

Attention pilots

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Attention pilot 1: study description

In this pilot we tested people on the attention pilot, where no feedback was provided and no prediction was collected. We have m_hist, anxiety, mood and certainty ratings for this pilot. This is the experiment on Gorilla: <https://app.gorilla.sc/admin/project/115369> This is the task version used: <https://app.gorilla.sc/admin/task/712861/editor?version=3>

The Externally focused attention condition was presented first, followed by the internally focused attention. Each condition had 24 trials. I will keep the mood and anxiety ratings before they start the task to look at baseline anxiety and mood in the following analysis.

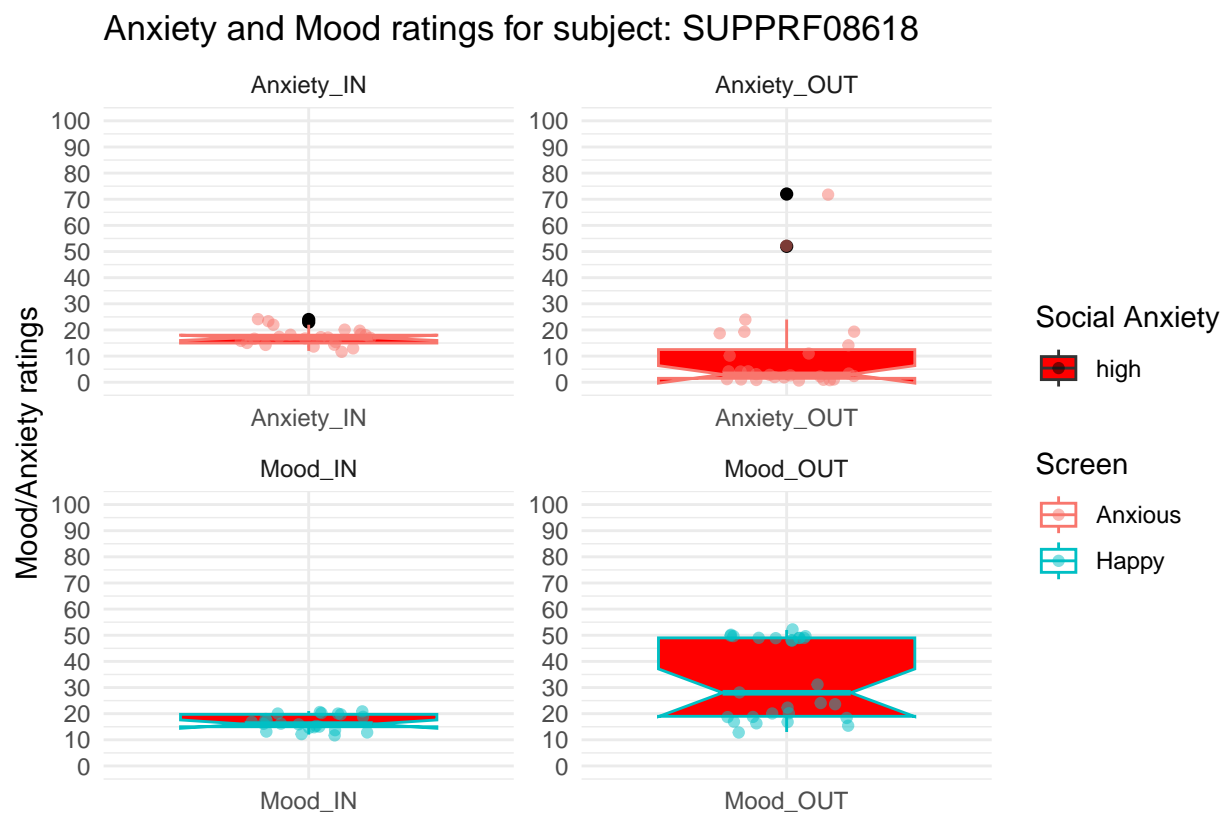
Anxiety and Mood ratings within subjects

There were 3 people that had given the same rating across all trials. Some people show the pattern we expect (lower anxiety, higher mood from IN to OUT conditions) but not everyone.

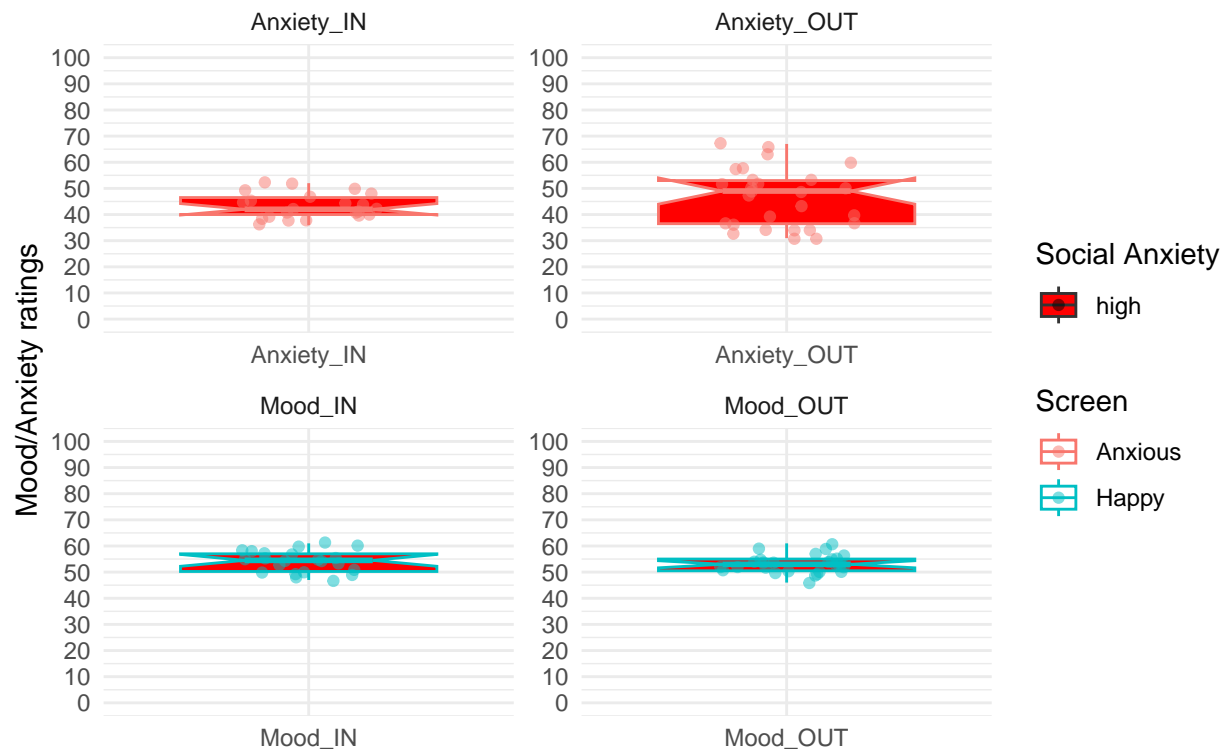
QUESTION: How can we best plot the group plot? We cannot plot the individual points anymore, as they would become hard to read; we could average within subjects but again not sure if this is the best approach? I also wonder maybe the fact that there was no feedback (per trial, only at the end) was not stressful enough. It would be interesting to pilot it with the feedback and prediction.

Let's also think how to have the feedback across both conditions: we do want to keep feedback constant to be comparable between conditions, right? If so, we would need to have 2 x 48 trials?

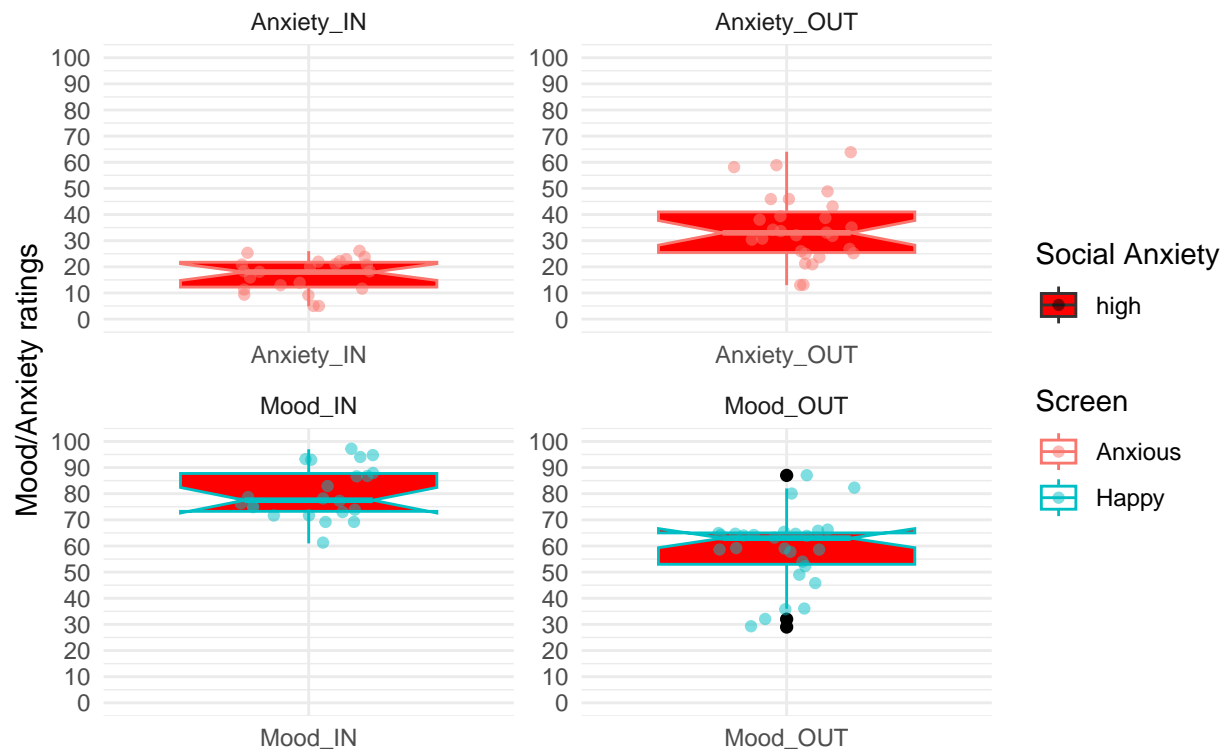
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## [1] "21 subjects out of 29 had high social anxiety"
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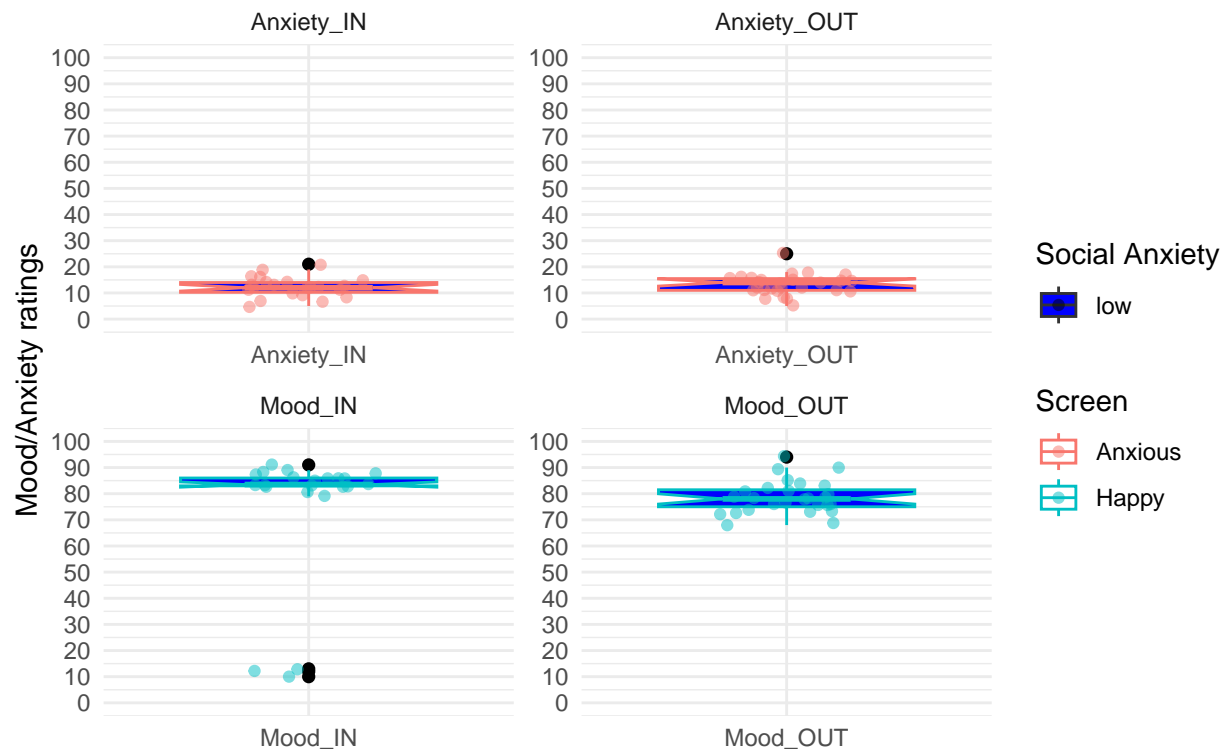
Anxiety and Mood ratings for subject: SUPPRF47263



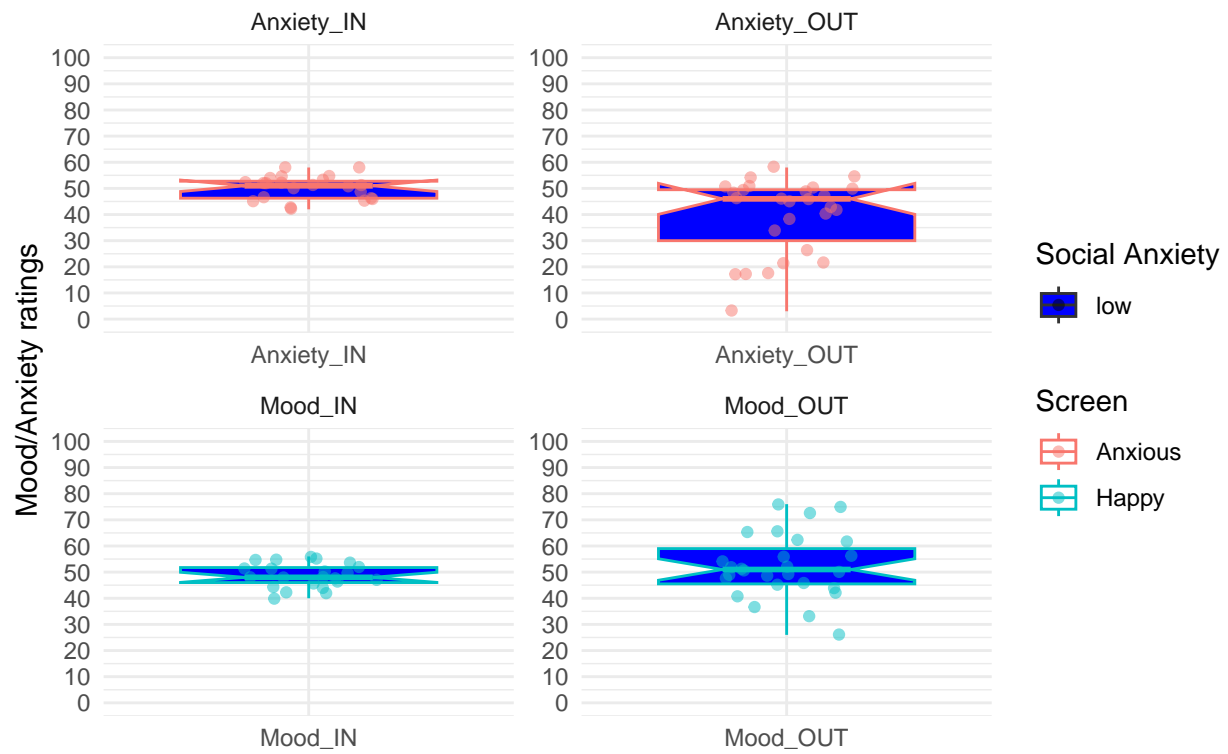
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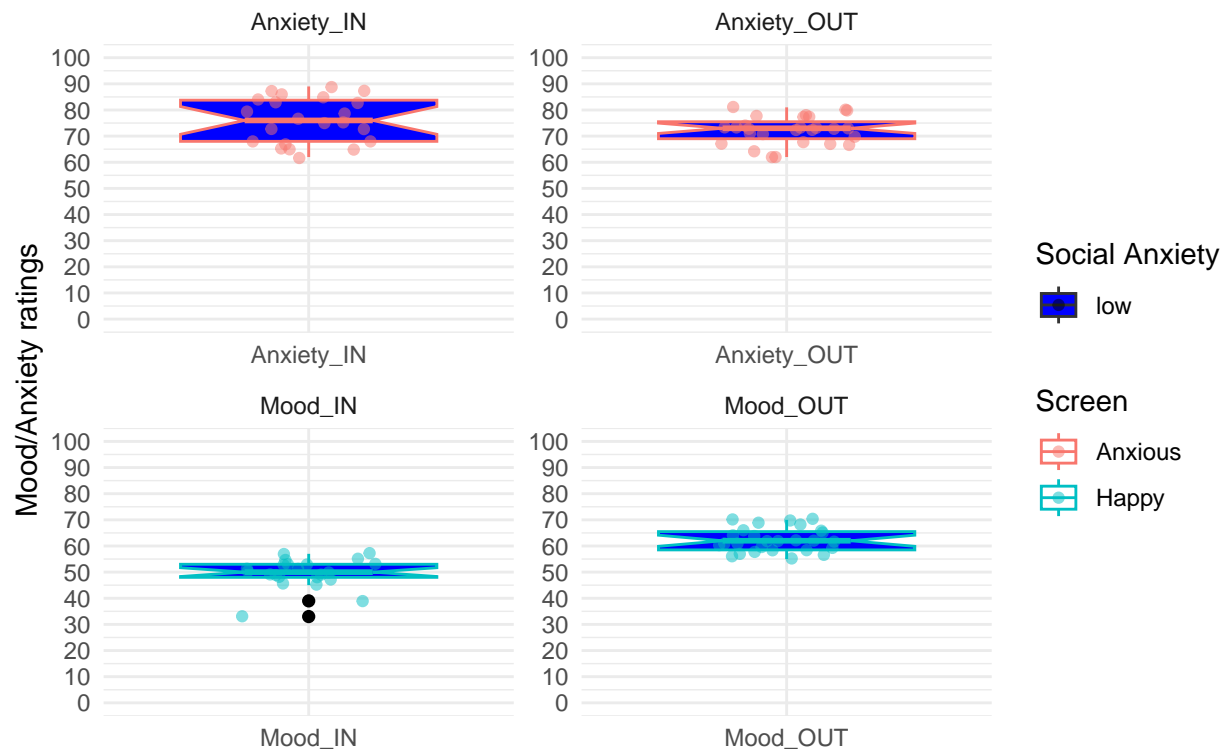
Anxiety and Mood ratings for subject: SUPPRF42417



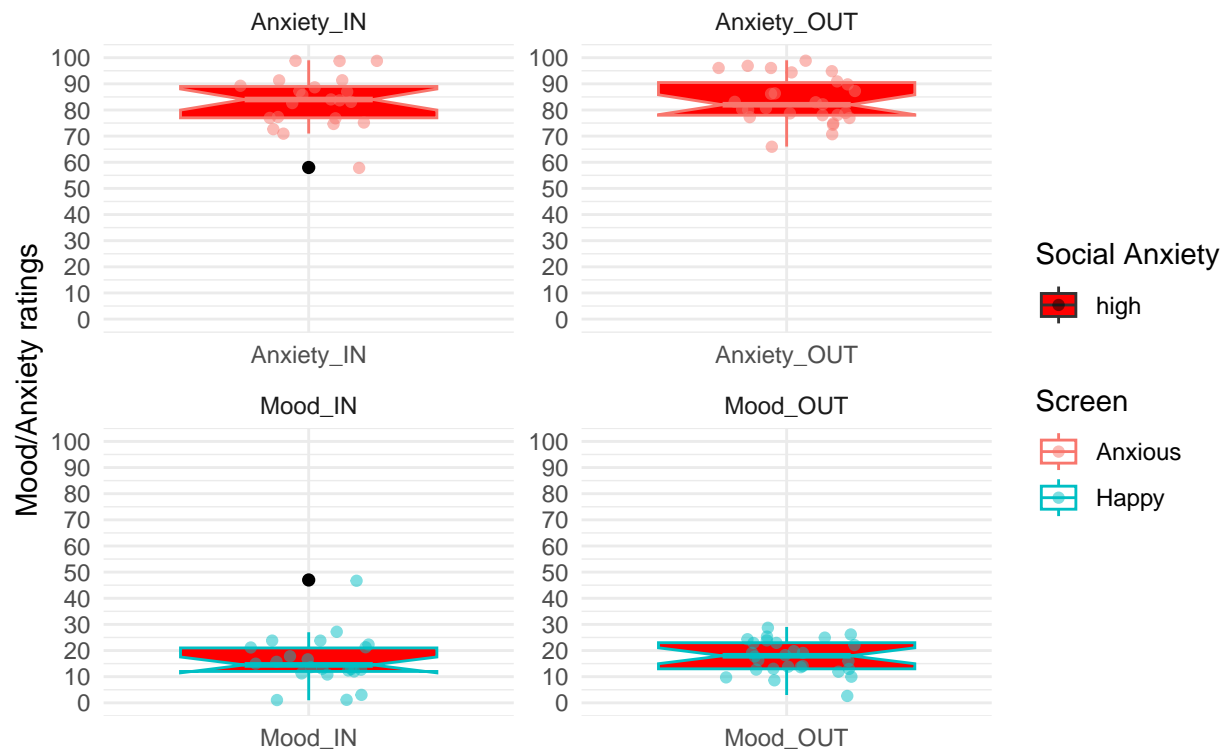
Anxiety and Mood ratings for subject: SUPPRF79567



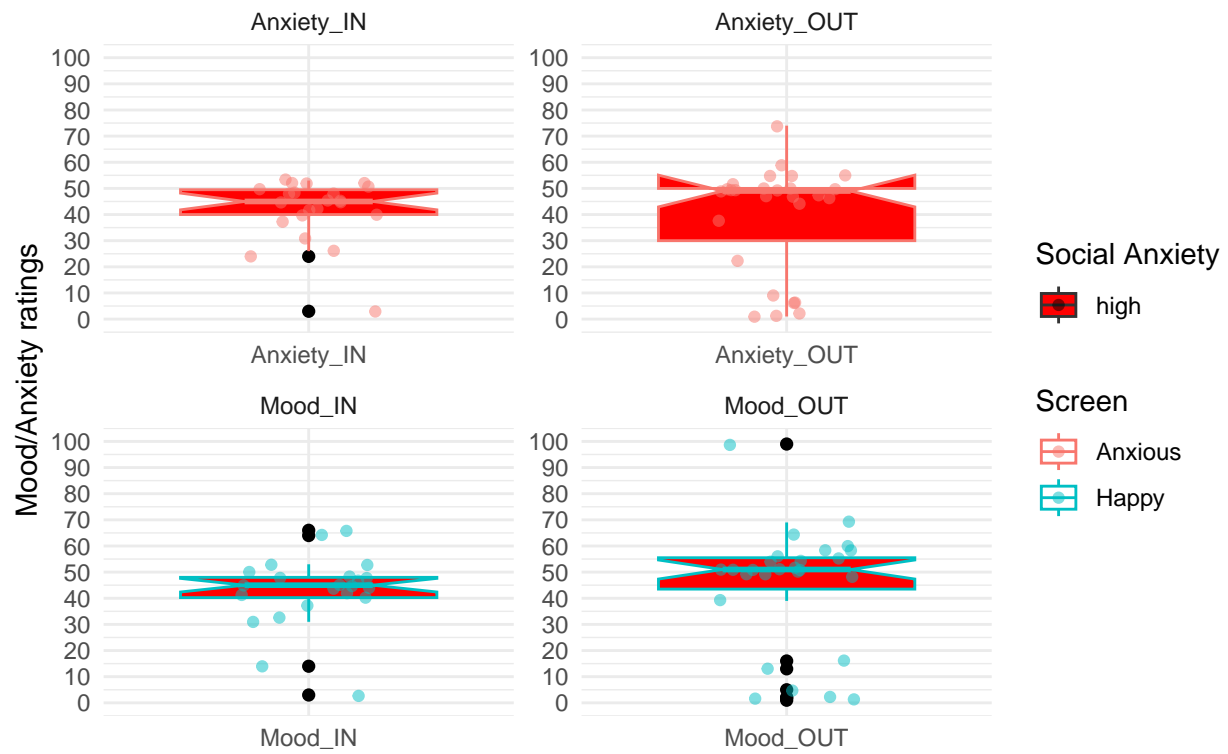
Anxiety and Mood ratings for subject: SUPPRF79528



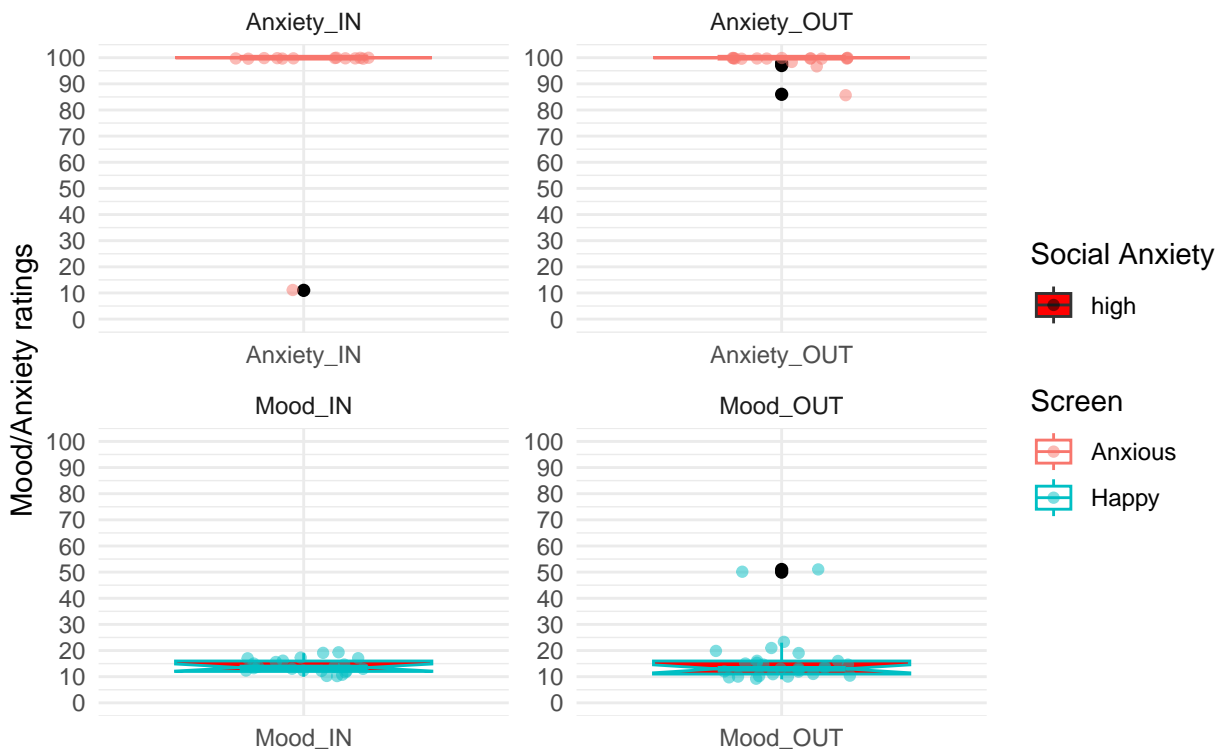
Anxiety and Mood ratings for subject: SUPPRF39307



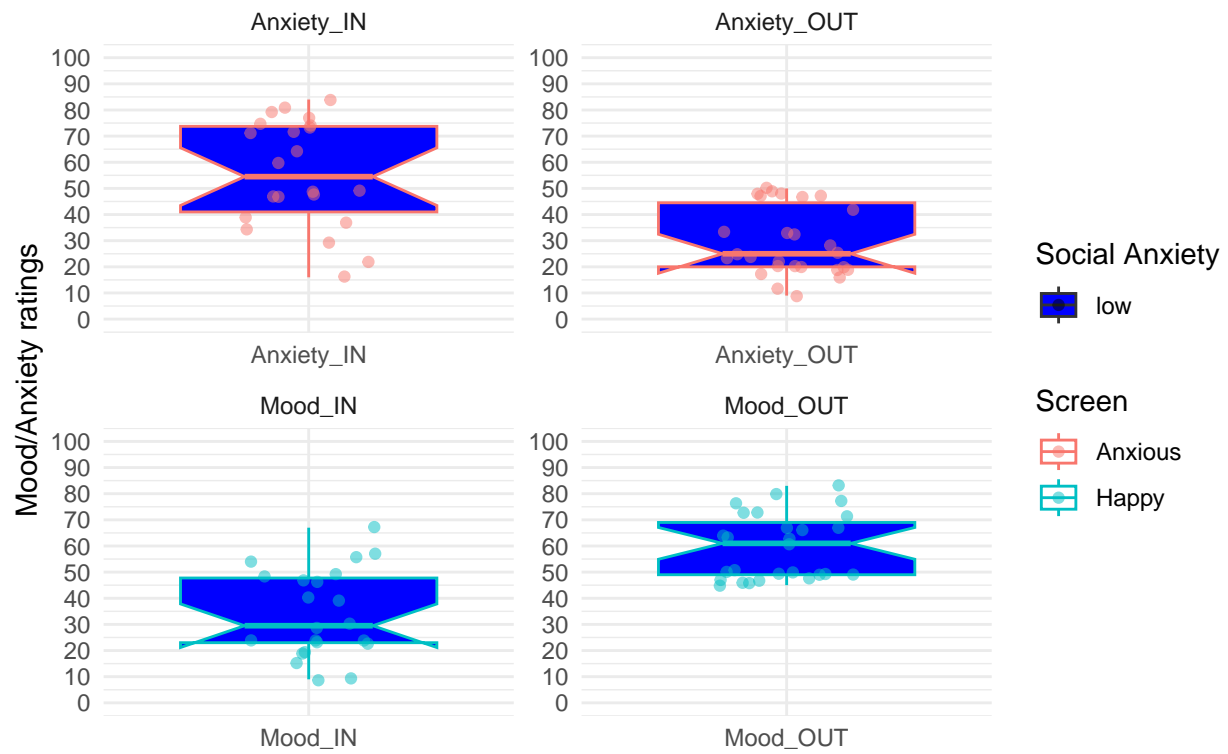
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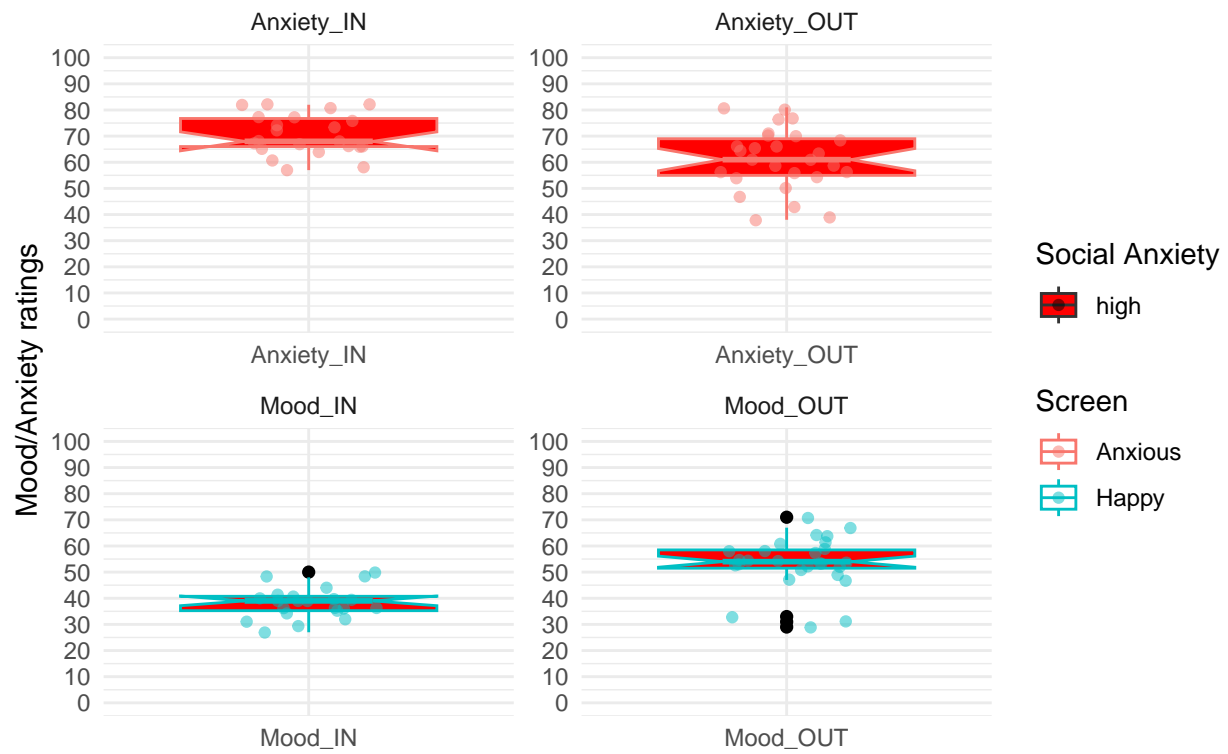
Anxiety and Mood ratings for subject: SUPPRF50800



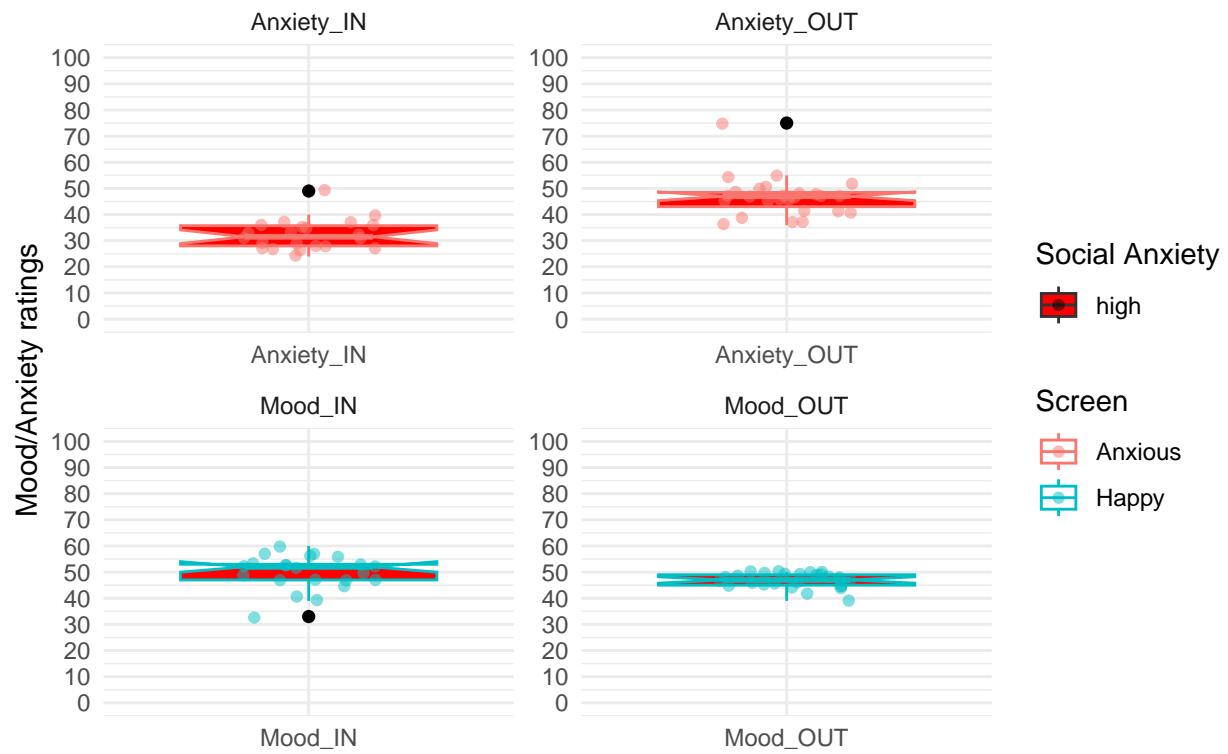
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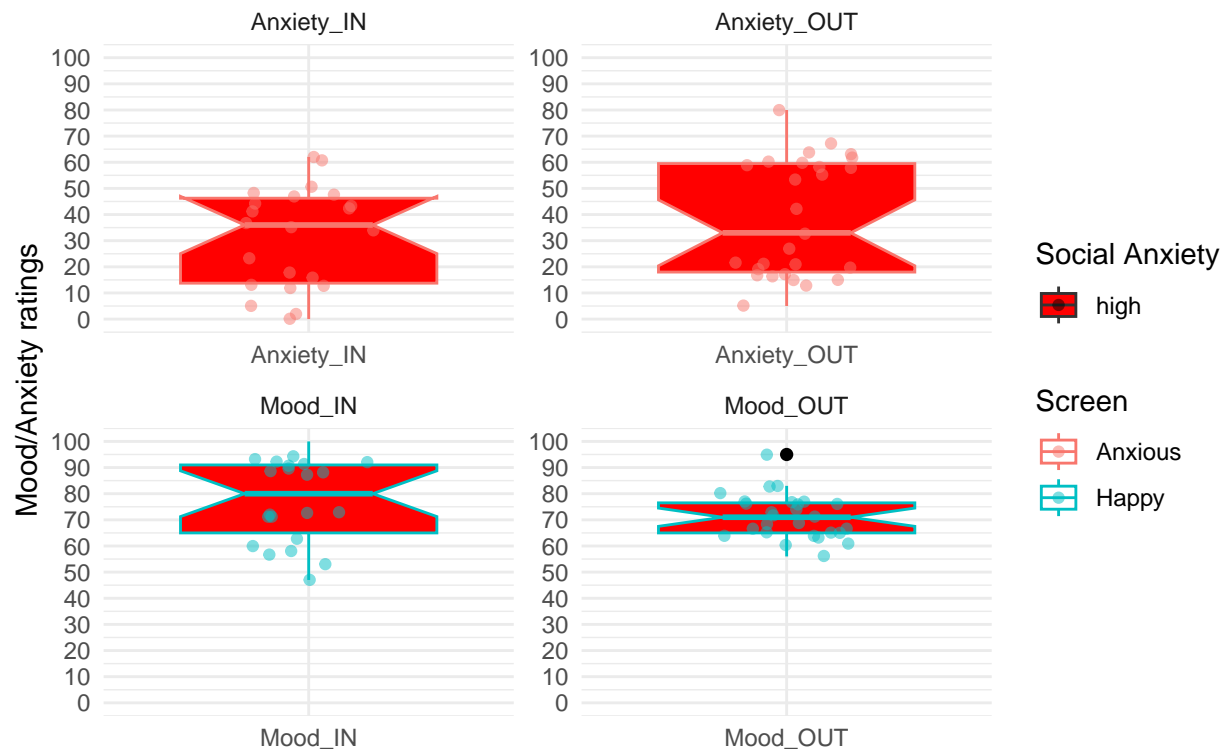
Anxiety and Mood ratings for subject: SUPPRF47480



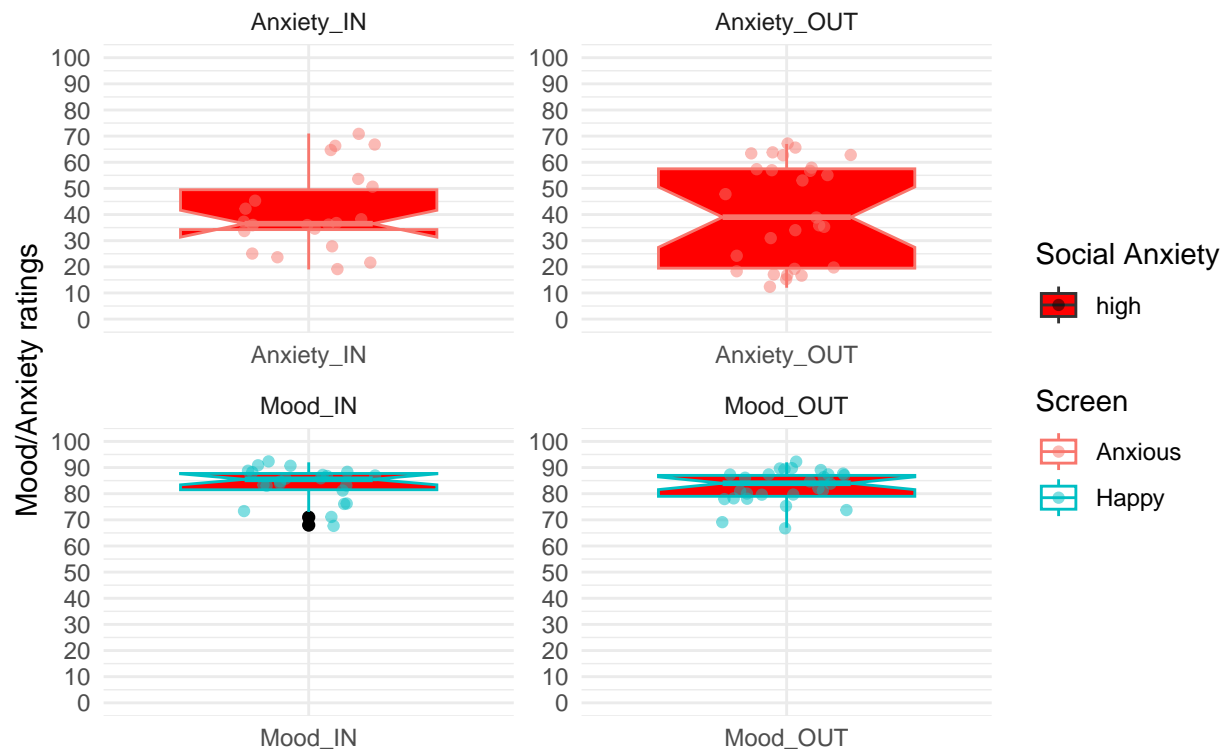
Anxiety and Mood ratings for subject: SUPPRF13830



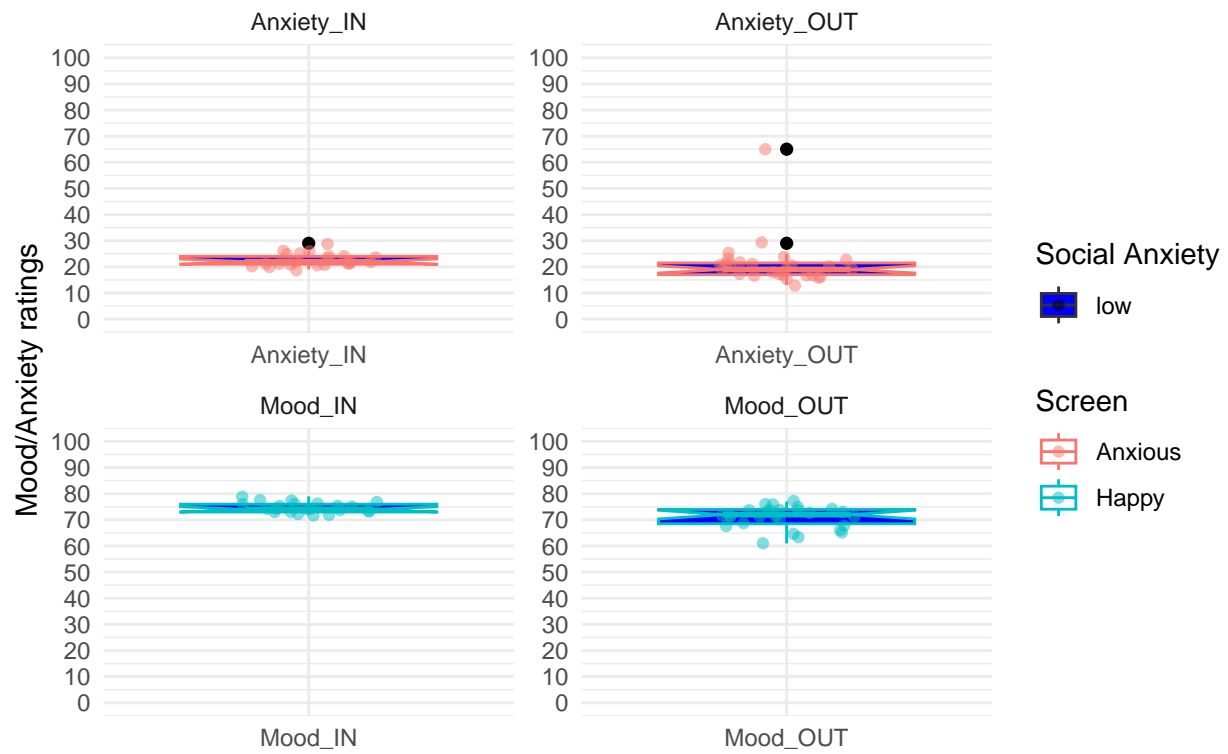
Anxiety and Mood ratings for subject: SUPPRF78219



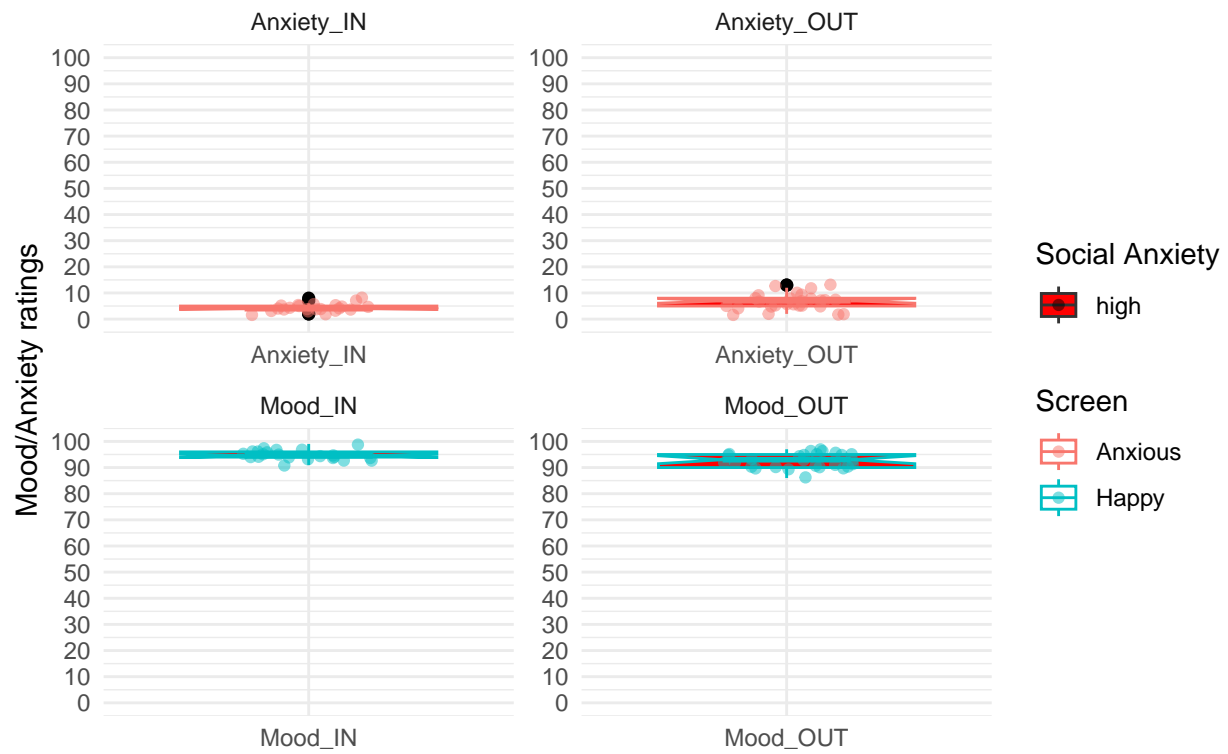
Anxiety and Mood ratings for subject: SUPPRF39662



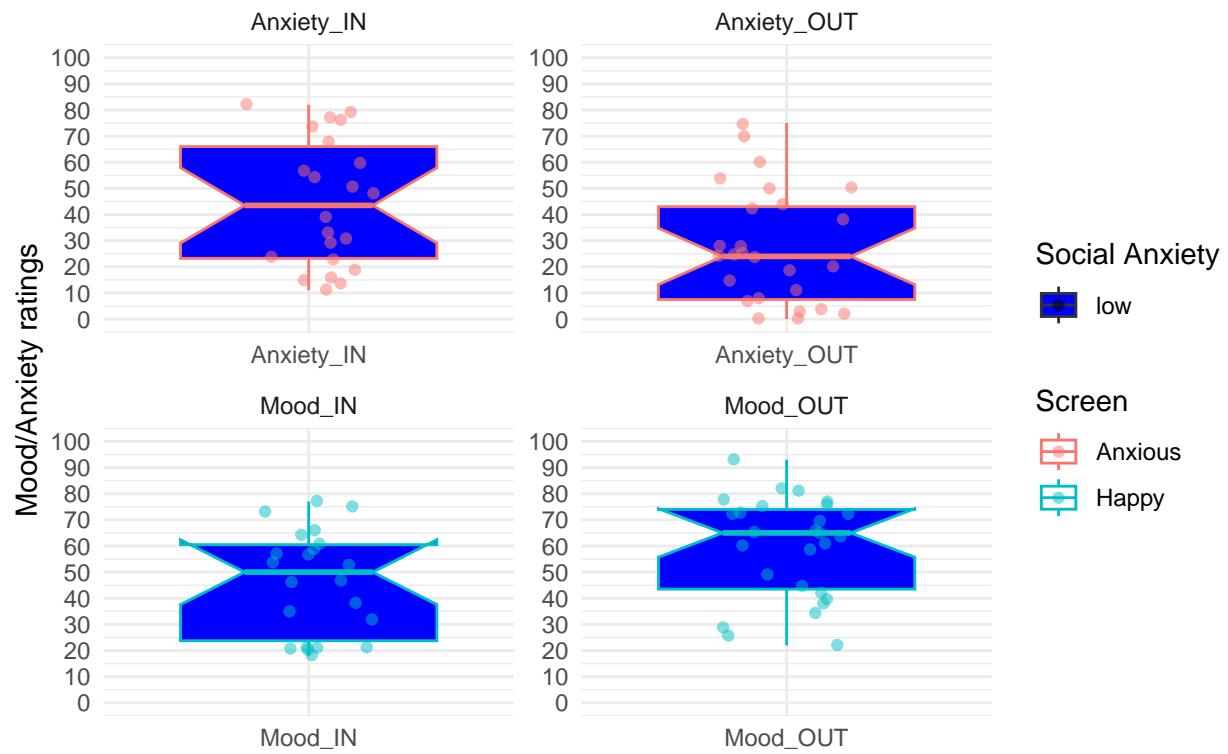
Anxiety and Mood ratings for subject: SUPPRF11368



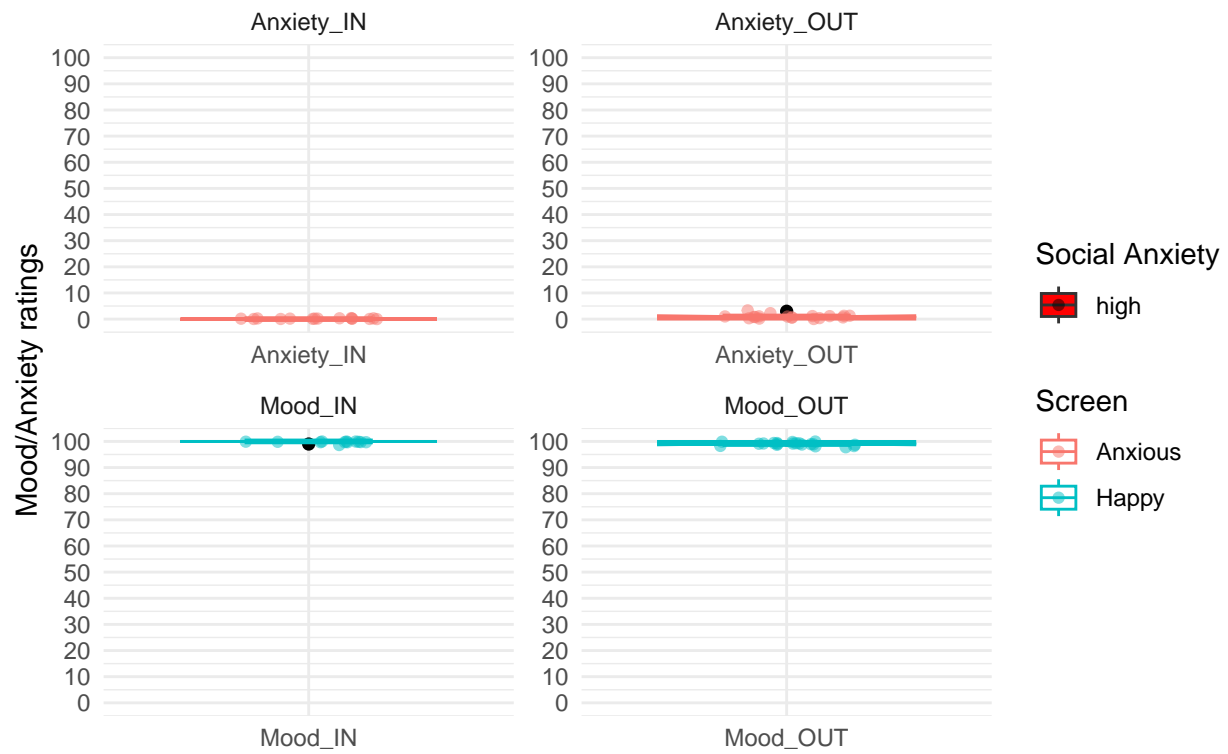
Anxiety and Mood ratings for subject: SUPPRF54499



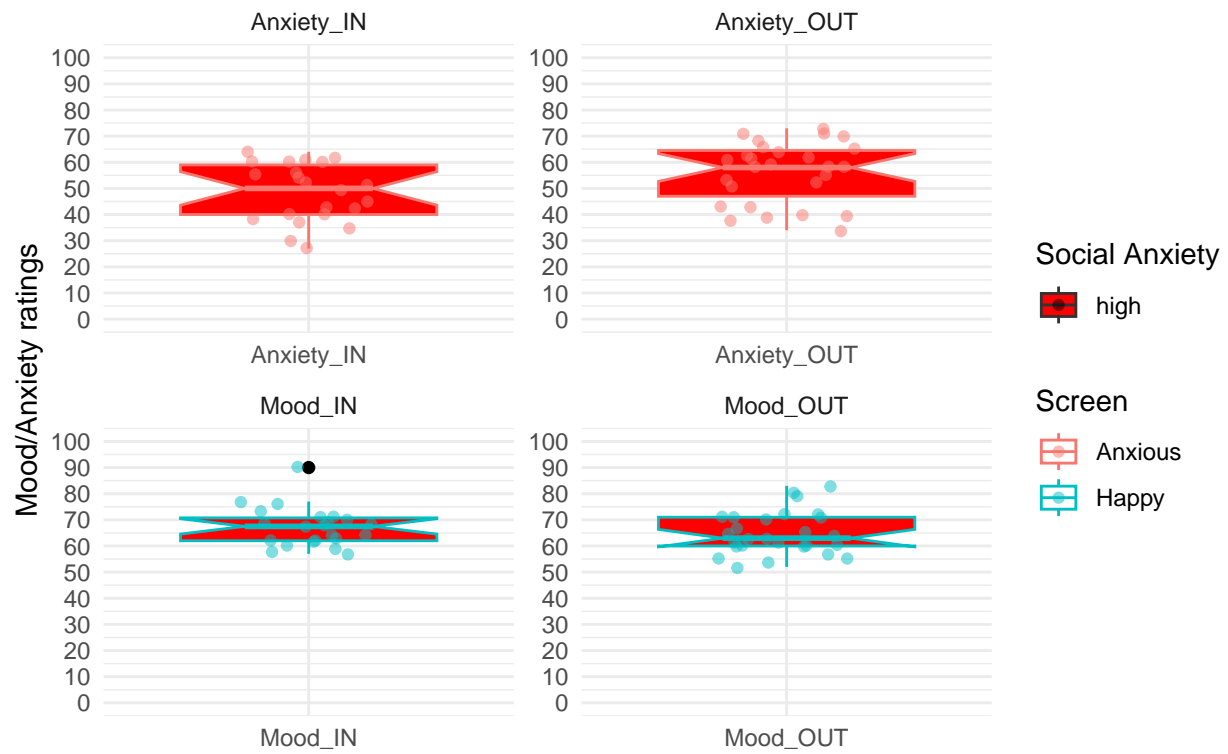
Anxiety and Mood ratings for subject: SUPPRF07775



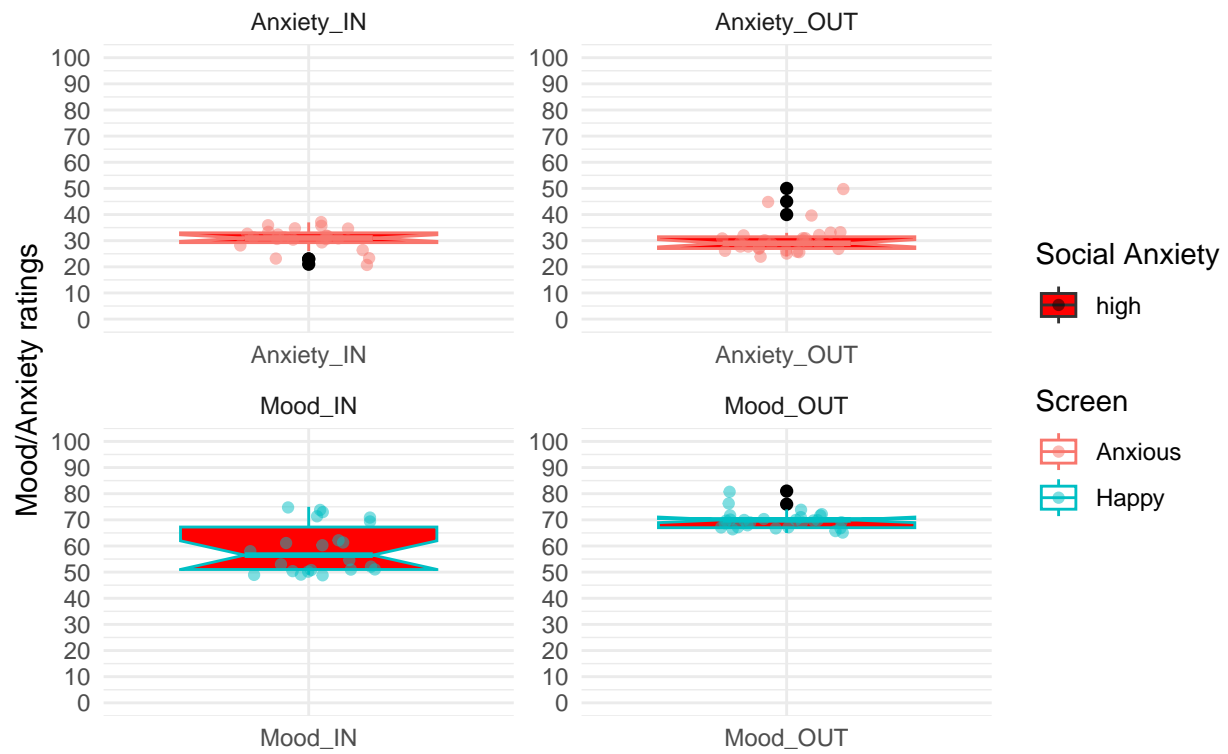
Anxiety and Mood ratings for subject: SUPPRF09833



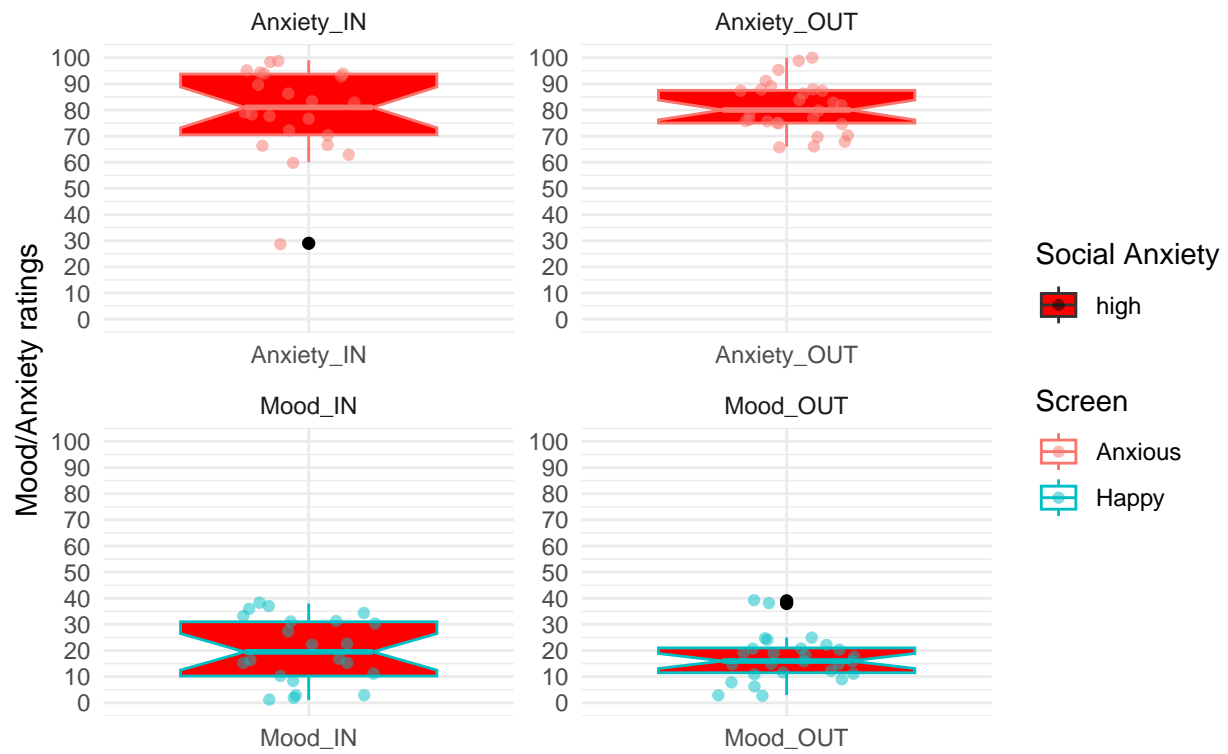
Anxiety and Mood ratings for subject: SUPPRF73005



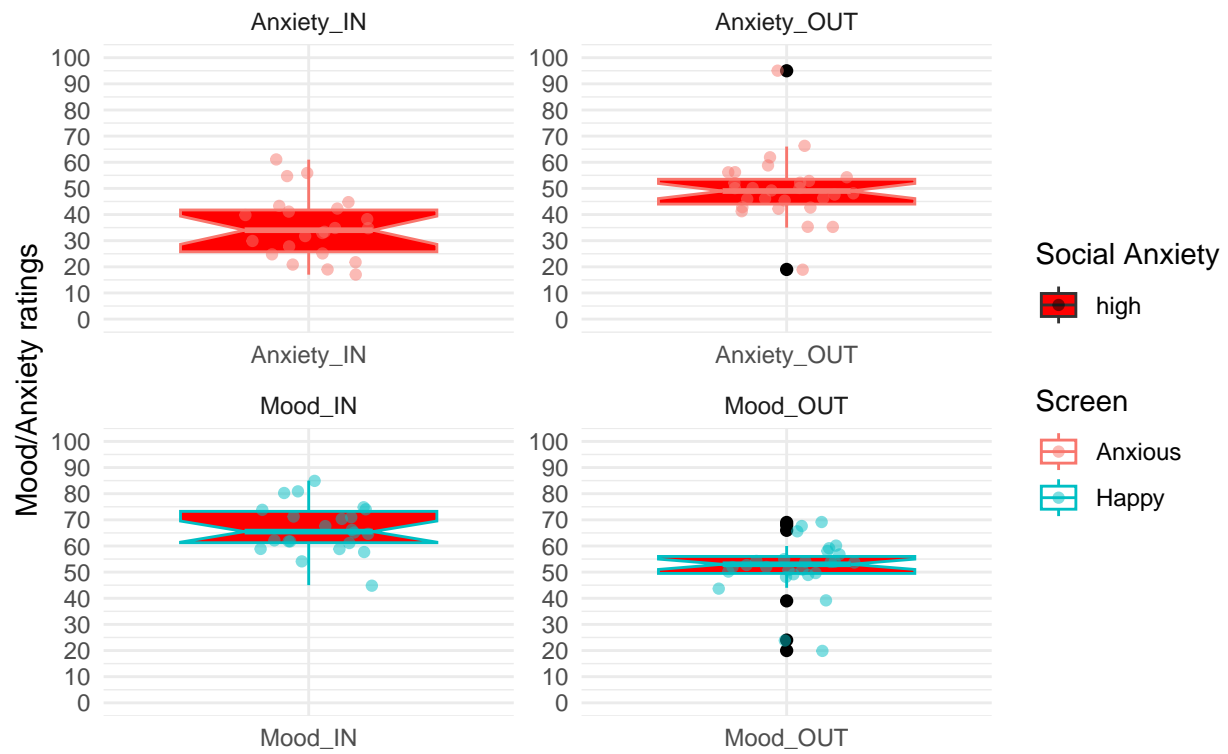
Anxiety and Mood ratings for subject: SUPPRF80411



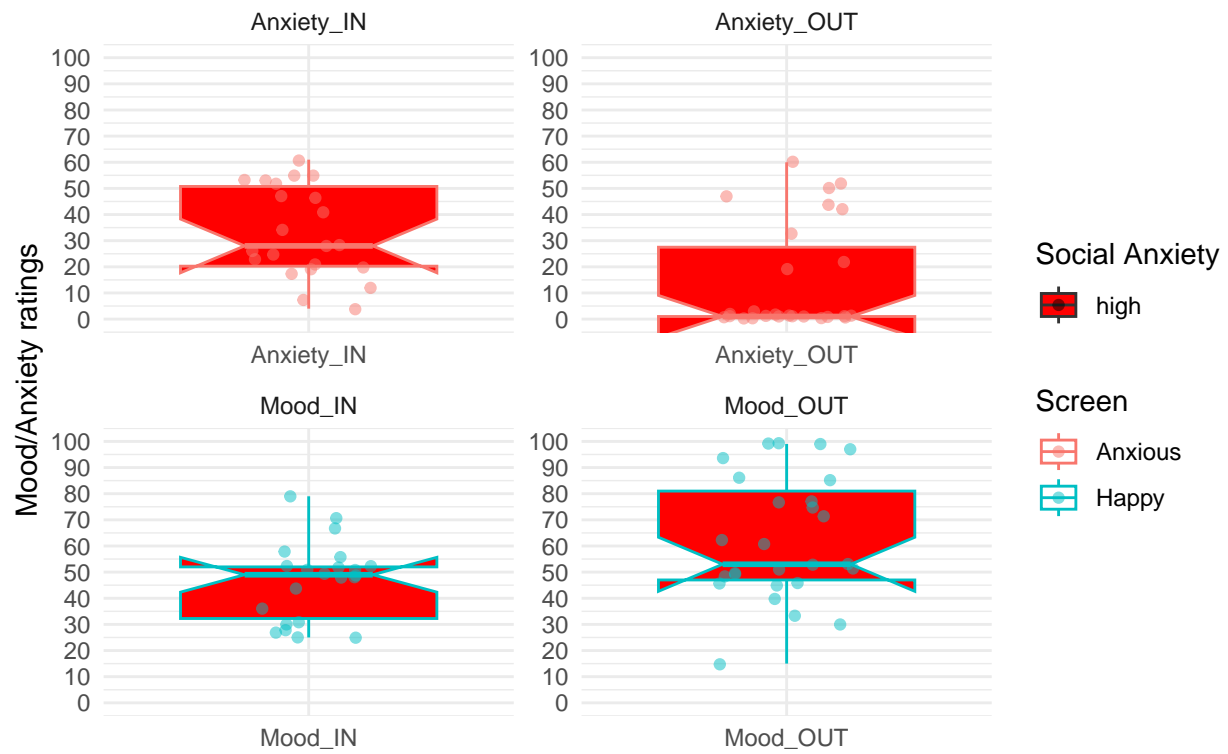
Anxiety and Mood ratings for subject: SUPPRF66399



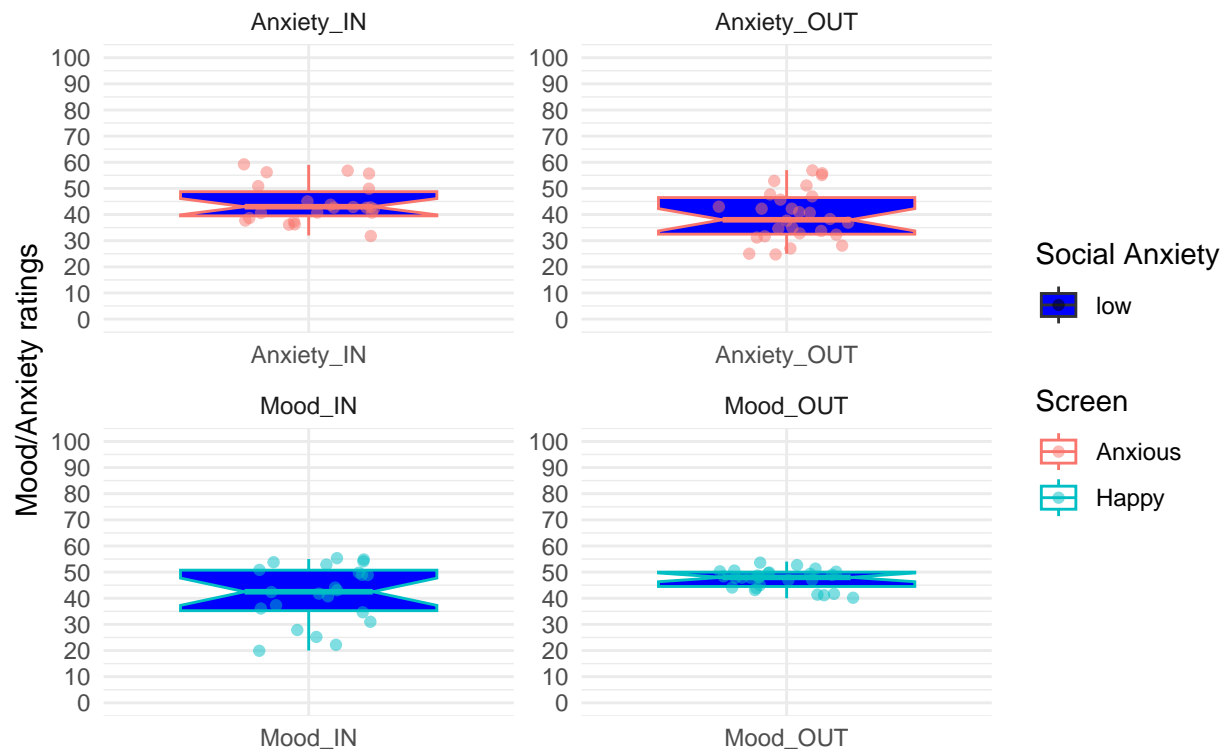
Anxiety and Mood ratings for subject: SUPPRF33488



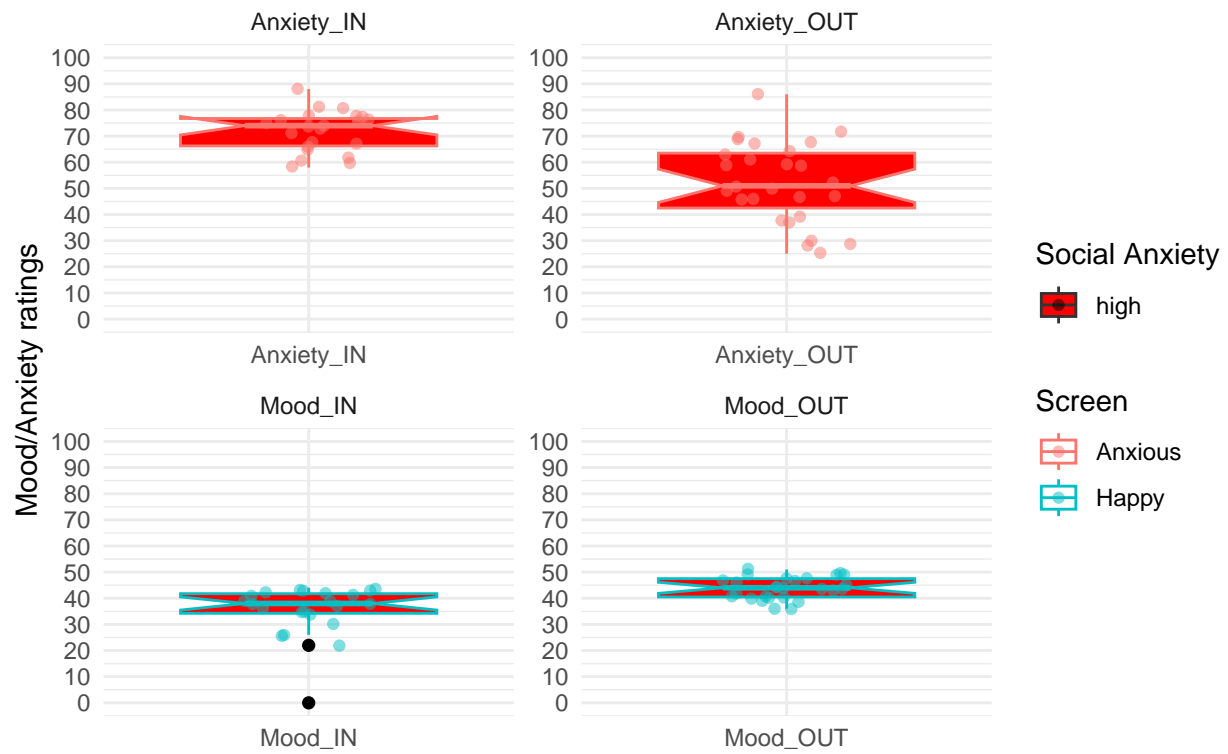
Anxiety and Mood ratings for subject: SUPPRF83636



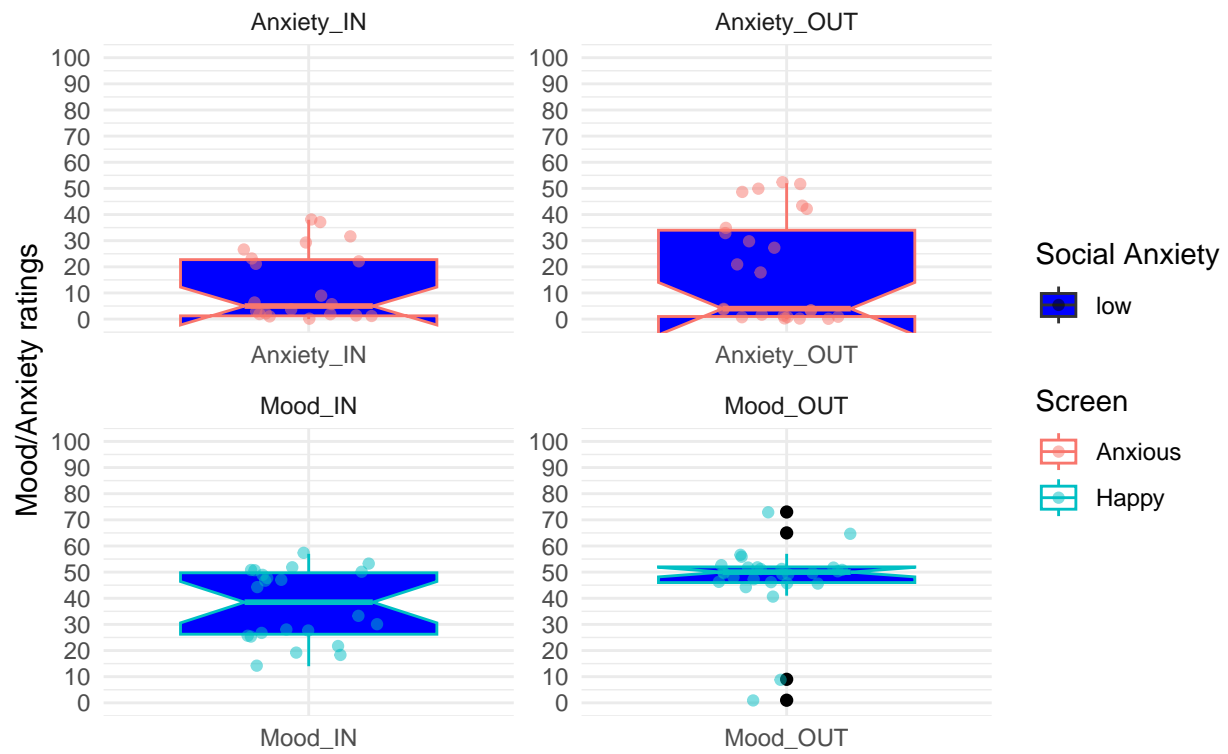
Anxiety and Mood ratings for subject: SUPPRF46512



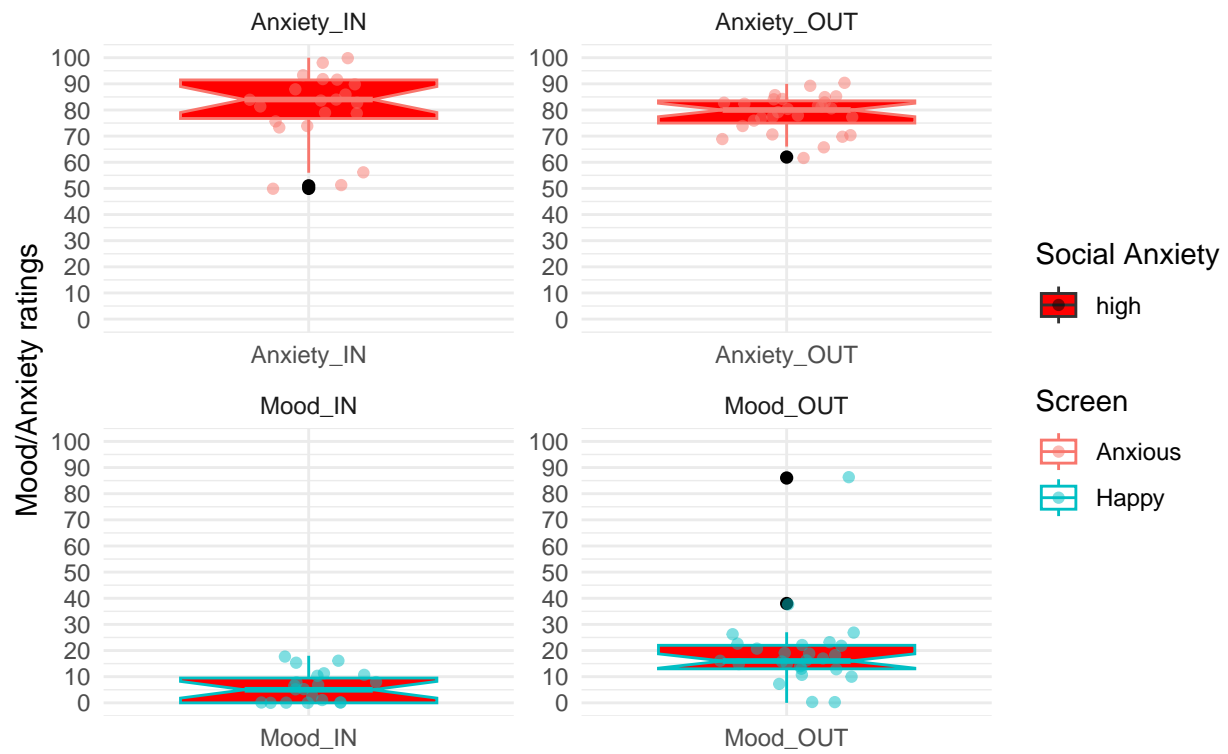
Anxiety and Mood ratings for subject: SUPPRF79316



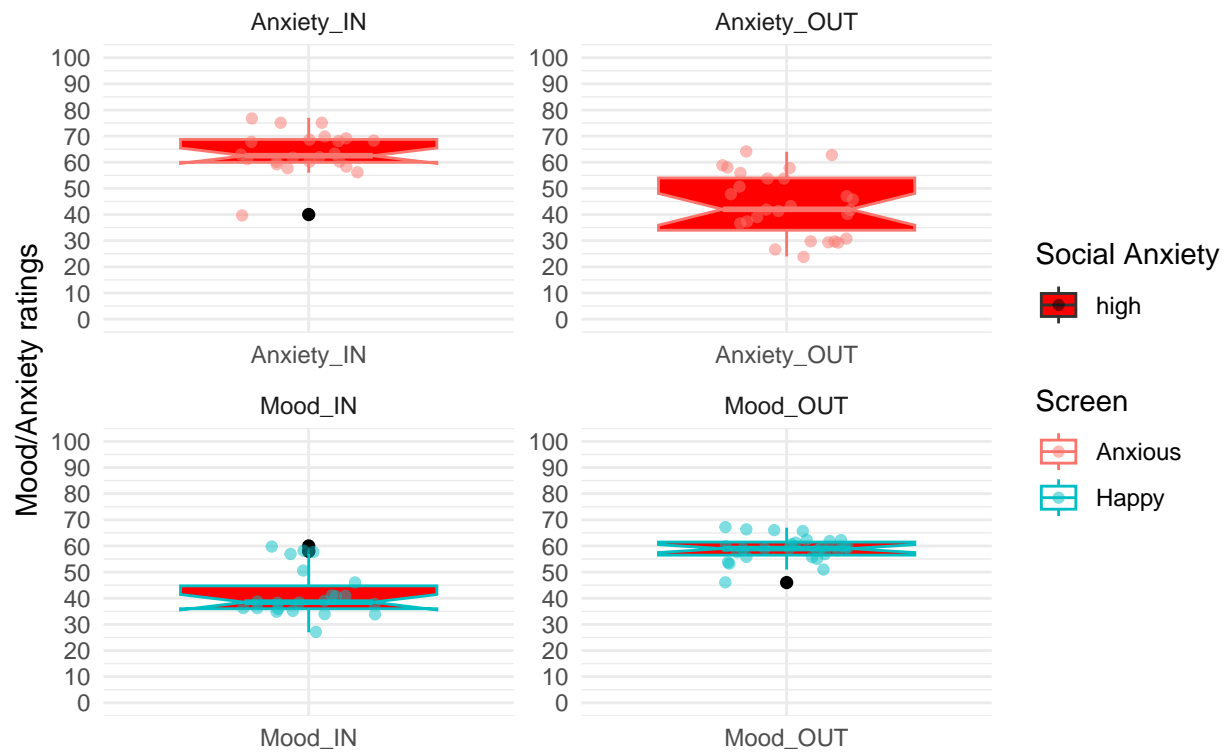
Anxiety and Mood ratings for subject: SUPPRF41237



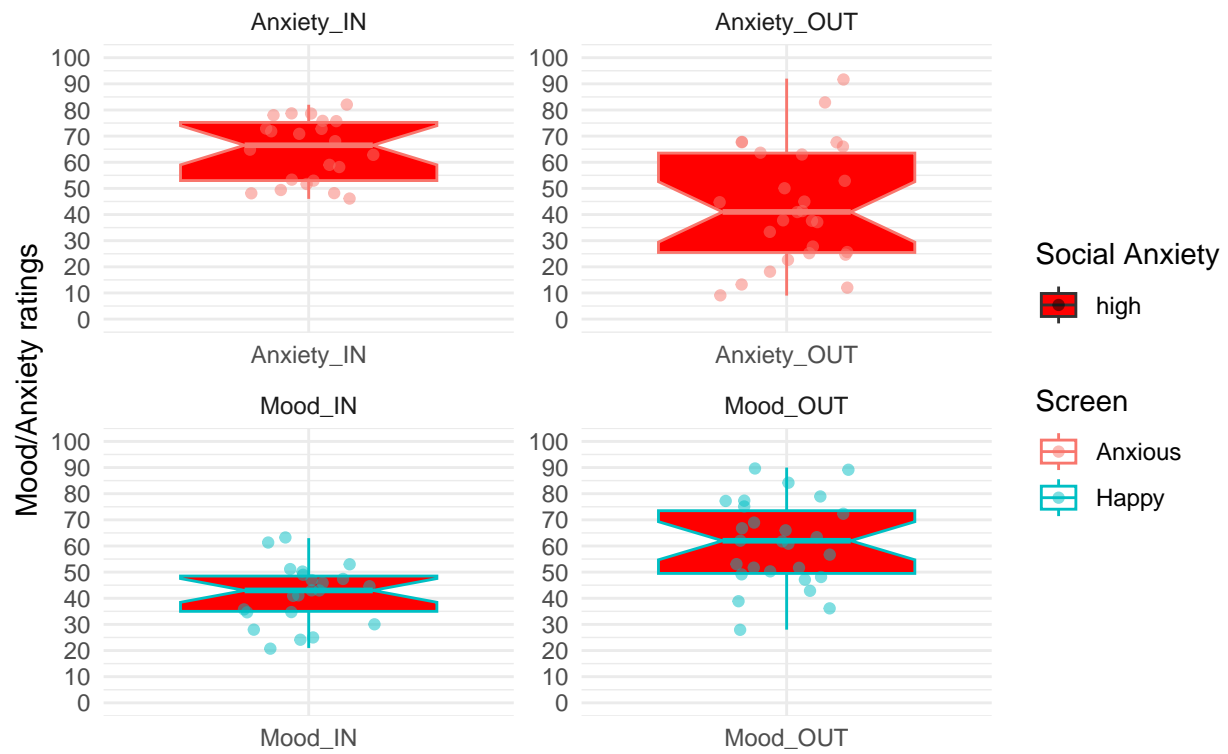
Anxiety and Mood ratings for subject: SUPPRF62780



Anxiety and Mood ratings for subject: SUPPRF80900



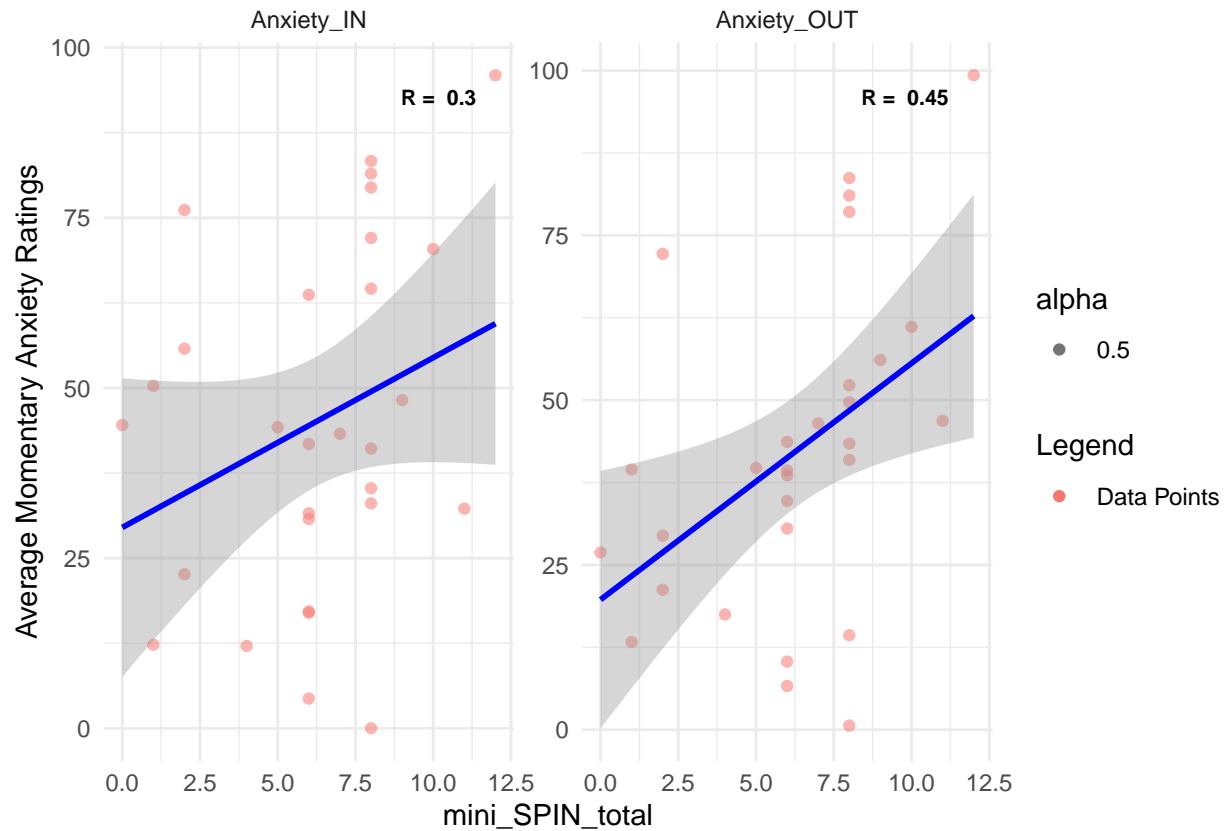
Anxiety and Mood ratings for subject: SUPPRF34449



Relationship between mini_SPIN and momentary anxiety ratings

The plot below show the relationship between the (average) anxiety ratings on the task and total mini_SPIN scores.

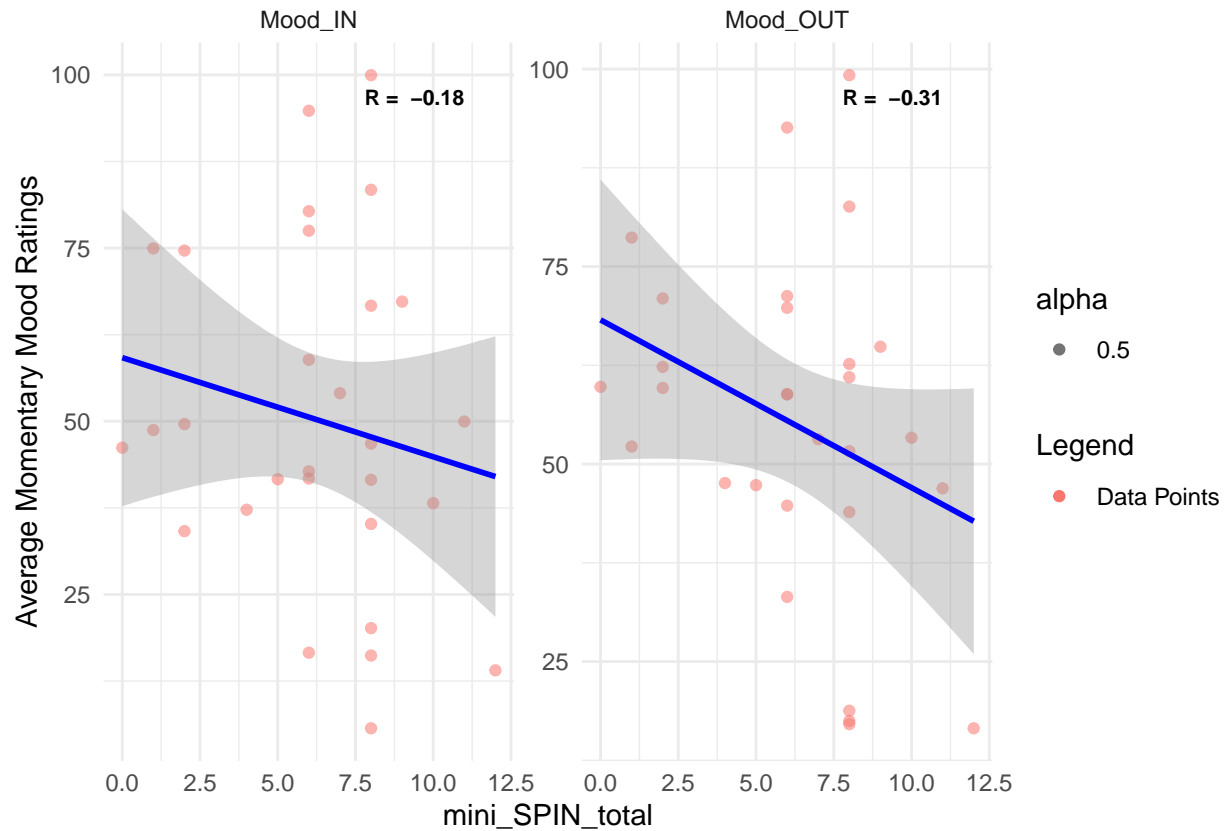
```
## [1] "correlation between mini_SPIN_total and average anxiety ratings: 0.371658363191696"
```



Relationship between mini_SPIN and momentary mood ratings

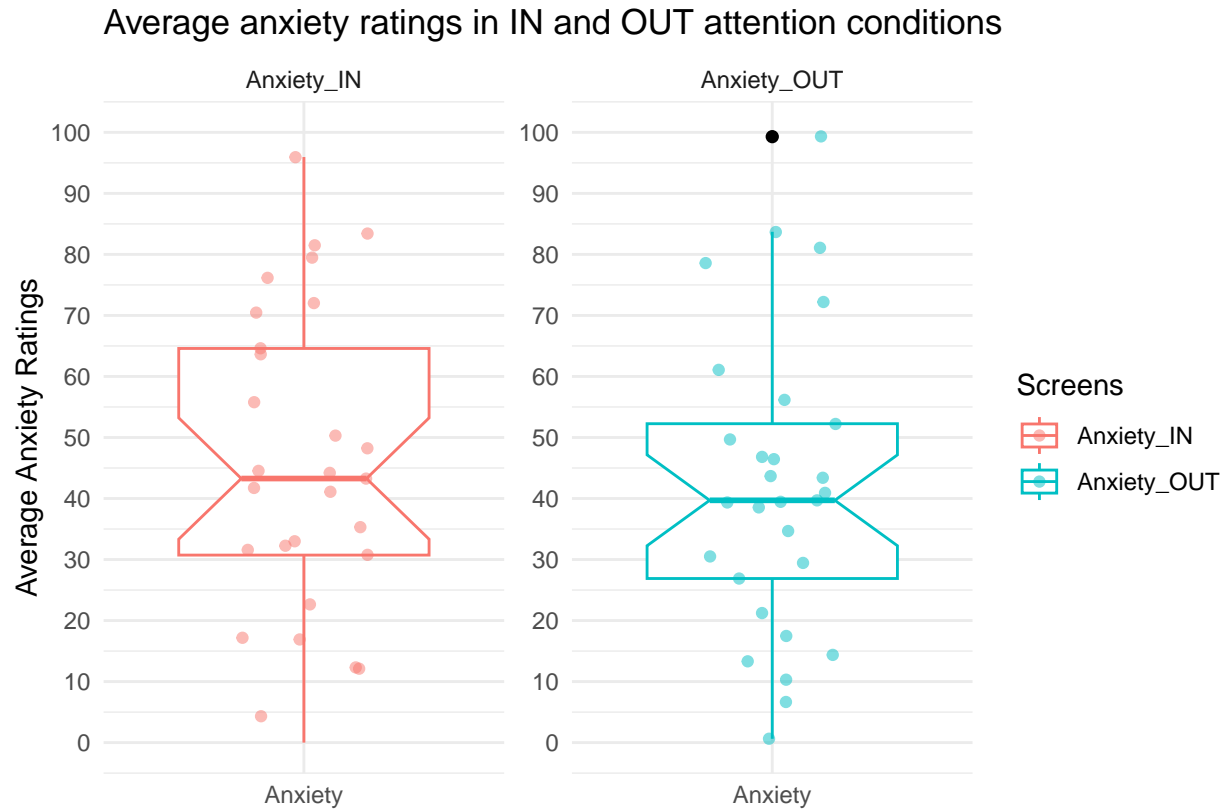
The plot below show the relationship between (average) mood ratings on the task and the total mini_SPIN scores.

```
## [1] "correlation between mini_SPIN_total and average anxiety ratings: -0.244178582278169"
```



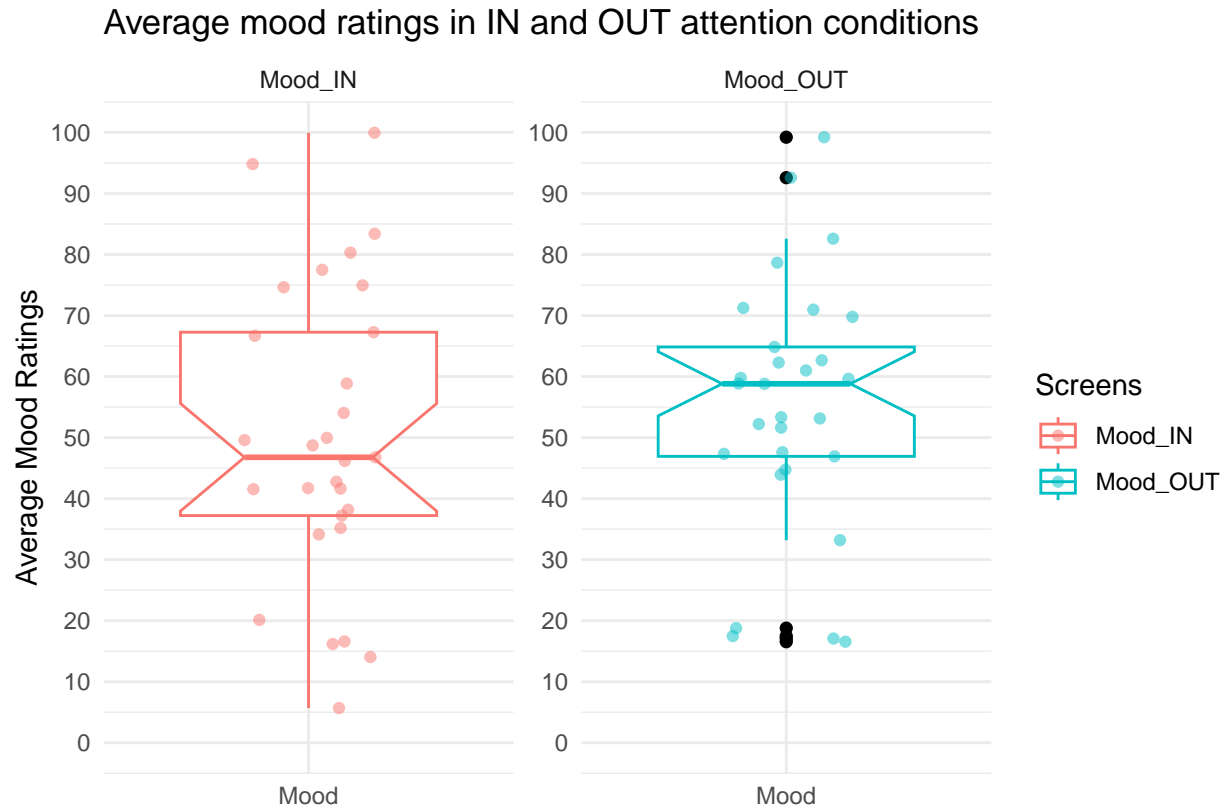
Average Anxiety in IN and OUT attention conditions

The plot below show the average anxiety ratings in IN and OUT attention conditions where people paid internal and external attention respectively. I think without the outlier (black dot), the difference becomes bigger, will test it later.



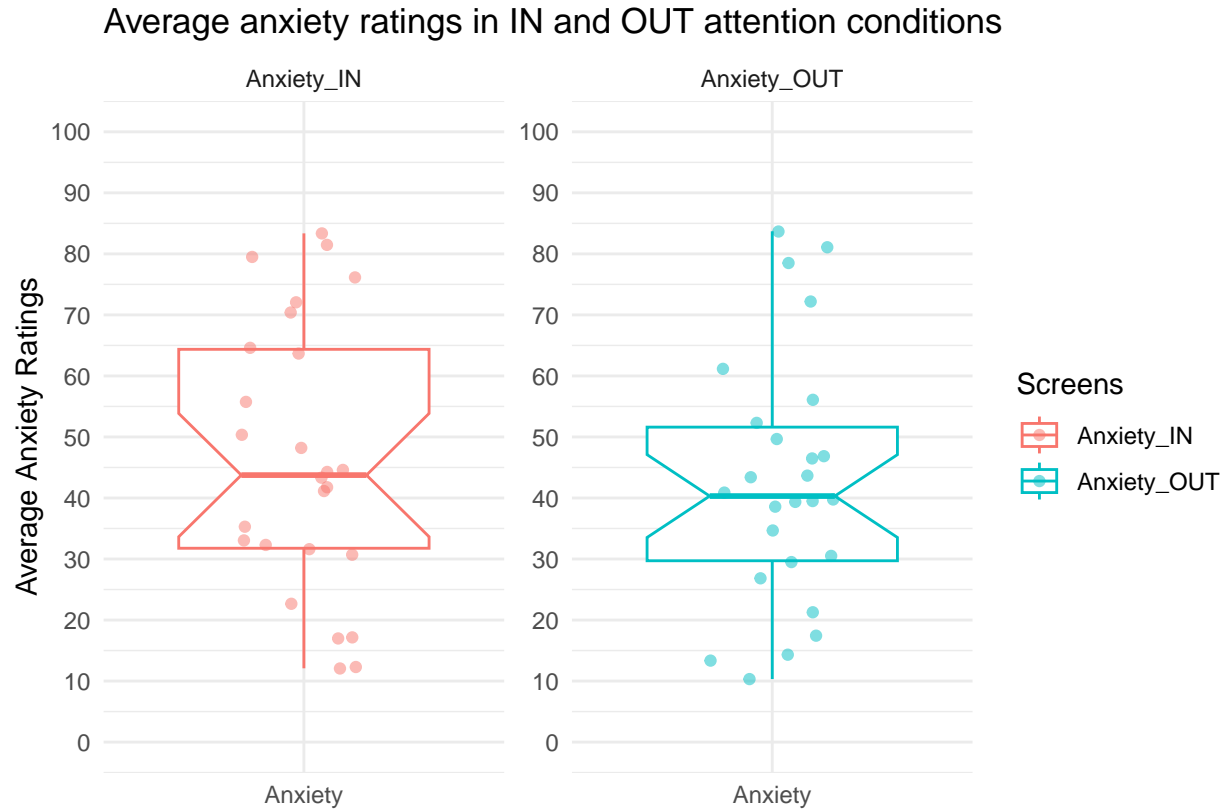
Average Mood in IN and OUT attention conditions

The plot below show the average mood ratings in IN and OUT attention conditions where people paid internal and external attention respectively.

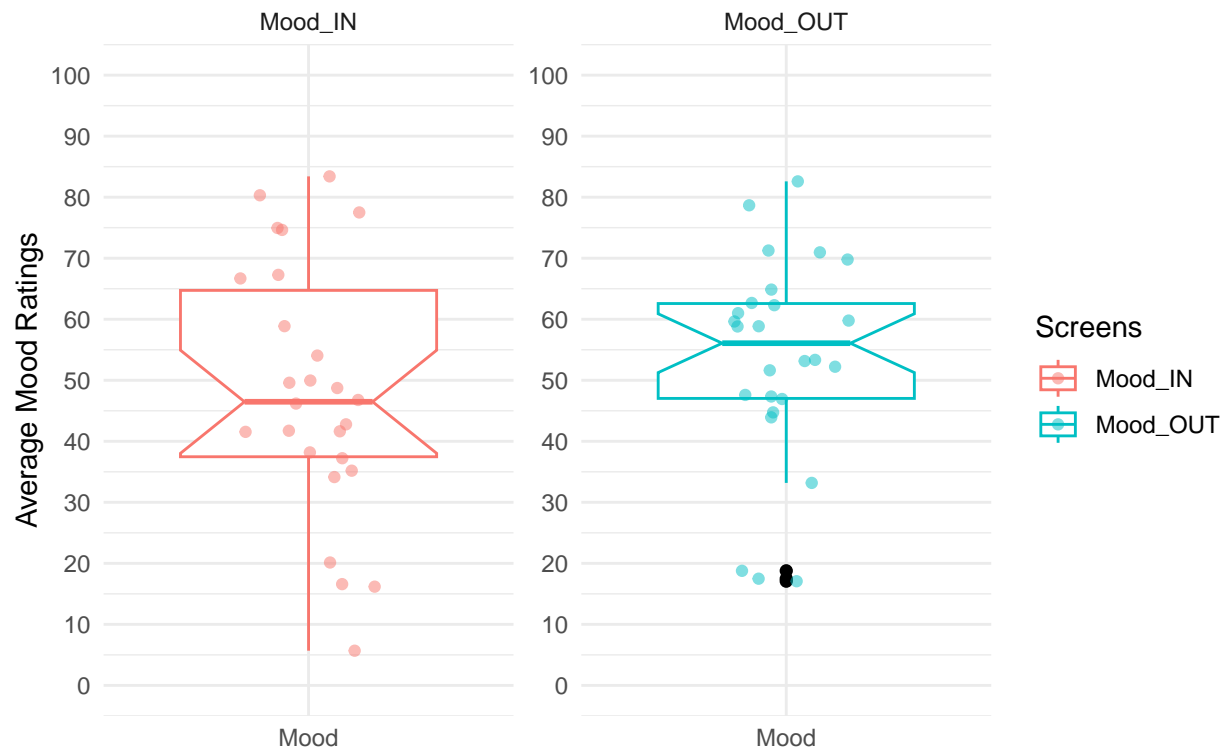


Repeating the group plots after excluding outliers

I have excluded the following subjects to see how the group plots change: “SUPPRF09833”, “SUPPRF54499”, “SUPPRF50800”. They all had rated the same scores for anxiety and mood throughout the task (their histograms above are flat).



Average mood ratings in IN and OUT attention conditions



Between condition tests

Since in this version we only had the mood and anxiety ratings without feedback and prediction, let's have a look at between condition differences per emotion rating (Mood and Anxiety) using two paired t-tests. We could look at the slopes for both attention conditions using a model with only the intercept?

```
##
## Paired t-test
##
## data: Mood_IN and Mood_OUT
## t = -2.4443, df = 28, p-value = 0.02107
## alternative hypothesis: true mean difference is not equal to 0
## 95 percent confidence interval:
## -8.7567902 -0.7715971
## sample estimates:
## mean difference
## -4.764194

##
## Paired t-test
##
## data: Anxiety_IN and Anxiety_OUT
## t = 1.4346, df = 28, p-value = 0.1625
## alternative hypothesis: true mean difference is not equal to 0
## 95 percent confidence interval:
## -1.282521 7.277064
## sample estimates:
## mean difference
## 2.997272
```

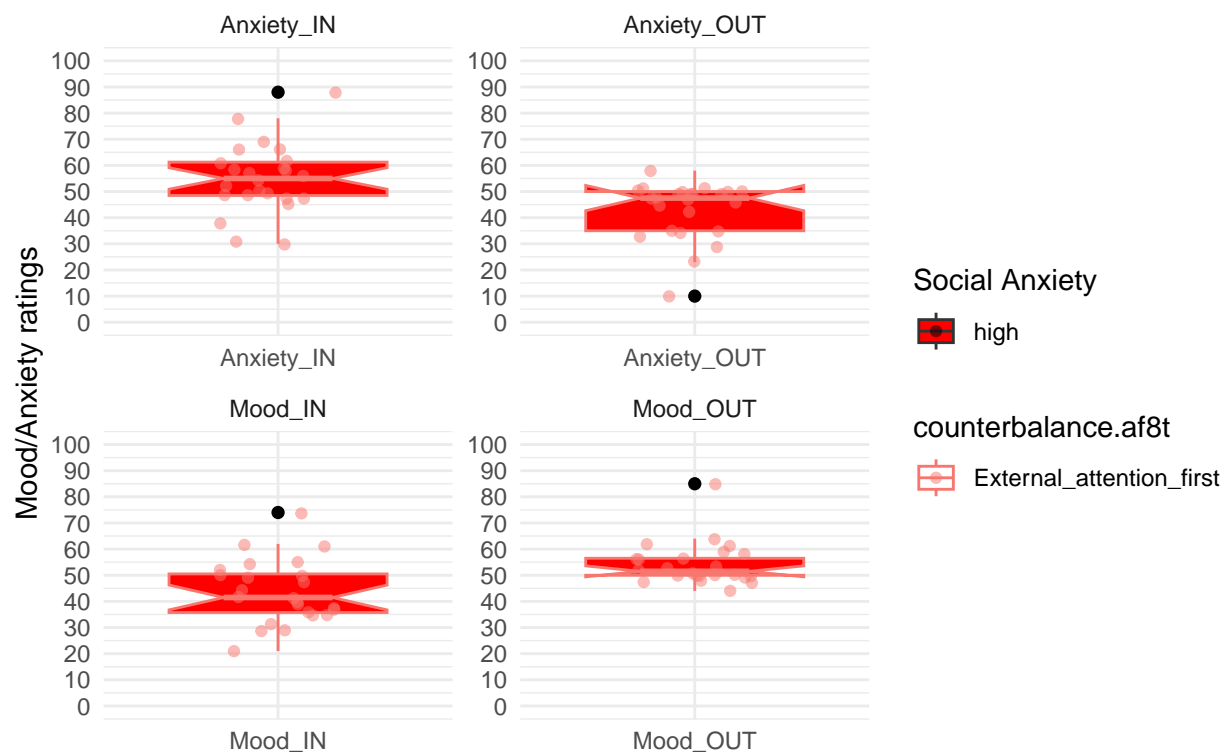
Attention pilot 2: study description

This pilot was the same as before but we had 59 people counterbalancing the order of conditions between them. Another difference with previous attention pilot is that around 51% of people had high social anxiety scores, and this was 72% in attention pilot 1. In pilot 1, the picture was presented for 4 seconds before they have to describe it and then would disappear. In pilot 2, we re-introduced the picture to have the same design as the surprise task if ultimately we wanted to combine both. However, we need to keep in mind for the next attention pilots, to present the picture separately for 4s, and remove it from the performance trial to see whether it improves the results.

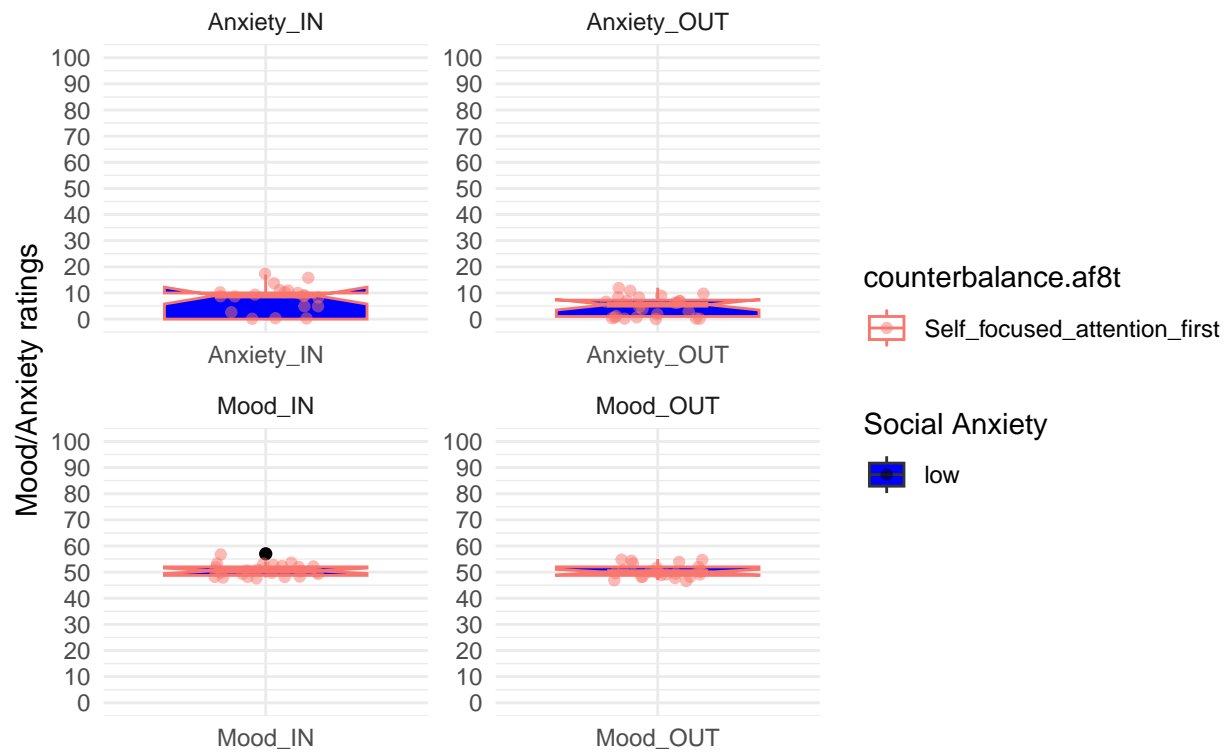
This was the Gorilla experiment: <https://app.gorilla.sc/admin/experiment/157047/design> This was the task used: <https://app.gorilla.sc/admin/task/725729/editor?version=10>

```
## [1] "30 subjects out of 58 had high social anxiety"
```

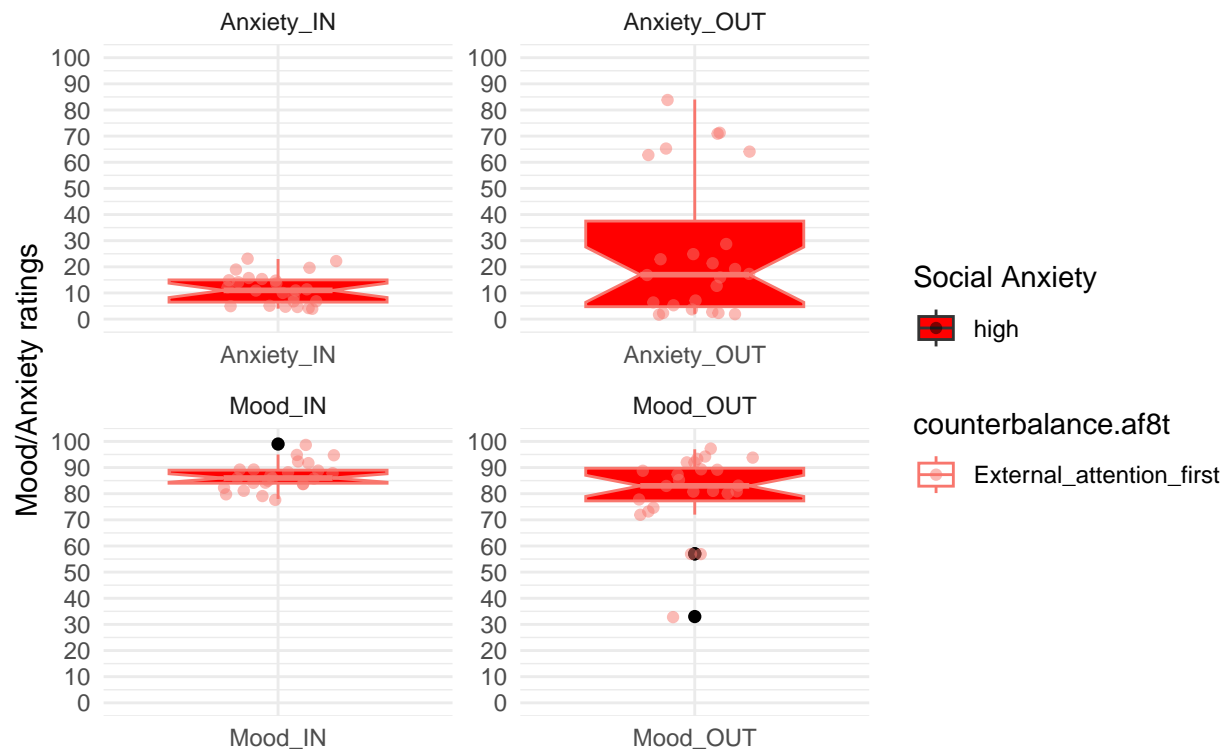
Anxiety and Mood ratings for subject: SUPPRF01609



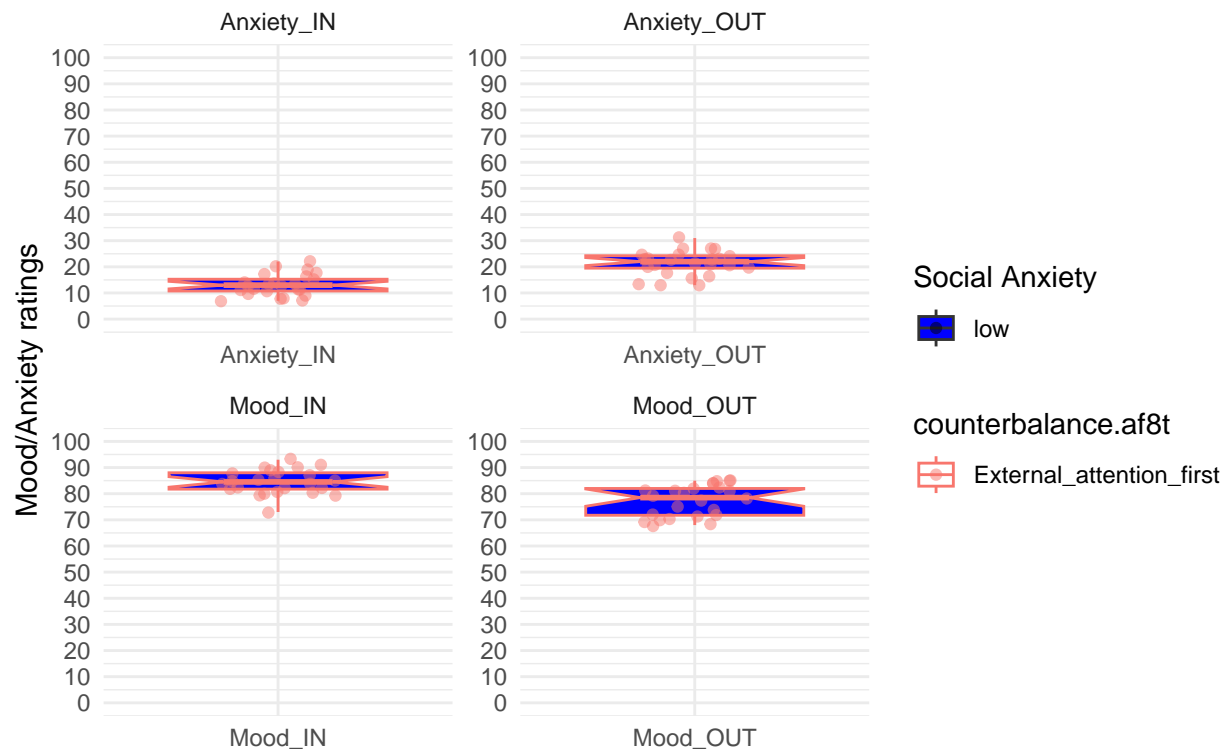
Anxiety and Mood ratings for subject: SUPPRF02996



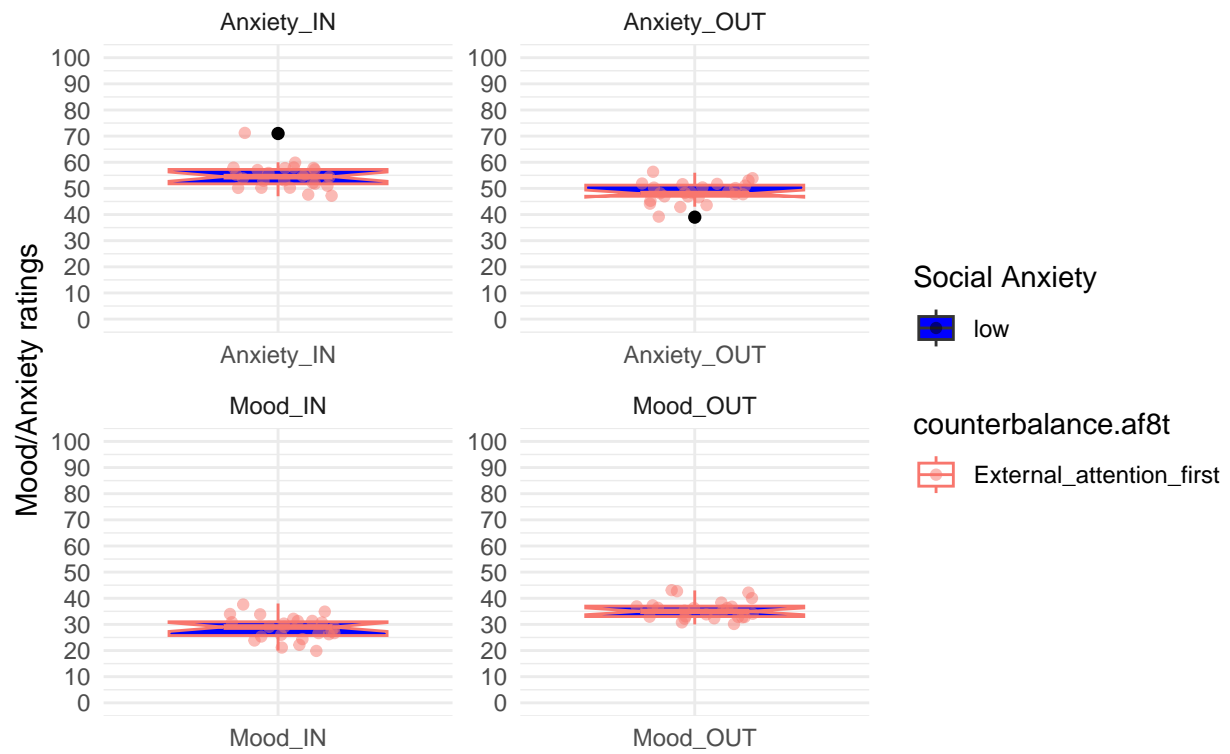
Anxiety and Mood ratings for subject: SUPPRF04851



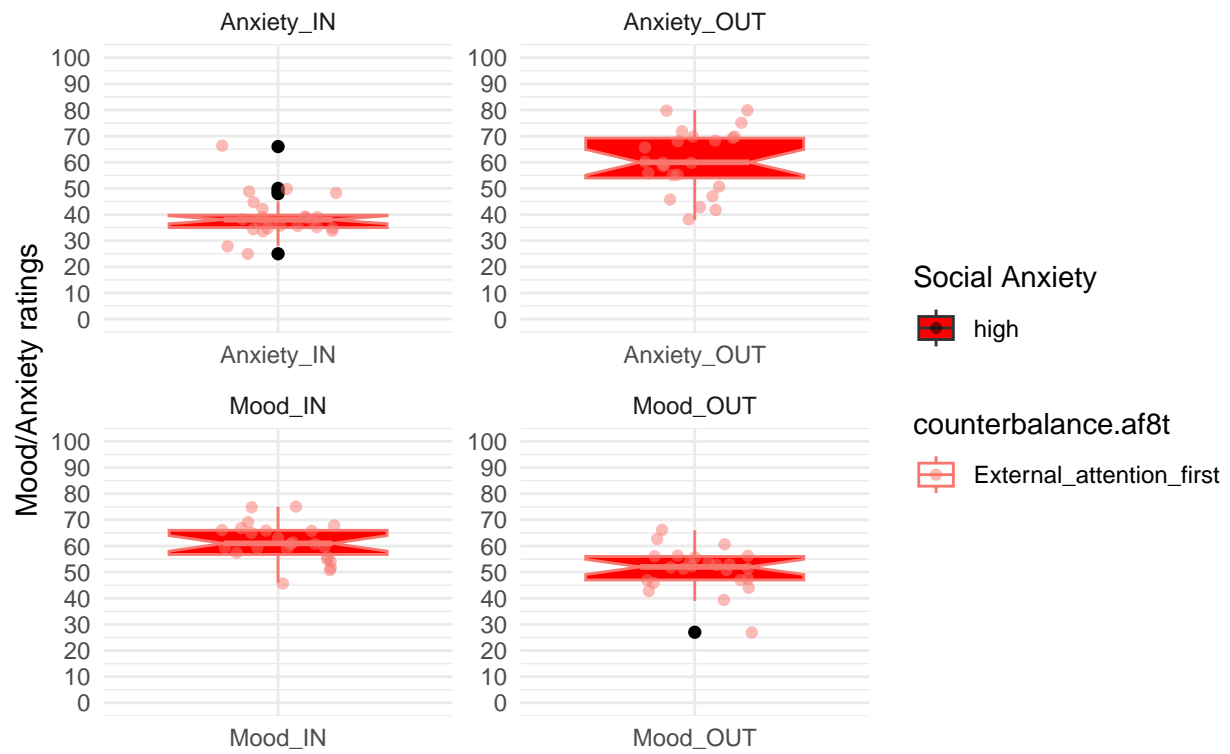
Anxiety and Mood ratings for subject: SUPPRF05707



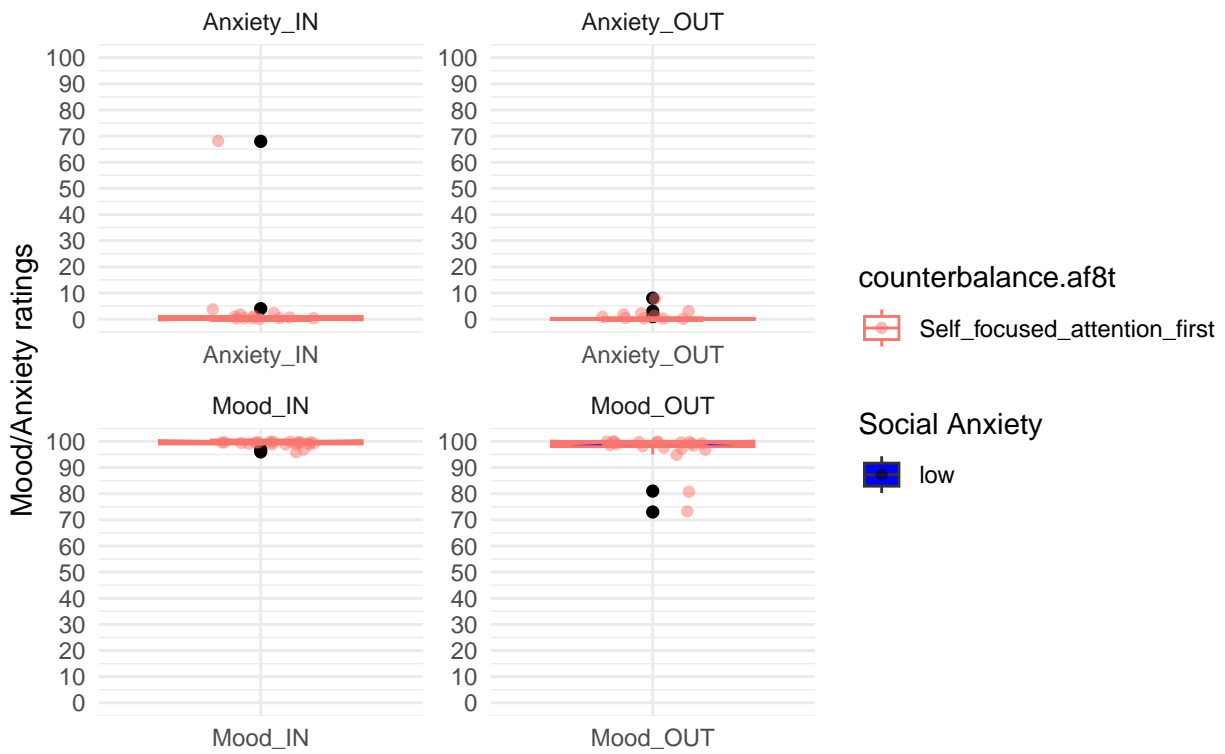
Anxiety and Mood ratings for subject: SUPPRF07871



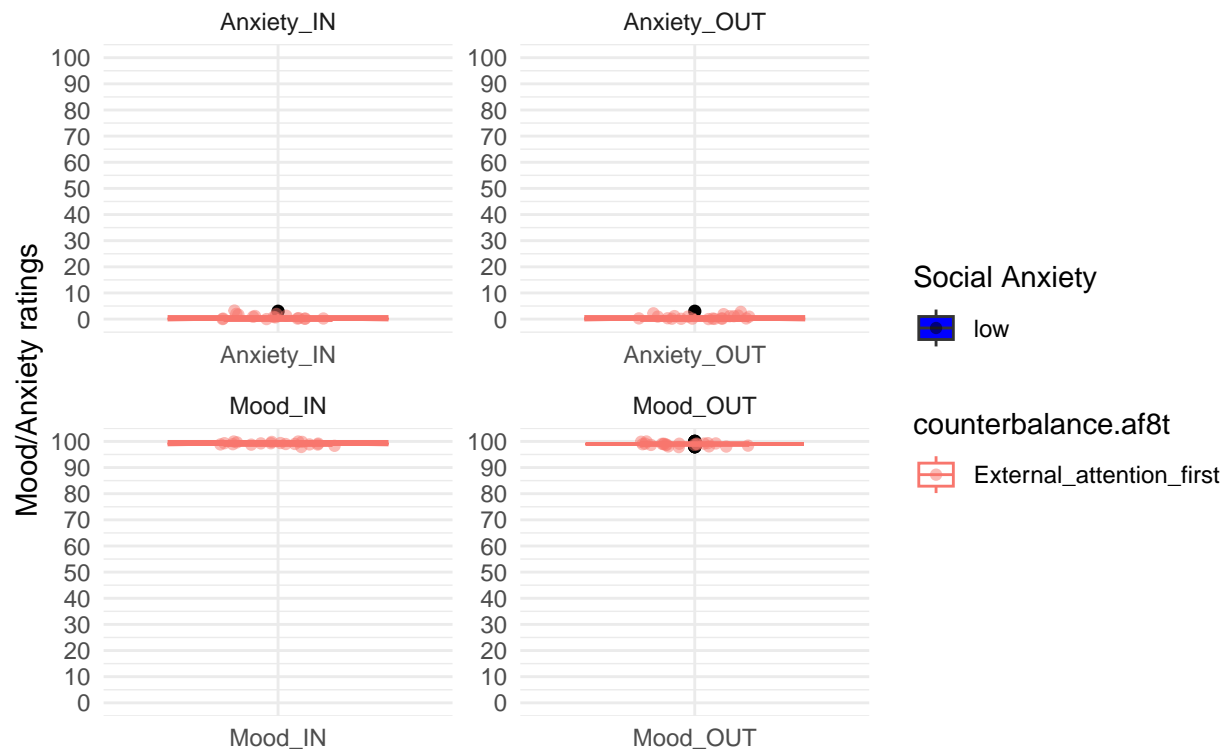
Anxiety and Mood ratings for subject: SUPPRF08809



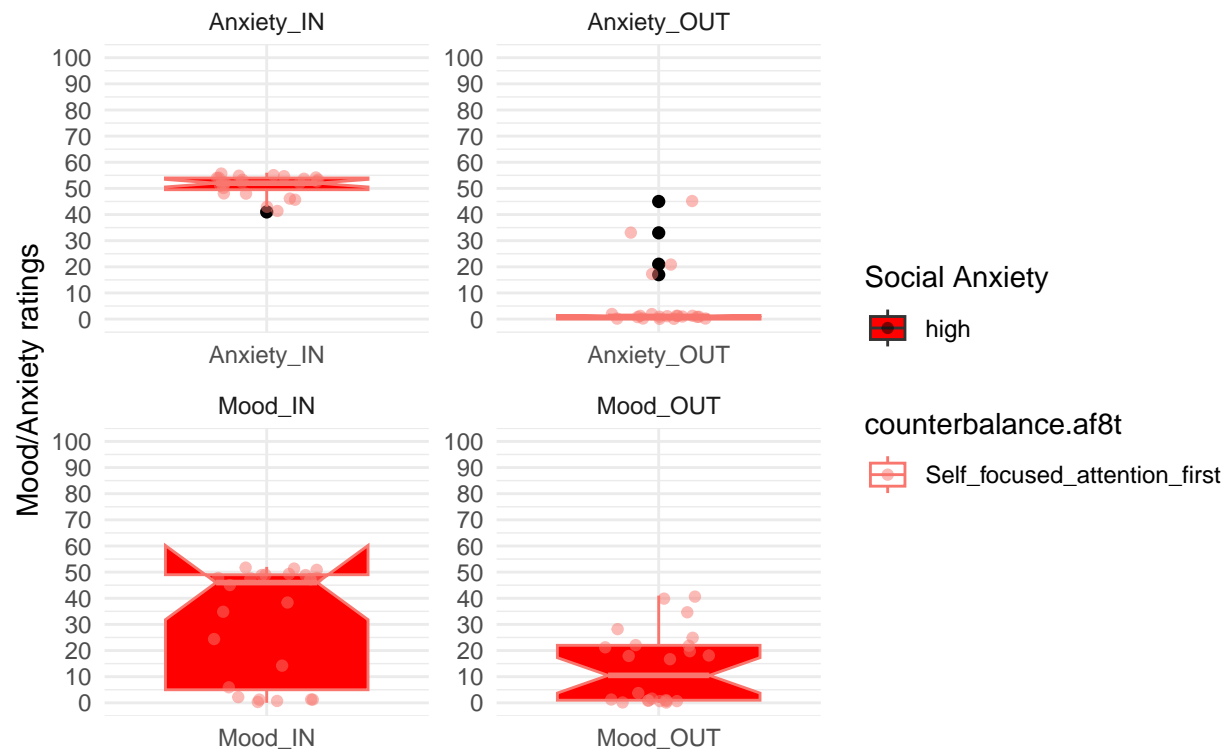
Anxiety and Mood ratings for subject: SUPPRF09275



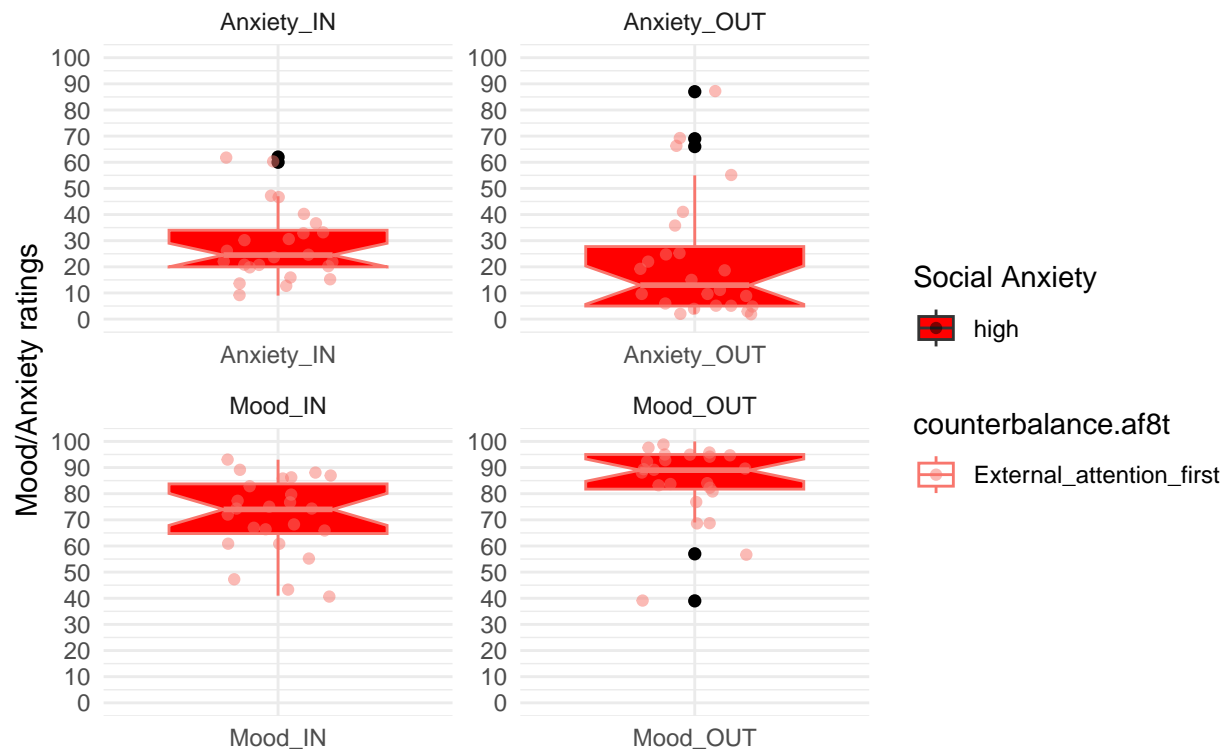
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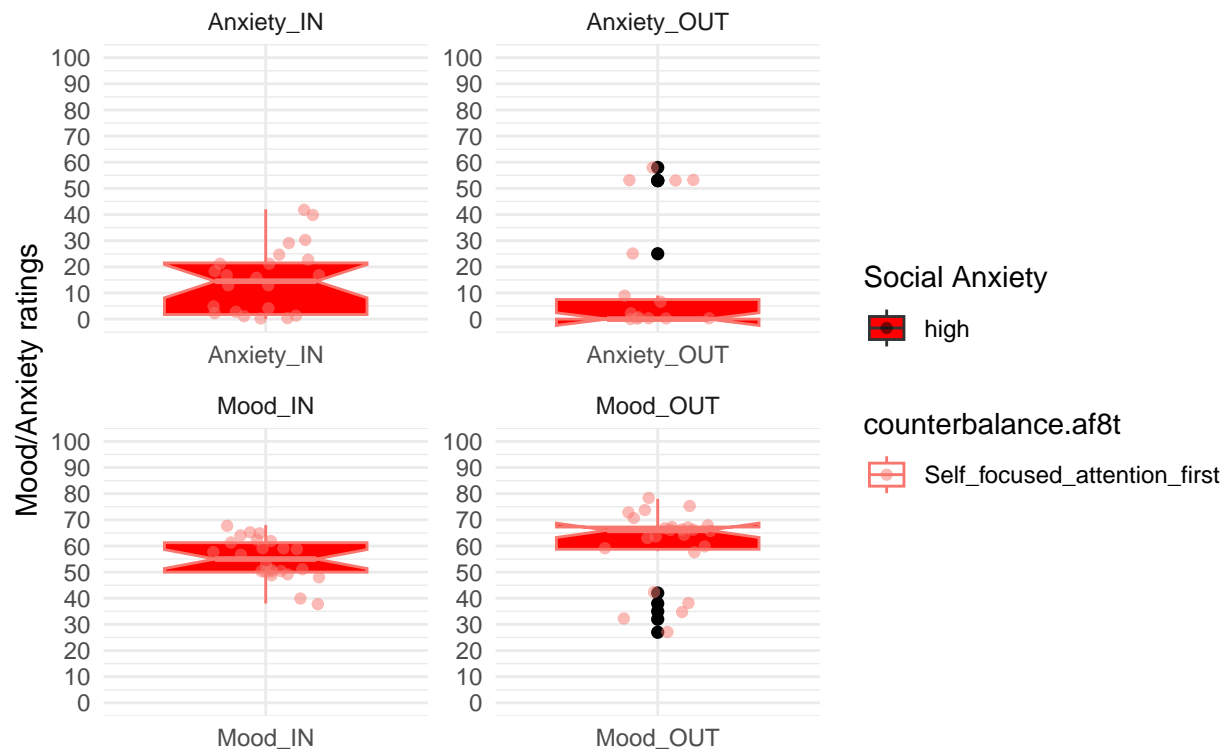
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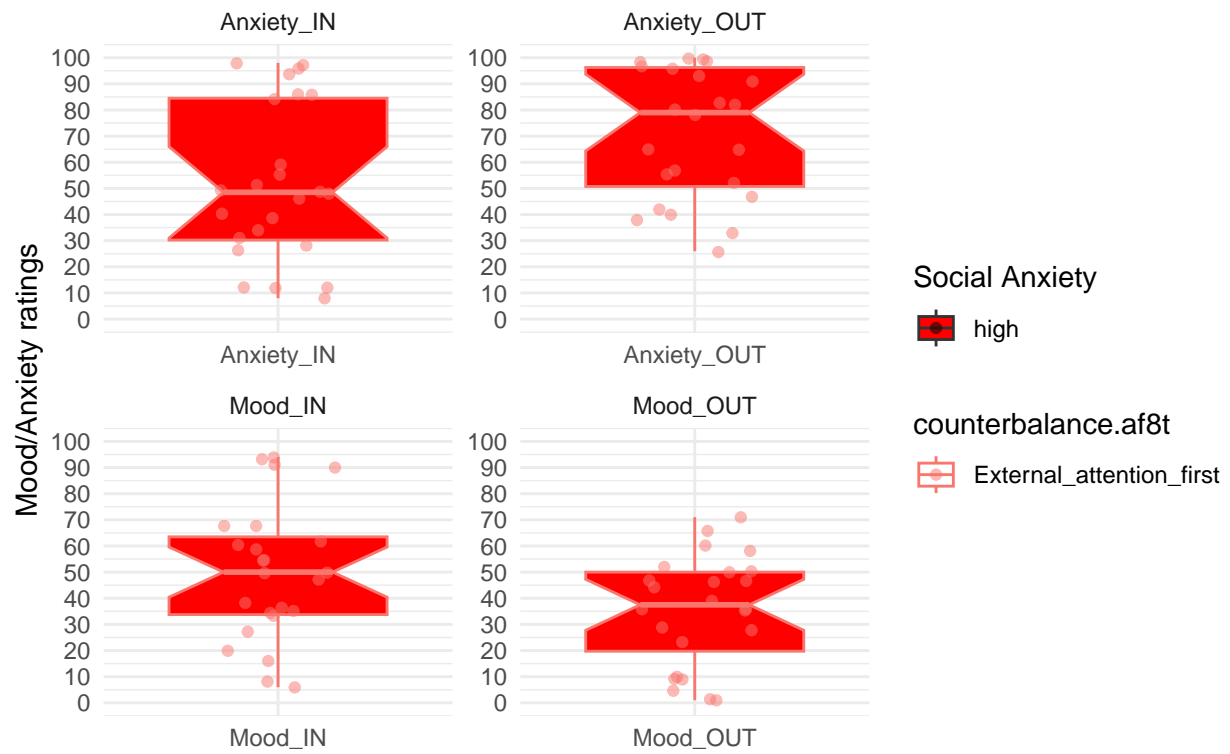
Anxiety and Mood ratings for subject: SUPPRF16834



Anxiety and Mood ratings for subject: SUPPRF18856



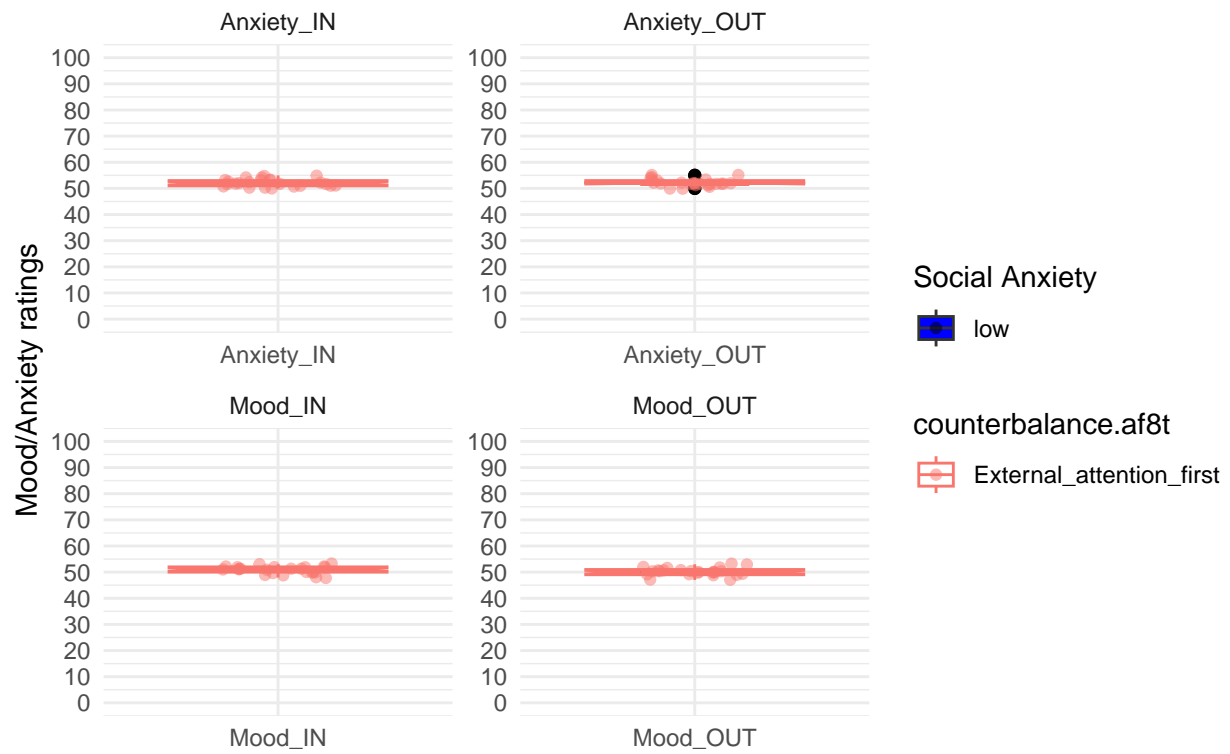
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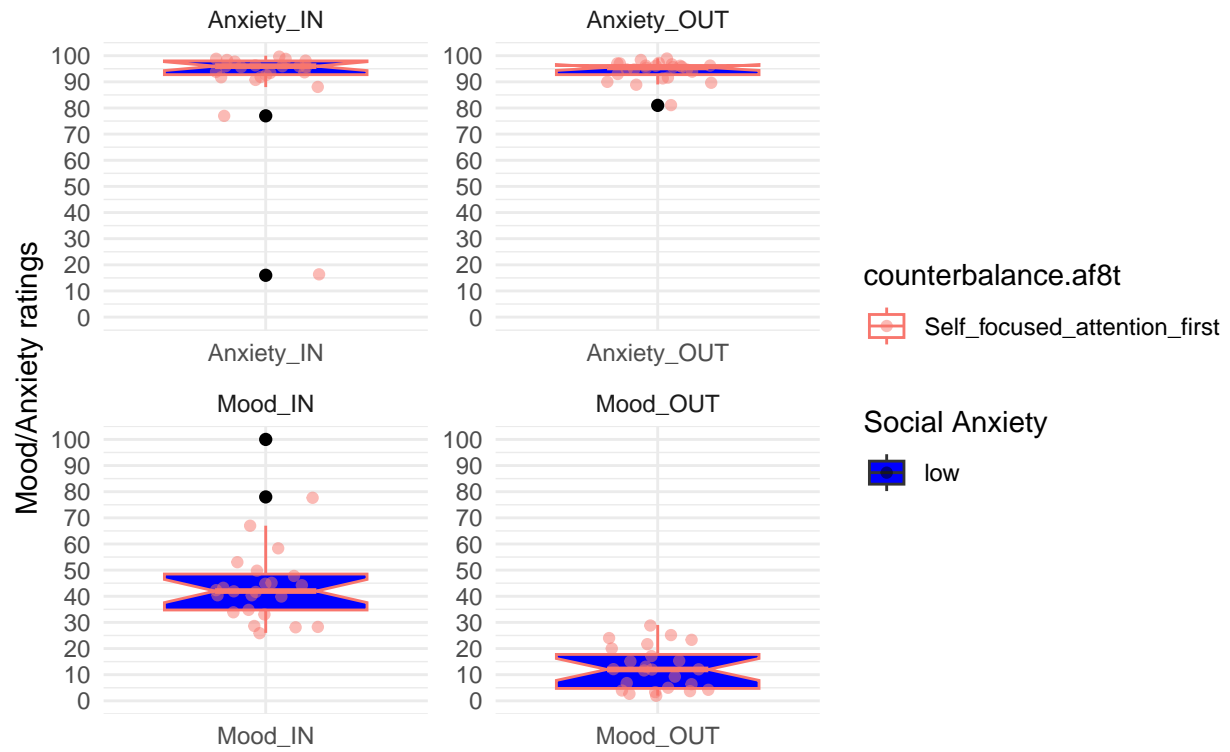
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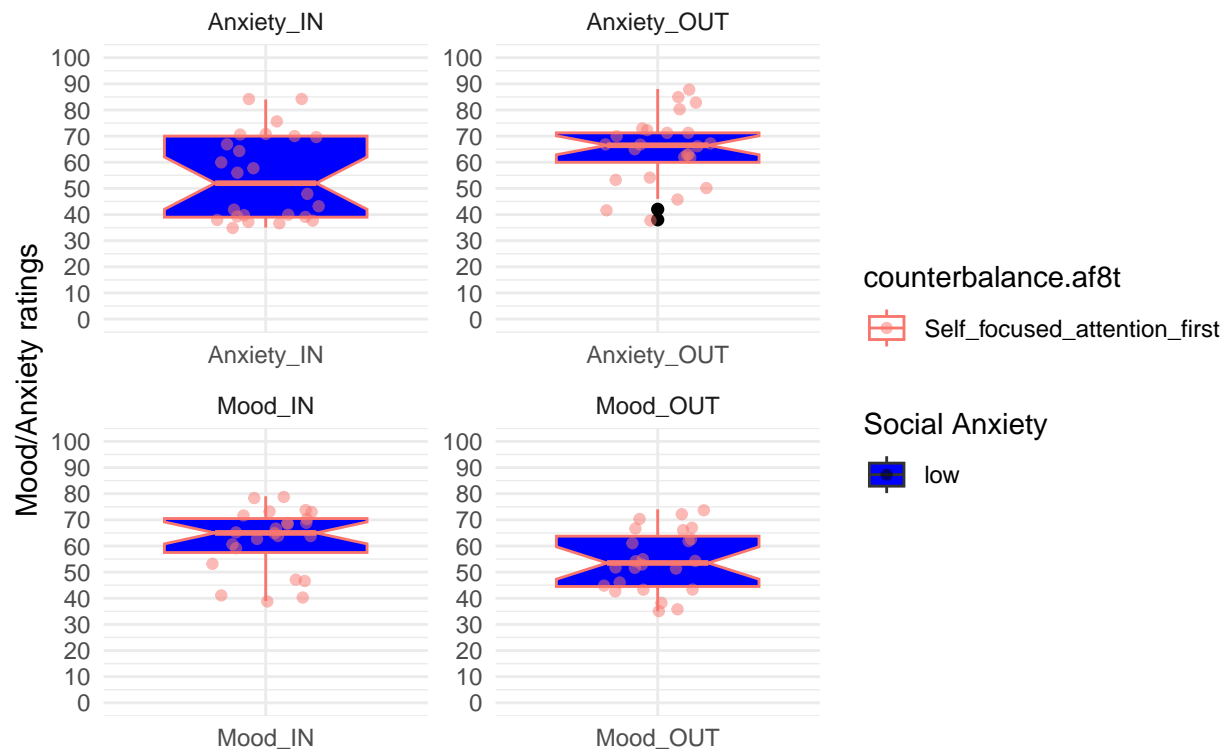
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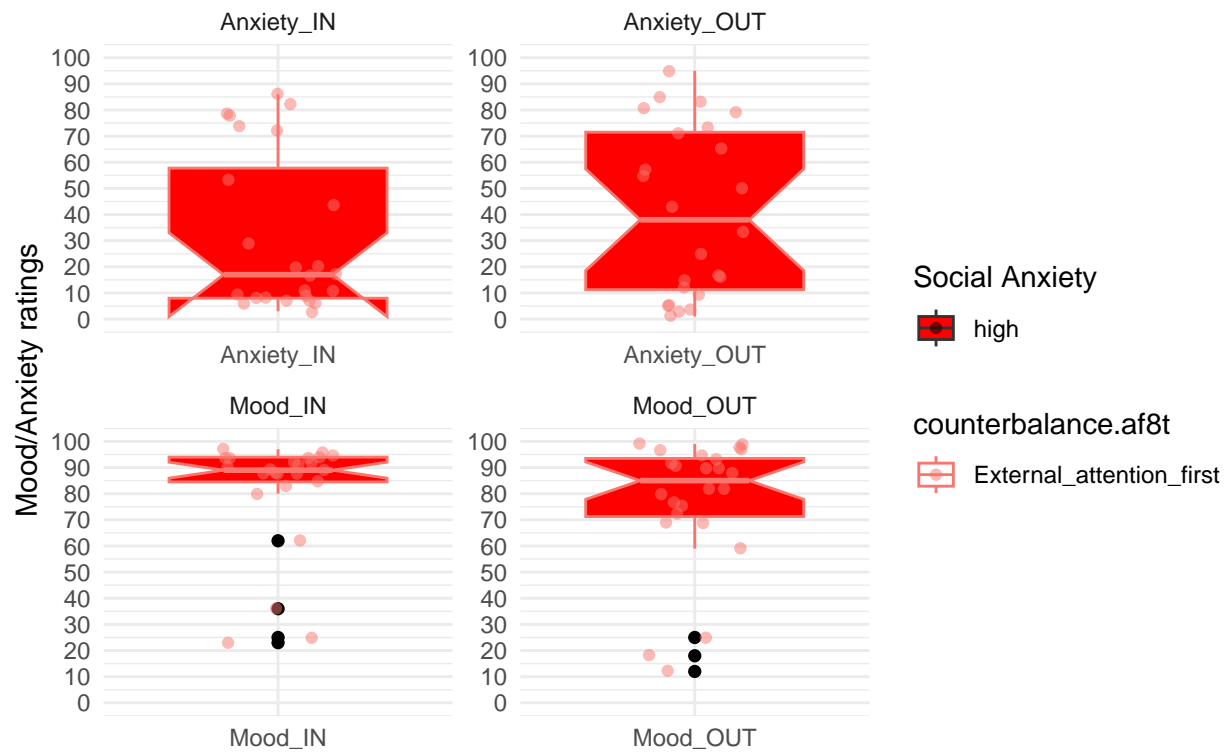
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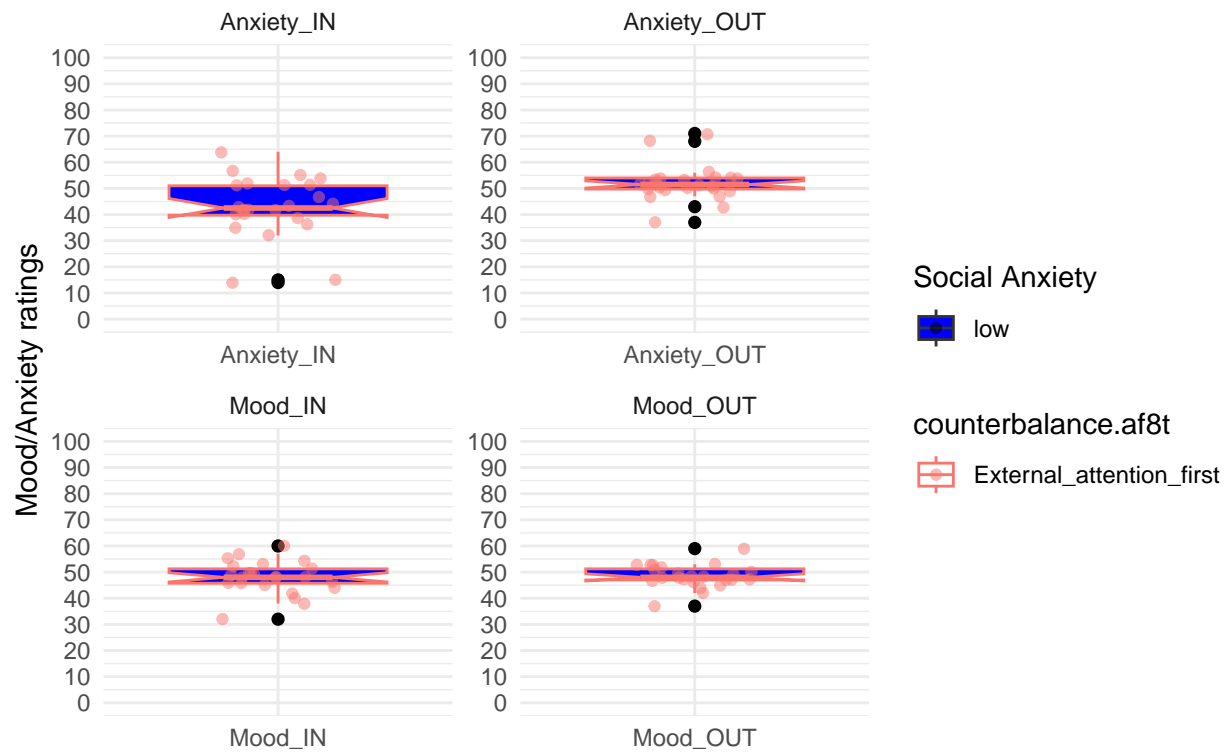
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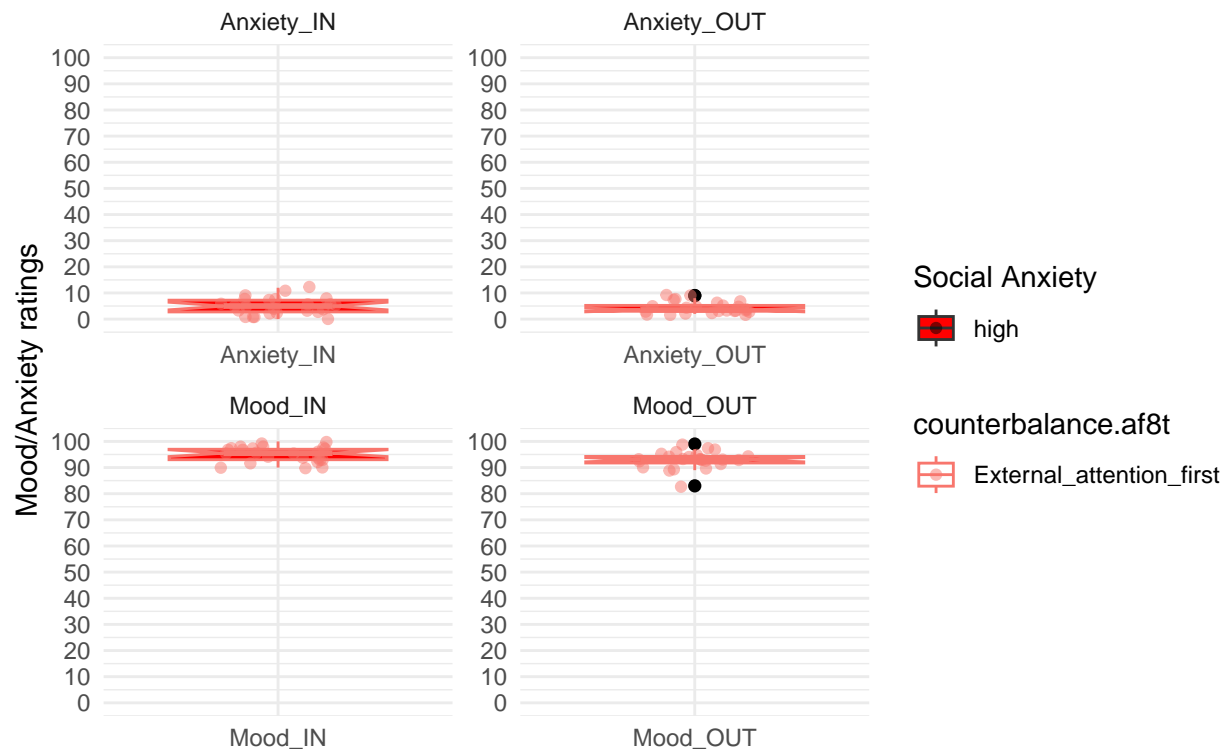
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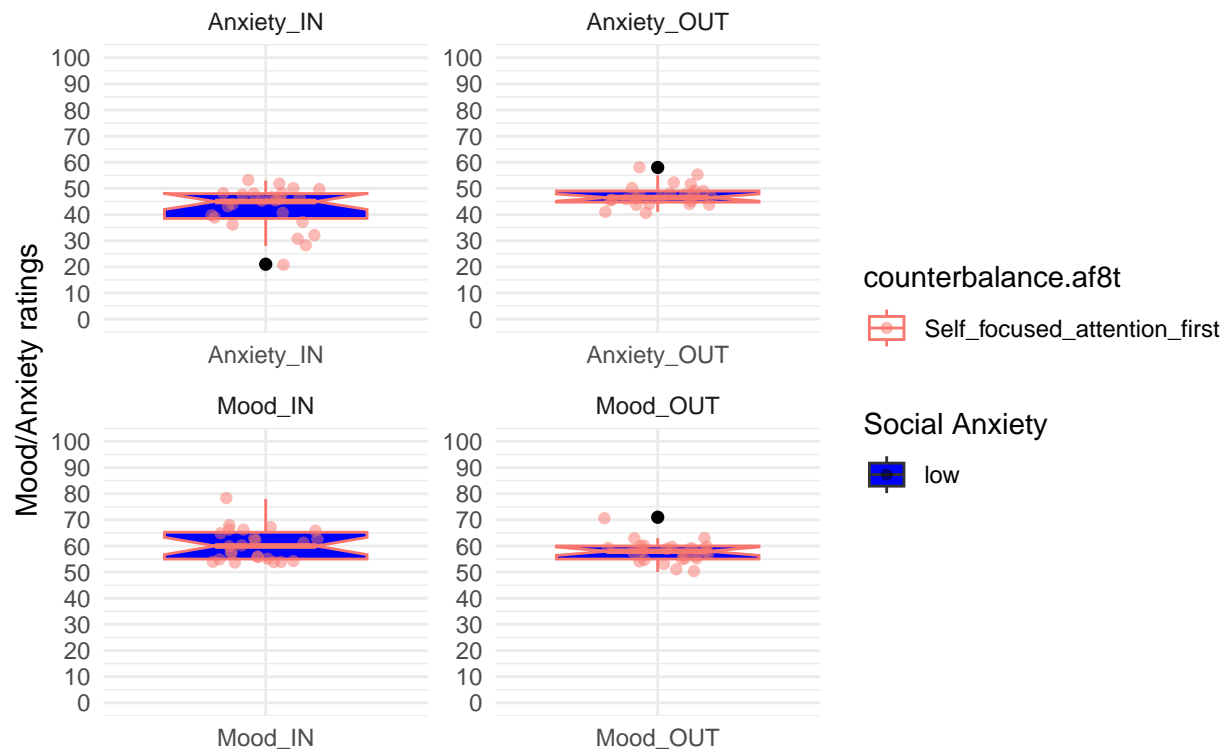
Anxiety and Mood ratings for subject: SUPPRF28854



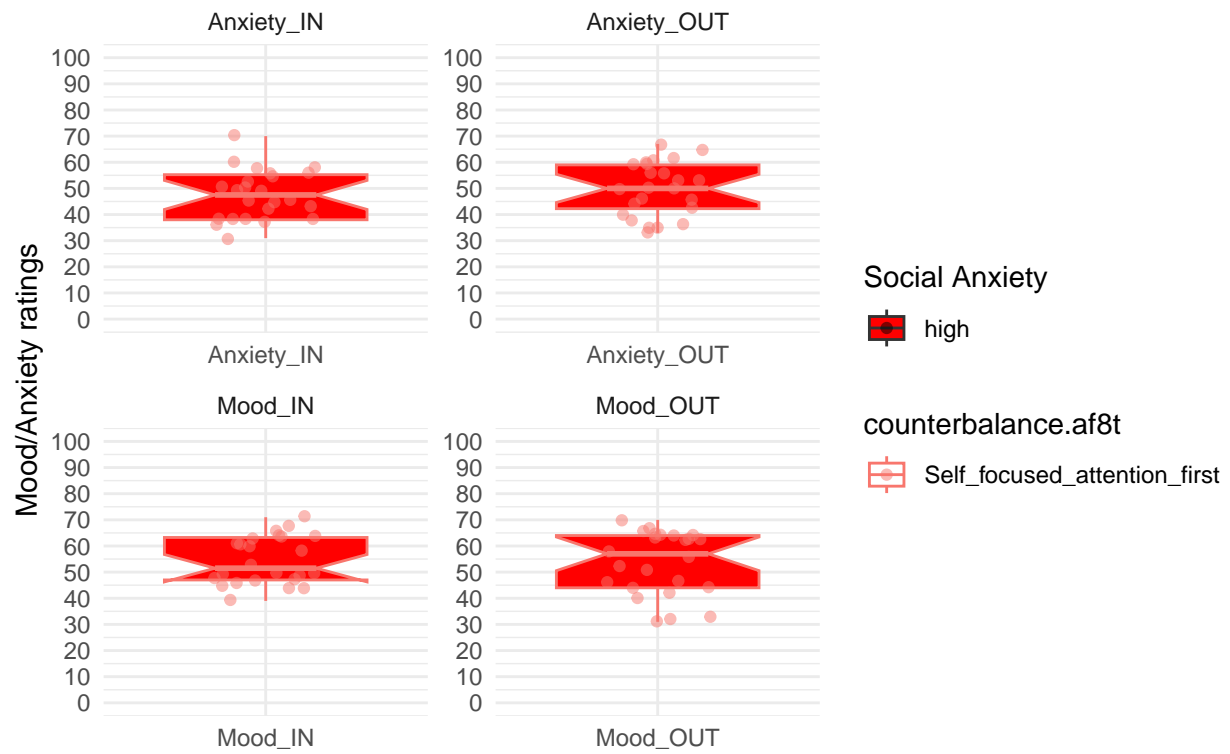
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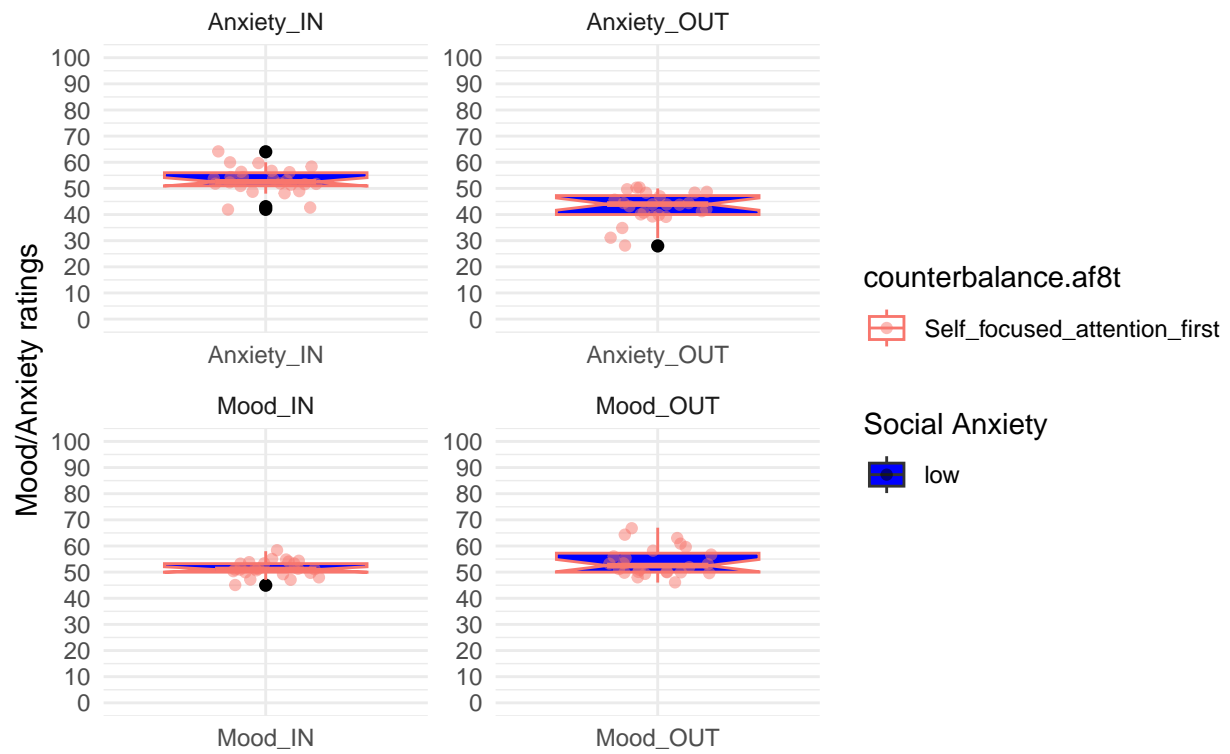
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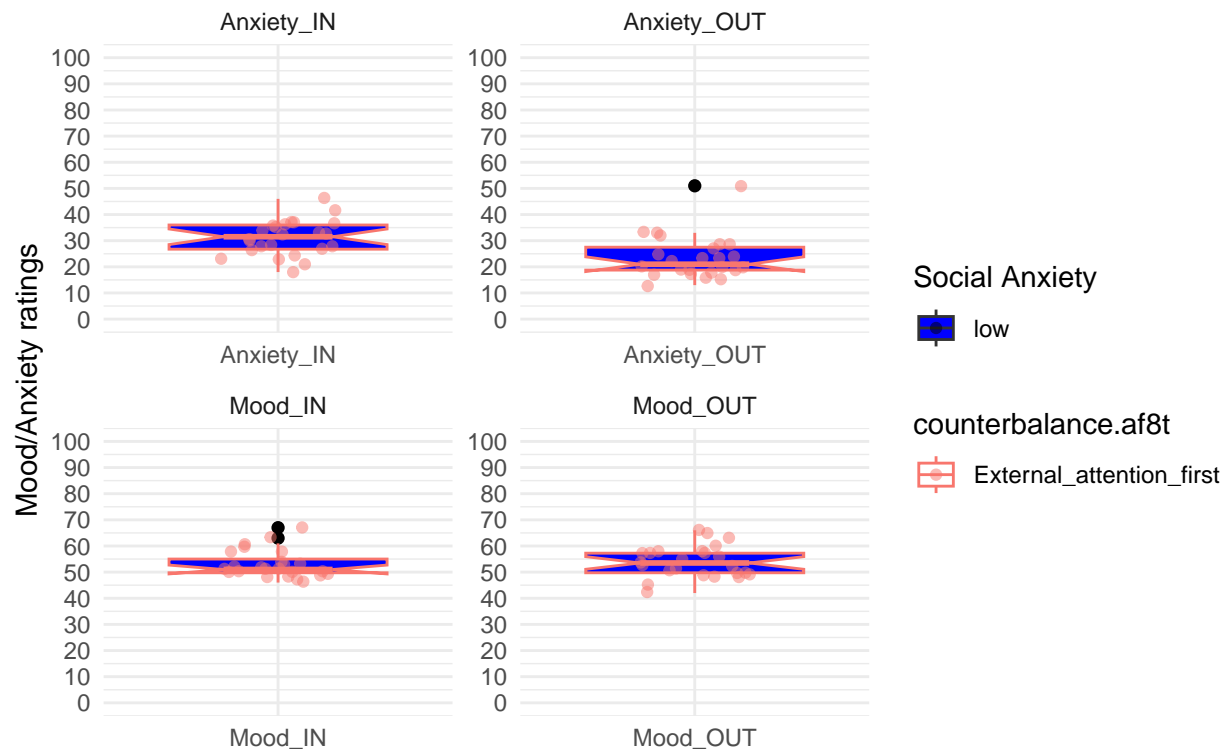
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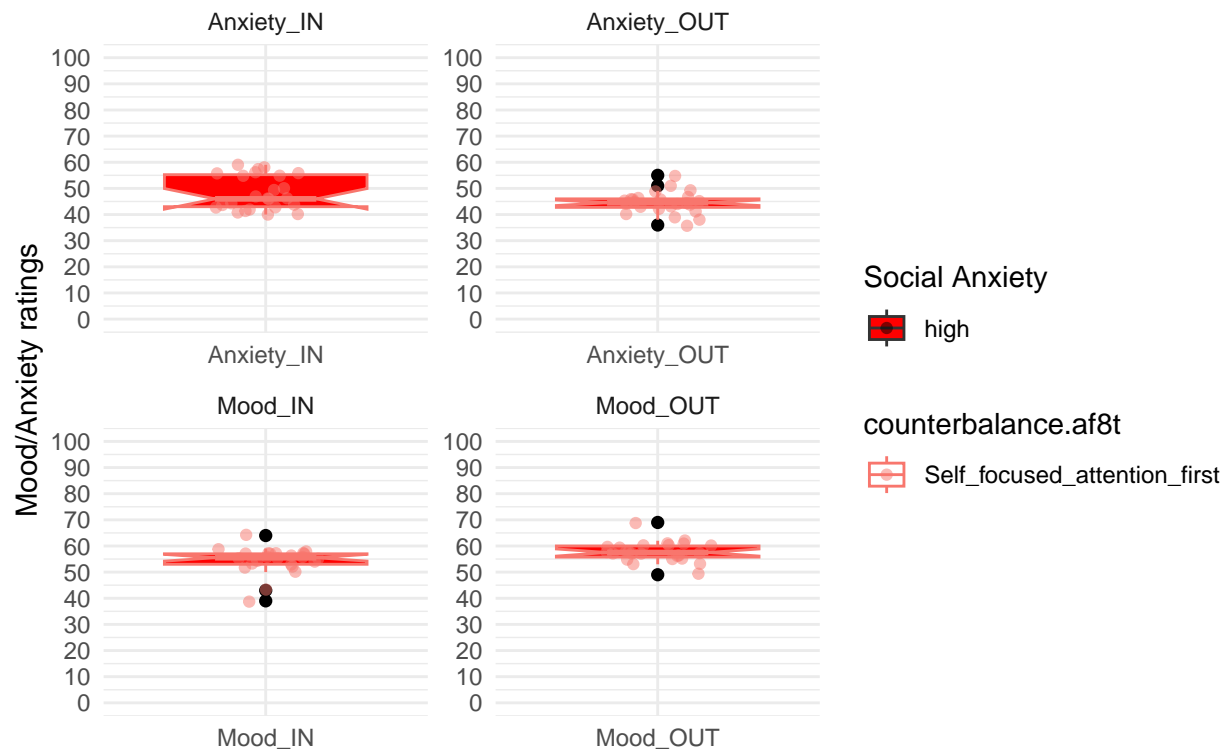
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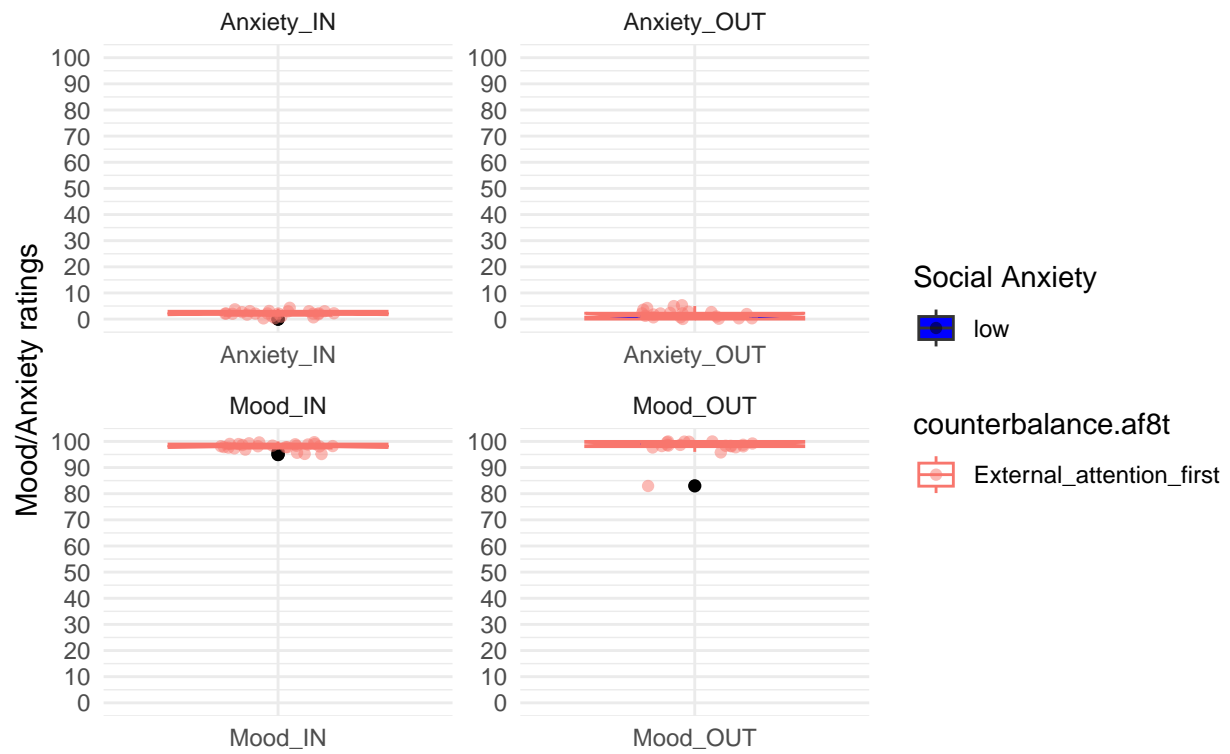
Anxiety and Mood ratings for subject: SUPPRF37742



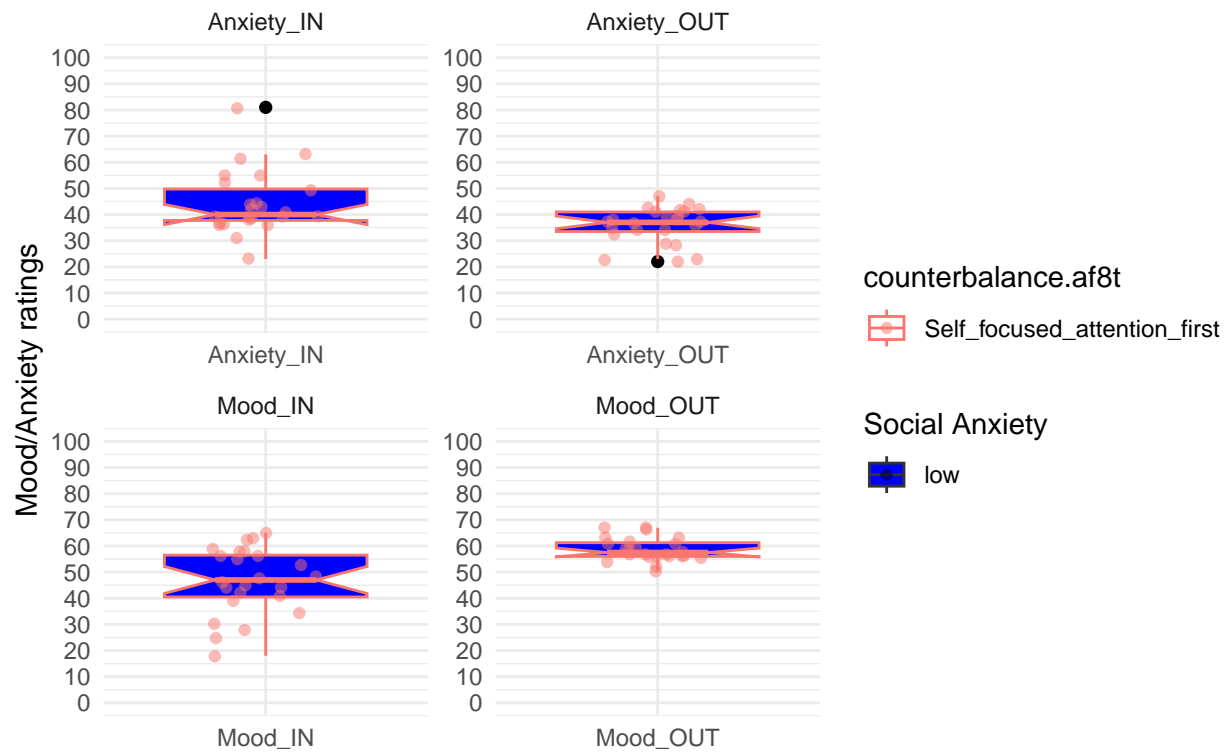
Anxiety and Mood ratings for subject: SUPPRF40441



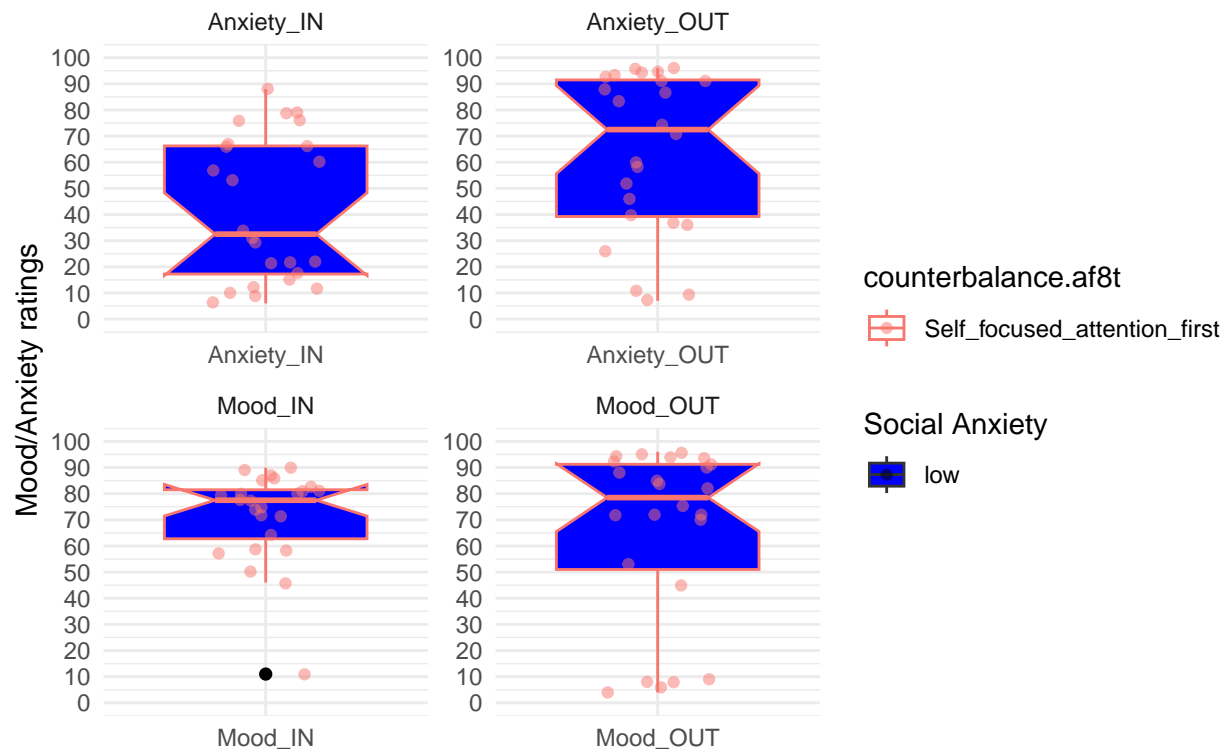
Anxiety and Mood ratings for subject: SUPPRF41927



Anxiety and Mood ratings for subject: SUPPRF42239



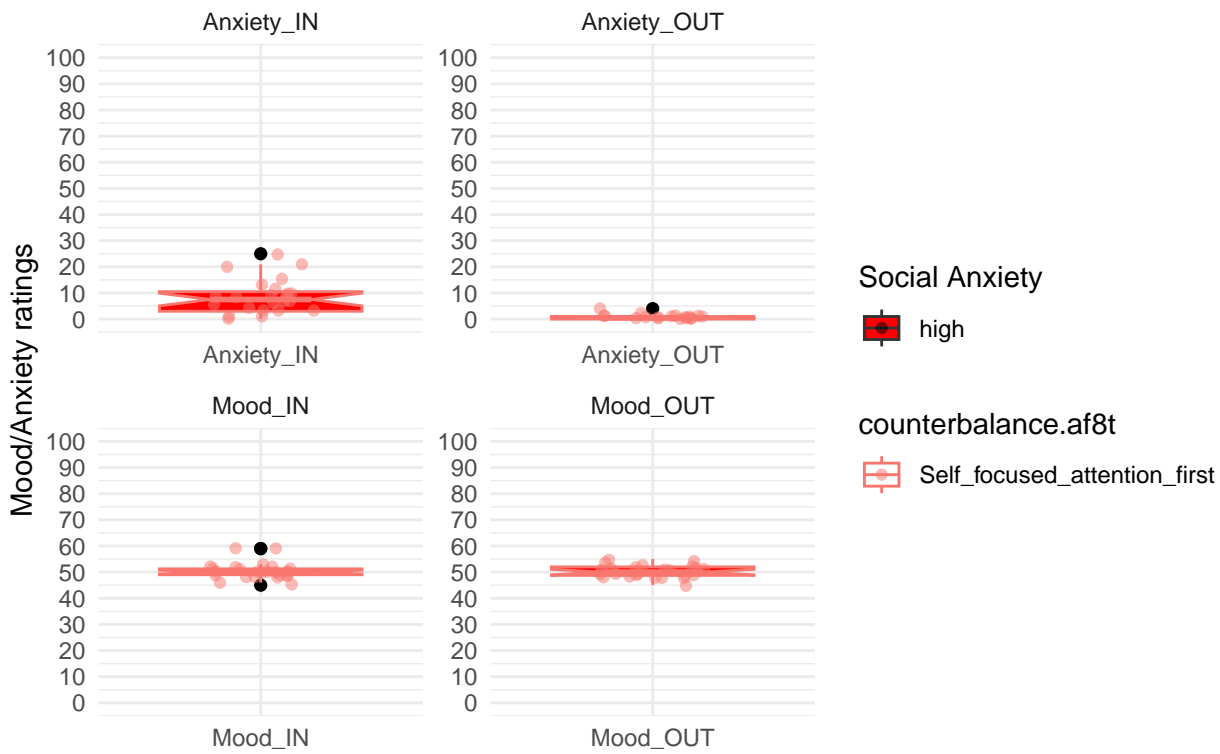
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Anxiety and Mood ratings for subject: SUPPRF49764



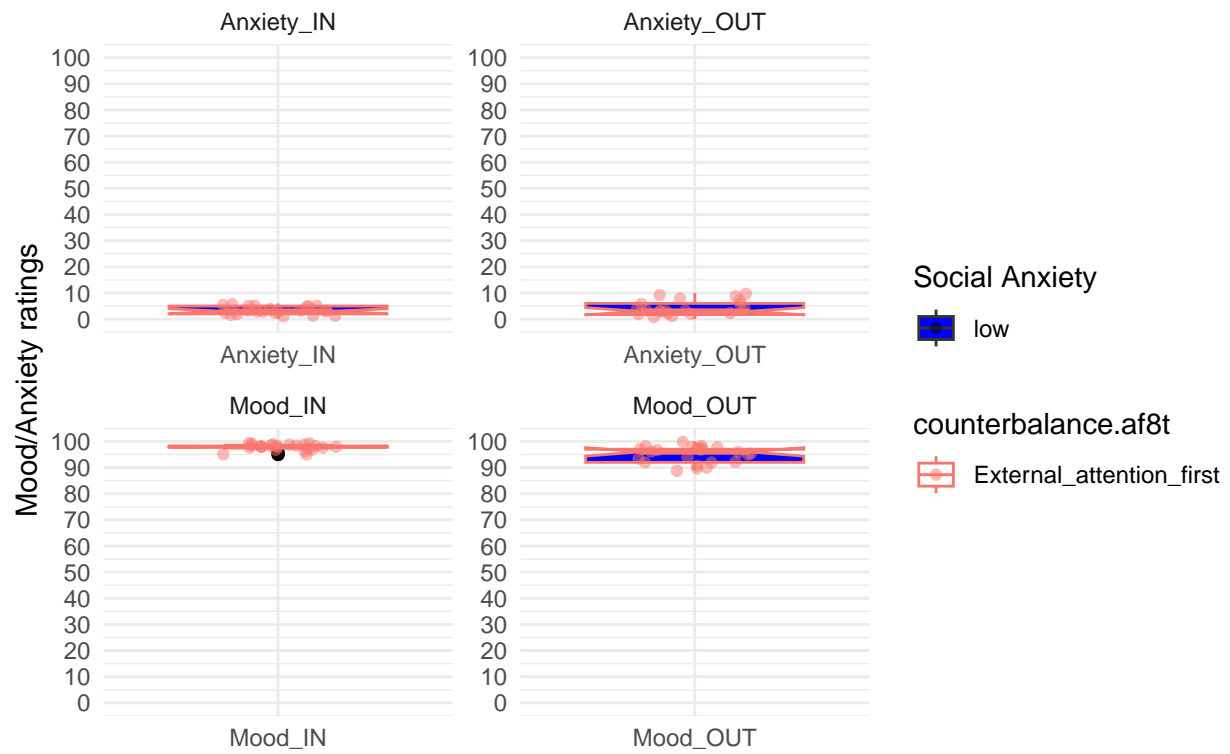
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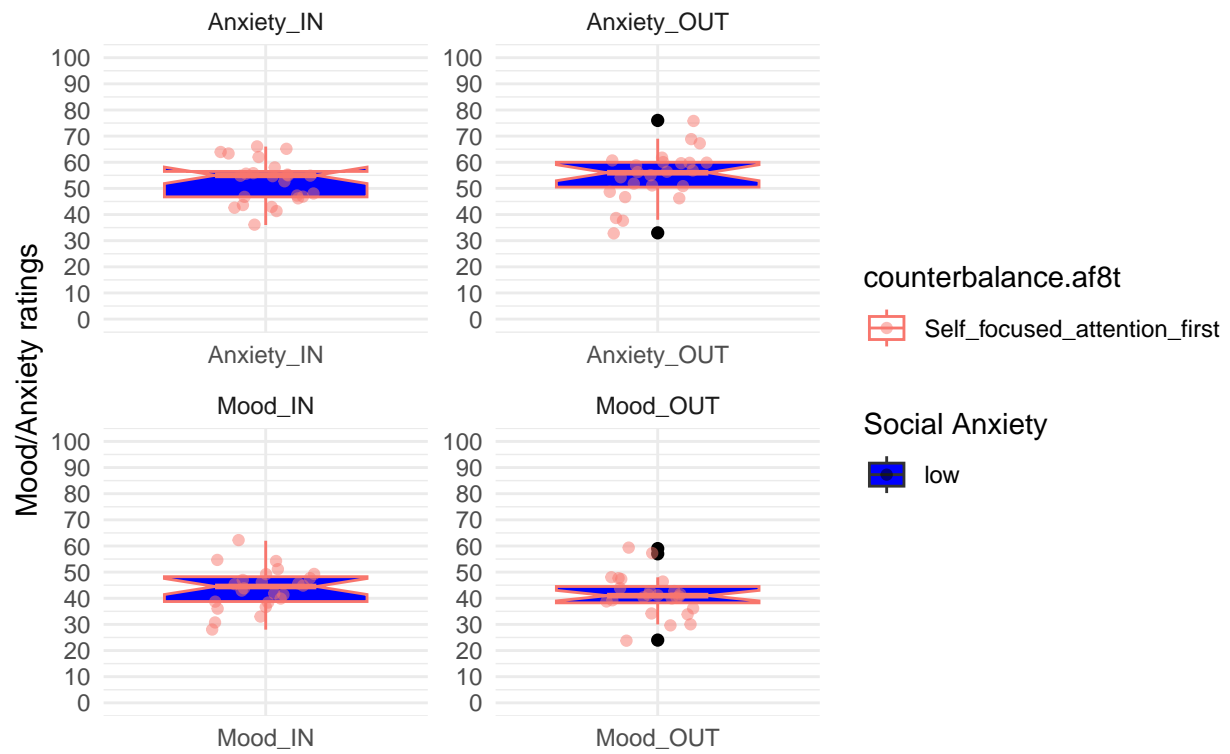
Anxiety and Mood ratings for subject: SUPPRF61954



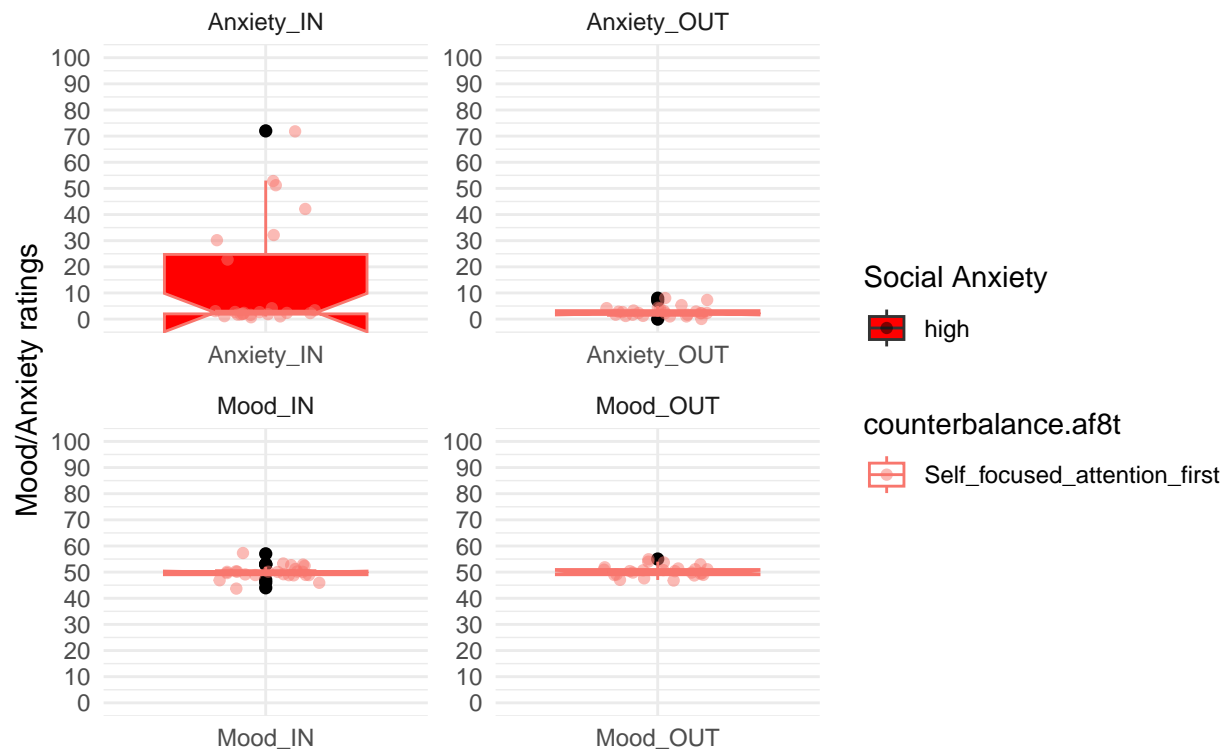
Anxiety and Mood ratings for subject: SUPPRF62274



Anxiety and Mood ratings for subject: SUPPRF62643



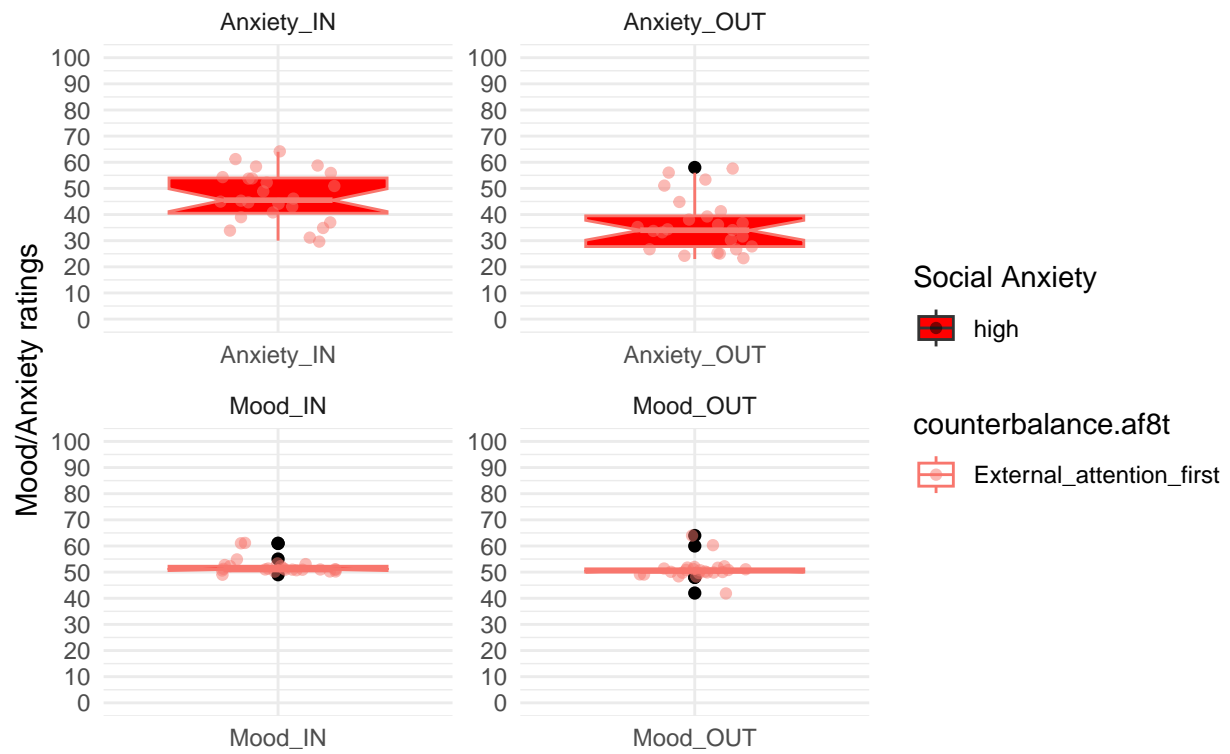
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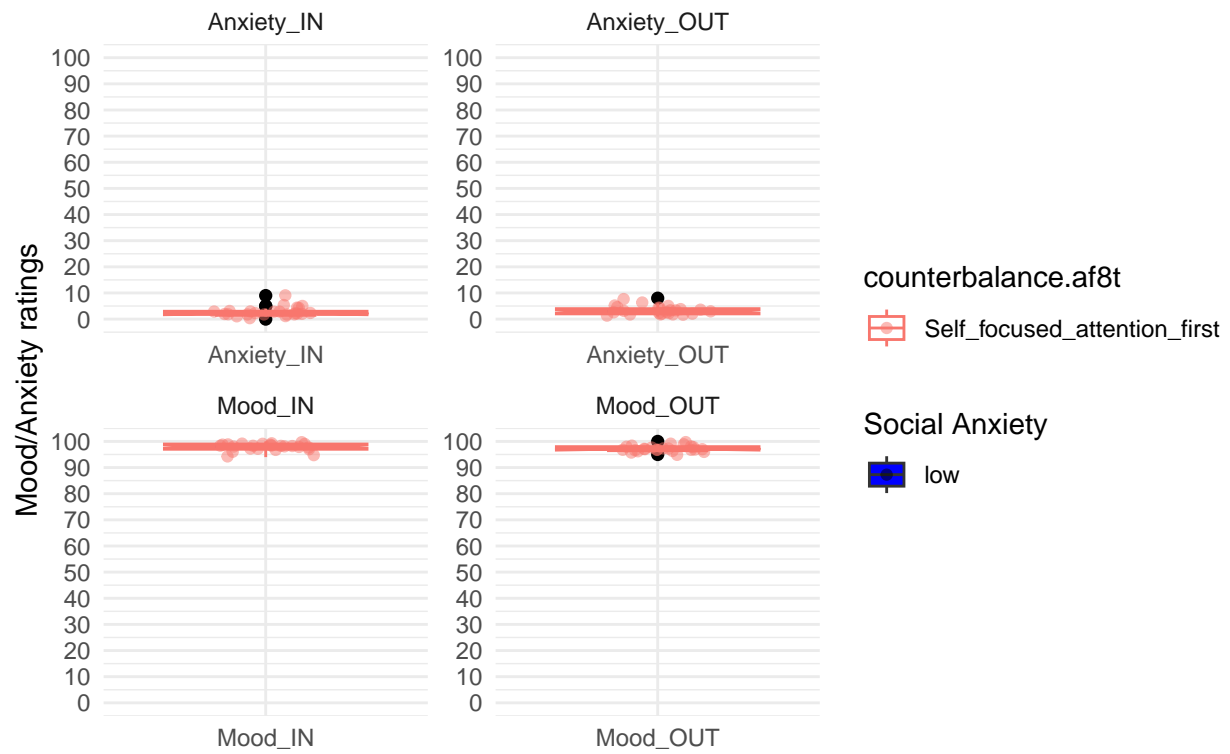
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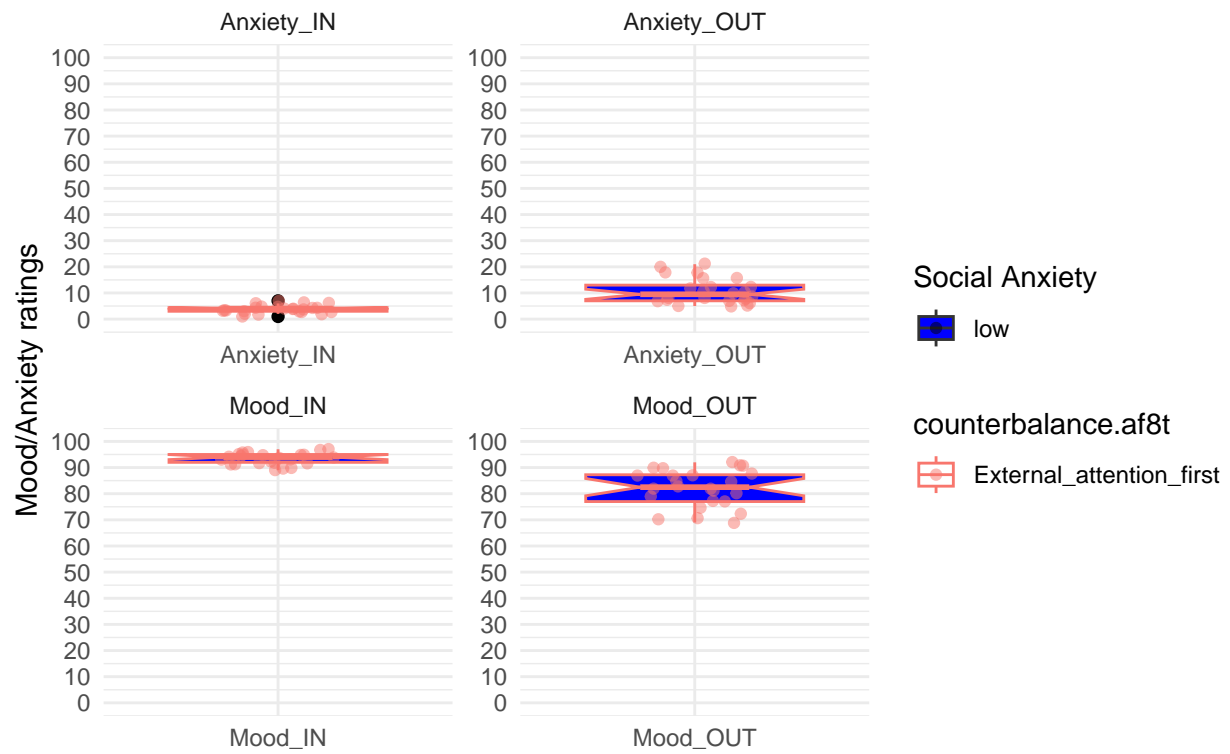
Anxiety and Mood ratings for subject: SUPPRF67062



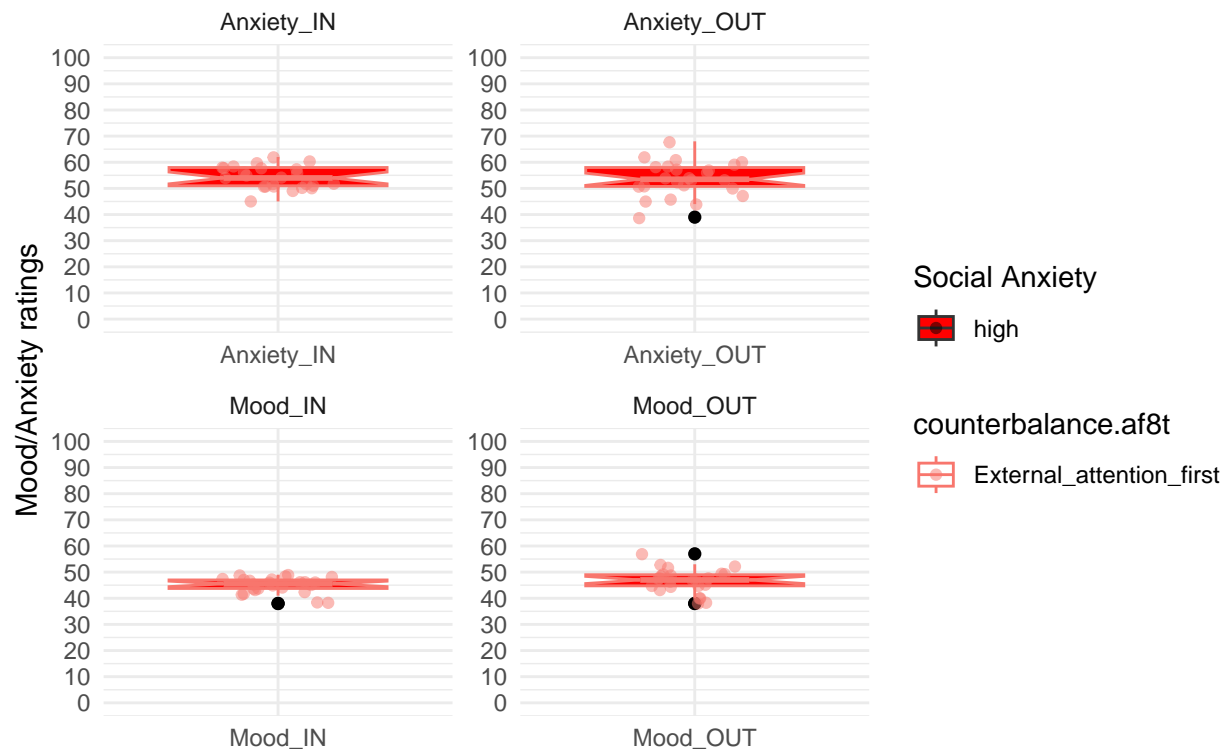
Anxiety and Mood ratings for subject: SUPPRF70678



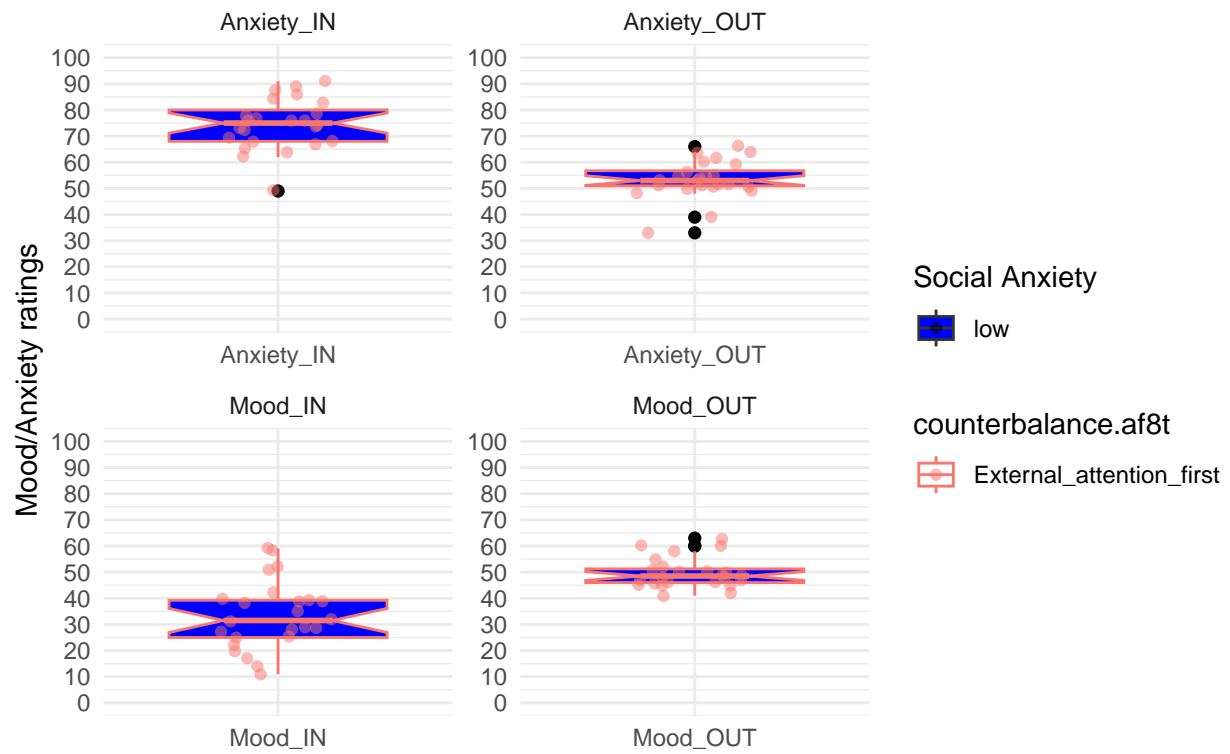
Anxiety and Mood ratings for subject: SUPPRF70931



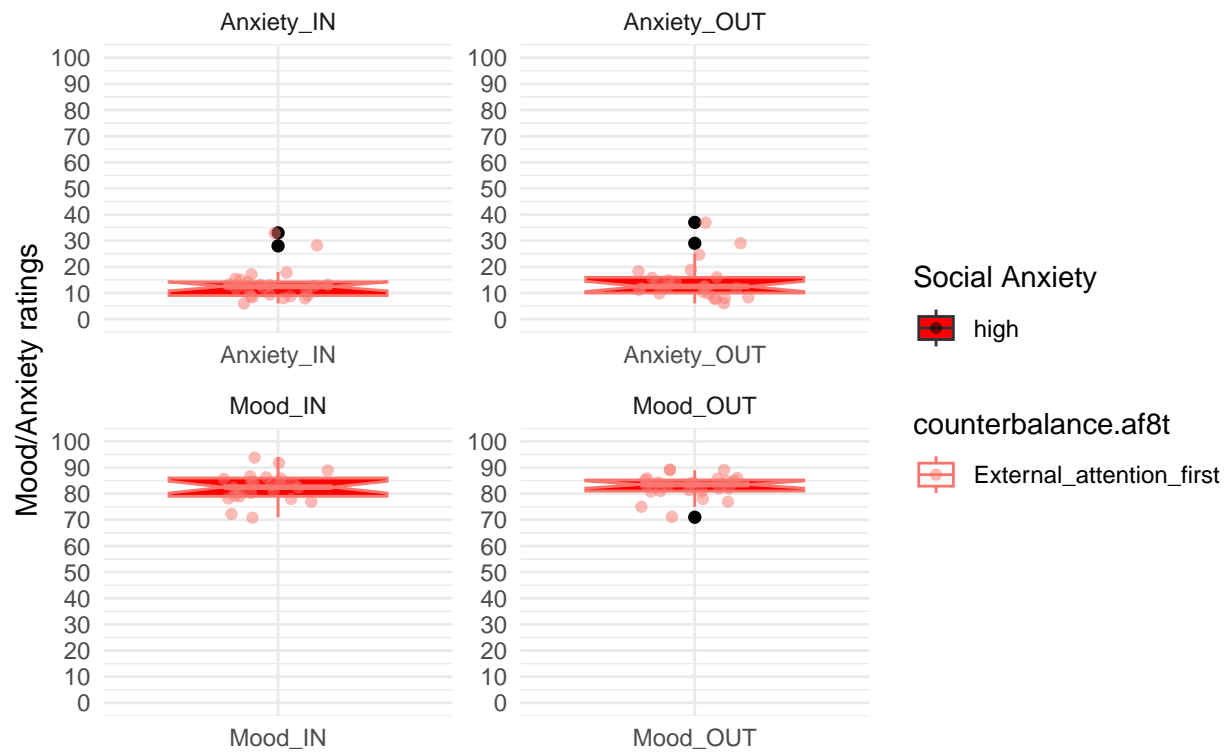
Anxiety and Mood ratings for subject: SUPPRF71127



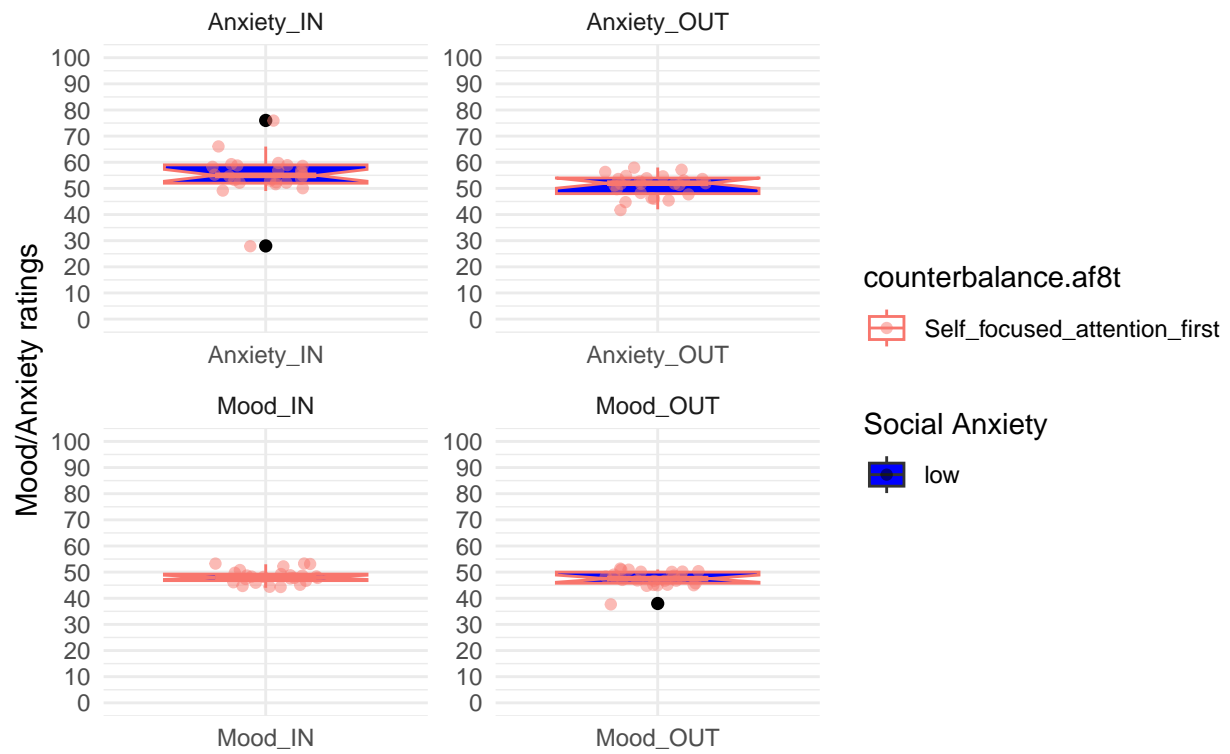
Anxiety and Mood ratings for subject: SUPPRF71393



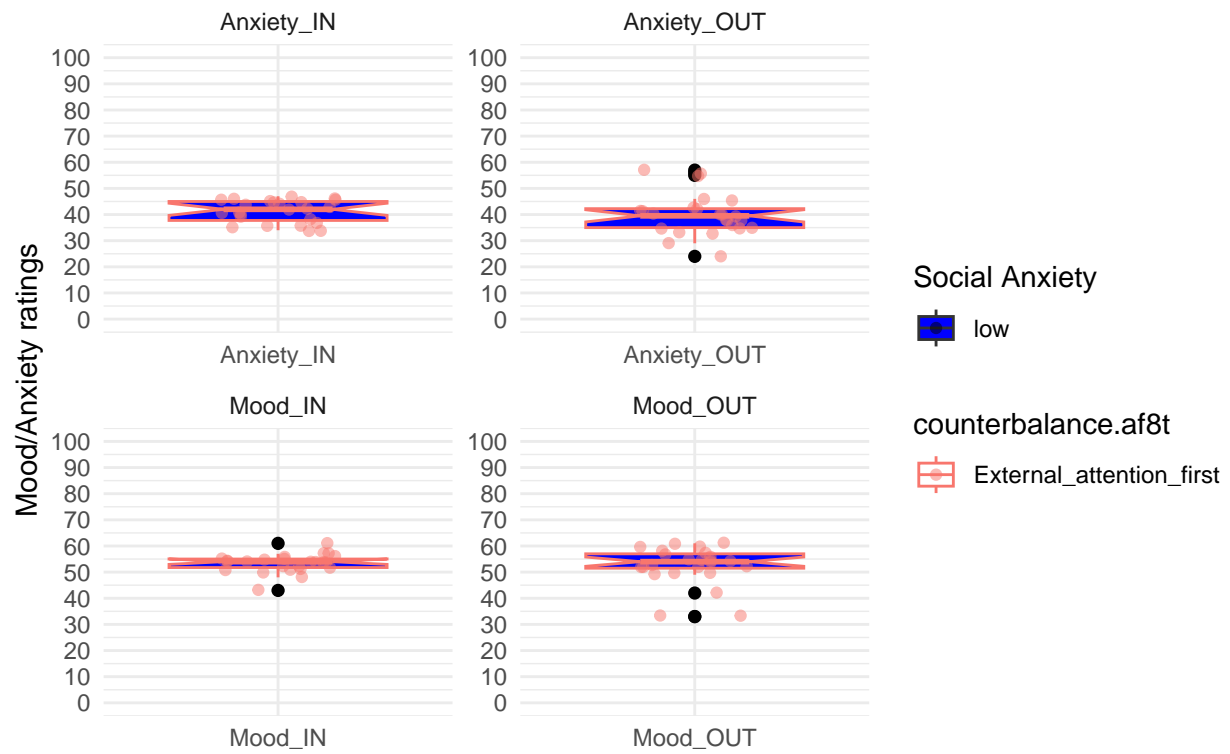
Anxiety and Mood ratings for subject: SUPPRF72971



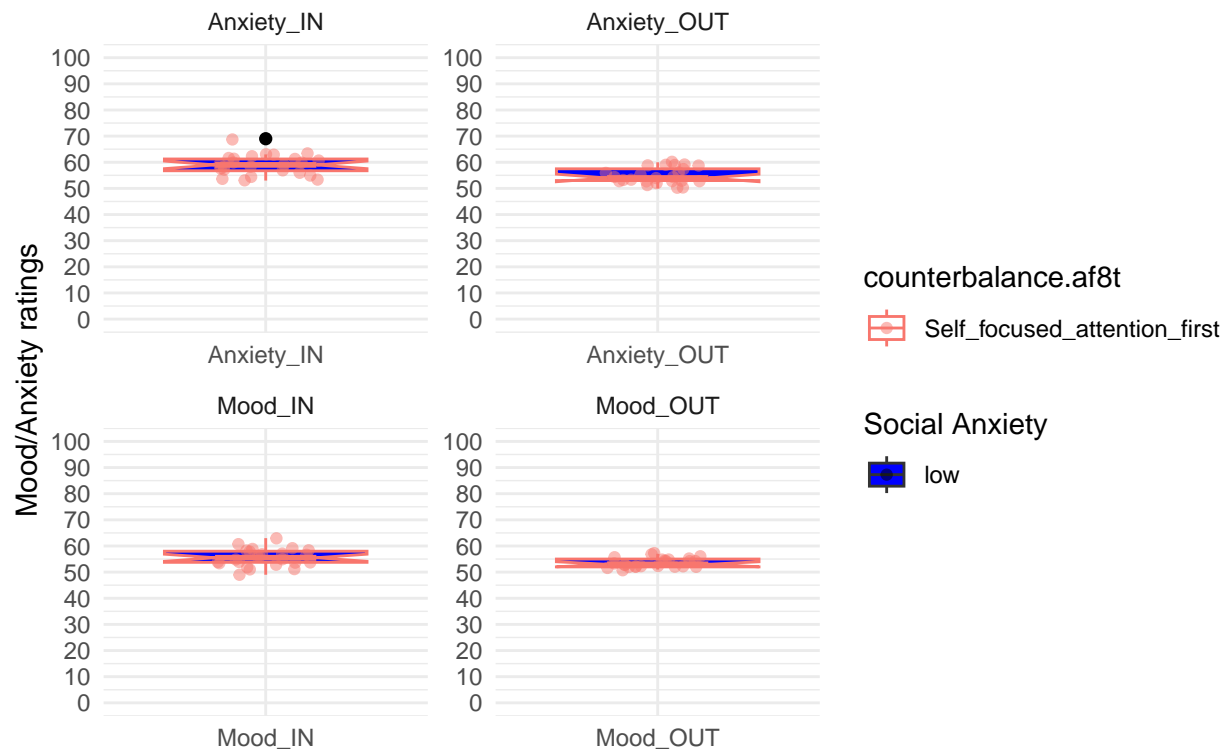
Anxiety and Mood ratings for subject: SUPPRF73458



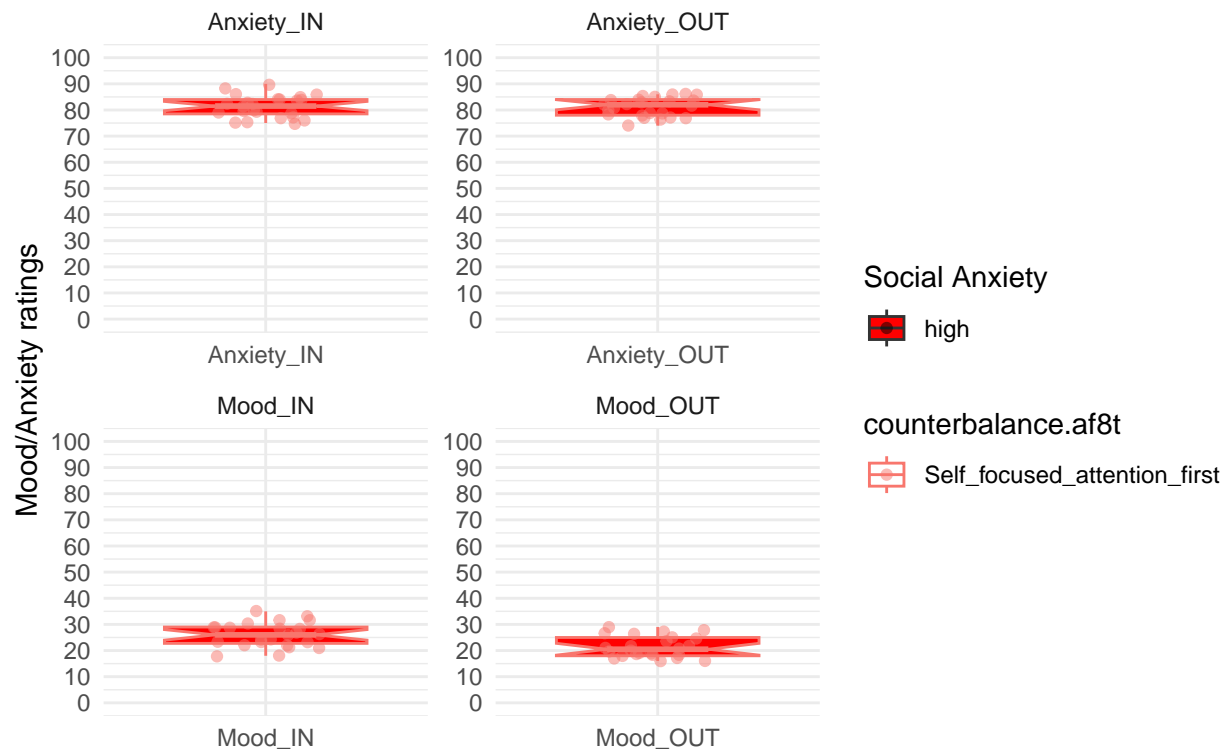
Anxiety and Mood ratings for subject: SUPPRF76142



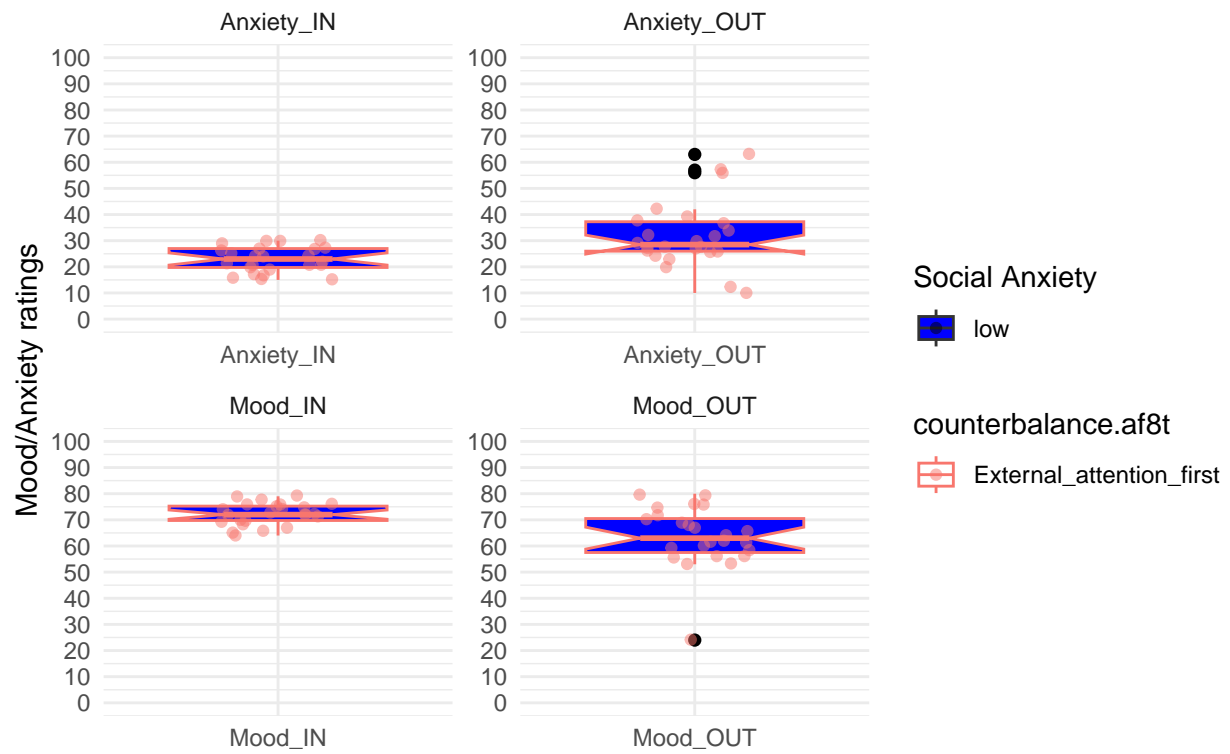
Anxiety and Mood ratings for subject: SUPPRF78779



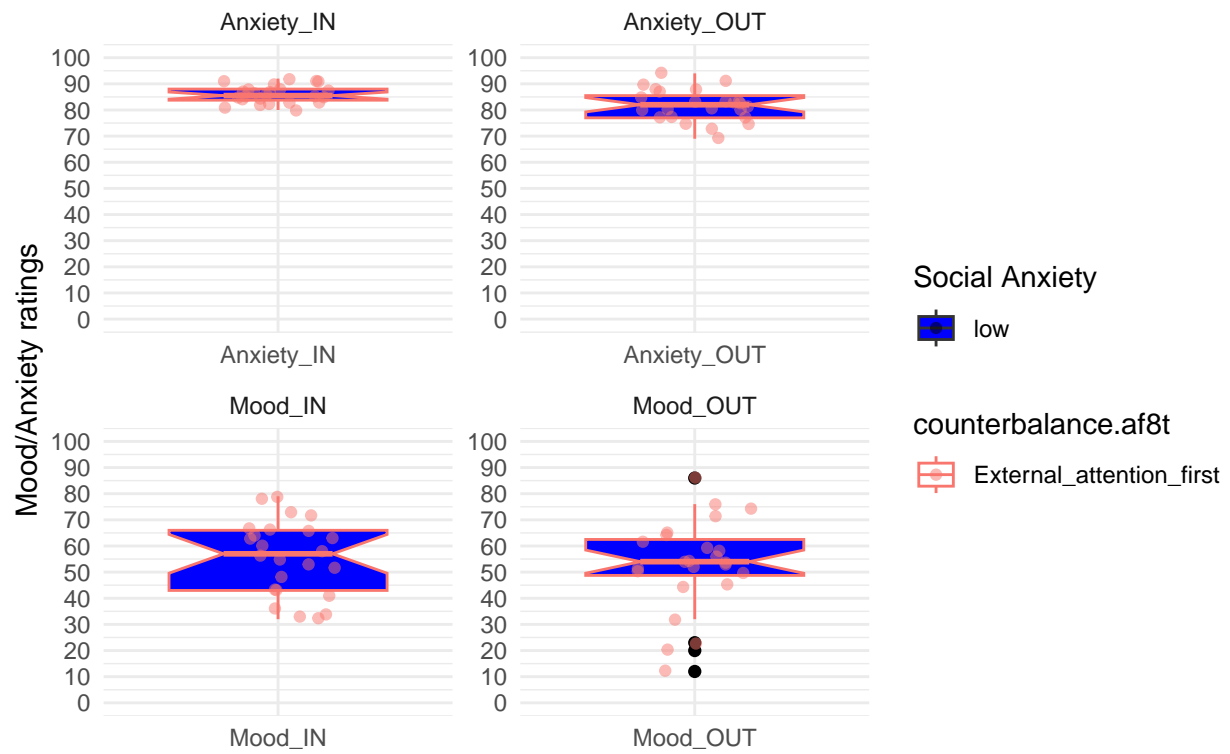
Anxiety and Mood ratings for subject: SUPPRF79308



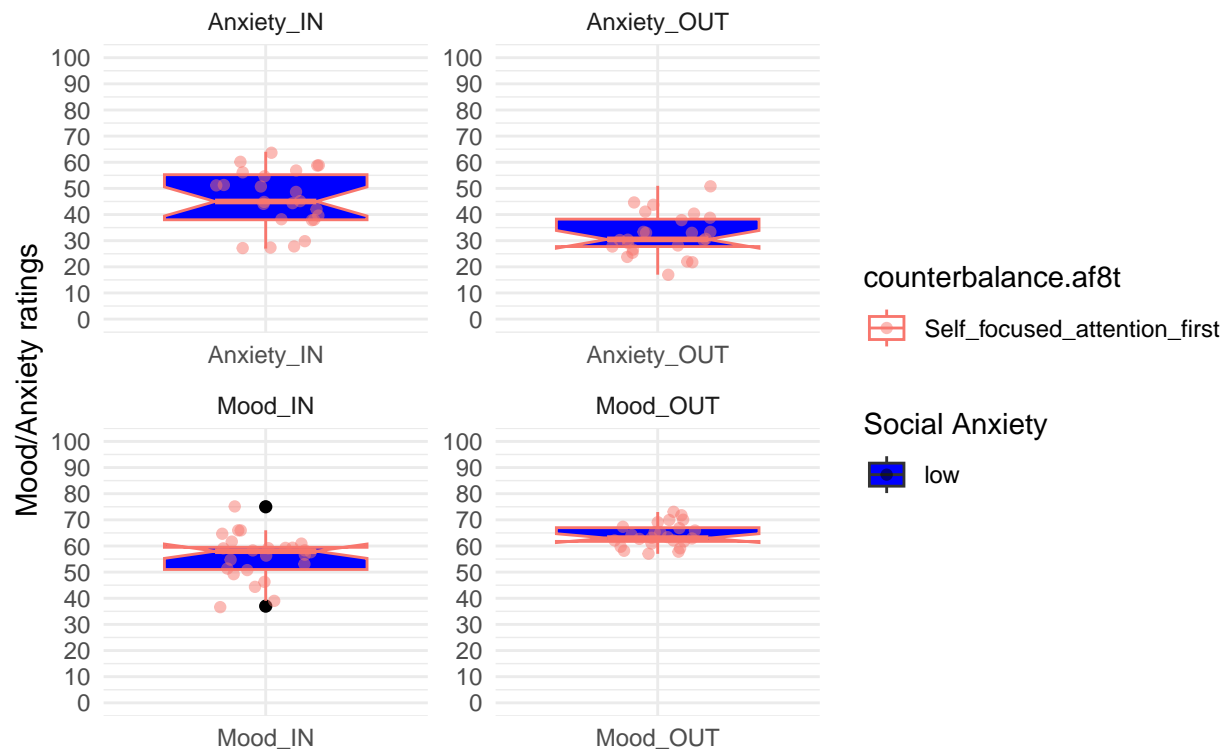
Anxiety and Mood ratings for subject: SUPPRF80125



Anxiety and Mood ratings for subject: SUPPRF85201



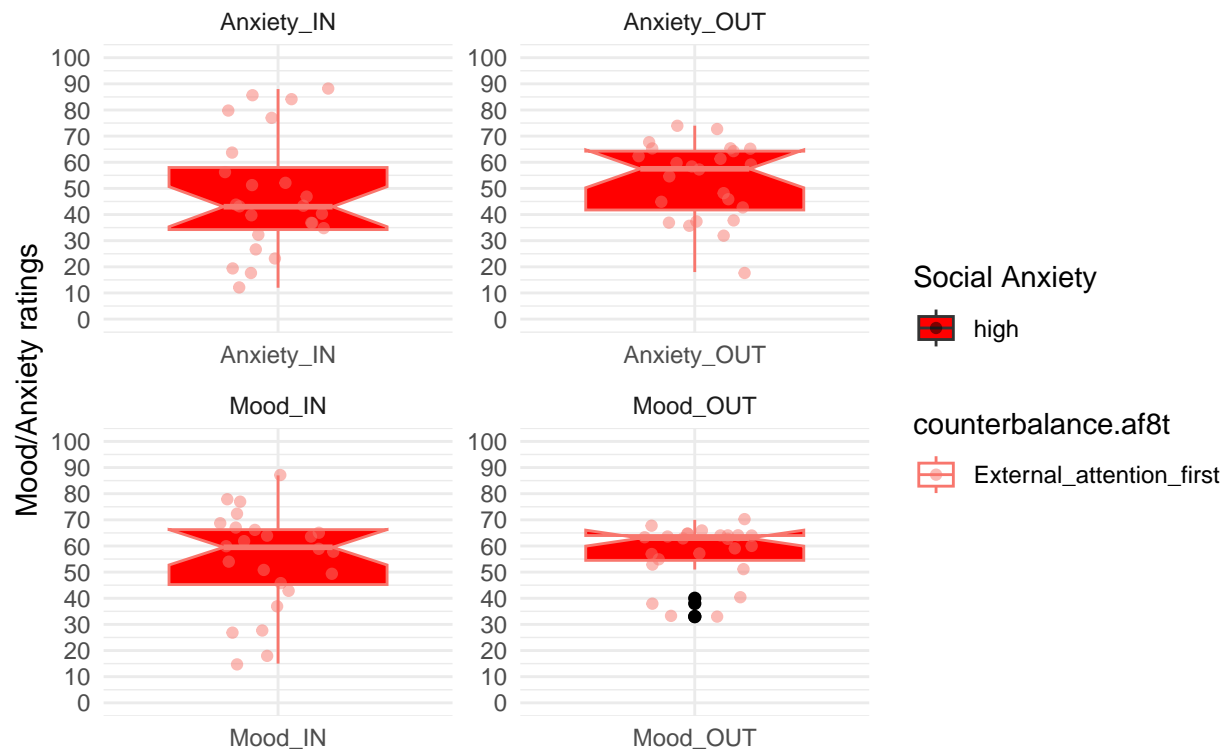
Anxiety and Mood ratings for subject: SUPPRF85554



Anxiety and Mood ratings for subject: SUPPRF87722



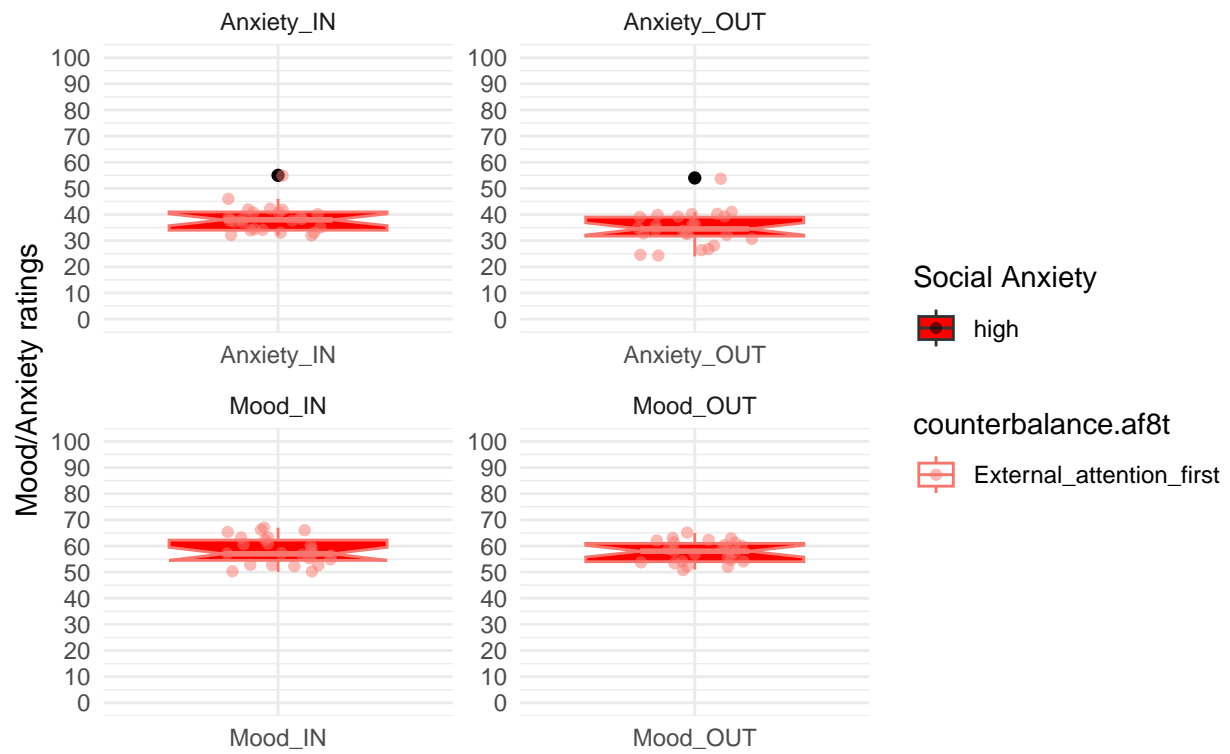
Anxiety and Mood ratings for subject: SUPPRF89484



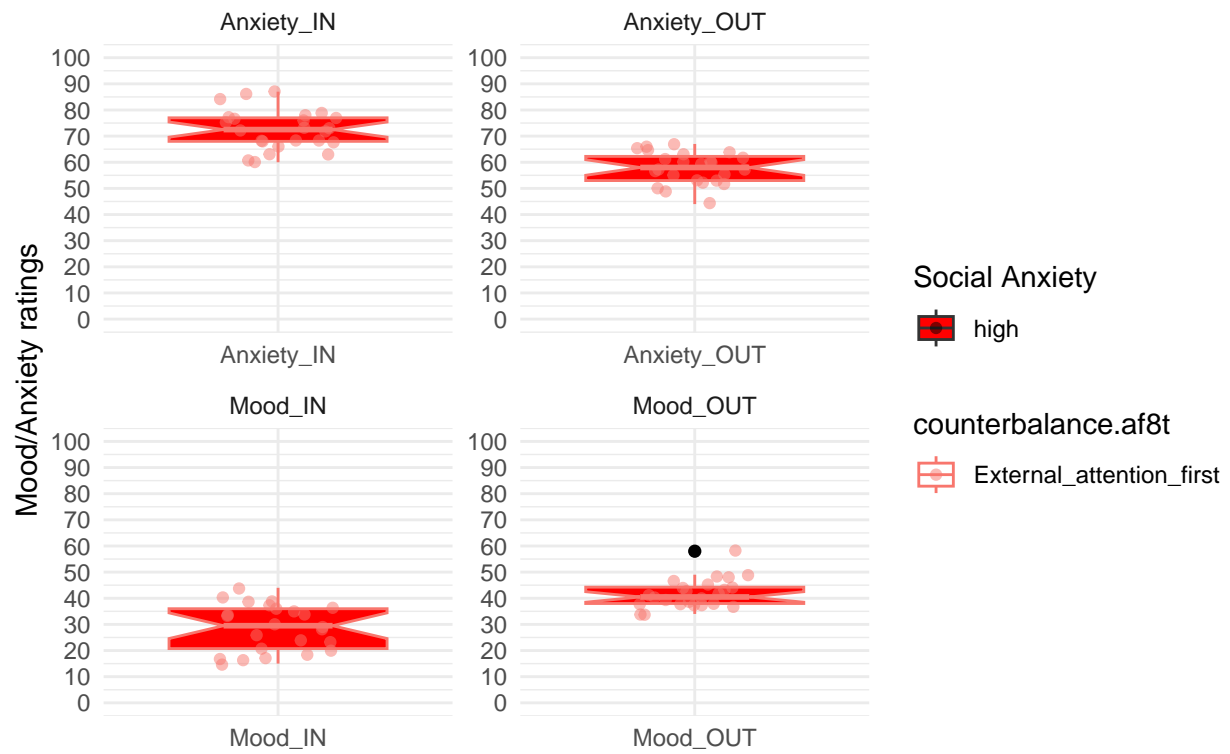
Anxiety and Mood ratings for subject: SUPPRF92652



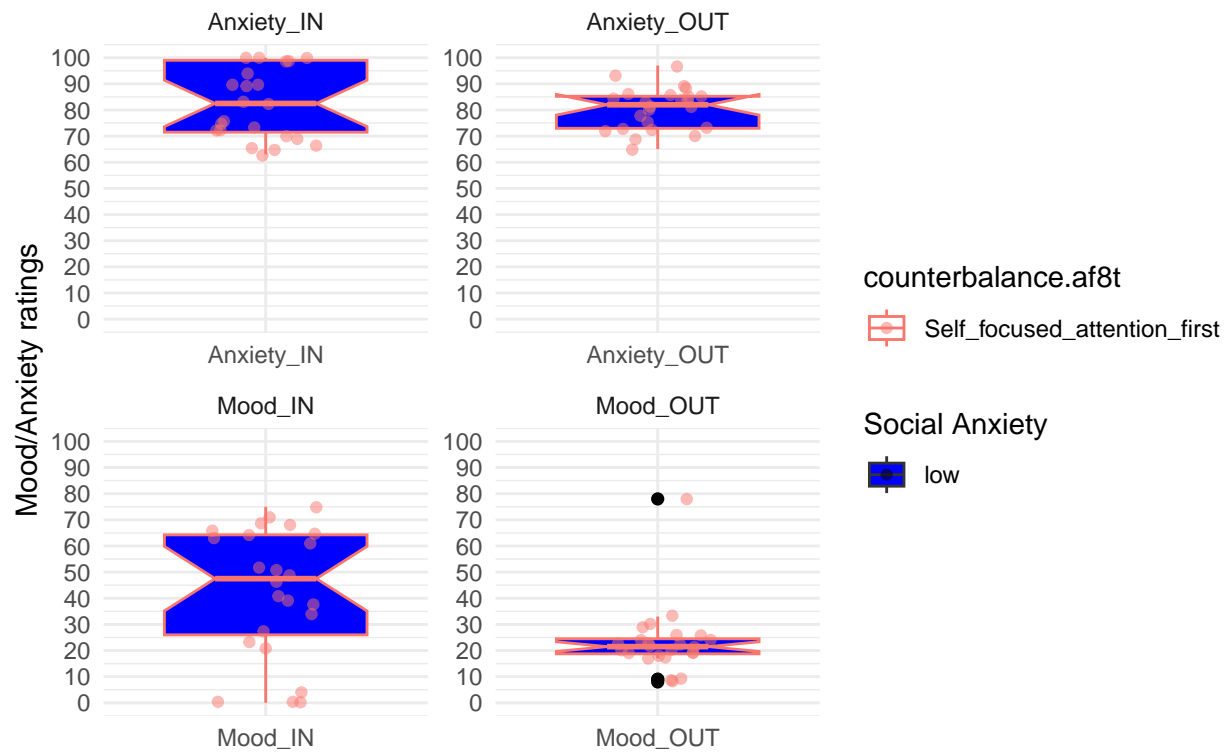
Anxiety and Mood ratings for subject: SUPPRF92791



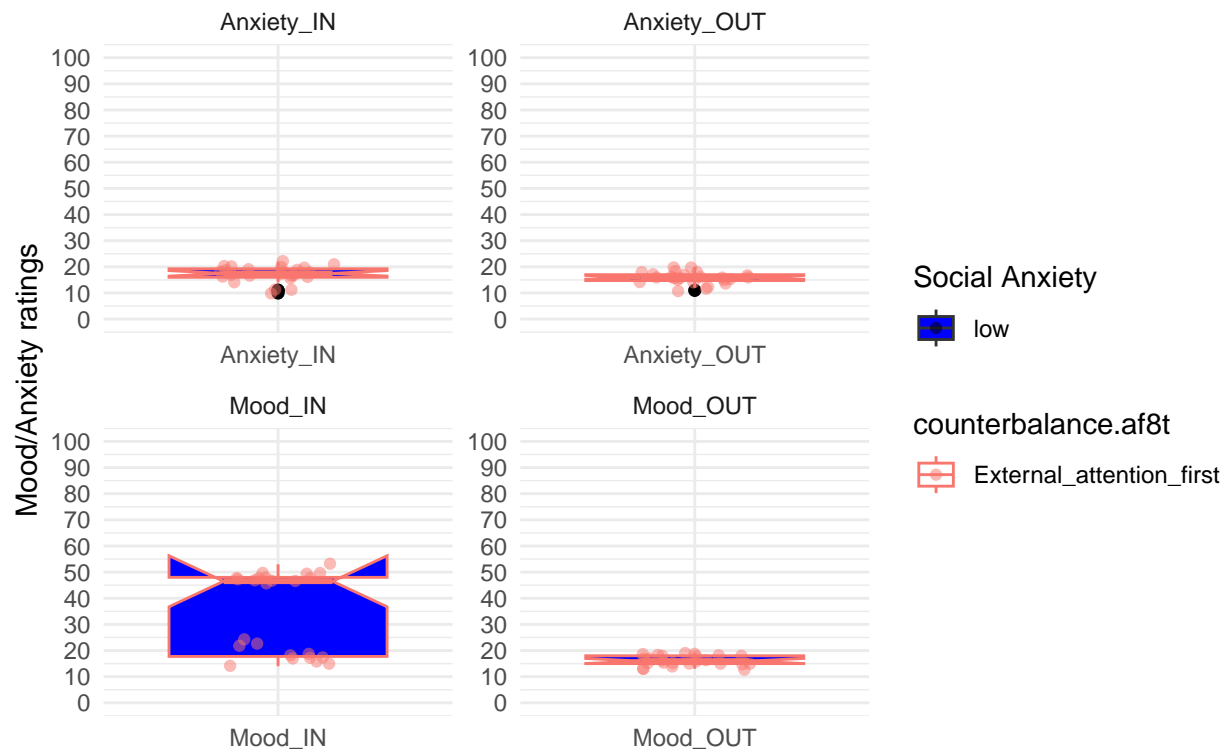
Anxiety and Mood ratings for subject: SUPPRF93631



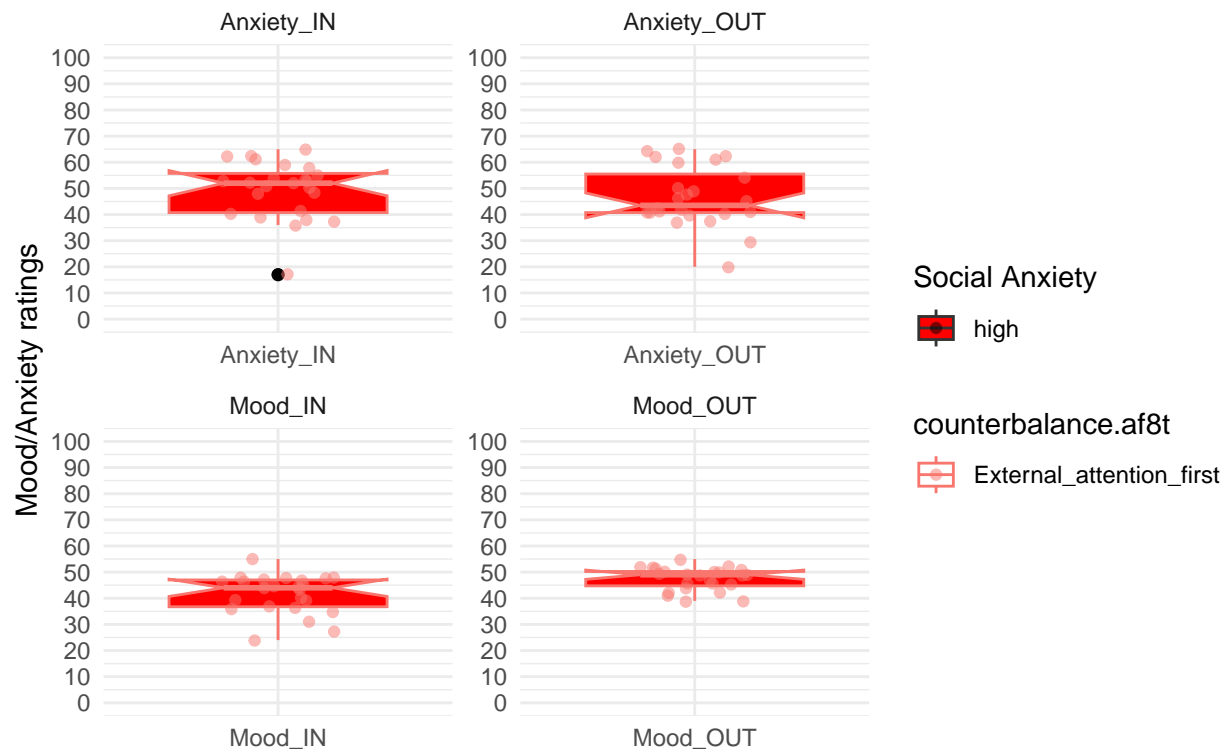
Anxiety and Mood ratings for subject: SUPPRF96230



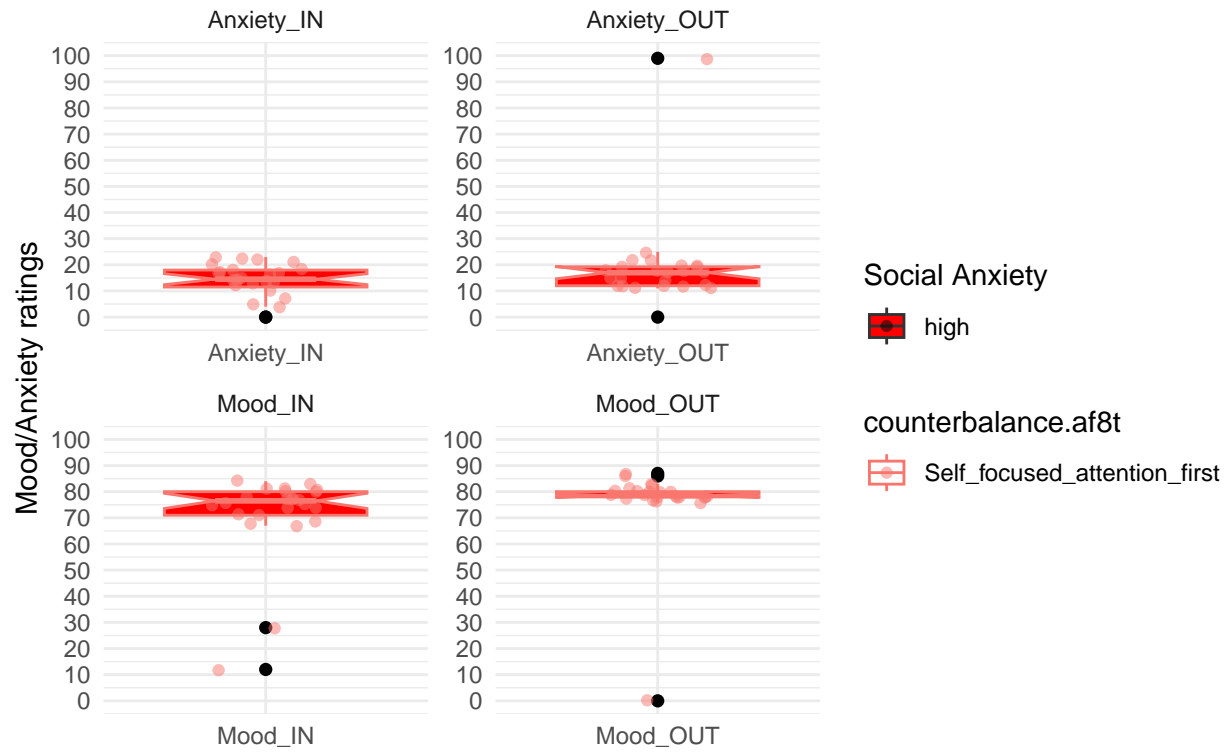
Anxiety and Mood ratings for subject: SUPPRF96766



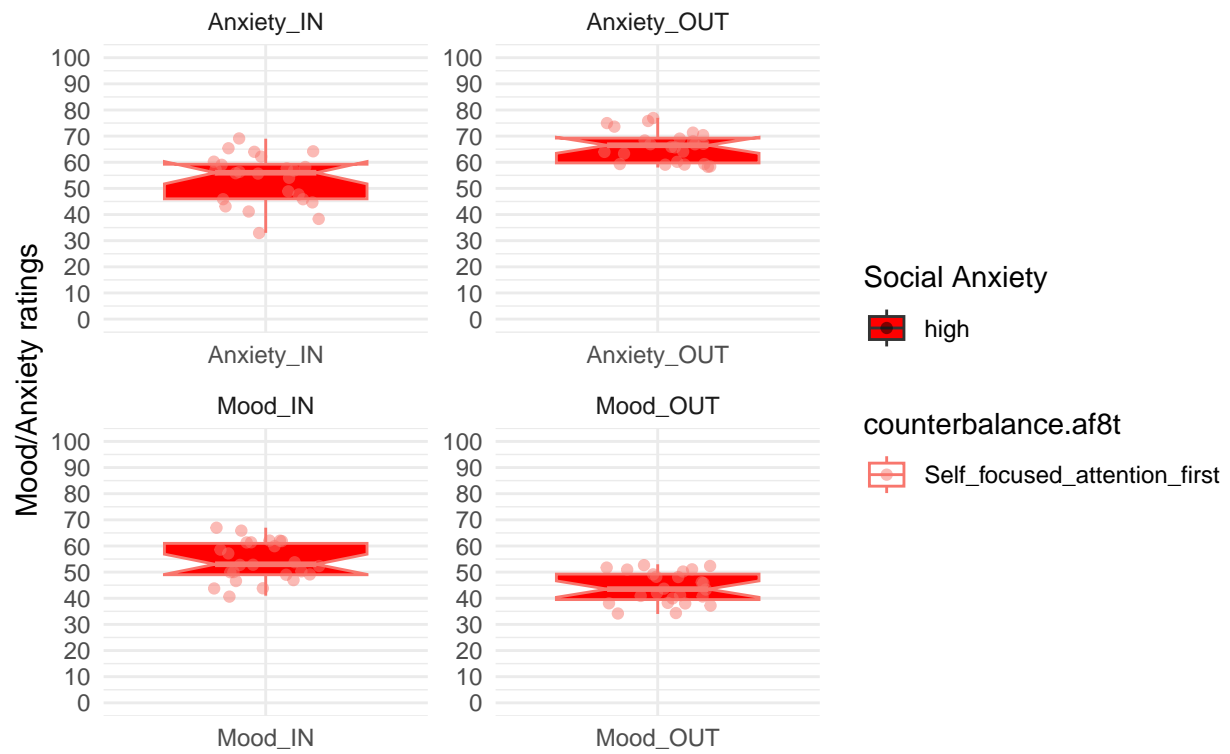
Anxiety and Mood ratings for subject: SUPPRF97977



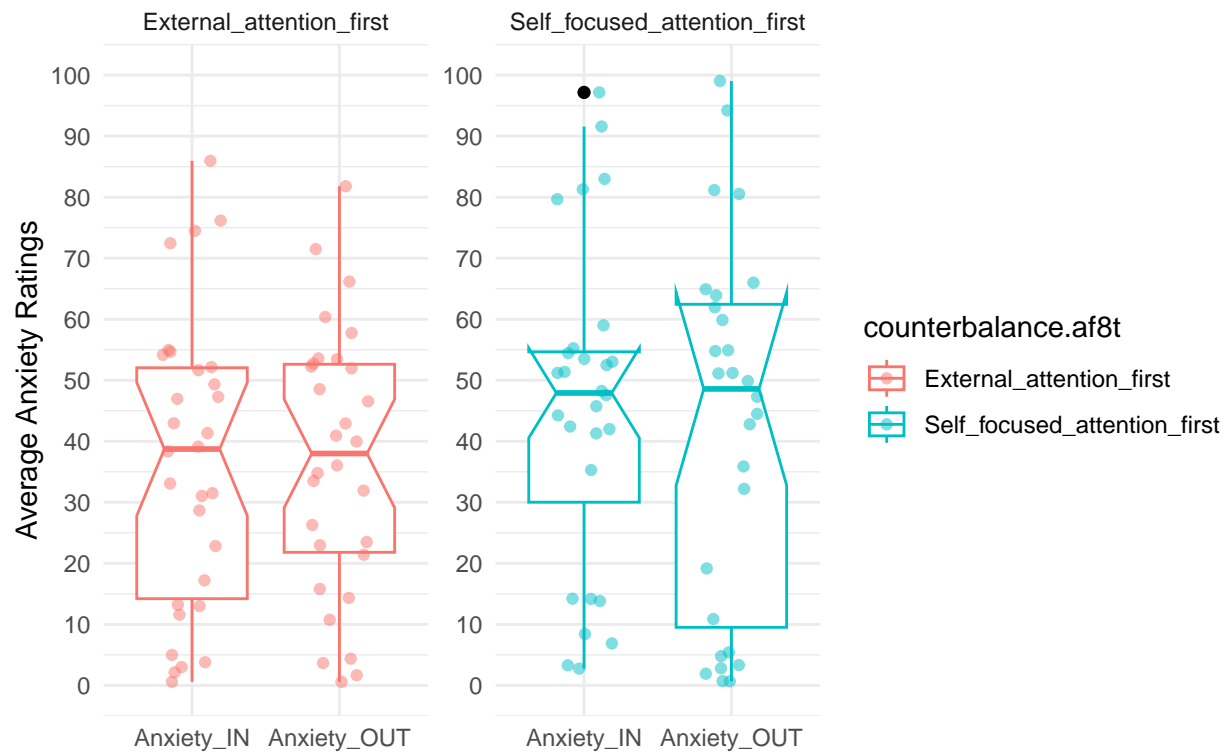
Anxiety and Mood ratings for subject: SUPPRF98911



Anxiety and Mood ratings for subject: SUPPRF99862

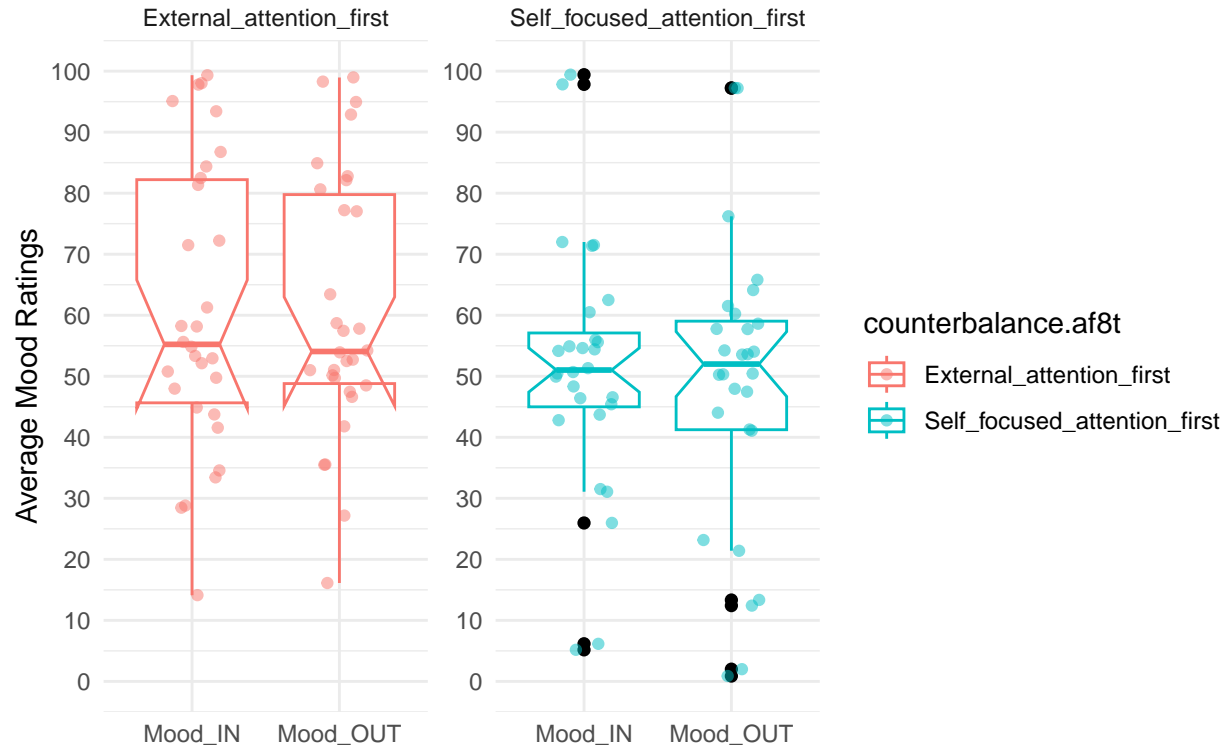


Average anxiety ratings in IN (internal) & OUT (external) attention condition



```
## # A tibble: 4 x 4
## # Groups:   counterbalance.af8t [2]
##   counterbalance.af8t    Display    mean_response sd_response
##   <chr>                <chr>          <dbl>         <dbl>
## 1 External_attention_first Anxiety_IN      36.6          24.0
## 2 External_attention_first Anxiety_OUT      36.7          21.8
## 3 Self_focused_attention_first Anxiety_IN      45.5          26.4
## 4 Self_focused_attention_first Anxiety_OUT      42.4          30.0
```

Average mood ratings in IN (internal) & OUT (external) attention conditions

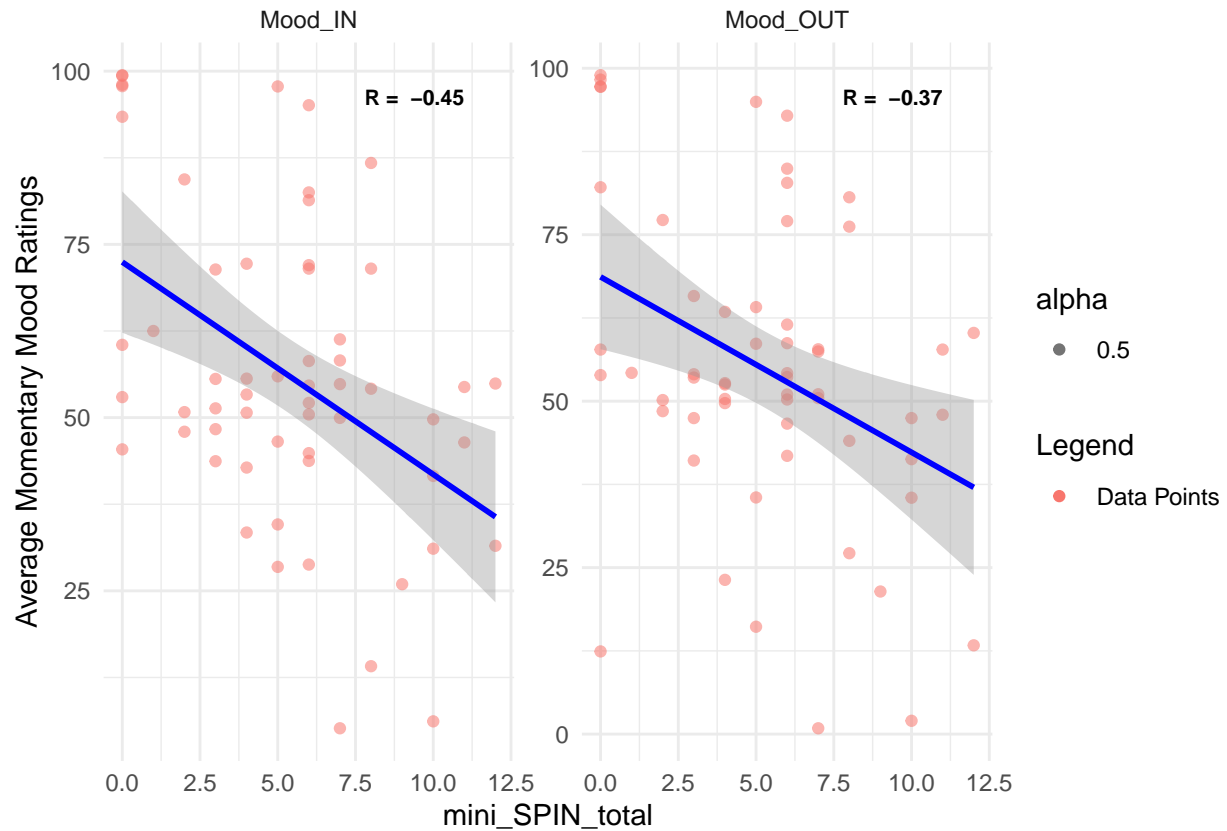


```
## # A tibble: 4 x 4
## # Groups:   counterbalance.af8t [2]
##   counterbalance.af8t    Display mean_response sd_response
##   <chr>                <chr>         <dbl>         <dbl>
## 1 External_attention_first Mood_IN           60.9           23.6
## 2 External_attention_first Mood_OUT           60.7           21.6
## 3 Self_focused_attention_first Mood_IN           51.4           20.9
## 4 Self_focused_attention_first Mood_OUT           48.5           23.8
```

Relationship between mini_SPIN and momentary mood ratings

The plot below show the relationship between (average) mood ratings on the task and the total mini_SPIN scores.

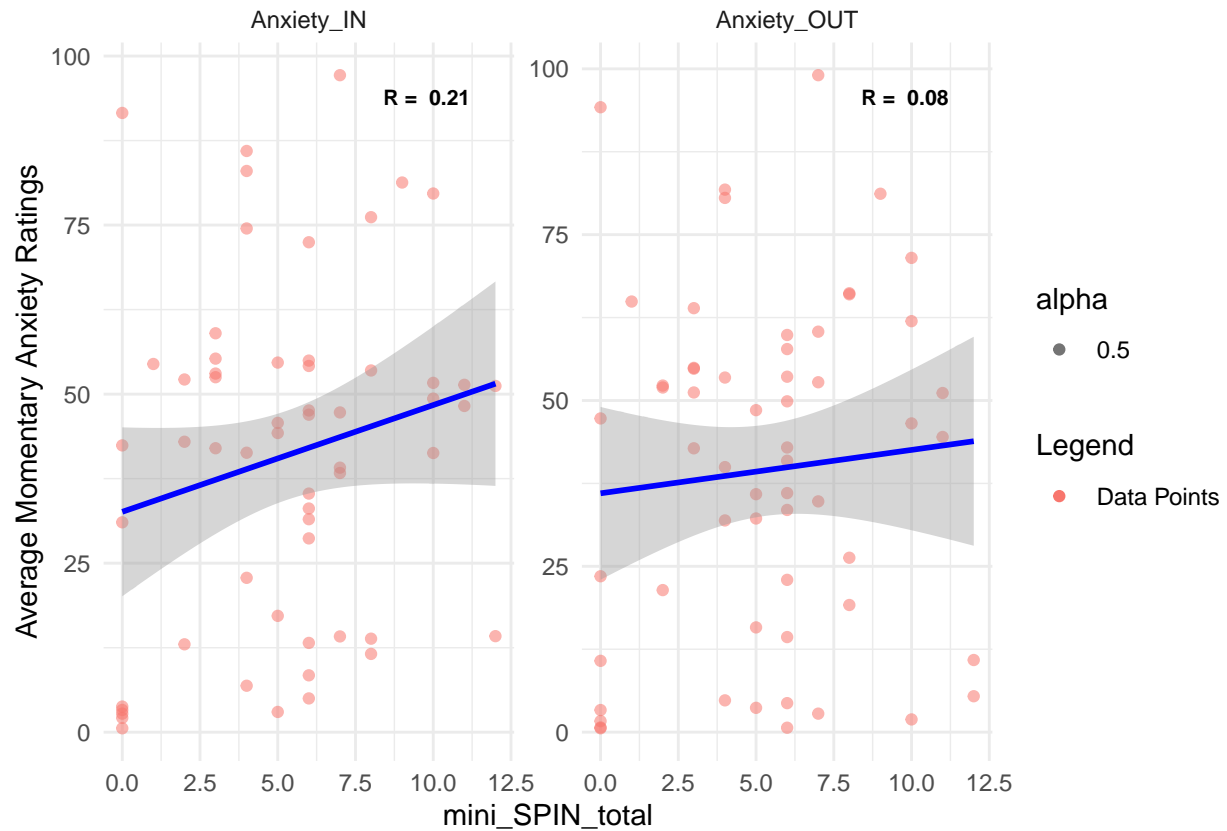
```
## [1] "correlation between mini_SPIN_total and average mood ratings: -0.409460955665047"
```



Relationship between mini_SPIN and momentary mood ratings

The plot below show the relationship between (average) anxiety ratings on the task and the total mini_SPIN scores.

```
## [1] "correlation between mini_SPIN_total and average anxiety ratings: 0.144019737741781"
```



Why is the data noisy?

We can look at the following:

- 1) is it due to social anxiety levels (less people with high social anxiety in the current pilot)?
- 2) is it due to order effects (we had externally focused attention first in the previous pilot)?
- 3) could it be due to just having less reliable participants (we can compare the externally focused attention first, with the previous pilot as the tasks would be exactly the same)?

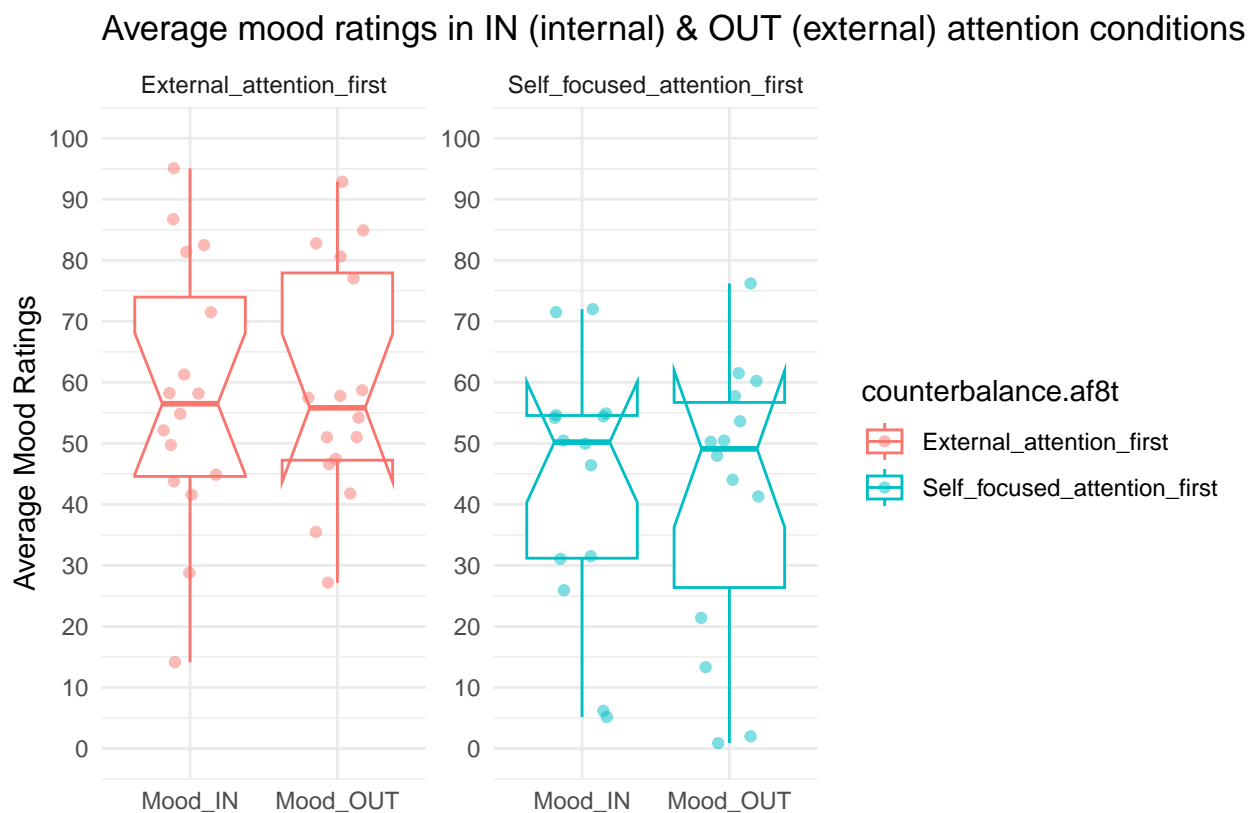
Separating people with high social anxiety

This would tell us whether the more “noisy” data we had/flat lines, were due to the fact that we have fewer people with high social anxiety in the second Attention pilot. The group plots seem similar to before, and scanning visually through individual plots above, it does not seem to be the case. Something that seems to be the case is that mood is slightly lower, and anxiety higher in self-focused attention first order, for both conditions when compared to externally focused first AND with a much larger confidence interval (compare the anxiety plot in green with the red one in the next page).

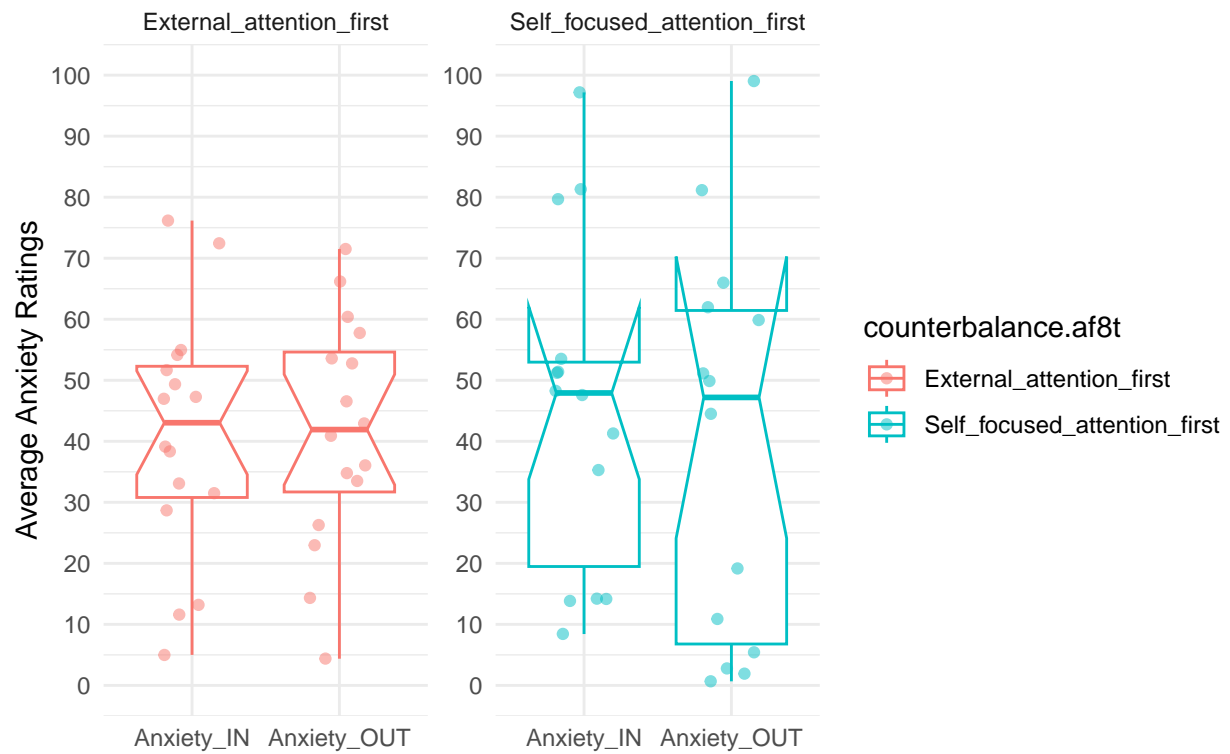
Conclusion:

There seems to be an order effect for both mood and anxiety. It becomes more clear when we only look at people with high social anxiety.

```
## [1] "Number of people with high social anxiety in this section: 30"
```



Average anxiety ratings in IN (internal) & OUT (external) attention condition



Comparing the pilots 1 and 2

In pilot 1, we had many people with high social anxiety (and we only selected those ones here), and the task had the same order as pilot 2 externally focused attention condition first, followed by internally focused attention condition.

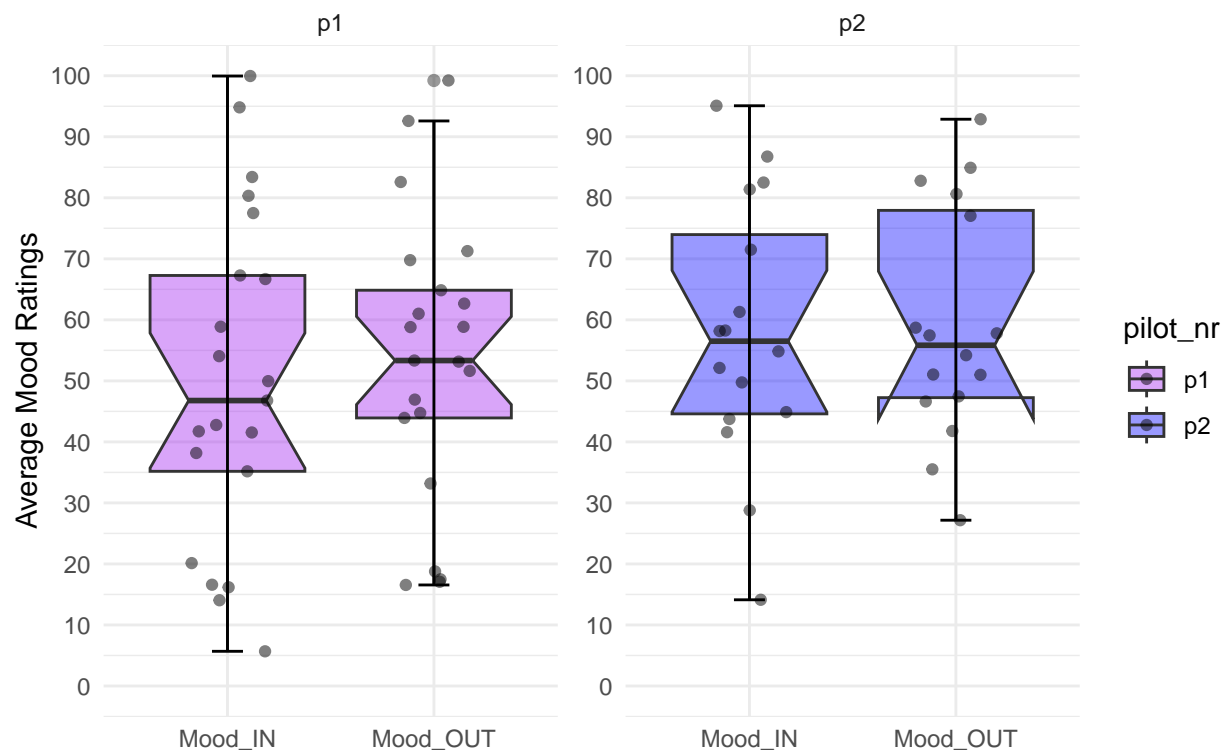
If they would be very different, it could possibly be due to two things:

- 1) we had more people with high social anxiety (we can check the impact of mini-SPIN scores)
- 2) we had less reliable participants in second pilot?

The plot below shows the average mood ratings across conditions for both pilots. We can see two things: **(A)** people in pilot 2 had in average a higher mood rating in the IN condition, which did not seem to change in the OUT condition. **(B)** The confidence interval is much wider in pilot 2, especially in the OUT condition. This could mean that these findings are just because of sample we had, and having another pilot could possibly show us different results.

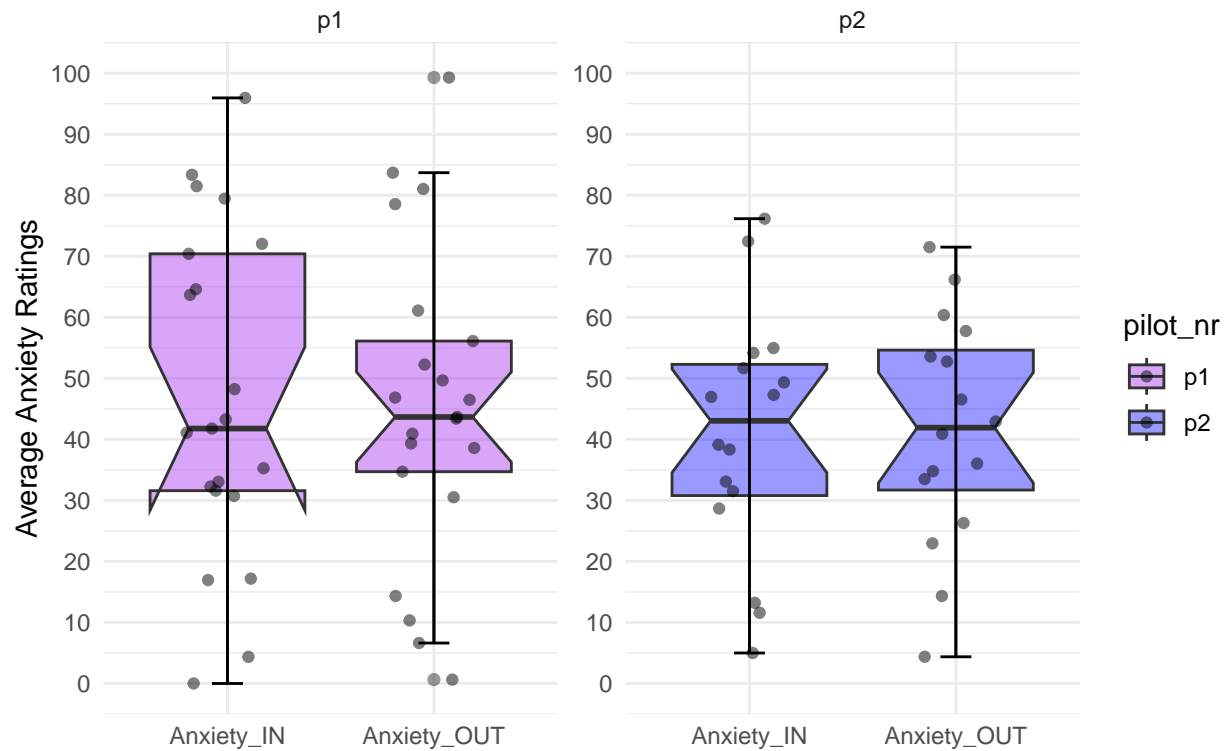
The black circles show the individual data points; the boxes start from the first to the third quartile, with a horizontal line and a notch through the median. The whiskers go from each quartile to the minimum and maximum. The notch approximates a 95% CI for the median. If the notches of 2 boxes do not overlap, this suggests that the medians are significantly different. The points outside whiskers represent the outliers.

Average mood ratings in pilots 1 and 2 in socially anxious people



The plot below shows the same results for average anxiety ratings. For anxiety, the CI is wider in the first pilot which could mean the findings we had were specific to the sample we had before or could have been caused by a few people?

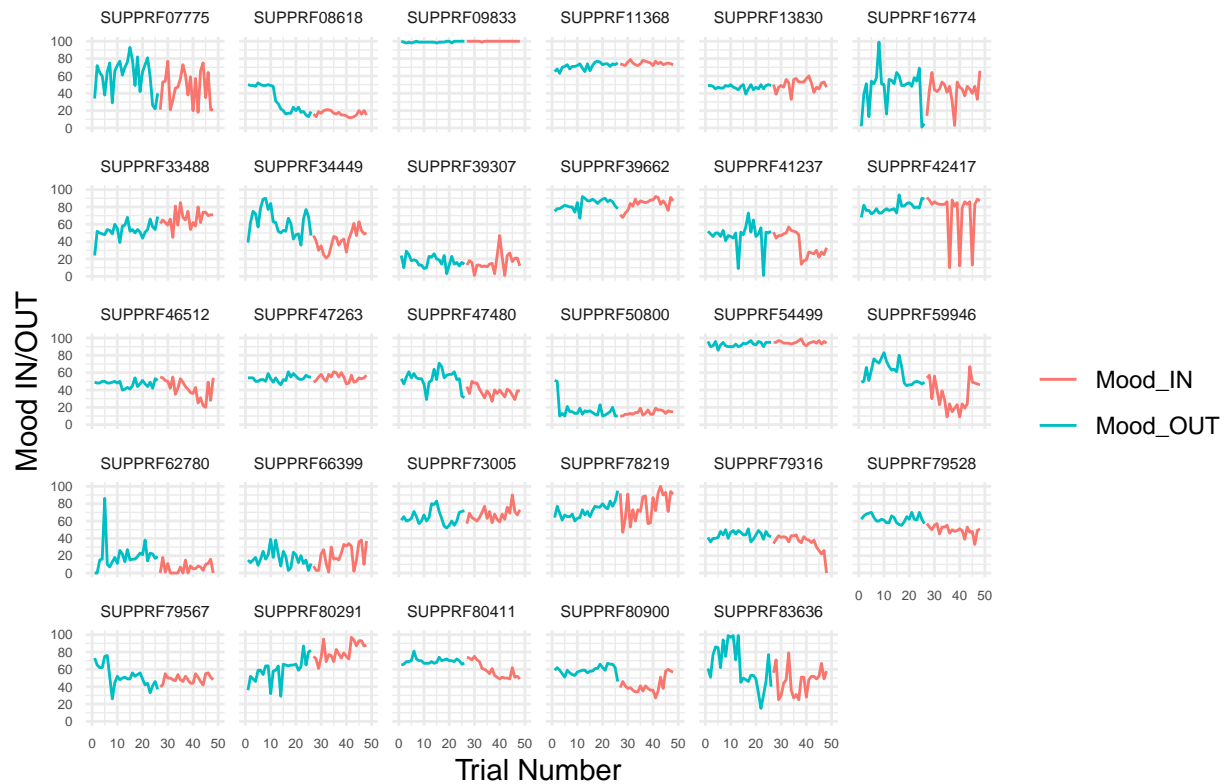
Average anxiety ratings in pilots 1 and 2 in socially anxious people



Mood over time pilot 1; OUT-1st order

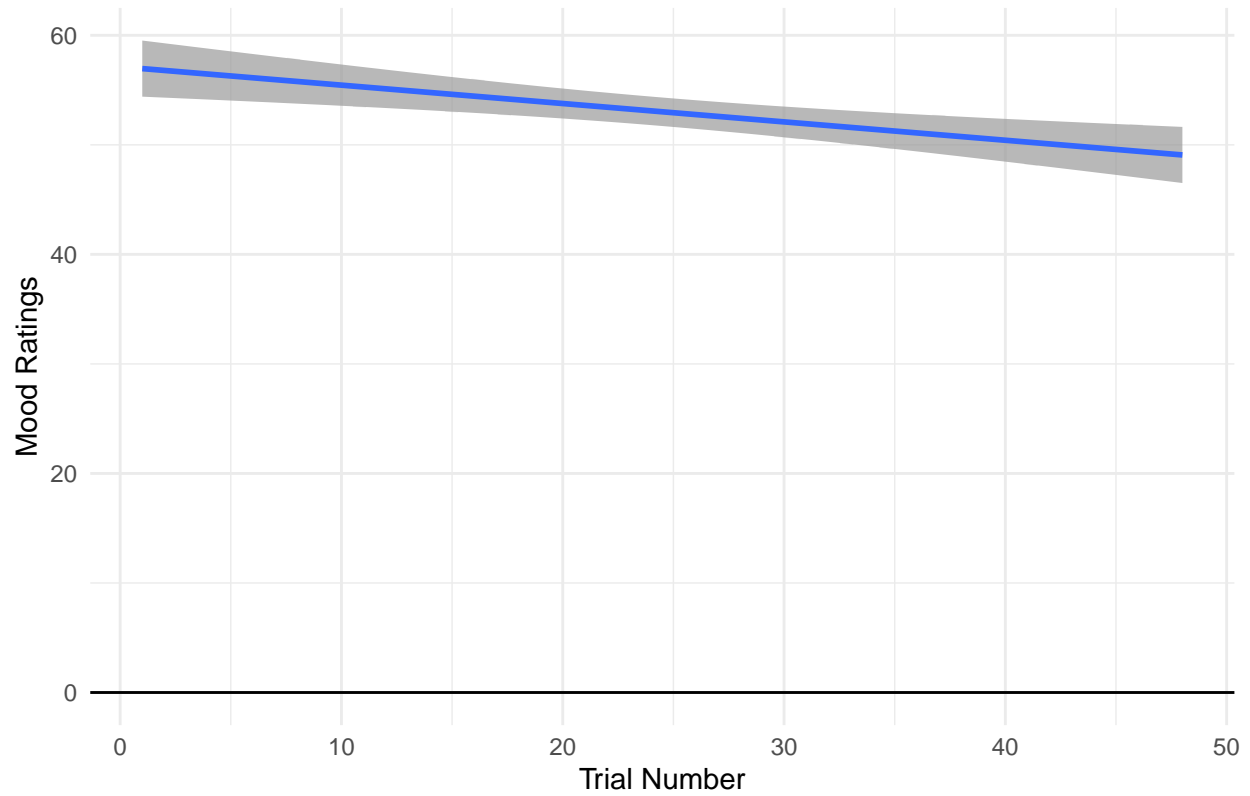
Since our trials were numbered from 1-48, we will not see them as two parallel lines (which is the case in pilot 2, where we have trials 1-24 per condition)

P1: Mood across time with OUT-1st order

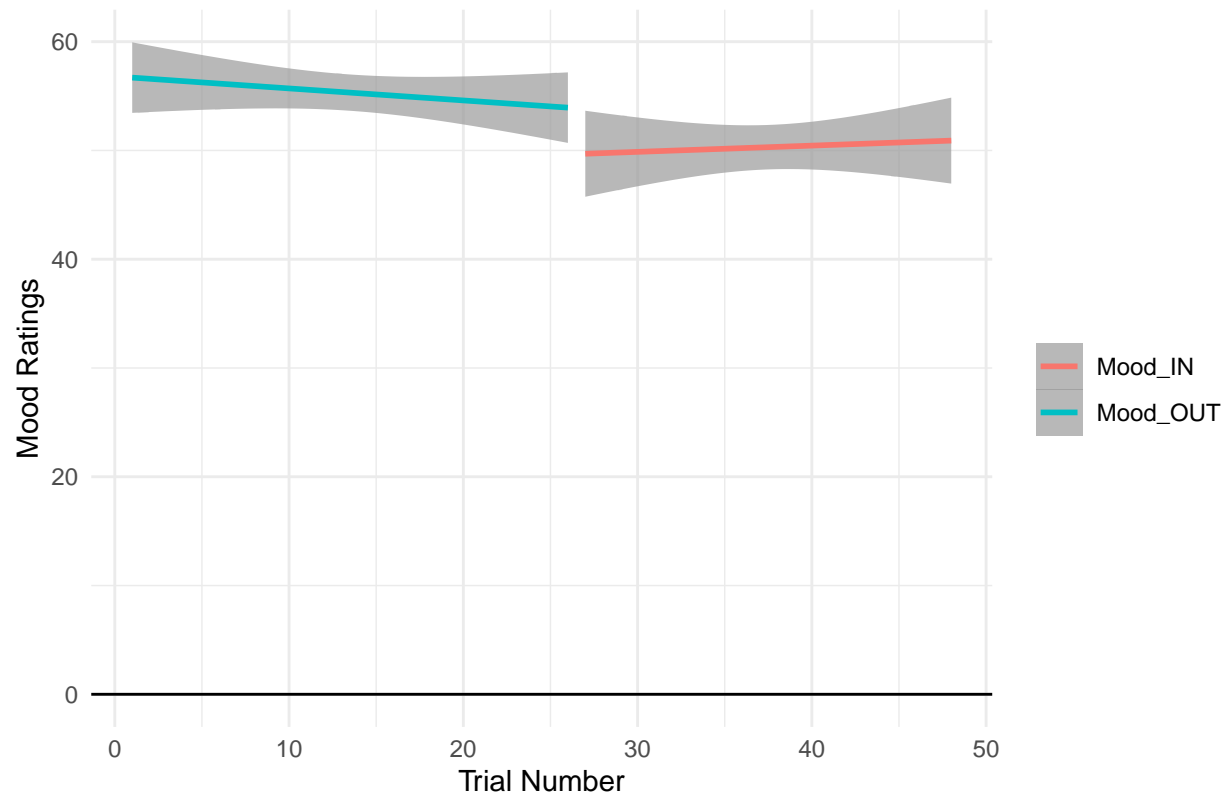


From OUT (trials 1-24) to IN (trials 25-48) condition in pilot 1, there is a slight reduction in mood which is what we expected.

P1 (OUT-1st): we expect a decrease in mood over time

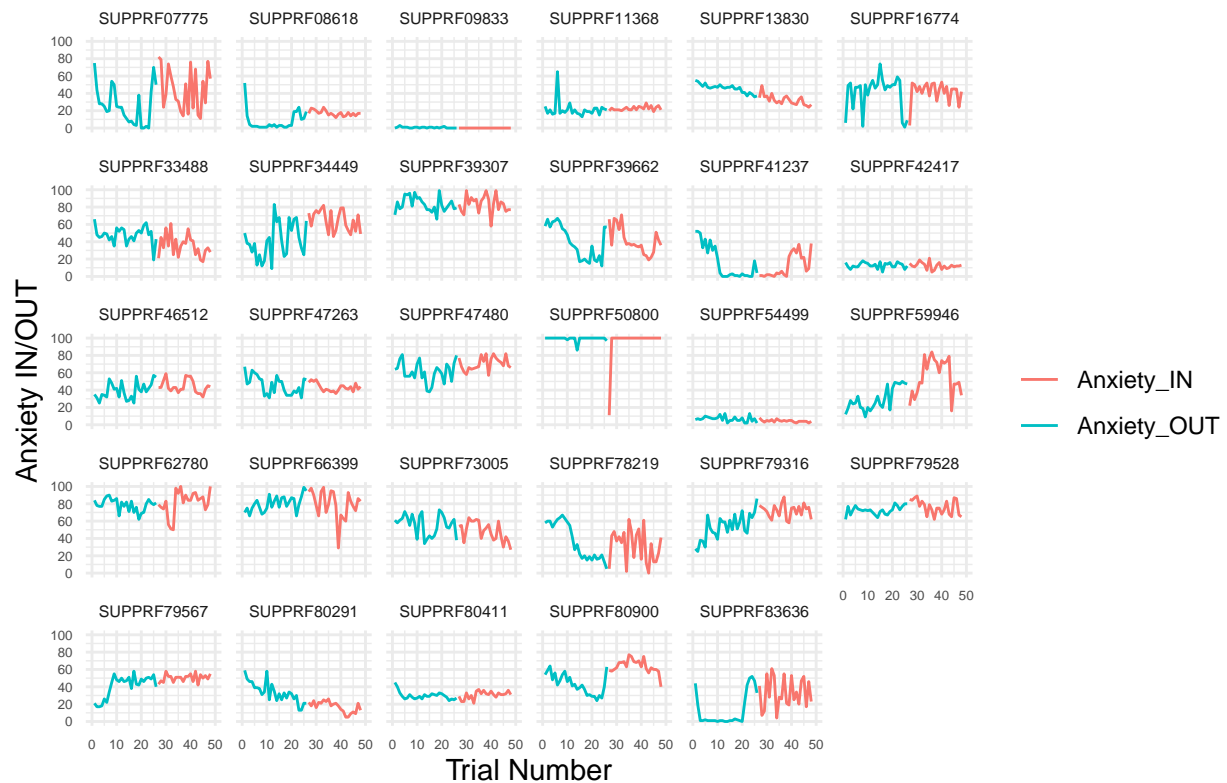


P1 (OUT-1st): we expect a decrease in mood over time



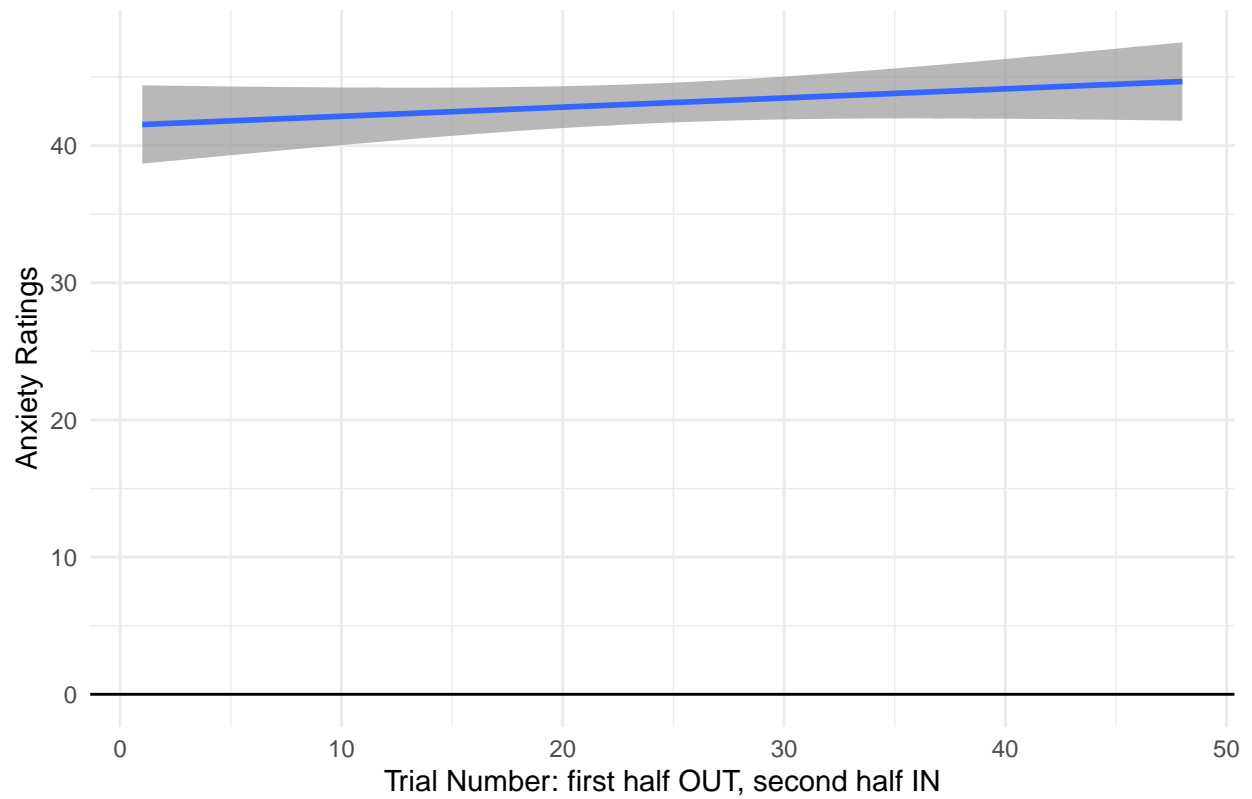
Anxiety over time pilot 1; OUT-1st order

P1: Anxiety across time with OUT-1st order

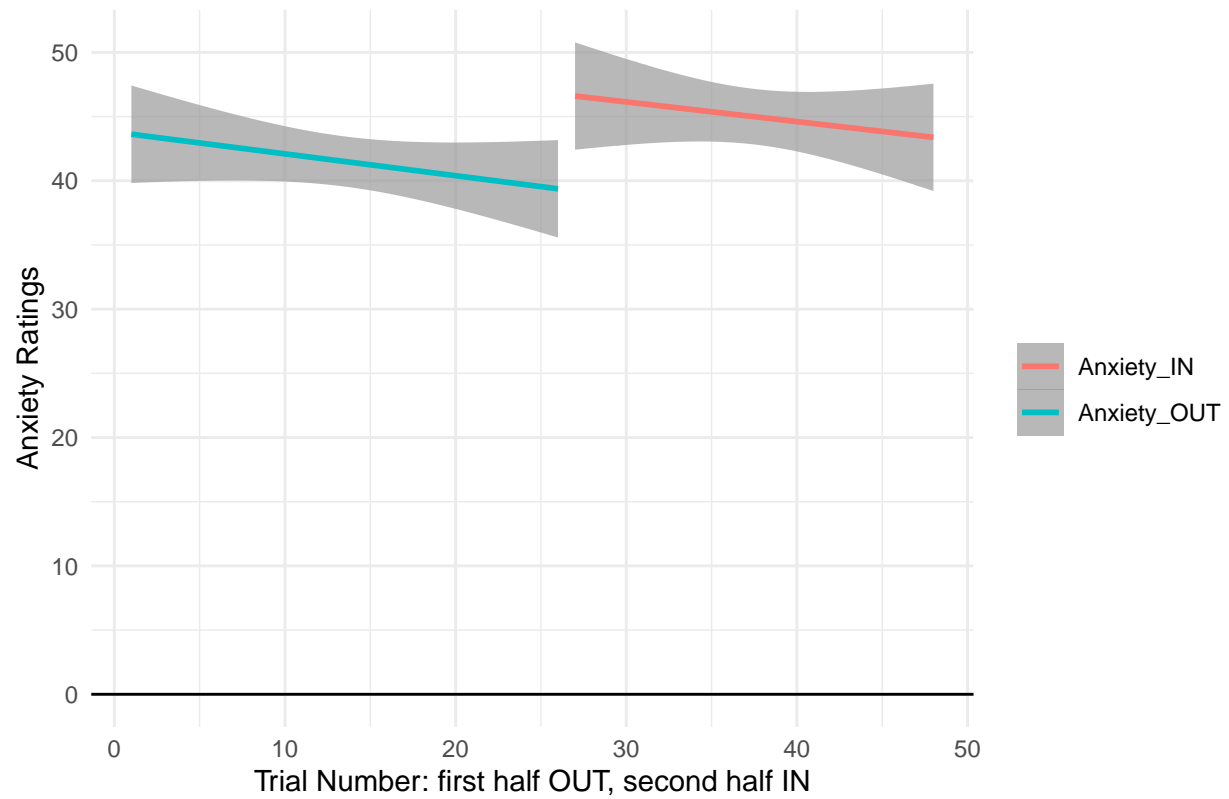


From OUT (trials 1-24) to IN (trials 25-48) condition in pilot 1, there is a slight increase in anxiety which is what we expected. However, there is a decrease in anxiety within conditions as well, it makes sense for the OUT condition why does this happen in the IN condition? Is it regression to the mean or is it because they realise there is not a real person online?

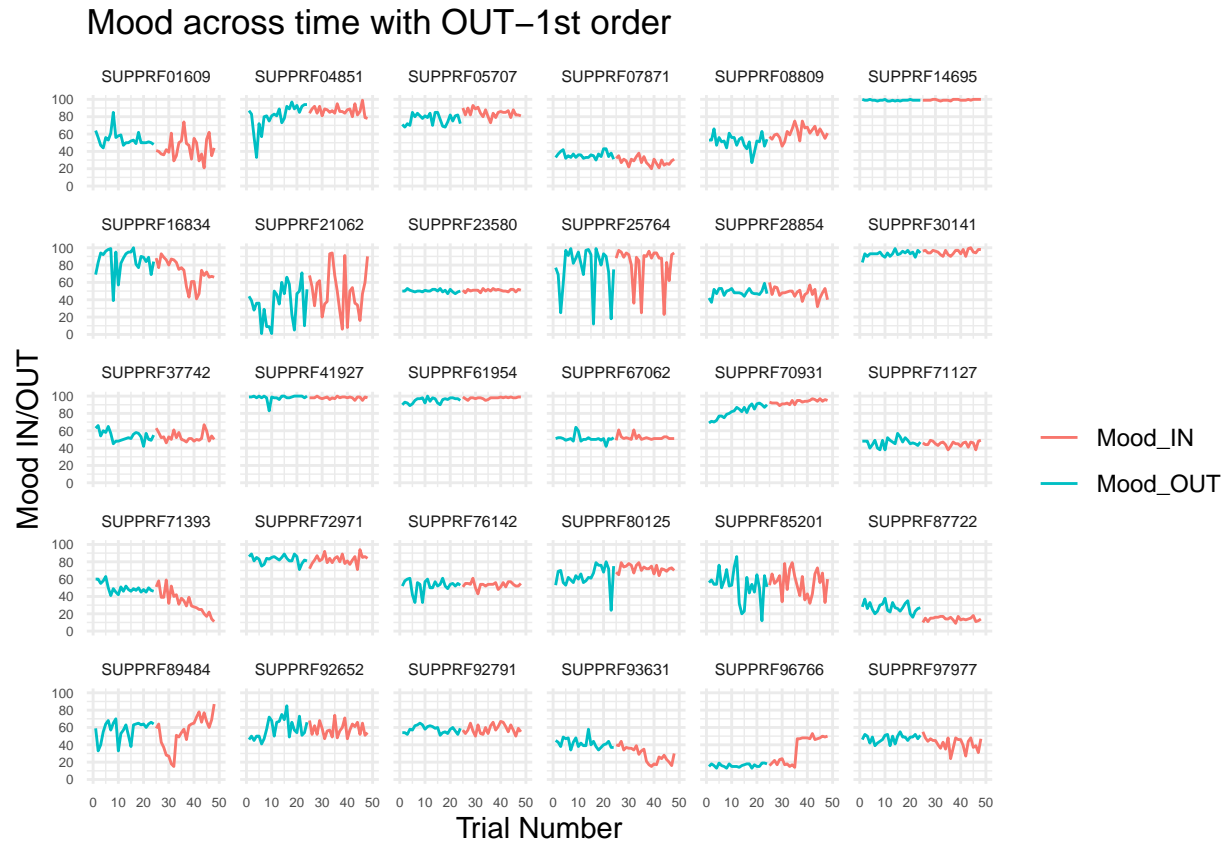
P1 (OUT-1st): we expect increase in anxiety over time



P1 (OUT-1st): we expect increase in anxiety over time

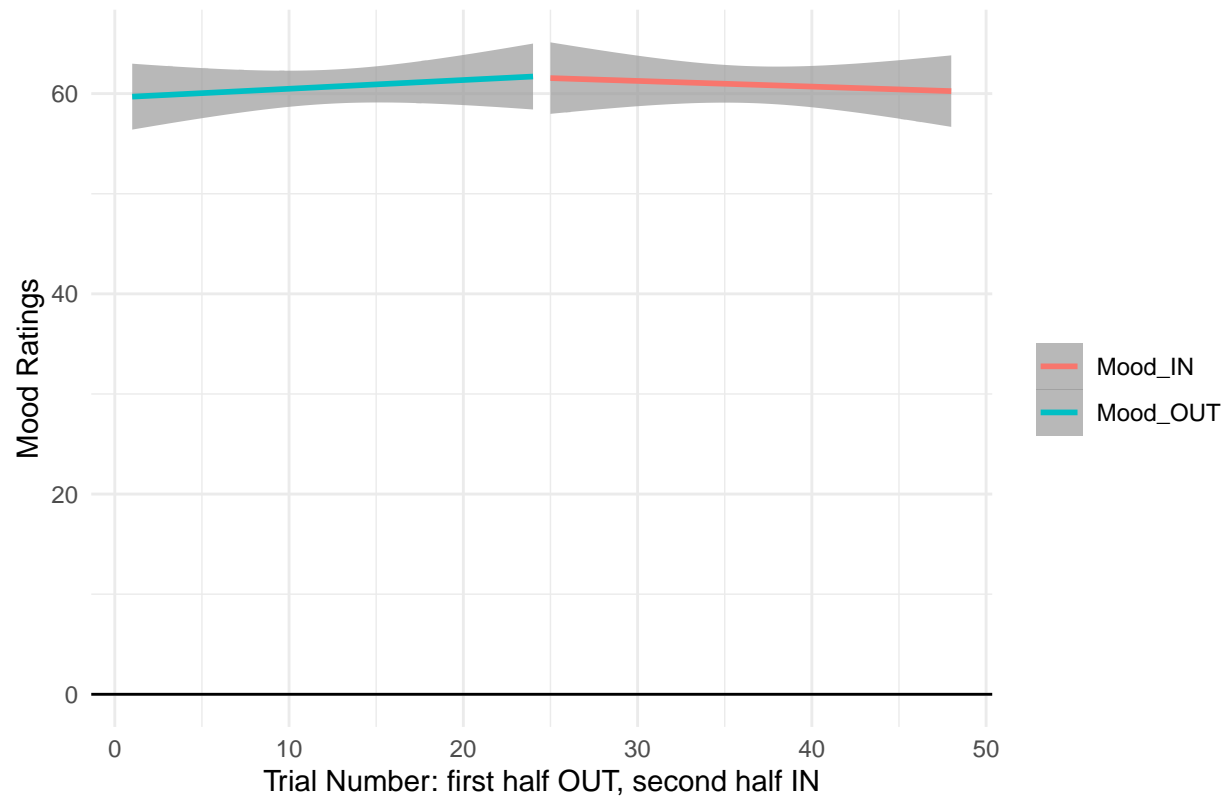


Mood over time pilot 2; OUT-1st order



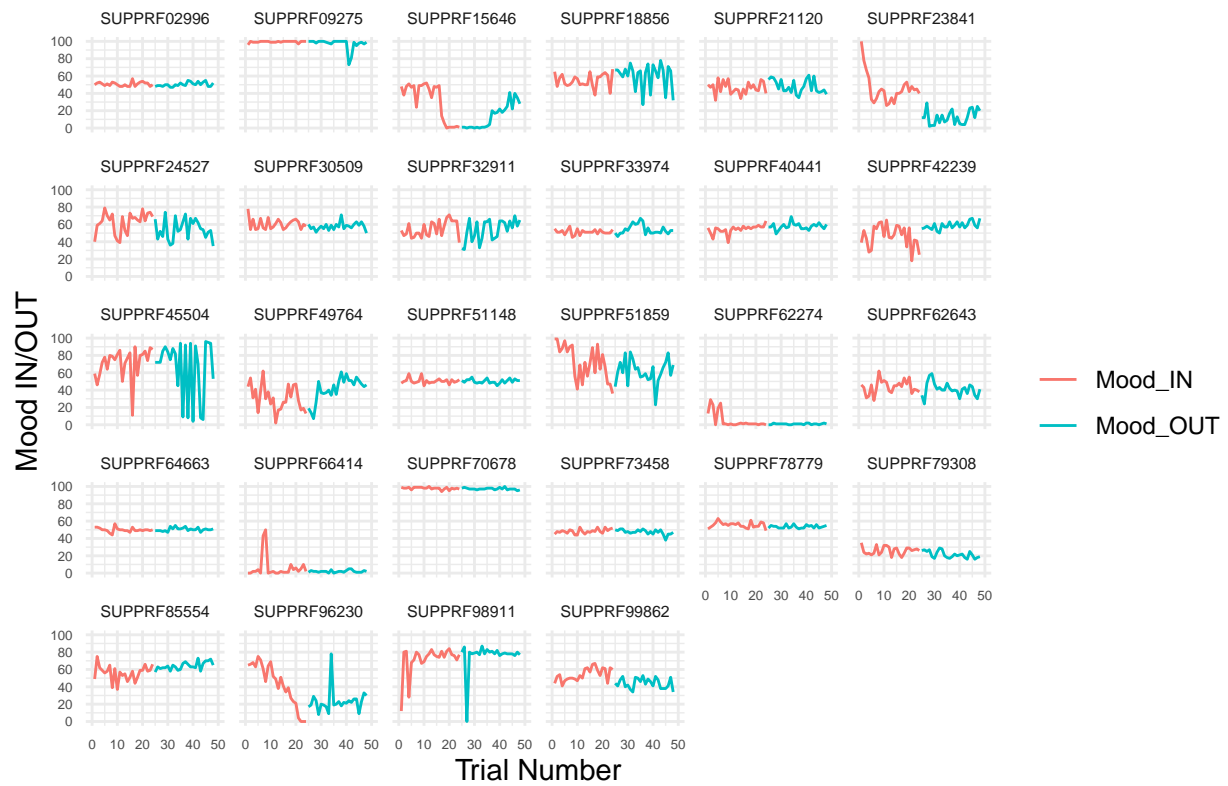
In pilot 2, we don't see any change in mood in OUT-1st condition which is the equivalent of the order in pilot 1.

P2 (OUT-1st): we expect a reduction in mood over time



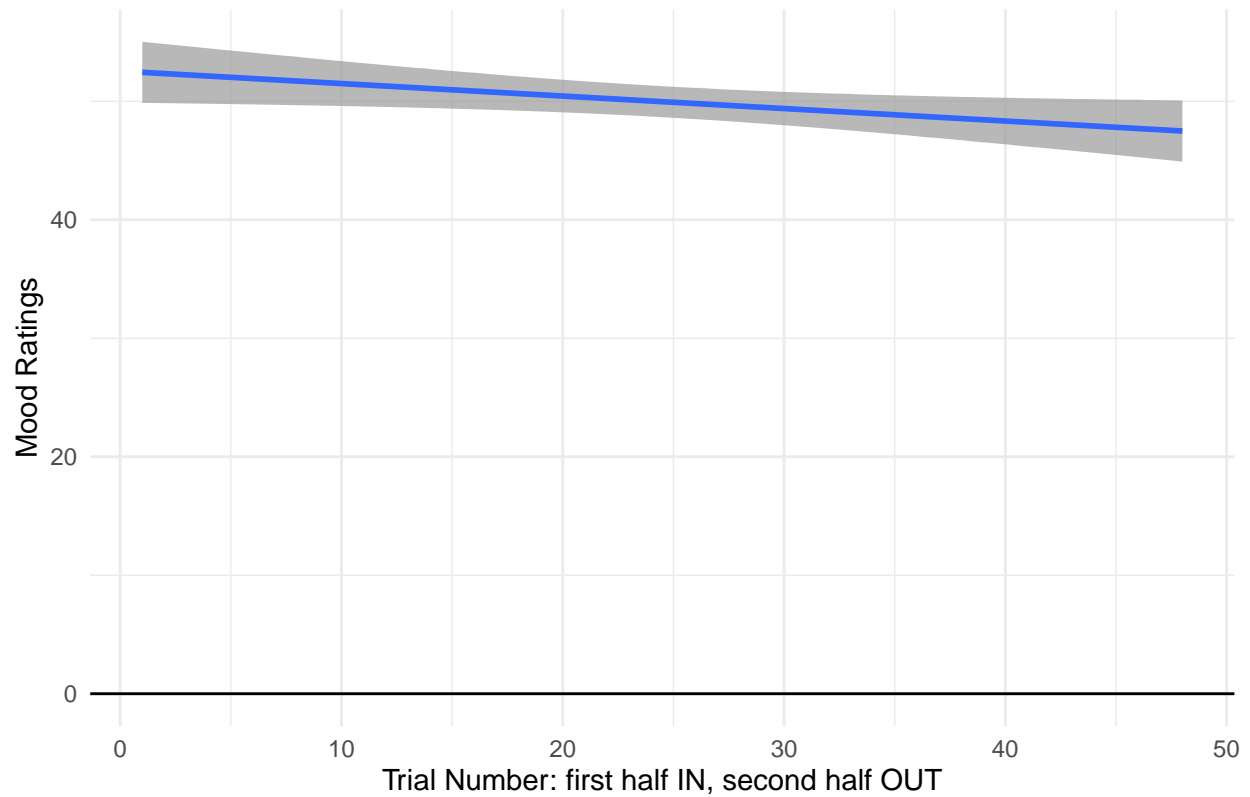
Mood over time pilot 2; IN-1st order

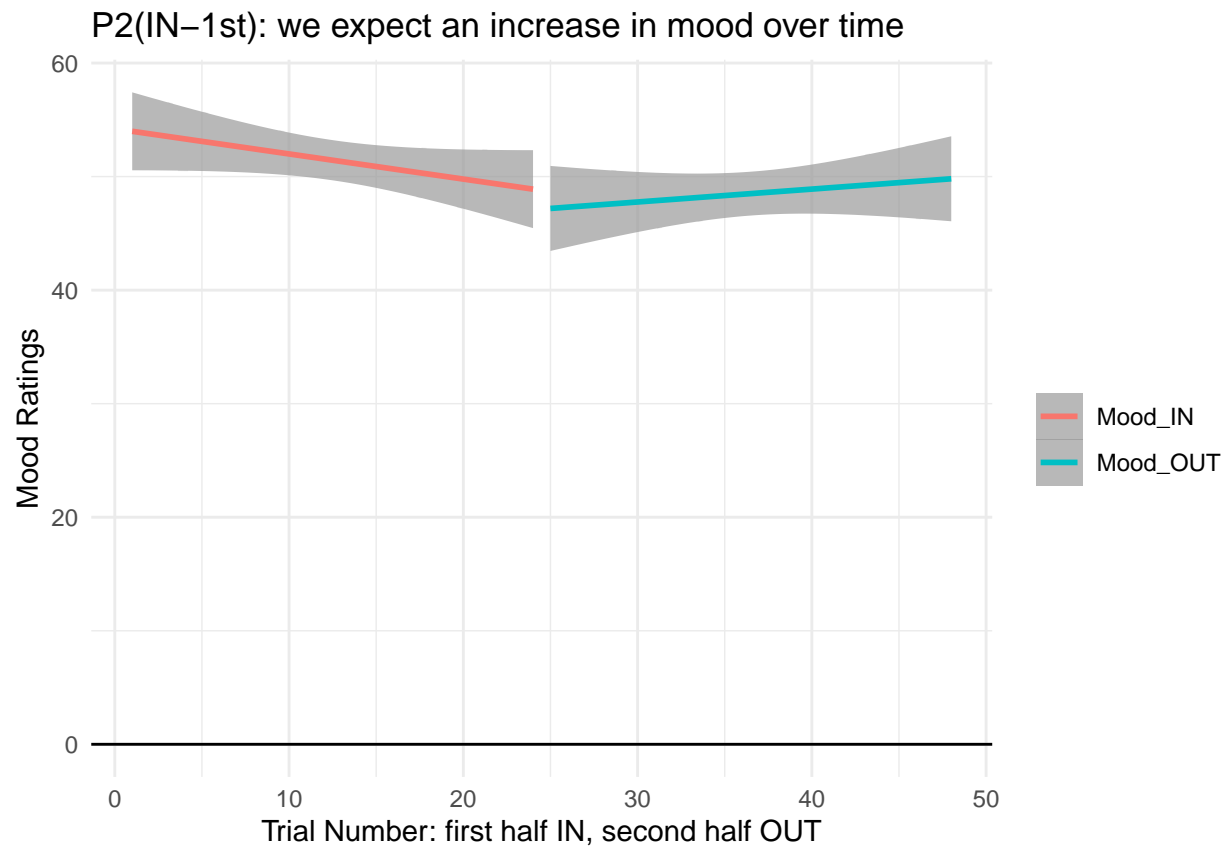
Mood across time with IN-1st order



We can see that mood goes down over time from IN to OUT condition which is the opposite of what we would expect. However, if we separate these two conditions (in second plot) we can see that mood goes down in the IN condition, but starts going up again in the OUT condition, but won't recover to the baseline mood by the end of the task (we may need to take mood drift over time into account as well?).

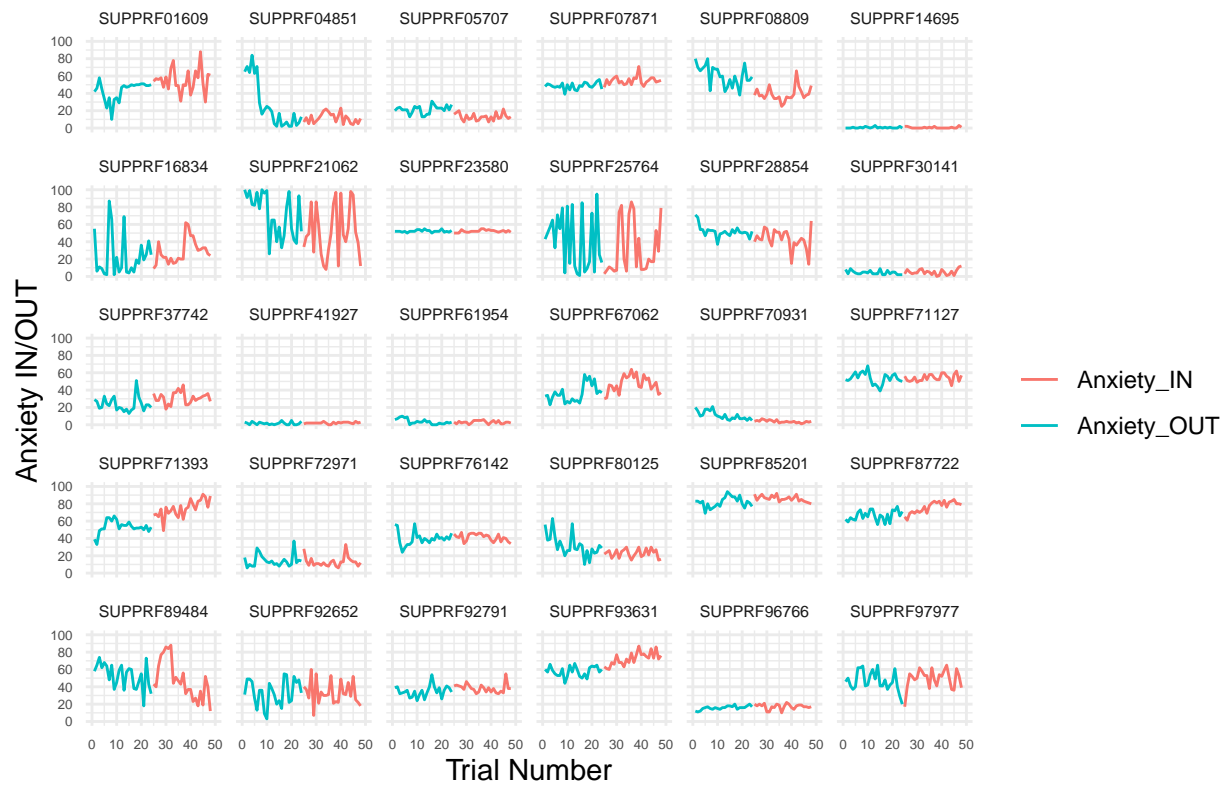
P2(IN-1st): we expect an increase in mood over time





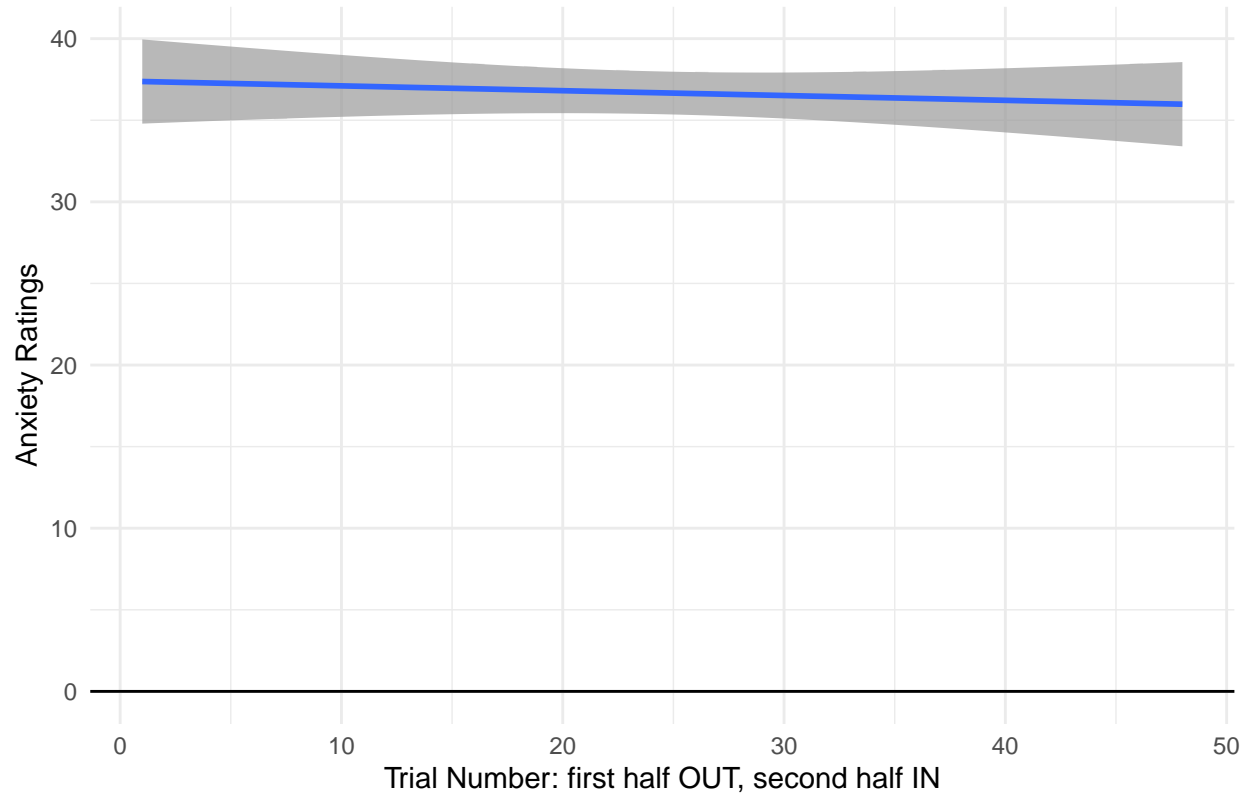
Anxiety over time pilot 2; OUT-1st order

Anxiety across time with OUT-1st order

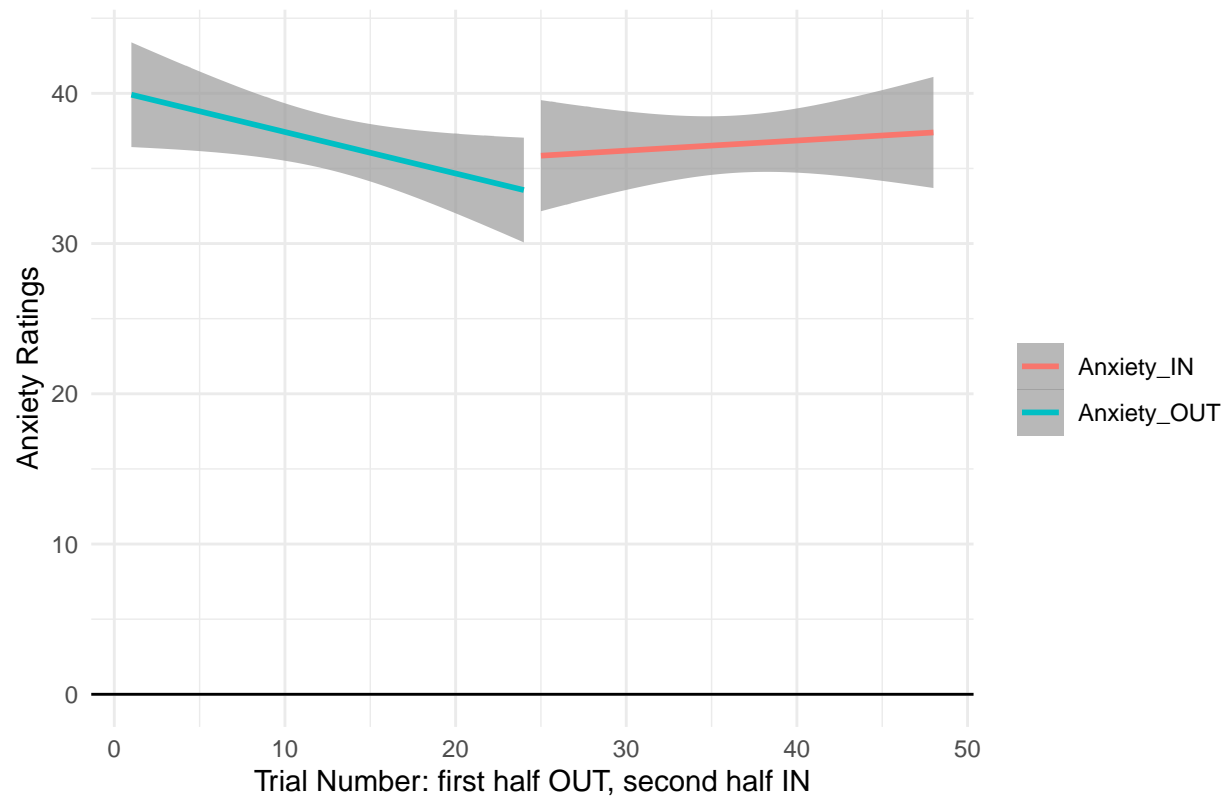


Their anxiety goes down in the OUT condition, and starts slightly going up from the IN condition, is it because the instructions make them less anxious and they don't follow the instructions or is it because they don't believe someone is watching them?

P2(OUT-1st): we expect an increase in anxiety over time



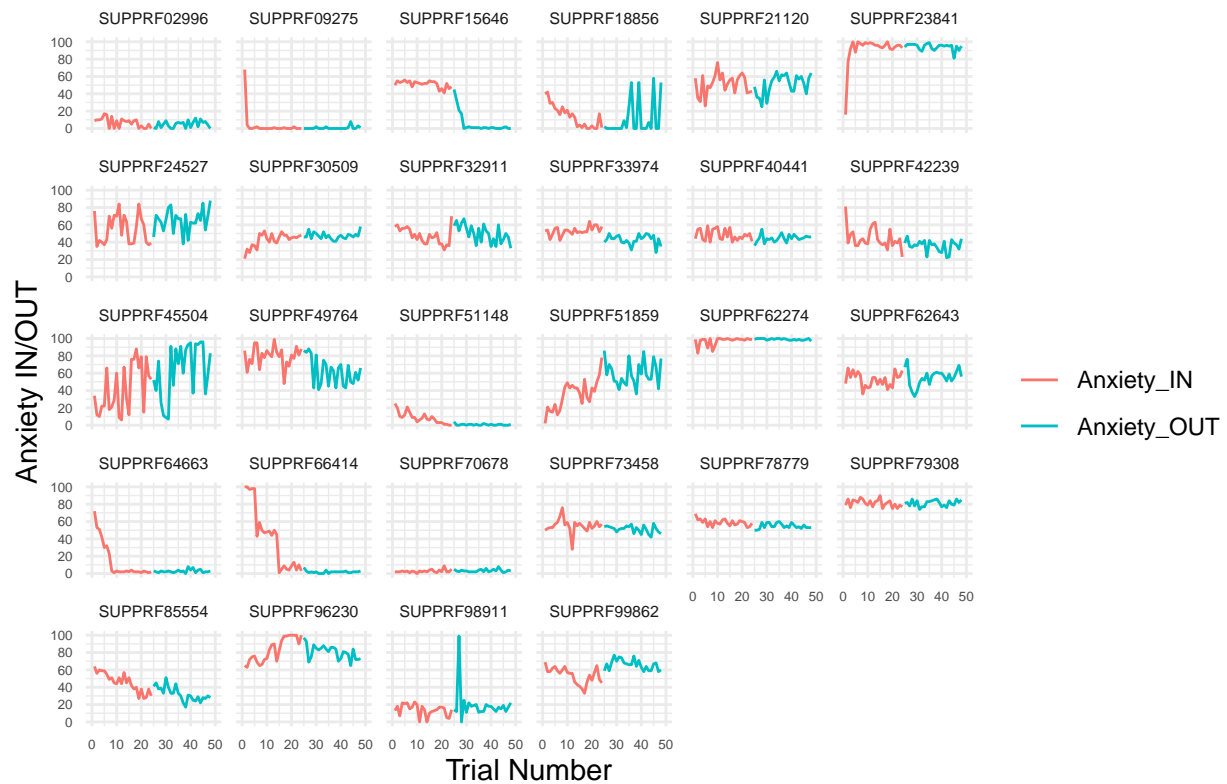
P2(OUT-1st): we expect an increase in anxiety over time



Anxiety over time pilot 2; IN-1st order

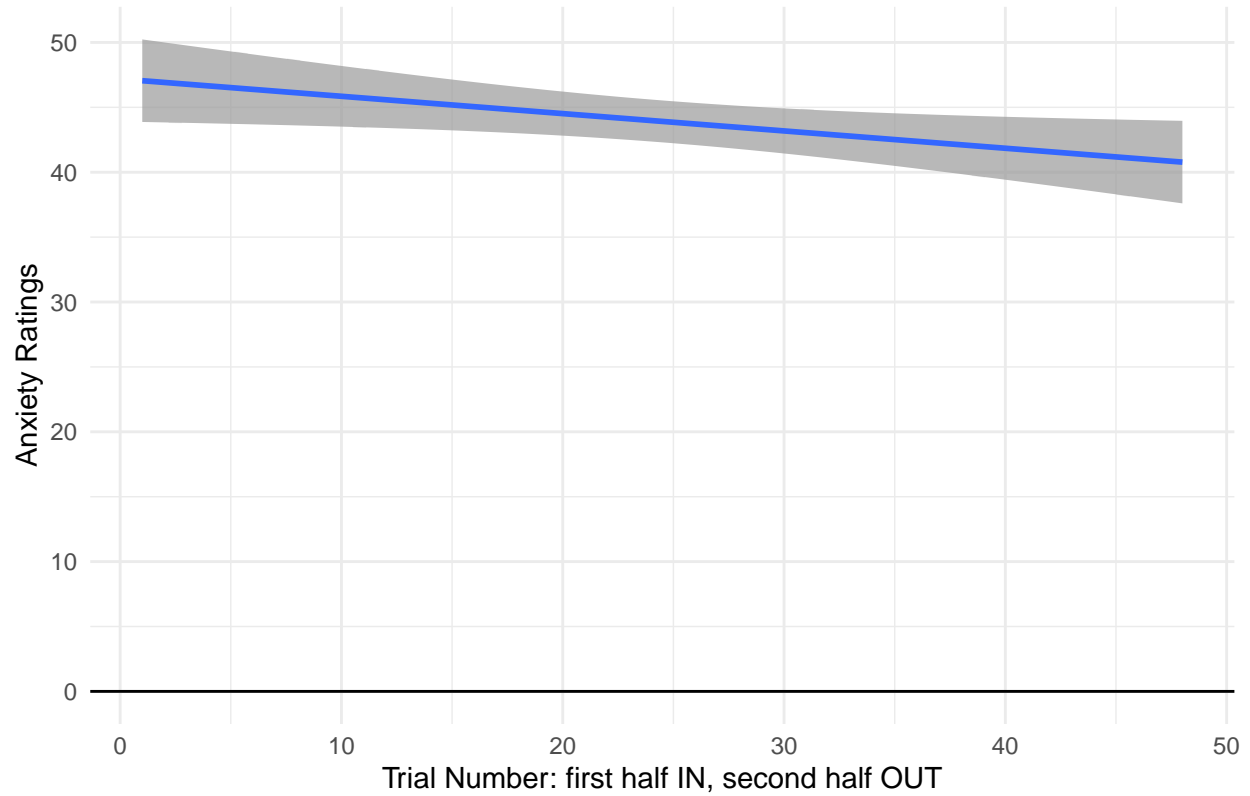
Some people, for example subjects xxx start with higher anxiety and then it suddenly drops, is it because they don't believe someone is watching them?

Anxiety across time with IN-1st order



If we look at the first plot we think great we managed to reduce anxiety, but if we look at the second plot, we can see the reduction in anxiety started to happen even before change in condition. In fact, the reduction was more steep in the IN condition.

P2(IN-1st): we expect an decrease in anxiety over time



P2(IN-1st): we expect an decrease in anxiety over time

