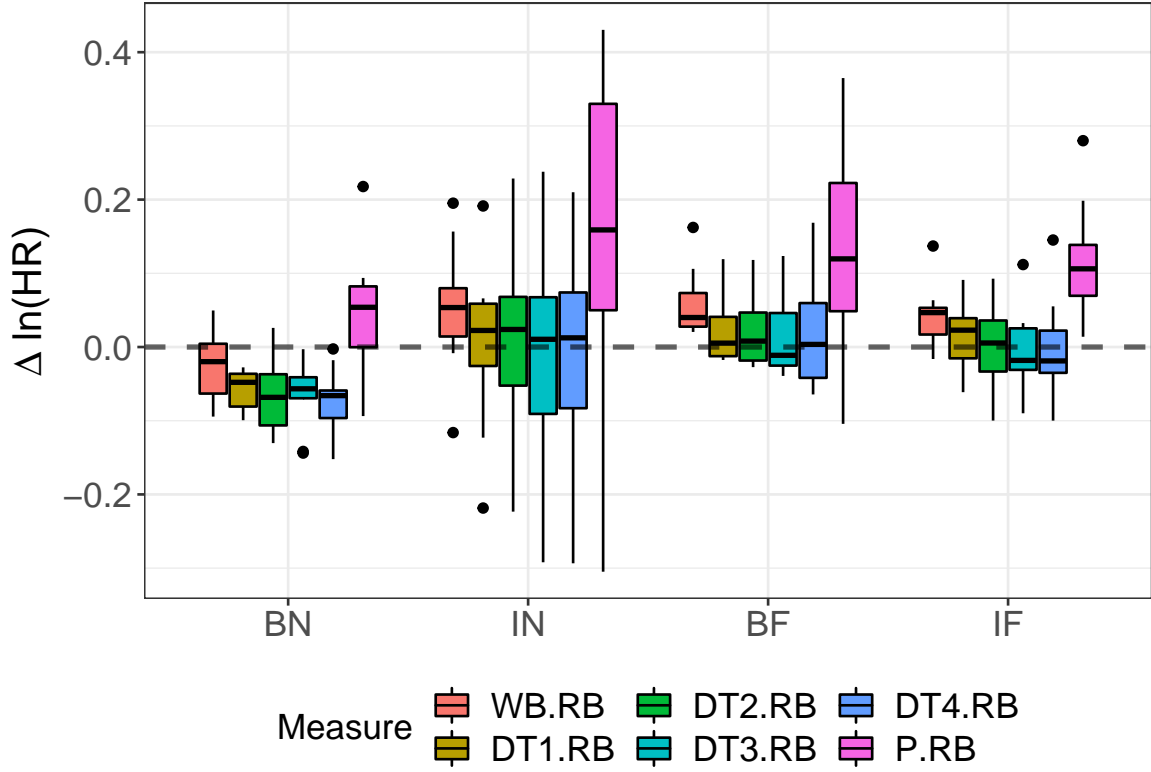
HR, 4 Groups, 4 Dual Task Sessions:

Stress Levels Across Activities

Our Linear Model:

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

```
## Linear mixed-effects model fit by REML
## Data: diff_df
##      AIC      BIC    logLik
## -852.8929 -807.1234 438.4465
##
## Random effects:
## Formula: ~1 | Subject
##      (Intercept)   Residual
## StdDev:  0.06657182 0.05188056
##
## Fixed effects: HR ~ 1 + Group + Activity
##              Value Std.Error DF   t-value p-value
## (Intercept) -0.00982019 0.02298435 289 -0.427256  0.6695
## GroupIN      0.05282378 0.02875652  46  1.836933  0.0727
## GroupBF      0.07248112 0.02834848  46  2.556791  0.0139
## GroupIF      0.05544926 0.03034198  46  1.827477  0.0741
## ActivityB    -0.03396378 0.01037611 289 -3.273266  0.0012
## ActivityDT1 -0.03802933 0.01037611 289 -3.665084  0.0003
## ActivityDT2 -0.04340130 0.01037611 289 -4.182809  0.0000
## ActivityDT3 -0.05124927 0.01037611 289 -4.939160  0.0000
## ActivityDT4 -0.05024100 0.01037611 289 -4.841987  0.0000
## ActivityP     0.08018826 0.01070286 289  7.492230  0.0000
## Correlation:
##      (Intr) GropIN GropBF GropIF ActvtB ActDT1 ActDT2 ActDT3 ActDT4
## GroupIN    -0.730
## GroupBF    -0.740  0.592
## GroupIF    -0.692  0.553  0.561
## ActivityB  -0.226  0.000  0.000  0.000
## ActivityDT1 -0.226  0.000  0.000  0.000  0.500
## ActivityDT2 -0.226  0.000  0.000  0.000  0.500  0.500
## ActivityDT3 -0.226  0.000  0.000  0.000  0.500  0.500  0.500
## ActivityDT4 -0.226  0.000  0.000  0.000  0.500  0.500  0.500  0.500
## ActivityP   -0.219  0.001 -0.001  0.000  0.485  0.485  0.485  0.485  0.485
##
## Standardized Within-Group Residuals:
##      Min      Q1      Med      Q3      Max
## -3.76926552 -0.46026564 -0.01842998  0.38299620  4.85683975
##
## Number of Observations: 345
## Number of Groups: 50
```



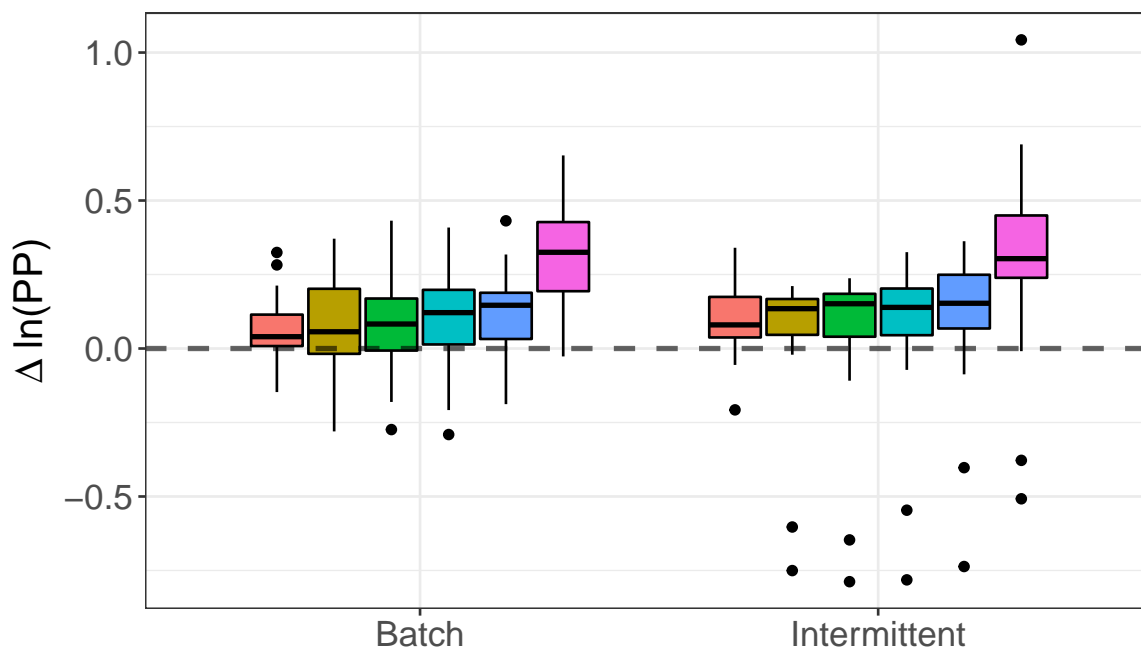
PP, 2 Groups, 4 Dual Task Sessions:

Stress Levels Across Activities

Our Linear Model:

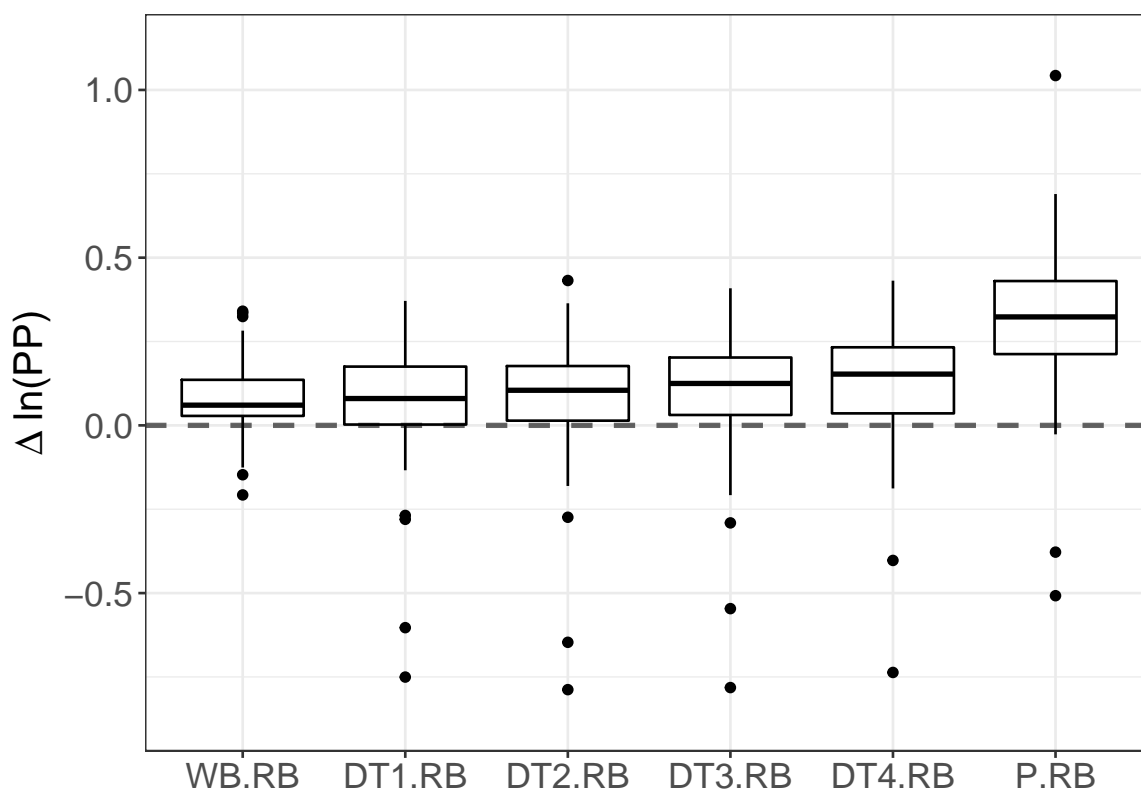
$$\Delta \ln(\bar{P}P) = 1 + \text{Group} + \text{Activity} + 1|\text{Subject}$$

```
## Linear mixed-effects model fit by REML
## Data: diff_df
##      AIC      BIC    logLik
## -487.8523 -447.6663 253.9261
##
## Random effects:
## Formula: ~1 | Subject
##      (Intercept) Residual
## StdDev:    0.1559704 0.1025039
##
## Fixed effects: PP ~ 1 + Group + Activity
##              Value Std.Error DF   t-value p-value
## (Intercept)   0.08158198 0.03275044 353   2.491019  0.0132
## GroupIntermittent -0.00133925 0.04159069  58  -0.032201  0.9744
## ActivityB       -0.04699852 0.01871456 353  -2.511334  0.0125
## ActivityDT1     -0.01585108 0.01871456 353  -0.846992  0.3976
## ActivityDT2     -0.00652683 0.01871456 353  -0.348757  0.7275
## ActivityDT3      0.01518141 0.01871456 353   0.811208  0.4178
## ActivityDT4      0.03806629 0.01871456 353   2.034046  0.0427
## ActivityP       0.23399014 0.01880598 353  12.442325  0.0000
## Correlation:
##              (Intr) GrpInt ActvtB ActDT1 ActDT2 ActDT3 ActDT4
## GroupIntermittent -0.677
## ActivityB         -0.286  0.000
## ActivityDT1       -0.286  0.000  0.500
## ActivityDT2       -0.286  0.000  0.500  0.500
## ActivityDT3       -0.286  0.000  0.500  0.500  0.500
## ActivityDT4       -0.286  0.000  0.500  0.500  0.500  0.500
## ActivityP         -0.285  0.001  0.498  0.498  0.498  0.498  0.498
##
## Standardized Within-Group Residuals:
##              Min           Q1           Med           Q3           Max
## -3.201772142 -0.418220176 -0.009973628  0.372296166  5.444495754
##
## Number of Observations: 419
## Number of Groups: 60
```



Measure

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



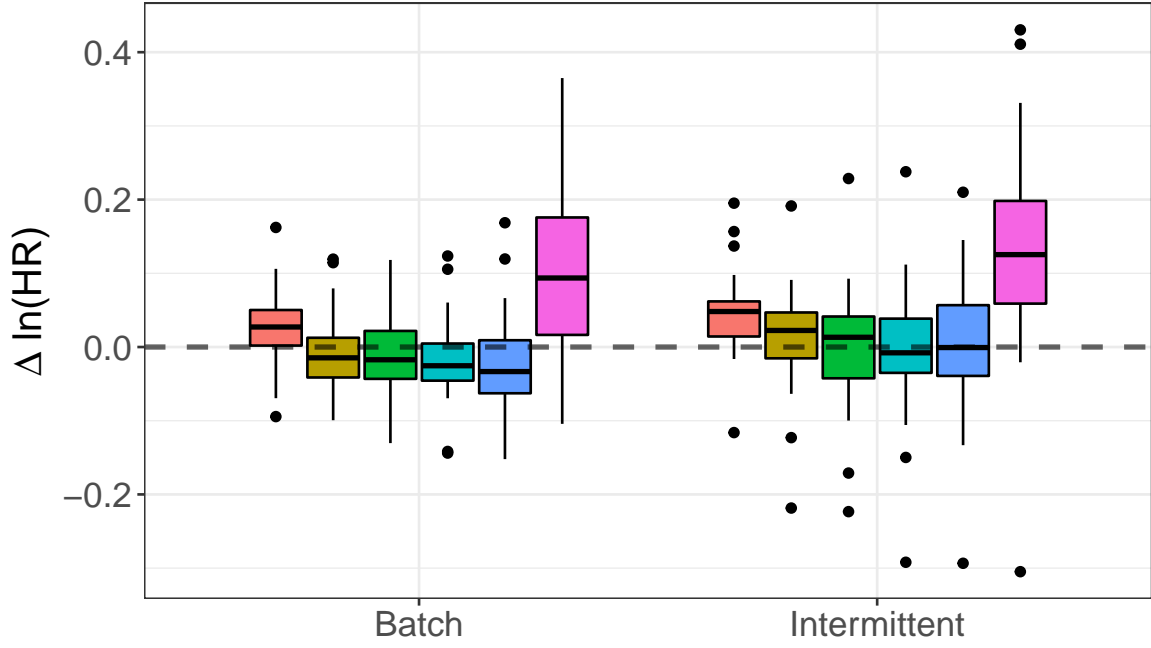
HR, 2 Groups, 4 Dual Task Sessions:

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
## -861.1544 -822.9535 440.5772
##
## Random effects:
## Formula: ~1 | Subject
##      (Intercept)   Residual
## StdDev:  0.06993124 0.05187893
##
## Fixed effects: HR ~ 1 + Group + Activity
##              Value Std.Error DF   t-value p-value
## (Intercept)  0.03367372 0.01603935 289   2.099444  0.0366
## GroupIntermittent 0.01047984 0.02055478  48   0.509850  0.6125
## ActivityB      -0.03396378 0.01037579 289  -3.273369  0.0012
## ActivityDT1     -0.03802933 0.01037579 289  -3.665200  0.0003
## ActivityDT2     -0.04340130 0.01037579 289  -4.182941  0.0000
## ActivityDT3     -0.05124927 0.01037579 289  -4.939315  0.0000
## ActivityDT4     -0.05024100 0.01037579 289  -4.842139  0.0000
## ActivityP       0.08022767 0.01070287 289   7.495906  0.0000
## Correlation:
##              (Intr) GrpInt ActvtB ActDT1 ActDT2 ActDT3 ActDT4
## GroupIntermittent -0.641
## ActivityB          -0.323  0.000
## ActivityDT1        -0.323  0.000  0.500
## ActivityDT2        -0.323  0.000  0.500  0.500
## ActivityDT3        -0.323  0.000  0.500  0.500  0.500
## ActivityDT4        -0.323  0.000  0.500  0.500  0.500  0.500
## ActivityP          -0.315  0.002  0.485  0.485  0.485  0.485  0.485
##
## Standardized Within-Group Residuals:
##      Min      Q1      Med      Q3      Max
## -3.73783958 -0.45000129 -0.02764217  0.38781952  4.84669373
##
## Number of Observations: 345
## Number of Groups: 50
```



Measure

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

