

# Surprise study pilot 12

Marjan Biria

2024-01-02

## Pilot 12: changing “nervous/uncomfortable” to “relaxed”

We changed the question about anxiety in this pilot, other than that everything is the same as pilot 11. After our last meeting we discussed 3 possible hypotheses:

- 1) Anxiety/discomfort may require a different cognitive process from happiness/mood
- 2) Starting point for anxiety is lower than it should be for us to see a change? (==> it does not seem to be the case)
- 3) Just a valence difference: “how relaxed do you feel?” Or “how unhappy do you feel?”; how relax someone feels may be easier to measure/observe/change on a momentary basis compared to how anxious someone feels which may require more time to change.

The Gorilla experiment is the following: <https://app.gorilla.sc/admin/experiment/157680/design>

The task is the following: <https://app.gorilla.sc/admin/task/728998/editor?version=3>

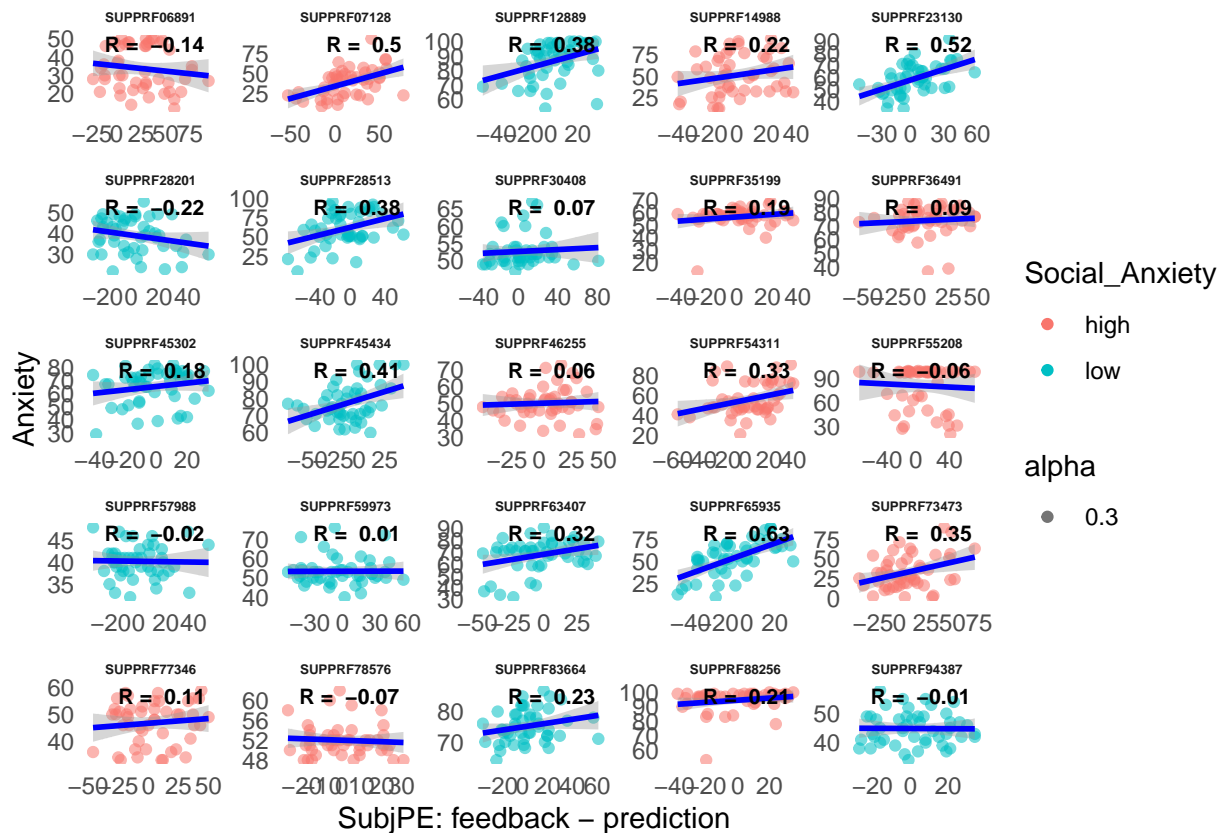
```
## [1] "It seems everyone has done all the 48 trials:"
```

```
## # A tibble: 25 x 2
##   Random_ID Trial_Count
##   <chr>         <int>
## 1 SUPPRF06891      48
## 2 SUPPRF07128      48
## 3 SUPPRF12889      48
## 4 SUPPRF14988      48
## 5 SUPPRF23130      48
## 6 SUPPRF28201      48
## 7 SUPPRF28513      48
## 8 SUPPRF30408      48
## 9 SUPPRF35199      48
## 10 SUPPRF36491      48
## # i 15 more rows
```

## Relationship between “relaxed feeling” and SubjPE

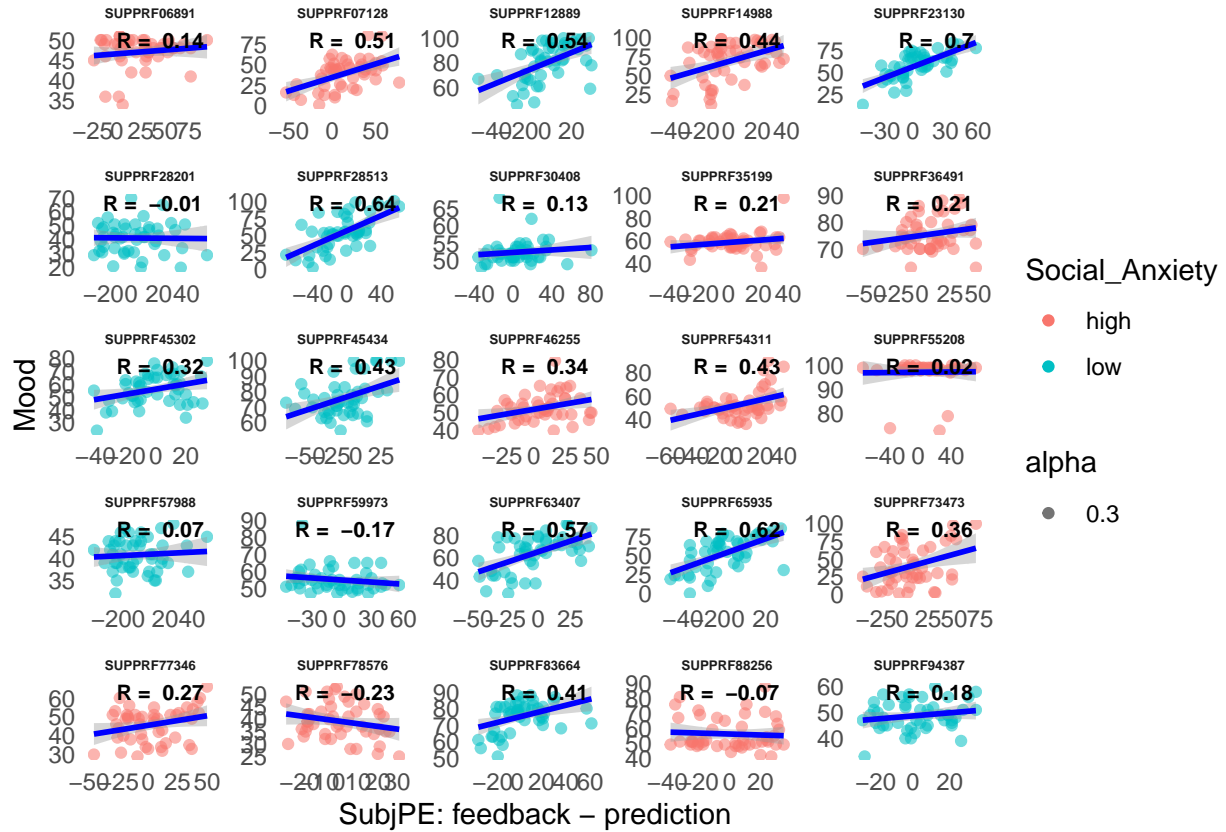
We replaced the anxiety question with how relaxed someone feels in the moment (right now). The findings are very similar to before (similar effect sizes), when we asked “How anxious are you right now?”, except in the opposite direction. It may be best to go back to the anxiety question then, since there won’t be any doubt about whether or not we are measuring anxiety with the new question. Unless, in younger kids, the word “anxiety” would be more difficult, so maybe keeping how “nervous/uncomfortable” you feel?

```
## [1] "average correlation between anxiety and SubjPE: 0.186380616533899"
```



# Relationship between mood and SubjPE

## [1] "average correlation between mood and SubjPE: 0.283457503711388"



## LME models for Mood and SubjPE

This is the best model: Mood ~ SubjPE + (SubjPE | Random\_ID)

```
## Data: final_df12
## Models:
## model1: Response_H ~ Response_SubjPE + (1 | Random_ID)
## model2: Response_H ~ Response_SubjPE + (Response_SubjPE | Random_ID)
##      npar    AIC    BIC logLik deviance Chisq Df Pr(>Chisq)
## model1     4 9659.6 9679.9 -4825.8   9651.6
## model2     6 9561.3 9591.8 -4774.6   9549.3 102.28  2 < 2.2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

## Linear mixed model fit by REML ['lmerMod']
## Formula: Response_H ~ Response_SubjPE + (1 | Random_ID)
## Data: final_df12
## Control: lmerControl(optimizer = "bobyqa")
##
## REML criterion at convergence: 9653.9
##
## Scaled residuals:
##      Min       1Q   Median       3Q      Max
## -4.1882 -0.4770  0.0271  0.5233  3.8321
##
## Random effects:
## Groups      Name      Variance Std.Dev.
## Random_ID (Intercept) 222.3    14.91
## Residual              167.3    12.93
## Number of obs: 1200, groups: Random_ID, 25
##
## Fixed effects:
##              Estimate Std. Error t value
## (Intercept)    56.57237    3.00587   18.82
## Response_SubjPE  0.20371    0.01669   12.20
##
## Correlation of Fixed Effects:
##              (Intr)
## Rspns_SbjPE -0.014

## Linear mixed model fit by REML ['lmerMod']
## Formula: Response_H ~ Response_SubjPE + (Response_SubjPE | Random_ID)
## Data: final_df12
## Control: lmerControl(optimizer = "bobyqa")
##
## REML criterion at convergence: 9549.7
##
## Scaled residuals:
##      Min       1Q   Median       3Q      Max
## -4.1799 -0.4574  0.0181  0.4887  3.8677
##
## Random effects:
## Groups      Name      Variance Std.Dev. Corr
## Random_ID (Intercept) 222.3    14.91
## Response_SubjPE      167.3    12.93
```

```

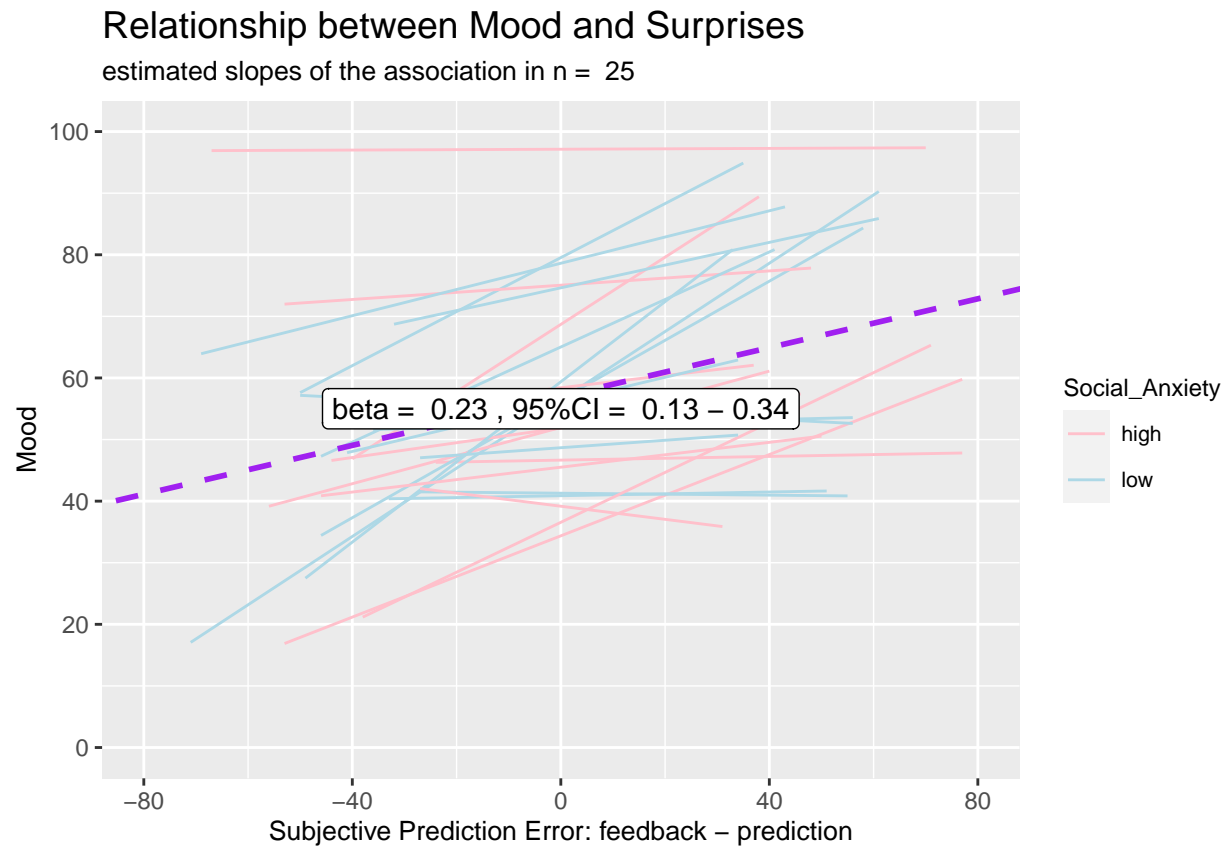
## Random_ID (Intercept)      227.64790 15.0880
## Response_SubjPE      0.04063 0.2016 0.13
## Residual      146.98904 12.1239
## Number of obs: 1200, groups: Random_ID, 25
##
## Fixed effects:
## Estimate Std. Error t value
## (Intercept)      56.98974      3.03939 18.750
## Response_SubjPE 0.19830      0.04355 4.554
##
## Correlation of Fixed Effects:
## (Intr)
## Rspns_SbjPE 0.118

## Data: final_df12
## Models:
## model2: Response_H ~ Response_SubjPE + (Response_SubjPE | Random_ID)
## model3: Response_H ~ Response_SubjPE * mini_SPIN_total + (Response_SubjPE | Random_ID)
##      npar      AIC      BIC logLik deviance Chisq Df Pr(>Chisq)
## model2      6 9561.3 9591.8 -4774.6 9549.3
## model3      8 9562.4 9603.2 -4773.2 9546.4 2.8334 2 0.2425

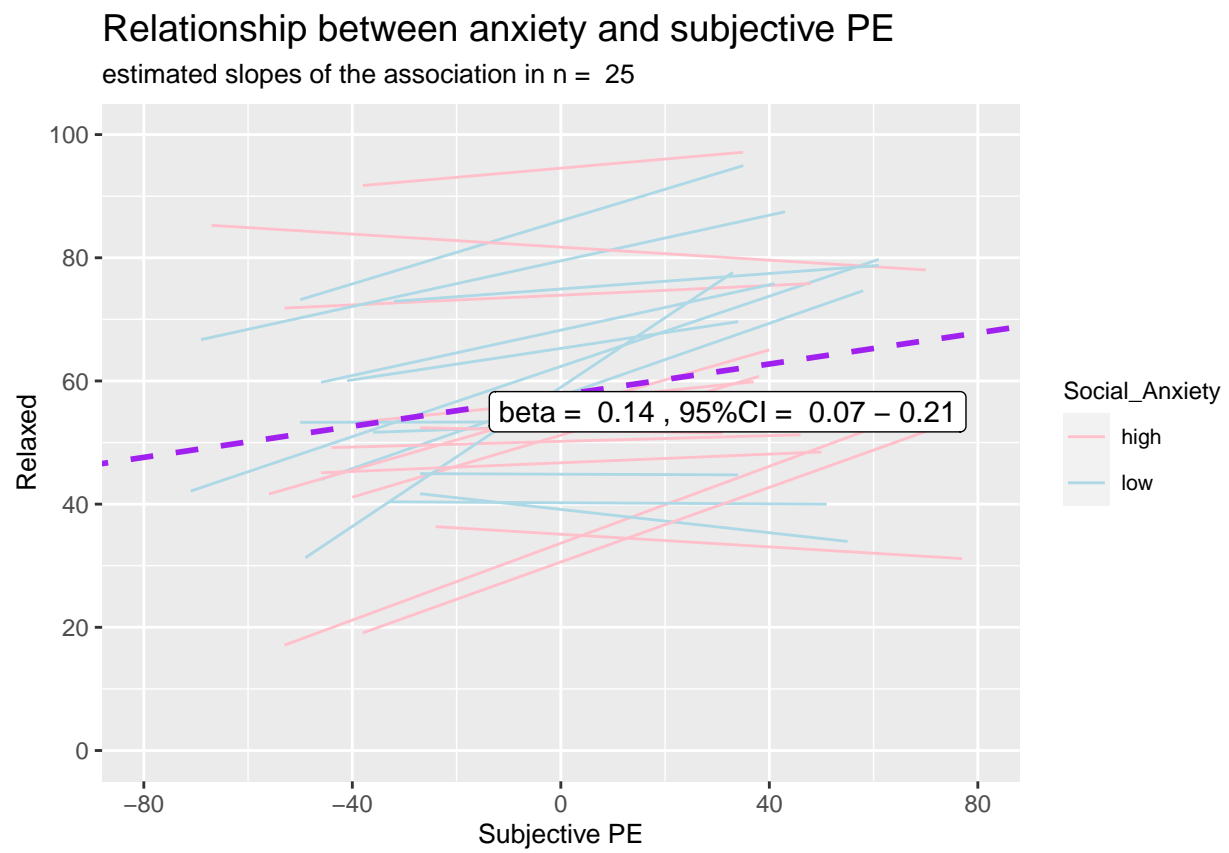
## # A tibble: 2 x 5
## effect term estimate std.error statistic
## <chr> <chr> <dbl> <dbl> <dbl>
## 1 fixed (Intercept) 57.0 3.04 18.8
## 2 fixed Response_SubjPE 0.198 0.0435 4.55

```

## Individual plots with LME for Mood



## Individual plots with LME for Anxiety with SubjPE





## LME models for Anxiety (~relaxed) and SubjPE

This is the best model: Anxiety ~ SubjPE + (SubjPE | Random\_ID)

```
## Data: final_df12
## Models:
## model1: Response_Ax ~ Response_SubjPE + (1 | Random_ID)
## model2: Response_Ax ~ Response_SubjPE + (Response_SubjPE | Random_ID)
##      npar    AIC    BIC logLik deviance  Chisq Df Pr(>Chisq)
## model1     4 9735.1 9755.5 -4863.6   9727.1
## model2     6 9708.0 9738.6 -4848.0   9696.0 31.105  2 1.761e-07 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

## Linear mixed model fit by REML ['lmerMod']
## Formula: Response_Ax ~ Response_SubjPE + (1 | Random_ID)
## Data: final_df12
## Control: lmerControl(optimizer = "bobyqa")
##
## REML criterion at convergence: 9729.2
##
## Scaled residuals:
##      Min       1Q   Median       3Q      Max
## -4.8666 -0.4772  0.0384  0.5402  3.9245
##
## Random effects:
## Groups      Name                Variance Std.Dev.
## Random_ID (Intercept) 282.0      16.79
## Residual              177.5      13.32
## Number of obs: 1200, groups: Random_ID, 25
##
## Fixed effects:
##              Estimate Std. Error t value
## (Intercept)    57.3996    3.3807  16.979
## Response_SubjPE  0.1281    0.0172   7.449
##
## Correlation of Fixed Effects:
##              (Intr)
## Rspns_SbjPE -0.013

## Linear mixed model fit by REML ['lmerMod']
## Formula: Response_Ax ~ Response_SubjPE + (Response_SubjPE | Random_ID)
## Data: final_df12
## Control: lmerControl(optimizer = "bobyqa")
##
## REML criterion at convergence: 9696.8
##
## Scaled residuals:
##      Min       1Q   Median       3Q      Max
## -4.6621 -0.4334  0.0262  0.5421  3.7277
##
## Random effects:
## Groups      Name                Variance Std.Dev. Corr
## Random_ID (Intercept) 282.0      16.79
## Response_SubjPE      177.5      13.32
```

```

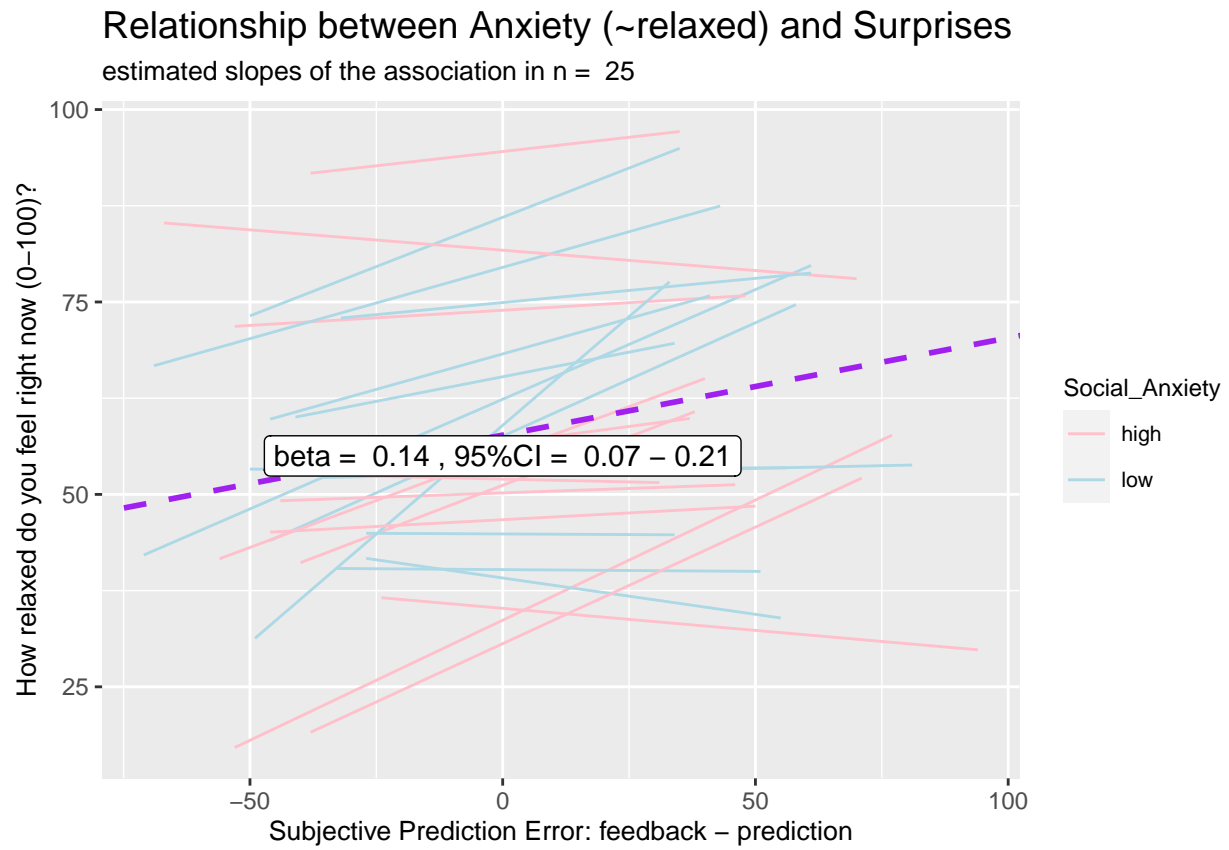
## Random_ID (Intercept)      282.56394 16.8096
## Response_SubjPE      0.01793 0.1339 0.04
## Residual      168.40348 12.9770
## Number of obs: 1200, groups: Random_ID, 25
##
## Fixed effects:
## Estimate Std. Error t value
## (Intercept)      57.70065      3.38415 17.050
## Response_SubjPE 0.12631      0.03197 3.951
##
## Correlation of Fixed Effects:
## (Intr)
## Rspns_SbjPE 0.024

## Data: final_df12
## Models:
## model2: Response_Ax ~ Response_SubjPE + (Response_SubjPE | Random_ID)
## model3: Response_Ax ~ Response_SubjPE * mini_SPIN_total + (Response_SubjPE | Random_ID)
##      npar    AIC    BIC logLik deviance Chisq Df Pr(>Chisq)
## model2      6 9708.0 9738.6 -4848.0 9696.0
## model3      8 9710.4 9751.1 -4847.2 9694.4 1.6201 2 0.4448

## # A tibble: 2 x 5
## effect term estimate std.error statistic
## <chr> <chr> <dbl> <dbl> <dbl>
## 1 fixed (Intercept) 57.7 3.38 17.1
## 2 fixed Response_SubjPE 0.126 0.0320 3.95

```

## Individual plots with LME for Anxiety



## ICC for anxiety

we will now look at the ICC outcome for anxiety The ICC for anxiety is 0.59, 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] 0.5924678
```

```
##           2.5 %   97.5 %  
## .sig01      12.43229 21.92820  
## .sigma      13.10197 14.20564  
## (Intercept) 51.12077 64.34423
```

## ICC for mood

The ICC for mood is 0.53 and lies within the moderate 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] 0.5319736
```

```
##           2.5 %   97.5 %  
## .sig01      11.05218 19.53965  
## .sigma      13.19221 14.30348  
## (Intercept) 51.20362 62.99972
```