Surprise Study Pilot 10 Analysis

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Study description

Pilot 10: Same version of the task as pilot 9 (prediction, bigger feedback, replacing anxiety with nervous/uncomfortable) + video/audio

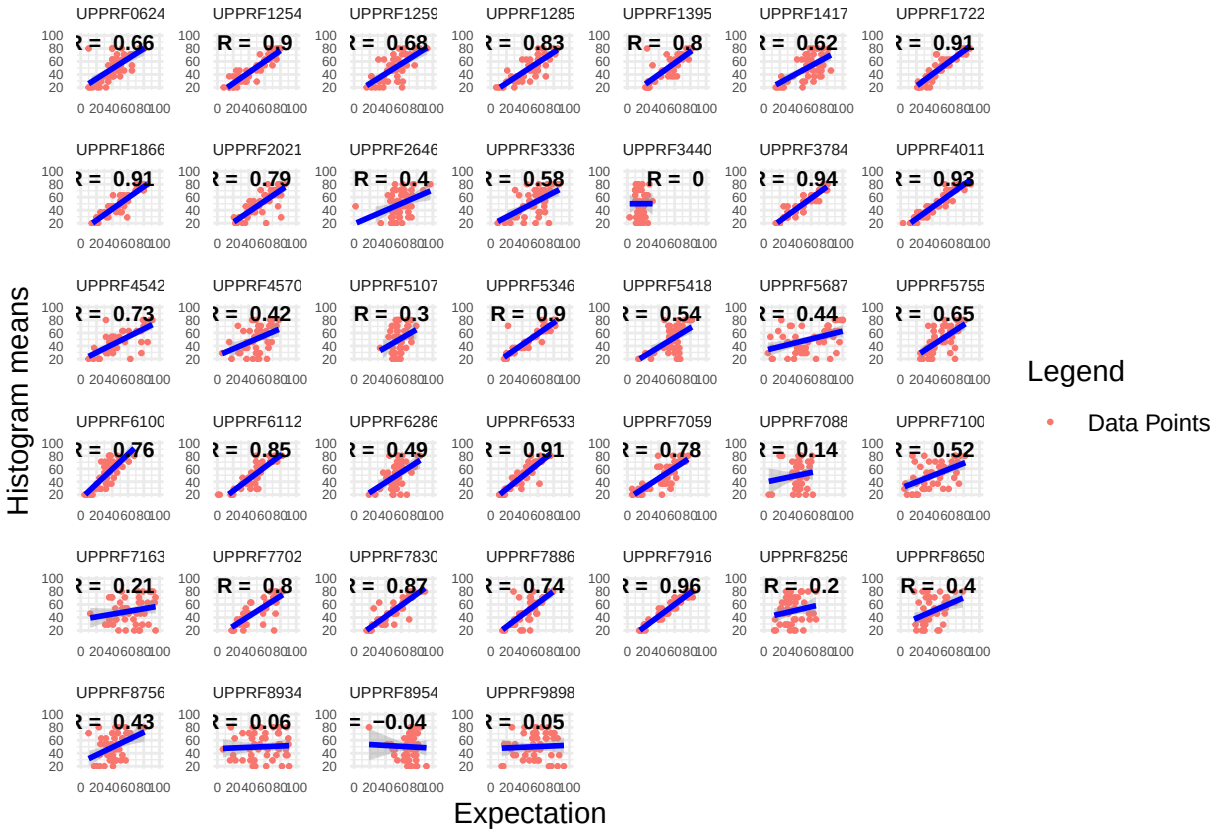
Goal: We used the task version from pilot 9, re-introducing the video. The task can be found here: https://app.gorilla.sc/admin/task/698788/editor

notes: 1) Gorilla does not allow recording audio and video files separately, so we have to always make sure "audio" is not ticked in the setting and we only choose the video. Video file will include the audio, otherwise, audio files will overwrite the video files. 2) The second issue is that video files are only 4s approximately despite the trials being 15s, Elena is in contact with the Gorilla support team to resolve this issue. Although it does not impact the current data, we do want to solve it for the actual experiment in case someone wants to analyse those video data in the future.

Histogram and prediction relationship

There were three people that ignored the histogram values and always chose similar values for prediction: "SUBPRF34408", "SUBPRF70880", "SUBPRF89542". I will do the analysis with and without them to see how they influenced the group correlations with anxiety and mood.

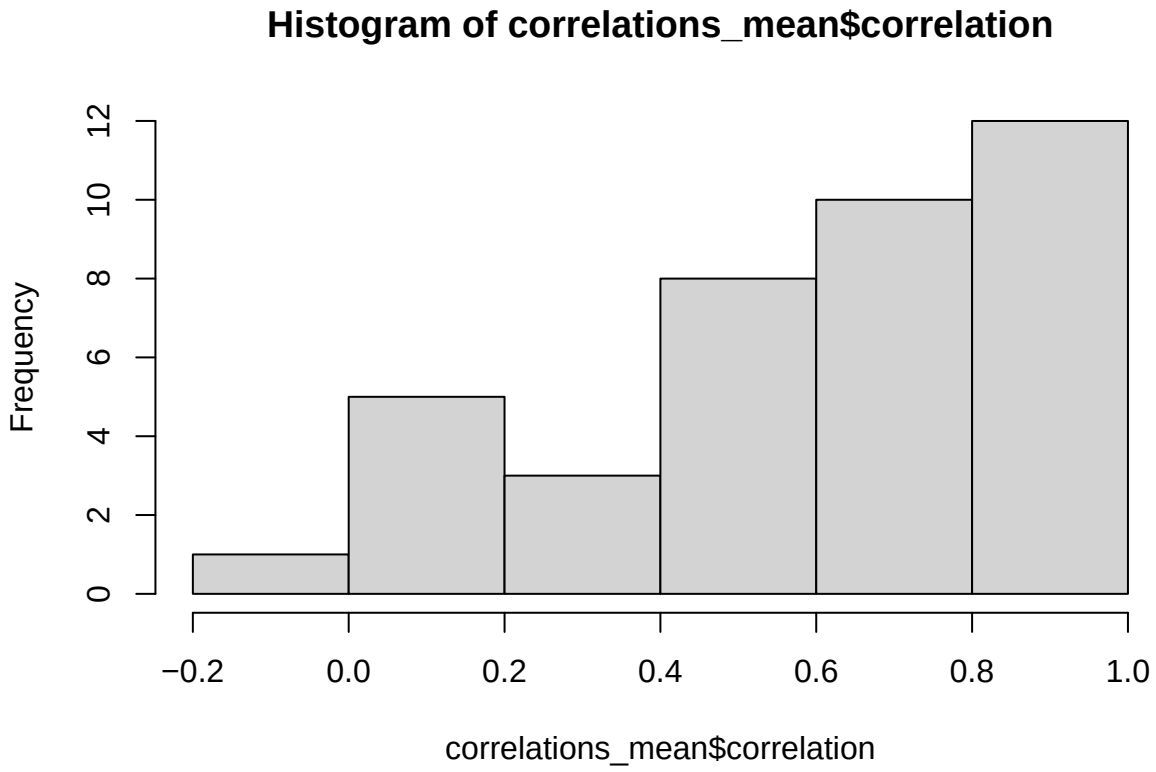
```
## [1] "average correlation between prediction and m_hist: 0.591578772599636"
```



Below we can see the average correlation between hist_mean and prediction and the histogram of the individual correlations.

```
## [1] "average of correlations: 0.591578772599636"
```

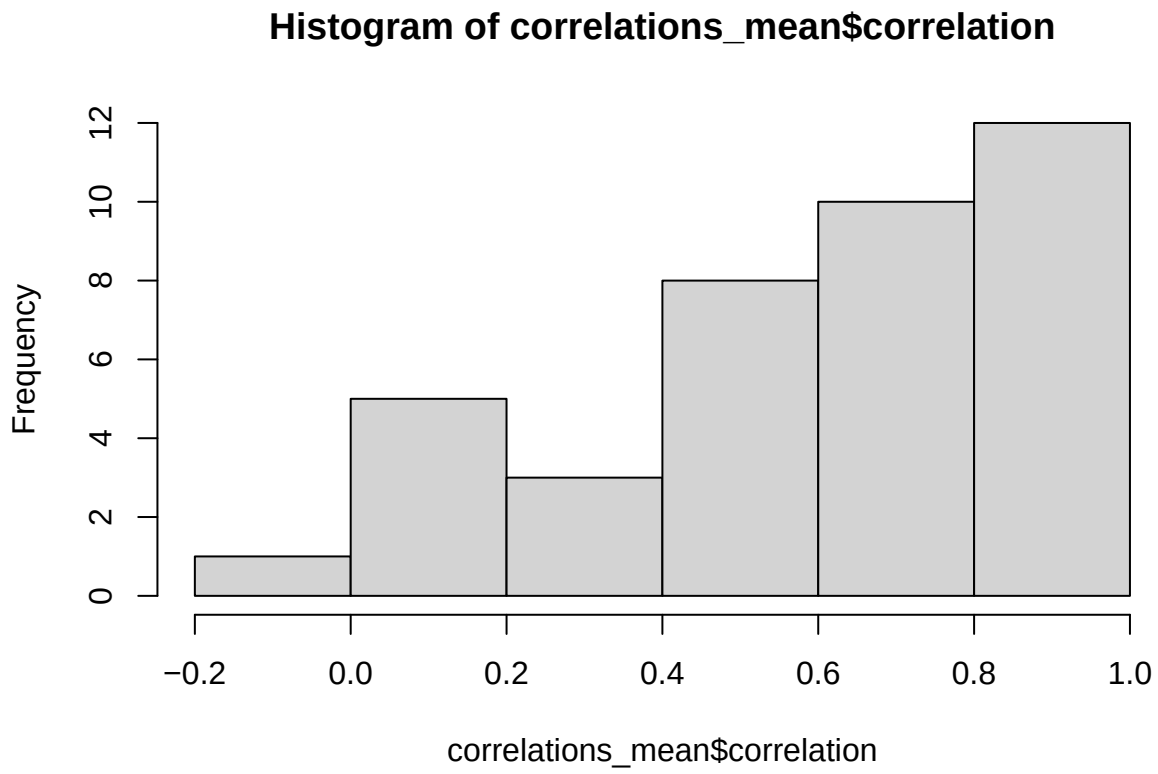
```
## [1] "sd of correlations: 0.298916065846828"
```



I will remove those 3 people who ignored the histogram and gave similar predictions across all trials and repeat the correlation:

```
## [1] "average of correlations: 0.591578772599636"
```

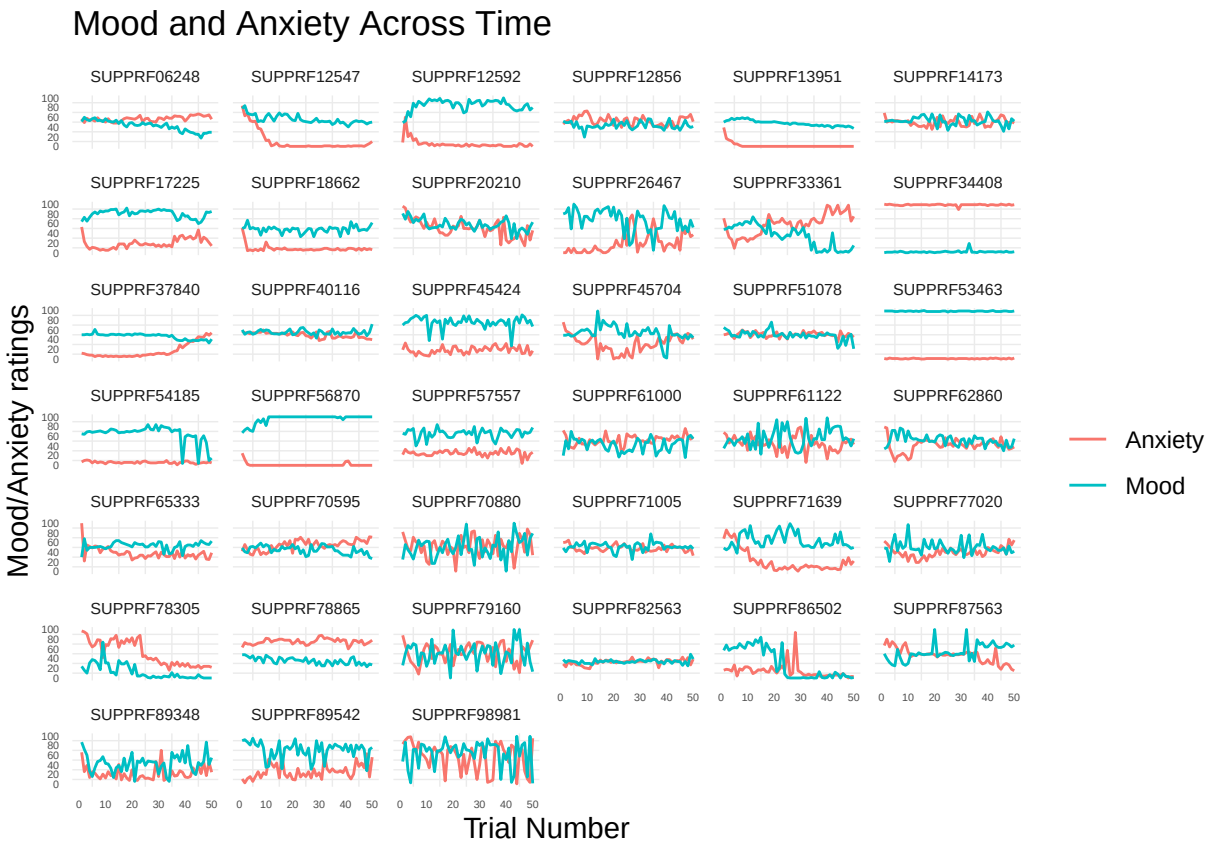
```
## [1] "sd of correlations: 0.298916065846828"
```



Histogram and prediction across trials

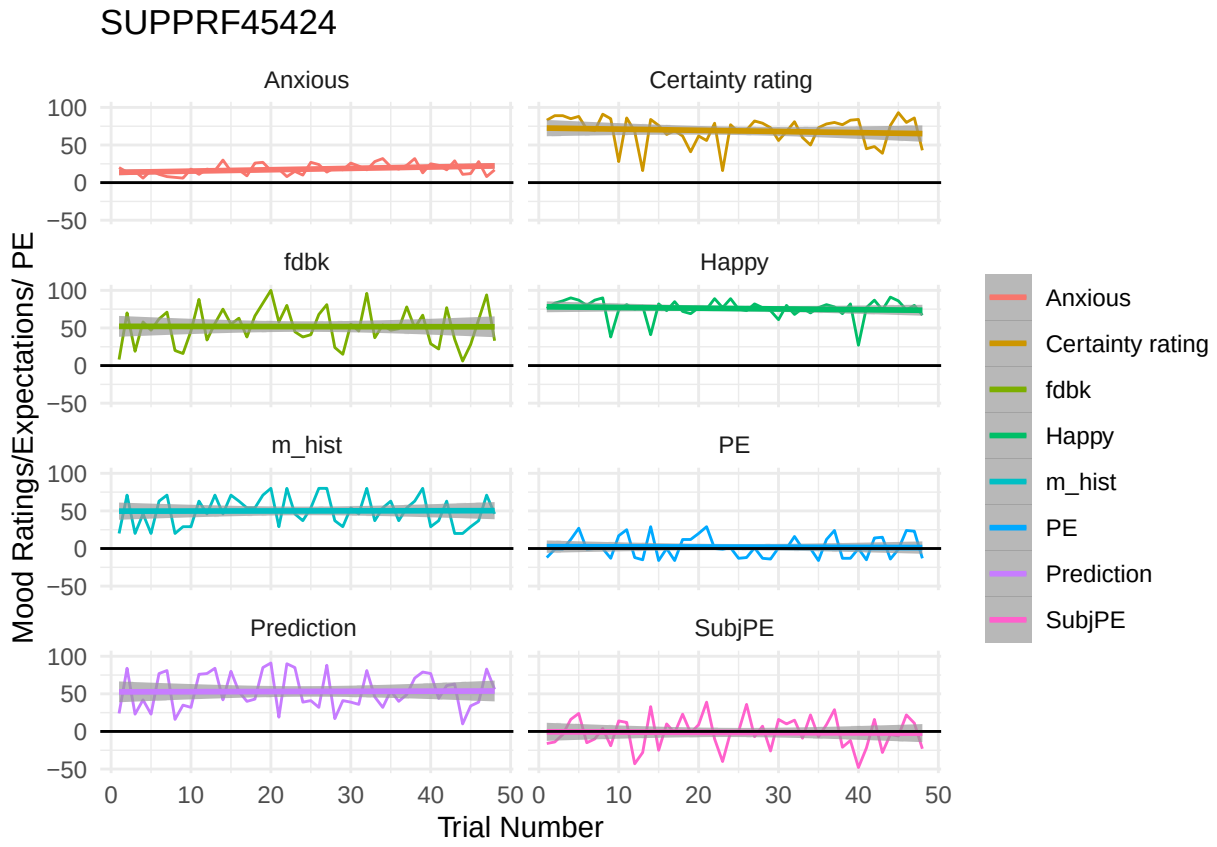
The figure below shows the histogram and expectation values over time and across trials.

Anxiety and mood across trials



Plots for all variables per subject

Now let's make plots for each subject that show how prediction, feedback, histogram mean, anxiety, mood, confidence rating, PE (feedback - histogram), subj_PE (feedback-prediction): one plot per subject. Two subjects had a flat 0 line for anxiety.

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Certainty rating
fdbk
Happy
m_hist
PE
Prediction
SubjPE
Mood Ratings/Expectations/ PE
Trial Number
100
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20
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Anxious
Certainty rating
fdbk
Happy
m_hist
PE
Prediction
SubjPE


SUPPRF45704
Anxious
Certainty rating
fdbk
Happy
m_hist
PE
Prediction
SubjPE
Mood Ratings/Expectations/ PE
Trial Number
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Anxious
Certainty rating
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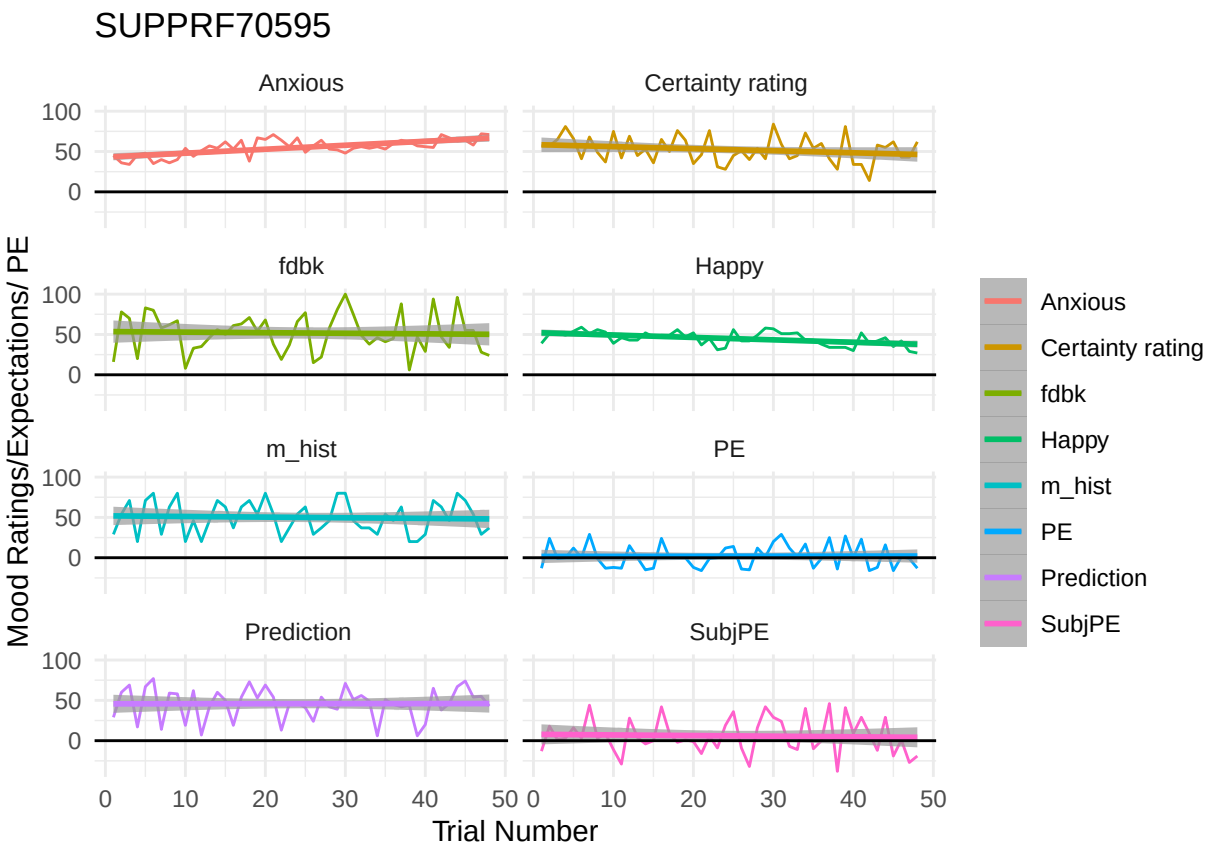
Happy
m_hist
PE
Prediction
SubjPE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Certainty rating
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Happy
m_hist
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Prediction
SubjPE
Mood Ratings/Expectations/ PE
Trial Number
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Certainty rating
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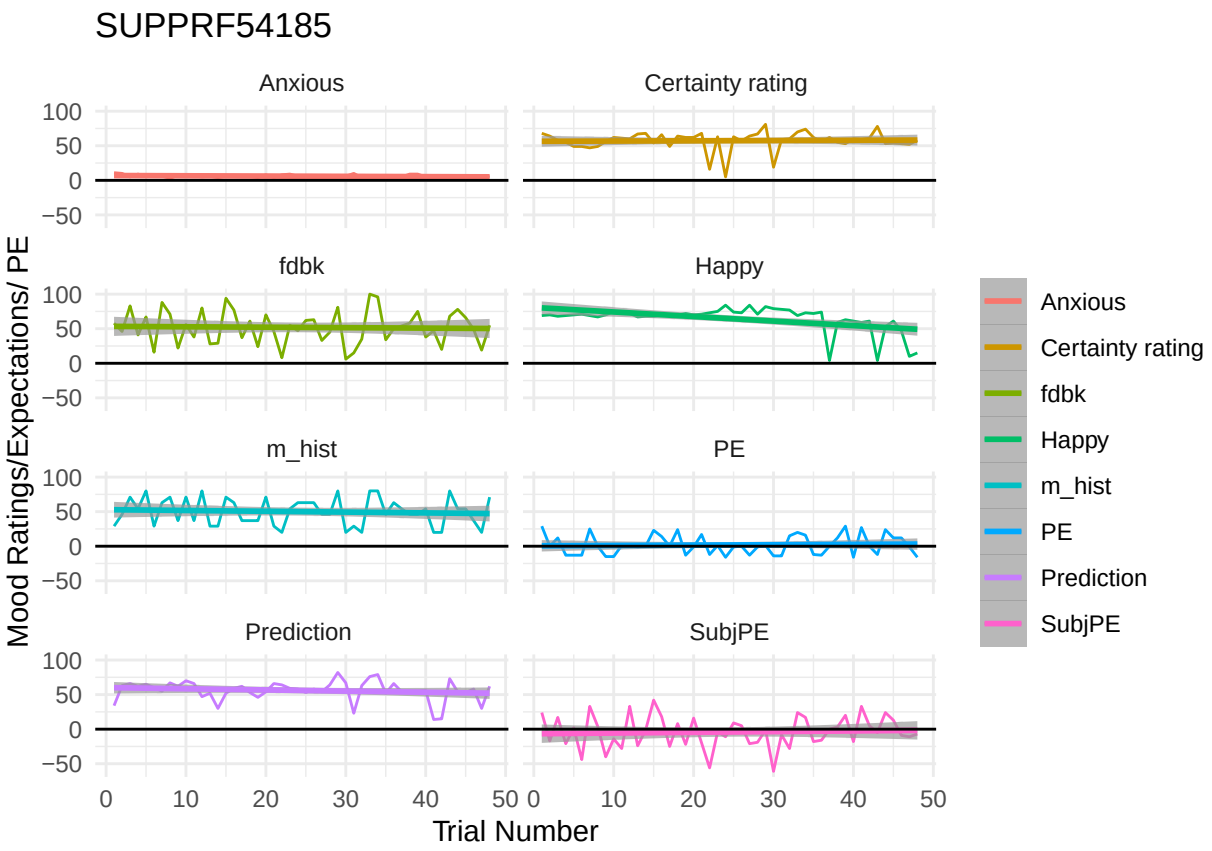
Happy
m_hist
PE
Prediction
SubjPE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Prediction
SubjPE
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Mood Ratings/Expectations/ PE
Trial Number
Anxious
Certainty rating
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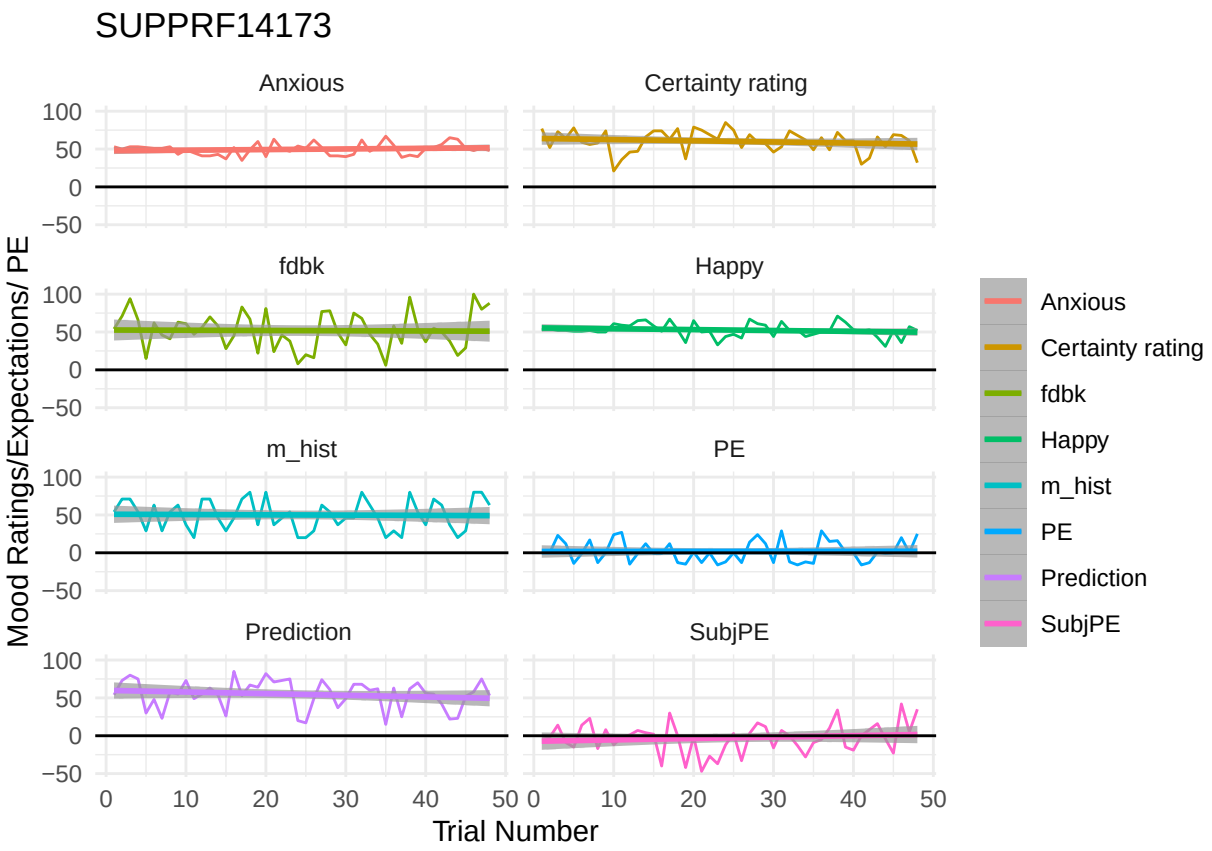
Happy
m_hist
PE
Prediction
SubjPE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Prediction
SubjPE
Mood Ratings/Expectations/ PE
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Certainty rating
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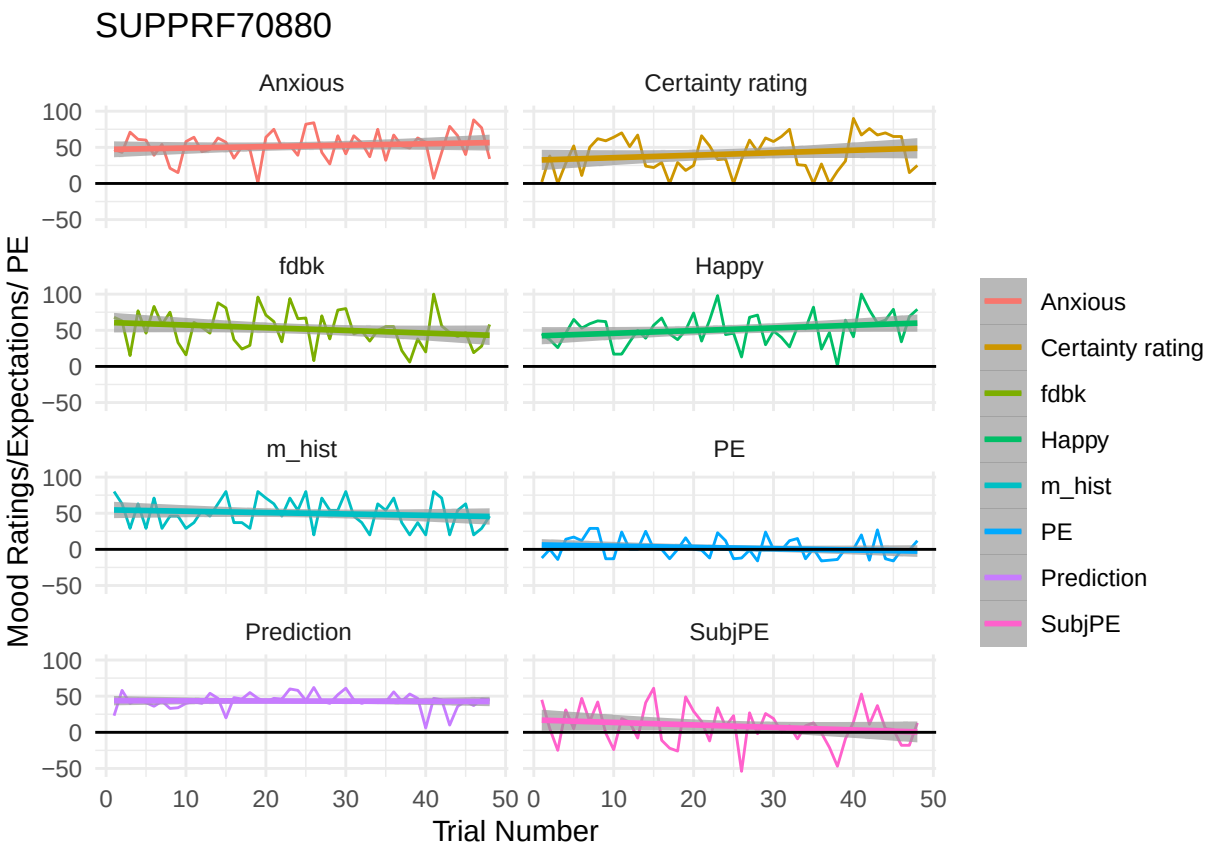
Happy
m_hist
PE
Prediction
SubjPE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Prediction
SubjPE
Mood Ratings/Expectations/ PE
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Anxious
Certainty rating
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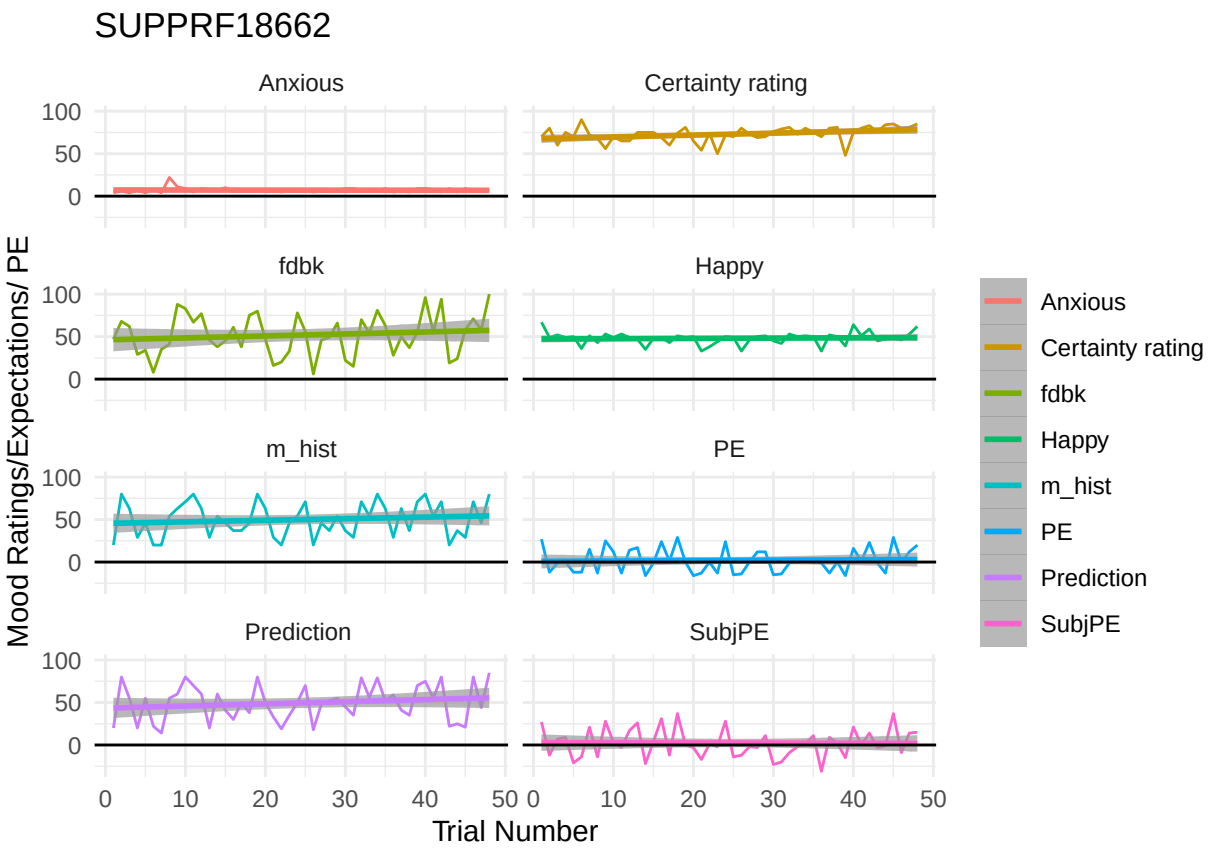
Happy
m_hist
PE
Prediction
SubjPE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Prediction
SubjPE
Mood Ratings/Expectations/ PE
Trial Number
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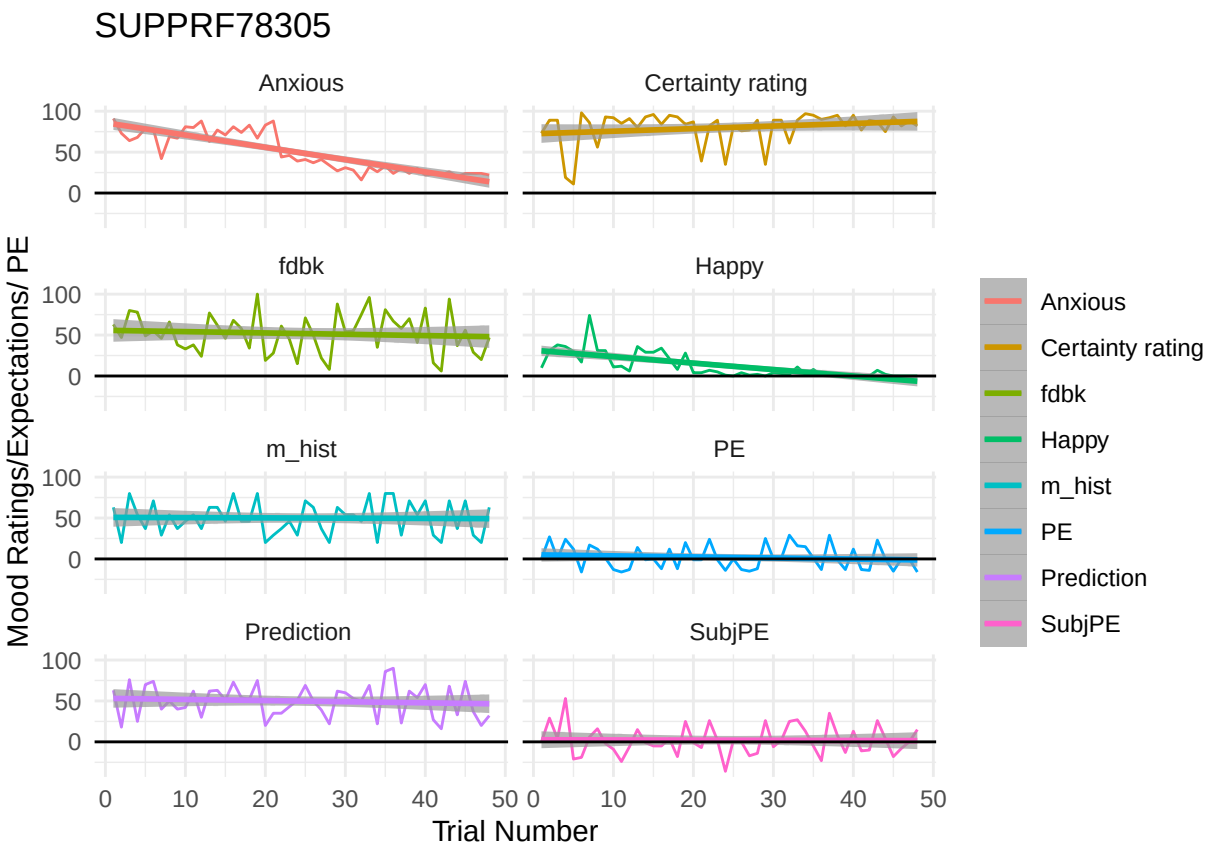
Anxious
Certainty rating
fdbk
Happy
m_hist
PE
Prediction
SubjPE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Prediction
SubjPE
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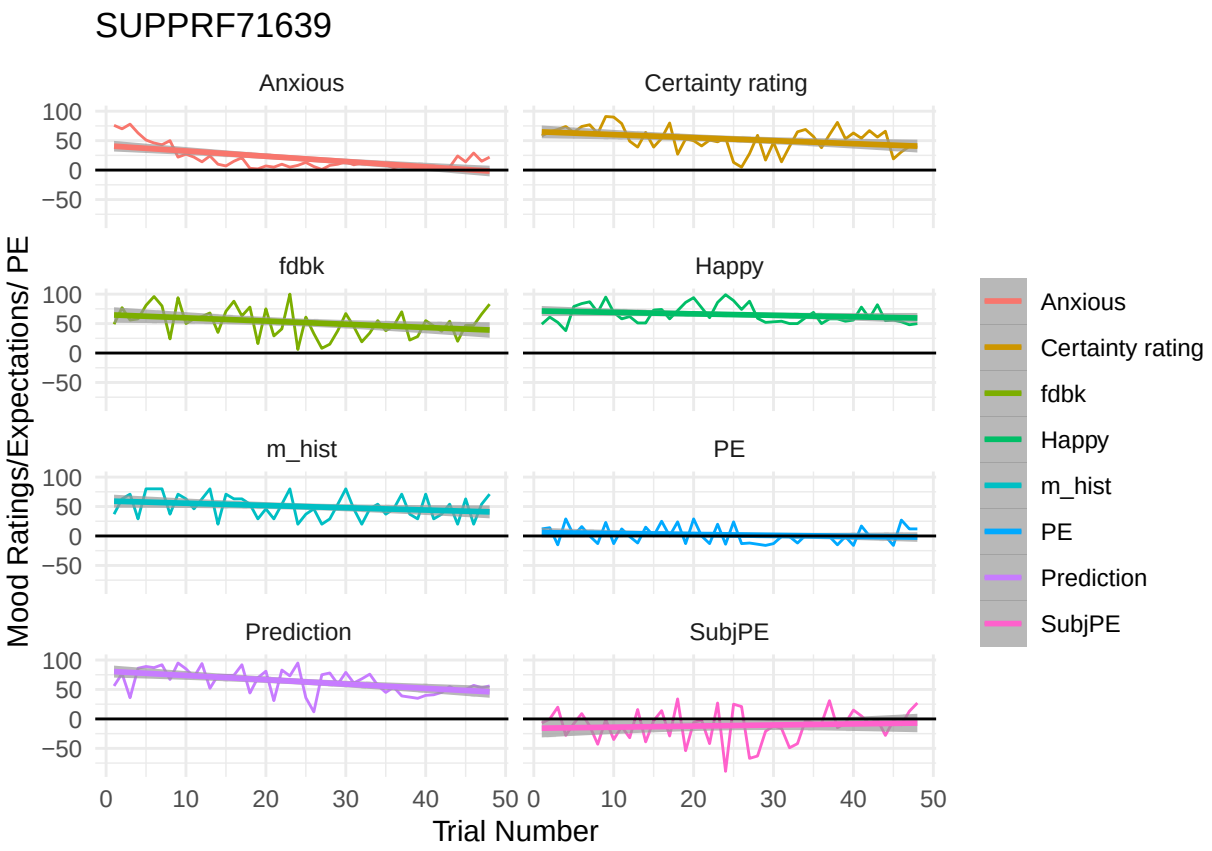
Mood Ratings/Expectations/ PE
Trial Number
Anxious
Certainty rating
fdbk
Happy
m_hist
PE
Prediction
SubjPE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Prediction
SubjPE
Mood Ratings/Expectations/ PE
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Certainty rating
fdbk
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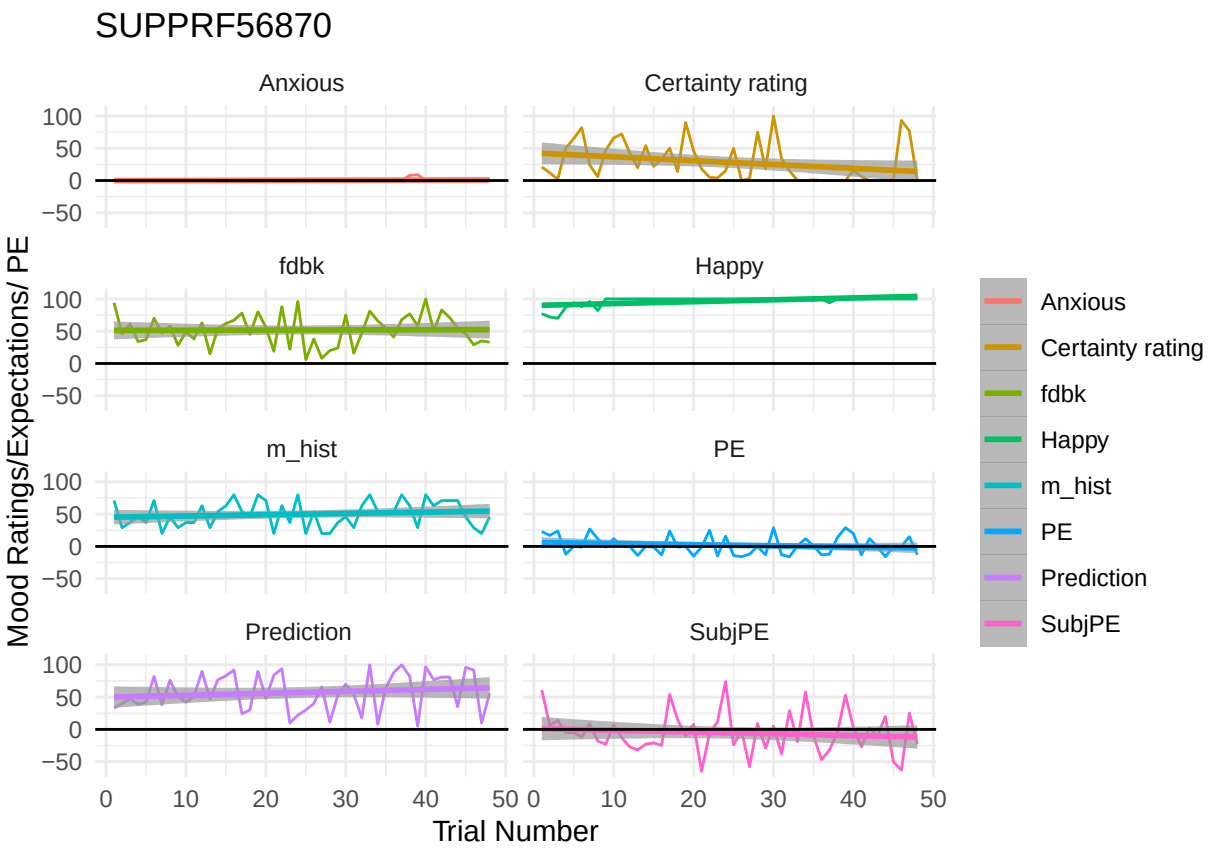
m_hist
PE
Prediction
SubjPE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Prediction
SubjPE
Mood Ratings/Expectations/ PE
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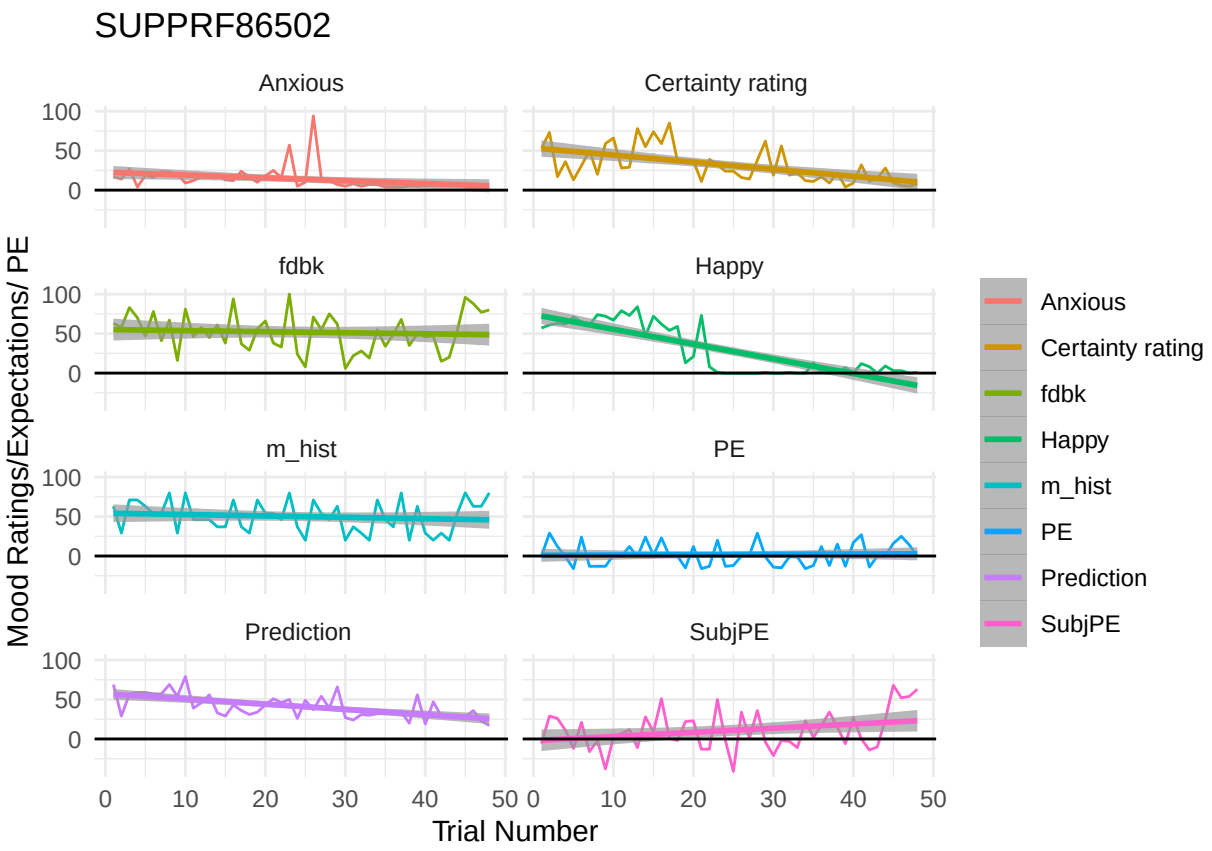
Certainty rating
fdbk
Happy
m_hist
PE
Prediction
SubjPE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Prediction
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Mood Ratings/Expectations/ PE
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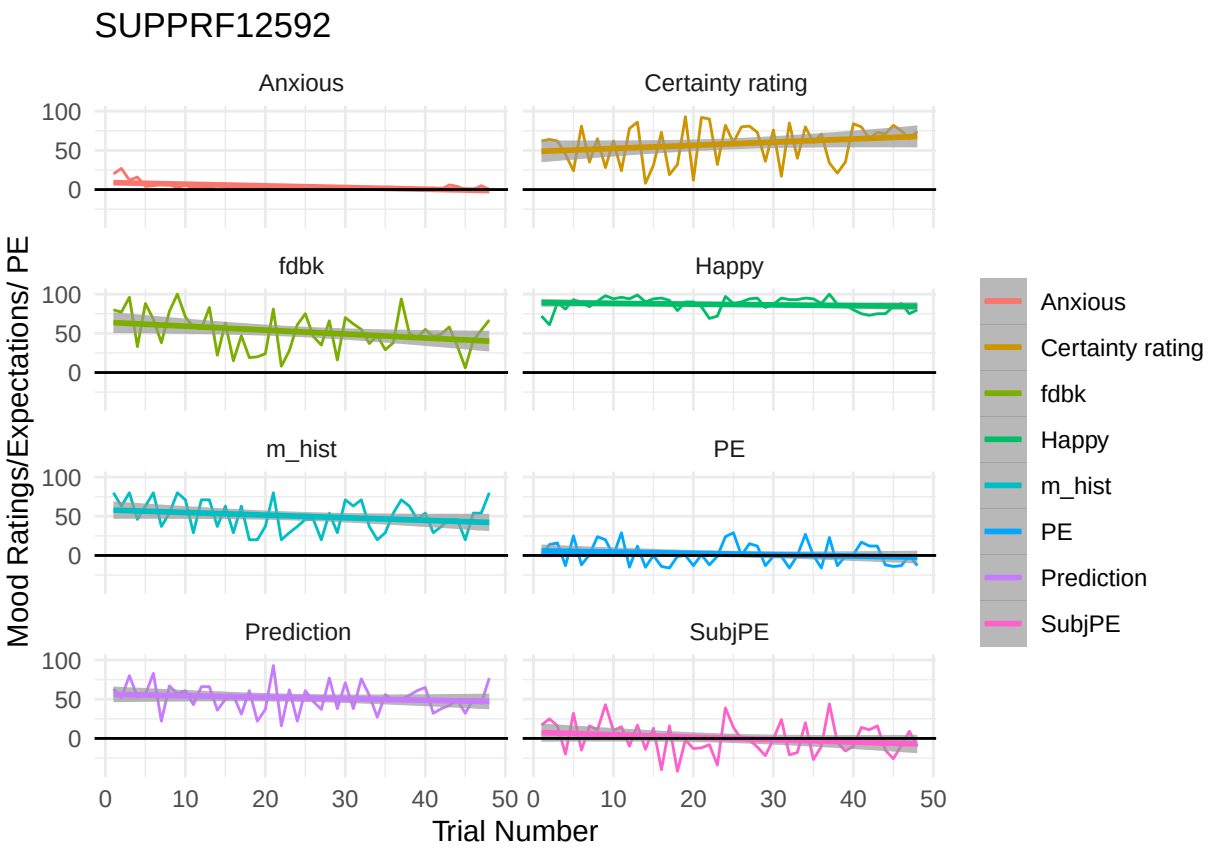
Certainty rating
fdbk
Happy
m_hist
PE
Prediction
SubjPE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Prediction
SubjPE
Mood Ratings/Expectations/ PE
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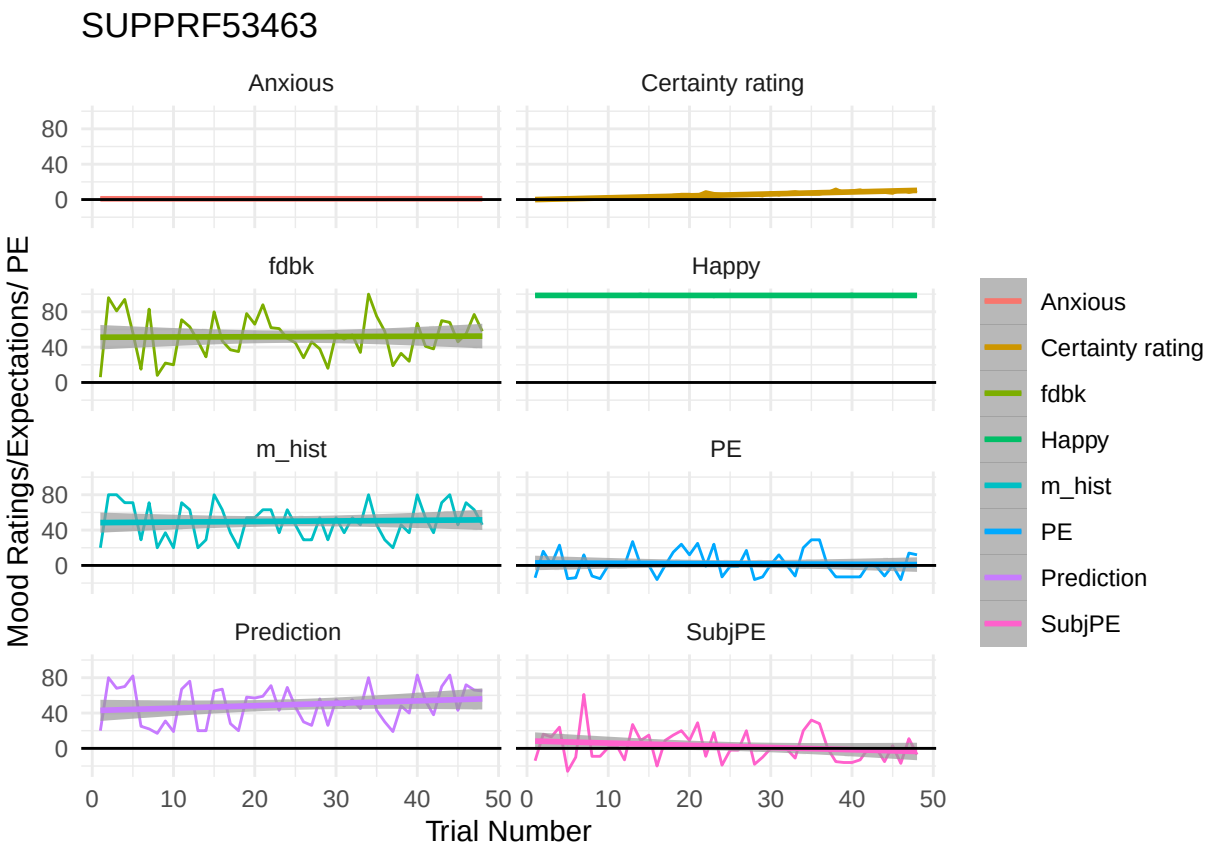
Certainty rating
fdbk
Happy
m_hist
PE
Prediction
SubjPE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Prediction
SubjPE
Mood Ratings/Expectations/ PE
Trial Number
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Anxious
Certainty rating
fdbk
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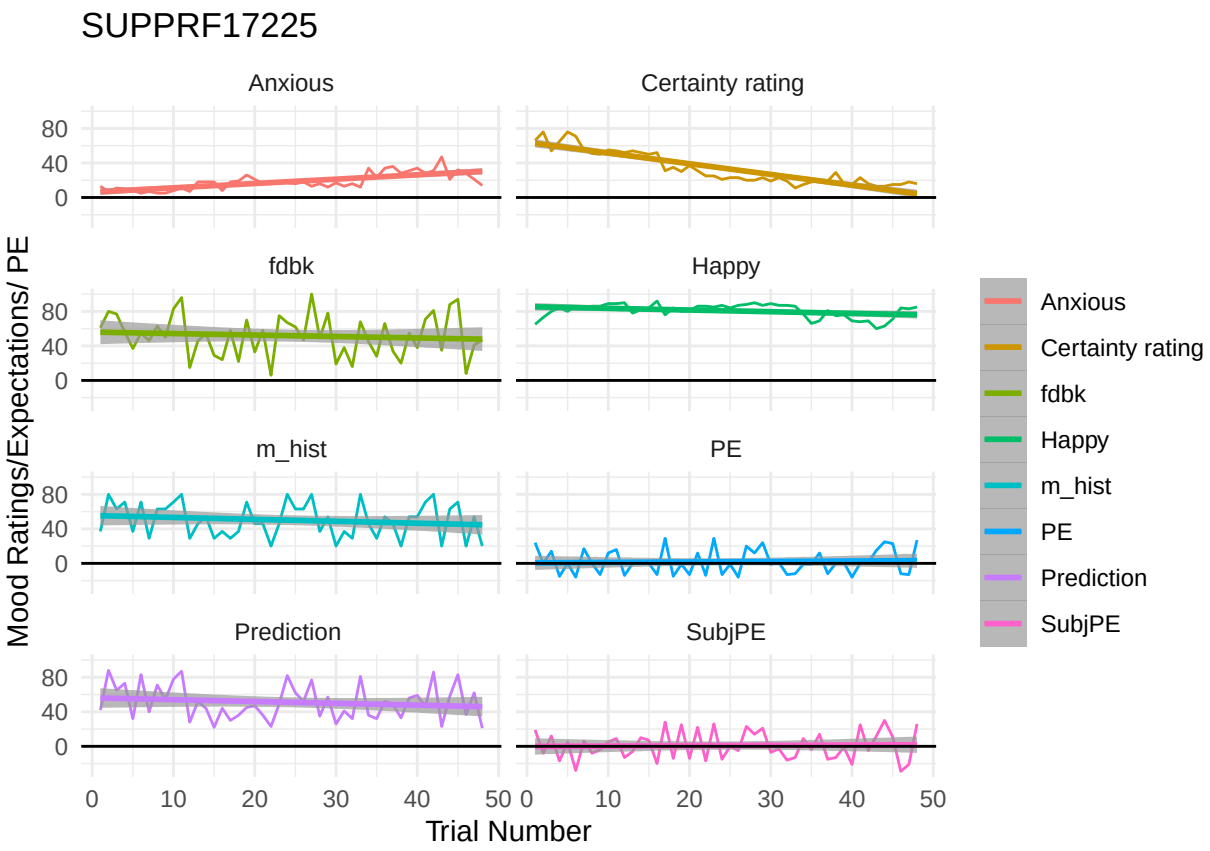
m_hist
PE
Prediction
SubjPE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Prediction
SubjPE
Mood Ratings/Expectations/ PE
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Anxious
Certainty rating
fdbk
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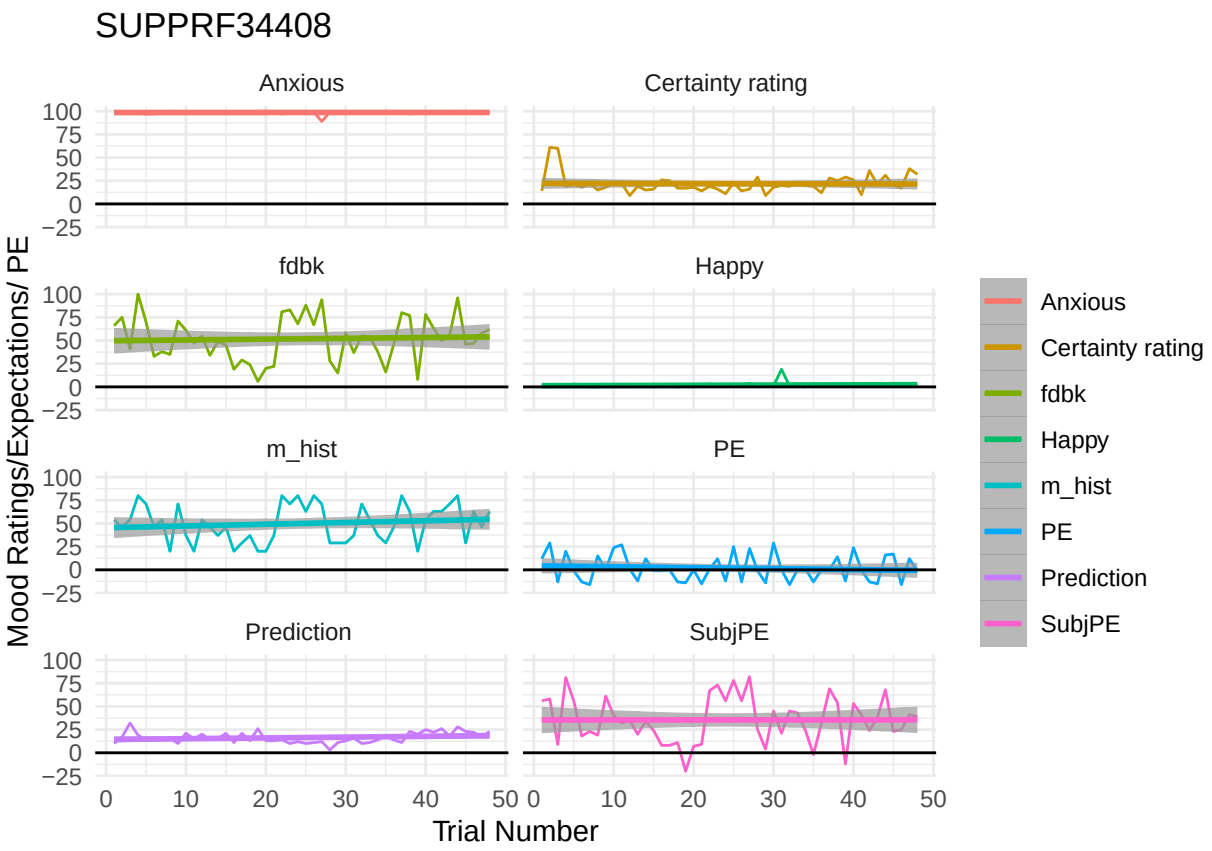
m_hist
PE
Prediction
SubjPE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Prediction
SubjPE
Mood Ratings/Expectations/ PE
Trial Number
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Certainty rating
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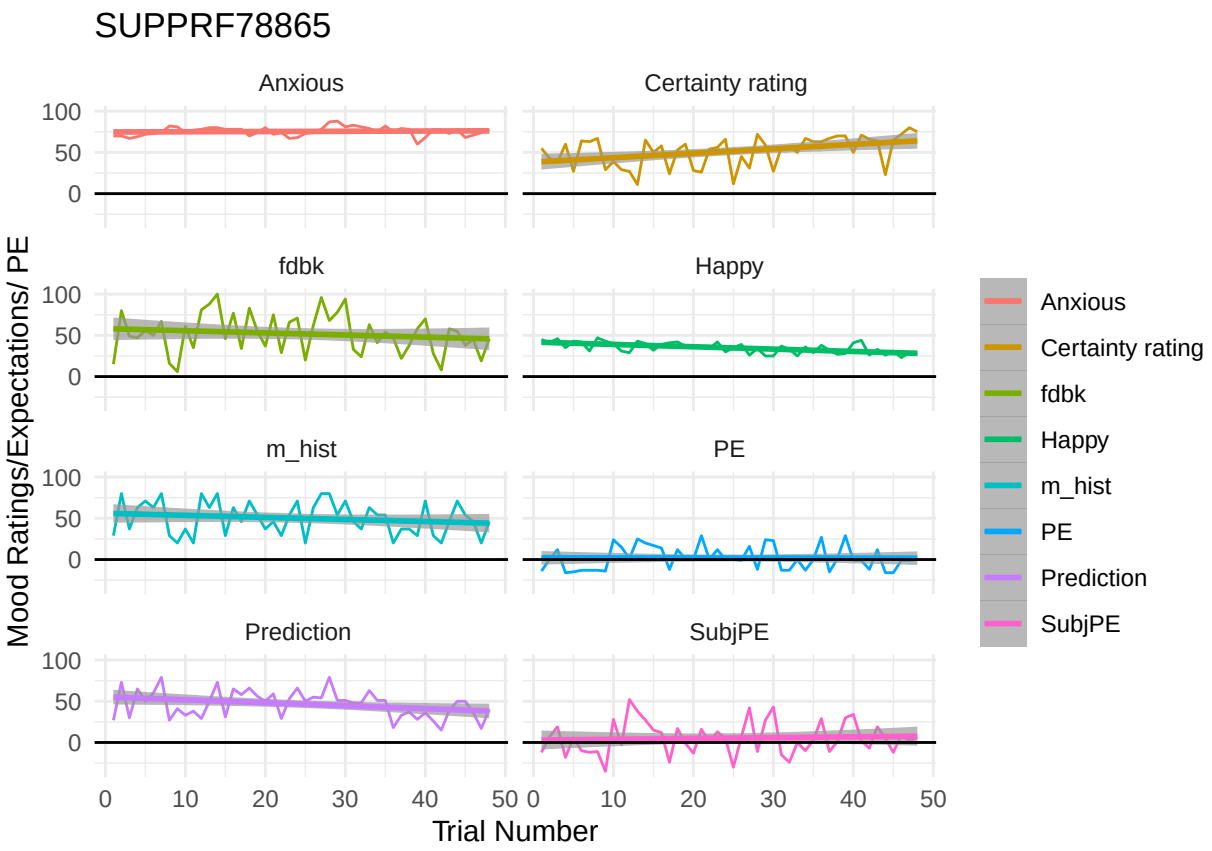
Happy
m_hist
PE
Prediction
SubjPE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Prediction
SubjPE
Mood Ratings/Expectations/ PE
Trial Number
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Certainty rating
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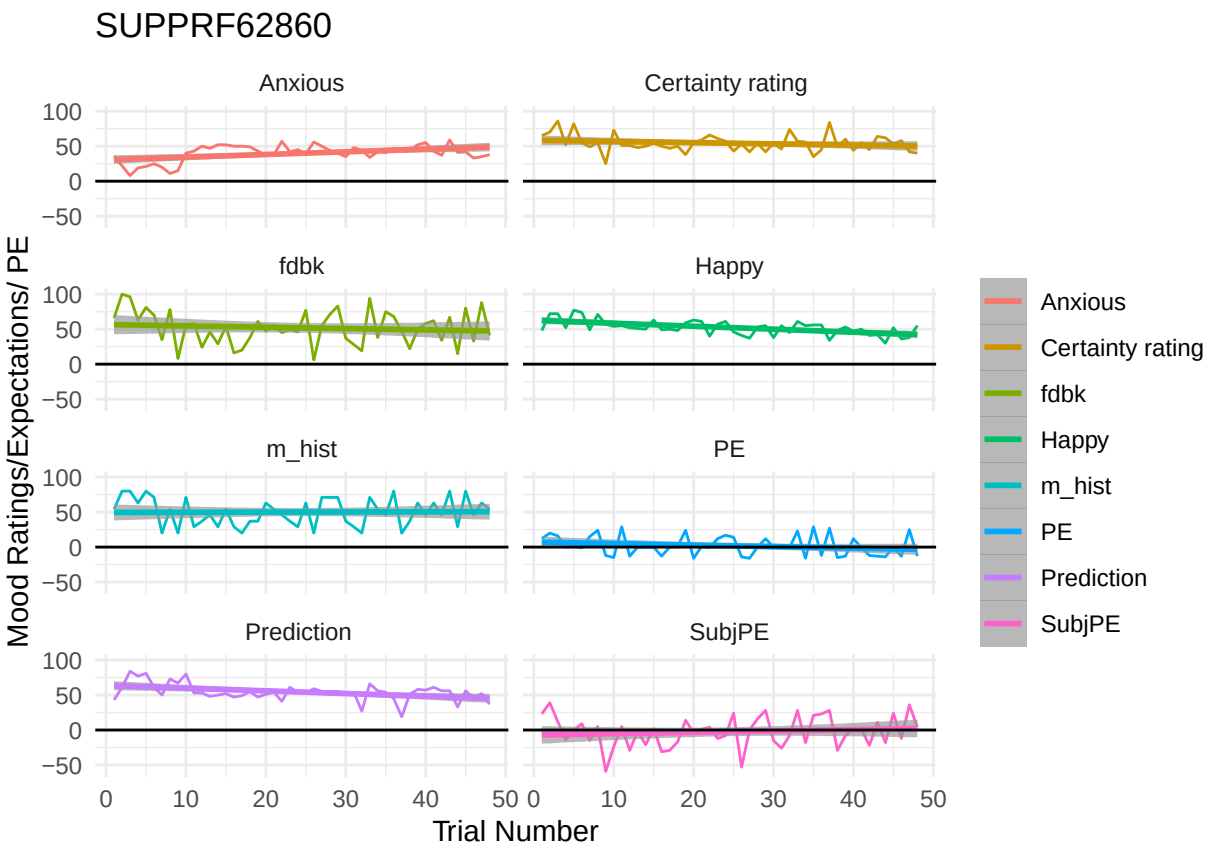
PE
Prediction
SubjPE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Prediction
SubjPE
Mood Ratings/Expectations/ PE
Trial Number
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Certainty rating
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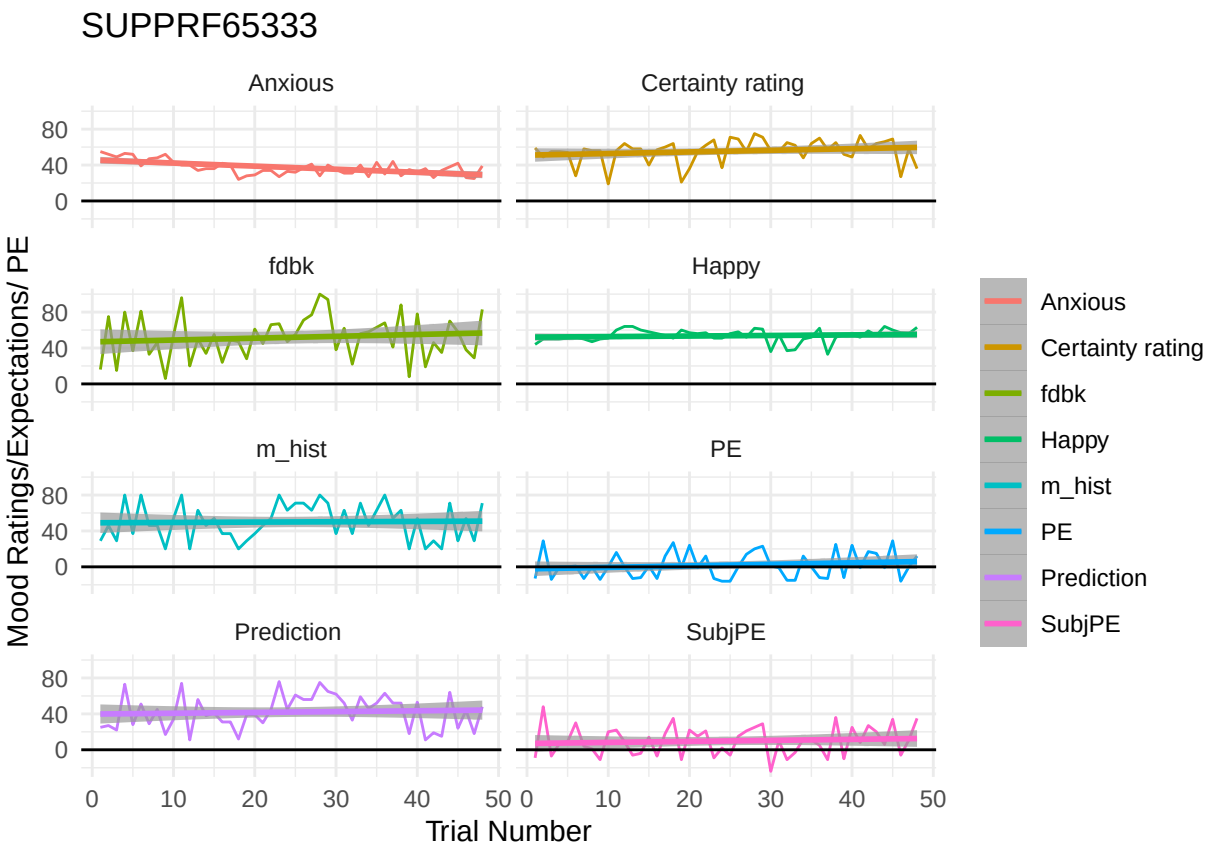
PE
Prediction
SubjPE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Prediction
SubjPE
Mood Ratings/Expectations/ PE
Trial Number
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Certainty rating
fdbk
Happy
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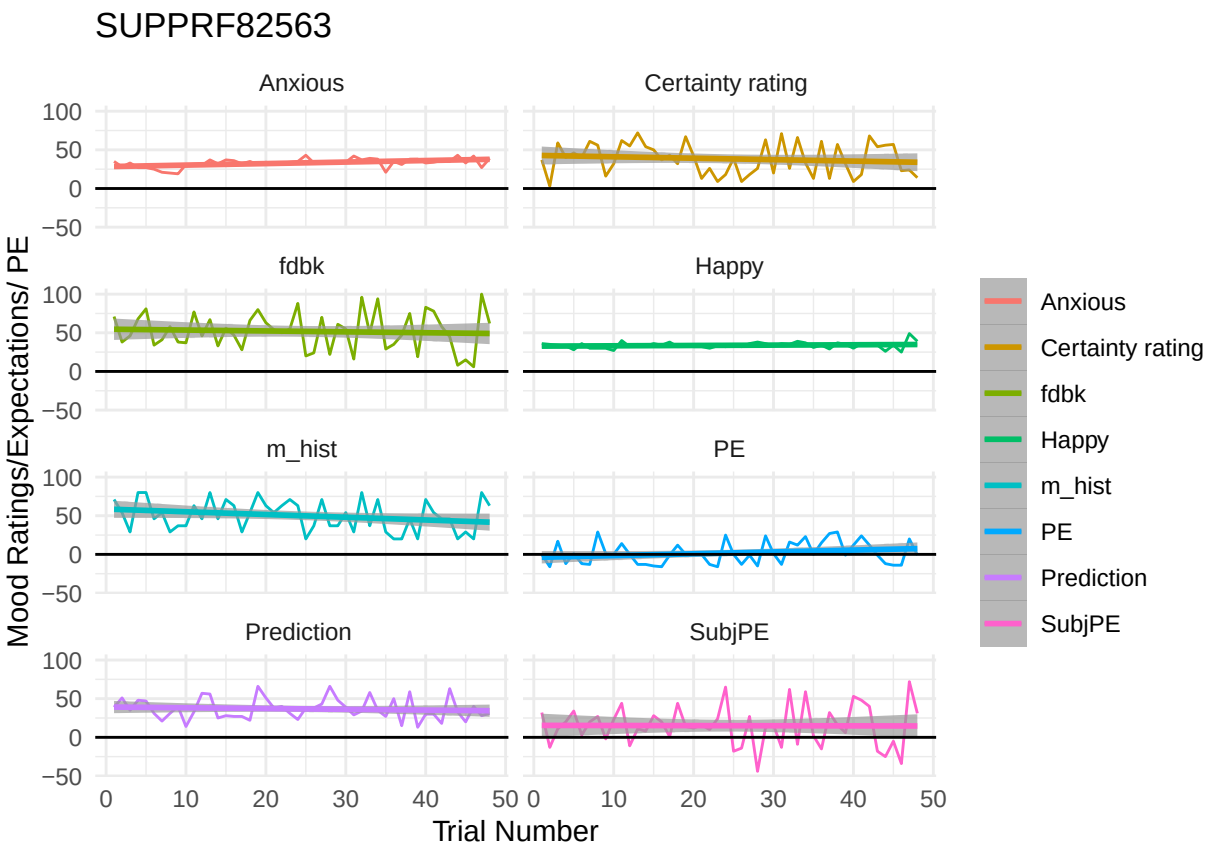
PE
Prediction
SubjPE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PE
Prediction
SubjPE
Mood Ratings/Expectations/ PE
Trial Number
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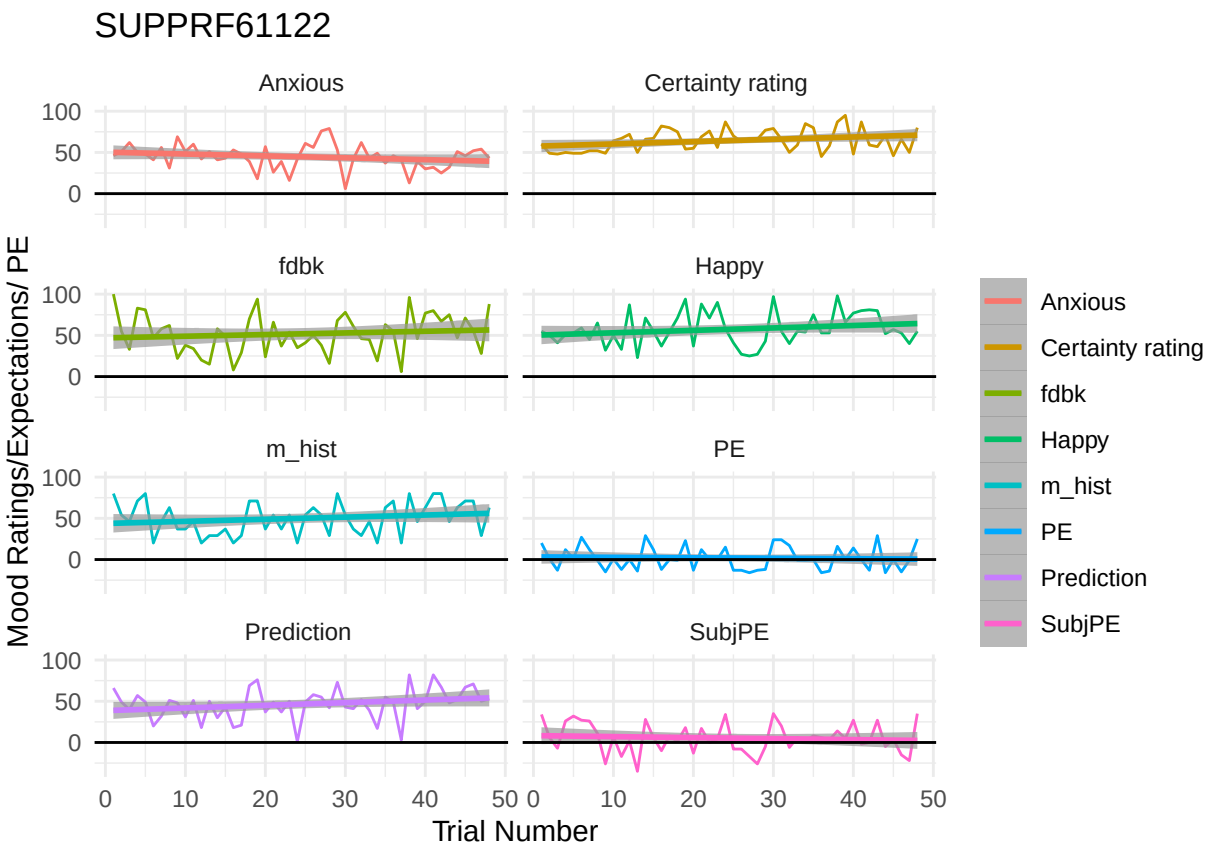
Certainty rating
fdbk
Happy
m_hist
PE
Prediction
SubjPE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m_hist
PE
Prediction
SubjPE
Mood Ratings/Expectations/ PE
Trial Number
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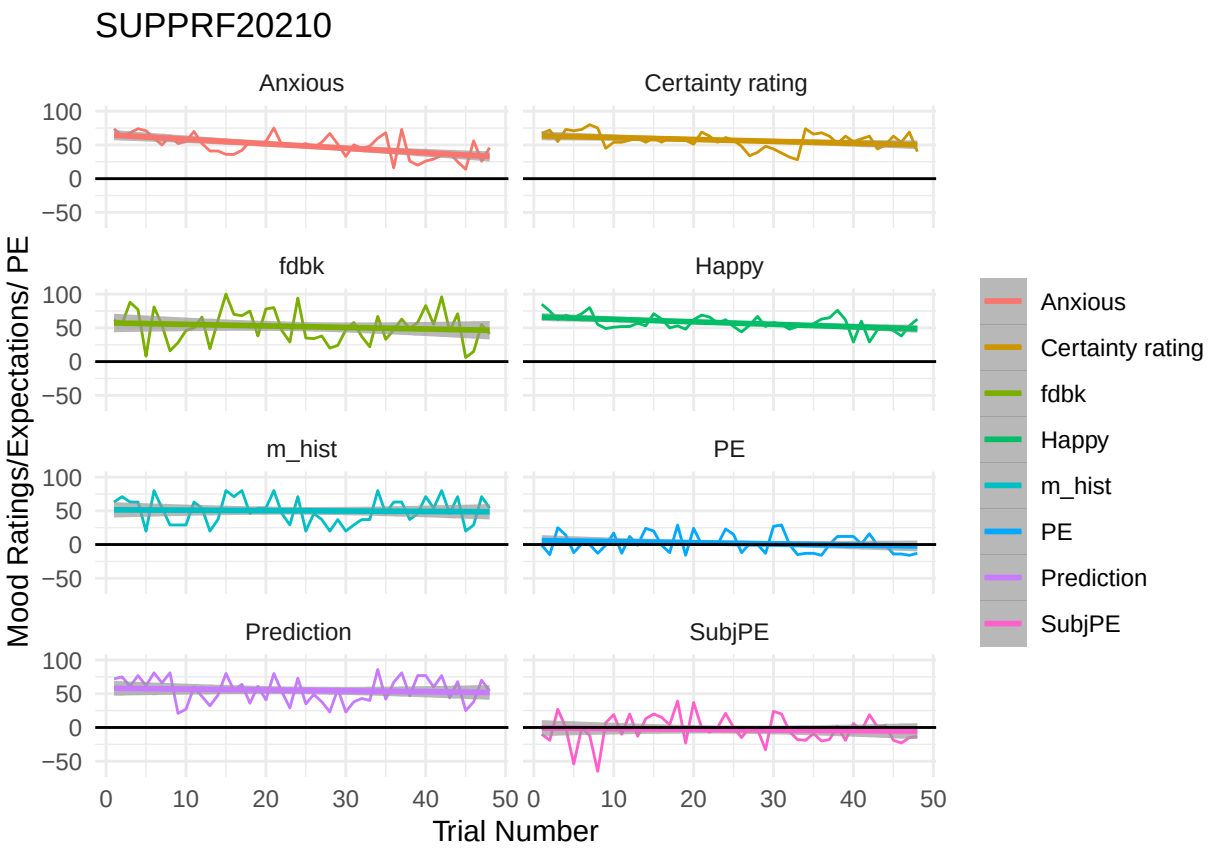
Prediction
SubjPE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Prediction
SubjPE
Mood Ratings/Expectations/ PE
Trial Number
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Certainty rating
fdbk
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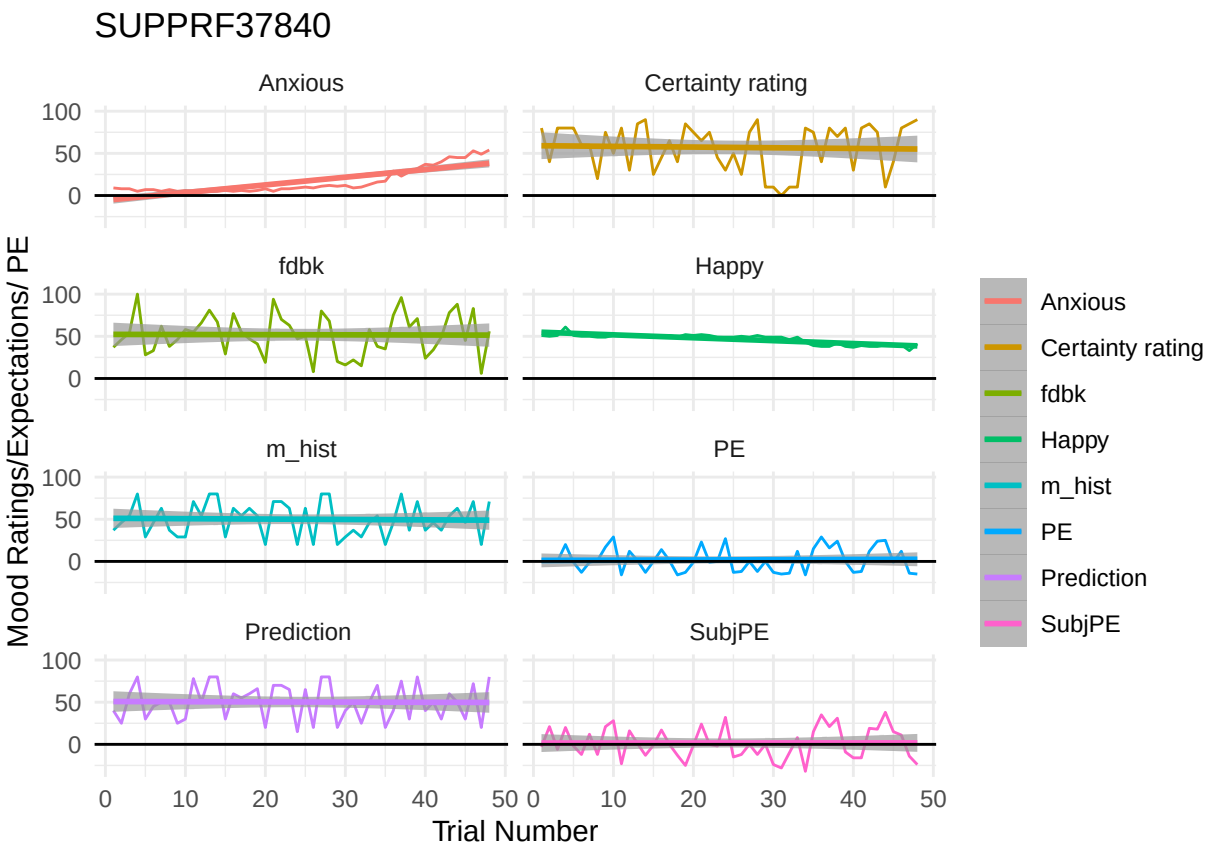
m_hist
PE
Prediction
SubjPE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Prediction
SubjPE
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Mood Ratings/Expectations/ PE
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Trial Number
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Certainty rating
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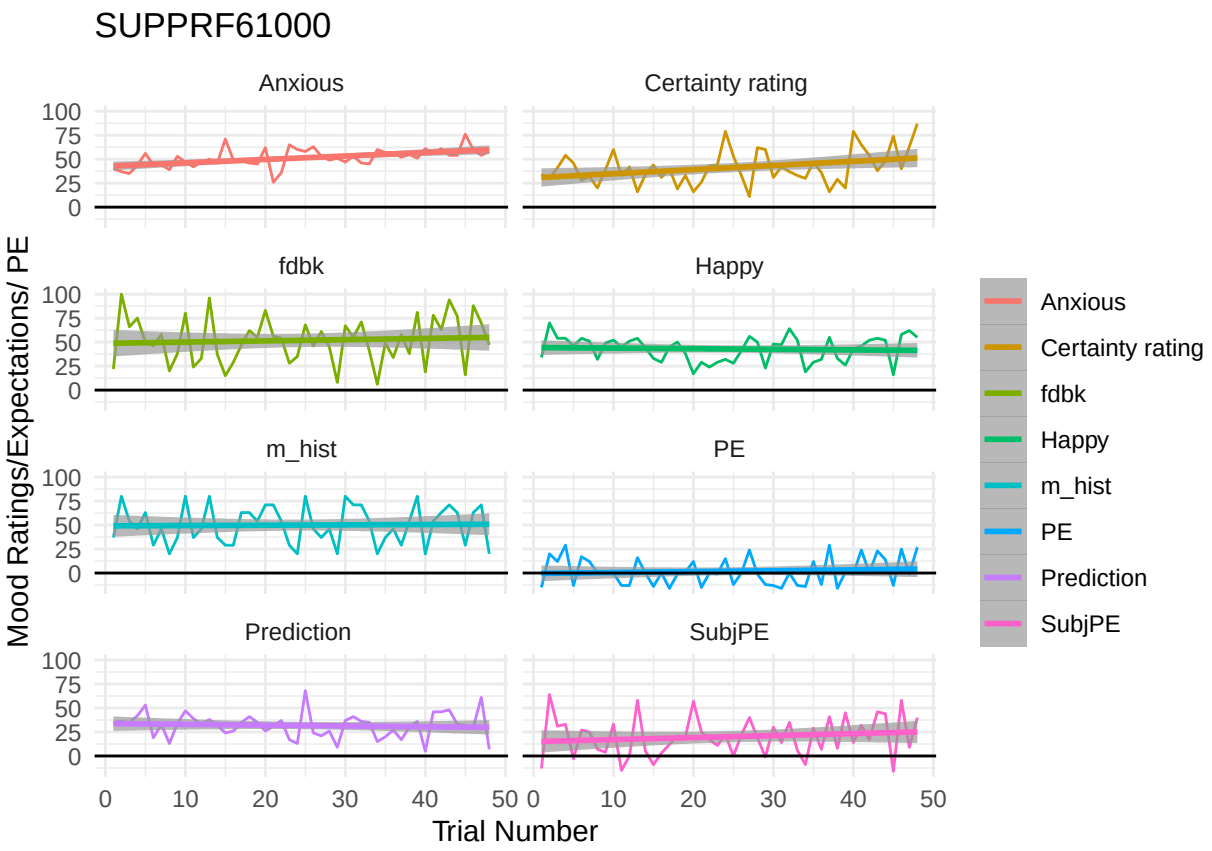
Happy
m_hist
PE
Prediction
SubjPE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PE
Prediction
SubjPE
Mood Ratings/Expectations/ PE
Trial Number
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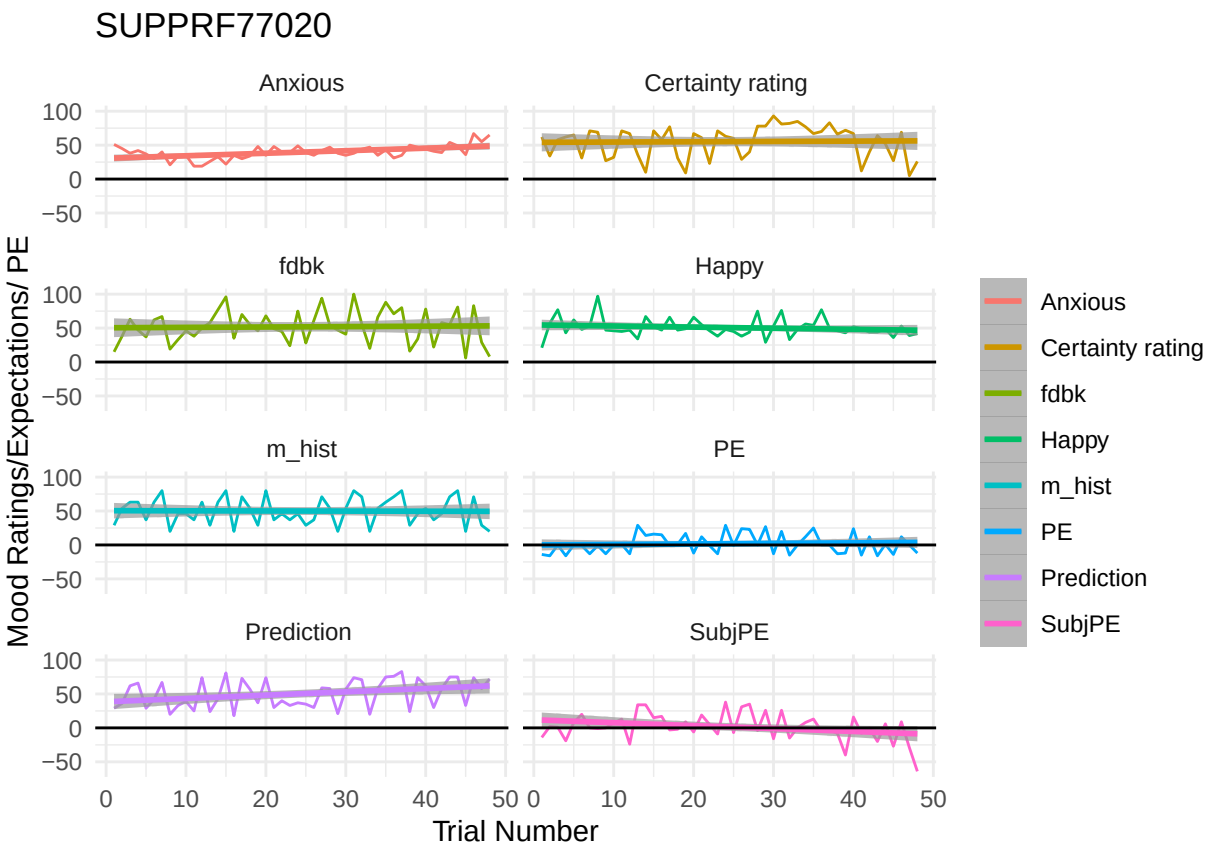
Certainty rating
fdbk
Happy
m_hist
PE
Prediction
SubjPE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Prediction
SubjPE
Mood Ratings/Expectations/ PE
Trial Number
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Certainty rating
fdbk
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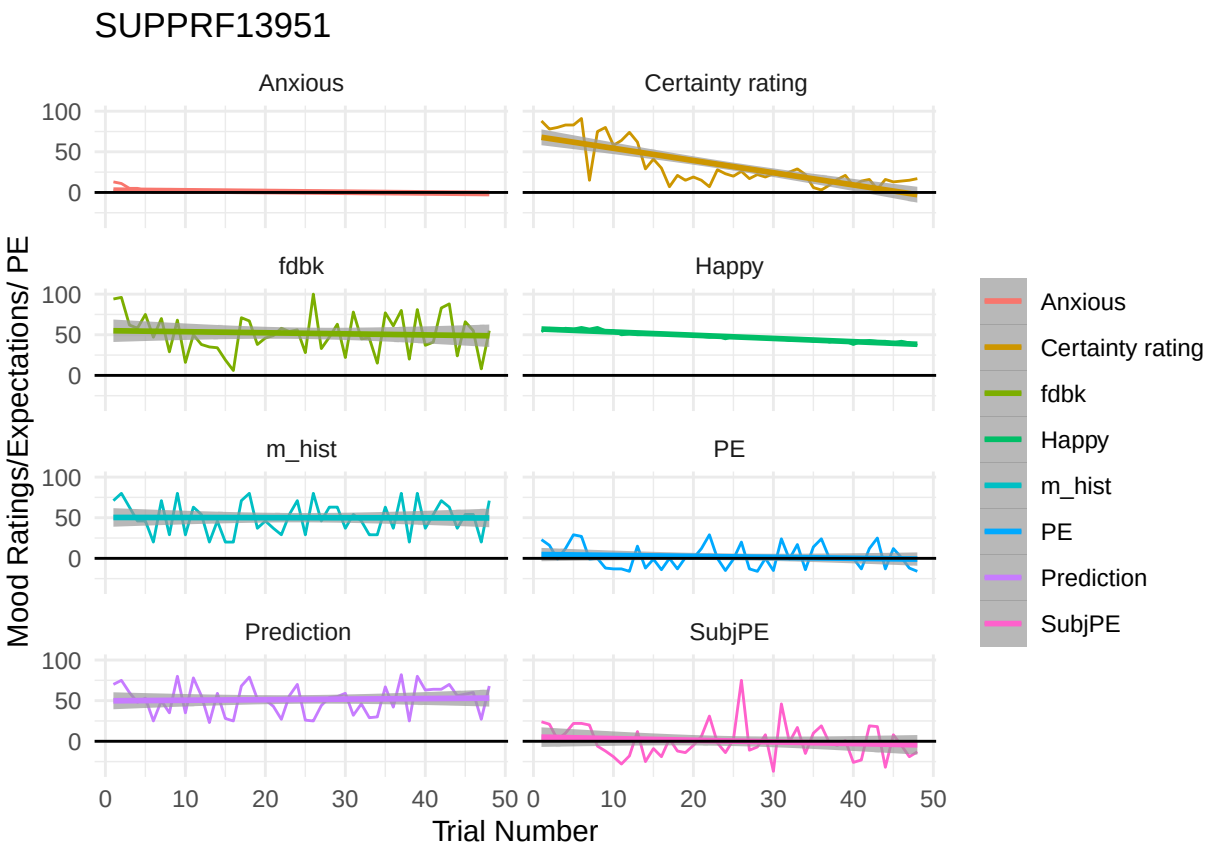
PE
Prediction
SubjPE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Prediction
SubjPE
Mood Ratings/Expectations/ PE
Trial Number
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Anxious
Certainty rating
fdbk
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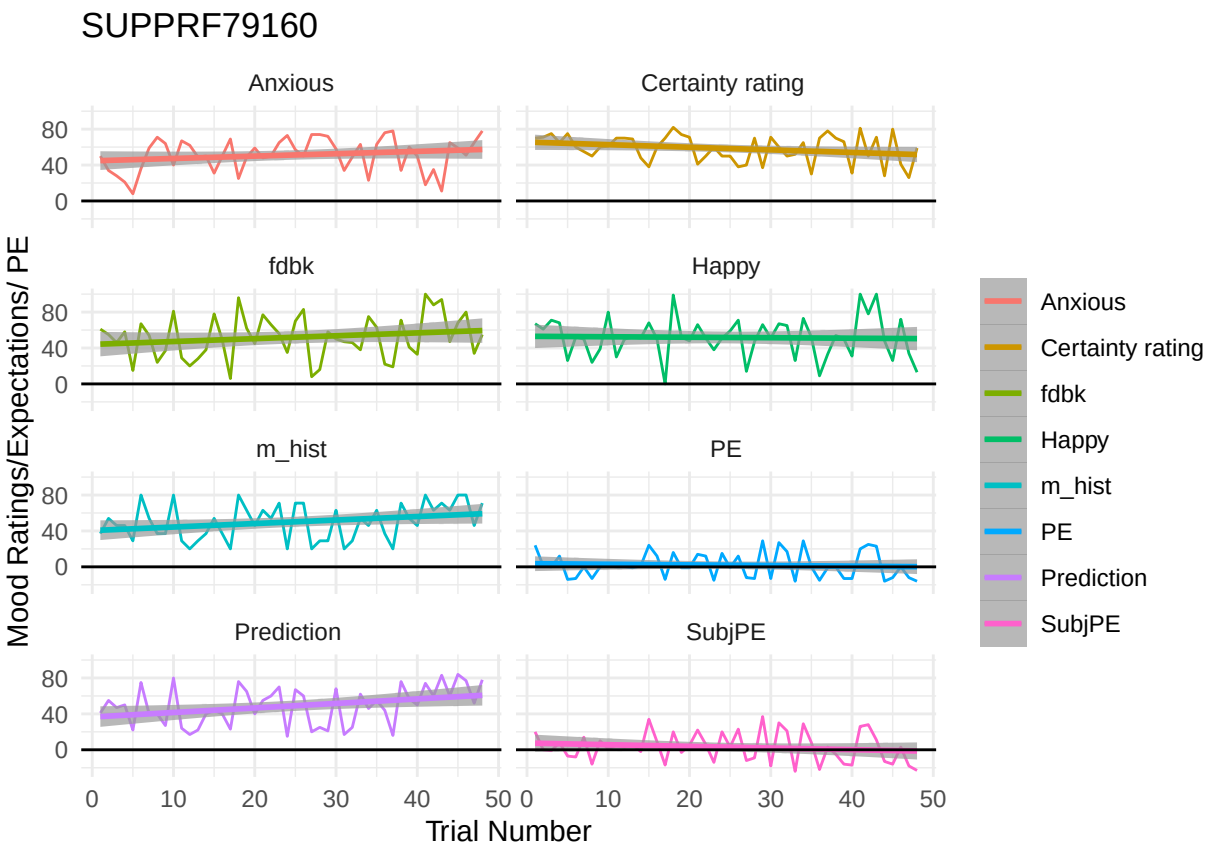
PE
Prediction
SubjPE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m_hist
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Prediction
SubjPE
Mood Ratings/Expectations/ PE
Trial Number
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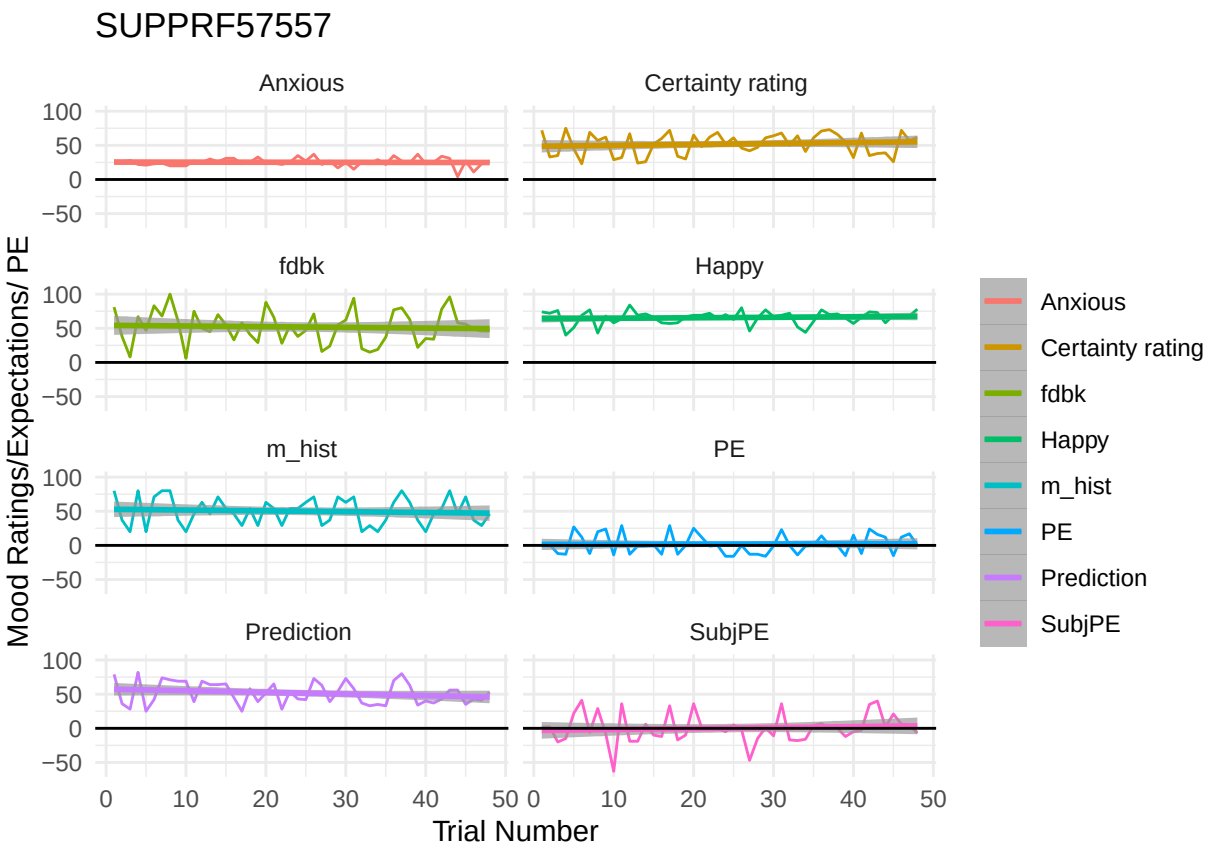
Certainty rating
fdbk
Happy
m_hist
PE
Prediction
SubjPE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Prediction
SubjPE
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Mood Ratings/Expectations/ PE
Trial Number
Anxious
Certainty rating
fdbk
Happy
m_hist
PE
Prediction
SubjPE


SUPPRF12856
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m_hist
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Prediction
SubjPE
Mood Ratings/Expectations/ PE
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fdbk
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m_hist
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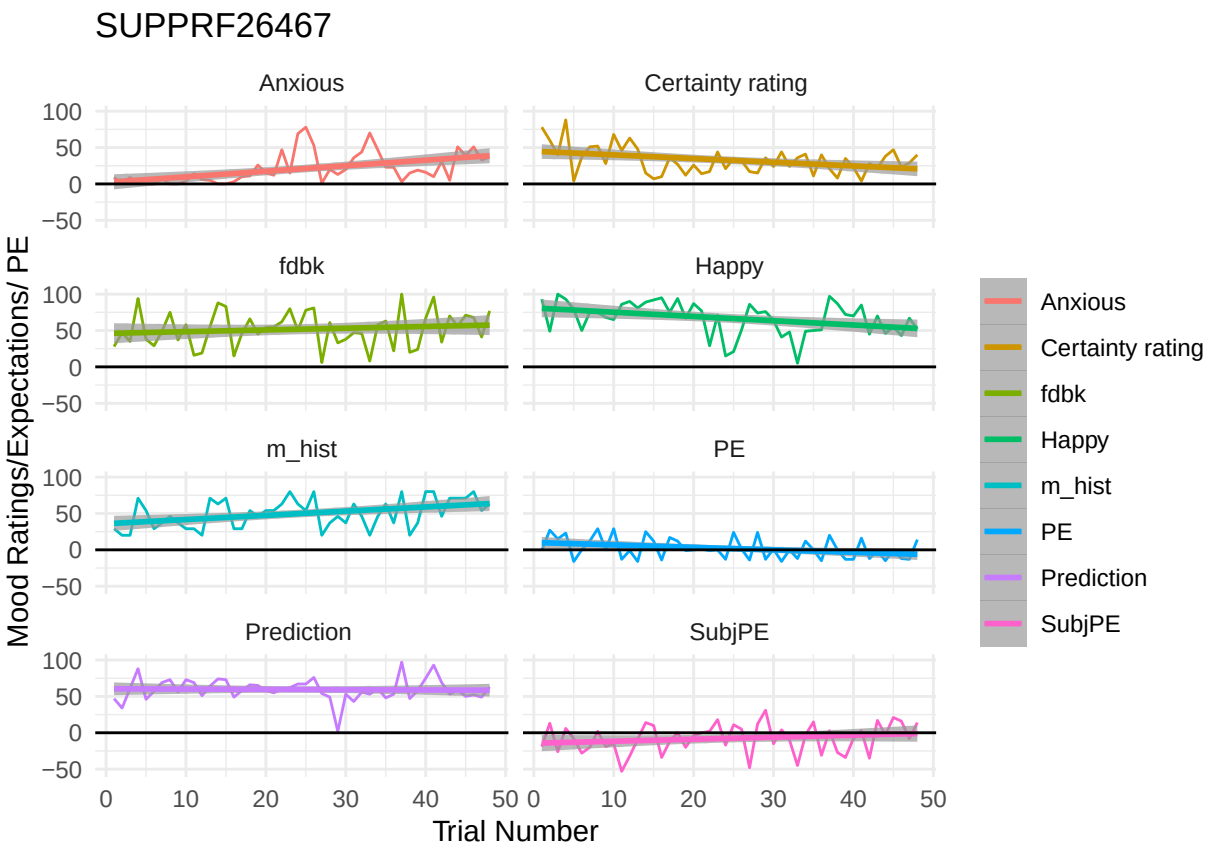
Prediction
SubjPE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m_hist
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Prediction
SubjPE
Mood Ratings/Expectations/ PE
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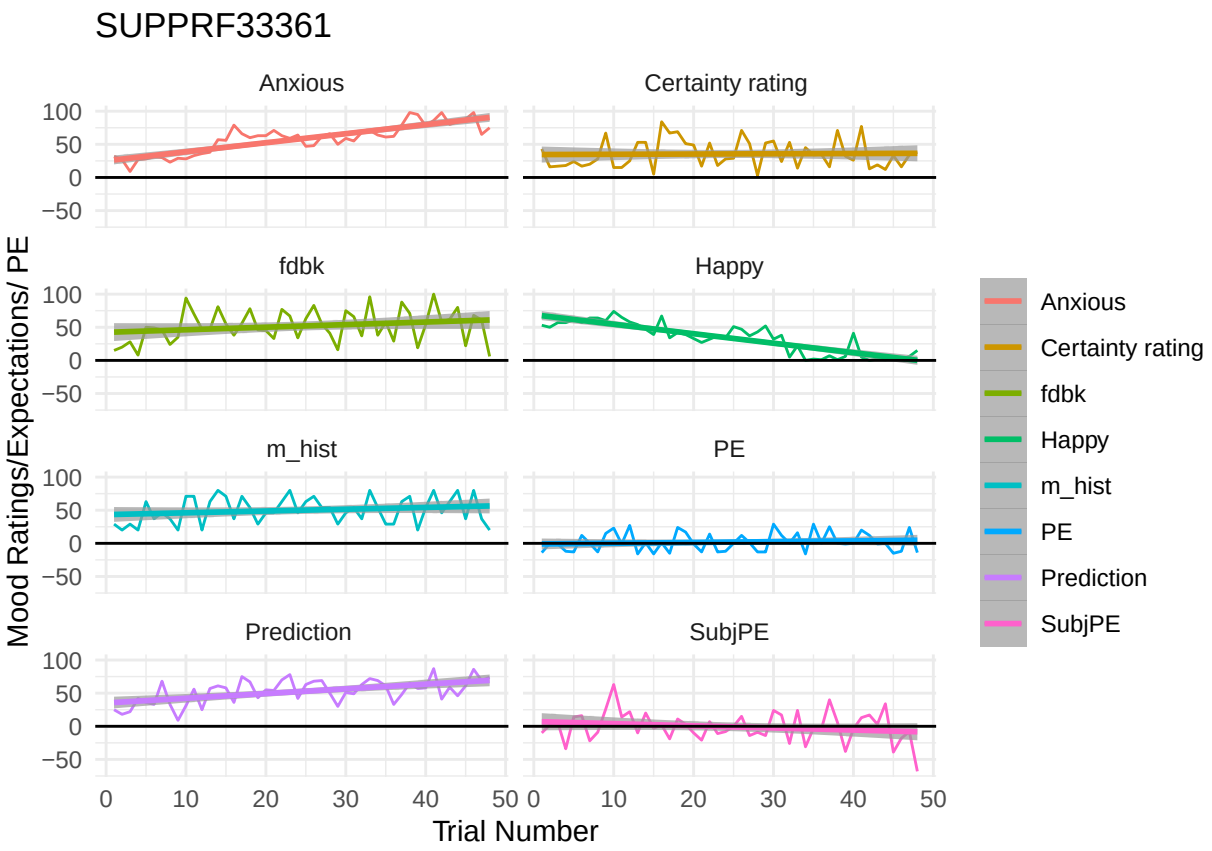
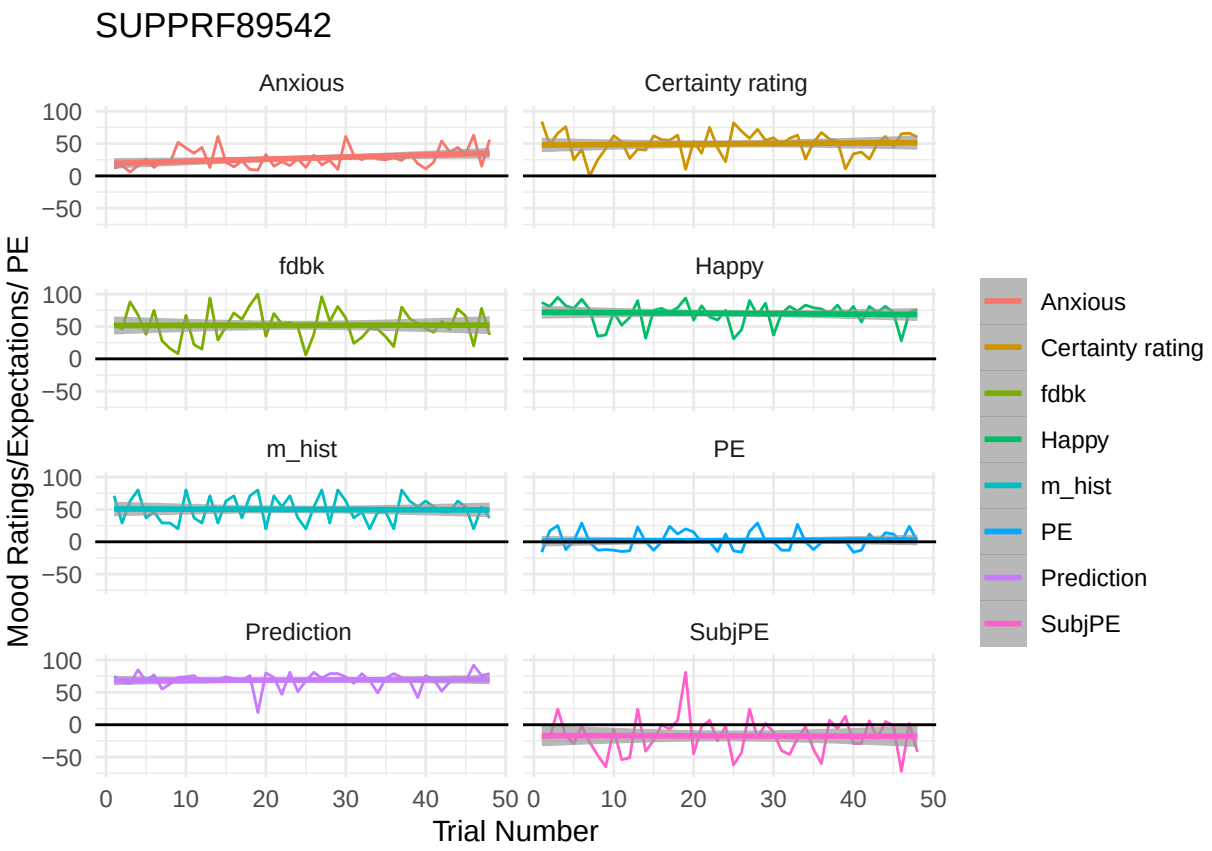
Anxious
Certainty rating
fdbk
Happy
m_hist
PE
Prediction
SubjPE

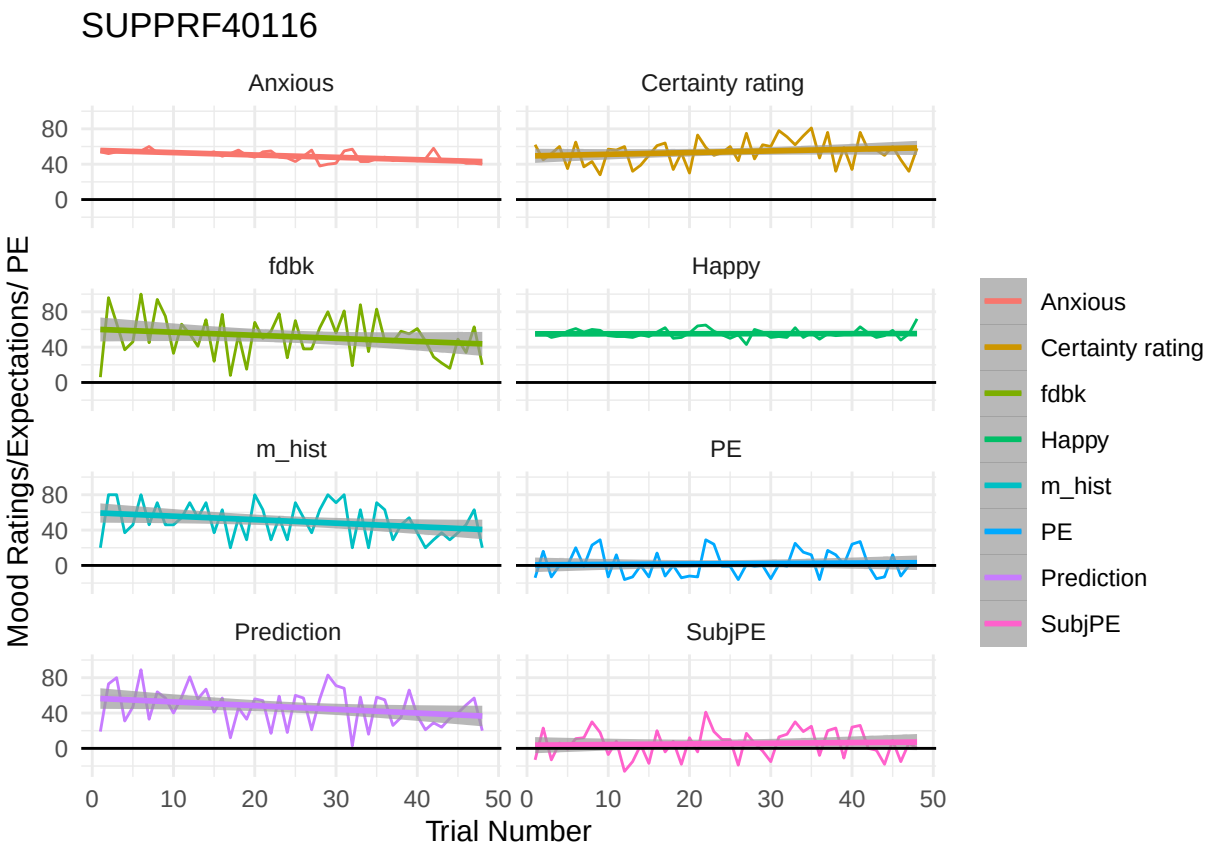

SUPPRF12547
Anxious
Certainty rating
fdbk
Happy
m_hist
PE
Prediction
SubjPE
Mood Ratings/Expectations/ PE
Trial Number
100
50
0
0
10
20
30
40
50
Anxious
Certainty rating
fdbk
Happy
m_hist
PE
Prediction
SubjPE


SUPPRF33361
Anxious
Certainty rating
fdbk
Happy
m_hist
PE
Prediction
SubjPE
Mood Ratings/Expectations/ PE
Trial Number
100
50
0
−50
0
10
20
30
40
50
Anxious
Certainty rating
fdbk
Happy
m_hist
PE
Prediction
SubjPE

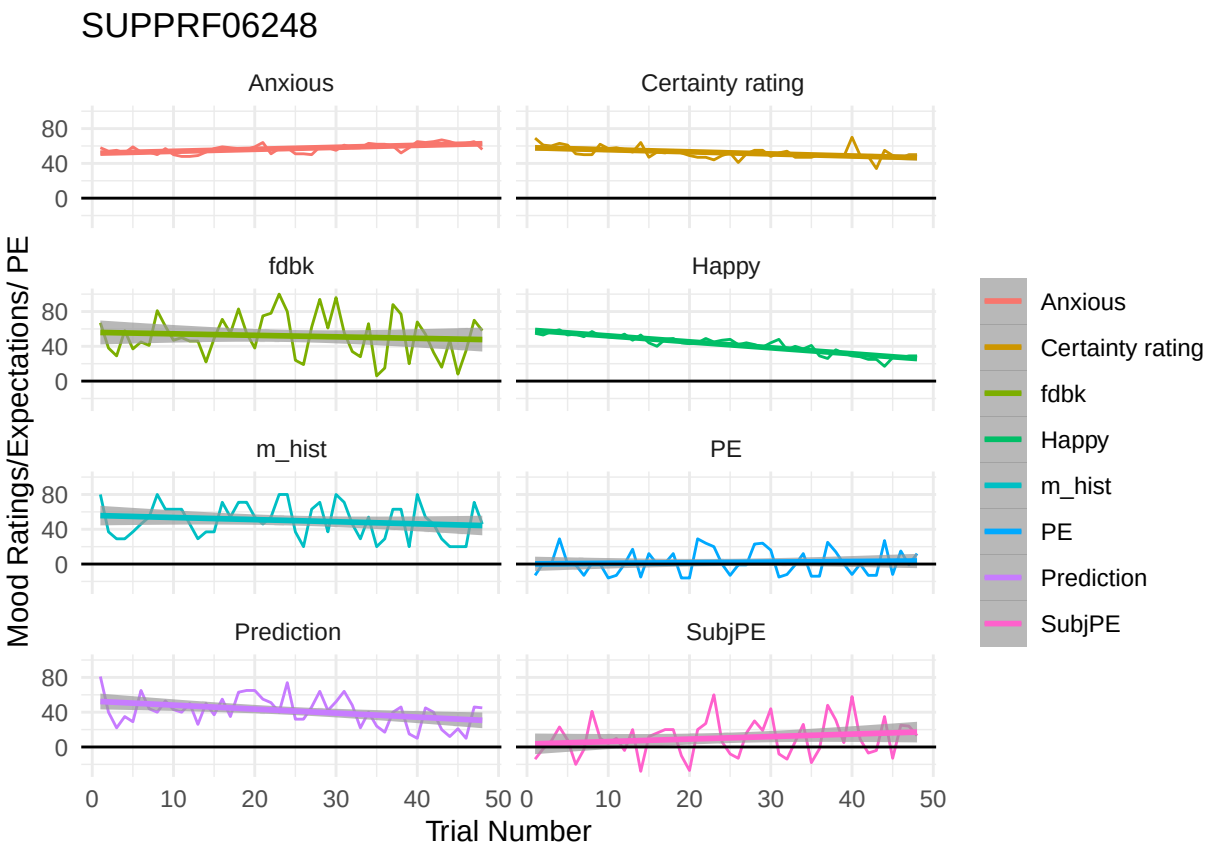

SUPPRF71005
Anxious
Certainty rating
fdbk
Happy
m_hist
PE
Prediction
SubjPE
Mood Ratings/Expectations/ PE
Trial Number
100
50
0
−50
0
10
20
30
40
50
Anxious
Certainty rating
fdbk
Happy
m_hist
PE
Prediction
SubjPE


SUPPRF51078
Anxious
Certainty rating
fdbk
Happy
m_hist
PE
Prediction
SubjPE
Mood Ratings/Expectations/ PE
Trial Number
100
50
0
−50
0
10
20
30
40
50
Anxious
Certainty rating
fdbk
Happy
m_hist
PE
Prediction
SubjPE


SUPPRF89542
Anxious
Certainty rating
fdbk
Happy
m_hist
PE
Prediction
SubjPE
Mood Ratings/Expectations/ PE
Trial Number
100
50
0
−50
0
10
20
30
40
50
Anxious
Certainty rating
fdbk
Happy
m_hist
PE
Prediction
SubjPE


SUPPRF40116
Anxious
Certainty rating
fdbk
Happy
m_hist
PE
Prediction
SubjPE
Mood Ratings/Expectations/ PE
Trial Number
0
40
80
0
10
20
30
40
50
Anxious
Certainty rating
fdbk
Happy
m_hist
PE
Prediction
SubjPE


SUPPRF98981
Anxious
Certainty rating
fdbk
Happy
m_hist
PE
Prediction
SubjPE
Mood Ratings/Expectations/ PE
Trial Number
100
50
0
−50
0
10
20
30
40
50
Anxious
Certainty rating
fdbk
Happy
m_hist
PE
Prediction
SubjPE

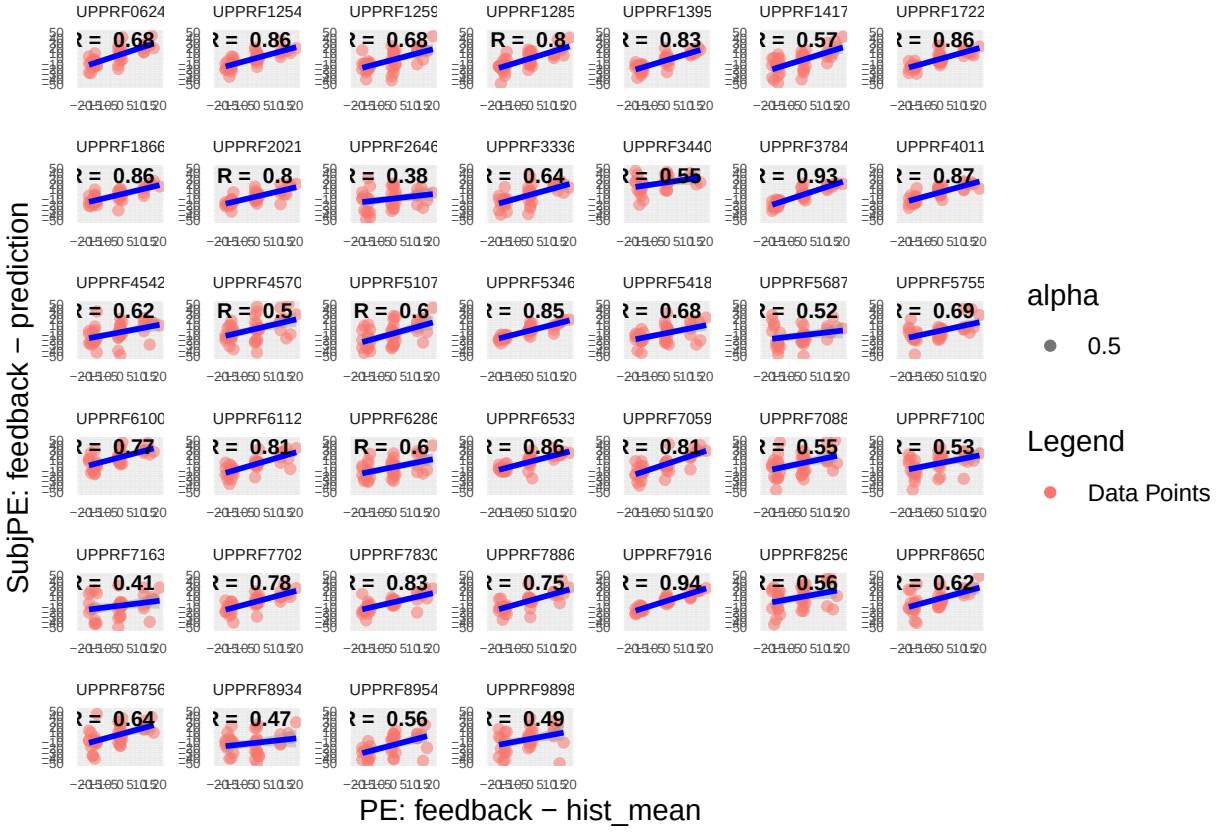

SUPPRF06248
Anxious
Certainty rating
fdbk
Happy
m_hist
PE
Prediction
SubjPE
Mood Ratings/Expectations/ PE
Trial Number
0
40
80
0
10
20
30
40
50
Anxious
Certainty rating
fdbk
Happy
m_hist
PE
Prediction
SubjPE


SUPPRF87563
Anxious
Certainty rating
fdbk
Happy
m_hist
PE
Prediction
SubjPE
Mood Ratings/Expectations/ PE
Trial Number
100
50
0
0
10
20
30
40
50
Anxious
Certainty rating
fdbk
Happy
m_hist
PE
Prediction
SubjPE

PE and SubjPE relationship

We now look at the relationship between PE (feedback - histogram_mean) and SubjPE (feedback - prediction). The correlation between SubjPE and objective PE remain similar to previous pilots.

```
## [1] "average correlation between PE and SubjPE: 0.686357933098262"
```



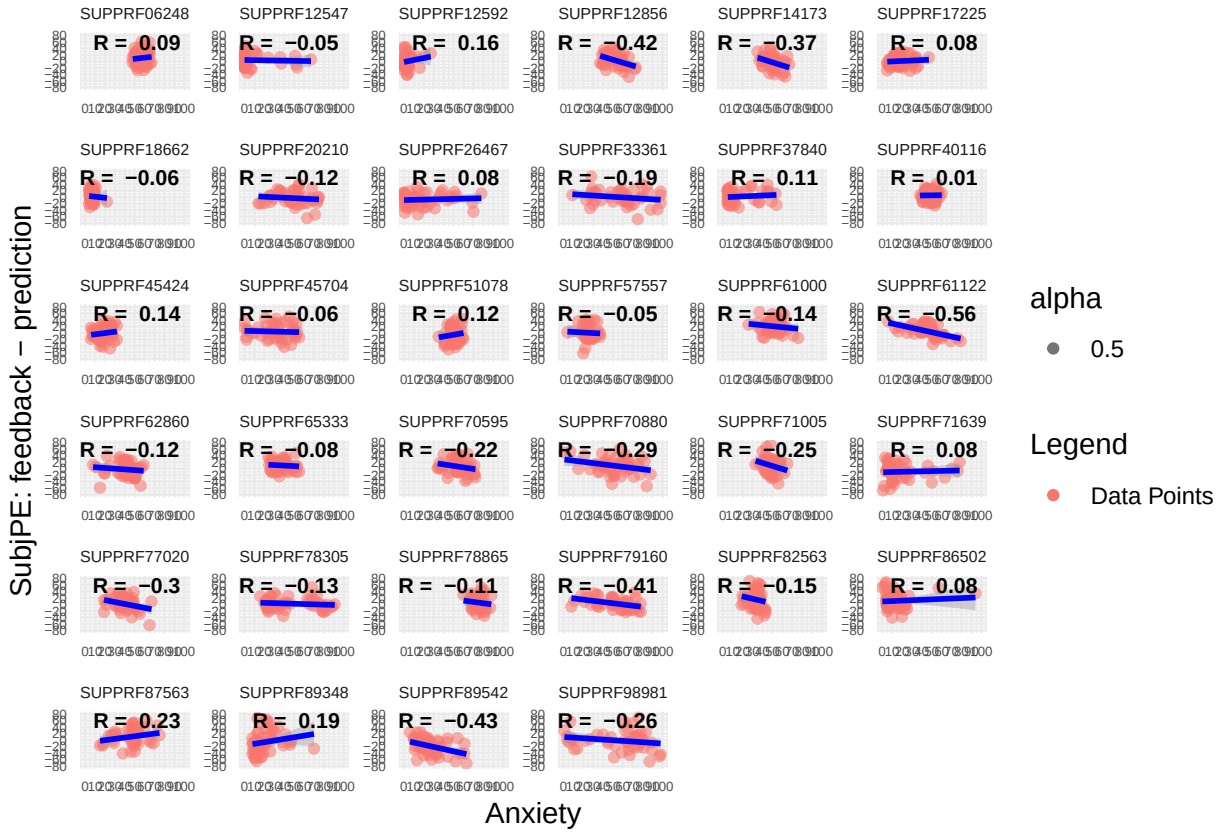
SubjPE and Anxiety relationship

Let's now look at the relationship between SubjPE and Anxiety ratings:

```
## [1] "average correlation between Anxiety and SubjPE: -0.0891129101944432"
```

I will exclude subject “SUPPRF13951” and “SUPPRF34408”, “SUPPRF53463”, “SUPPRF54185”, “SUPPRF56870” who rated always 0 or 100 for anxiety. After repeating the previous plot and correlations without them, the correlation becomes -0.10 from -0.09. I will add them back in.

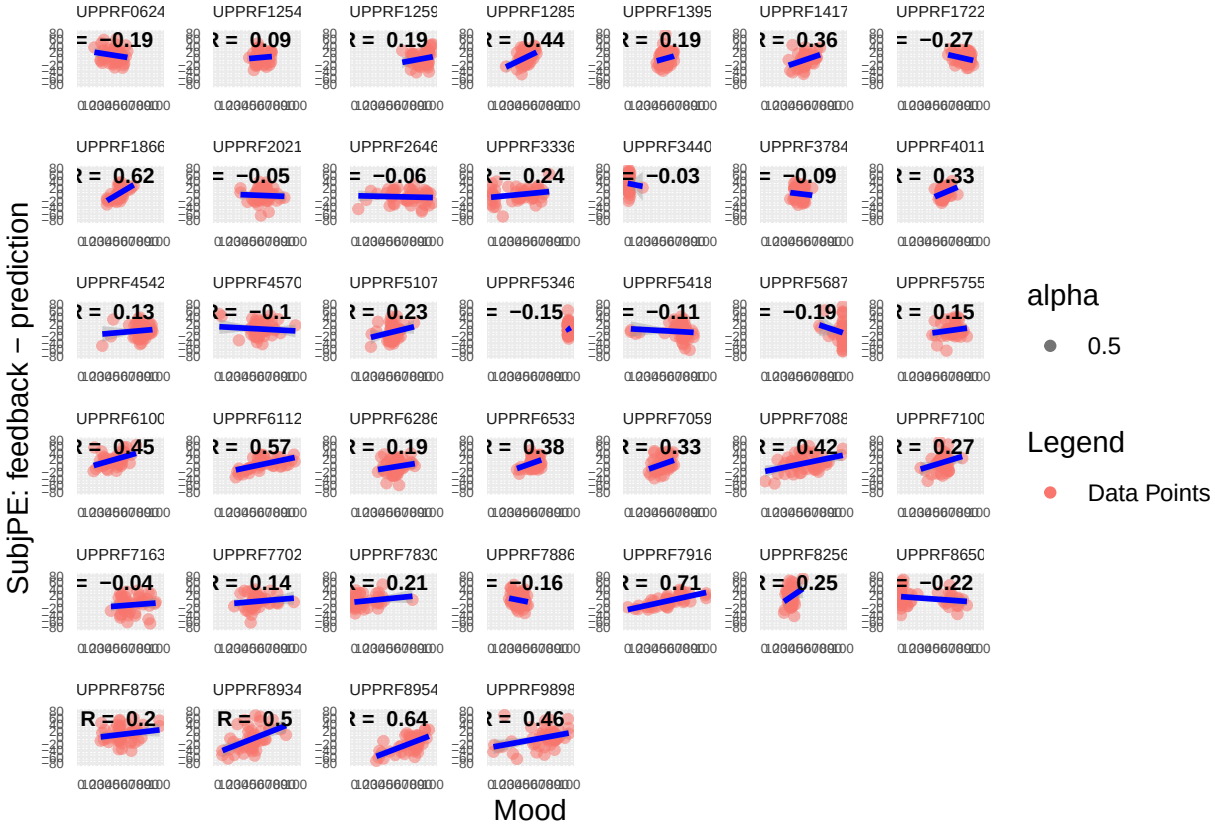
```
## [1] "average correlation between Anxiety and SubjPE: -0.100044677288319"
```



SubjPE and Anxiety

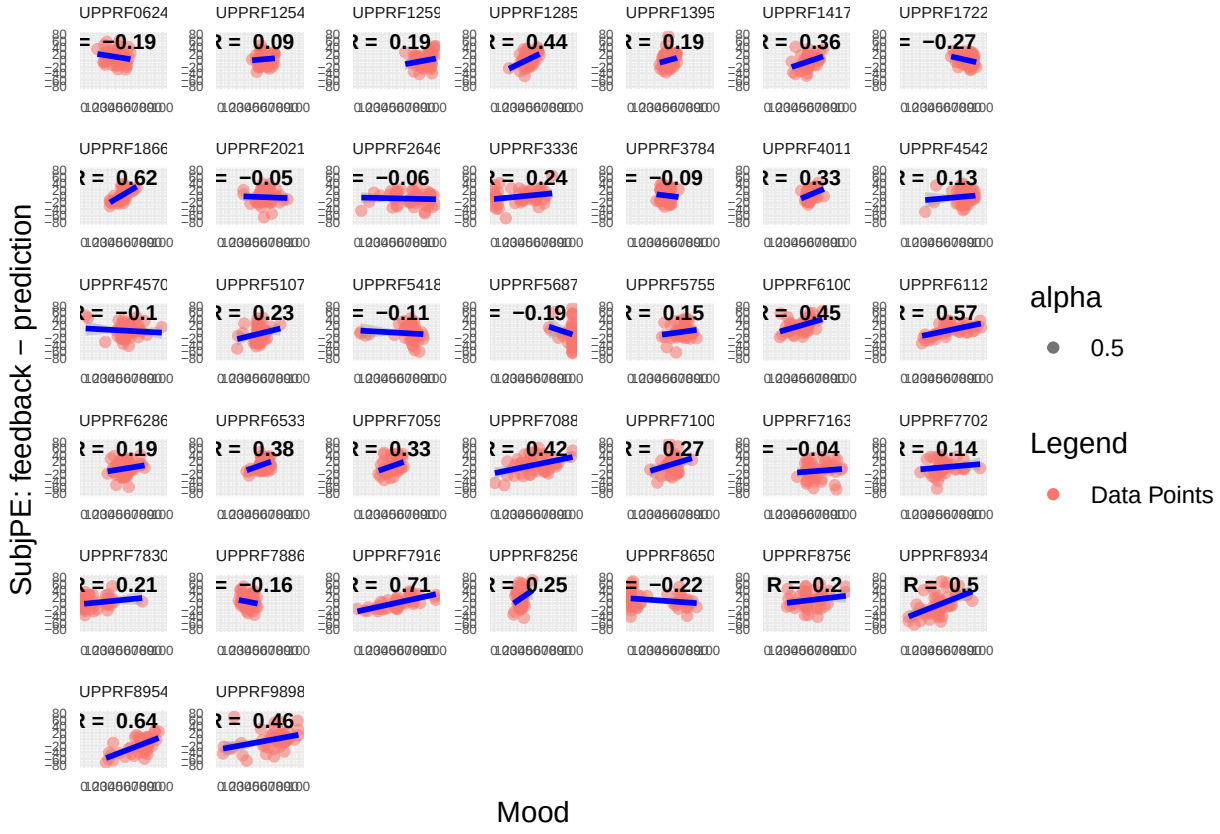
Let's look at the same relationship for mood and subjPE:

```
## [1] "average correlation between Mood and SubjPE: 0.180251962174898"
```



I will remove subjects “SUPPRF34408” and “SUPPRF53463” who again rated 0 or 100. Let’s look at the same relationship for mood and subjPE without these people. The correlation increases to 0.21 from 0.18.

```
## [1] "average correlation between Mood and SubjPE: 0.194867474595861"
```



The correlation for mood is less than before (0.18/0.21 vs 0.26), and consistently higher than anxiety (which is the same as before despite changing the wording of the question). We now will look whether the average correlations are significantly different from zero for both anxiety and mood.

```
## [1] "corr Anxiety and SubjPE"
```

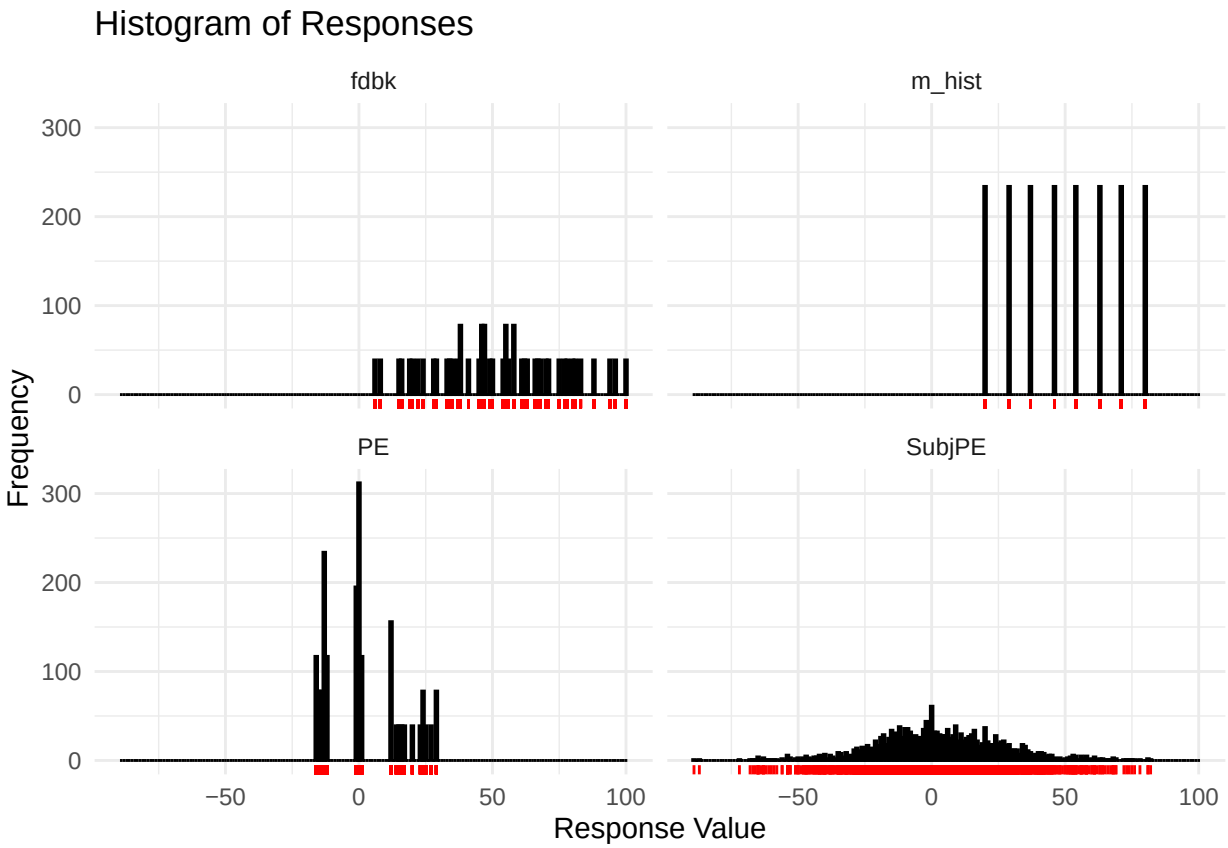
```
##
##  One Sample t-test
##
## data:  correlations_Ax_SubPE$correlation
## t = -2.8832, df = 33, p-value = 0.006879
## alternative hypothesis: true mean is not equal to 0
## 95 percent confidence interval:
##  -0.17064167 -0.02944768
## sample estimates:
##  mean of x
## -0.1000447
```

```
## [1] "corr happiness and SubjPE"
```

```
##
##  One Sample t-test
##
## data:  correlations_H_SubPE$correlation
## t = 4.4922, df = 36, p-value = 7.008e-05
## alternative hypothesis: true mean is not equal to 0
## 95 percent confidence interval:
##  0.1068905 0.2828444
## sample estimates:
## mean of x
## 0.1948675
```

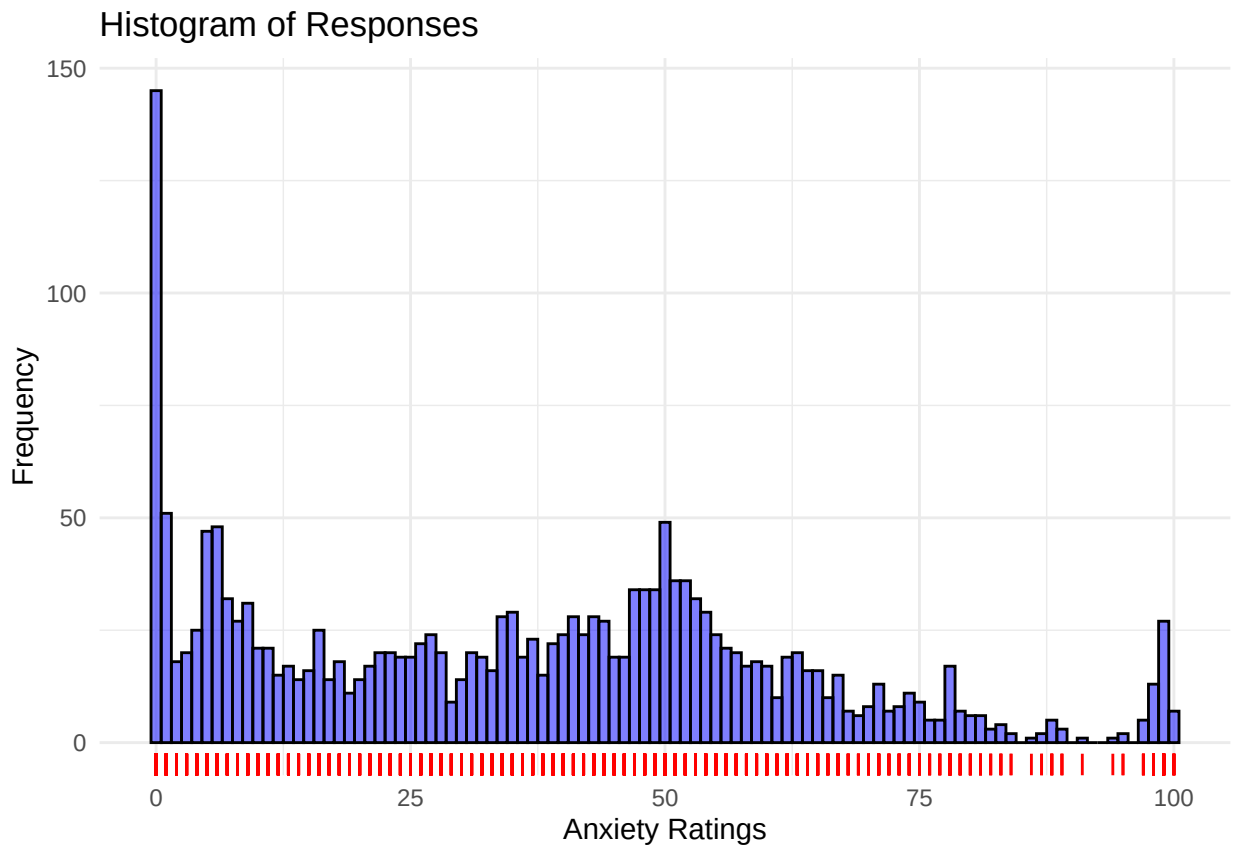
Histogram for PE, SubjPE, feedback, hist_m

Let's have a look at histograms of SubjPE, PE, feedback and histogram means:

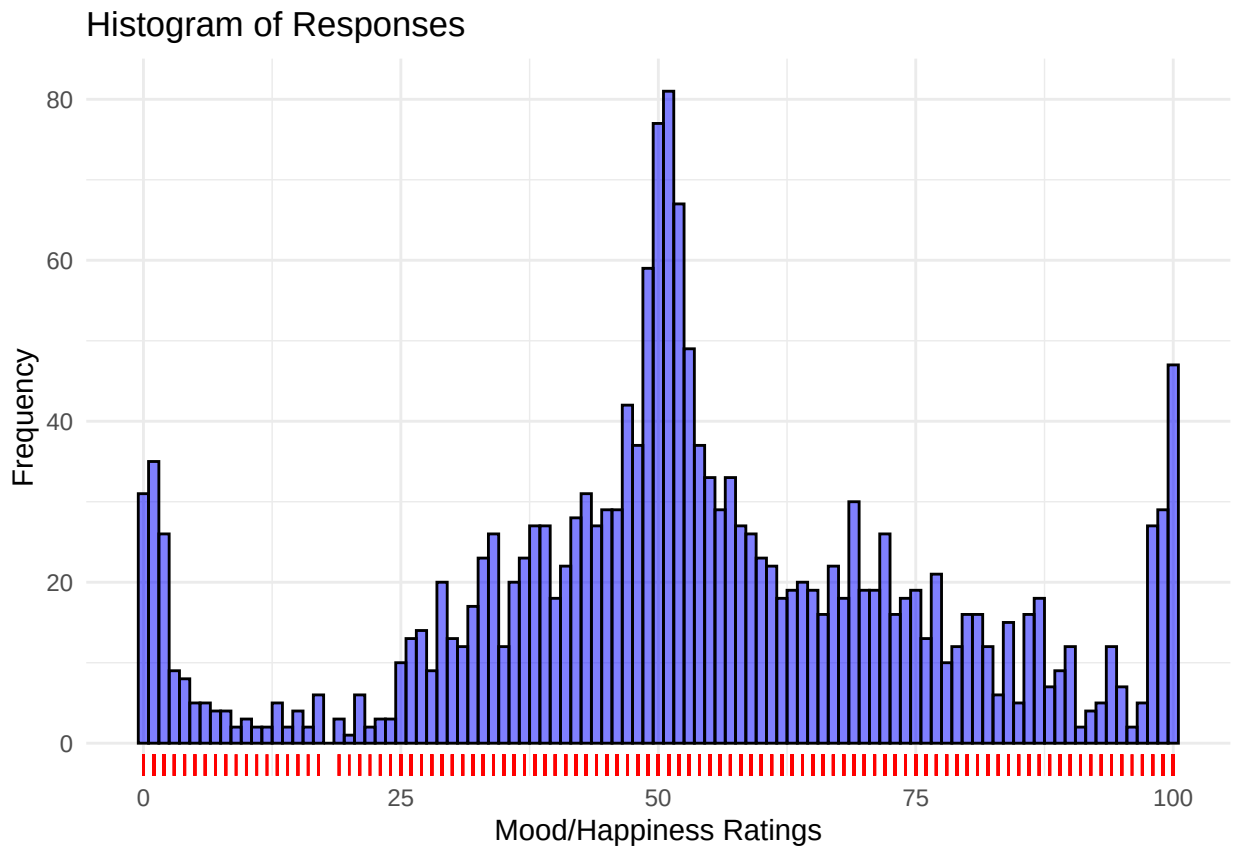


Histogram for anxiety ratings

We have again less variability in anxiety ratings, so the previous pilot was not because we changed the question!



Histogram for mood ratings



ICC and LME models for mood and anxiety

we will now look at the ICC outcome for anxiety The ICC is lower than the study without feedback (which was 0.80), it 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] 0.7465389
```

```
##                2.5 %   97.5 %
## .sig01      17.92998 28.10639
## .sigma      12.62812 13.47283
## (Intercept) 28.32054 42.58438
```

```
## [1] 15120.9
```

```
## [1] 15113.18
```

```
## Data: final_df10
## Models:
## model1: Response_Ax ~ 1 + (1 | Random_ID)
## model2: Response_Ax ~ Response_PE + (1 | Random_ID)
##        npar   AIC   BIC  logLik deviance  Chisq Df Pr(>Chisq)
## model1    3 15125 15142 -7559.6    15119
## model2    4 15112 15134 -7551.9    15104 15.583  1  7.895e-05 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
## [1] 15113.95
```

```
## Linear mixed model fit by REML ['lmerMod']
## Formula: Response_Ax ~ Response_SubjPE + +(1 | Random_ID)
##    Data: final_df10
##
## REML criterion at convergence: 15105.9
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -4.0822 -0.4630 -0.0345  0.3571  6.2550
##
## Random effects:
##  Groups    Name        Variance Std.Dev.
##  Random_ID (Intercept) 511.7    22.62
##  Residual              168.6    12.98
## Number of obs: 1872, groups:  Random_ID, 39
##
## Fixed effects:
##                 Estimate Std. Error t value
## (Intercept)     35.59988    3.63472   9.794
## Response_SubjPE -0.05399    0.01359  -3.973
##
```

```
## Correlation of Fixed Effects:
##             (Intr)
## Rspns_SbjPE -0.010
```

```
## Data: final_df10
## Models:
## model1: Response_Ax ~ 1 + (1 | Random_ID)
## model3: Response_Ax ~ Response_SubjPE + +(1 | Random_ID)
##        npar   AIC   BIC  logLik deviance  Chisq Df Pr(>Chisq)
## model1    3 15125 15142 -7559.6    15119
## model3    4 15112 15134 -7551.8    15104 15.691  1  7.456e-05 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
## Data: final_df10
## Models:
## model2: Response_Ax ~ Response_PE + (1 | Random_ID)
## model3: Response_Ax ~ Response_SubjPE + +(1 | Random_ID)
##        npar   AIC   BIC  logLik deviance  Chisq Df Pr(>Chisq)
## model2    4 15112 15134 -7551.9    15104
## model3    4 15112 15134 -7551.8    15104 0.1082  0
```

```
##                2.5 %   97.5 %
## .sig01      17.92998 28.10639
## .sigma      12.62812 13.47283
## (Intercept) 28.32054 42.58438
```

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

```
## [1] 0.7465389
```

```
## [1] 15121.57
```

```
## Linear mixed model fit by REML ['lmerMod']
## Formula: Response_Ax ~ Response_SubjPE + Response_fdbk + (1 | Random_ID)
##    Data: final_df10
##
## REML criterion at convergence: 15111.6
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -4.0683 -0.4653 -0.0348  0.3573  6.2562
##
## Random effects:
##  Groups    Name        Variance Std.Dev.
##  Random_ID (Intercept) 509.6    22.57
##  Residual              168.6    12.99
## Number of obs: 1872, groups:  Random_ID, 39
##
## Fixed effects:
##                 Estimate Std. Error t value
## (Intercept)     36.29237    3.72997   9.730
```

```
## Response_SubjPE -0.04371    0.01872  -2.335
## Response_fdbk   -0.01390    0.01744  -0.797
##
## Correlation of Fixed Effects:
##             (Intr) Rs_SPE
## Rspns_SbjPE  0.153
## Respns_fdbk -0.233 -0.688
```

```
## [1] 15113.95
```

```
## Linear mixed model fit by REML ['lmerMod']
## Formula: Response_Ax ~ Response_SubjPE + (1 | Random_ID)
##    Data: final_df10
##
## REML criterion at convergence: 15105.9
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -4.0822 -0.4630 -0.0345  0.3571  6.2550
##
## Random effects:
##  Groups    Name        Variance Std.Dev.
##  Random_ID (Intercept) 511.7    22.62
##  Residual              168.6    12.98
## Number of obs: 1872, groups:  Random_ID, 39
##
## Fixed effects:
##                 Estimate Std. Error t value
## (Intercept)     35.59988    3.63472   9.794
## Response_SubjPE -0.05399    0.01359  -3.973
##
## Correlation of Fixed Effects:
##             (Intr)
## Rspns_SbjPE -0.010
```

```
## Data: final_df10
## Models:
## model2: Response_Ax ~ Response_SubjPE + (1 | Random_ID)
## model1: Response_Ax ~ Response_SubjPE + Response_fdbk + (1 | Random_ID)
##        npar   AIC   BIC  logLik deviance  Chisq Df Pr(>Chisq)
## model2    4 15112 15134 -7551.8    15104
## model1    5 15113 15141 -7551.5    15103 0.6394  1     0.4239
```

```
## [1] 15118.89
```

```
## Linear mixed model fit by REML ['lmerMod']
## Formula: Response_Ax ~ Response_fdbk + (1 | Random_ID)
##    Data: final_df10
##
## REML criterion at convergence: 15110.9
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
```

```
## -4.0925 -0.4563 -0.0299  0.3644  6.2101
##
## Random effects:
##  Groups    Name        Variance Std.Dev.
##  Random_ID (Intercept) 500.8    22.38
##  Residual              169.1    13.00
## Number of obs: 1872, groups:  Random_ID, 39
##
## Fixed effects:
##               Estimate Std. Error t value
## (Intercept)   37.62506    3.65551  10.293
## Response_fdbk -0.04190    0.01267  -3.307
##
## Correlation of Fixed Effects:
##             (Intr)
## Respns_fdbk -0.180

## Data: final_df10
## Models:
## model3: Response_Ax ~ Response_fdbk + (1 | Random_ID)
## model1: Response_Ax ~ Response_SubjPE + Response_fdbk + (1 | Random_ID)
##        npar   AIC   BIC  logLik deviance  Chisq Df Pr(>Chisq)
## model3    4 15116 15138 -7554.2    15108
## model1    5 15113 15141 -7551.5    15103 5.4244  1    0.01986 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

The ICC outcome for mood: The ICC is moderate according to guidelines by Koo and Li (2016).

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

```
## [1] 0.6437434
```

```
##                2.5 %   97.5 %
## .sig01      15.34013 24.09587
## .sigma      13.81085 14.73467
## (Intercept) 47.29225 59.53788
```

```
## [1] 15437.52
```

```
## [1] 15384.58
```

```
## Data: final_df10
## Models:
## model0: Response_H ~ 1 + (1 | Random_ID)
## model1: Response_H ~ Response_SubjPE + (1 | Random_ID)
##        npar   AIC   BIC  logLik deviance  Chisq Df Pr(>Chisq)
## model0    3 15442 15458 -7717.8    15436
## model1    4 15382 15404 -7687.1    15374 61.486  1  4.459e-15 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
## Linear mixed model fit by maximum likelihood  ['lmerMod']
## Formula: Response_H ~ Response_SubjPE + (Response_SubjPE | Random_ID)
##    Data: final_df10
## Control: lmerControl(optimizer = "bobyqa")
##
##      AIC      BIC   logLik deviance df.resid
##  15292.1  15325.3  -7640.0  15280.1     1866
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -5.3899 -0.4299  0.0201  0.4616  4.5245
##
## Random effects:
##  Groups    Name            Variance Std.Dev. Corr
##  Random_ID (Intercept)     365.9256 19.1292
##            Response_SubjPE   0.0355  0.1884  -0.05
##  Residual                  180.2017 13.4239
## Number of obs: 1872, groups:  Random_ID, 39
##
## Fixed effects:
##                 Estimate Std. Error t value
## (Intercept)     53.22371    3.08091  17.275
## Response_SubjPE  0.11523    0.03364   3.425
##
## Correlation of Fixed Effects:
##             (Intr)
## Rspns_SbjPE -0.052
```

```
## [1] 15292.05
```

1st and last trial correlations for anxiety and mood

The correlations between first and last anxiety and mood ratings are doubled compared to the previous pilot! Do we have people who gave less reliable answers? We can see it from the ratings themselves, or predictions where some people ignored the histograms.

```
## [1] "Correlation between first and last anxiety rating"
```

```
##
##  Pearson's product-moment correlation
##
## data:  final_df10[final_df10$Trial.Number == 1, ]$Response_Ax and final_df10[final_df10$Trial.Number
## t = 3.9135, df = 37, p-value = 0.0003758
## alternative hypothesis: true correlation is not equal to 0
## 95 percent confidence interval:
##  0.2719854 0.7316774
## sample estimates:
##     cor
## 0.54107
```

```
## [1] "Correlation between first and last mood rating"
```

```
##
##  Pearson's product-moment correlation
##
## data:  final_df10[final_df10$Trial.Number == 1, ]$Response_H and final_df10[final_df10$Trial.Number =
## t = 4.0628, df = 37, p-value = 0.0002423
## alternative hypothesis: true correlation is not equal to 0
## 95 percent confidence interval:
##  0.2908819 0.7410709
## sample estimates:
##       cor
## 0.5554232
```

Objective PE and anxiety relationship

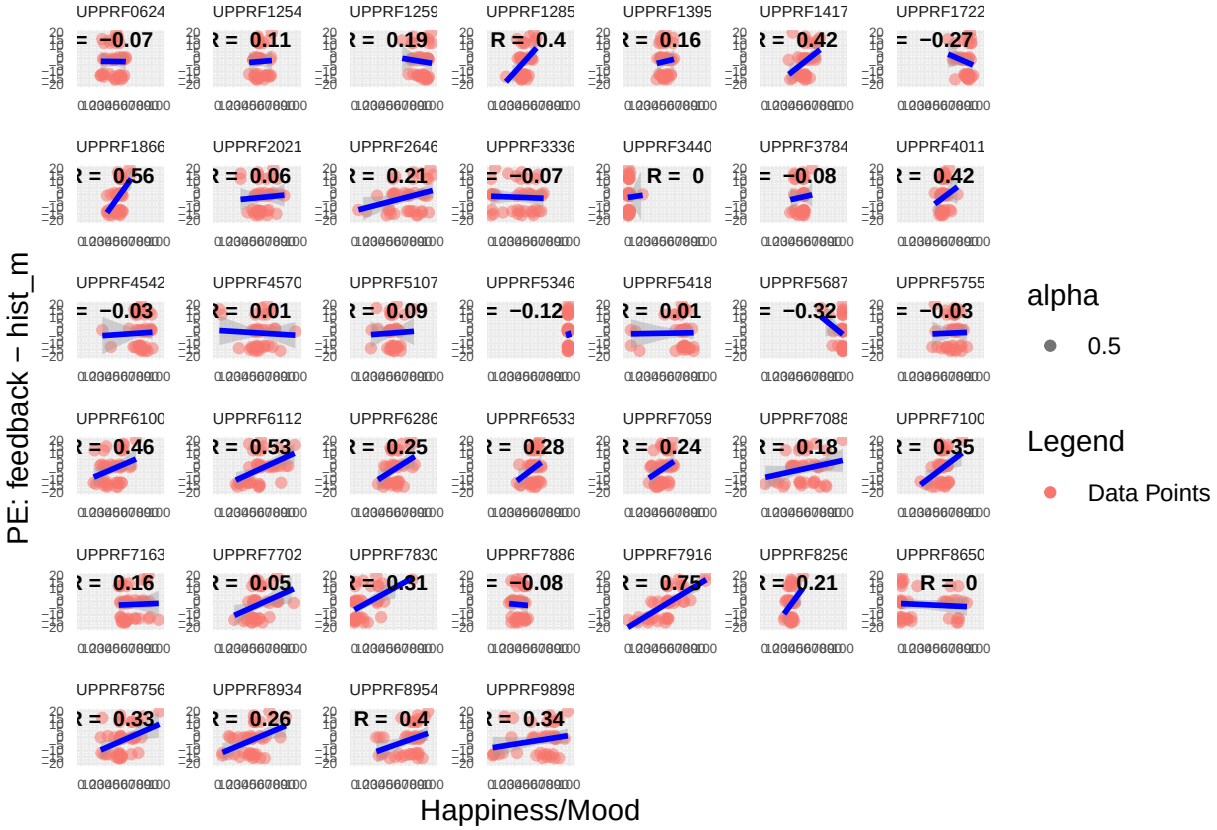
We now will run everything again but this time using the objective PE (feedback - histogram_mean) instead of the subjective one (feedback - prediction). The correlation between subjective_PE and anxiety is very similar to objective_PE and anxiety (-0.089 vs -0.087).

```
## [1] "average correlation between Anxiety and PE: -0.0871134288971019"
```

Objective PE and mood relationship

We will repeat the same thing for the relationship between PE and mood. Same as anxiety, the relationship between the objective PE and mood is very similar to the Subj_PE (0.18 vs 0.17).

```
## [1] "average correlation between happiness and objective PE: 0.170645092999263"
```

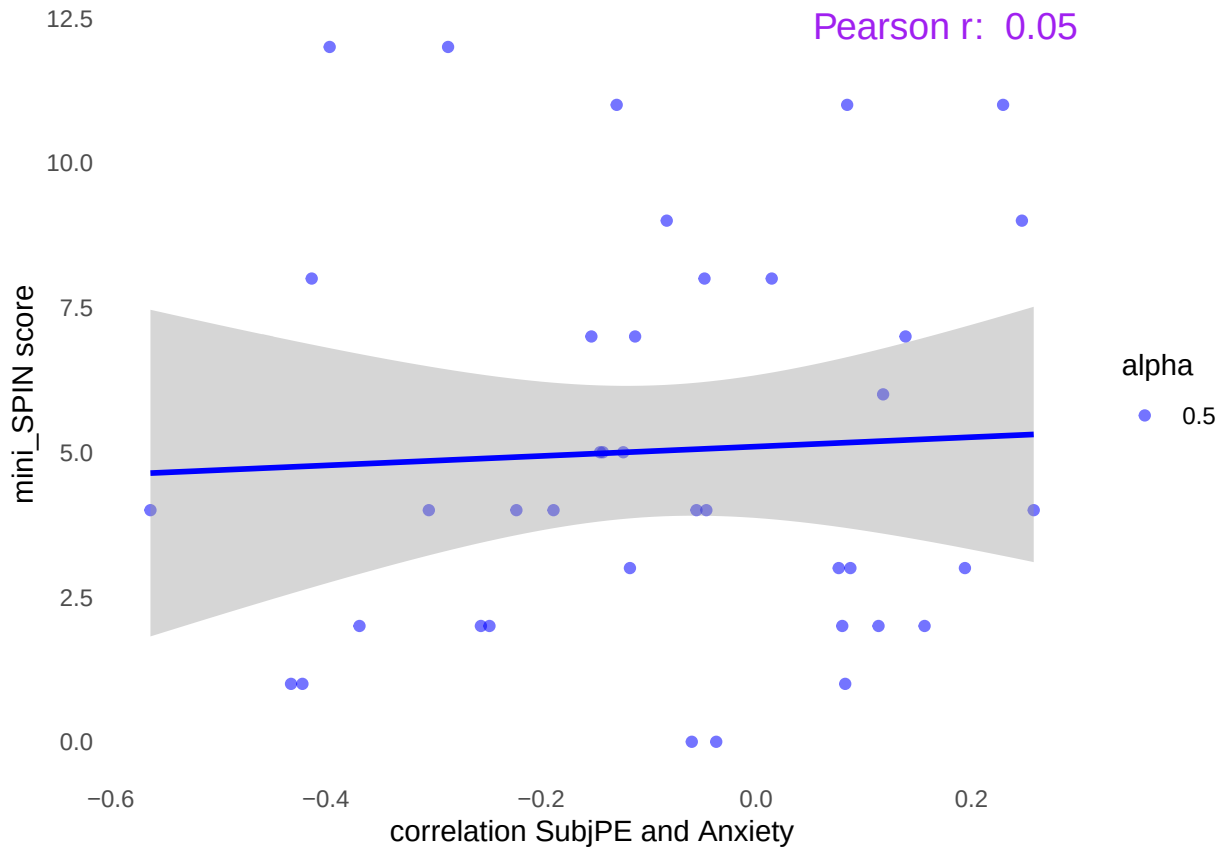


mini-SPIN count

Since these people were not screened for social anxiety, let's see how many of them had social anxiety scores higher than or equal to 6. We have 14/38 people who have high social anxiety on mini-SPIN, compared to 21/38 in the previous pilot.

```
## [1] "Out of 38 people, these people had a mini_SPIN total score higher or equal to 6: 14"
```

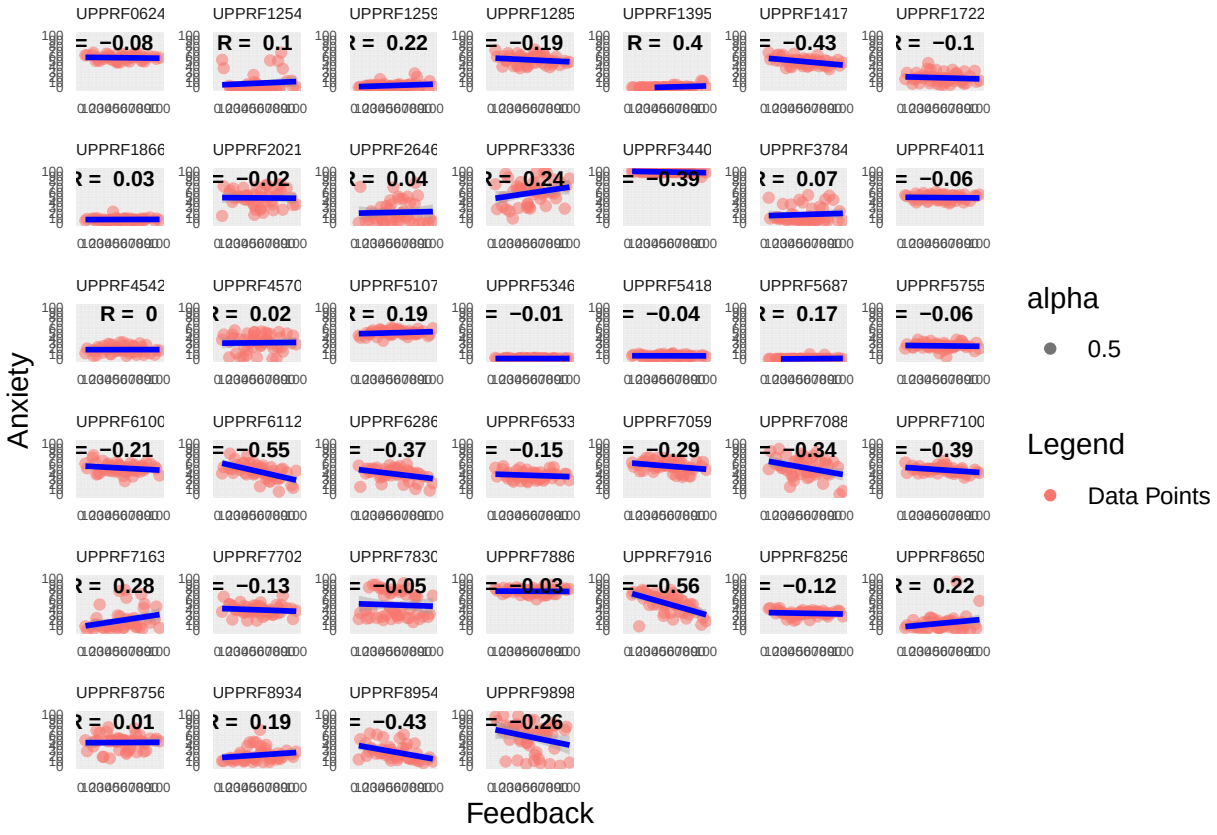
```
## [1] 0.04964543
```



Feedback and anxiety relationship

We will now look at the relationship between feedback and anxiety (so without taking prediction or histogram into account). Again, almost the same as the same relationship with Subj_PE and PE. We can again see people who almost always rated 0 or 100 for anxiety.

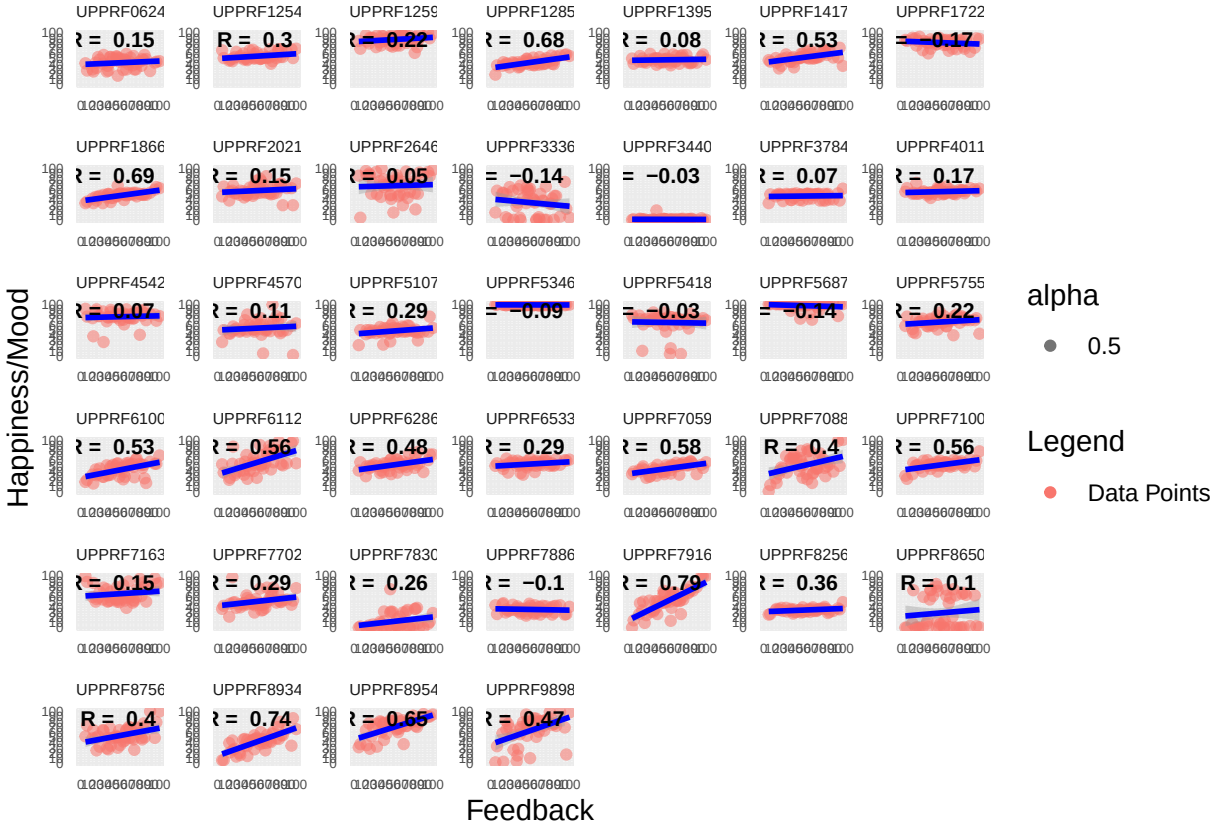
```
## [1] "average correlation between feedback and anxiety: -0.078696284365809"
```



Feedback and mood relationship

The relationship between feedback and happiness: this relationship is stronger than the one with Subj_PE (0.27 vs 0.17).

```
## [1] "average correlation between feedback and happiness: 0.27407792712756"
```



What would be the best next step? We had 14 people with social anxiety, maybe 1) looking these people separately, 2) looking at correlations with mini-SPIN, 3) shall we collect more data? 4) shall we collect data in people with high social anxiety (although we also don't want to use our participants for piloting considering it will be hard to recruit people for the video pilot, we may want to maybe increase the sample to 30/40, so only 15/25 more people to combine with this current pilot data?), 5) would introducing attention shift, or algorithm to produce the feedback change anything, as we do not have any effects of the PE at the moment, it seems?

LME's taking subjective PE and feedback into account

```
## Linear mixed model fit by REML ['lmerMod']
## Formula: Response_Ax ~ Response_SubjPE + (1 | Random_ID)
##    Data: final_df10
##
## REML criterion at convergence: 15105.9
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -4.0822 -0.4630 -0.0345  0.3571  6.2550
##
## Random effects:
##  Groups    Name        Variance Std.Dev.
##  Random_ID (Intercept) 511.7    22.62
##  Residual              168.6    12.98
## Number of obs: 1872, groups:  Random_ID, 39
##
## Fixed effects:
##                 Estimate Std. Error t value
## (Intercept)     35.59988    3.63472   9.794
## Response_SubjPE -0.05399    0.01359  -3.973
##
## Correlation of Fixed Effects:
##             (Intr)
## Rspns_SbjPE -0.010

## Linear mixed model fit by REML ['lmerMod']
## Formula: Response_Ax ~ Response_fdbk + (1 | Random_ID)
##    Data: final_df10
##
## REML criterion at convergence: 15110.9
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -4.0925 -0.4563 -0.0299  0.3644  6.2101
##
## Random effects:
##  Groups    Name        Variance Std.Dev.
##  Random_ID (Intercept) 500.8    22.38
##  Residual              169.1    13.00
## Number of obs: 1872, groups:  Random_ID, 39
##
## Fixed effects:
##                Estimate Std. Error t value
## (Intercept)   37.62506    3.65551  10.293
## Response_fdbk -0.04190    0.01267  -3.307
##
## Correlation of Fixed Effects:
##             (Intr)
## Respns_fdbk -0.180

## Linear mixed model fit by REML ['lmerMod']
```

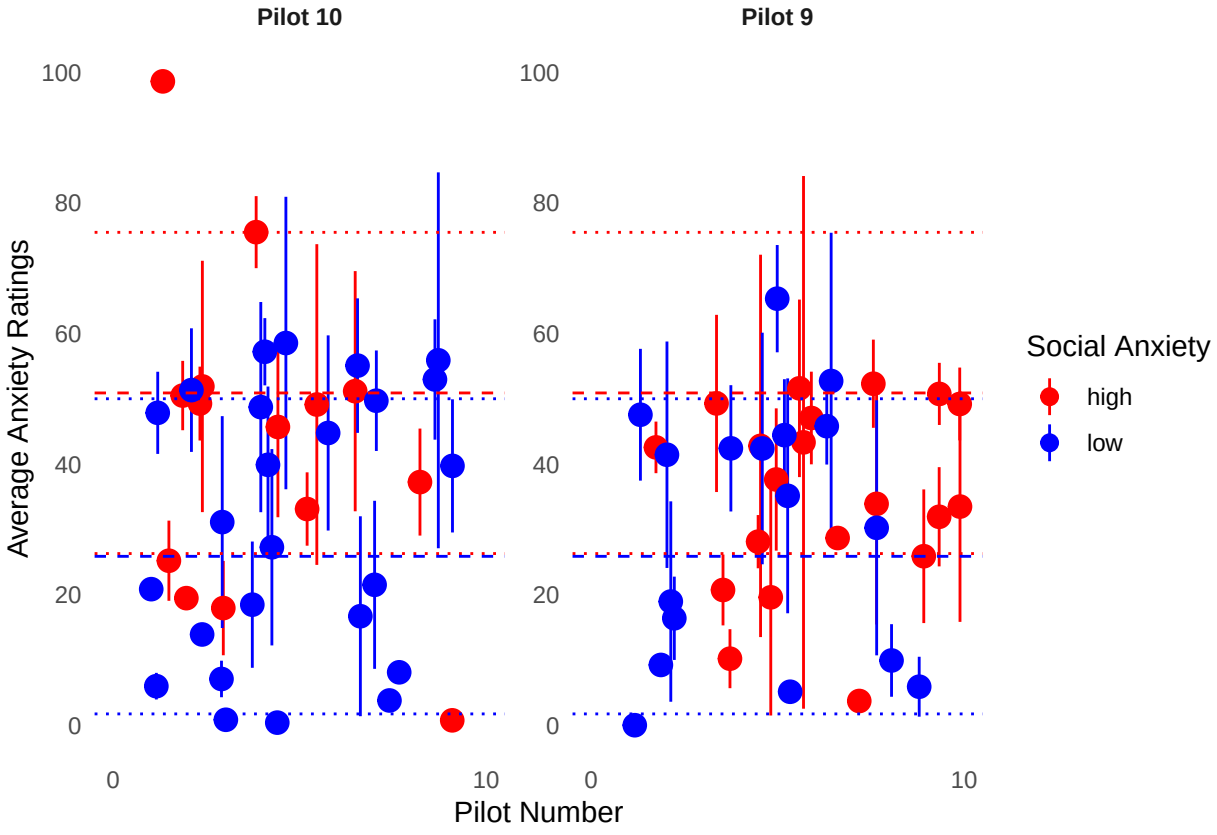
```
## Formula: Response_Ax ~ Response_SubjPE + Response_fdbk + (1 | Random_ID)
##    Data: final_df10
##
## REML criterion at convergence: 15111.6
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -4.0683 -0.4653 -0.0348  0.3573  6.2562
##
## Random effects:
##  Groups    Name        Variance Std.Dev.
##  Random_ID (Intercept) 509.6    22.57
##  Residual              168.6    12.99
## Number of obs: 1872, groups:  Random_ID, 39
##
## Fixed effects:
##                 Estimate Std. Error t value
## (Intercept)     36.29237    3.72997   9.730
## Response_SubjPE -0.04371    0.01872  -2.335
## Response_fdbk   -0.01390    0.01744  -0.797
##
## Correlation of Fixed Effects:
##             (Intr) Rs_SPE
## Rspns_SbjPE  0.153
## Respns_fdbk -0.233 -0.688
```

Anxiety plots + mini_SPIN + average ratings from Eleanor's study

In the plot below we have anxiety ratings during pilots 9 (no video, more people with high social anxiety) and 10 (video re-introduced, less people with high social anxiety).

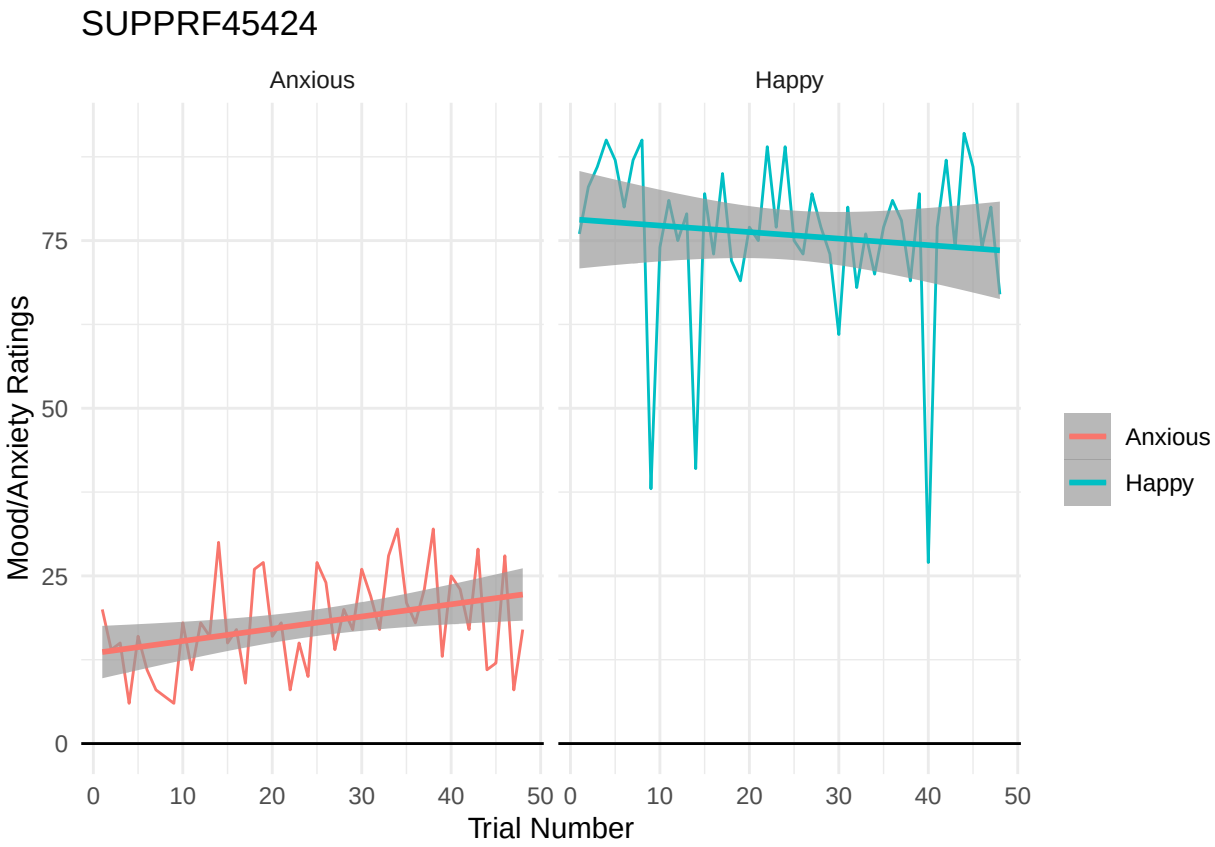
- The dots represent the average anxiety ratings per subject with SD as vertical lines.
- The red and blue dots represent people who had mini-SPIN scores that were above or below threshold of 6.
- The blue dashed line is the average anxiety after the externally focused attention in Eleanor's study and the dotted lines are ± SD. The red ones are for the self-focused attention.

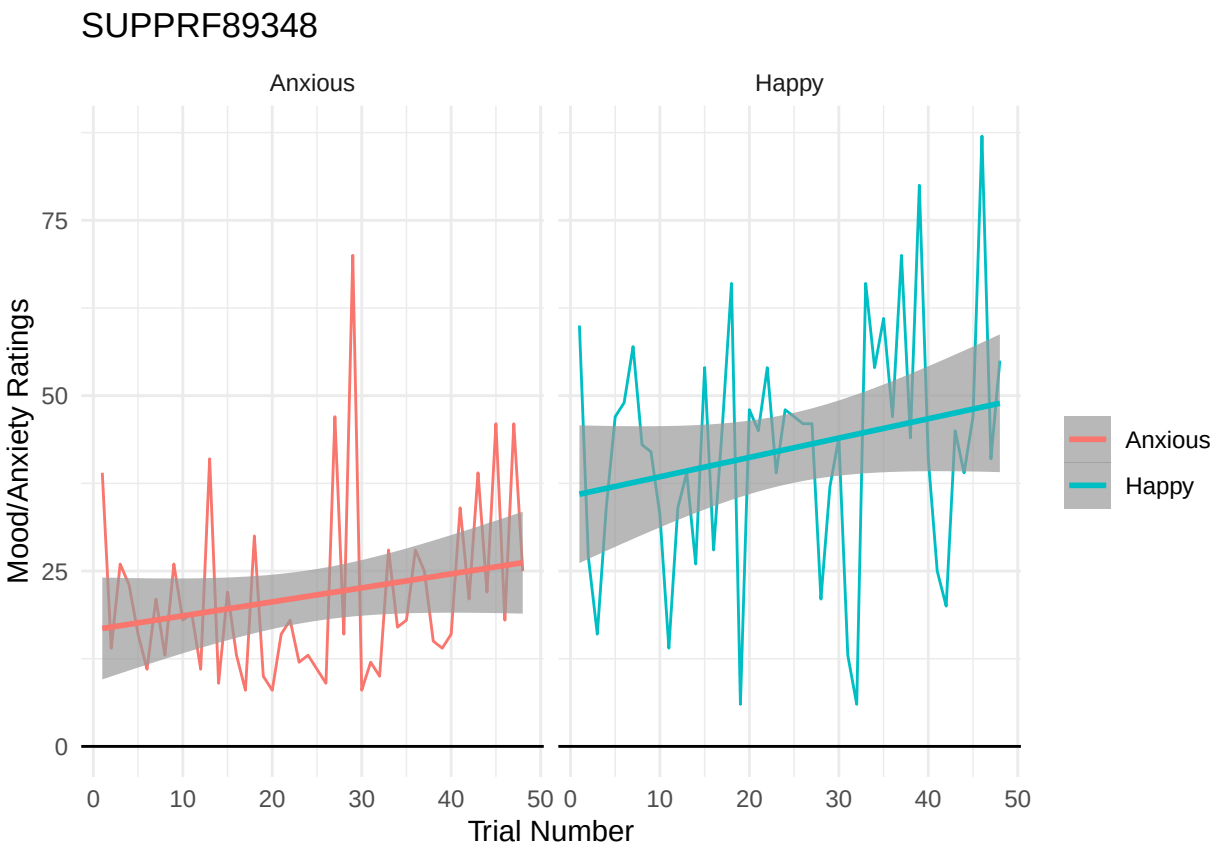
- Pilot 9 was without video where we had 21/37 subjects with high social anxiety and people had to type their answers, and pilot 10 was with the video where we had only 14/38 people with high social anxiety and people had to verbally share their answers.

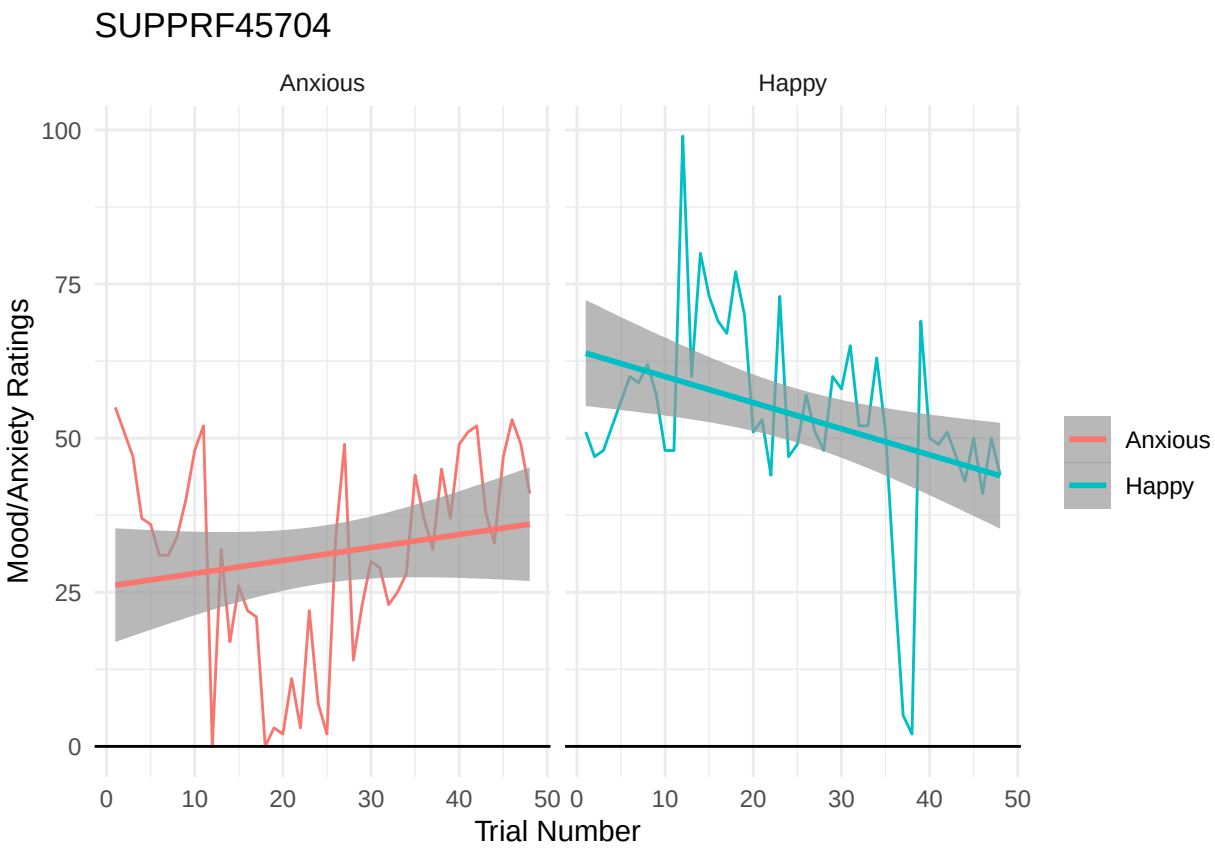


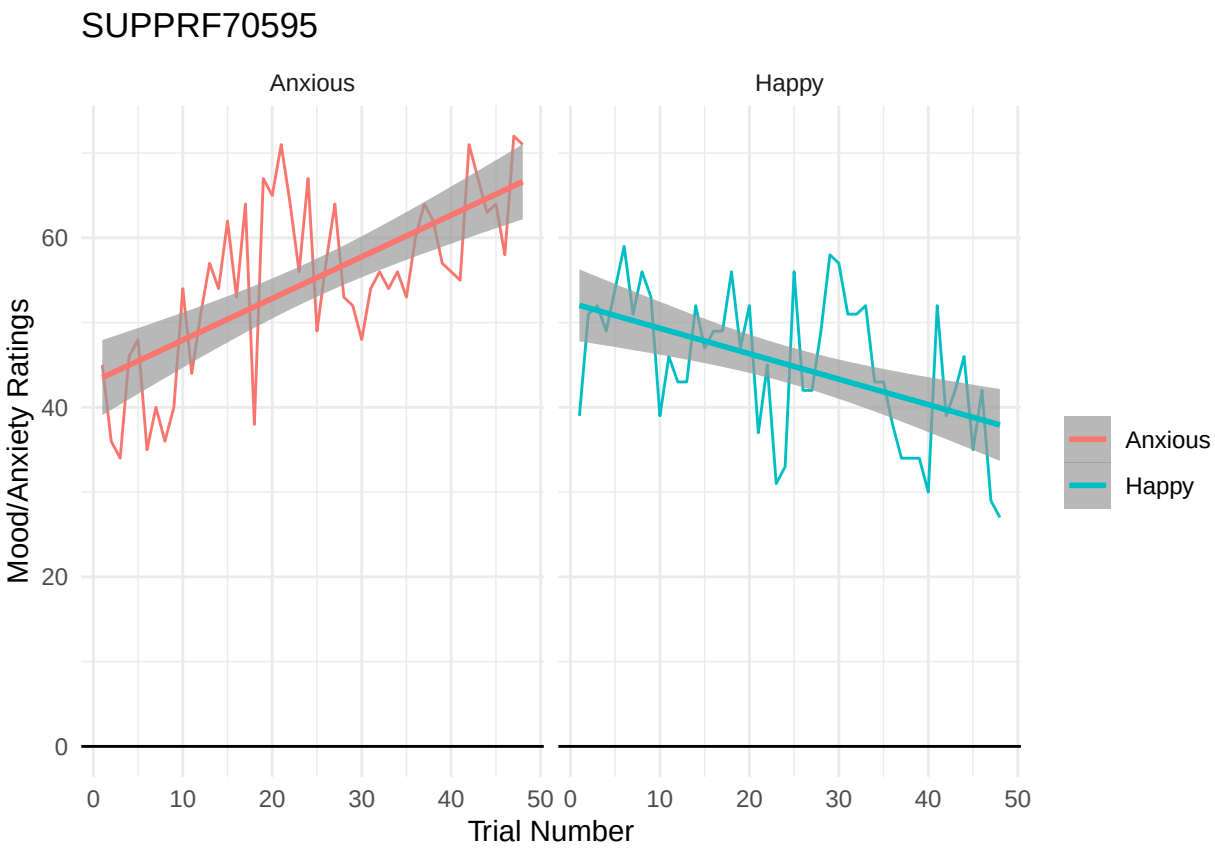
Anxiety and Mood over time within subjects + regression line

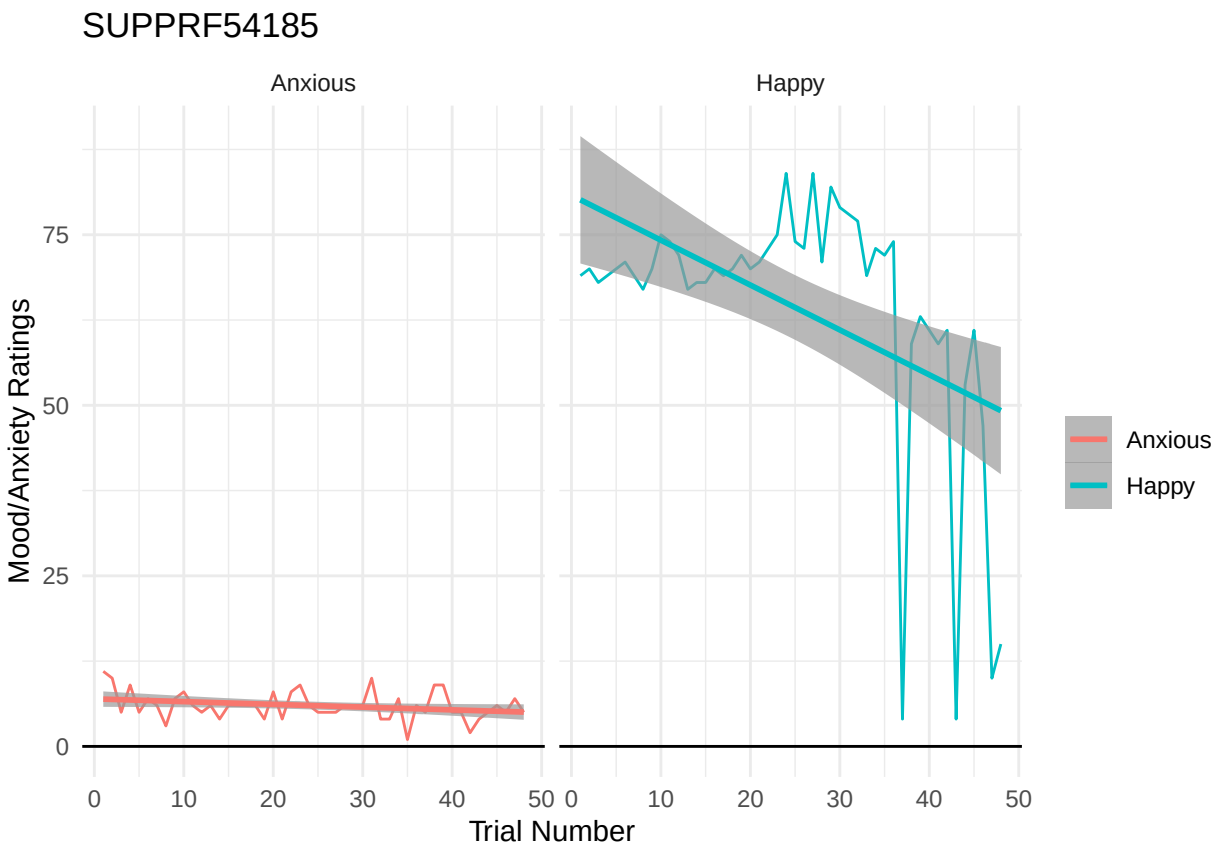
I will now repeat the same plot we had within subjects and fit a regression line for mood/anxiety ratings

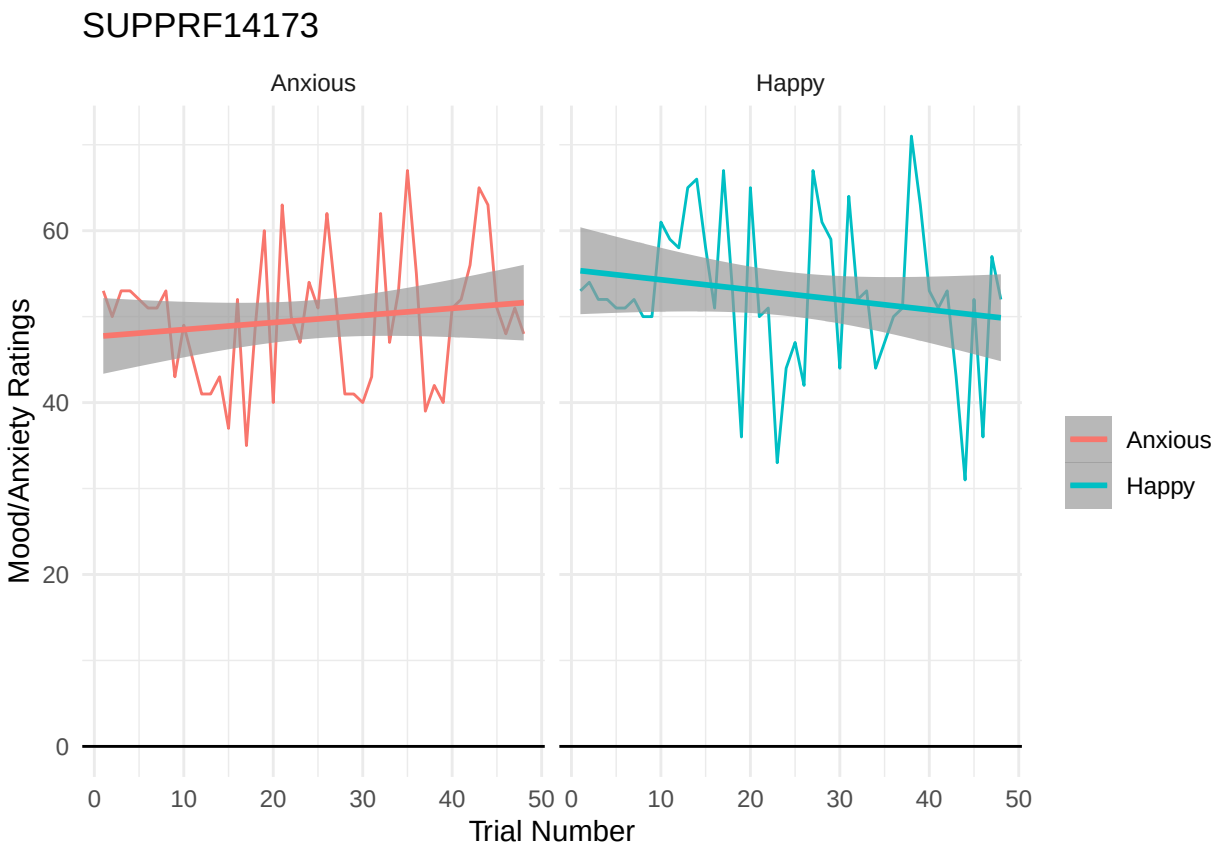


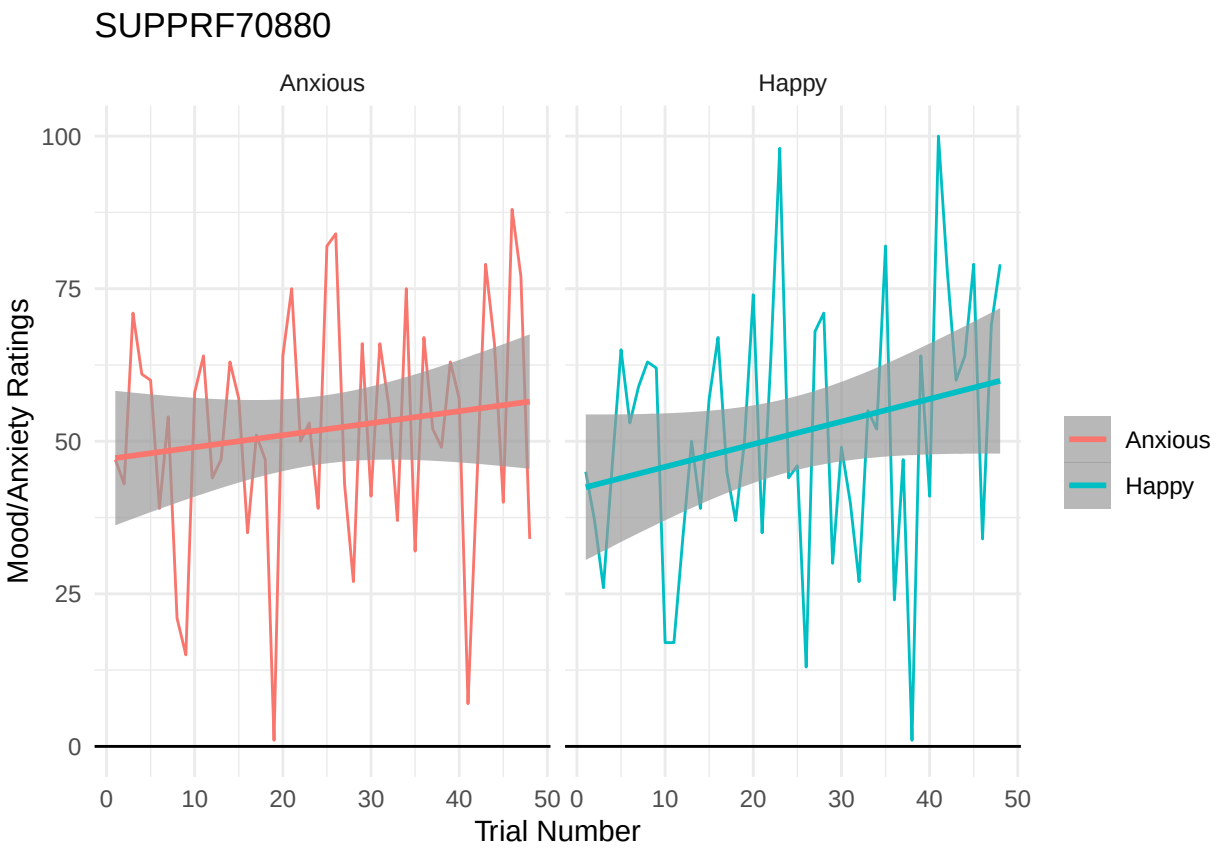

SUPPRF89348
Anxious
Happy
Mood/Anxiety Ratings
75
50
25
0
0
10
20
30
40
50
Trial Number
Anxious
Happy

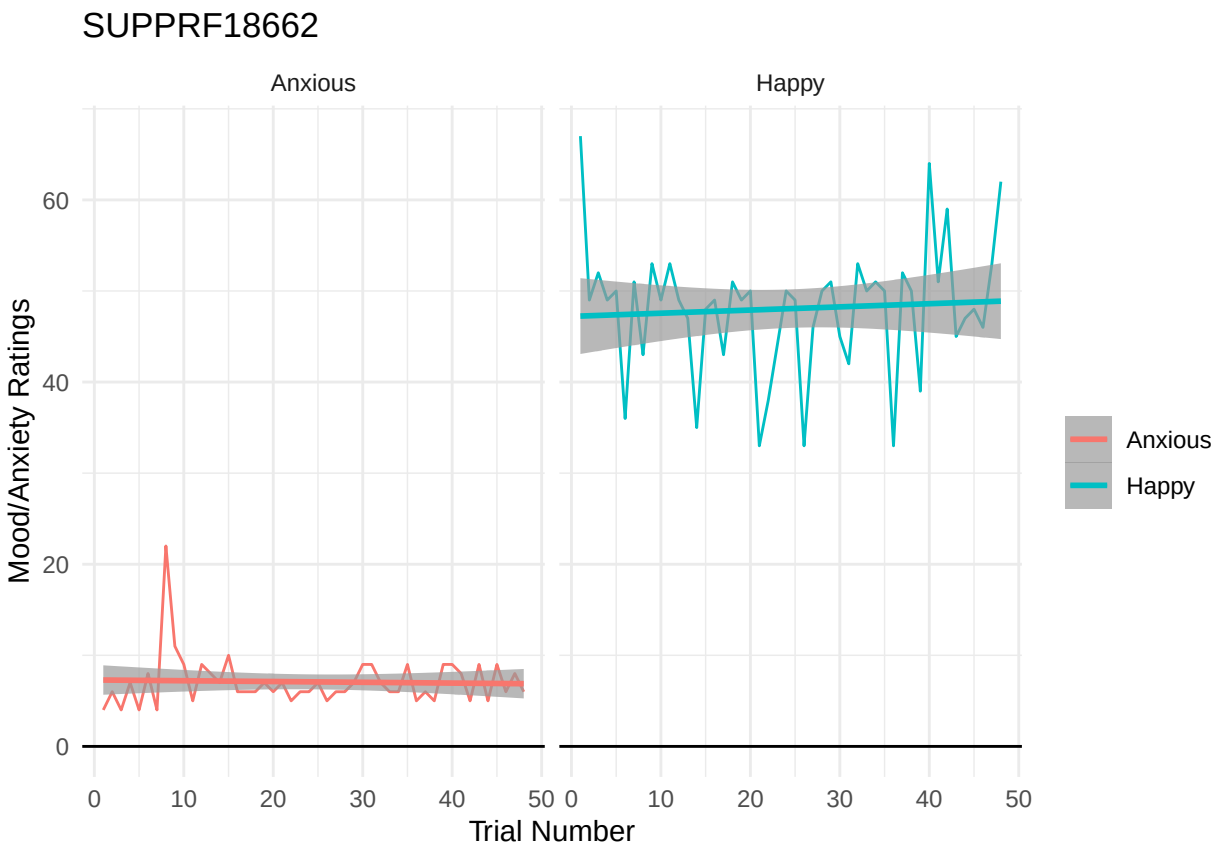

SUPPRF45704
Anxious
Happy
Mood/Anxiety Ratings
100
75
50
25
0
0
10
20
30
40
50
Trial Number
Anxious
Happy

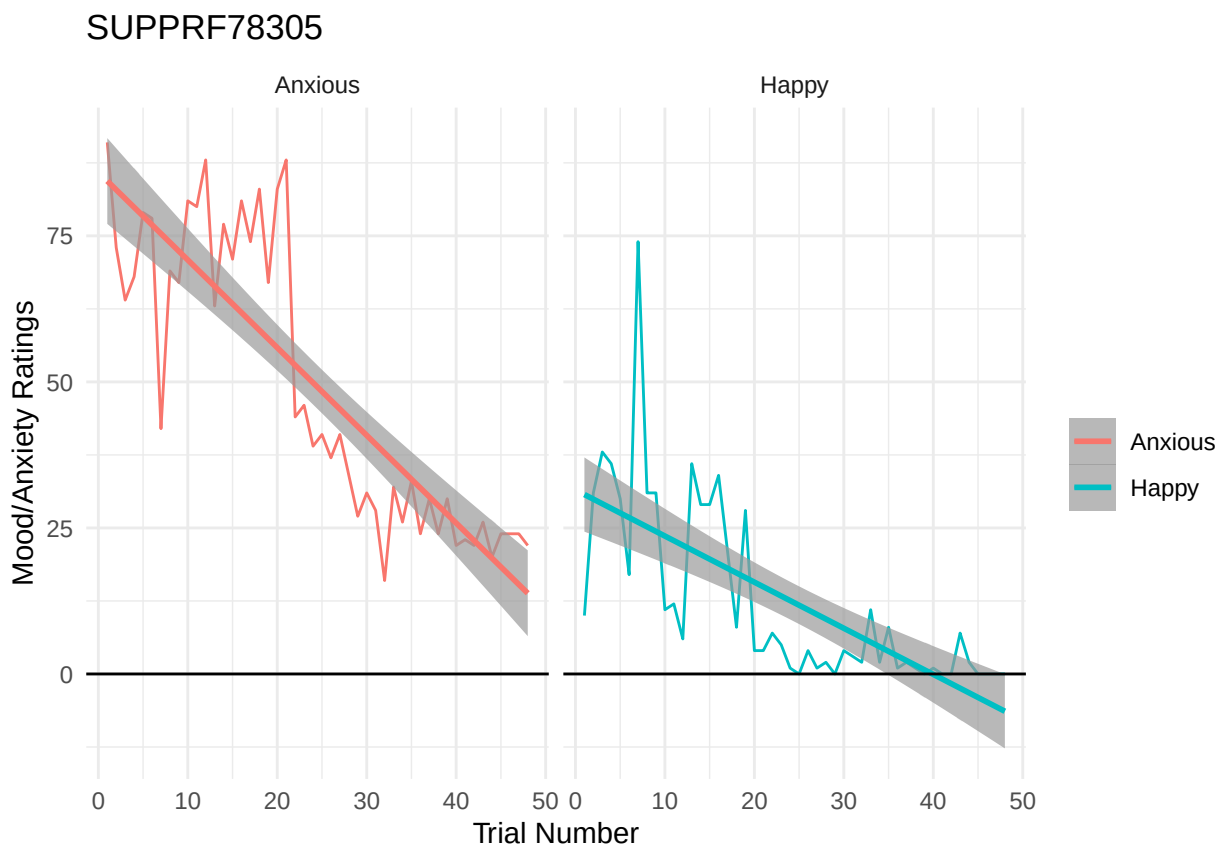

SUPPRF70595
Anxious
Happy
Mood/Anxiety Ratings
0
20
40
60
0
10
20
30
40
50
Trial Number
Anxious
Happy


SUPPRF54185
Anxious
Happy
Mood/Anxiety Ratings
75
50
25
0
0
10
20
30
40
50
Trial Number
Anxious
Happy

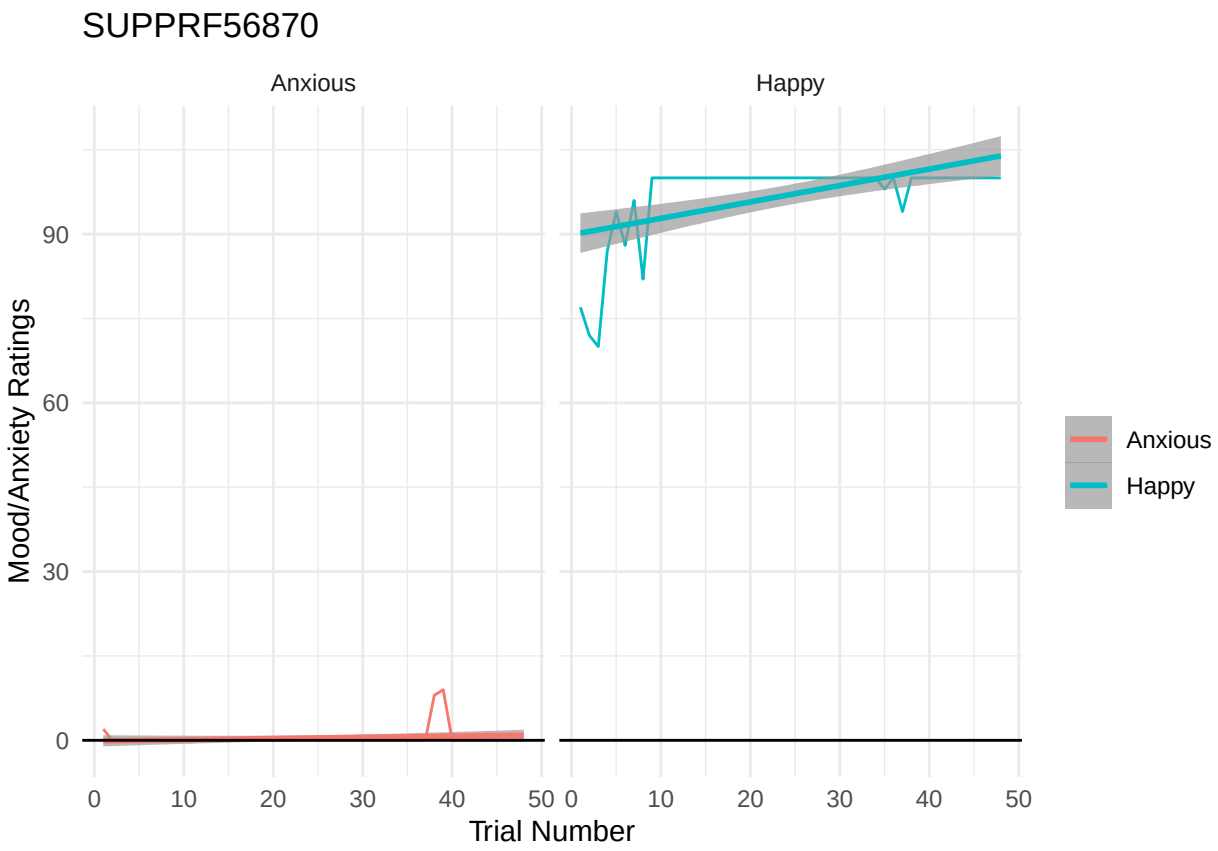

SUPPRF14173
Anxious
Happy
Mood/Anxiety Ratings
0
20
40
60
0
10
20
30
40
50
Trial Number
Anxious
Happy

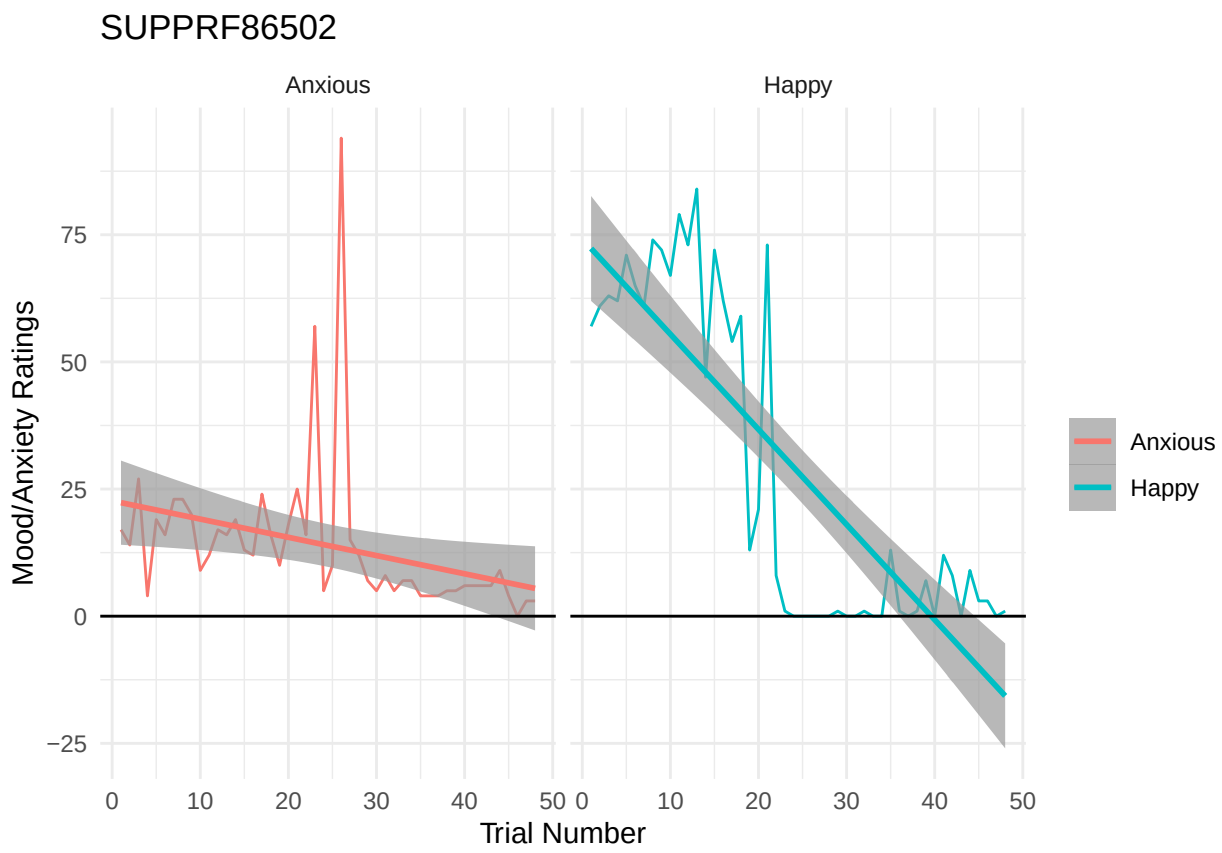

SUPPRF70880
Anxious
Happy
Mood/Anxiety Ratings
100
75
50
25
0
0
10
20
30
40
50
Trial Number
Anxious
Happy

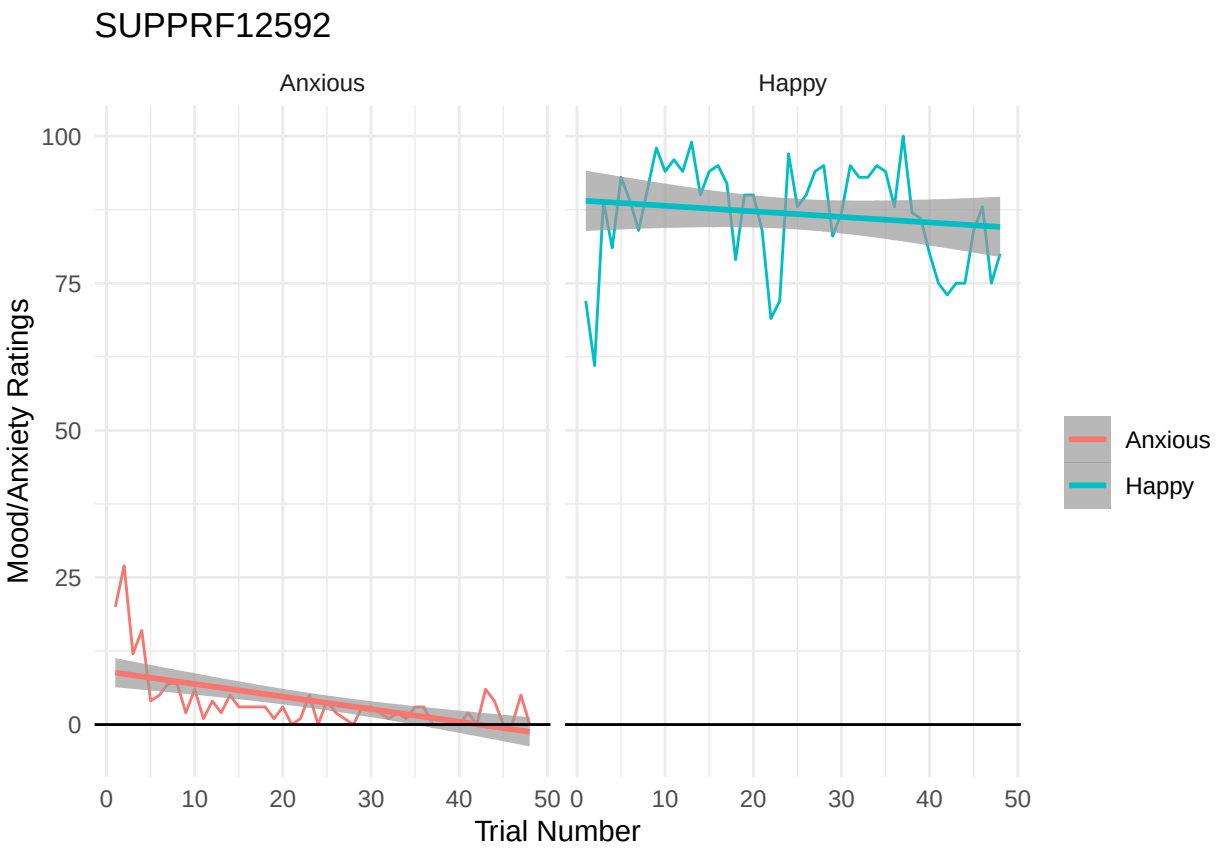

SUPPRF18662
Anxious
Happy
Mood/Anxiety Ratings
0
20
40
60
0
10
20
30
40
50
Trial Number
Anxious
Happy

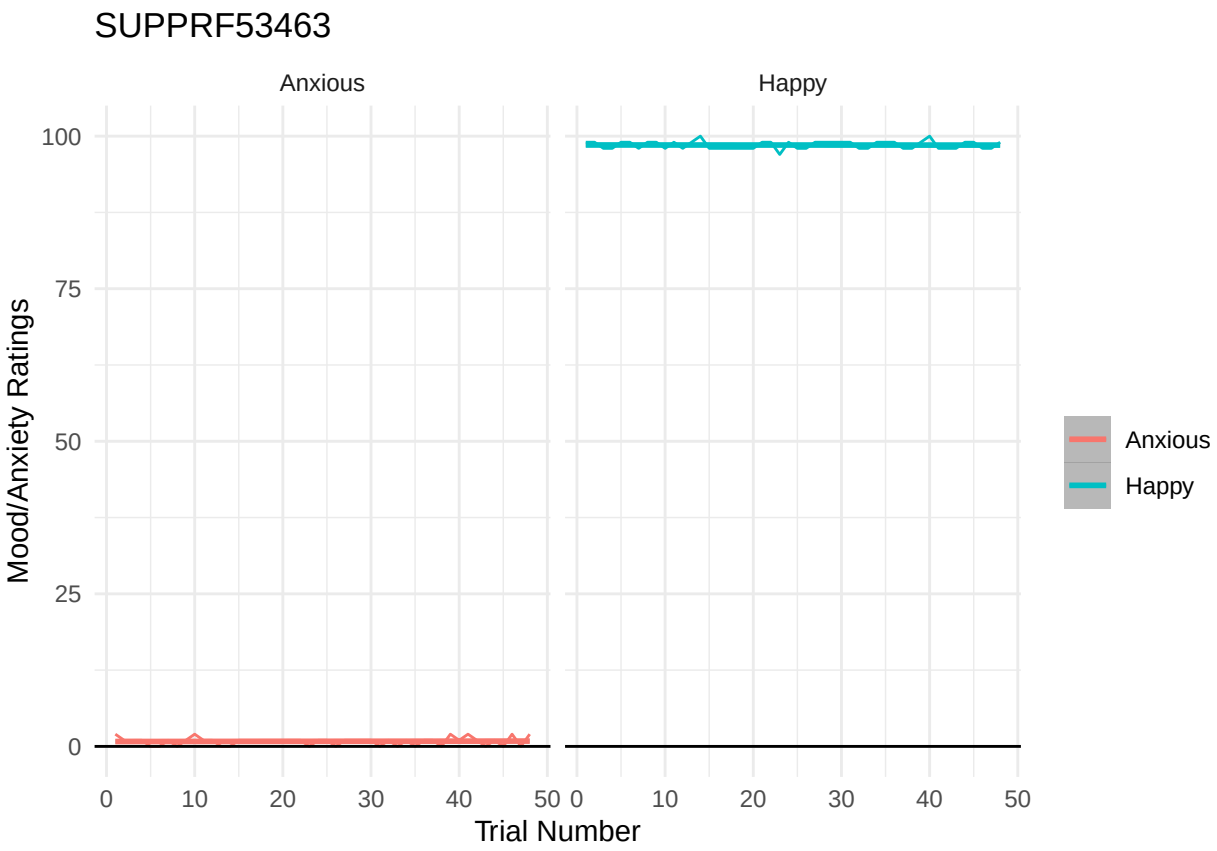

SUPPRF78305
Anxious
Happy
Mood/Anxiety Ratings
75
50
25
0
0
10
20
30
40
50
Trial Number
Anxious
Happy

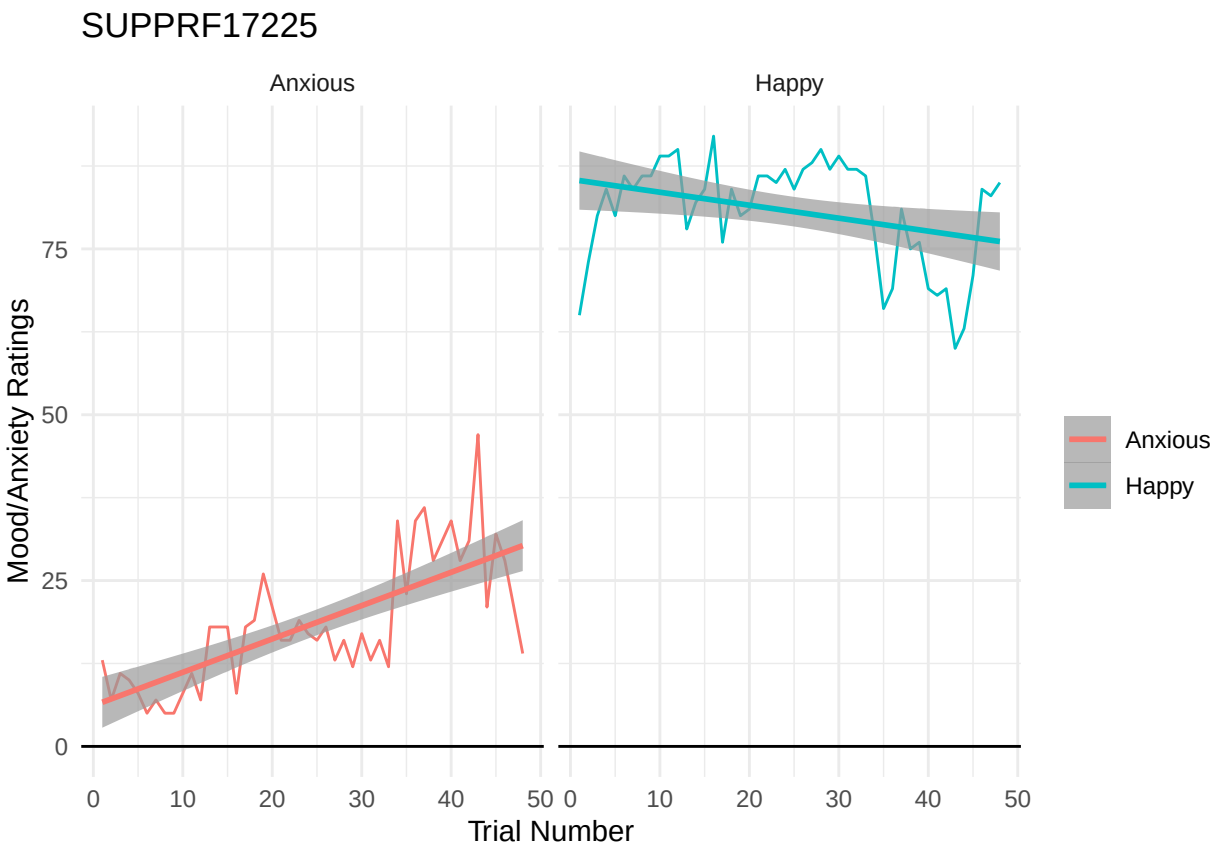

SUPPRF71639
Anxious
Happy
Mood/Anxiety Ratings
100
75
50
25
0
0
10
20
30
40
50
Trial Number
Anxious
Happy

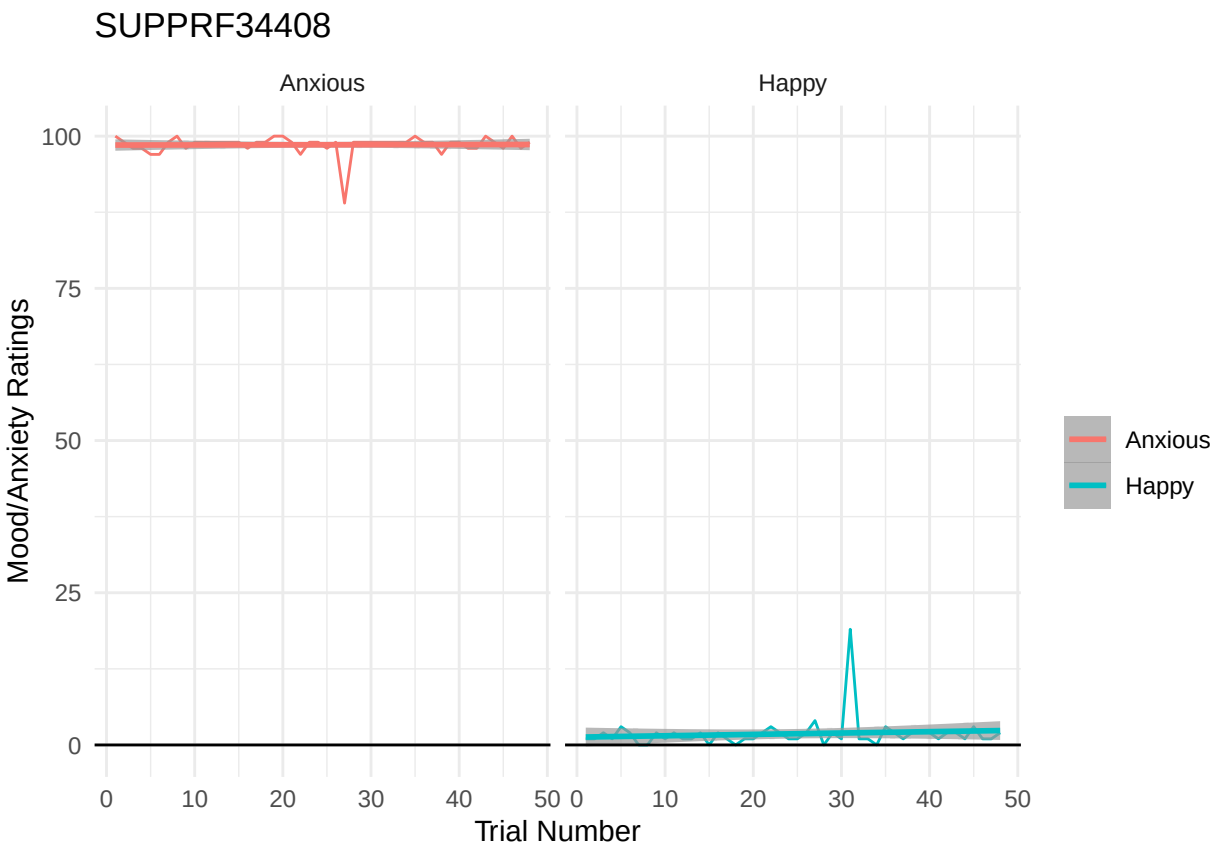

SUPPRF56870
Anxious
Happy
Mood/Anxiety Ratings
90
60
30
0
0
10
20
30
40
50
Trial Number
Anxious
Happy


SUPPRF86502
Anxious
Happy
Mood/Anxiety Ratings
75
50
25
0
−25
0
10
20
30
40
50
Trial Number
Anxious
Happy


SUPPRF12592
Anxious
Happy
Mood/Anxiety Ratings
100
75
50
25
0
0
10
20
30
40
50
Trial Number
Anxious
Happy


SUPPRF53463
Anxious
Happy
Mood/Anxiety Ratings
100
75
50
25
0
0
10
20
30
40
50
Trial Number
Anxious
Happy


SUPPRF17225
Anxious
Happy
Mood/Anxiety Ratings
75
50
25
0
0
10
20
30
40
50
Trial Number
Anxious
Happy


SUPPRF34408
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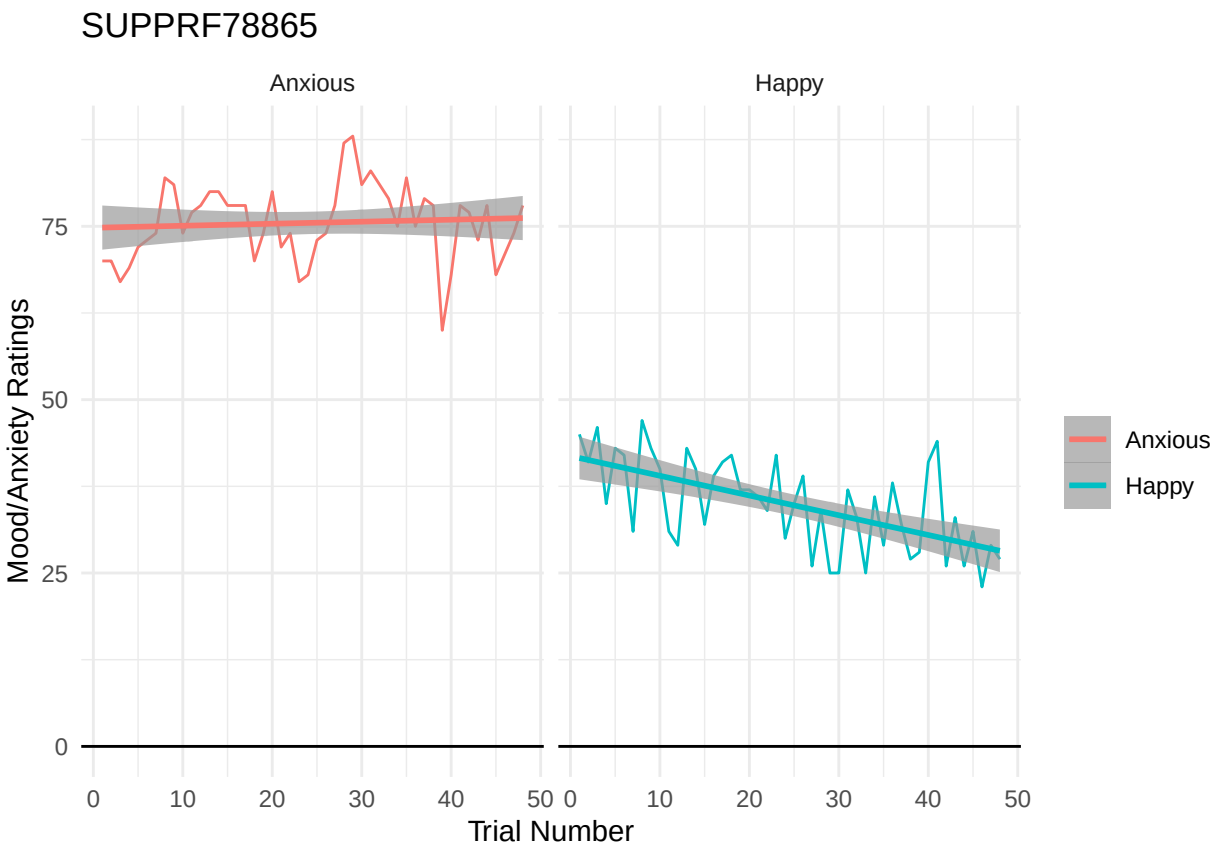
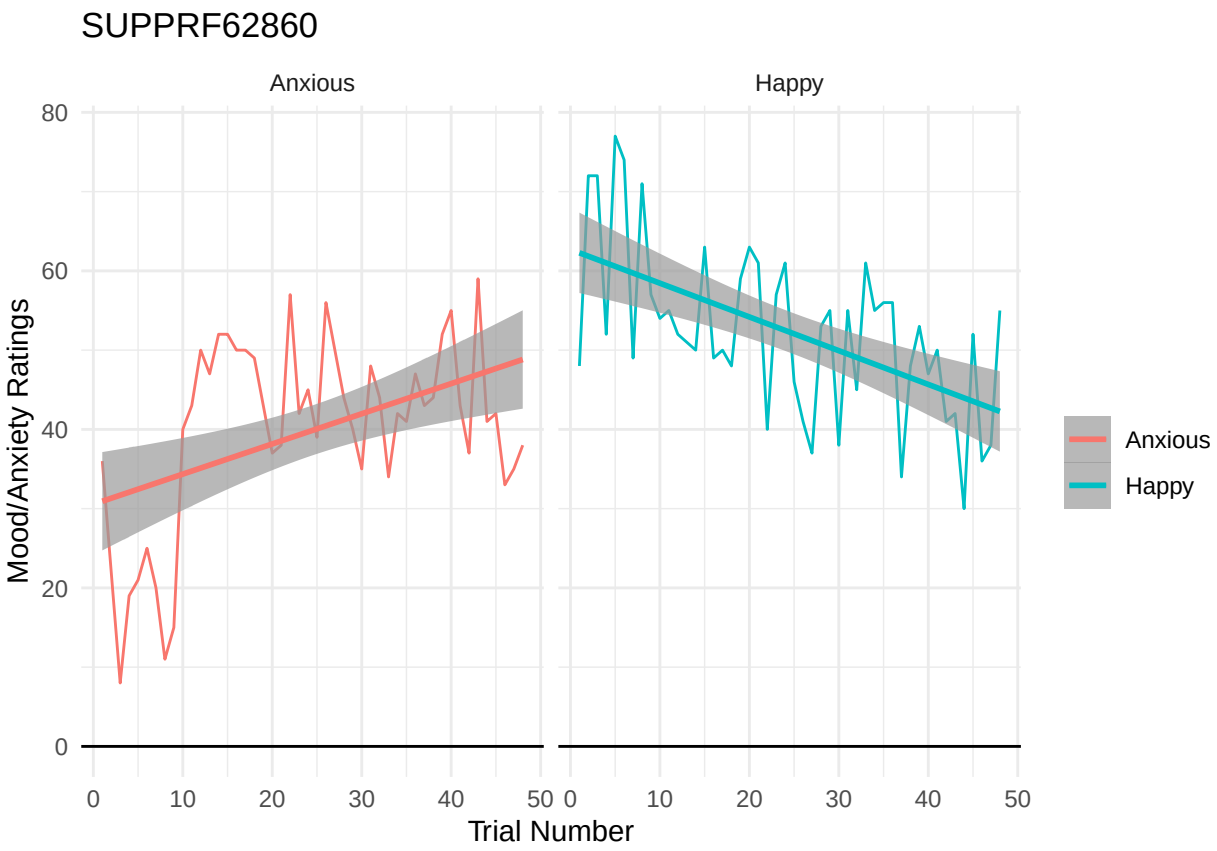
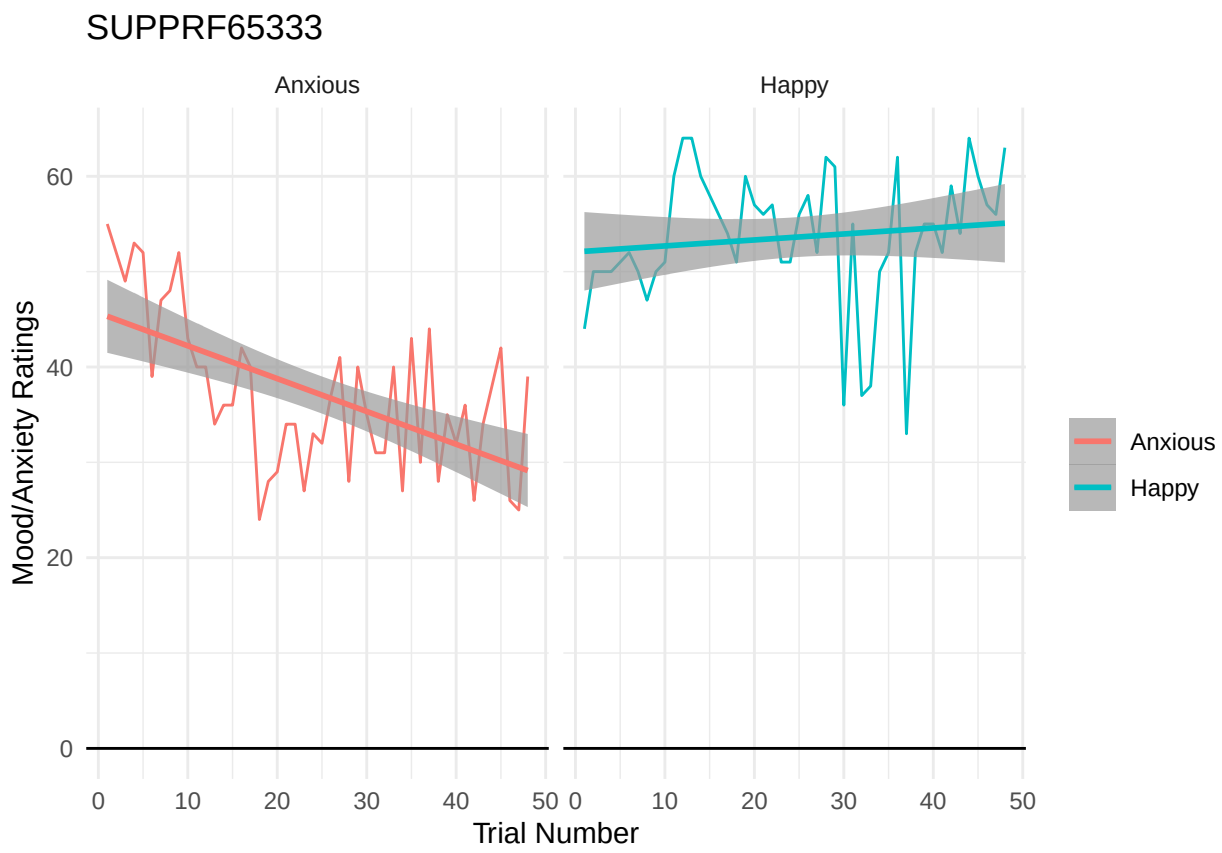
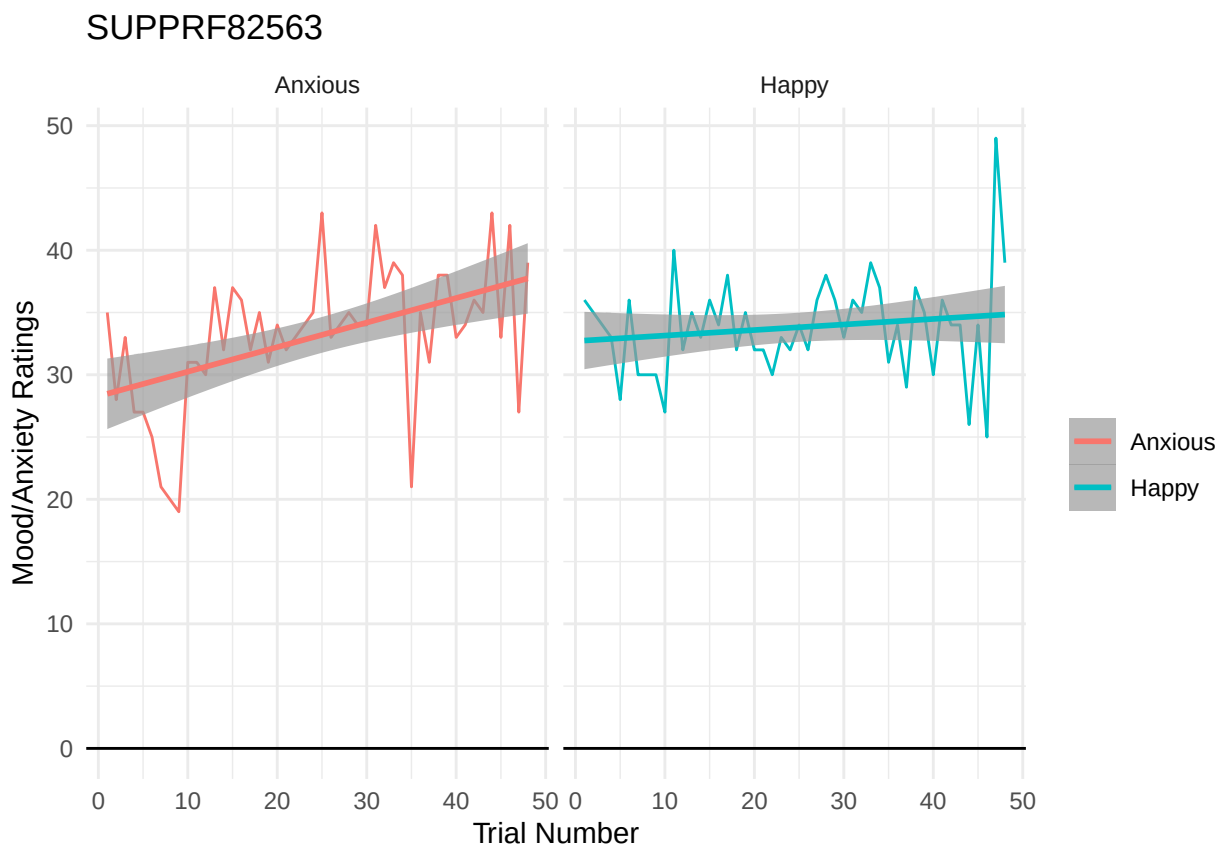
Happy
Mood/Anxiety Ratings
100
75
50
25
0
0
10
20
30
40
50
Trial Number
Anxious
Happy

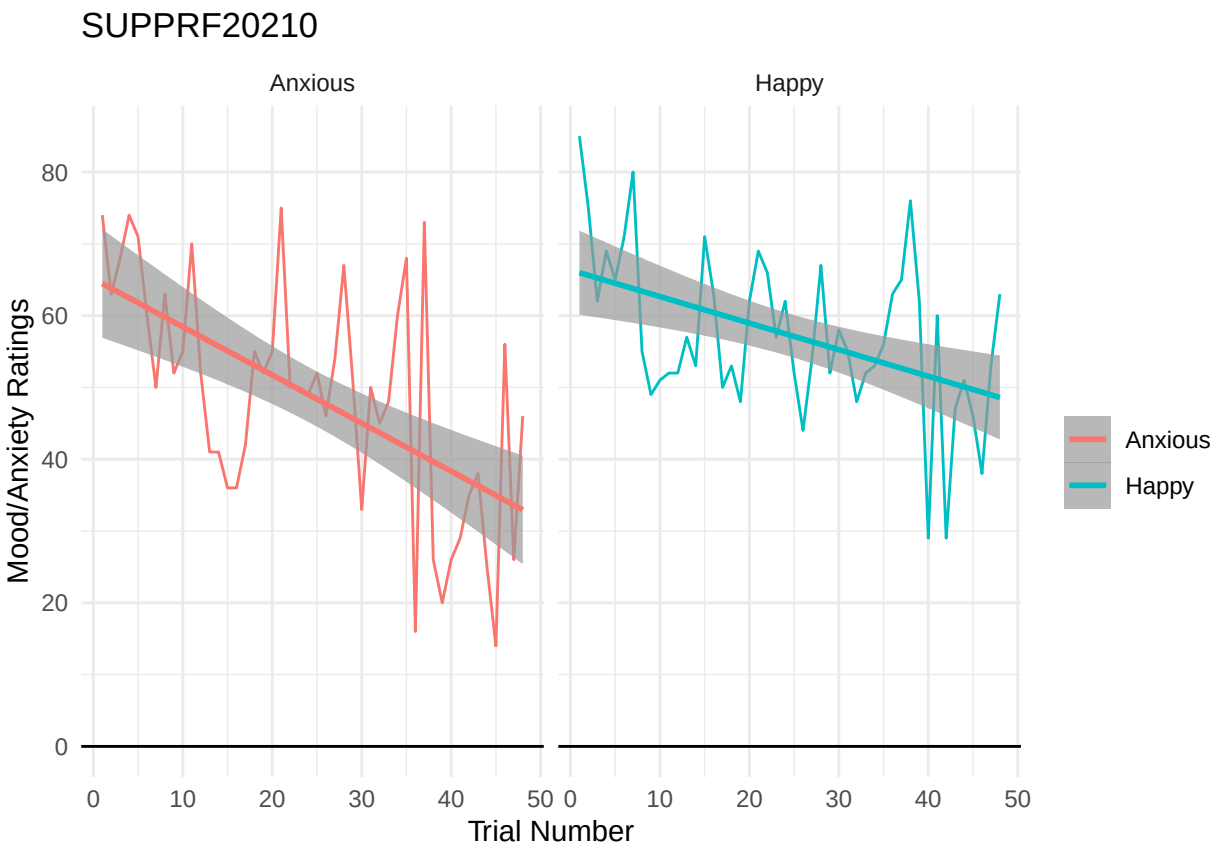

SUPPRF78865
Anxious
Happy
Mood/Anxiety Ratings
75
50
25
0
0
10
20
30
40
50
Trial Number
Anxious
Happy

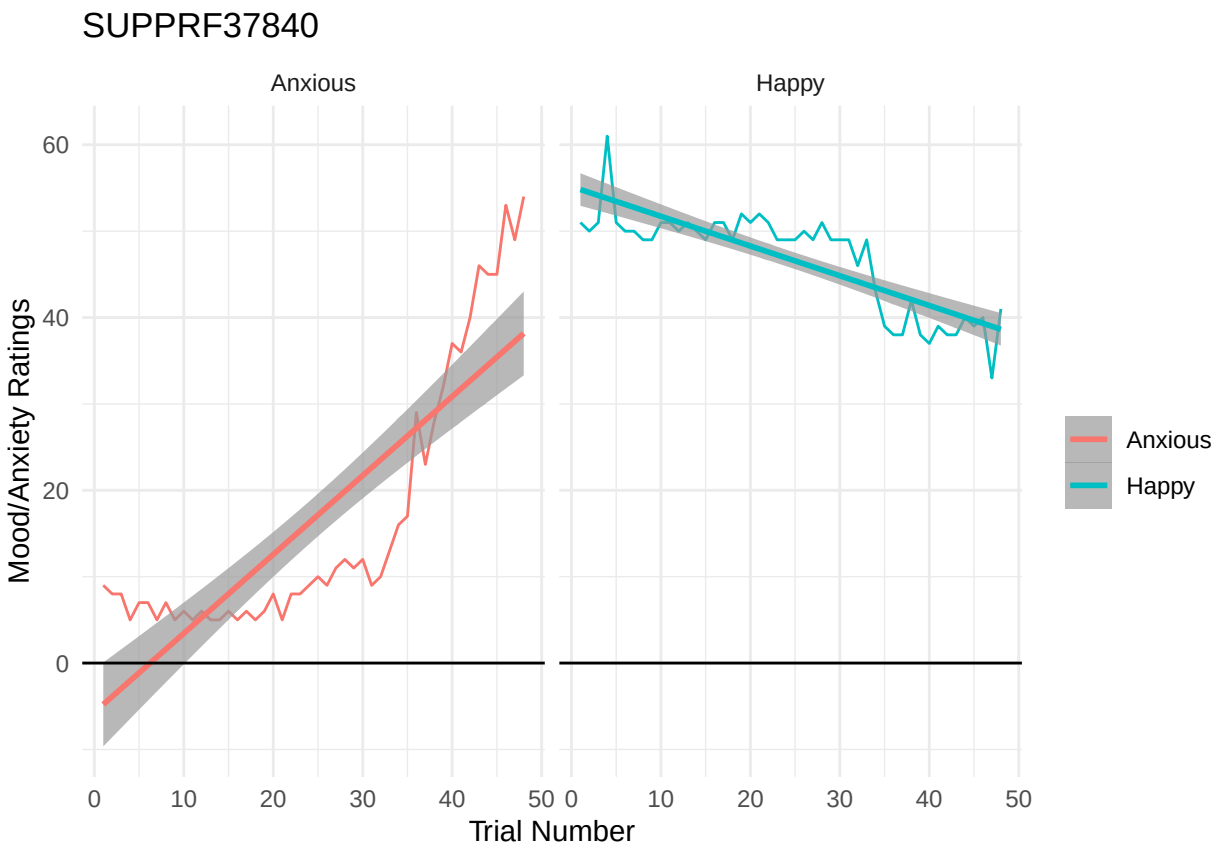

SUPPRF62860
Anxious
Happy
Mood/Anxiety Ratings
80
60
40
20
0
0
10
20
30
40
50
Trial Number
Anxious
Happy

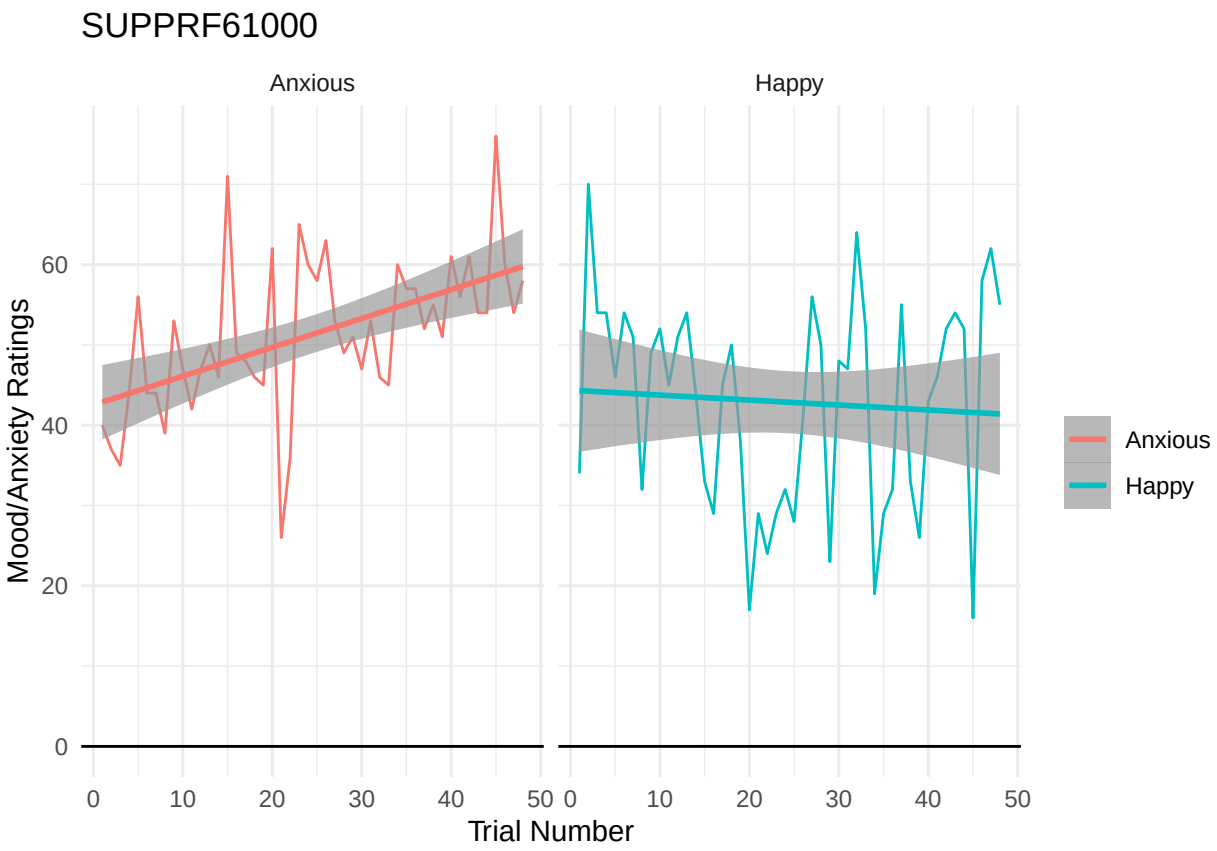

SUPPRF65333
Anxious
Happy
Mood/Anxiety Ratings
60
40
20
0
0
10
20
30
40
50
Trial Number
Anxious
Happy

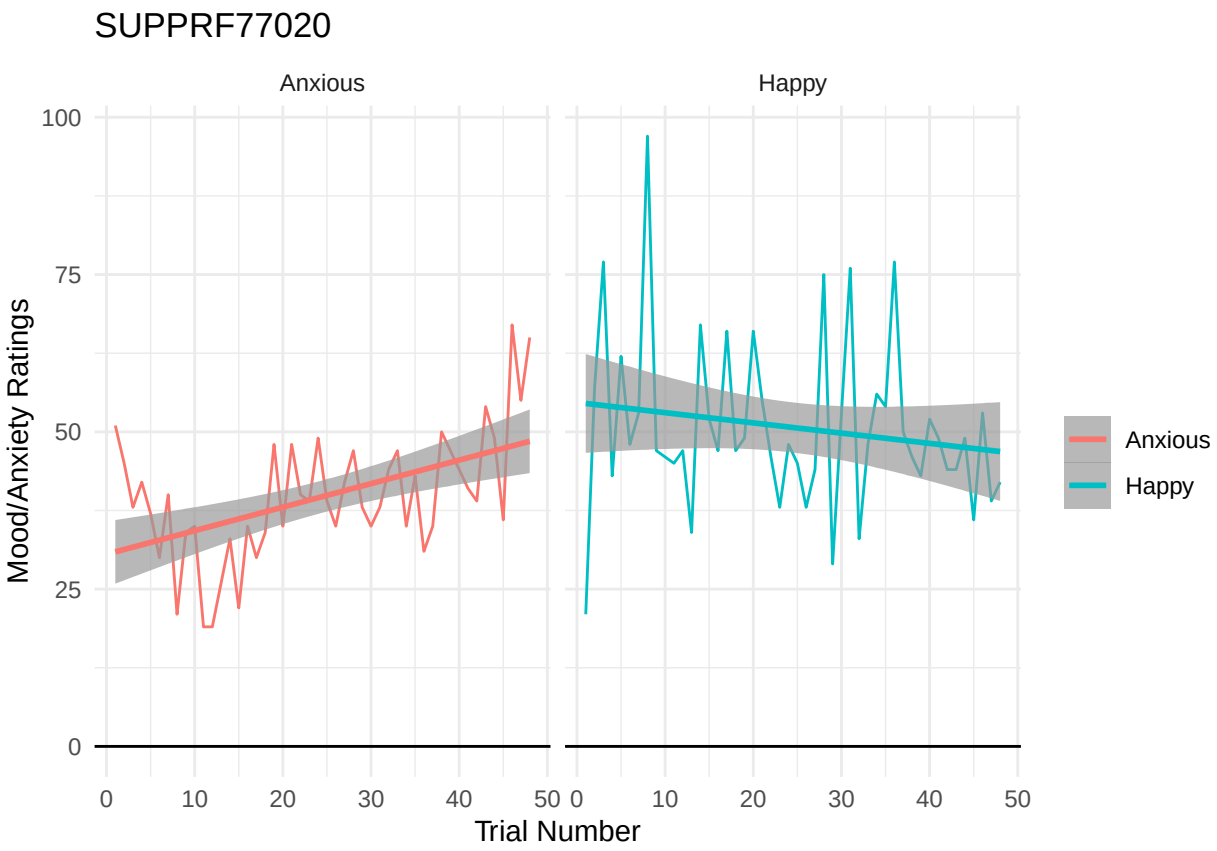

SUPPRF82563
Anxious
Happy
Mood/Anxiety Ratings
Trial Number
0
10
20
30
40
50
Anxious
Happy

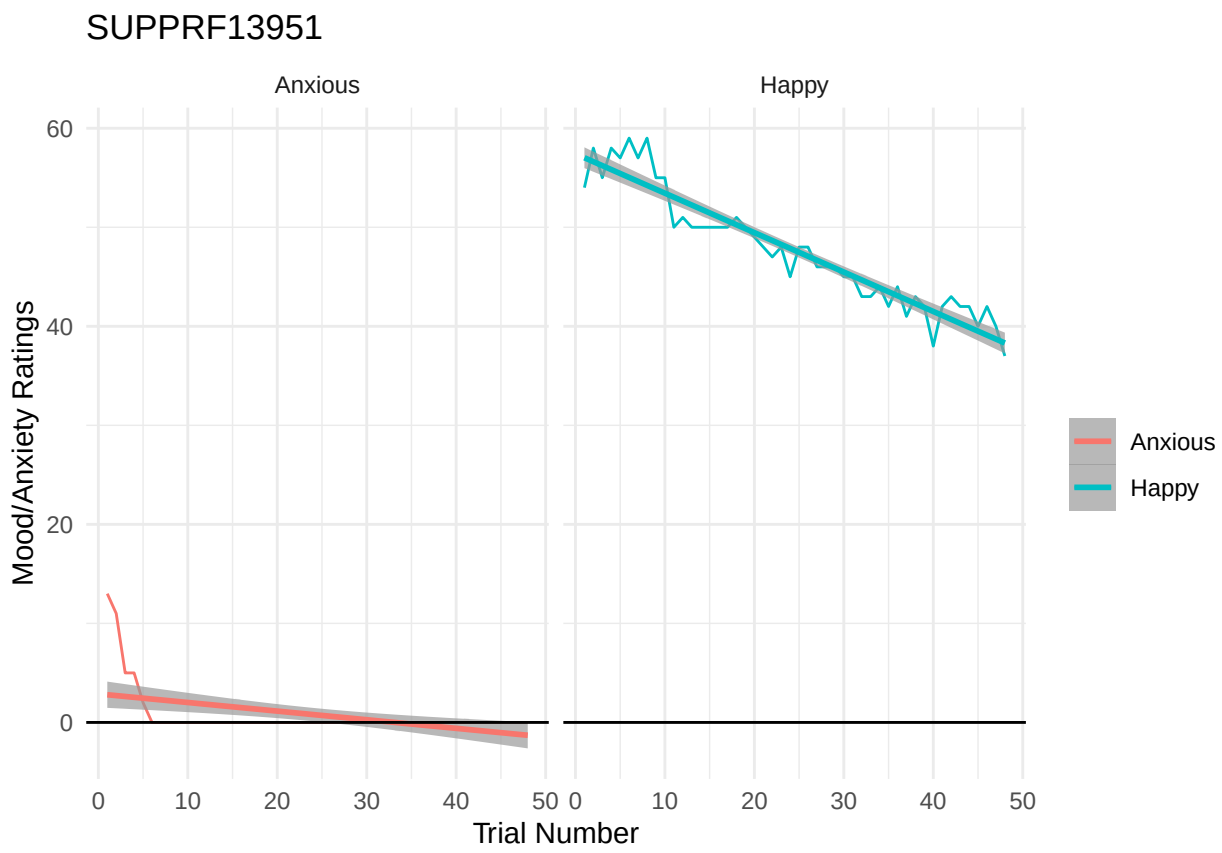

SUPPRF61122
Anxious
Happy
Mood/Anxiety Ratings
100
75
50
25
0
0
10
20
30
40
50
Trial Number
Anxious
Happy

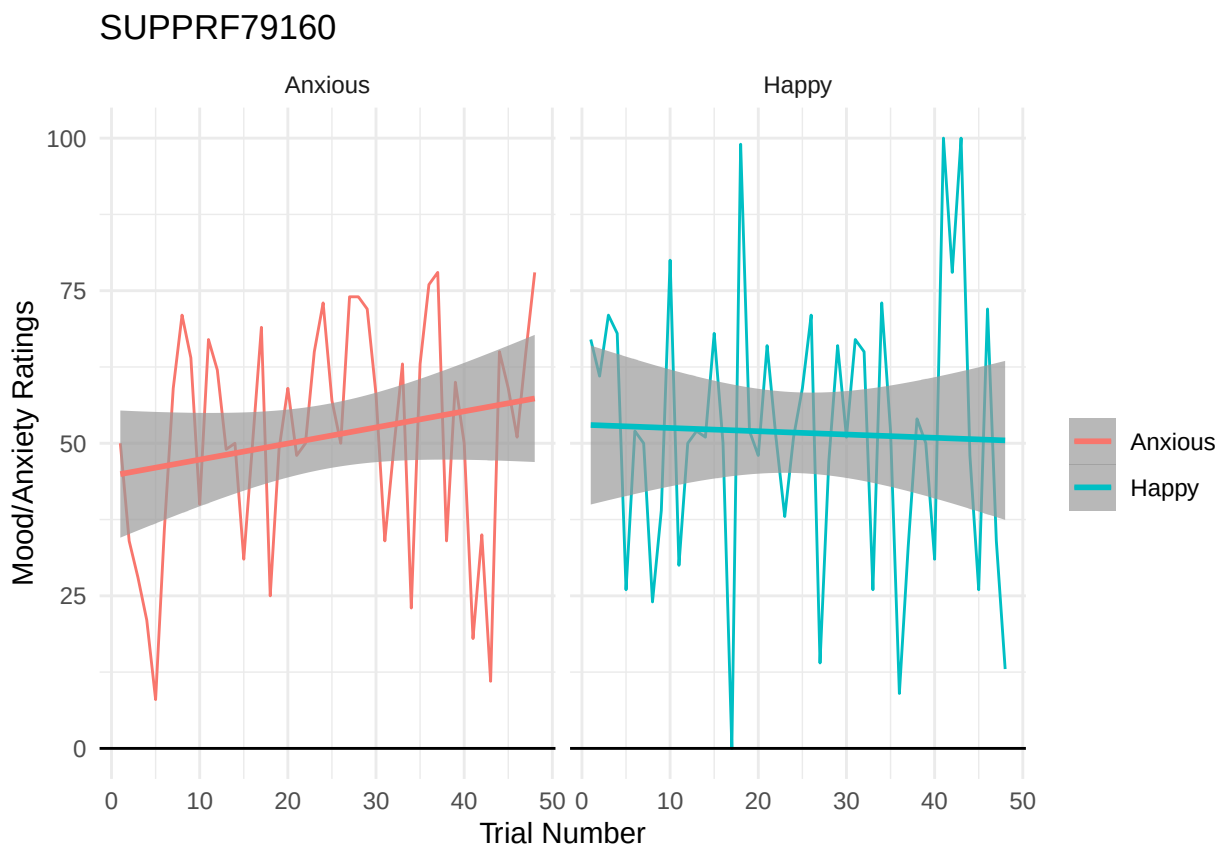

SUPPRF20210
Anxious
Happy
Mood/Anxiety Ratings
0
20
40
60
80
0
10
20
30
40
50
Trial Number
Anxious
Happy

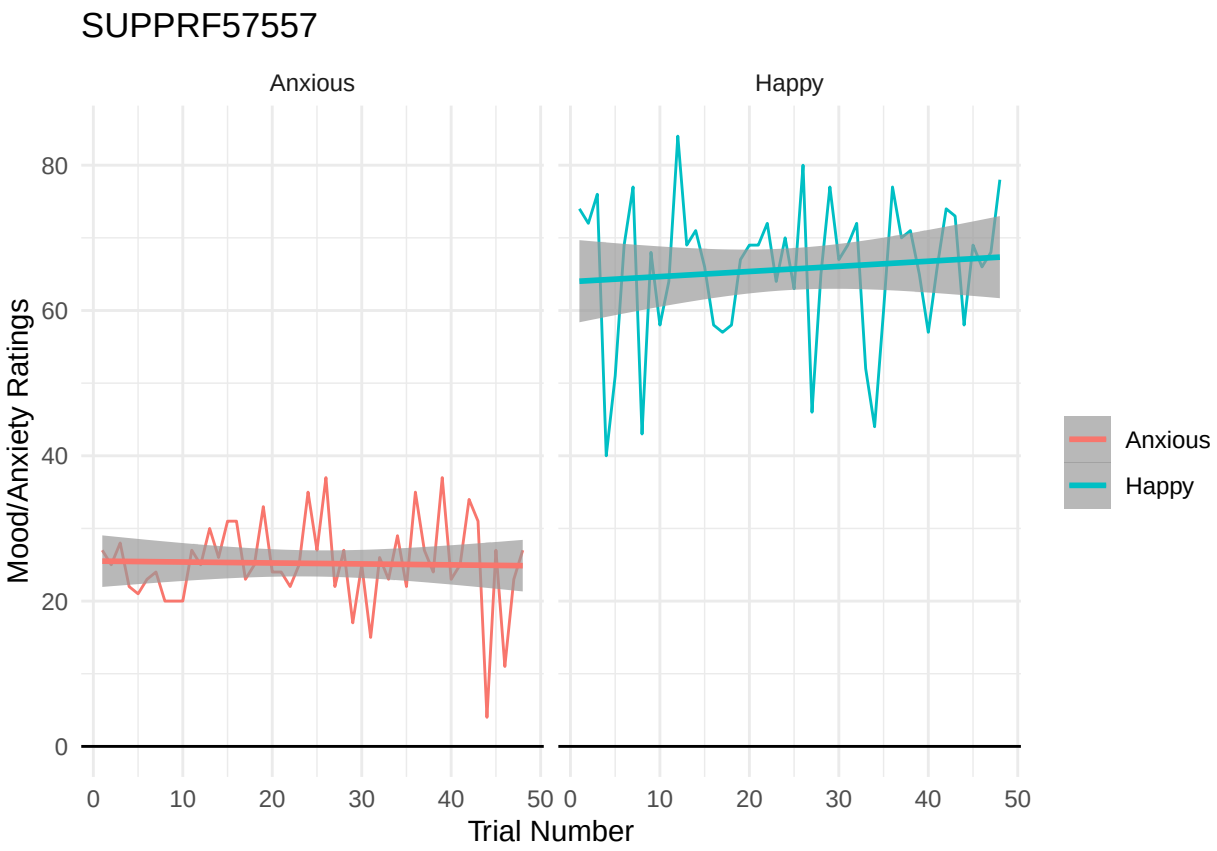

SUPPRF37840
Anxious
Happy
Mood/Anxiety Ratings
60
40
20
0
0
10
20
30
40
50
Trial Number
Anxious
Happy


SUPPRF61000
Anxious
Happy
Mood/Anxiety Ratings
0
20
40
60
0
10
20
30
40
50
Trial Number
Anxious
Happy

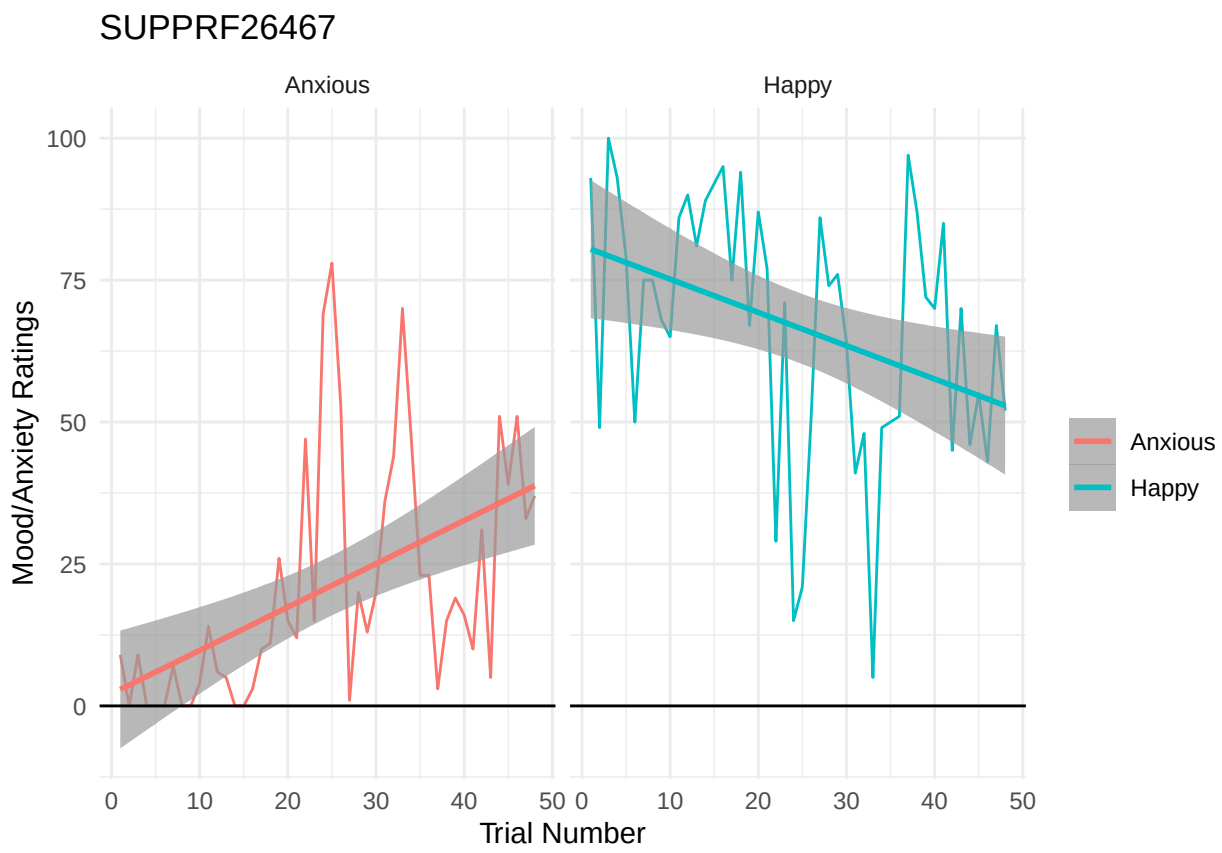

SUPPRF77020
Anxious
Happy
Mood/Anxiety Ratings
100
75
50
25
0
0
10
20
30
40
50
Trial Number
Anxious
Happy

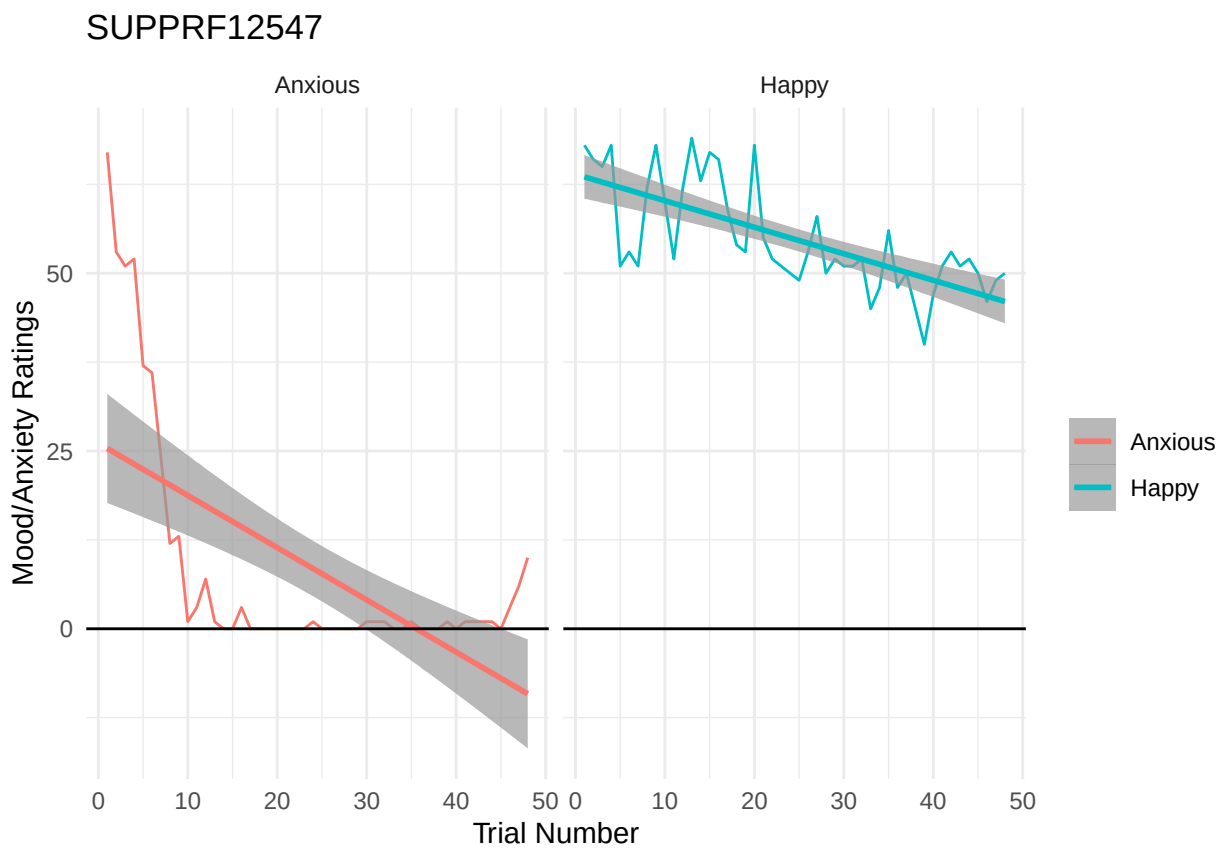

SUPPRF13951
Anxious
Happy
Mood/Anxiety Ratings
60
40
20
0
0
10
20
30
40
50
Trial Number
Anxious
Happy

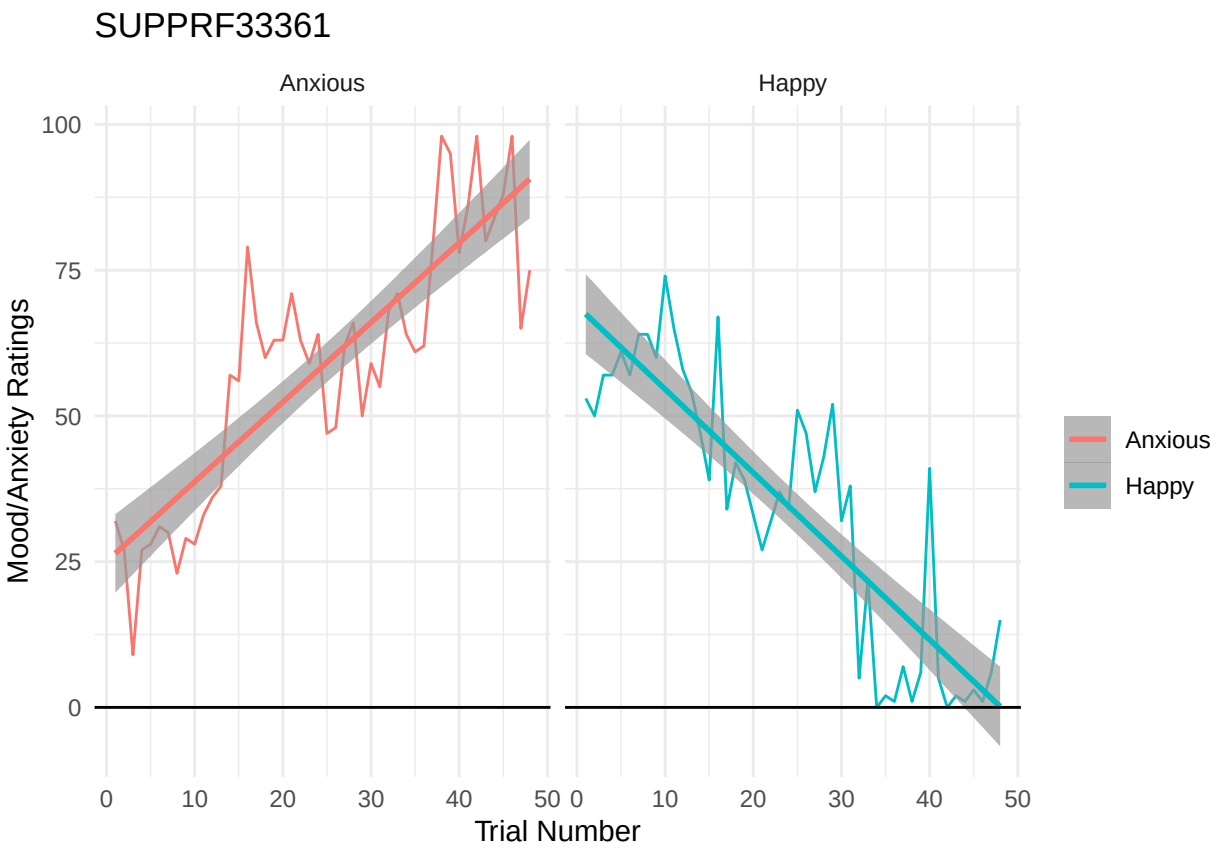

SUPPRF79160
Anxious
Happy
Mood/Anxiety Ratings
100
75
50
25
0
0
10
20
30
40
50
Trial Number
Anxious
Happy


SUPPRF57557
Anxious
Happy
Mood/Anxiety Ratings
0
20
40
60
80
0
10
20
30
40
50
Trial Number
Anxious
Happy


SUPPRF12856
Anxious
Happy
Mood/Anxiety Ratings
0
20
40
60
0
10
20
30
40
50
Trial Number
Anxious
Happy

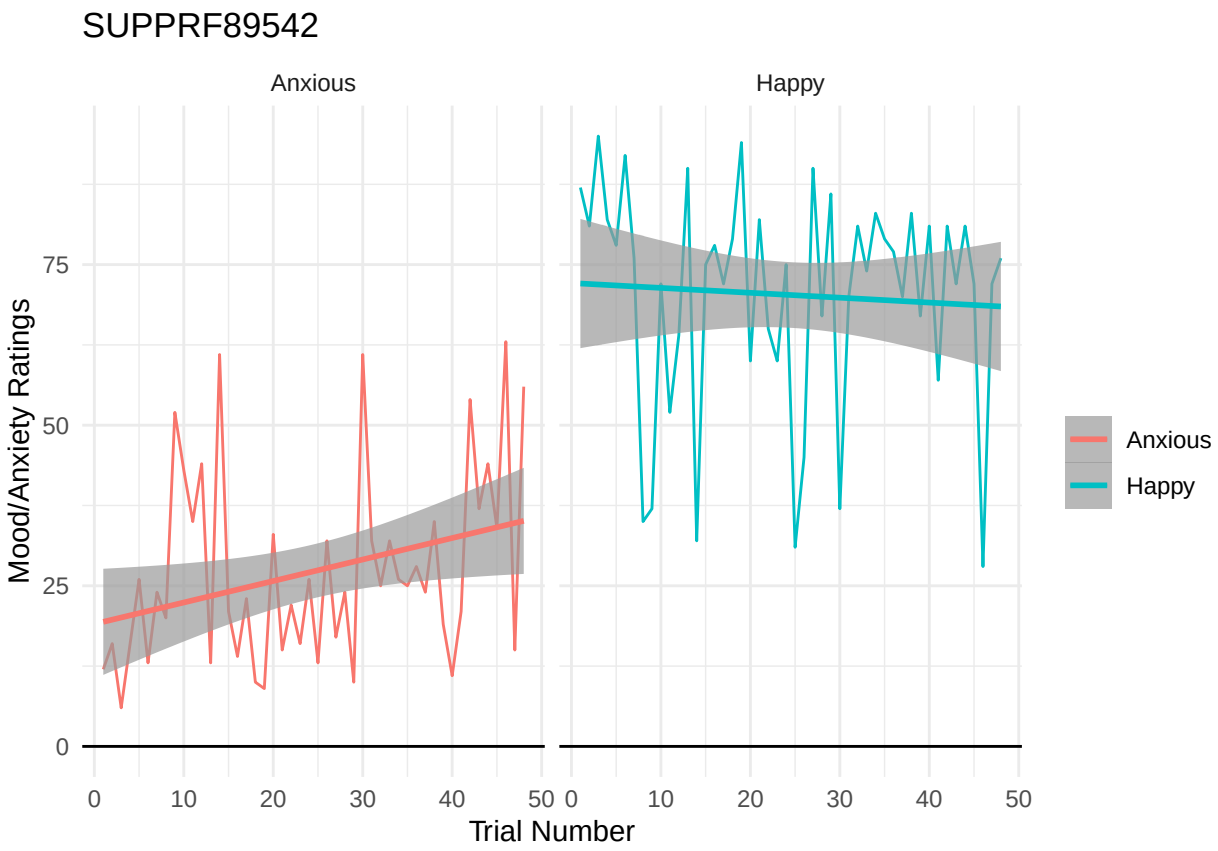

SUPPRF26467
Anxious
Happy
Mood/Anxiety Ratings
100
75
50
25
0
0
10
20
30
40
50
Trial Number
Anxious
Happy

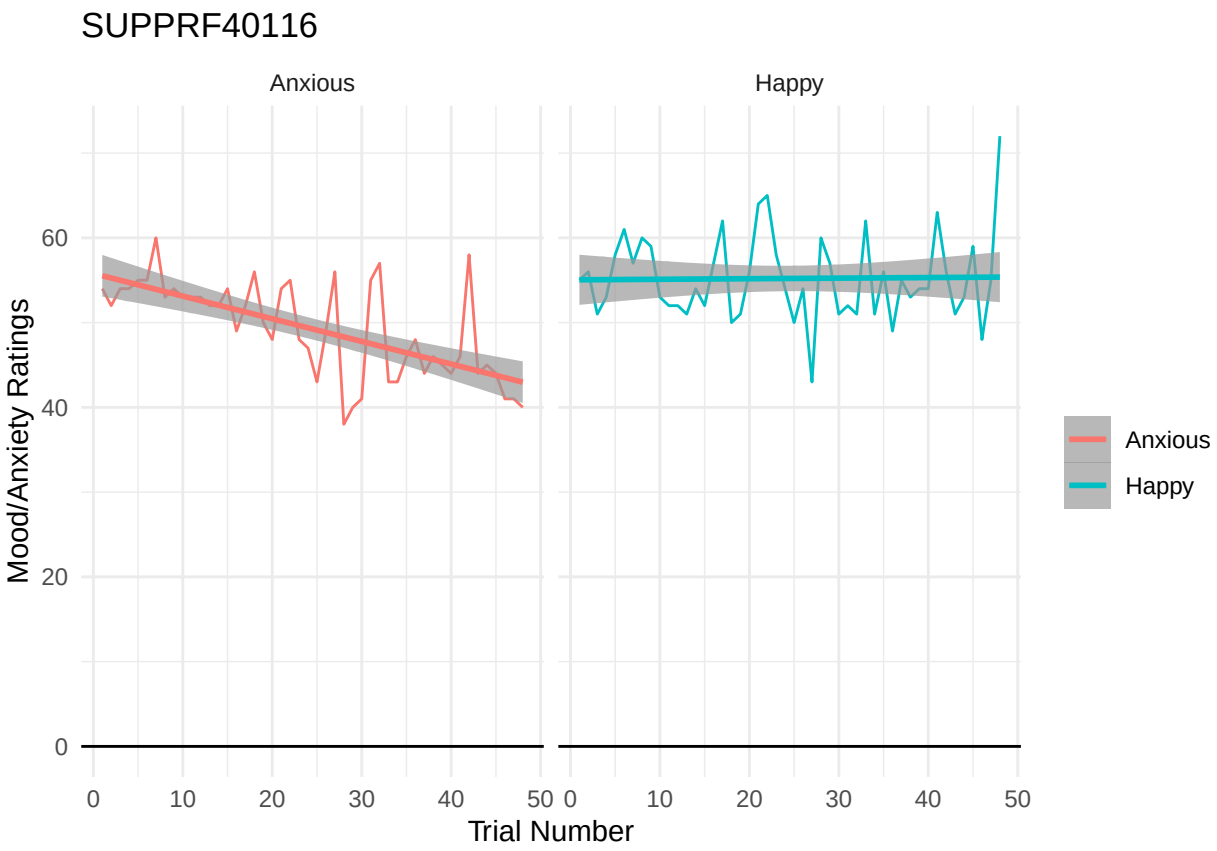

SUPPRF12547
Anxious
Happy
Mood/Anxiety Ratings
50
25
0
0
10
20
30
40
50
Trial Number
Anxious
Happy

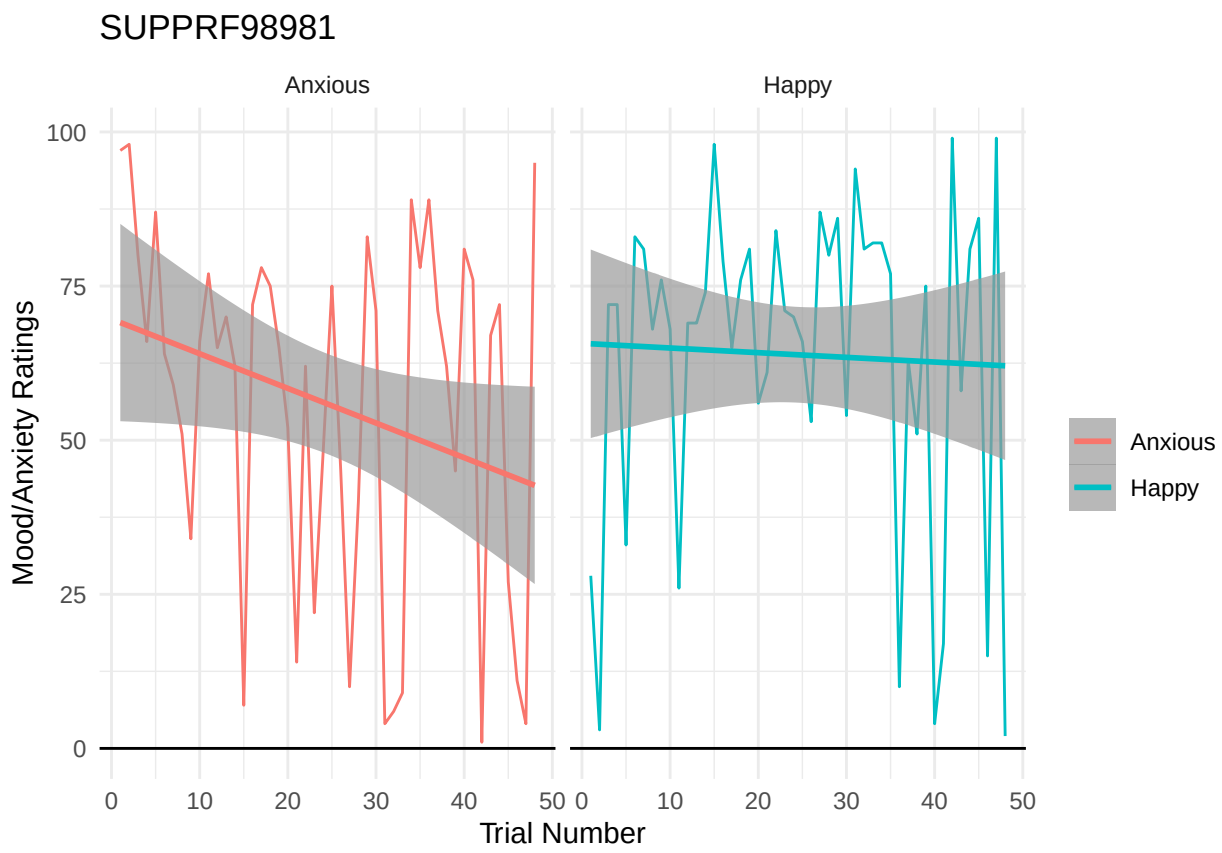

SUPPRF33361
Anxious
Happy
Mood/Anxiety Ratings
100
75
50
25
0
0
10
20
30
40
50
Trial Number
Anxious
Happy


SUPPRF71005
Anxious
Happy
Mood/Anxiety Ratings
80
60
40
20
0
0
10
20
30
40
50
Trial Number
Anxious
Happy


SUPPRF51078
Anxious
Happy
Mood/Anxiety Ratings
60
40
20
0
0
10
20
30
40
50
Trial Number
Anxious
Happy


SUPPRF89542
Anxious
Happy
Mood/Anxiety Ratings
0
25
50
75
0
10
20
30
40
50
Trial Number
Anxious
Happy


SUPPRF40116
Anxious
Happy
Mood/Anxiety Ratings
60
40
20
0
0
10
20
30
40
50
Trial Number
Anxious
Happy


SUPPRF98981
Anxious
Happy
Mood/Anxiety Ratings
100
75
50
25
0
0
10
20
30
40
50
Trial Number
Anxious
Happy


SUPPRF06248
Anxious
Happy
Mood/Anxiety Ratings
0
20
40
60
0
10
20
30
40
50
Trial Number
Anxious
Happy


SUPPRF87563
Anxious
Happy
Mood/Anxiety Ratings
100
75
50
25
0
0
10
20
30
40
50
Trial Number
Anxious
Happy

Anxiety and Mood over time- group plot

I will now repeat the same plot but for all subjects