Surprise study pilot 15

Marjan Biria

2024-02-07

Study description

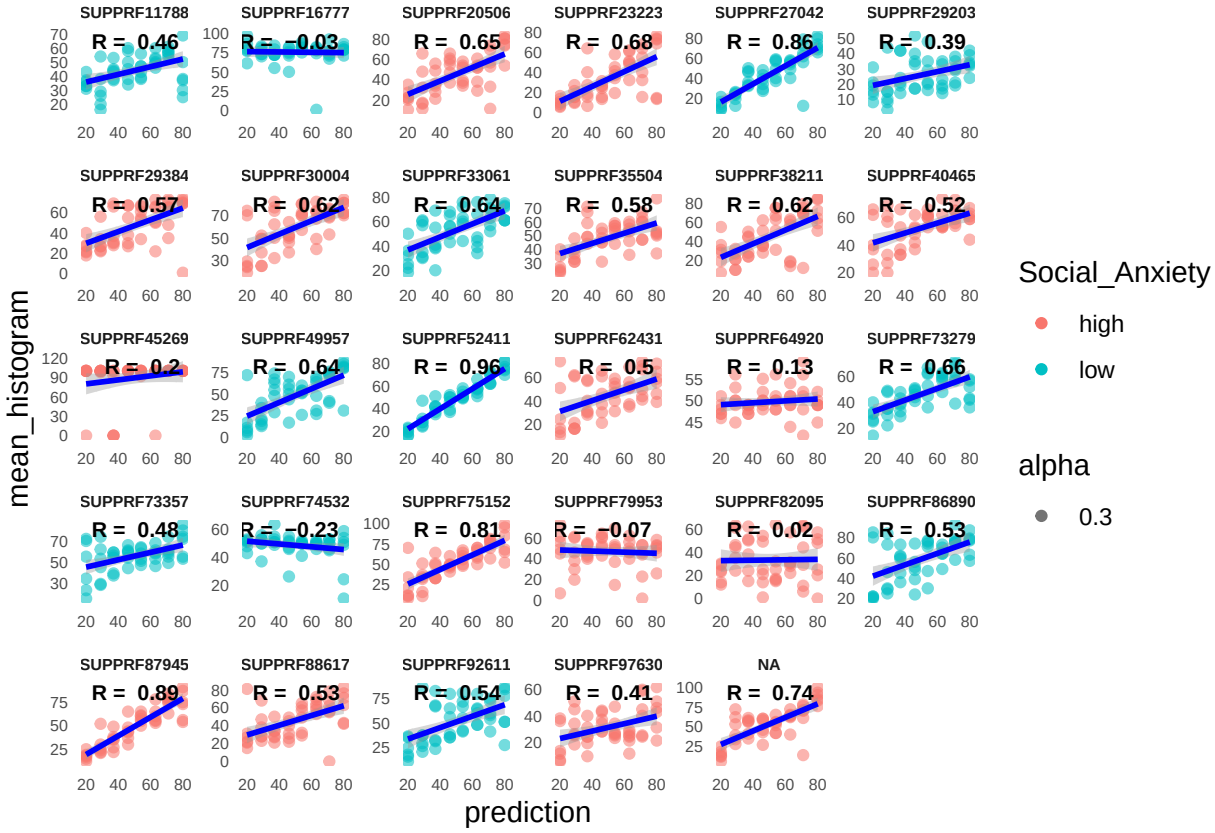
This study is the same as pilot 14, but we brought the old judge pictures back, and changed the narrative around public speaking. Instead we say "getting better at speaking to others". There have been few other changes such as saying the judge will rate "you" rather than "your description" as we have 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
```

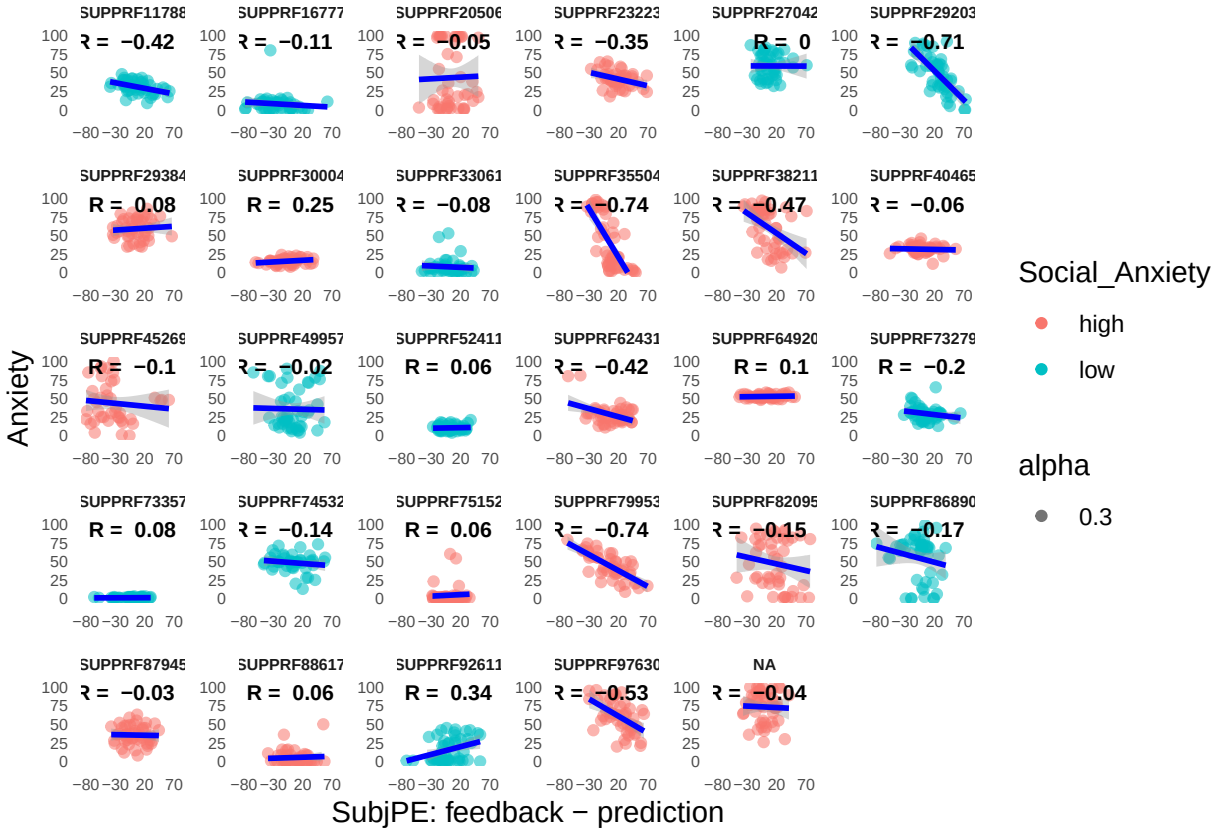
Relationship between prediction and mean histogram

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



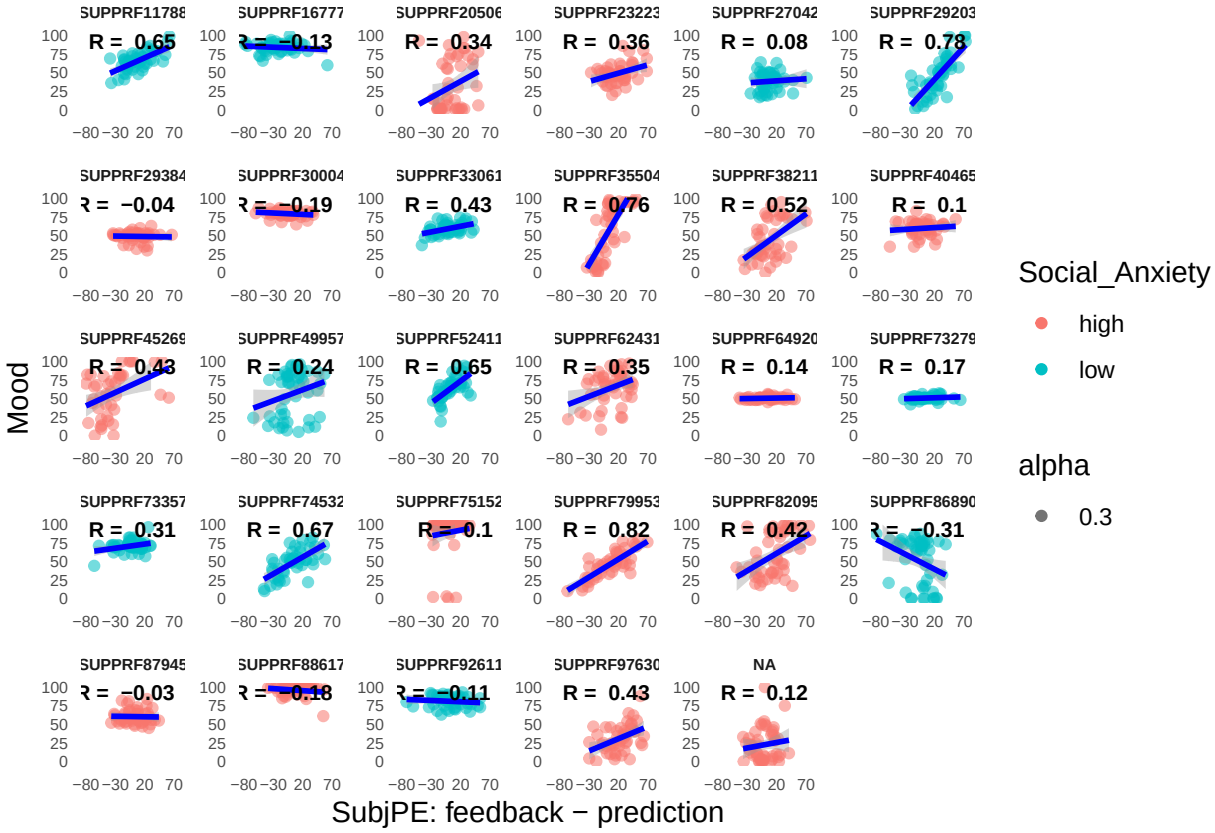
Relationship between Anxiety and SubjPE

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



Relationship between Mood and SubjPE

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

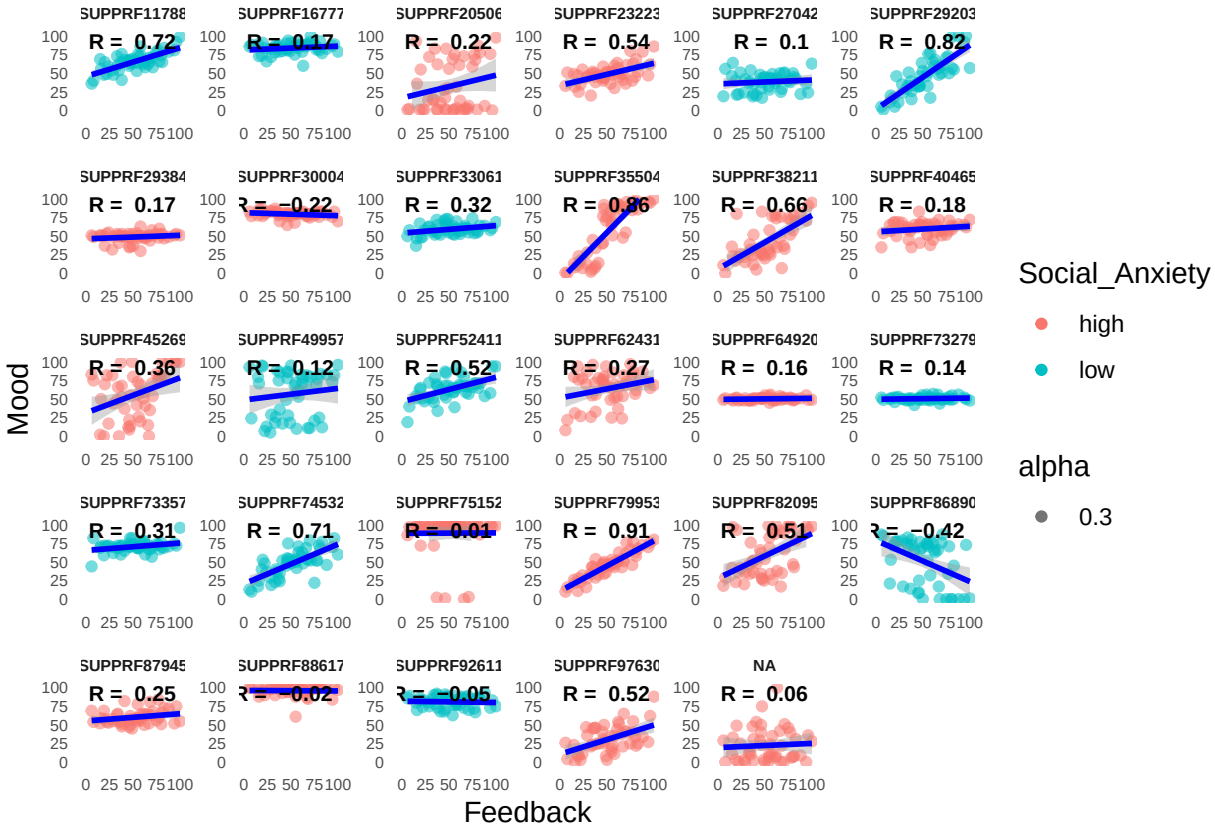


Relationship between Mood and feedback

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?).

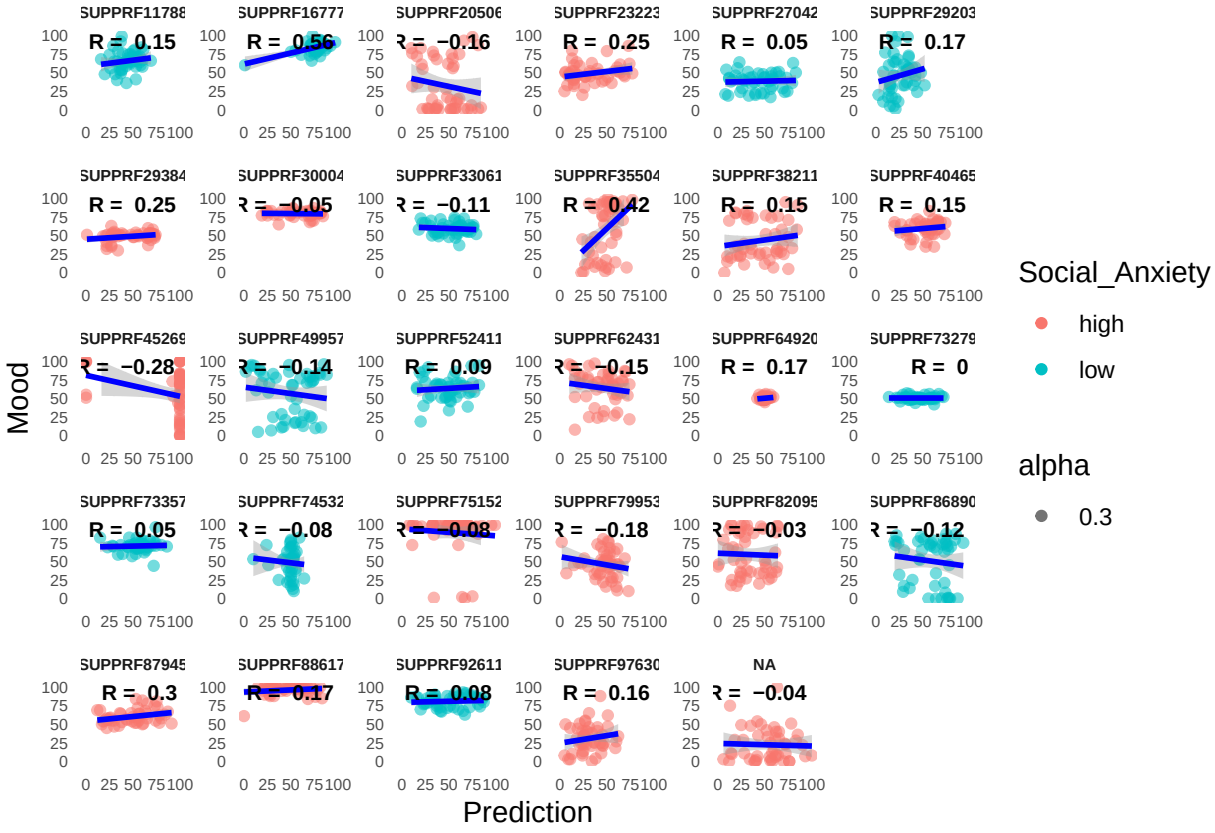
To be sure, I wonder if we want to repeat the pilot and just replace the images?

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



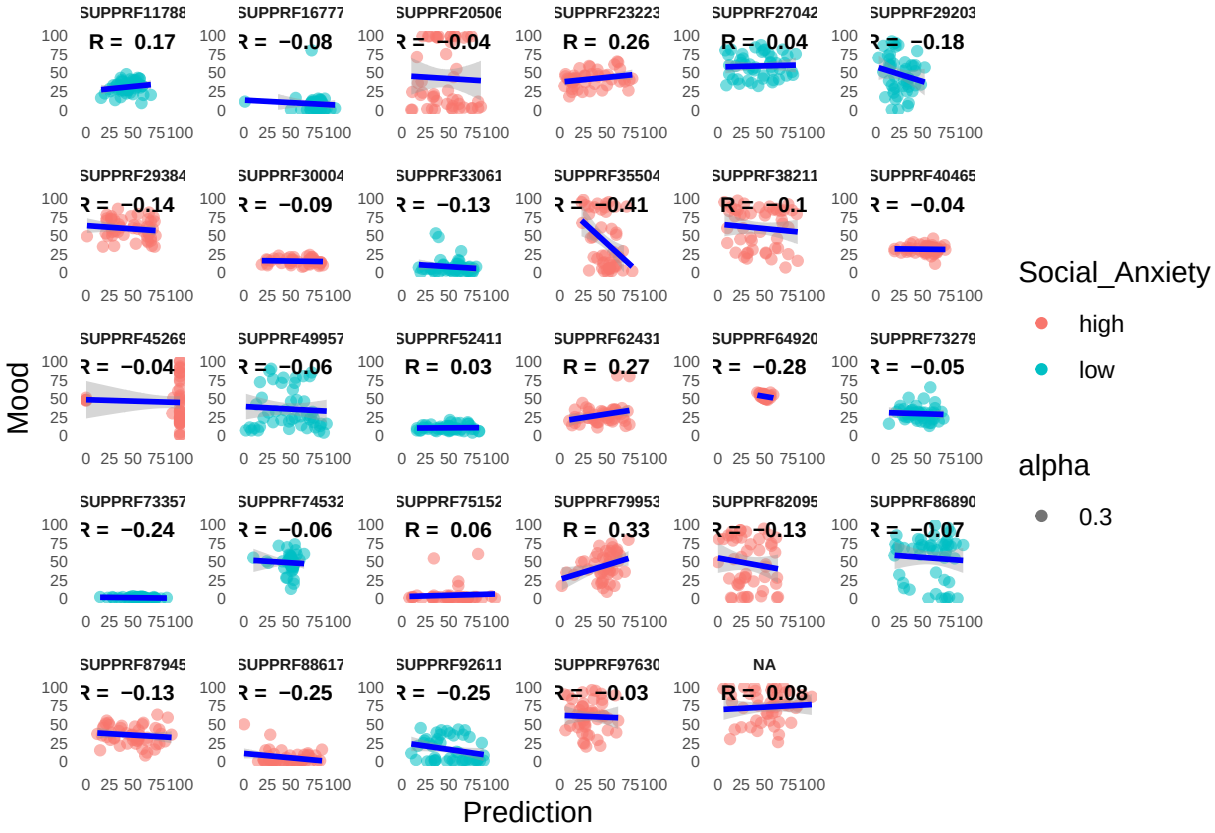
Relationship between Mood and prediction

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



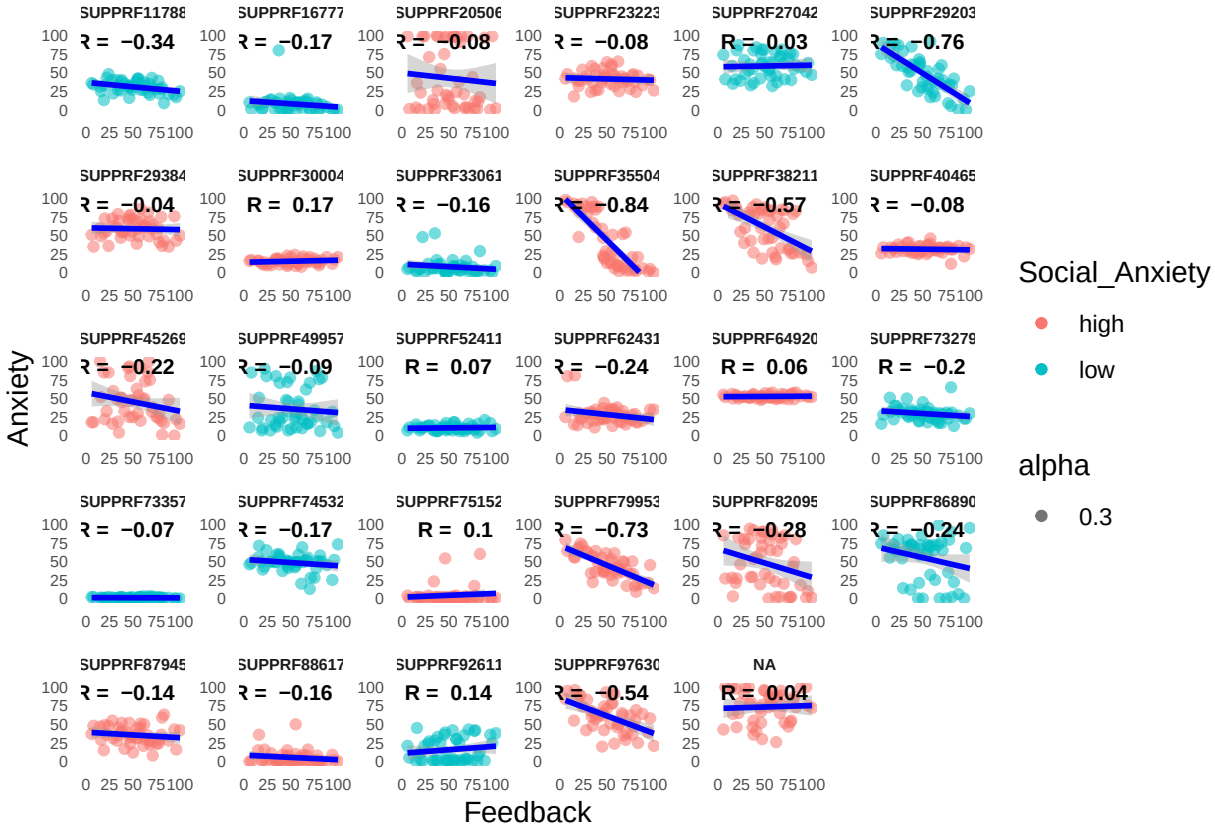
Relationship between Anxiety and prediction

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

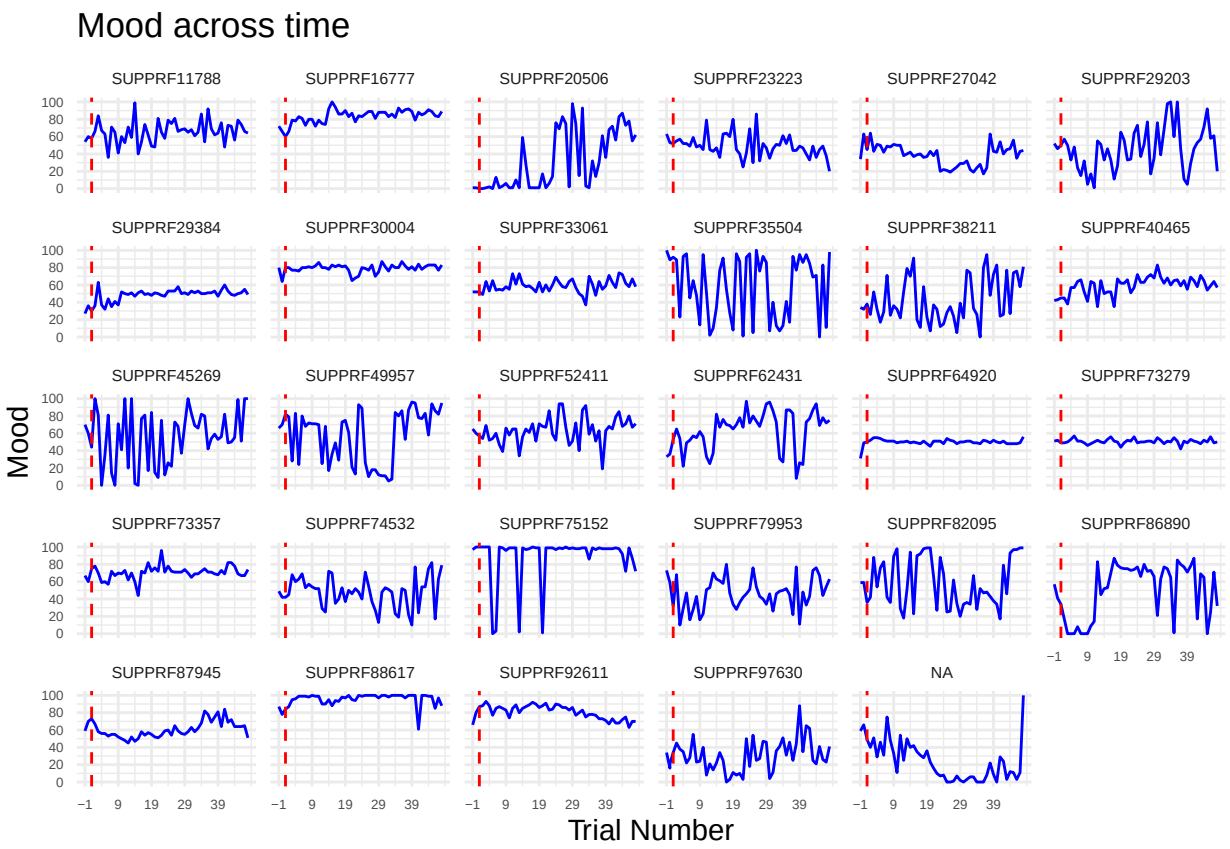


Relationship between Anxiety and feedback

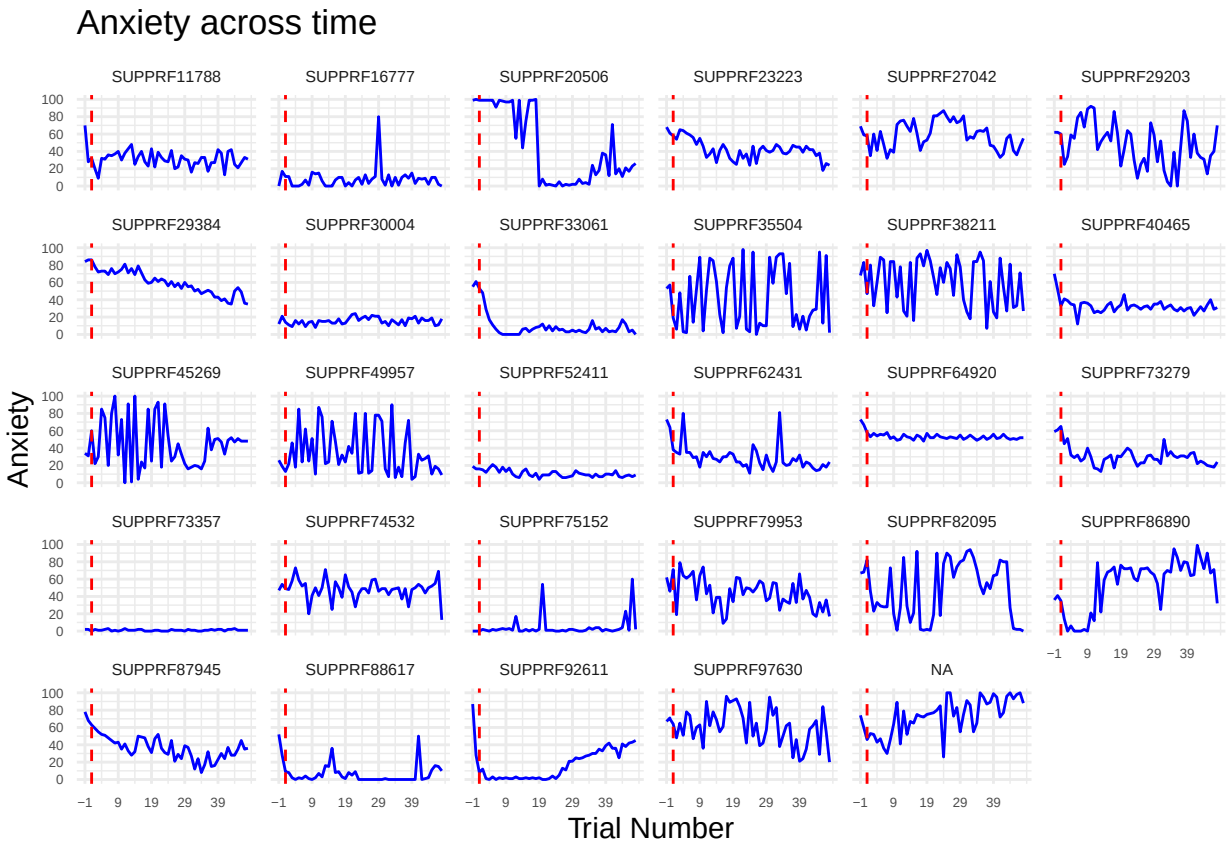
```
## [1] "average correlation between anxiety and feedback: -0.192049814274122"
```



Mood over time



Anxiety over time



LME models for Mood and SubjPE

When looking at subjective PE, the best model is Mood ~ SubjPE + (SubjPE | Random_ID) with an AIC of 11681.18 When including feedback the best model is Mood ~ feedback + (feedback | 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: 11807.5
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -4.7960 -0.4581  0.0541  0.5271  3.9446
##
## Random effects:
##  Groups    Name        Variance Std.Dev.
##  Random_ID (Intercept) 301.6    17.37
##  Residual              354.2    18.82
## Number of obs: 1344, groups:  Random_ID, 28
##
## Fixed effects:
##                 Estimate Std. Error t value
## (Intercept)     57.73162    3.32248   17.38
## Response_SubjPE  0.25238    0.02143   11.78
##
## Correlation of Fixed Effects:
##             (Intr)
## Rspns_SbjPE -0.019

## 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: 11669.2
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -5.0781 -0.4046  0.0474  0.4680  4.9207
##
## Random effects:
##  Groups    Name            Variance Std.Dev. Corr
##  Random_ID (Intercept)     326.8741 18.0797
##            Response_SubjPE   0.0995  0.3154  -0.42
##  Residual                  305.1663 17.4690
## Number of obs: 1344, groups:  Random_ID, 28
##
## Fixed effects:
##                 Estimate Std. Error t value
## (Intercept)     56.55030    3.45624  16.362
```

```
## Response_SubjPE  0.24579    0.06323   3.887
##
## Correlation of Fixed Effects:
##             (Intr)
## Rspns_SbjPE -0.403
```

```
## 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: 11672
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -5.0841 -0.3986  0.0426  0.4678  4.9461
##
## Random effects:
##  Groups    Name            Variance  Std.Dev. Corr
##  Random_ID (Intercept)     331.85579 18.217
##            Response_SubjPE   0.09673  0.311   -0.40
##  Residual                  305.18742 17.470
## Number of obs: 1344, groups:  Random_ID, 28
##
## Fixed effects:
##                                 Estimate Std. Error t value
## (Intercept)                     60.92949    6.75240   9.023
## Response_SubjPE                  0.11515    0.12158   0.947
## mini_SPIN_total                 -0.76155    1.00644  -0.757
## Response_SubjPE:mini_SPIN_total  0.02259    0.01801   1.254
##
## Correlation of Fixed Effects:
##             (Intr) Rs_SPE m_SPIN
## Rspns_SbjPE -0.377
## mn_SPIN_ttl -0.857  0.322
## R_SPE:_SPIN  0.325 -0.858 -0.380
```

```
## 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: 11803.9
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -4.8664 -0.4793  0.0365  0.5253  3.6739
##
## Random effects:
##  Groups    Name        Variance Std.Dev.
##  Random_ID (Intercept) 254.1    15.94
##  Residual              354.5    18.83
## Number of obs: 1344, groups:  Random_ID, 28
```

```
##
## Fixed effects:
##               Estimate Std. Error t value
## (Intercept)   45.08361    3.25564   13.85
## Response_fdbk  0.25792    0.02165   11.91
##
## Correlation of Fixed Effects:
##             (Intr)
## Respns_fdbk -0.345

## 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: 11603
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -5.1861 -0.3932  0.0355  0.4810  4.2003
##
## Random effects:
##  Groups    Name          Variance Std.Dev. Corr
##  Random_ID (Intercept)   758.7044 27.5446
##            Response_fdbk   0.1166  0.3415  -0.84
##  Residual                289.8213 17.0241
## Number of obs: 1344, groups:  Random_ID, 28
##
## Fixed effects:
##               Estimate Std. Error t value
## (Intercept)   45.08361    5.32380   8.468
## Response_fdbk  0.25792    0.06744   3.824
##
## Correlation of Fixed Effects:
##             (Intr)
## Respns_fdbk -0.839

## 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: 11604.3
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -5.1919 -0.3923  0.0337  0.4774  4.2248
##
## Random effects:
##  Groups    Name          Variance Std.Dev. Corr
##  Random_ID (Intercept)   701.905  26.4935
##            Response_fdbk   0.107   0.3271  -0.82
##  Residual                289.821  17.0241
```

```
## Number of obs: 1344, groups:  Random_ID, 28
##
## Fixed effects:
##                               Estimate Std. Error t value
## (Intercept)                   60.04686    9.94877   6.036
## Response_fdbk                  0.06498    0.12577   0.517
## mini_SPIN_total               -2.60230    1.48249  -1.755
## Response_fdbk:mini_SPIN_total  0.03355    0.01874   1.790
##
## Correlation of Fixed Effects:
##             (Intr) Rspns_ m_SPIN
## Respns_fdbk -0.819
## mn_SPIN_ttl -0.857  0.702
## Rsp_:_SPIN_  0.702 -0.857 -0.819
```

```
## [1] 11815.55
```

```
## [1] 11681.18
```

```
## [1] 11688.05
```

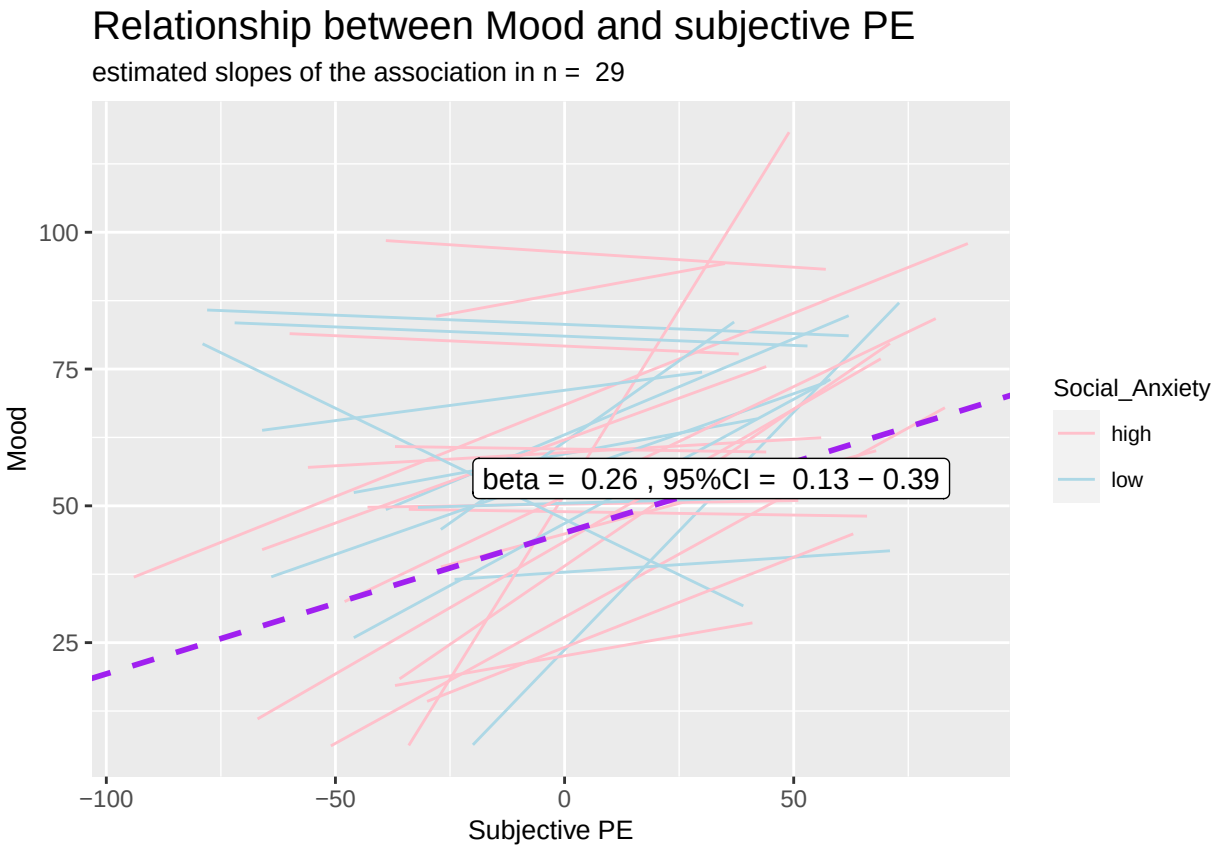
```
## [1] 11811.92
```

```
## [1] 11615
```

```
## [1] 11620.27
```

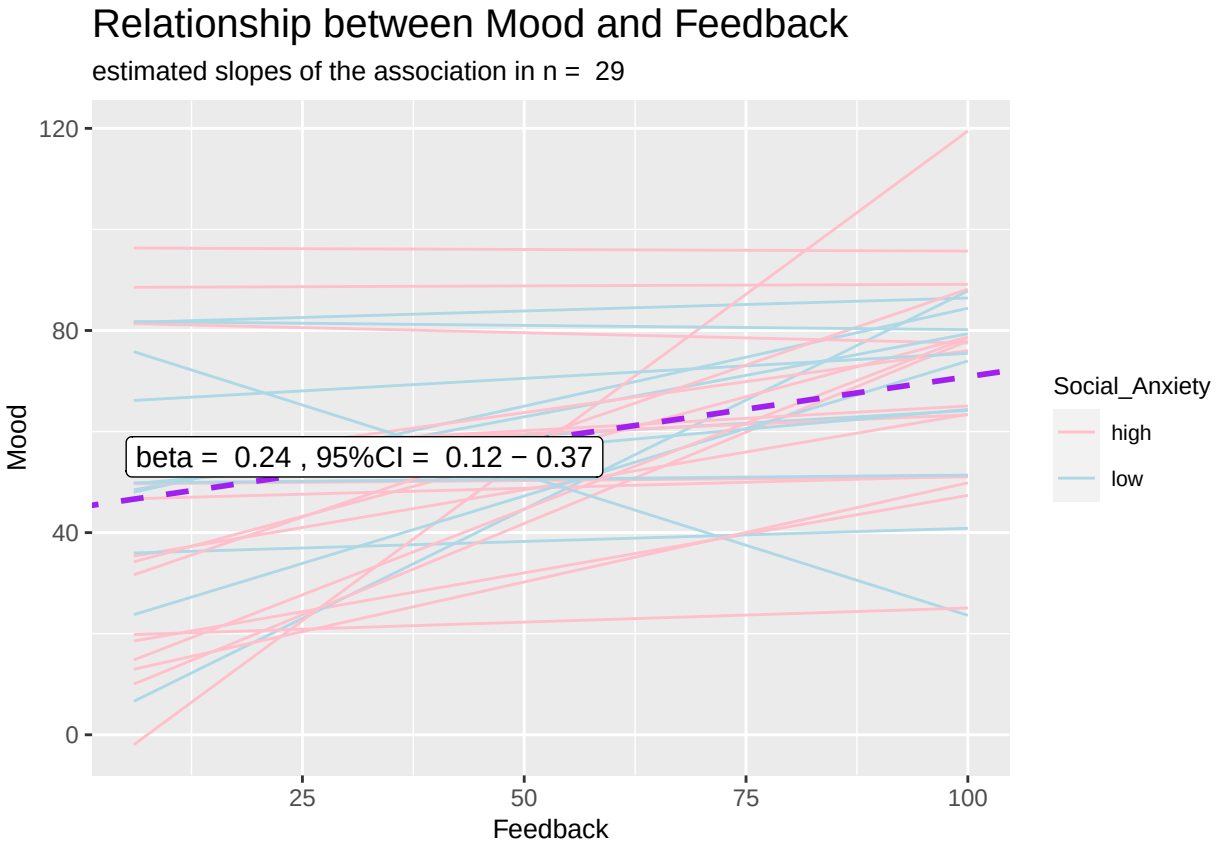
Individual plots with LME for Mood with SubjPE

When looking at subjective PE, the best model is Mood ~ SubjPE + (SubjPE | Random_ID) with an AIC of 11681.18



Individual plots with LME for Mood with feedback instead of SubjPE

When including feedback the best model is Mood ~ feedback + (feedback | Random_ID) with an AIC of 11615.



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: 11845.6
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -3.0209 -0.4357 -0.0555  0.4232  3.6596
##
## Random effects:
##  Groups    Name        Variance Std.Dev.
##  Random_ID (Intercept) 381.8    19.54
##  Residual              362.9    19.05
## Number of obs: 1344, groups:  Random_ID, 28
##
## Fixed effects:
##                 Estimate Std. Error t value
## (Intercept)      34.8326     3.7297   9.339
## Response_SubjPE  -0.1544     0.0217  -7.117
##
## Correlation of Fixed Effects:
##             (Intr)
## Rspns_SbjPE -0.017

## 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: 11752.6
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -3.2777 -0.3826 -0.0464  0.3745  3.9493
##
## Random effects:
##  Groups    Name            Variance  Std.Dev. Corr
##  Random_ID (Intercept)     419.83821 20.4900
##            Response_SubjPE   0.07659  0.2768  -0.54
##  Residual                  326.14082 18.0594
## Number of obs: 1344, groups:  Random_ID, 28
##
## Fixed effects:
##                 Estimate Std. Error t value
## (Intercept)     35.93818    3.90924   9.193
```

```
## Response_SubjPE -0.15649    0.05664  -2.763
##
## Correlation of Fixed Effects:
##             (Intr)
## Rspns_SbjPE -0.498
```

```
## 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: 11754.8
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -3.2688 -0.3821 -0.0443  0.3718  3.9539
##
## Random effects:
##  Groups    Name            Variance  Std.Dev. Corr
##  Random_ID (Intercept)     397.76596 19.9441
##            Response_SubjPE   0.07756  0.2785  -0.51
##  Residual                  326.11840 18.0587
## Number of obs: 1344, groups:  Random_ID, 28
##
## Fixed effects:
##                                 Estimate Std. Error t value
## (Intercept)                     25.98917    7.38303   3.520
## Response_SubjPE                 -0.07533    0.11099  -0.679
## mini_SPIN_total                  1.73055    1.10041   1.573
## Response_SubjPE:mini_SPIN_total -0.01410    0.01641  -0.859
##
## Correlation of Fixed Effects:
##             (Intr) Rs_SPE m_SPIN
## Rspns_SbjPE -0.469
## mn_SPIN_ttl -0.857  0.402
## R_SPE:_SPIN  0.405 -0.858 -0.474
```

```
## 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: 11817.5
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -2.9381 -0.4904 -0.0425  0.4152  3.6391
##
## Random effects:
##  Groups    Name        Variance Std.Dev.
##  Random_ID (Intercept) 355.2    18.85
##  Residual              355.8    18.86
## Number of obs: 1344, groups:  Random_ID, 28
```

```
##
## Fixed effects:
##               Estimate Std. Error t value
## (Intercept)   44.44565    3.77057  11.788
## Response_fdbk -0.19395    0.02169  -8.941
##
## Correlation of Fixed Effects:
##             (Intr)
## Respns_fdbk -0.298

## 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: 11693.6
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -3.2332 -0.3981 -0.0474  0.3874  3.9904
##
## Random effects:
##  Groups    Name          Variance  Std.Dev. Corr
##  Random_ID (Intercept)   823.02113 28.6883
##            Response_fdbk   0.07971  0.2823  -0.81
##  Residual                311.58043 17.6516
## Number of obs: 1344, groups:  Random_ID, 28
##
## Fixed effects:
##               Estimate Std. Error t value
## (Intercept)   44.44565    5.54378   8.017
## Response_fdbk -0.19395    0.05709  -3.397
##
## Correlation of Fixed Effects:
##             (Intr)
## Respns_fdbk -0.809

## 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: 11695.2
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -3.2509 -0.3940 -0.0447  0.3880  4.0007
##
## Random effects:
##  Groups    Name          Variance  Std.Dev. Corr
##  Random_ID (Intercept)   759.96592 27.5675
##            Response_fdbk   0.07753  0.2784  -0.80
##  Residual                311.58056 17.6516
```

```
## Number of obs: 1344, groups:  Random_ID, 28
##
## Fixed effects:
##                               Estimate Std. Error t value
## (Intercept)                    28.7452    10.3503   2.777
## Response_fdbk                  -0.0732     0.1094  -0.669
## mini_SPIN_total                 2.7305     1.5423   1.770
## Response_fdbk:mini_SPIN_total  -0.0210     0.0163  -1.288
##
## Correlation of Fixed Effects:
##             (Intr) Rspns_ m_SPIN
## Respns_fdbk -0.795
## mn_SPIN_ttl -0.857  0.681
## Rsp_:_SPIN_  0.681 -0.857 -0.795
```

```
## [1] 11853.59
```

```
## [1] 11764.61
```

```
## [1] 11770.79
```

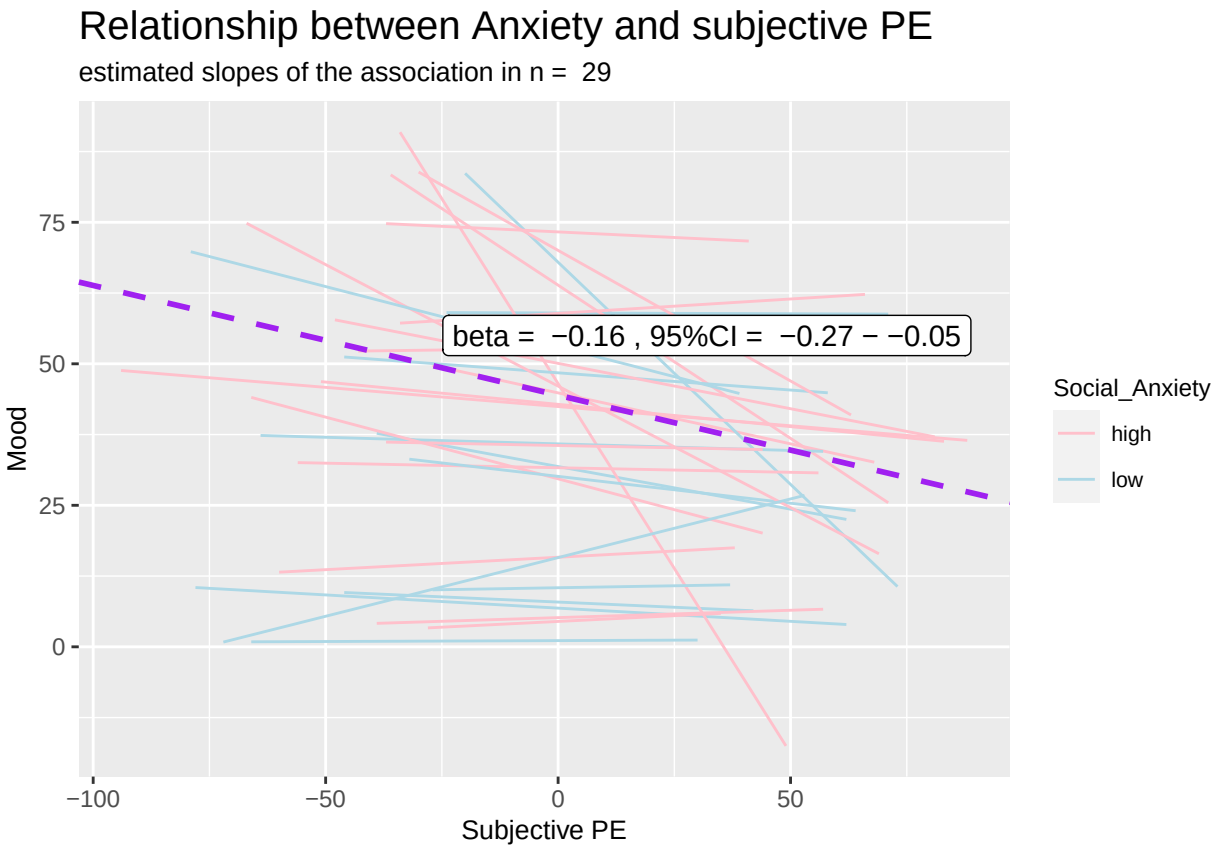
```
## [1] 11825.53
```

```
## [1] 11705.6
```

```
## [1] 11711.22
```

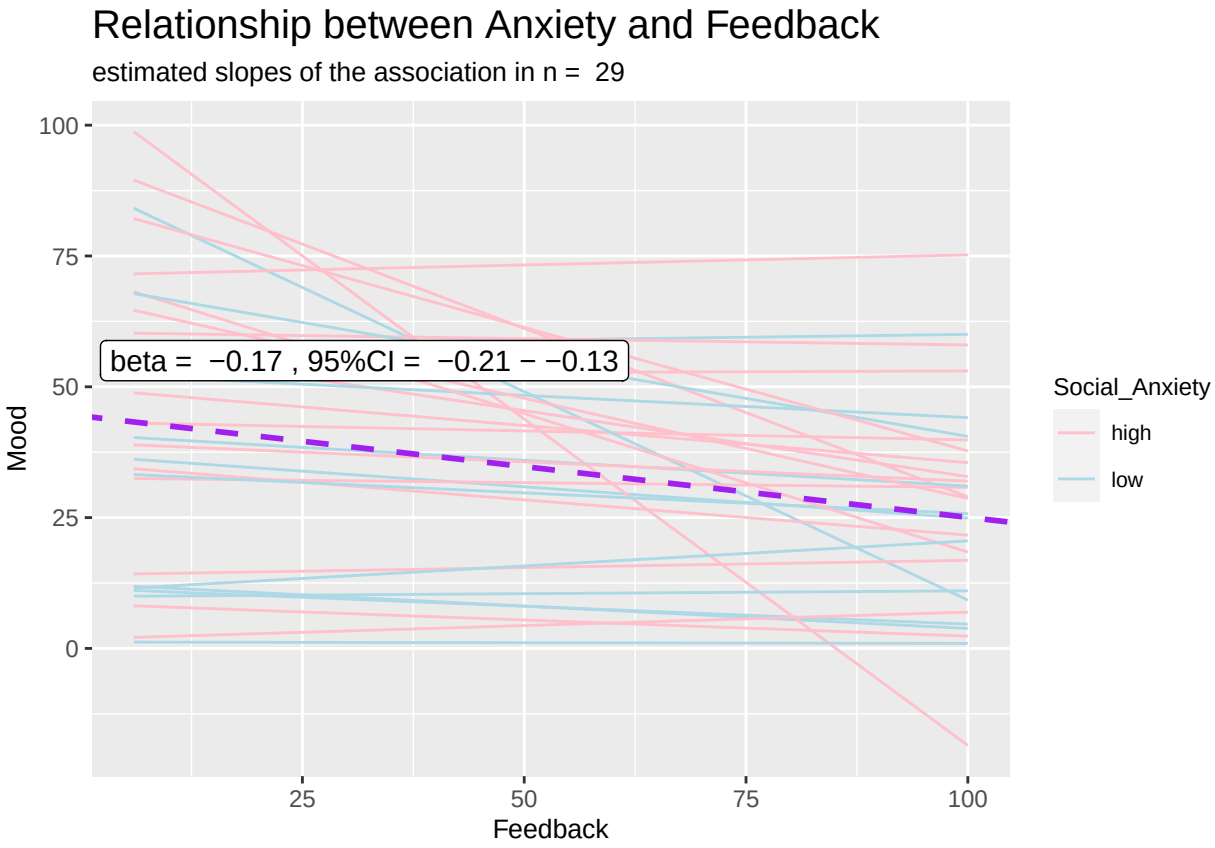
Individual plots with LME for Anxiety with SubjPE

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



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



Bayesian LME