

Surprise study pilot 15

Marjan Biria

2024-02-07

Study description

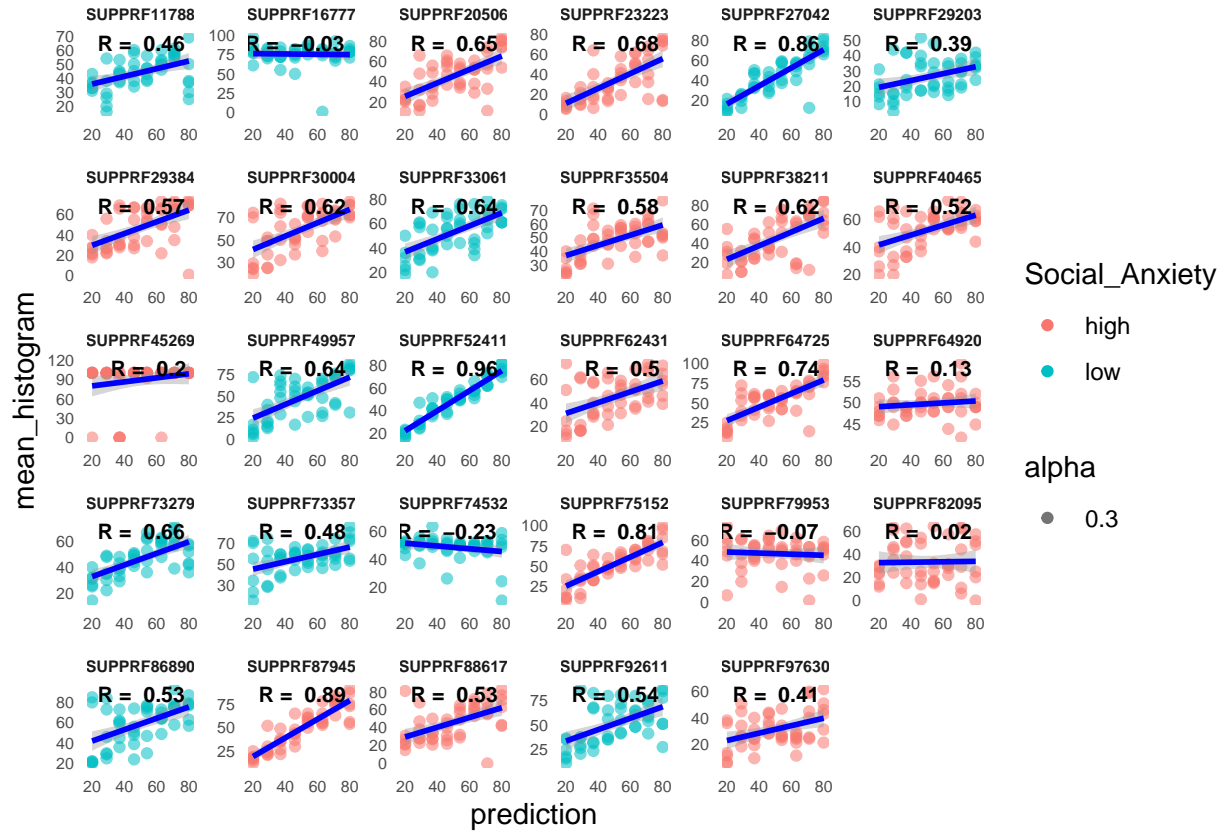
This study is the same as pilot 14, but we brought the old judge pictures back, and changed the narrative around public speaking. Instead we say “getting better at speaking to others”. There have been few other changes such as saying the judge will rate “you” rather than “your description” as we have made the task more social by sharing some criteria they will be rated on that are not just about the description. There have been other minor edits to make the instructions read better and change font sizes etc.

The Gorilla experiment is the following: <https://app.gorilla.sc/admin/project/125338> The task is the following: <https://app.gorilla.sc/admin/task/768786/editor>

```
## # A tibble: 29 x 2
##   Random_ID Trial.Number
##   <chr>         <int>
## 1 SUPPRF11788      48
## 2 SUPPRF16777      48
## 3 SUPPRF20506      48
## 4 SUPPRF23223      48
## 5 SUPPRF27042      48
## 6 SUPPRF29203      48
## 7 SUPPRF29384      48
## 8 SUPPRF30004      48
## 9 SUPPRF33061      48
## 10 SUPPRF35504      48
## # i 19 more rows
```

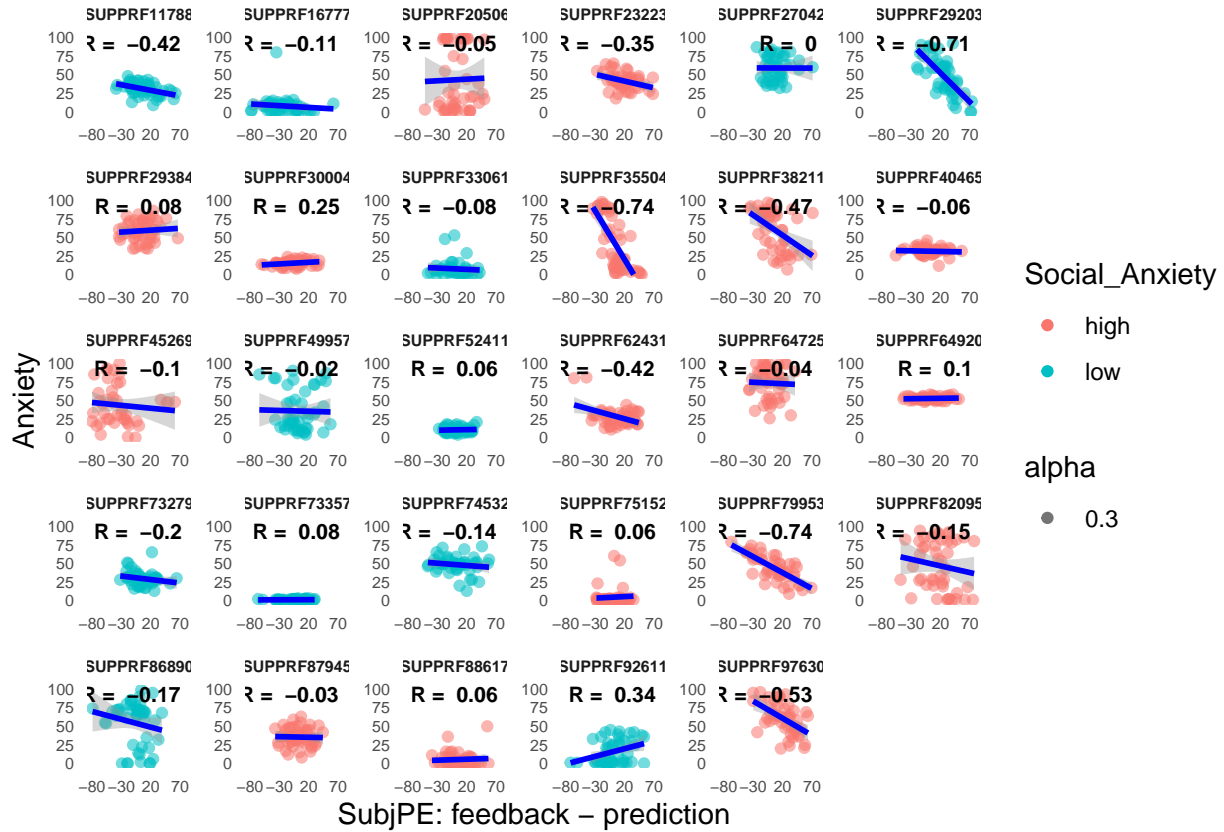
Relationship between prediction and mean histogram

[1] "average correlation between mean_hist and prediction: 0.493157277031423"



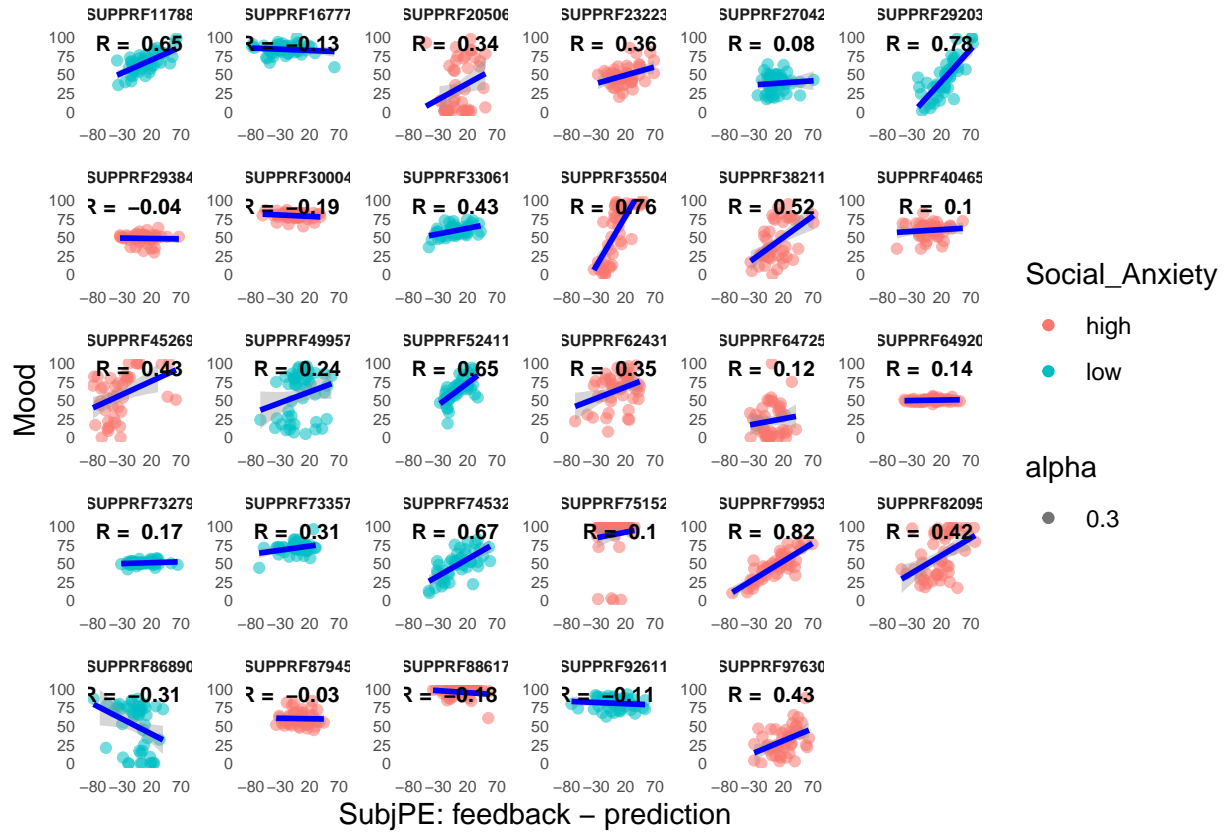
Relationship between Anxiety and SubjPE

[1] "average correlation between anxiety and SubjPE: -0.154787698341662"



Relationship between Mood and SubjPE

[1] "average correlation between mood and SubjPE: 0.272178591156413"

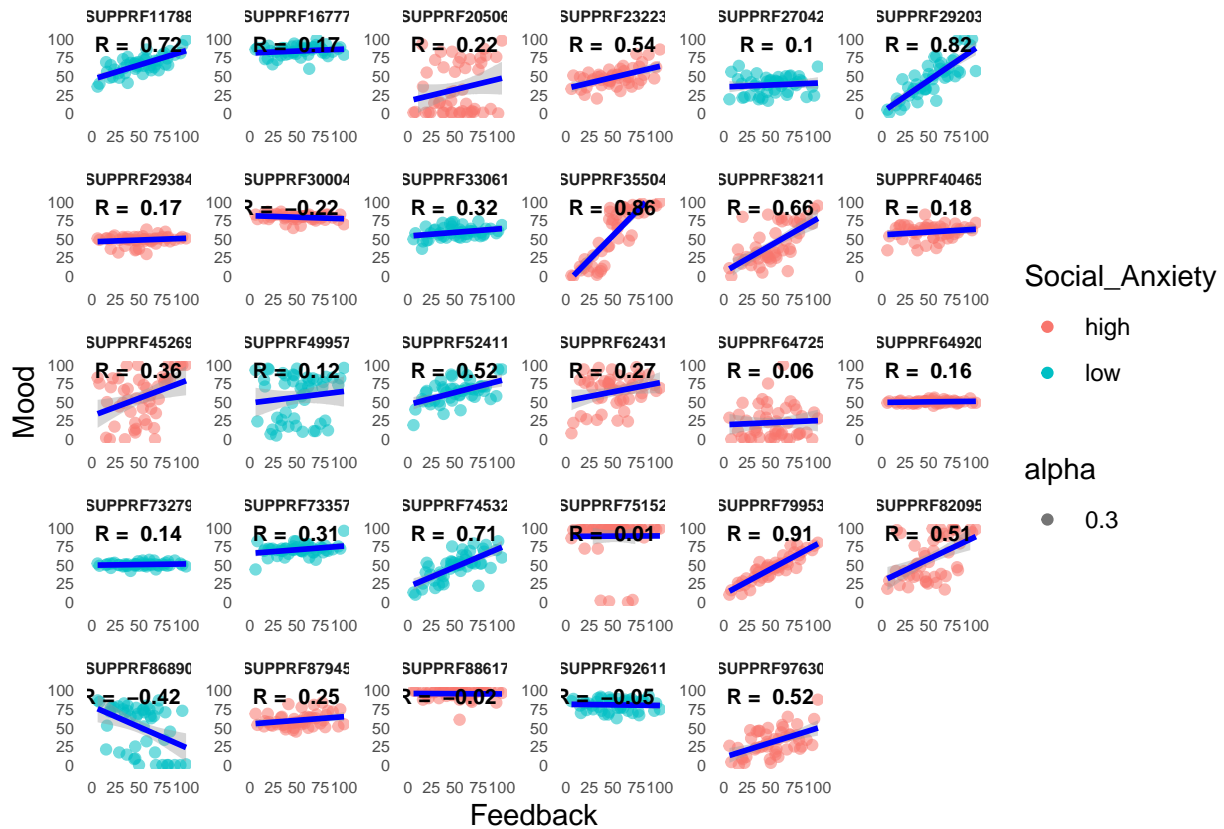


Relationship between Mood and feedback

The relationship between mood and feedback seems to be stronger than mood and subjective PE (0.24 vs 0.17), so it seems people may care more about the feedback as receiving reward or punishment, rather than social PE? The relationship between subjective PE with both anxiety and mood has been the weakest across all pilots. We need to make sure it is only because of changing the pictures of virtual players, maybe by changing the narrative they would assume that the other players are also learning how to do public speaking (less intimidating than someone who is an expert?).

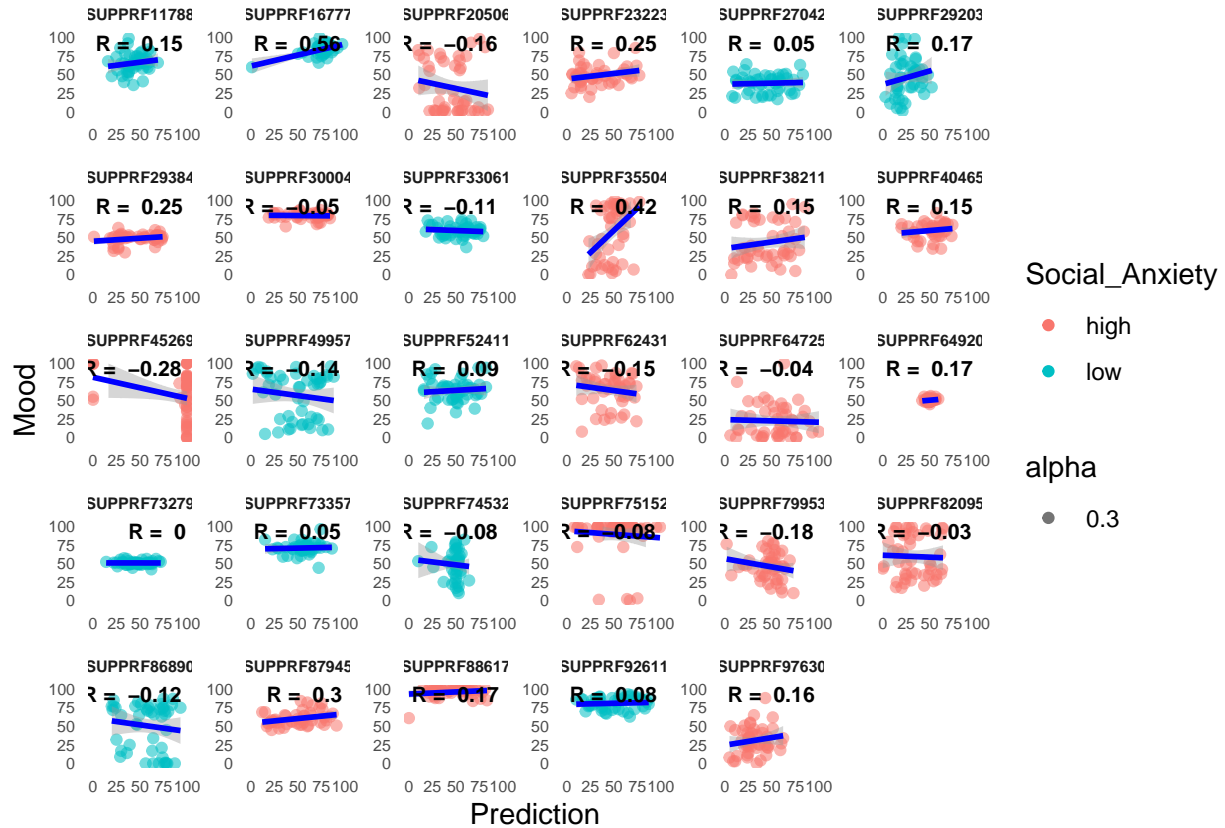
To be sure, I wonder if we want to repeat the pilot and just replace the images?

[1] "average correlation between mood and feedback: 0.306477183943363"



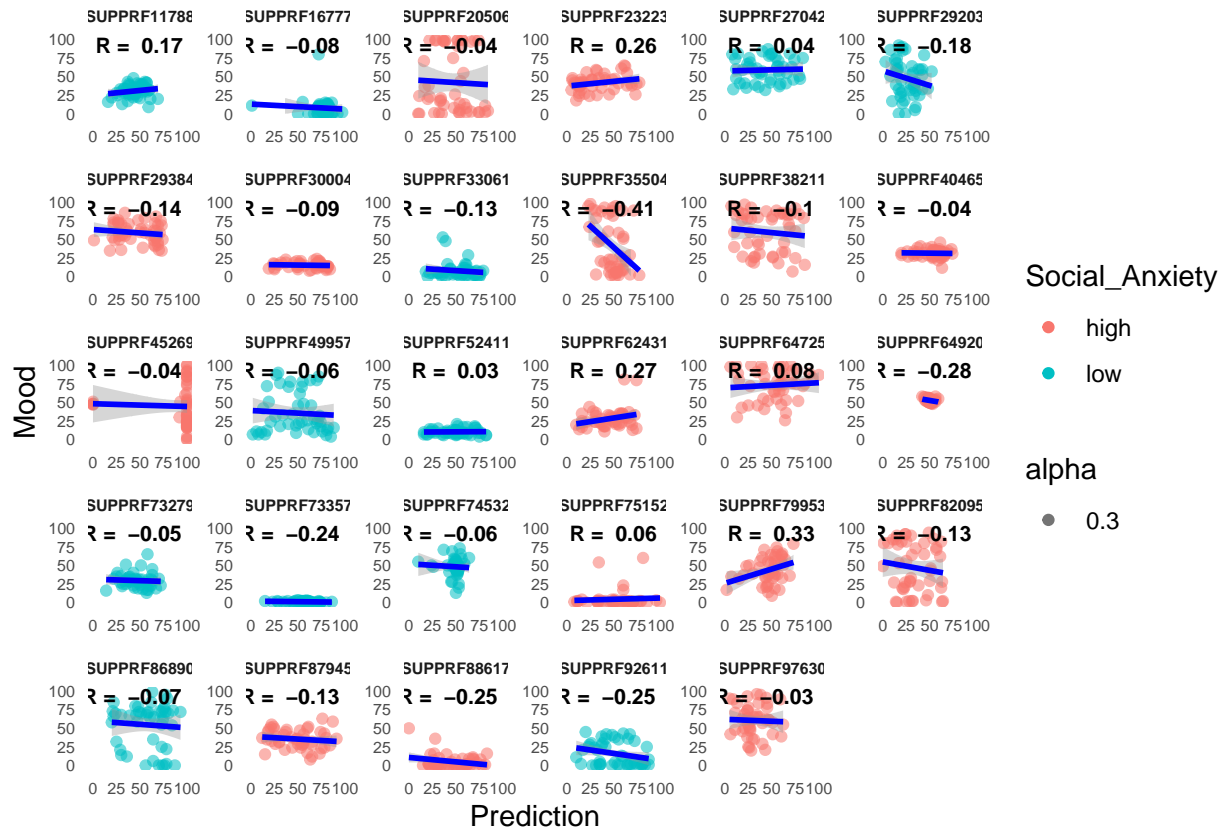
Relationship between Mood and prediction

[1] "average correlation between mood and prediction: 0.0602197674873277"



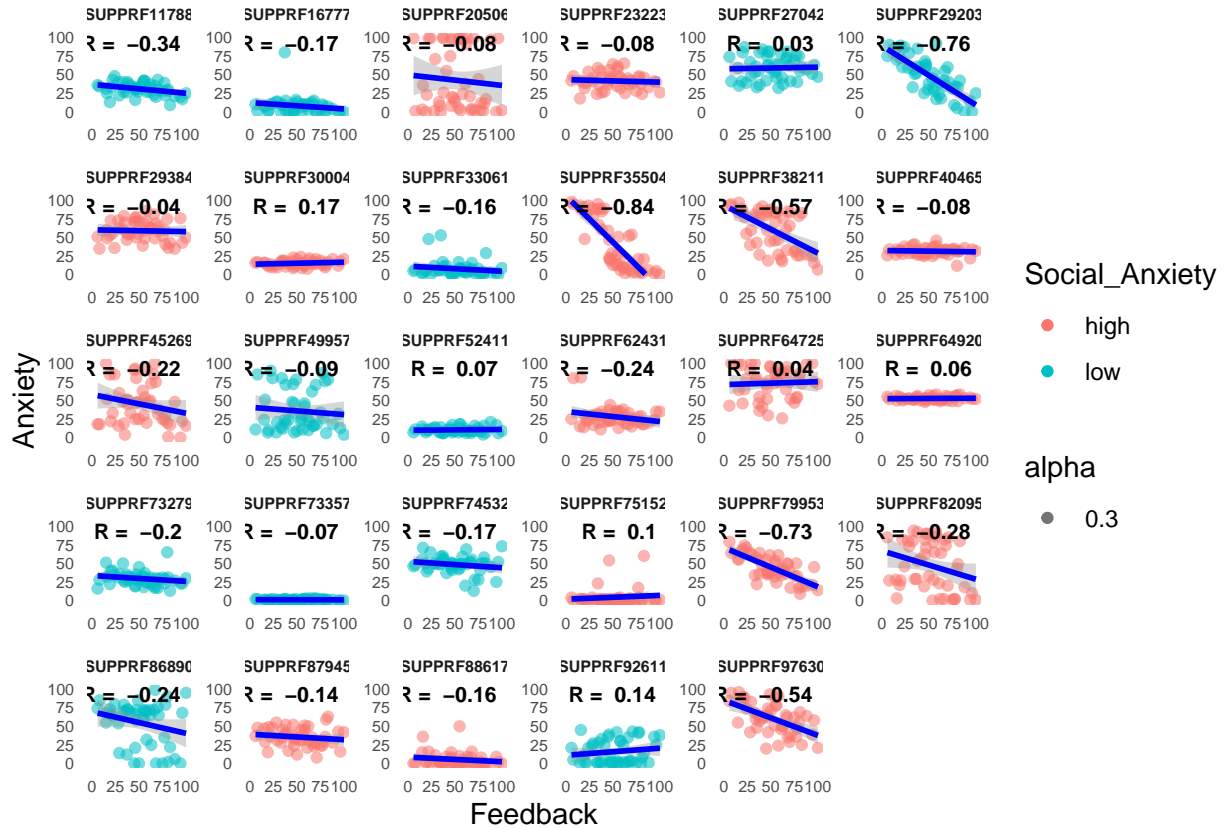
Relationship between Anxiety and prediction

[1] "average correlation between anxiety and prediction: -0.0539605824688277"



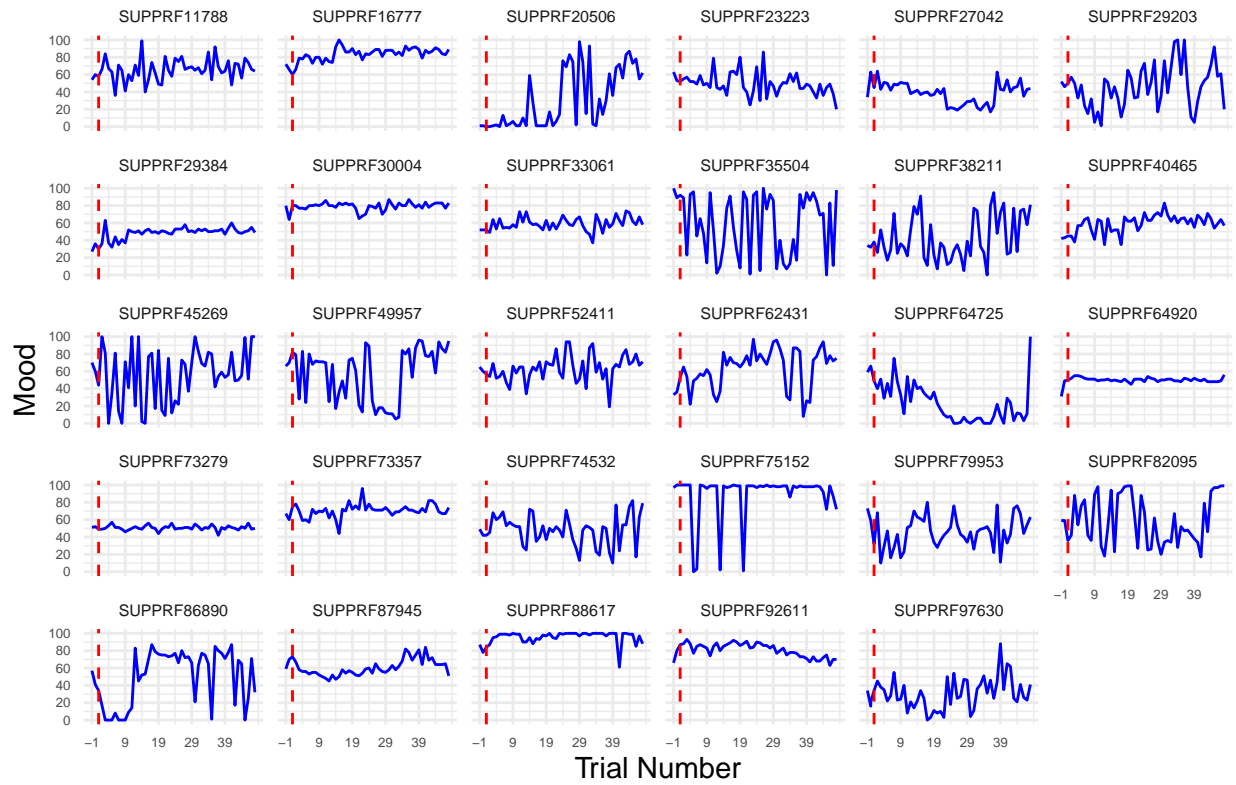
Relationship between Anxiety and feedback

[1] "average correlation between anxiety and feedback: -0.192049814274122"



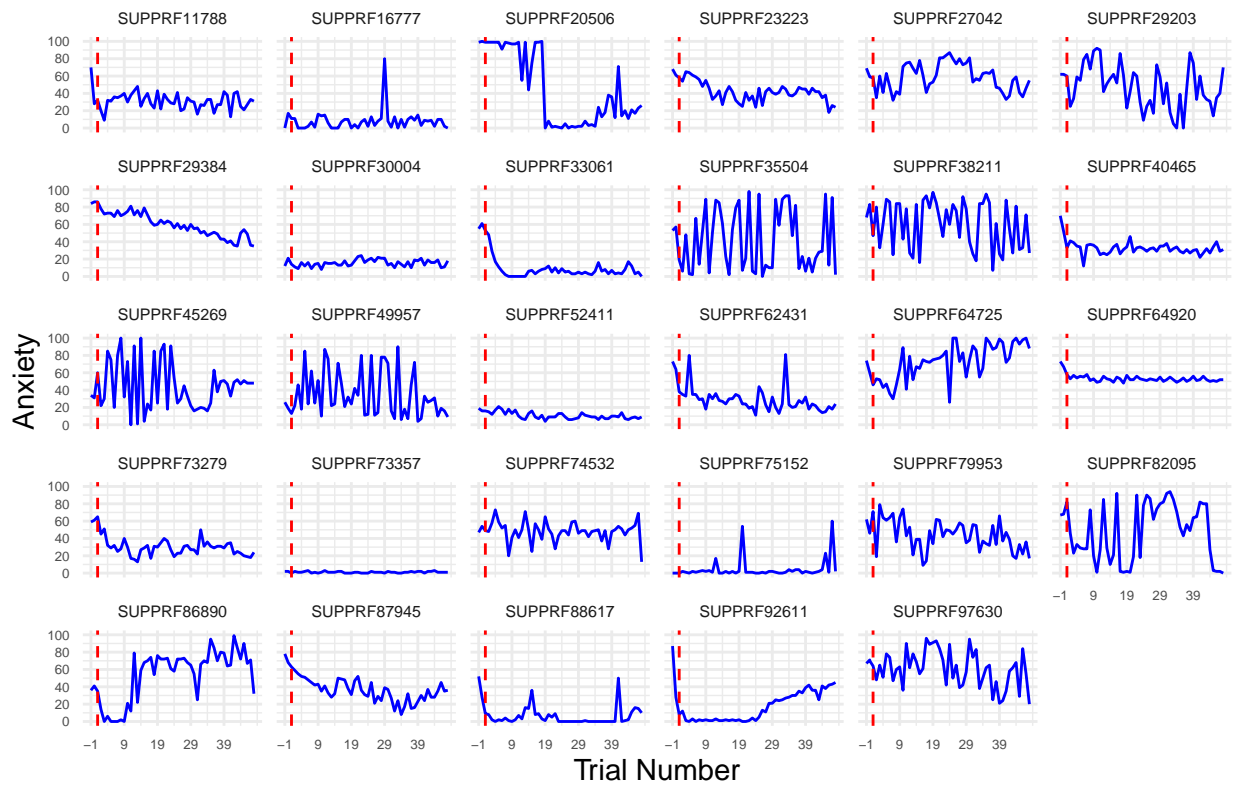
Mood over time

Mood across time



Anxiety over time

Anxiety across time



LME models for Mood and SubjPE

When looking at subjective PE, the best model is $\text{Mood} \sim \text{SubjPE} + (\text{SubjPE} \mid \text{Random_ID})$ with an AIC of 11681.18 When including feedback the best model is $\text{Mood} \sim \text{feedback} + (\text{feedback} \mid \text{Random_ID})$ with an AIC of 11615

```
## Linear mixed model fit by REML ['lmerMod']
## Formula: Response_H ~ Response_SubjPE + (1 | Random_ID)
## Data: final_df15
## Control: lmerControl(optimizer = "bobyqa")
##
## REML criterion at convergence: 12248.9
##
## Scaled residuals:
##      Min       1Q   Median       3Q      Max
## -4.7670 -0.4801  0.0517  0.5232  4.0405
##
## Random effects:
## Groups      Name      Variance Std.Dev.
## Random_ID (Intercept) 332.4    18.23
## Residual              358.7    18.94
## Number of obs: 1392, groups: Random_ID, 29
##
## Fixed effects:
##              Estimate Std. Error t value
## (Intercept)   56.52936    3.42373   16.51
## Response_SubjPE 0.25076    0.02134   11.75
##
## Correlation of Fixed Effects:
##              (Intr)
## Rspns_SbjPE -0.017

## Linear mixed model fit by REML ['lmerMod']
## Formula: Response_H ~ Response_SubjPE + (Response_SubjPE | Random_ID)
## Data: final_df15
## Control: lmerControl(optimizer = "bobyqa")
##
## REML criterion at convergence: 12115.4
##
## Scaled residuals:
##      Min       1Q   Median       3Q      Max
## -5.0310 -0.4213  0.0482  0.4715  4.8621
##
## Random effects:
## Groups      Name      Variance Std.Dev. Corr
## Random_ID (Intercept) 354.0208 18.8154
## Response_SubjPE      0.0958  0.3095 -0.39
## Residual              311.5072 17.6496
## Number of obs: 1392, groups: Random_ID, 29
##
## Fixed effects:
##              Estimate Std. Error t value
## (Intercept)   55.39518    3.53179   15.685
```

```

## Response_SubjPE 0.24361 0.06123 3.979
##
## Correlation of Fixed Effects:
## (Intr)
## Rspns_SbjPE -0.366

## Linear mixed model fit by REML ['lmerMod']
## Formula: Response_H ~ Response_SubjPE * mini_SPIN_total + (Response_SubjPE |
## Random_ID)
## Data: final_df15
## Control: lmerControl(optimizer = "bobyqa")
##
## REML criterion at convergence: 12118
##
## Scaled residuals:
## Min 1Q Median 3Q Max
## -5.0358 -0.4242 0.0451 0.4697 4.8849
##
## Random effects:
## Groups Name Variance Std.Dev. Corr
## Random_ID (Intercept) 352.85216 18.7844
## Response_SubjPE 0.09342 0.3056 -0.35
## Residual 311.53707 17.6504
## Number of obs: 1392, groups: Random_ID, 29
##
## Fixed effects:
## Estimate Std. Error t value
## (Intercept) 61.53970 6.94982 8.855
## Response_SubjPE 0.11738 0.11974 0.980
## mini_SPIN_total -1.04776 1.02182 -1.025
## Response_SubjPE:mini_SPIN_total 0.02143 0.01751 1.224
##
## Correlation of Fixed Effects:
## (Intr) Rs_SPE m_SPIN
## Rspns_SbjPE -0.331
## mn_SPIN_ttl -0.862 0.285
## R_SPE:_SPIN 0.287 -0.863 -0.334

## Linear mixed model fit by REML ['lmerMod']
## Formula: Response_H ~ Response_fdbk + (1 | Random_ID)
## Data: final_df15
## Control: lmerControl(optimizer = "bobyqa")
##
## REML criterion at convergence: 12249.2
##
## Scaled residuals:
## Min 1Q Median 3Q Max
## -4.8287 -0.4831 0.0358 0.5190 3.8978
##
## Random effects:
## Groups Name Variance Std.Dev.
## Random_ID (Intercept) 289.5 17.01
## Residual 359.7 18.97
## Number of obs: 1392, groups: Random_ID, 29

```

```

##
## Fixed effects:
##           Estimate Std. Error t value
## (Intercept)  44.20123    3.38763   13.05
## Response_fdbk  0.25095    0.02143   11.71
##
## Correlation of Fixed Effects:
##           (Intr)
## Respns_fdbk -0.328

## Linear mixed model fit by REML ['lmerMod']
## Formula: Response_H ~ Response_fdbk + (Response_fdbk | Random_ID)
##   Data: final_df15
## Control: lmerControl(optimizer = "bobyqa")
##
## REML criterion at convergence: 12053.7
##
## Scaled residuals:
##      Min       1Q   Median       3Q      Max
## -5.1304 -0.4161  0.0362  0.4829  4.3971
##
## Random effects:
##   Groups      Name              Variance Std.Dev. Corr
##   Random_ID (Intercept)    752.0861  27.4242
##               Response_fdbk    0.1132  0.3365  -0.80
##   Residual                  296.8837  17.2303
## Number of obs: 1392, groups: Random_ID, 29
##
## Fixed effects:
##           Estimate Std. Error t value
## (Intercept)  44.20123    5.21216   8.480
## Response_fdbk  0.25095    0.06545   3.834
##
## Correlation of Fixed Effects:
##           (Intr)
## Respns_fdbk -0.804

## Linear mixed model fit by REML ['lmerMod']
## Formula: Response_H ~ Response_fdbk * mini_SPIN_total + (Response_fdbk |
##   Random_ID)
##   Data: final_df15
## Control: lmerControl(optimizer = "bobyqa")
##
## REML criterion at convergence: 12054.6
##
## Scaled residuals:
##      Min       1Q   Median       3Q      Max
## -5.1344 -0.4116  0.0337  0.4750  4.3983
##
## Random effects:
##   Groups      Name              Variance Std.Dev. Corr
##   Random_ID (Intercept)    683.9445  26.1523
##               Response_fdbk    0.1057  0.3252  -0.78
##   Residual                  296.8837  17.2303

```

```

## Number of obs: 1392, groups: Random_ID, 29
##
## Fixed effects:
##
##              Estimate Std. Error t value
## (Intercept)    60.36835    9.81881   6.148
## Response_fdbk     0.07082    0.12505   0.566
## mini_SPIN_total  -2.75792    1.44338  -1.911
## Response_fdbk:mini_SPIN_total  0.03073    0.01838   1.672
##
## Correlation of Fixed Effects:
##              (Intr) Rspns_ m_SPIN
## Rspns_fdbk -0.782
## mn_SPIN_ttl -0.862  0.674
## Rsp:_SPIN_  0.674 -0.862 -0.782

## [1] 12256.89

## [1] 12127.38

## [1] 12133.98

## [1] 12257.17

## [1] 12065.71

## [1] 12070.64

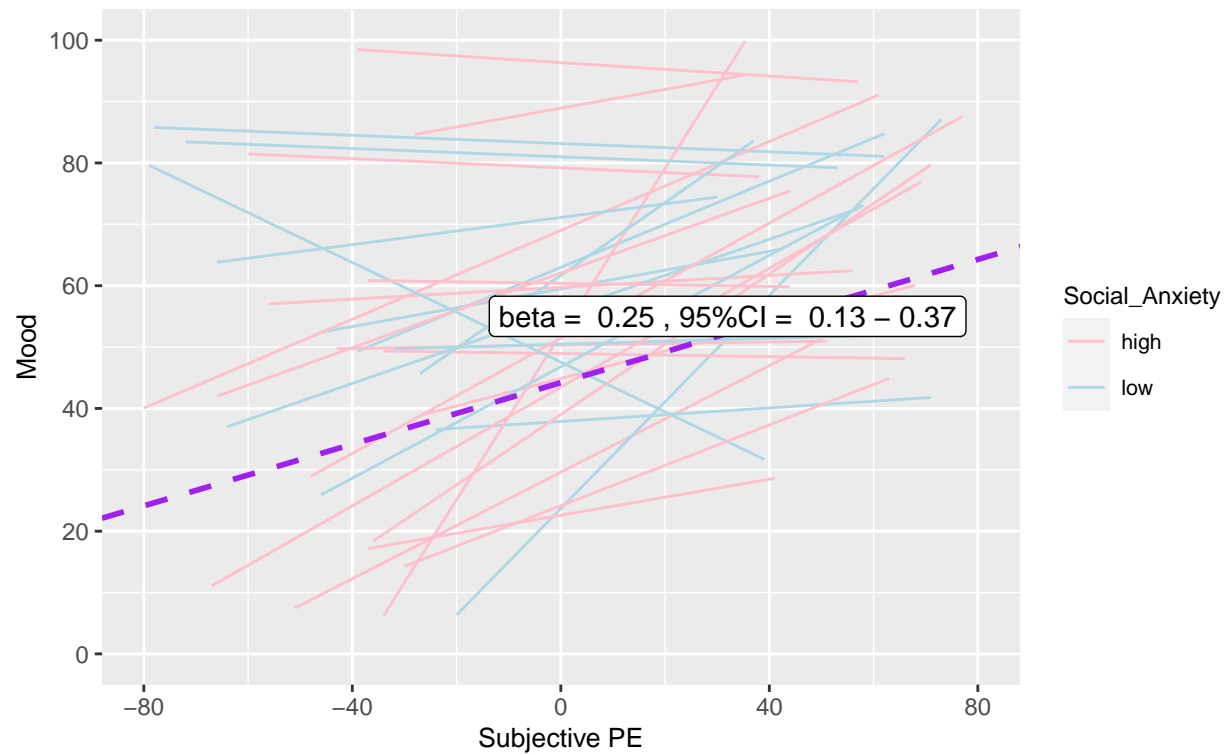
```

Individual plots with LME for Mood with SubjPE

When looking at subjective PE, the best model is $\text{Mood} \sim \text{SubjPE} + (\text{SubjPE} \mid \text{Random_ID})$ with an AIC of 11681.18

Relationship between Mood and subjective PE

estimated slopes of the association in $n = 29$

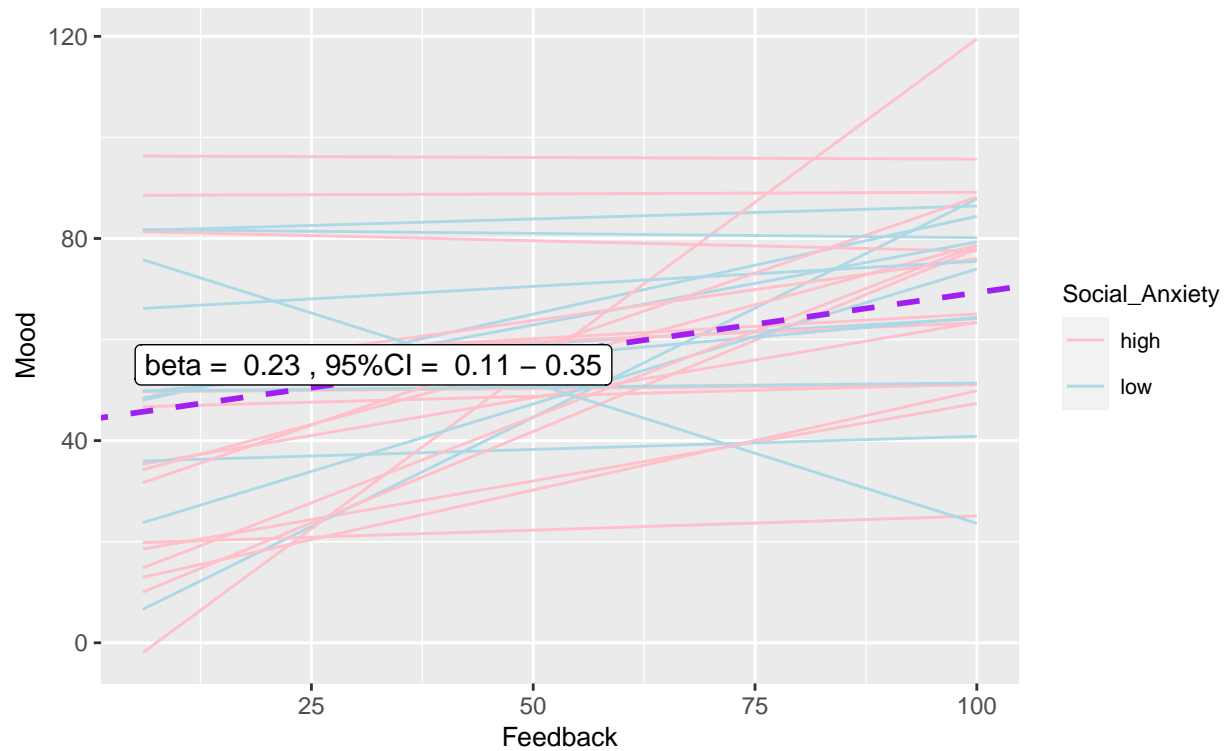


Individual plots with LME for Mood with feedback instead of SubjPE

When including feedback the best model is $\text{Mood} \sim \text{feedback} + (\text{feedback} \mid \text{Random_ID})$ with an AIC of 11615.

Relationship between Mood and Feedback

estimated slopes of the association in $n = 29$



LME models for Anxiety and SubjPE

When looking at subjective PE, the best model is Anxiety ~ SubjPE + (SubjPE | Random_ID) with an AIC of 11764.61 When including feedback the best model is Anxiety ~ feedback + (Random_ID) with an AIC of 11705.6

```
## Linear mixed model fit by REML ['lmerMod']
## Formula: Response_Ax ~ Response_SubjPE + (1 | Random_ID)
## Data: final_df15
## Control: lmerControl(optimizer = "bobyqa")
##
## REML criterion at convergence: 12280.7
##
## Scaled residuals:
##      Min       1Q   Median       3Q      Max
## -3.0109 -0.4425 -0.0512  0.4449  3.6493
##
## Random effects:
## Groups      Name      Variance Std.Dev.
## Random_ID (Intercept) 418.1    20.45
## Residual              365.4    19.12
## Number of obs: 1392, groups: Random_ID, 29
##
## Fixed effects:
##              Estimate Std. Error t value
## (Intercept)   36.14845    3.83205   9.433
## Response_SubjPE -0.15250    0.02155  -7.075
##
## Correlation of Fixed Effects:
##              (Intr)
## Rspns_SbjPE -0.015

## Linear mixed model fit by REML ['lmerMod']
## Formula: Response_Ax ~ Response_SubjPE + (Response_SubjPE | Random_ID)
## Data: final_df15
## Control: lmerControl(optimizer = "bobyqa")
##
## REML criterion at convergence: 12191
##
## Scaled residuals:
##      Min       1Q   Median       3Q      Max
## -3.2546 -0.3826 -0.0447  0.3852  3.9249
##
## Random effects:
## Groups      Name      Variance Std.Dev. Corr
## Random_ID (Intercept) 451.69353 21.2531
## Response_SubjPE      0.07373  0.2715 -0.49
## Residual              330.11449 18.1691
## Number of obs: 1392, groups: Random_ID, 29
##
## Fixed effects:
##              Estimate Std. Error t value
## (Intercept)   37.20401    3.98189   9.343
```

```

## Response_SubjPE -0.15430    0.05488  -2.812
##
## Correlation of Fixed Effects:
##      (Intr)
## Rspns_SbjPE -0.453

## Linear mixed model fit by REML ['lmerMod']
## Formula: Response_Ax ~ Response_SubjPE * mini_SPIN_total + (Response_SubjPE |
##      Random_ID)
##      Data: final_df15
## Control: lmerControl(optimizer = "bobyqa")
##
## REML criterion at convergence: 12192.4
##
## Scaled residuals:
##      Min       1Q   Median       3Q      Max
## -3.2460 -0.3829 -0.0414  0.3873  3.9296
##
## Random effects:
##      Groups      Name              Variance Std.Dev. Corr
##      Random_ID (Intercept)    416.70159  20.4133
##              Response_SubjPE    0.07483   0.2735  -0.46
##      Residual                330.09475  18.1685
## Number of obs: 1392, groups:  Random_ID, 29
##
## Fixed effects:
##
##              Estimate Std. Error t value
## (Intercept)    25.37056    7.54360   3.363
## Response_SubjPE    -0.07758    0.10930  -0.710
## mini_SPIN_total     2.01901    1.10910   1.820
## Response_SubjPE:mini_SPIN_total -0.01307    0.01596  -0.819
##
## Correlation of Fixed Effects:
##      (Intr) Rs_SPE m_SPIN
## Rspns_SbjPE -0.424
## mn_SPIN_ttl -0.862  0.365
## R_SPE:_SPIN  0.368 -0.863 -0.427

## Linear mixed model fit by REML ['lmerMod']
## Formula: Response_Ax ~ Response_fdbk + (1 | Random_ID)
##      Data: final_df15
## Control: lmerControl(optimizer = "bobyqa")
##
## REML criterion at convergence: 12256.4
##
## Scaled residuals:
##      Min       1Q   Median       3Q      Max
## -2.9235 -0.4923 -0.0364  0.4290  3.6281
##
## Random effects:
##      Groups      Name              Variance Std.Dev.
##      Random_ID (Intercept)  394.6    19.86
##      Residual                359.4    18.96
## Number of obs: 1392, groups:  Random_ID, 29

```

```

##
## Fixed effects:
##           Estimate Std. Error t value
## (Intercept)  45.37353    3.88564  11.677
## Response_fdbk -0.18593    0.02142  -8.679
##
## Correlation of Fixed Effects:
##           (Intr)
## Respns_fdbk -0.286

## Linear mixed model fit by REML ['lmerMod']
## Formula: Response_Ax ~ Response_fdbk + (Response_fdbk | Random_ID)
##   Data: final_df15
## Control: lmerControl(optimizer = "bobyqa")
##
## REML criterion at convergence: 12134.9
##
## Scaled residuals:
##      Min       1Q   Median       3Q      Max
## -3.2034 -0.3978 -0.0450  0.3971  3.9606
##
## Random effects:
##   Groups   Name                Variance Std.Dev. Corr
##   Random_ID (Intercept)    816.62962  28.5767
##               Response_fdbk   0.07815   0.2795  -0.76
##   Residual                  316.02948  17.7772
## Number of obs: 1392, groups: Random_ID, 29
##
## Fixed effects:
##           Estimate Std. Error t value
## (Intercept)  45.37353    5.42879   8.358
## Response_fdbk -0.18593    0.05566  -3.340
##
## Correlation of Fixed Effects:
##           (Intr)
## Respns_fdbk -0.764

## Linear mixed model fit by REML ['lmerMod']
## Formula: Response_Ax ~ Response_fdbk * mini_SPIN_total + (Response_fdbk |
##   Random_ID)
##   Data: final_df15
## Control: lmerControl(optimizer = "bobyqa")
##
## REML criterion at convergence: 12135.7
##
## Scaled residuals:
##      Min       1Q   Median       3Q      Max
## -3.2199 -0.3969 -0.0430  0.3973  3.9708
##
## Random effects:
##   Groups   Name                Variance Std.Dev. Corr
##   Random_ID (Intercept)    741.0426  27.2221
##               Response_fdbk   0.0772   0.2778  -0.75
##   Residual                  316.0301  17.7772

```

```

## Number of obs: 1392, groups: Random_ID, 29
##
## Fixed effects:
##
##              Estimate Std. Error t value
## (Intercept)    28.40681   10.21600   2.781
## Response_fdbk   -0.07884    0.10913  -0.722
## mini_SPIN_total    2.89432    1.50177   1.927
## Response_fdbk:mini_SPIN_total -0.01827    0.01604  -1.139
##
## Correlation of Fixed Effects:
##              (Intr) Rspns_ m_SPIN
## Rspns_fdbk -0.753
## mn_SPIN_ttl -0.862  0.649
## Rsp:_SPIN_  0.649 -0.862 -0.753
## optimizer (bobyqa) convergence code: 0 (OK)
## Model failed to converge with max|grad| = 0.00221391 (tol = 0.002, component 1)

## [1] 12288.68

## [1] 12203

## [1] 12208.39

## [1] 12264.42

## [1] 12146.86

## [1] 12151.7

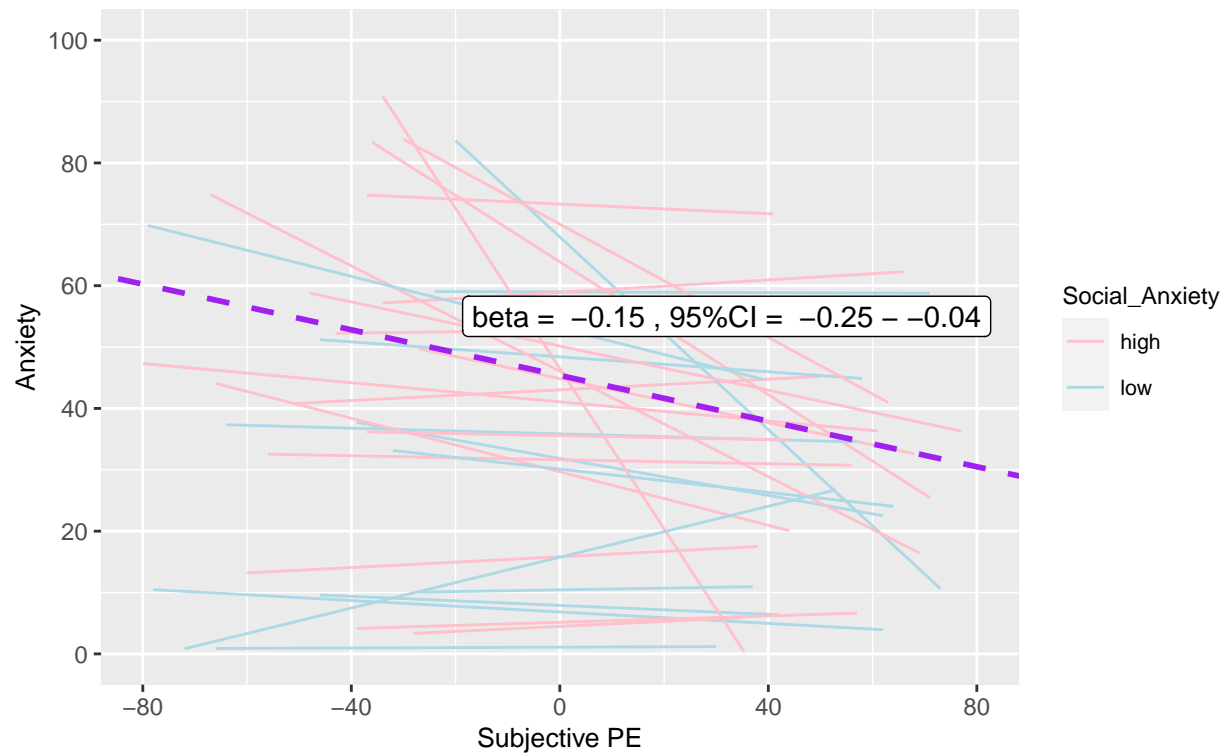
```

Individual plots with LME for Anxiety with SubjPE

When looking at subjective PE, the best model is $\text{Anxiety} \sim \text{SubjPE} + (\text{SubjPE} \mid \text{Random_ID})$ with an AIC of 11764.61

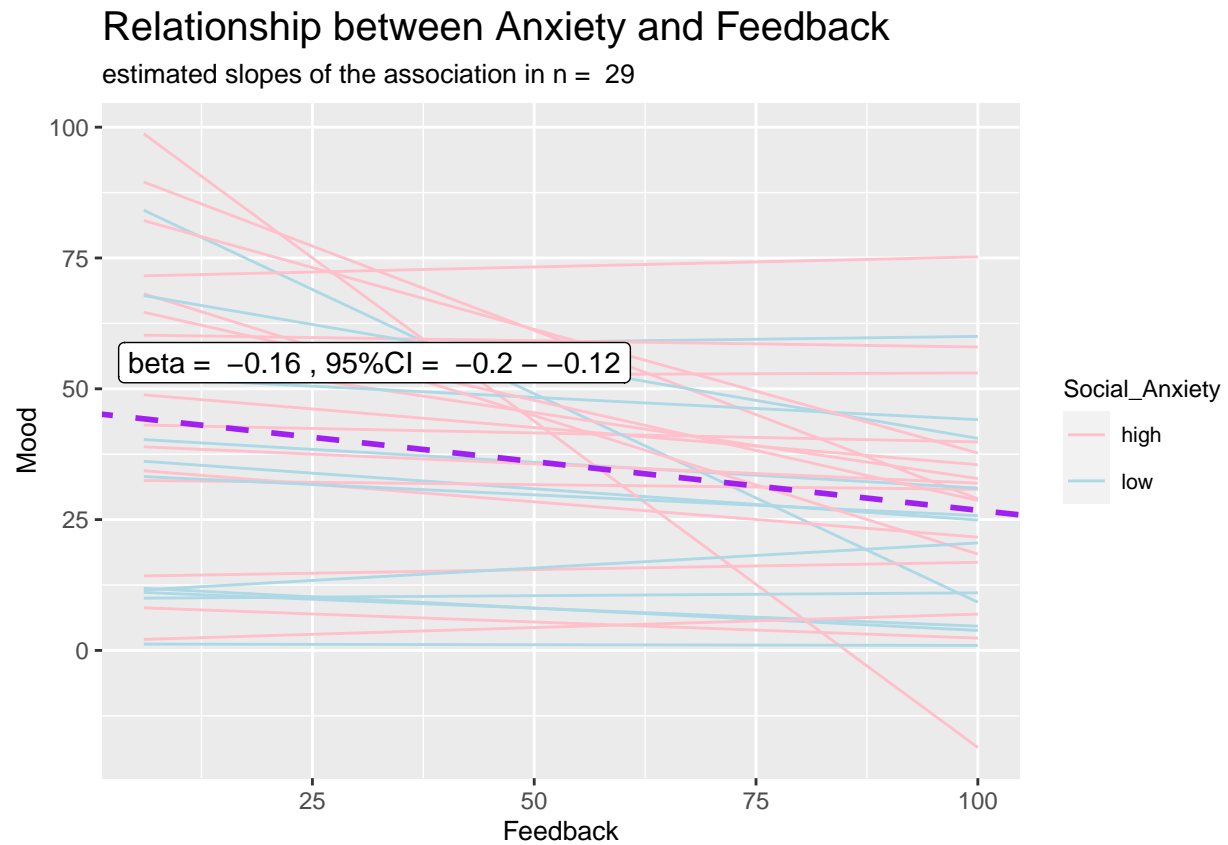
Relationship between Anxiety and subjective PE

estimated slopes of the association in $n = 29$



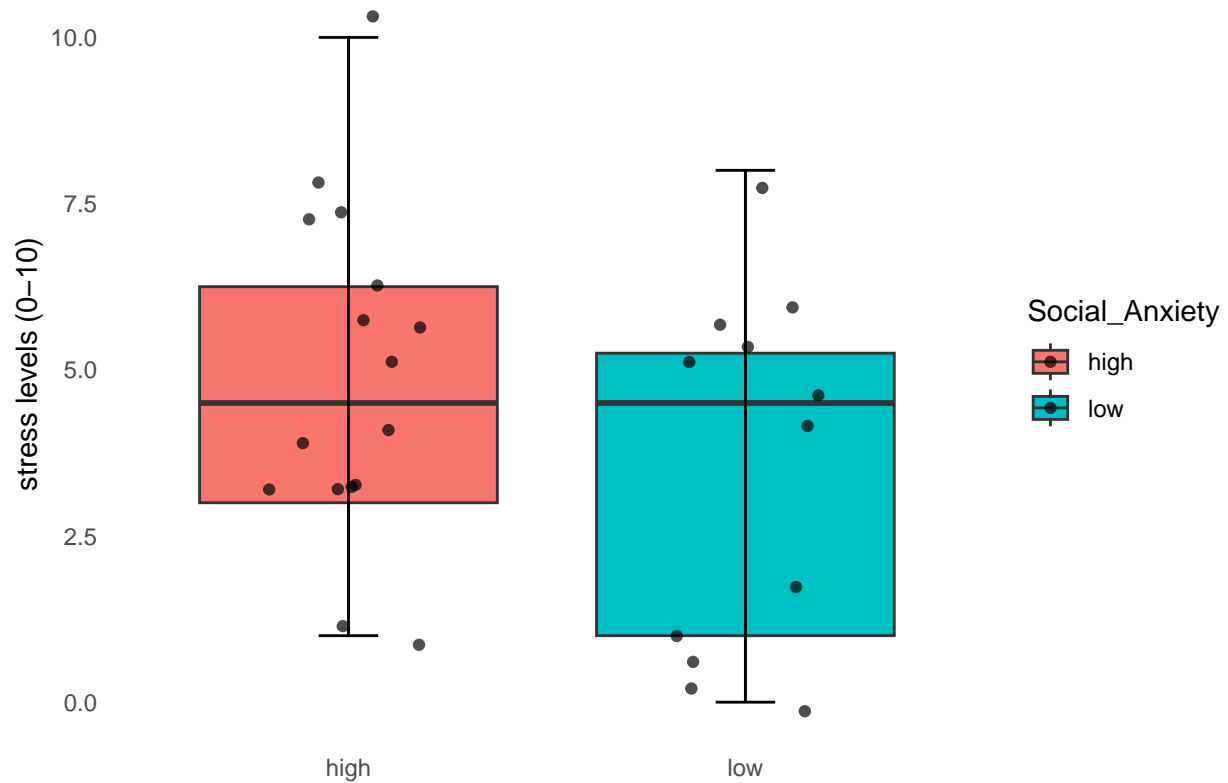
Individual plots with LME for Anxiety with feedback instead of SubjPE

When including feedback the best model is Anxiety ~ feedback + (Random_ID) with an AIC of 11705.6



Relationship average anxiety on the task and how stressful they rated the task

We have only one scale at the end when asking feedback, and we ask them “How stressful was this as a social situation?” on a scale of 0-100. Let’s look at the relationship between this score and anxiety on the task, but also the average score in people with high and low social anxiety.



ICC for anxiety

we will now look at the ICC outcome for anxiety The ICC for anxiety is 0.51, which is moderate according to guidelines by Koo and Li (2016): below 0.50: poor between 0.50 and 0.75: moderate between 0.75 and 0.90: good above 0.90: excellent

```
## [1] "lmer for anxiety with just the intercept"
```

```
## [1] 0.5097967
```

```
##           2.5 %   97.5 %  
## .sig01      15.28831 25.95566  
## .sigma      18.75972 20.22262  
## (Intercept) 28.31695 43.14713
```

ICC for mood

The ICC for mood is 0.42, which is lower than anxiety and is actually within the poor category, according to guidelines by Koo and Li (2016): below 0.50: poor between 0.50 and 0.75: moderate between 0.75 and 0.90: good above 0.90: excellent

```
## [1] "lmer for mood with just the intercept"
```

```
## [1] 0.4218881
```

```
##           2.5 %   97.5 %  
## .sig01      13.04748 22.25356  
## .sigma      19.16727 20.66197  
## (Intercept) 50.84117 63.58699
```