Corruption in the lab

Fedor Anna, Mokos Judit

Description of the experiment

Sequential dyadic die-rolling task
Two-by-two design:

- Game: simple game or charity game
- Partner: simulated honest partner or simulated dishonest partner

Participants are randomly assigned to one of the four conditions:

- SH: simple game with honest partner
- SD: simple game with dishonest partner
- CH: charity game with honest partner
- CD: charity game with dishonest partner

Each participant plays 20 rounds of the game. A round of game consists of the following steps:

1. Participant learns the reported number of the supposed partner
2. Participant throws a dice
3. Participant reports the number
4. Both players get a score according to the reported numbers: the score is the reported value, if they reported a double; otherwise it's 0
5. In the charity game a charity foundation gets a small amount of donation

Dummy data

Data frame column names (each row is a dice roll):

- ID: random ID of participant (10000:99999)
- Game: simple or charity (S/C)
- Partner: honest or dishonest (H/D)
- Condition: one of the four experimental conditions (SH, SD, CH, CD)
- Index: index of round of game (1:20)
- ValueA: value of simulated dice roll (1:6)
- ValueB: value of participant's reported dice roll (1:6)
- Double: whether the participant reported a double (1/0)
- Q1: answer to first questionnaire quiestion (a random letter)
- Q2: answer to second questionnaire question (a random letter)
- Fingerratio: ratio of two fingers (normal distribution, mean=1, sd=0.1)

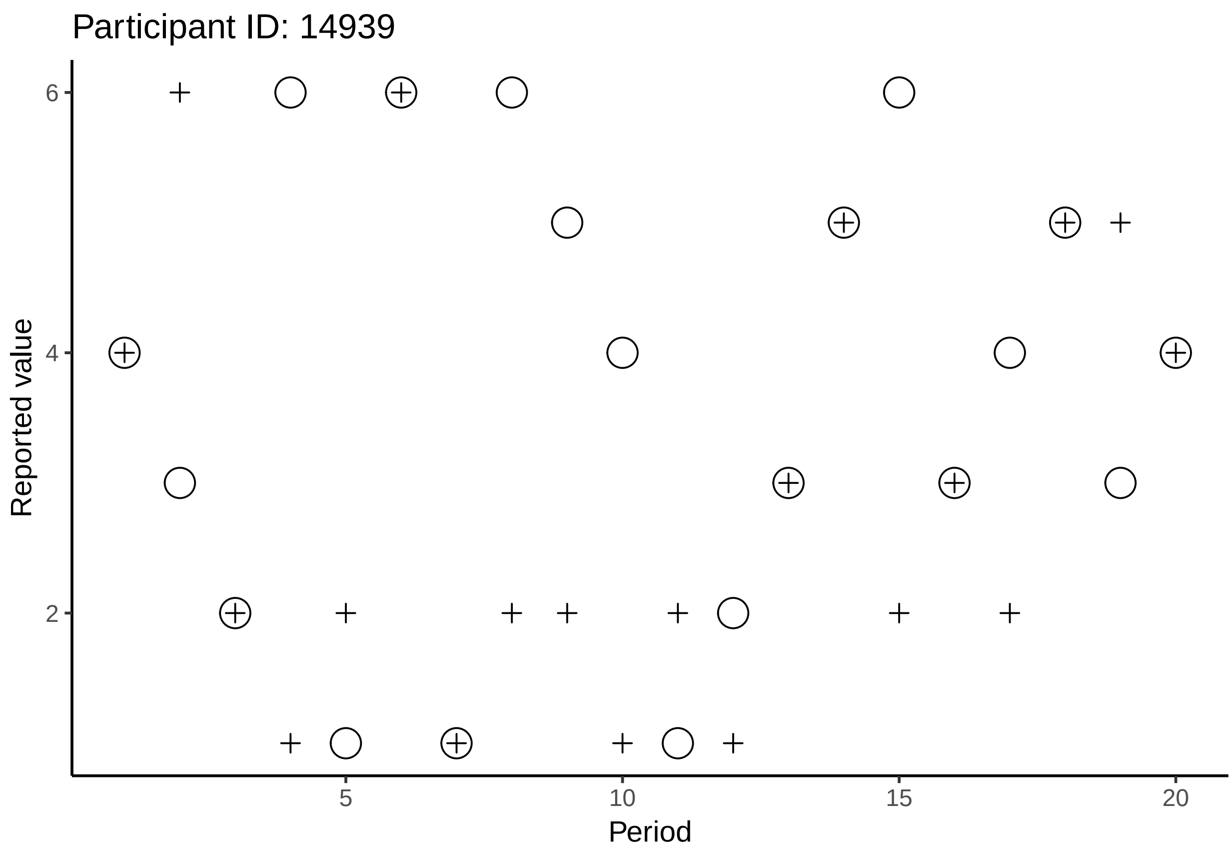
Data checking

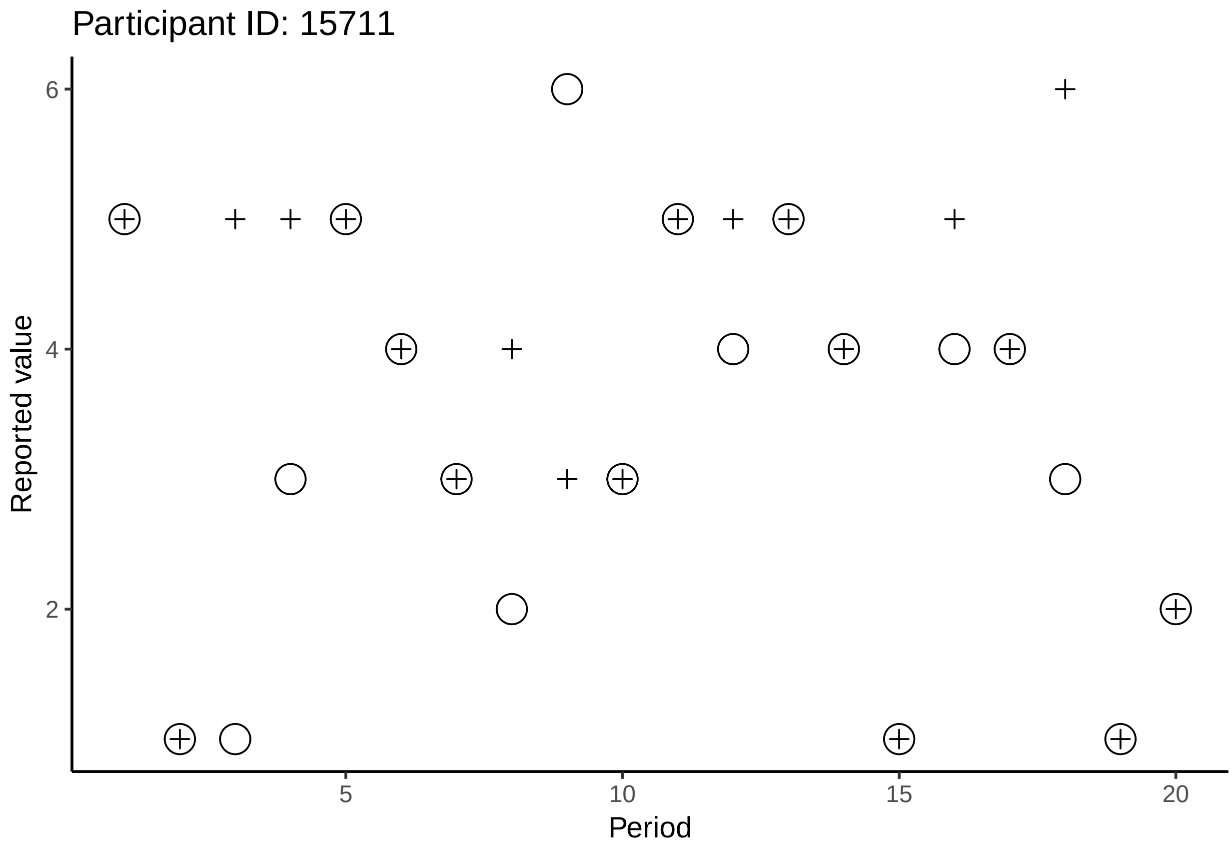
- Check if every participant had 20 round
- Delete participants who had less than 20 rounds
- Delete excess rounds for each participant
- Check if there is any missing data (columns)

Figures

Scatter plots of individual behavior

These should be based on Weisel & Shalvi, 2015, Fig. S10.
One plot per participant. Plots from the same condition should be compiled into one composite figure.

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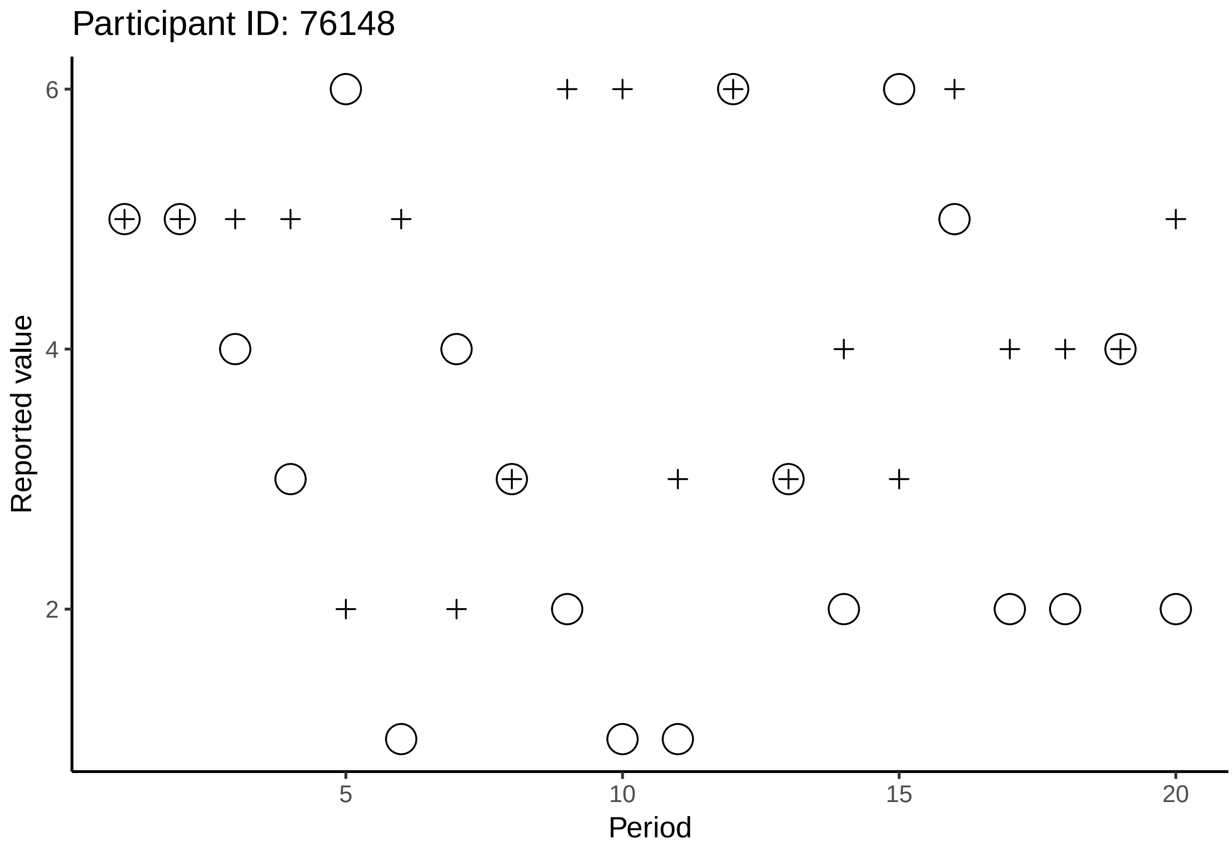
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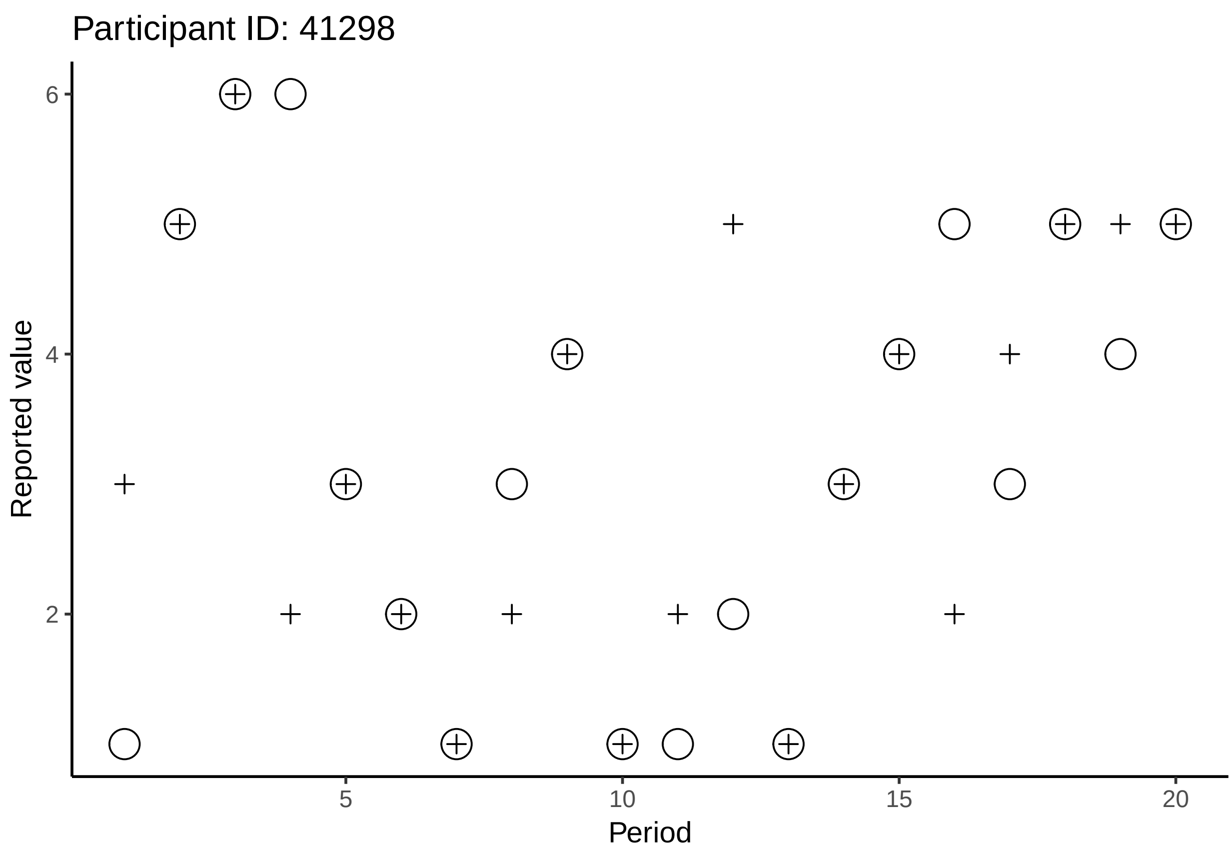
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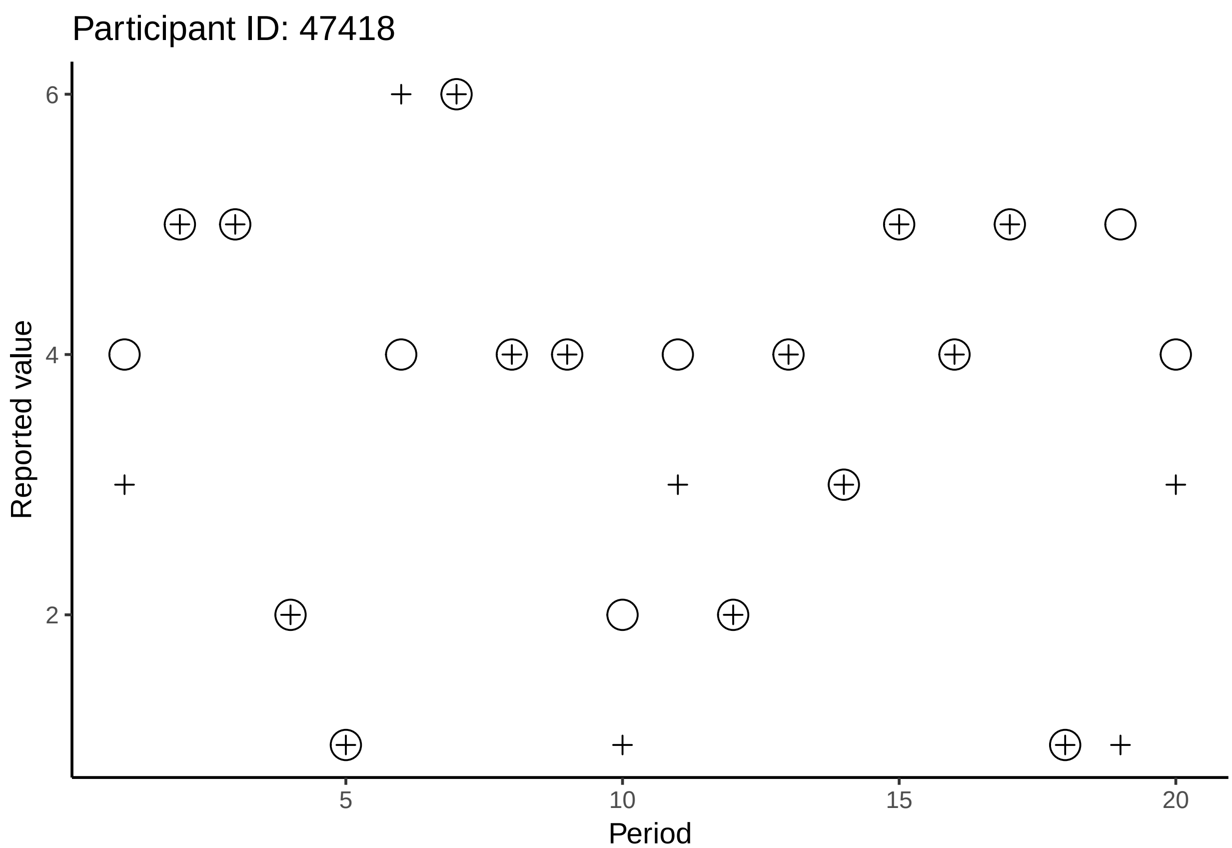

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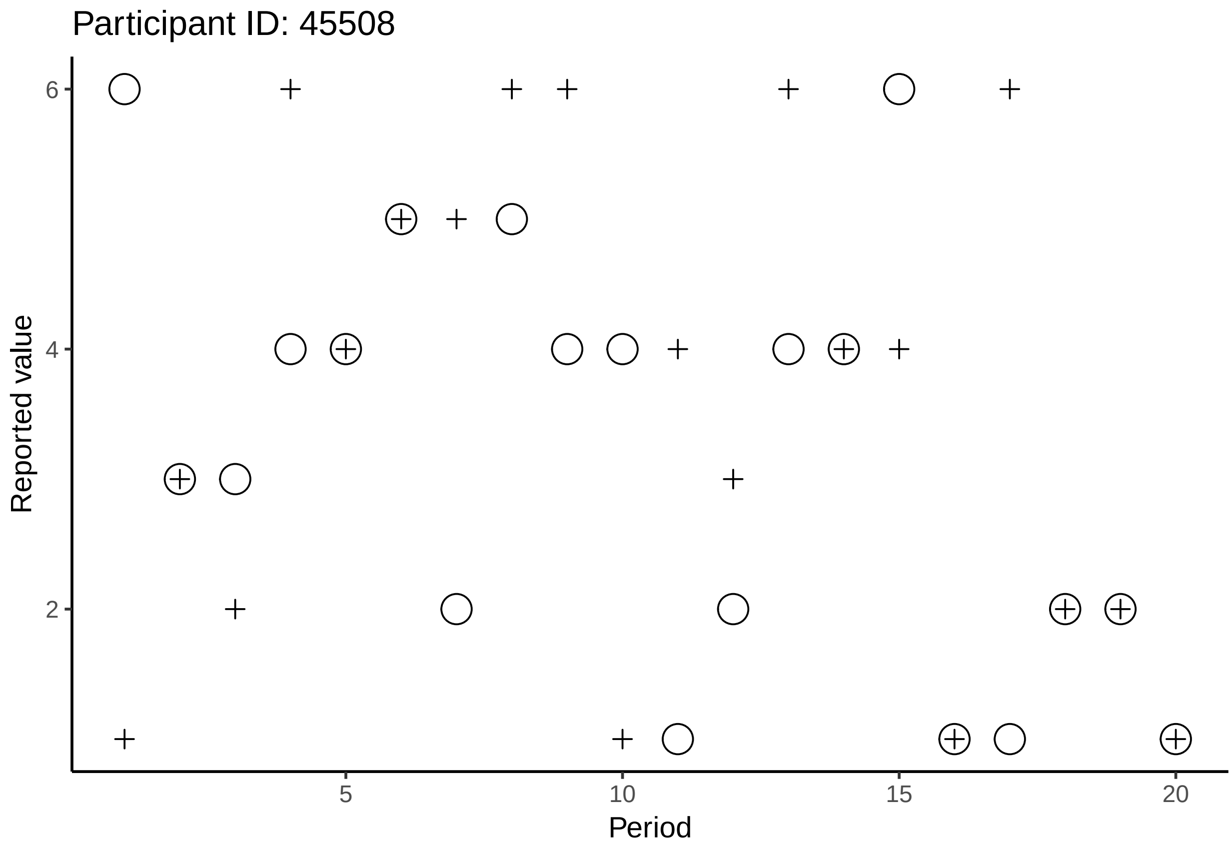
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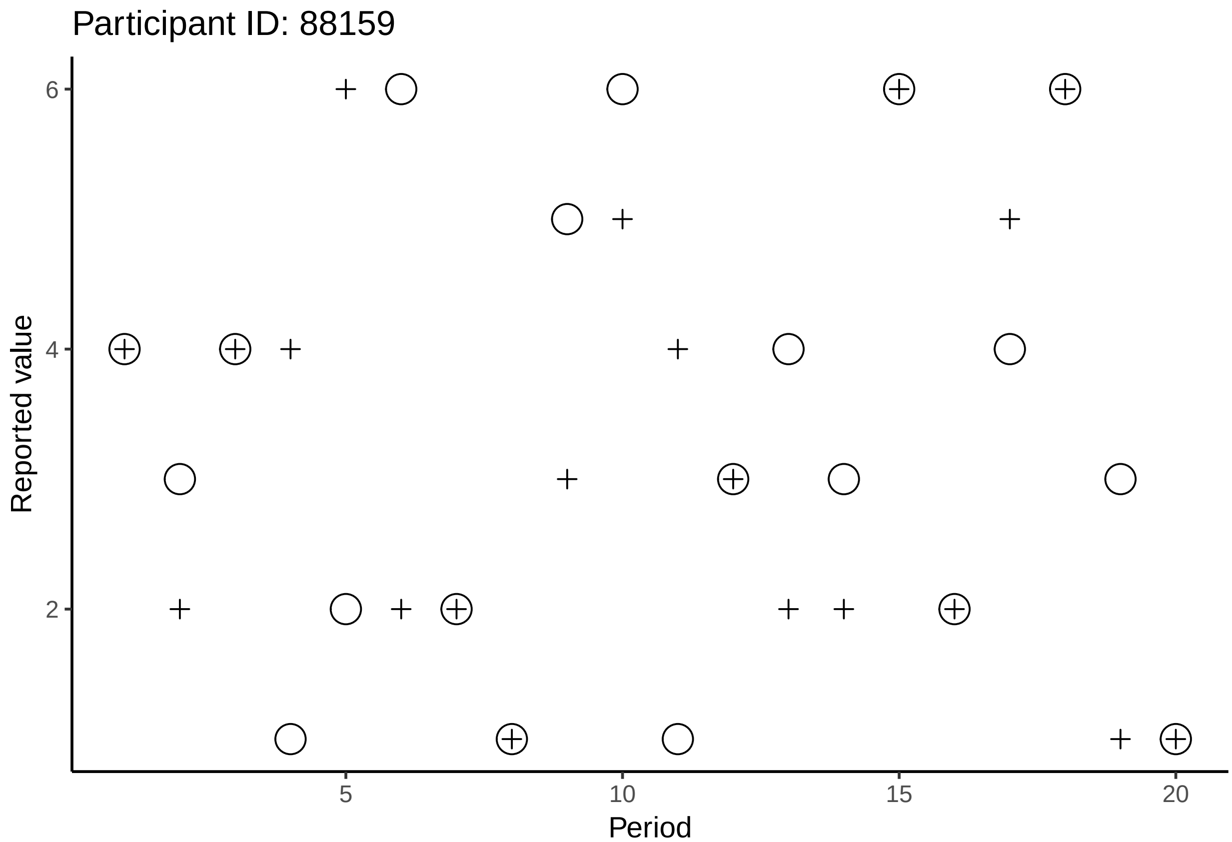
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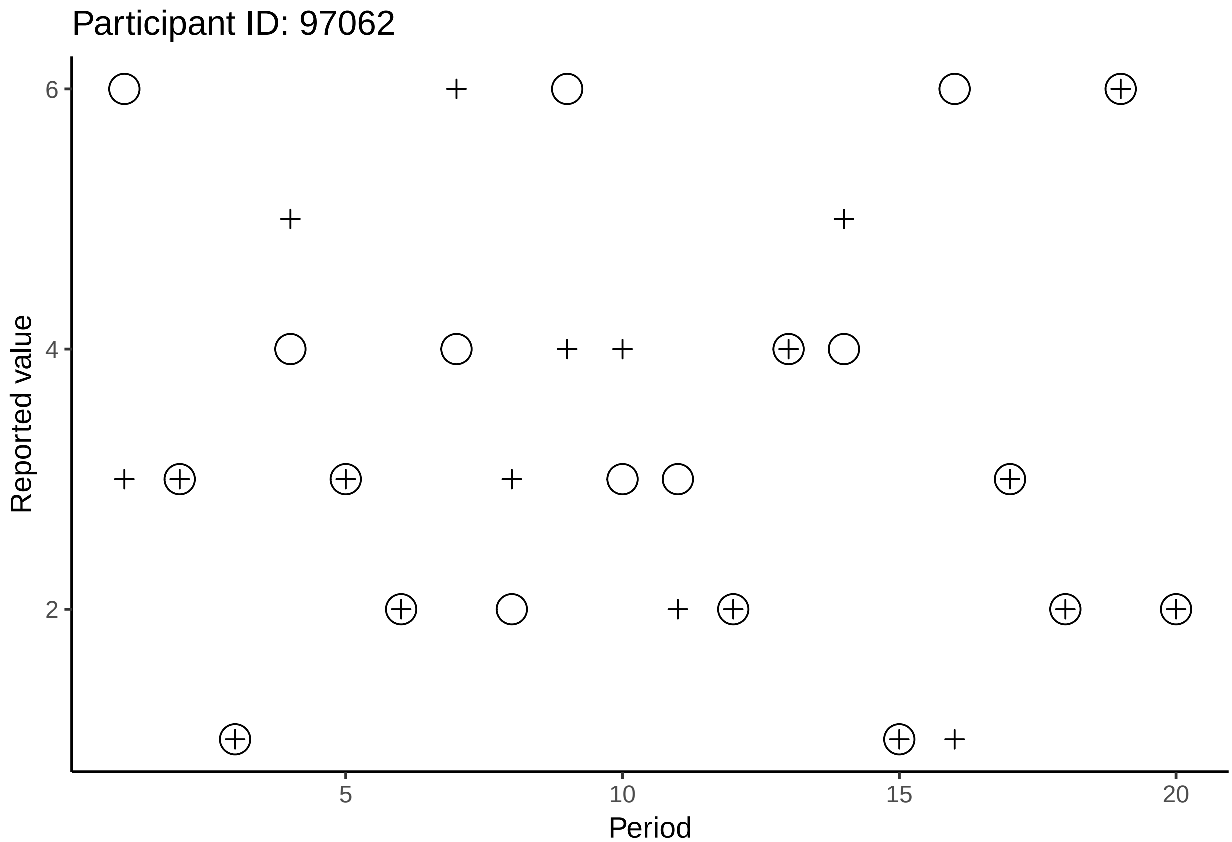

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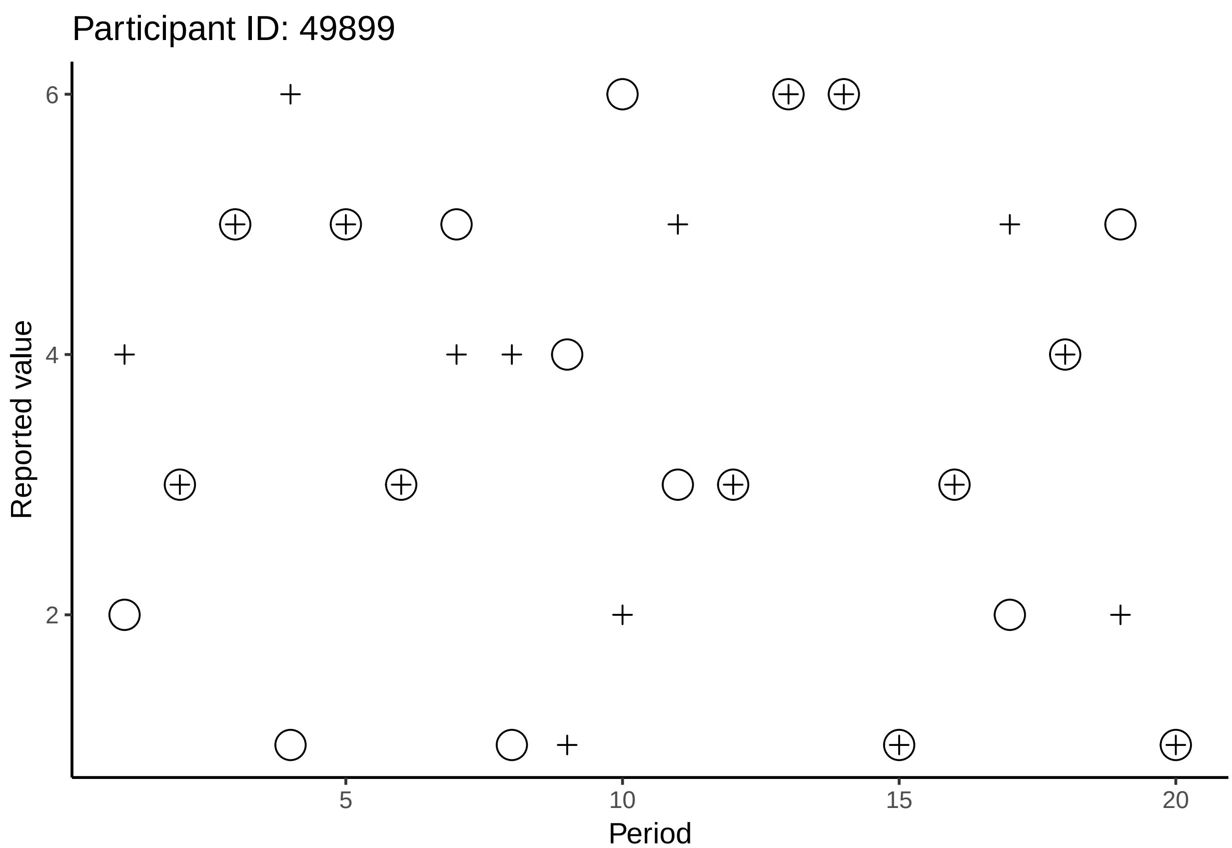
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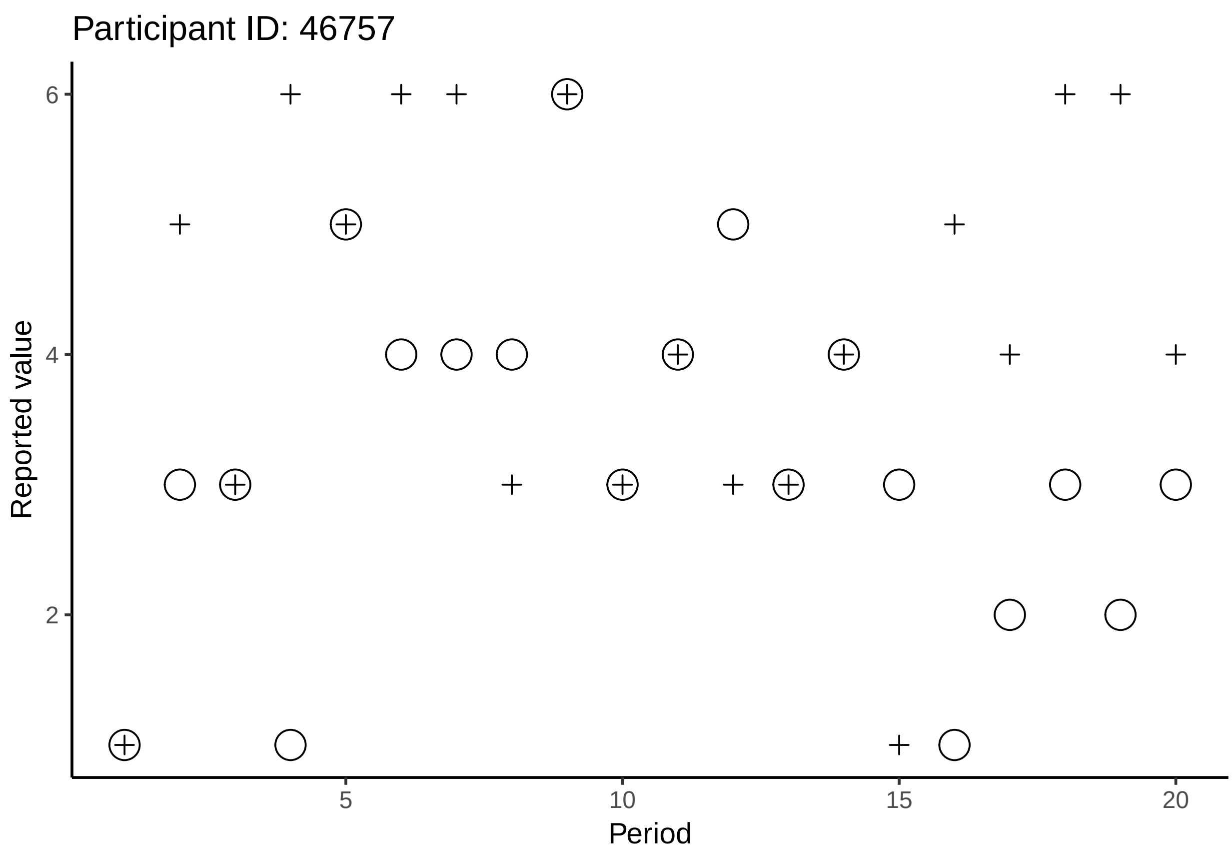

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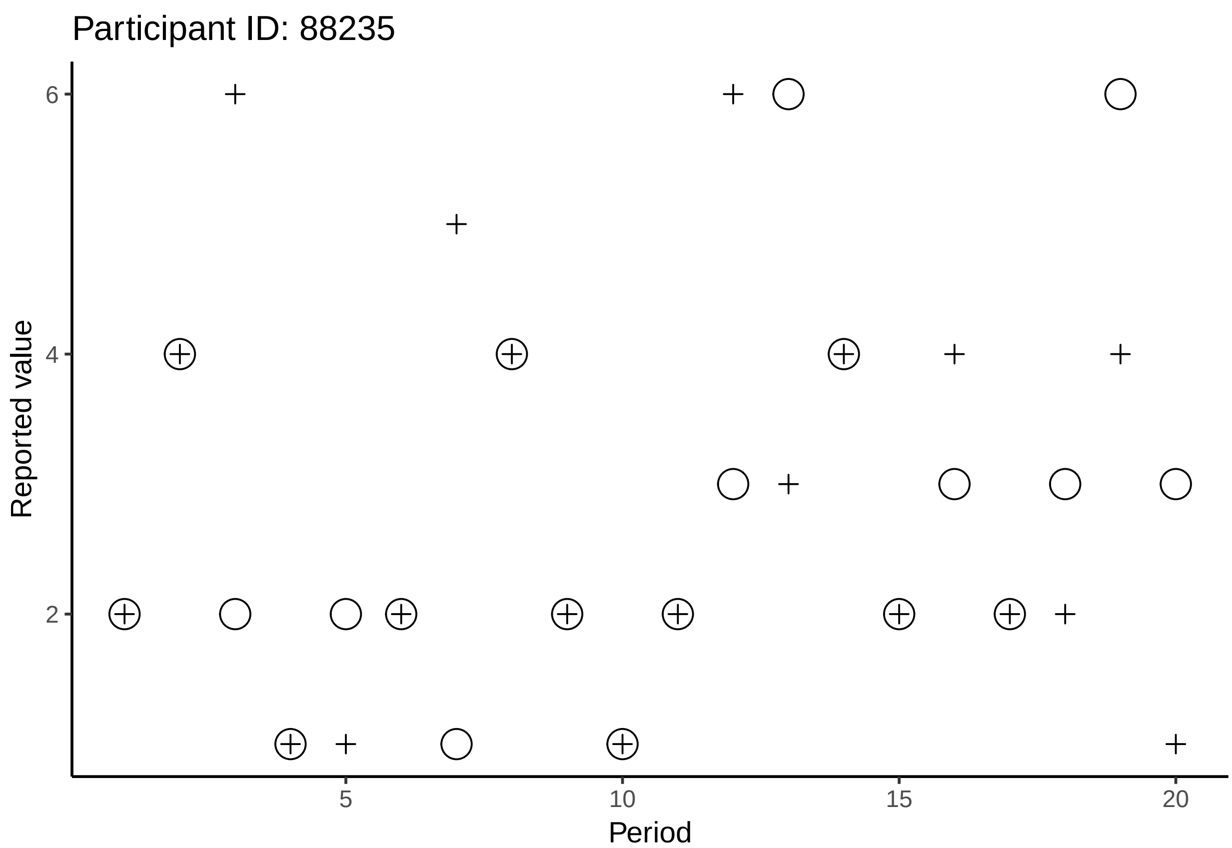

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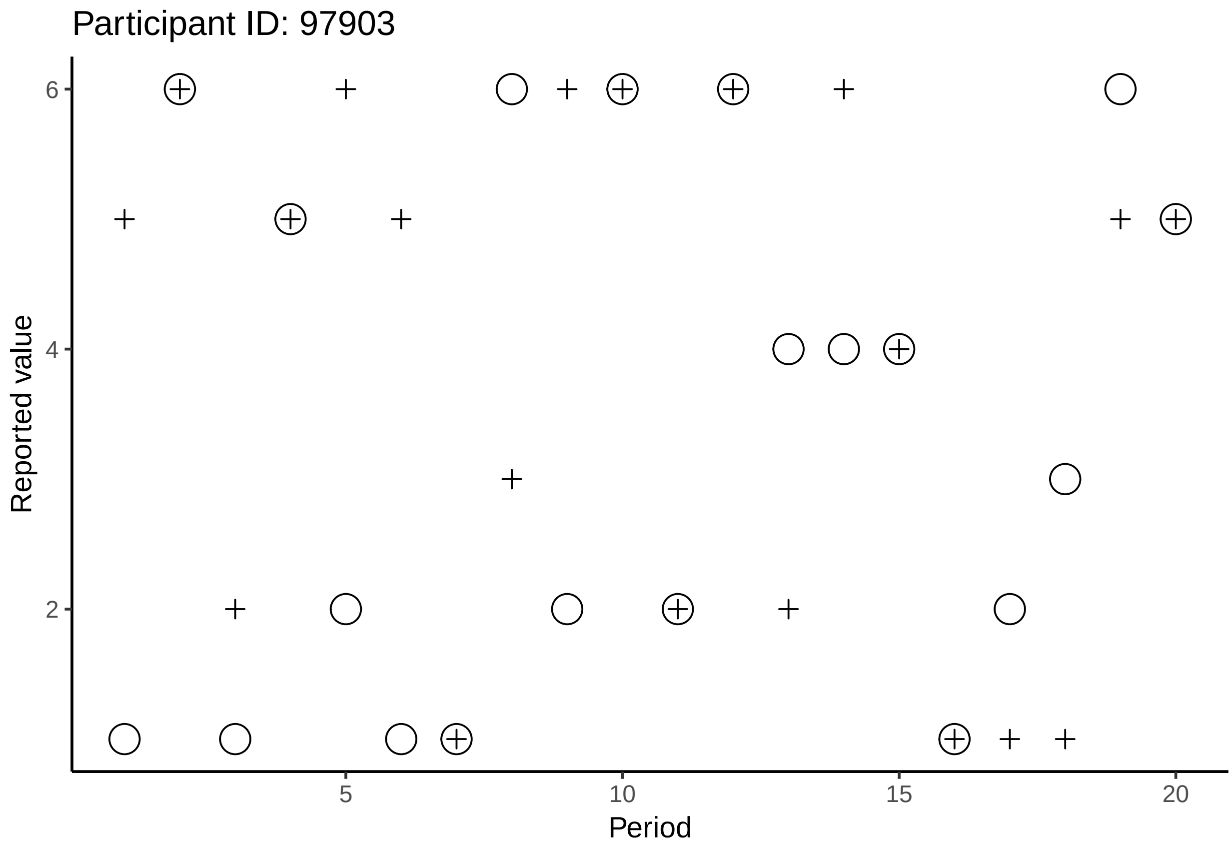
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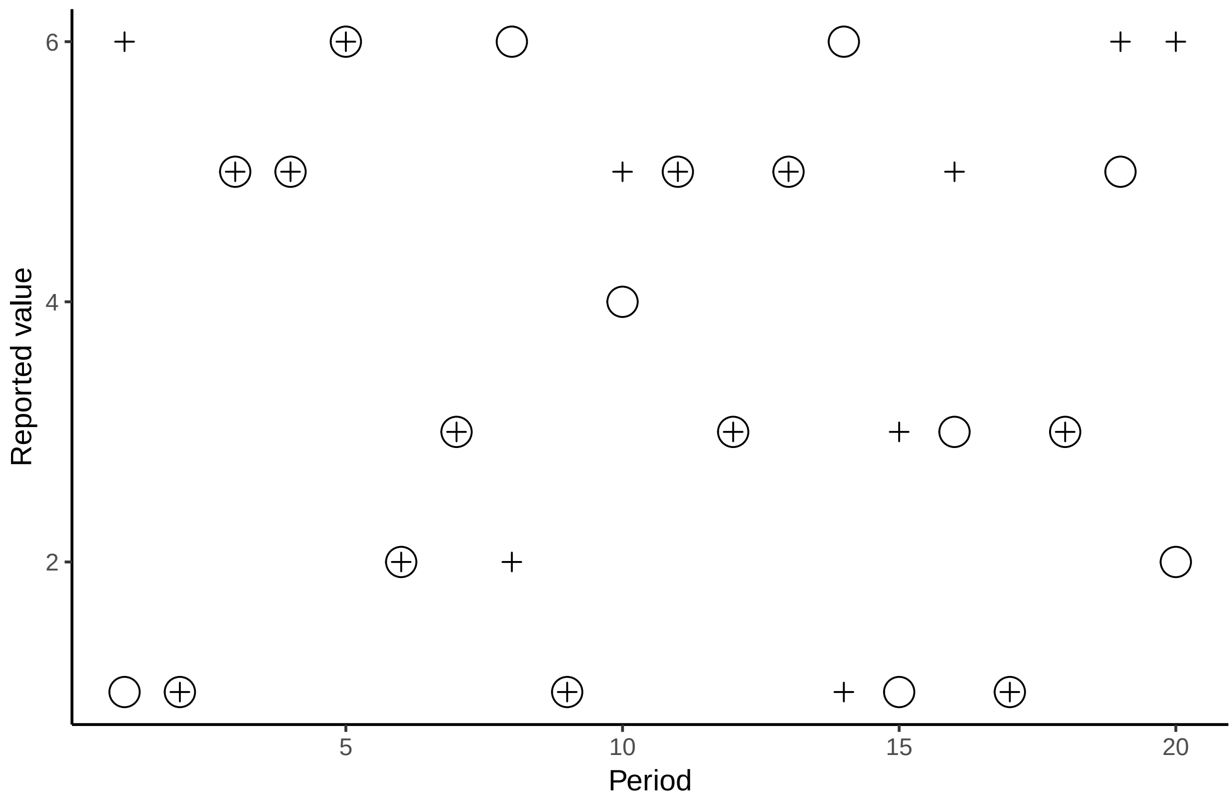

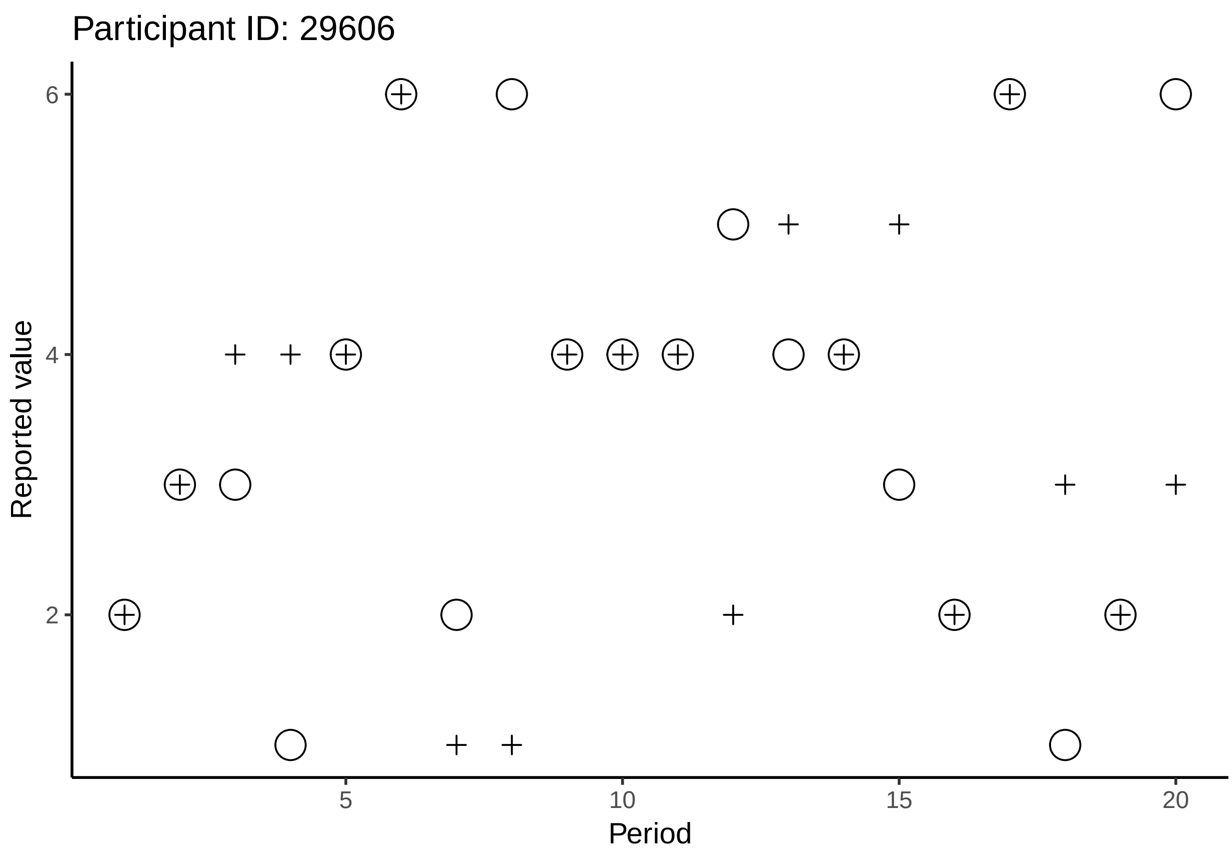

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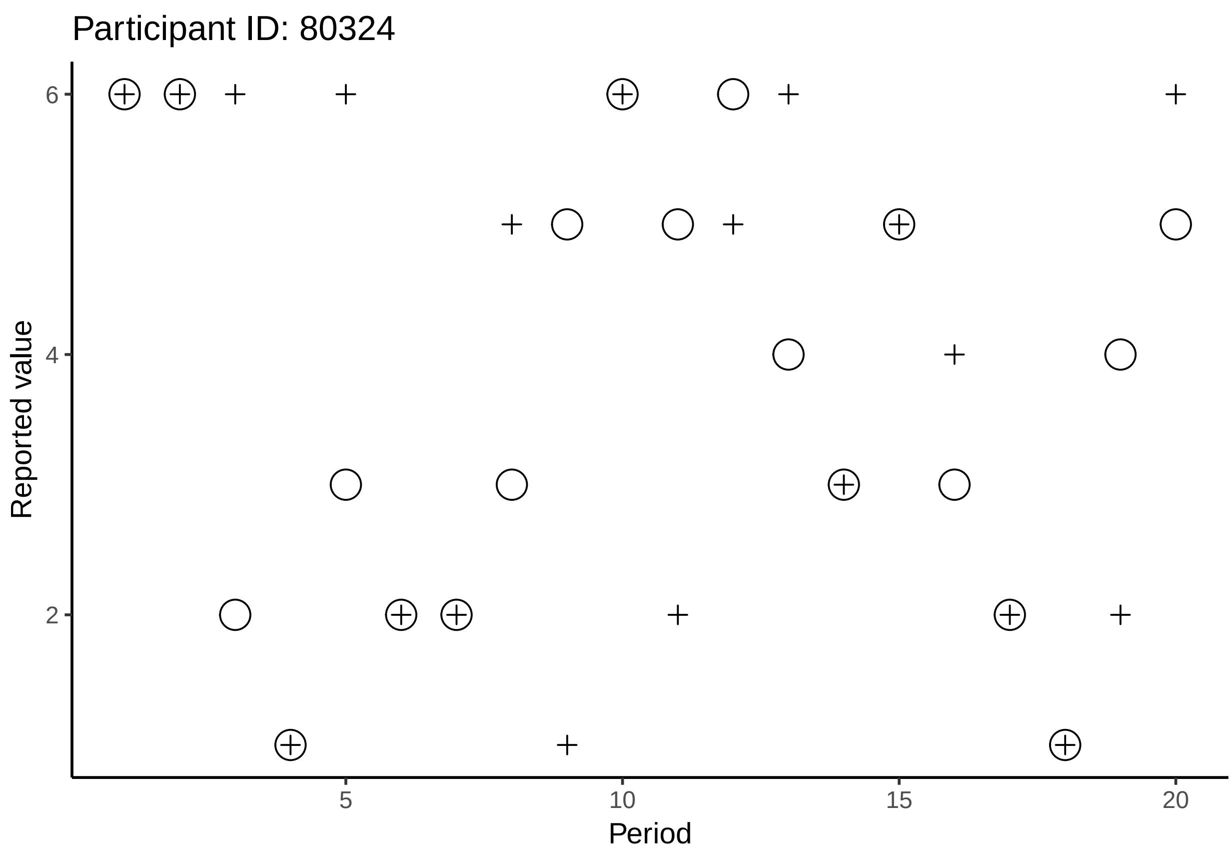
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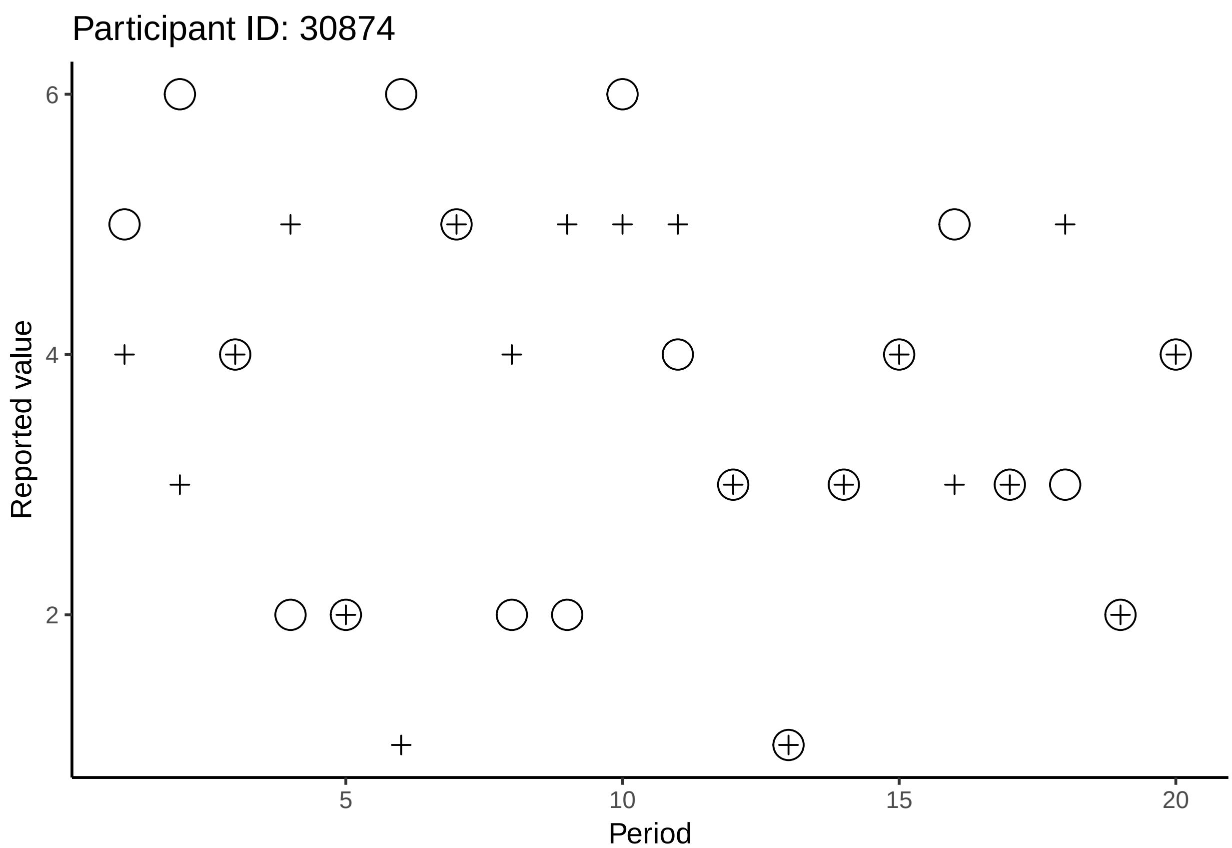
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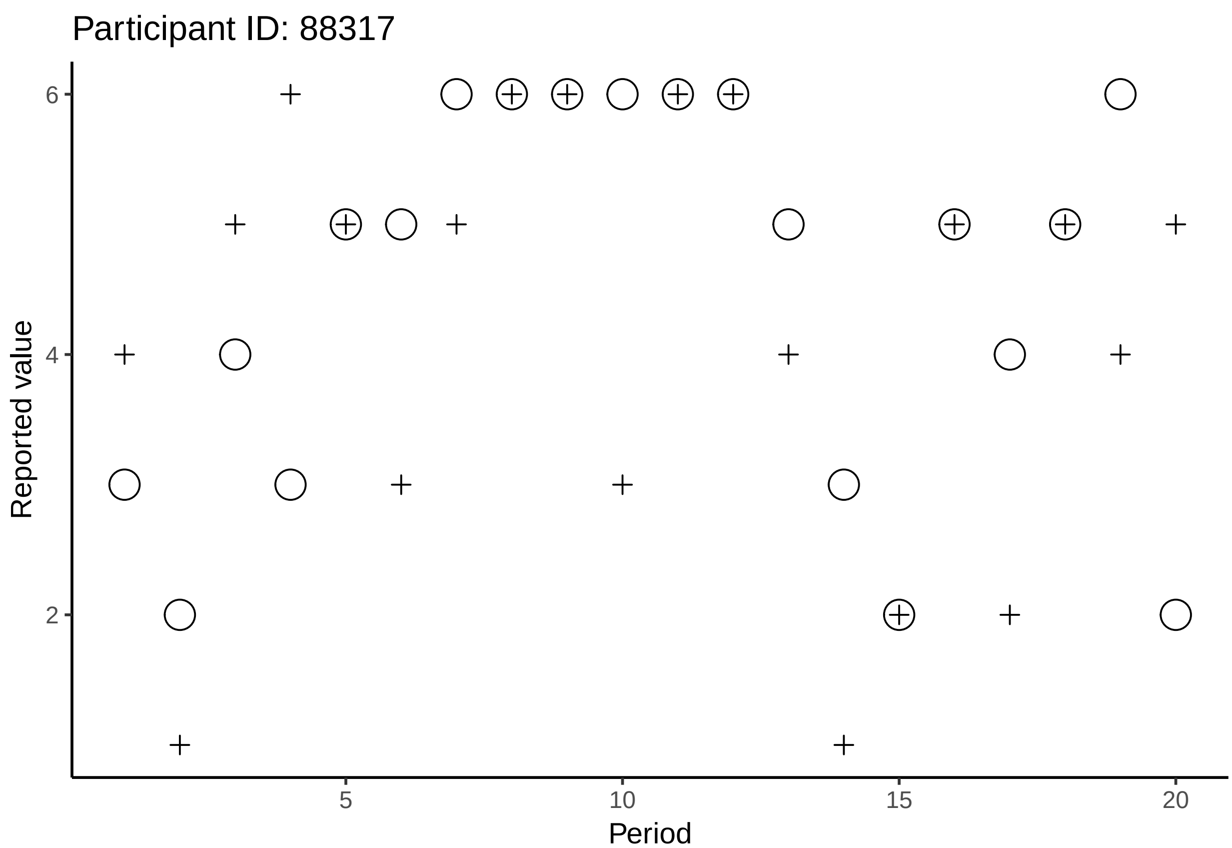

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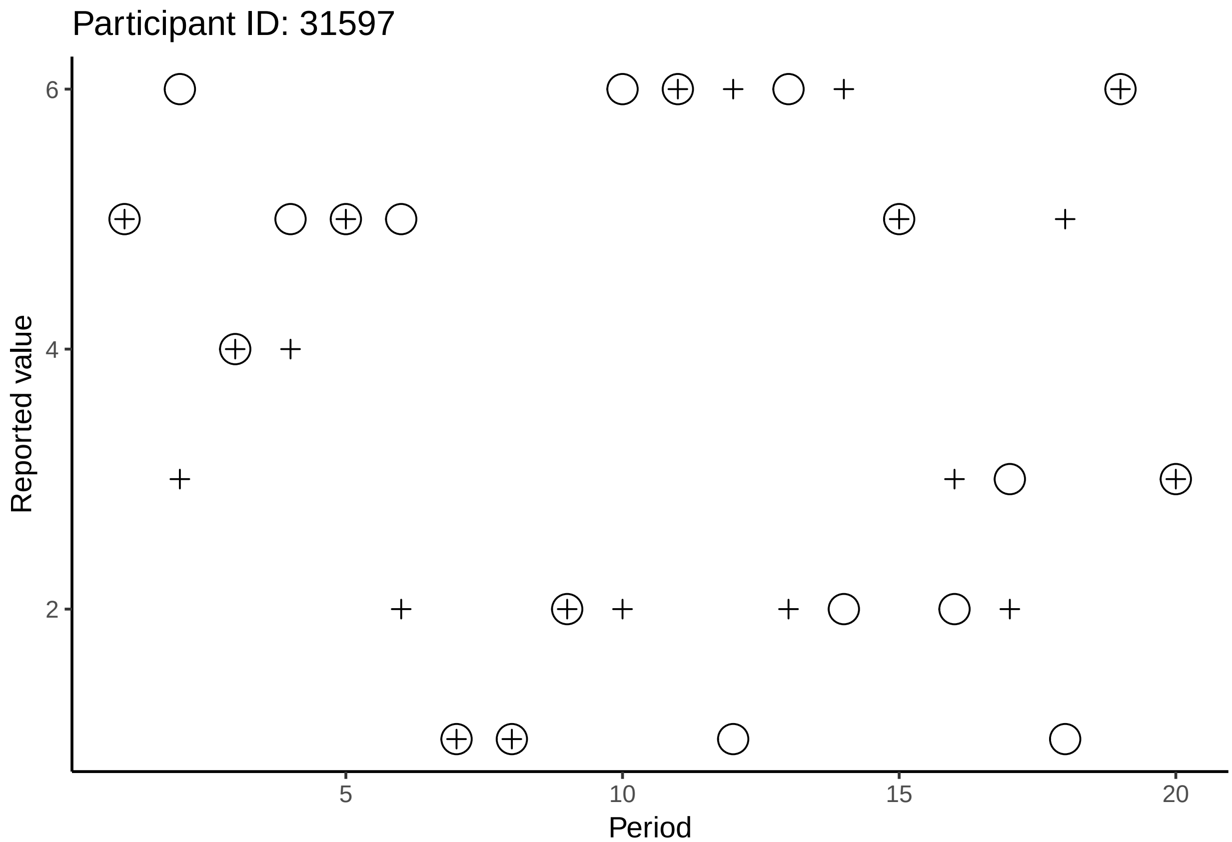
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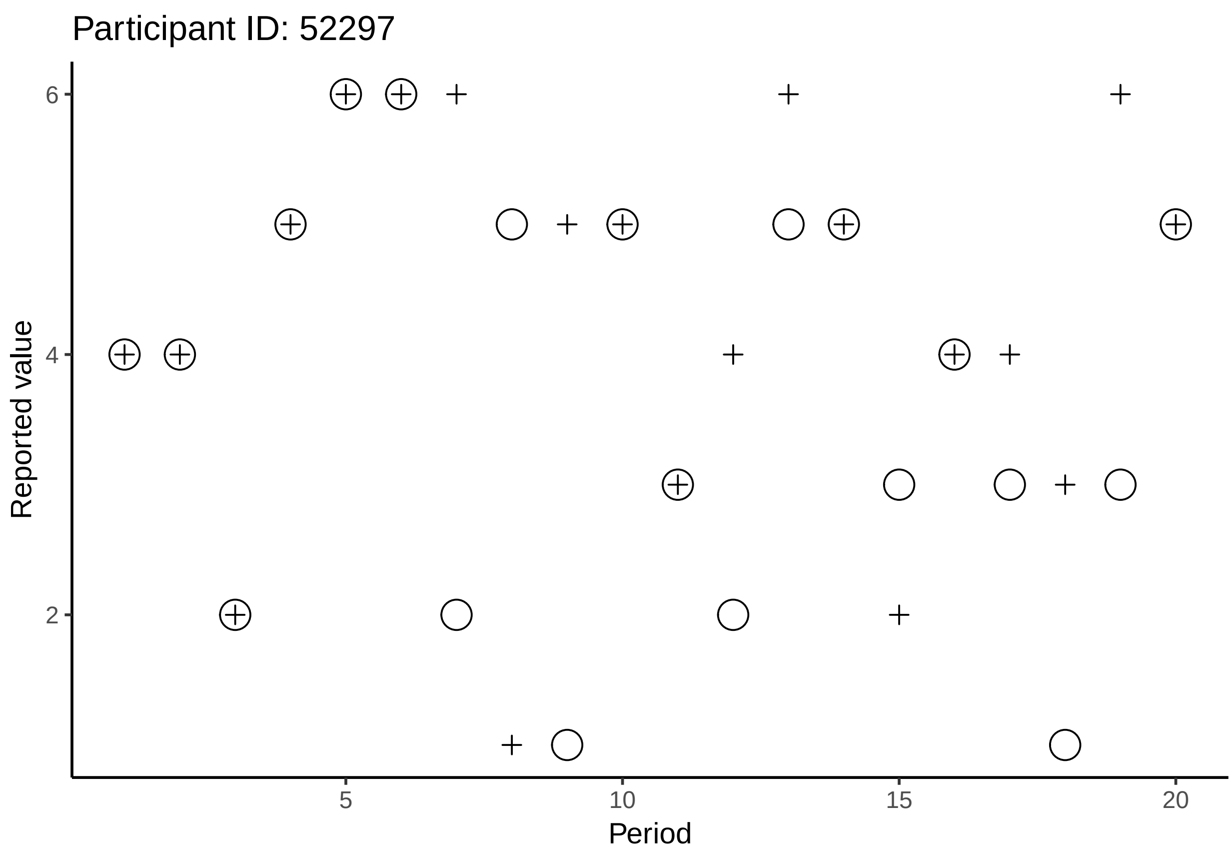
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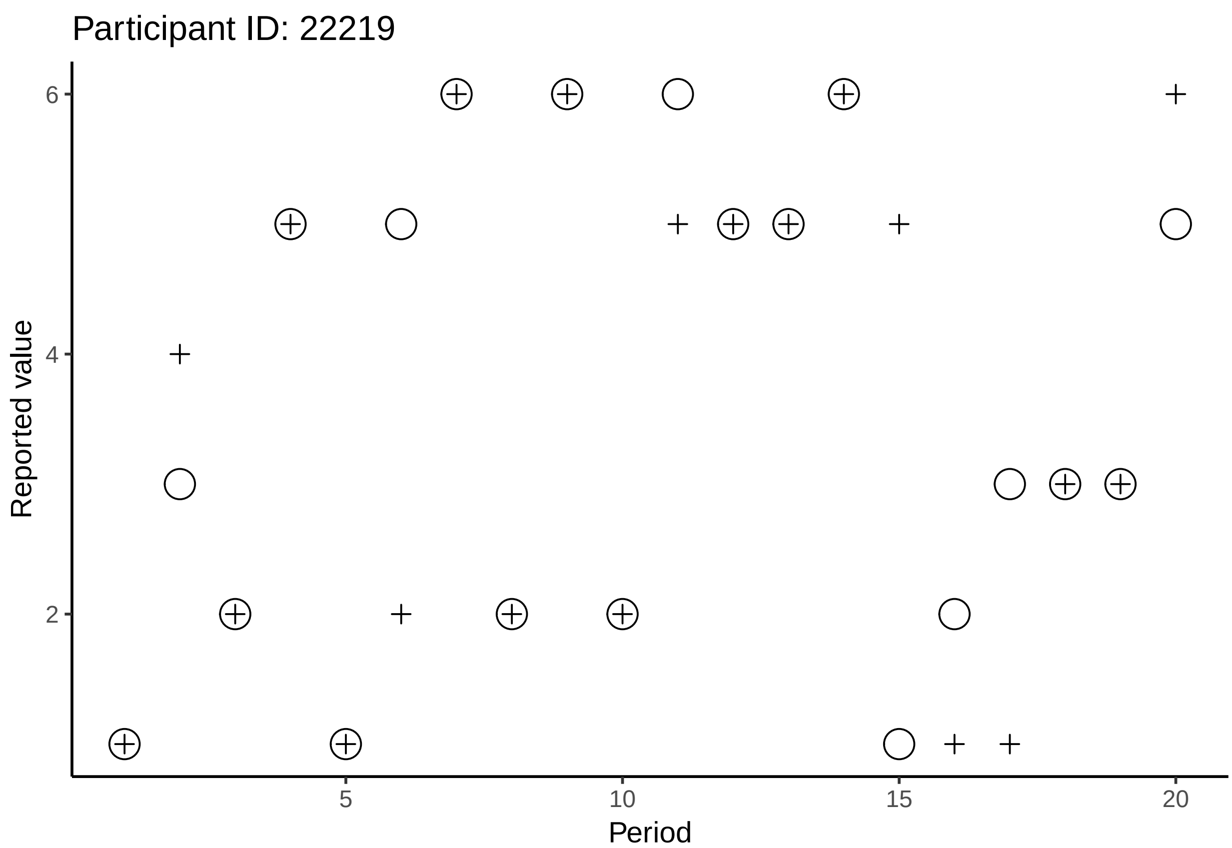

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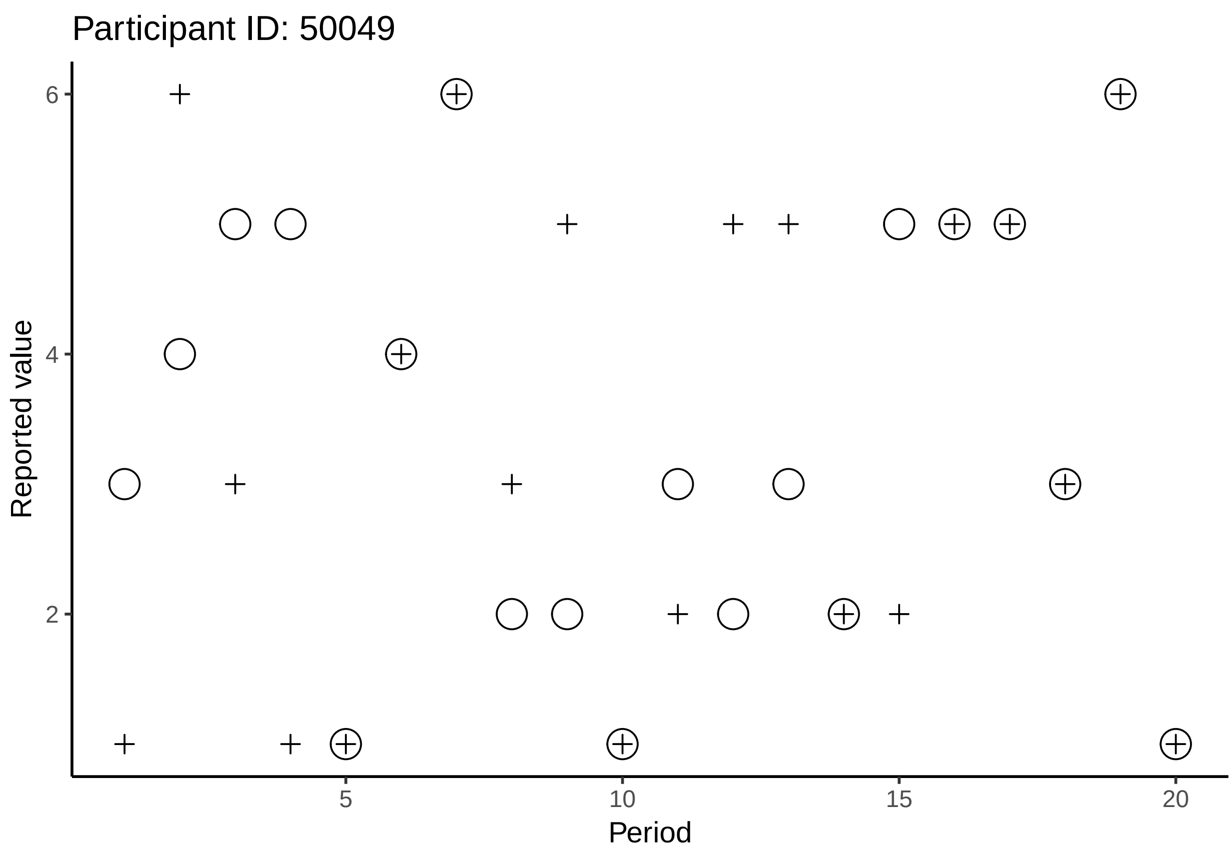
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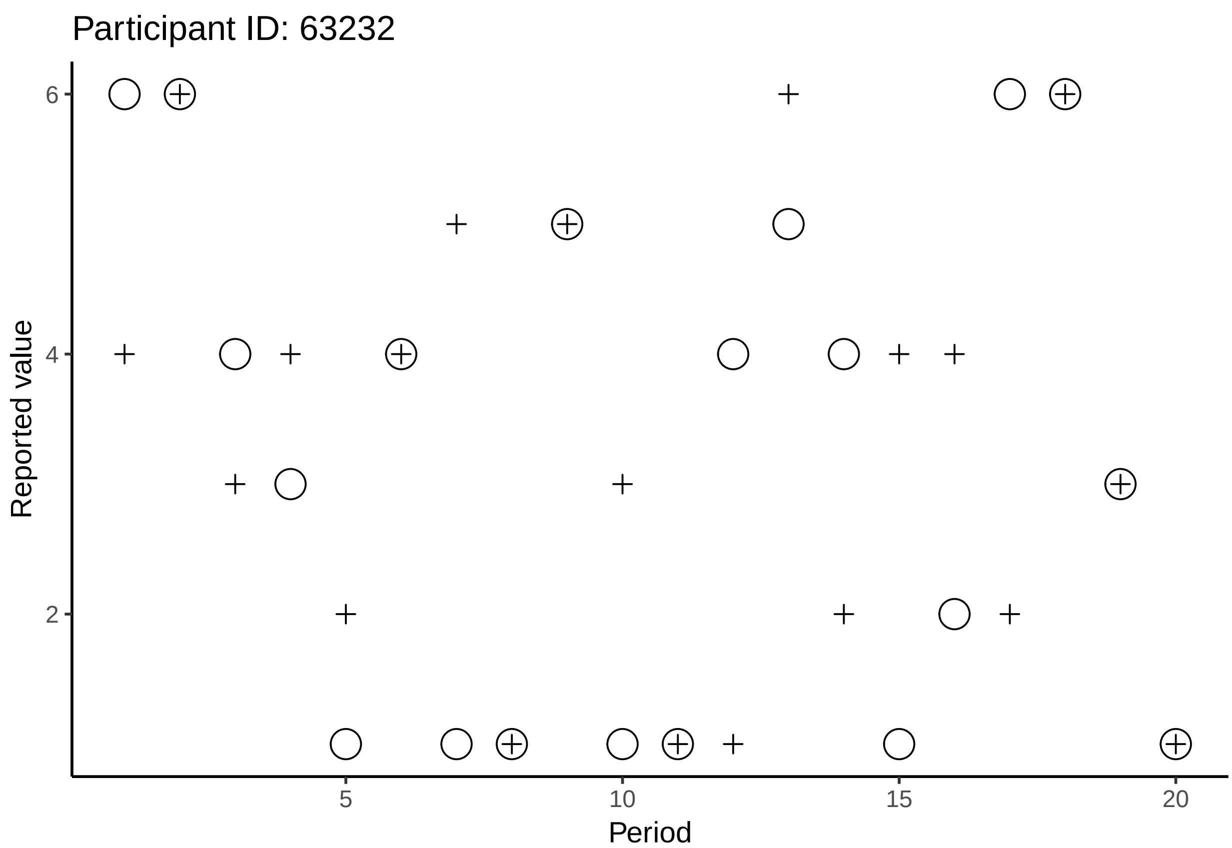

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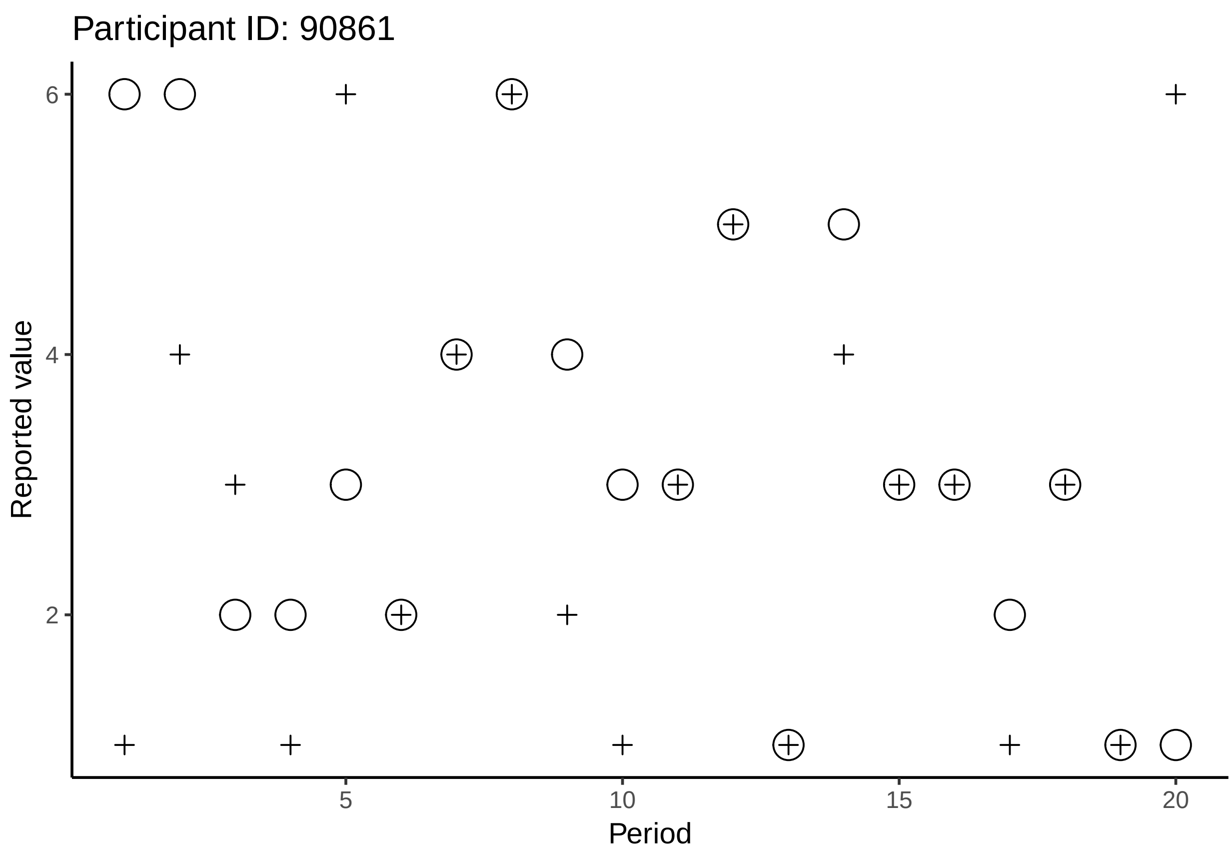

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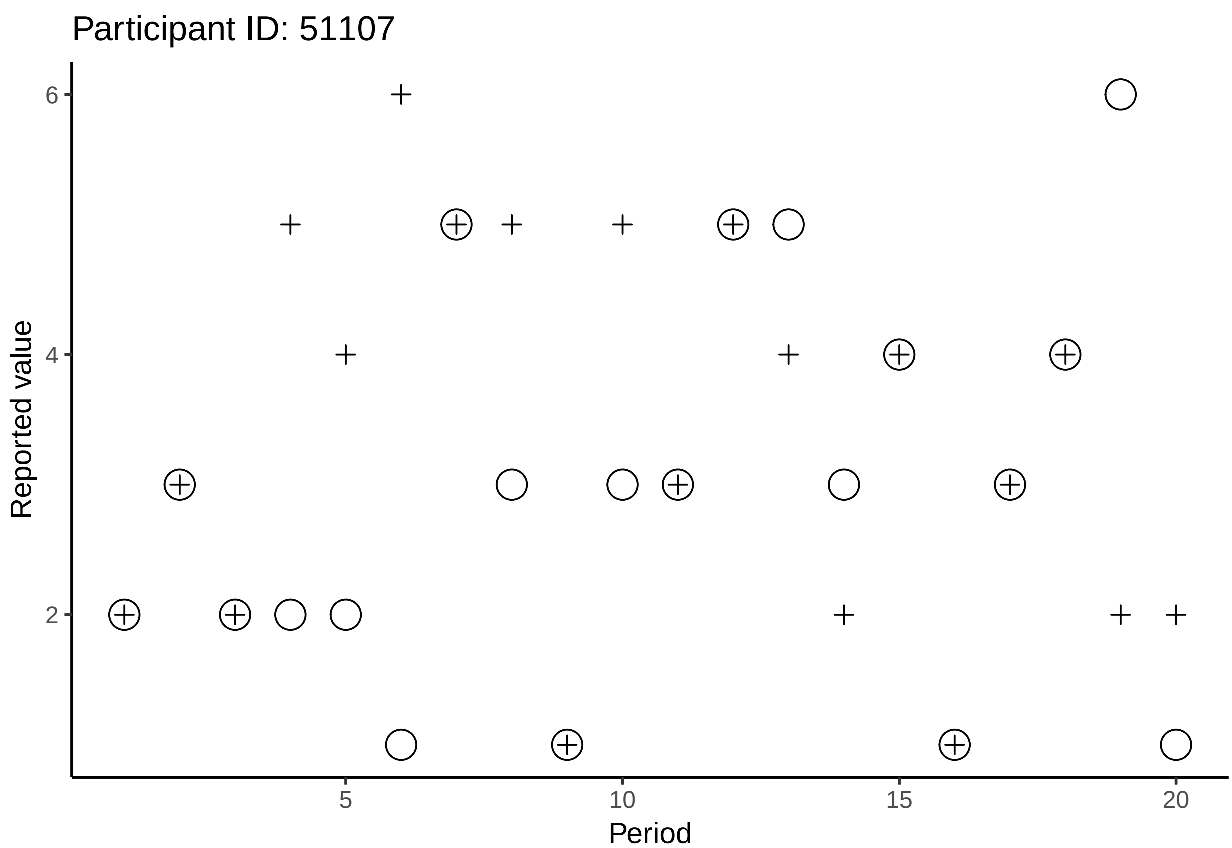

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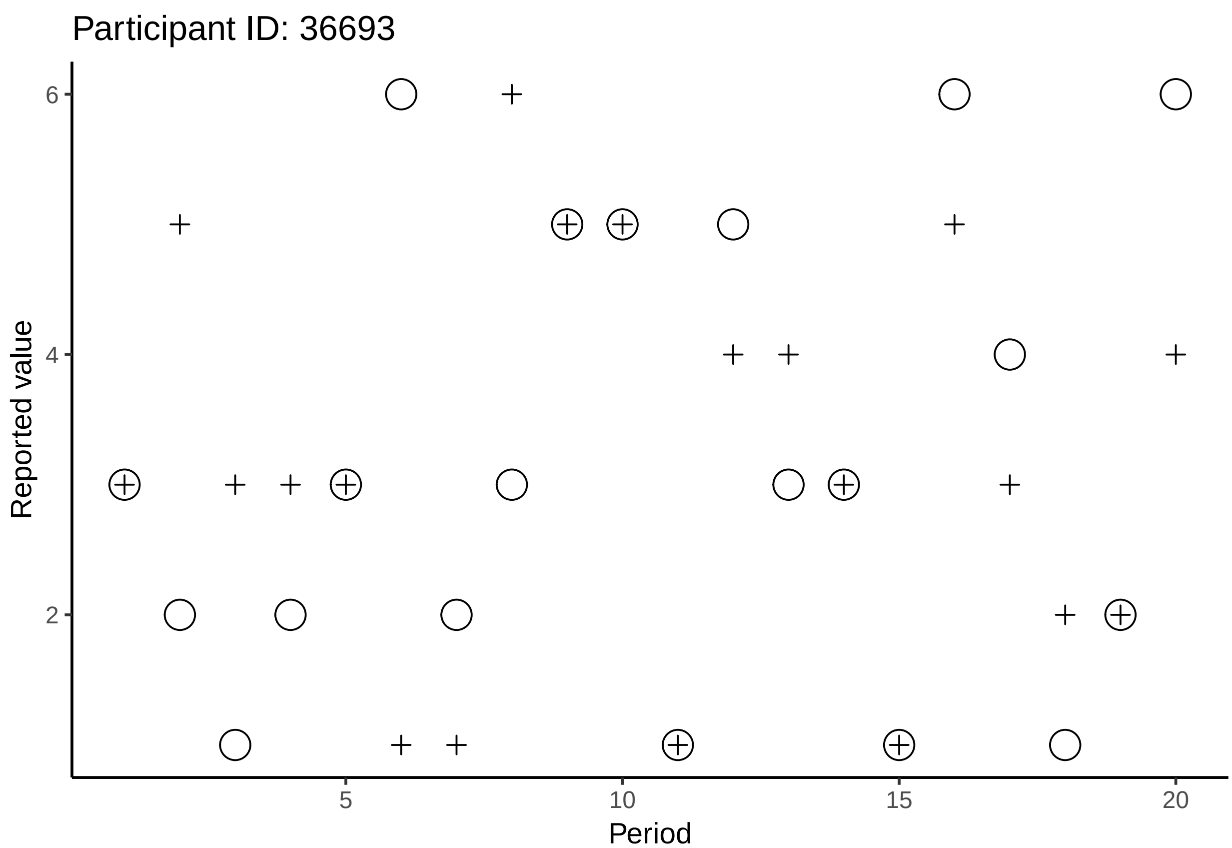
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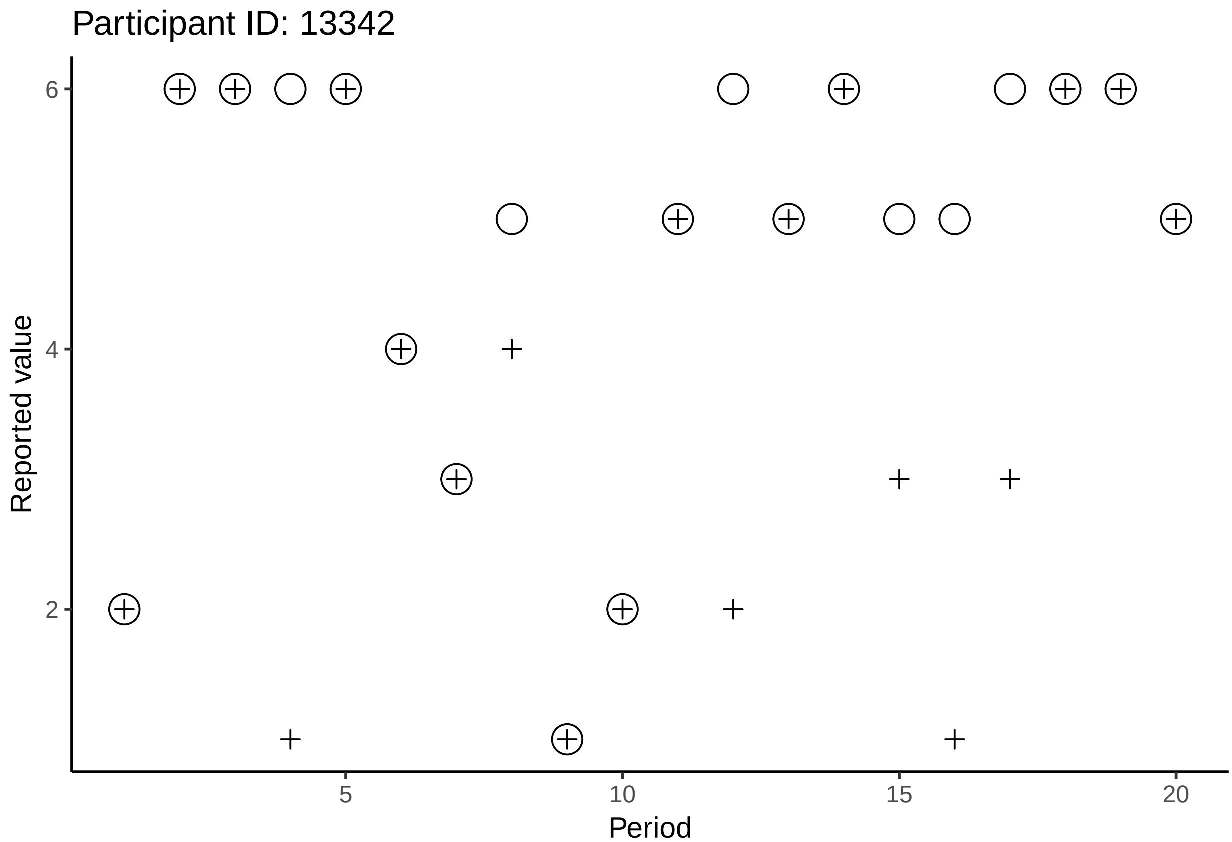
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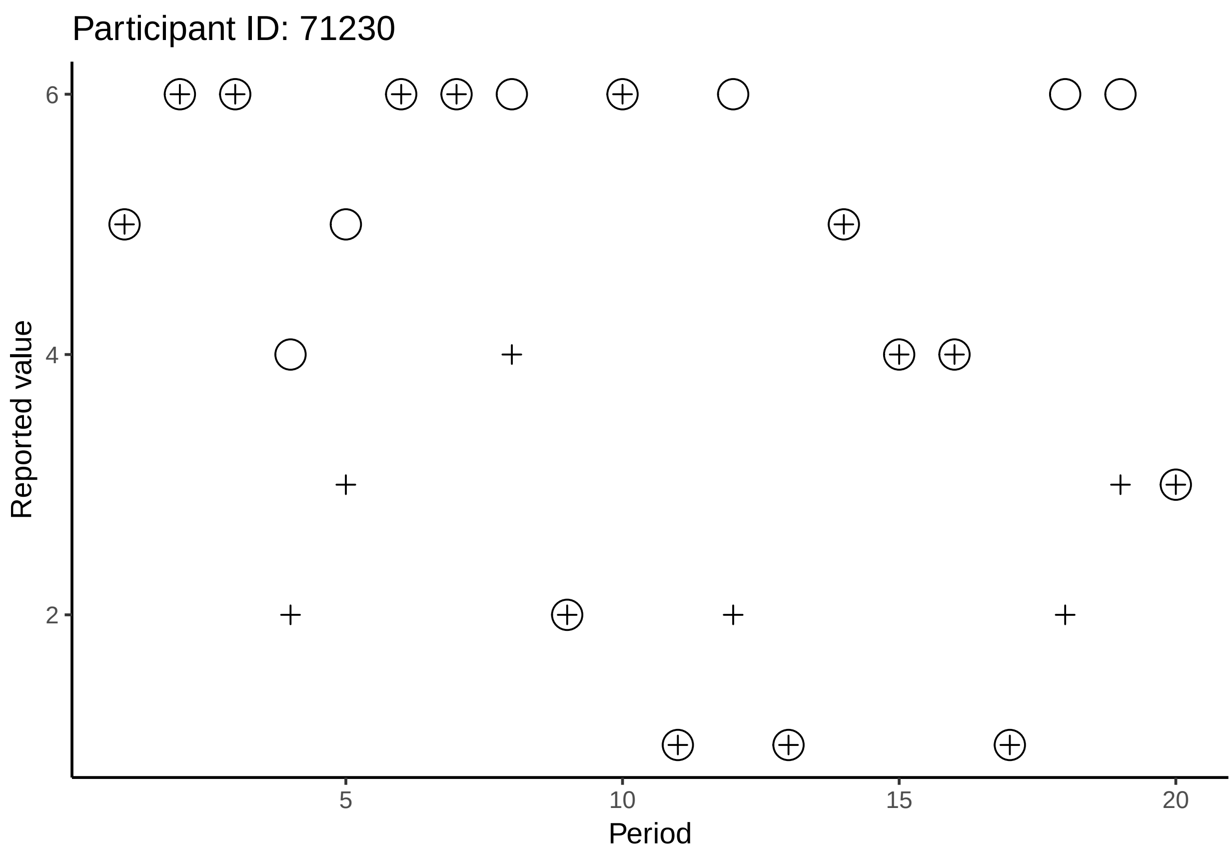
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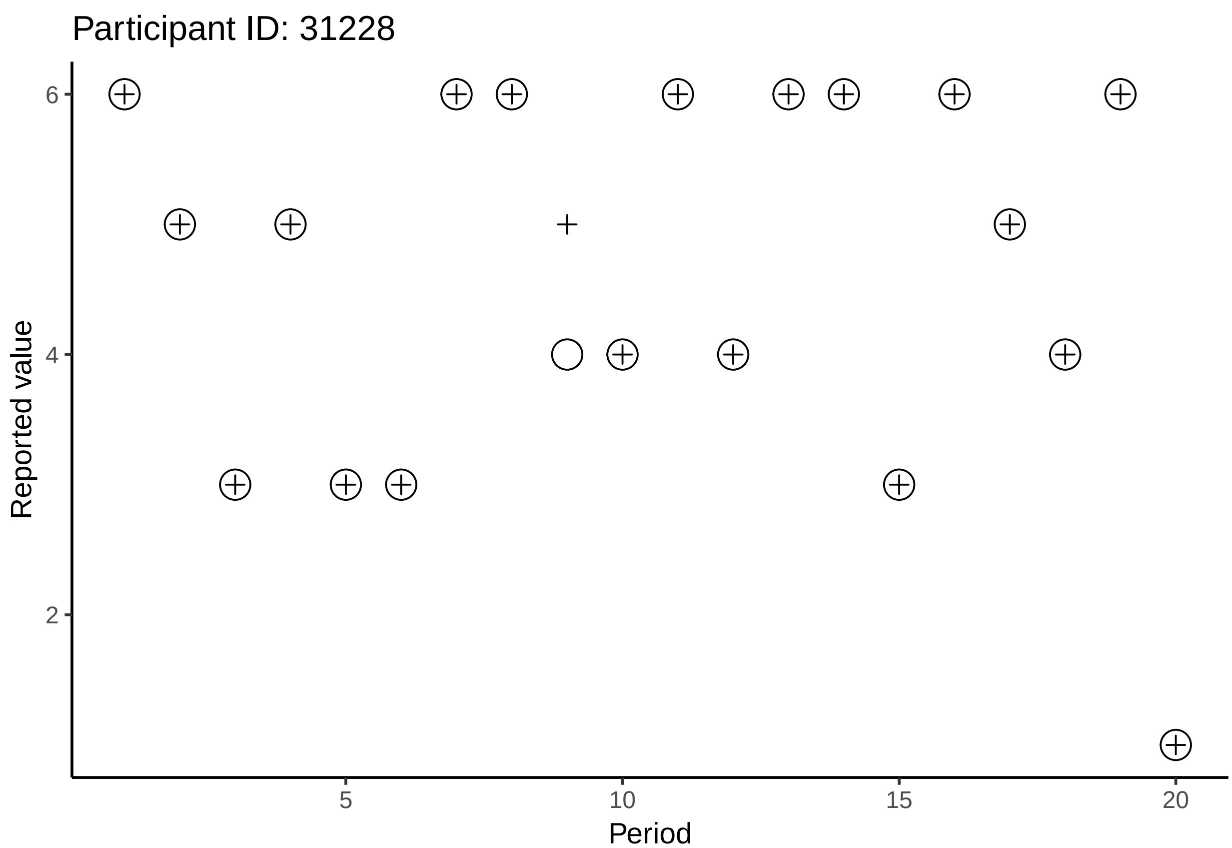
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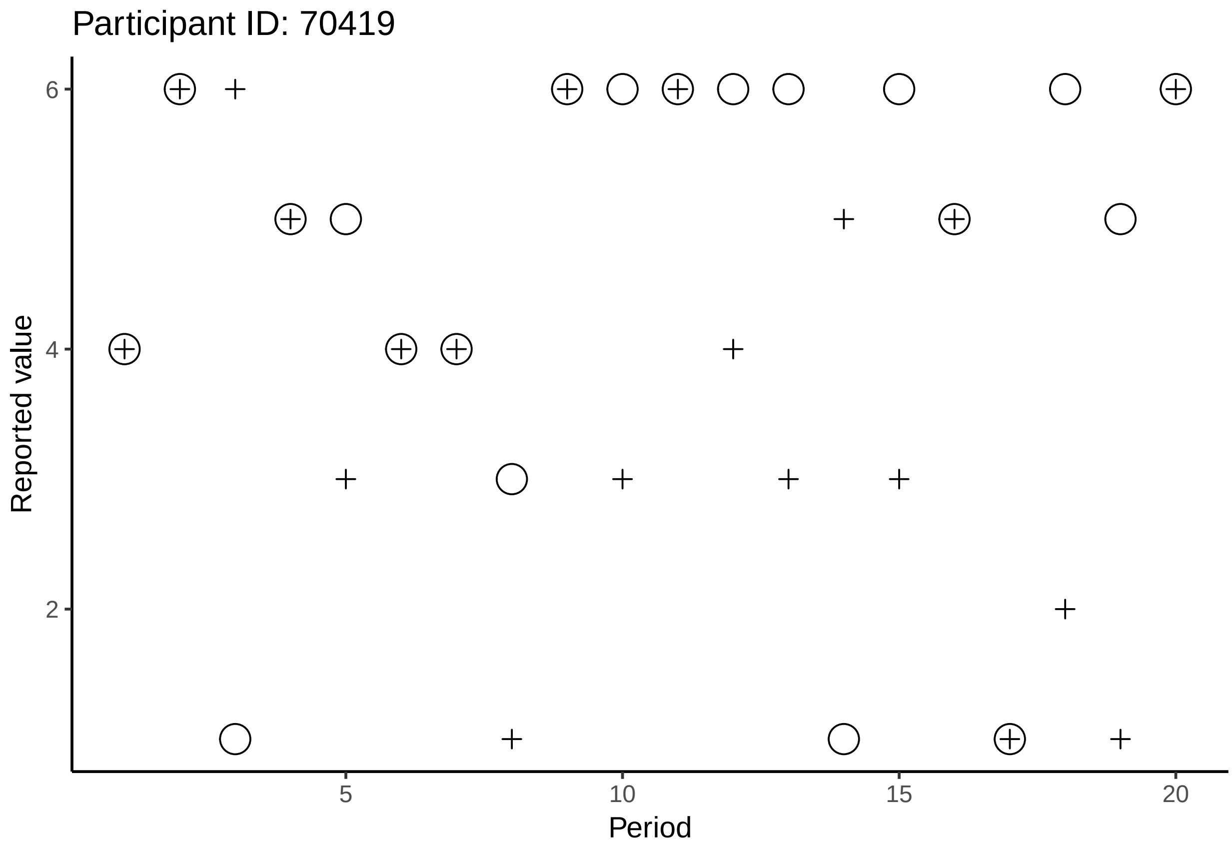
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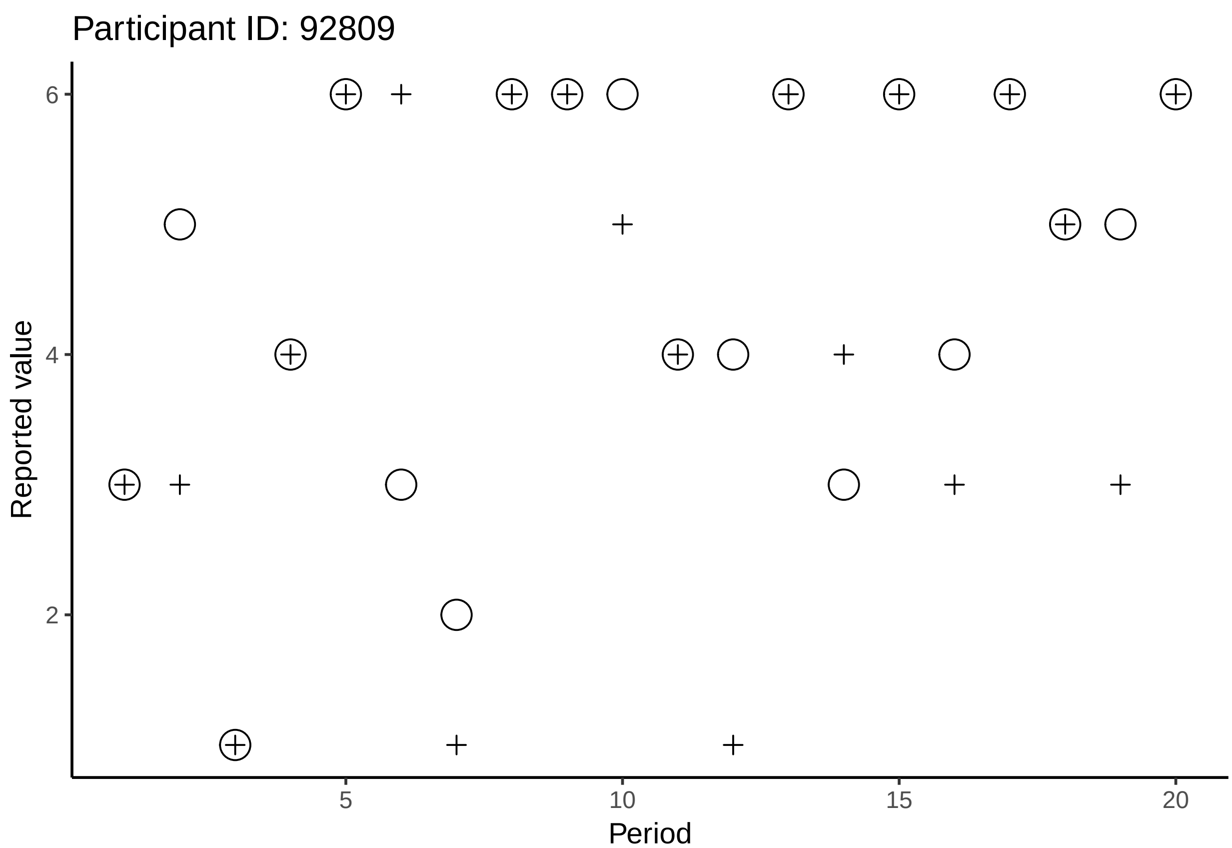
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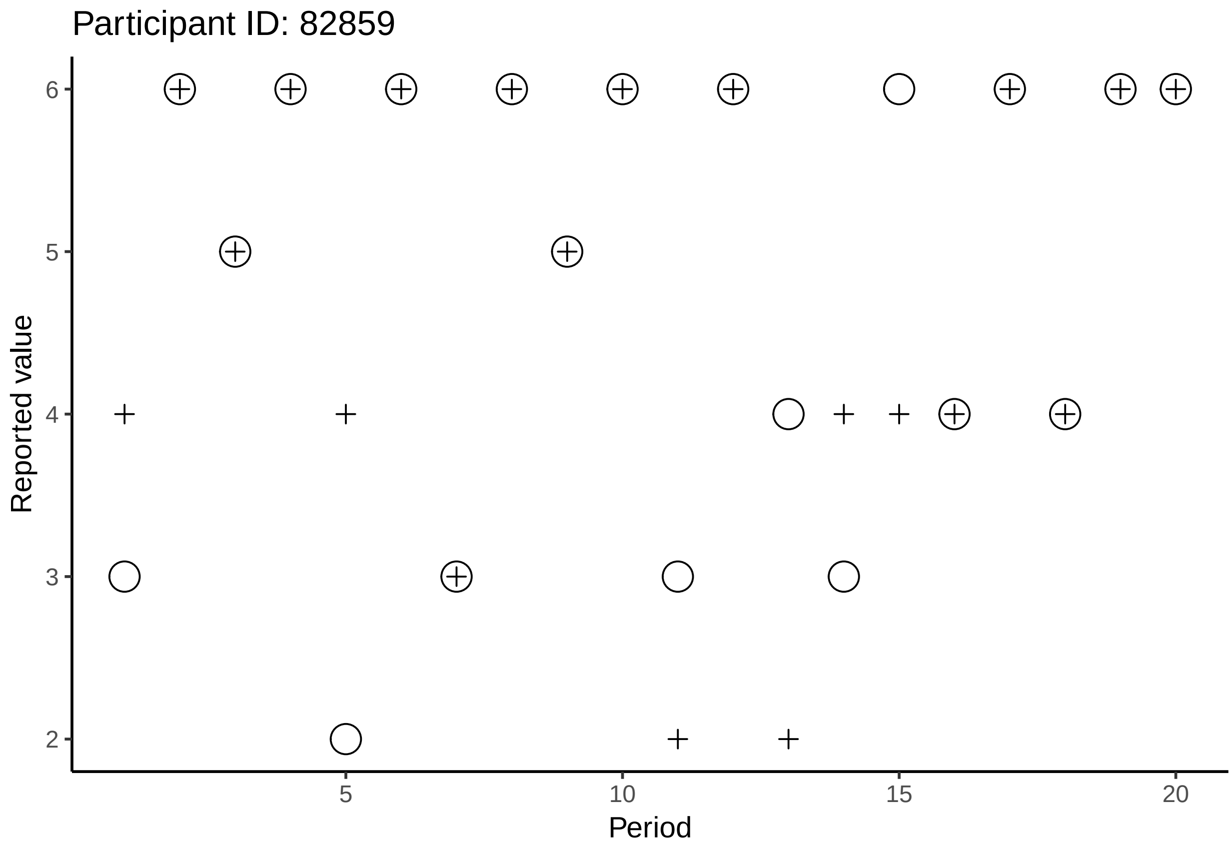
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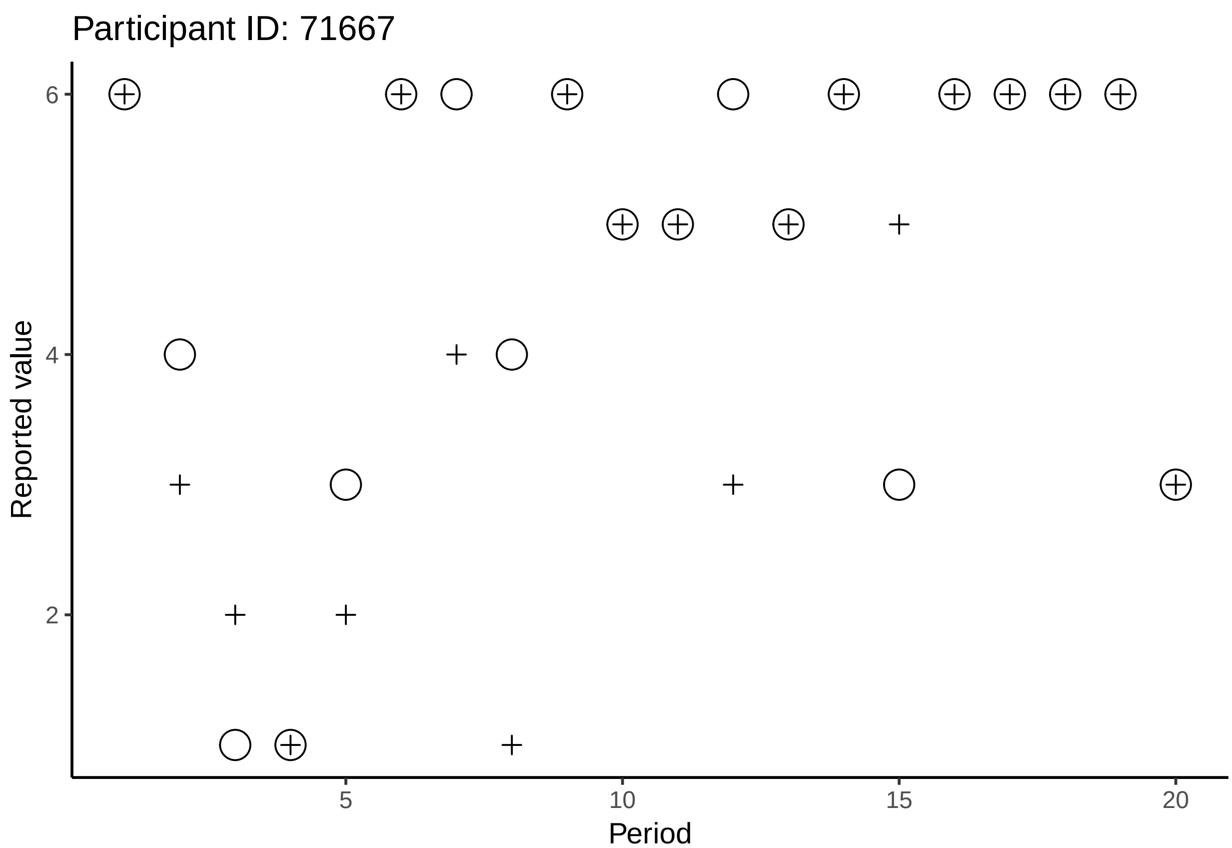
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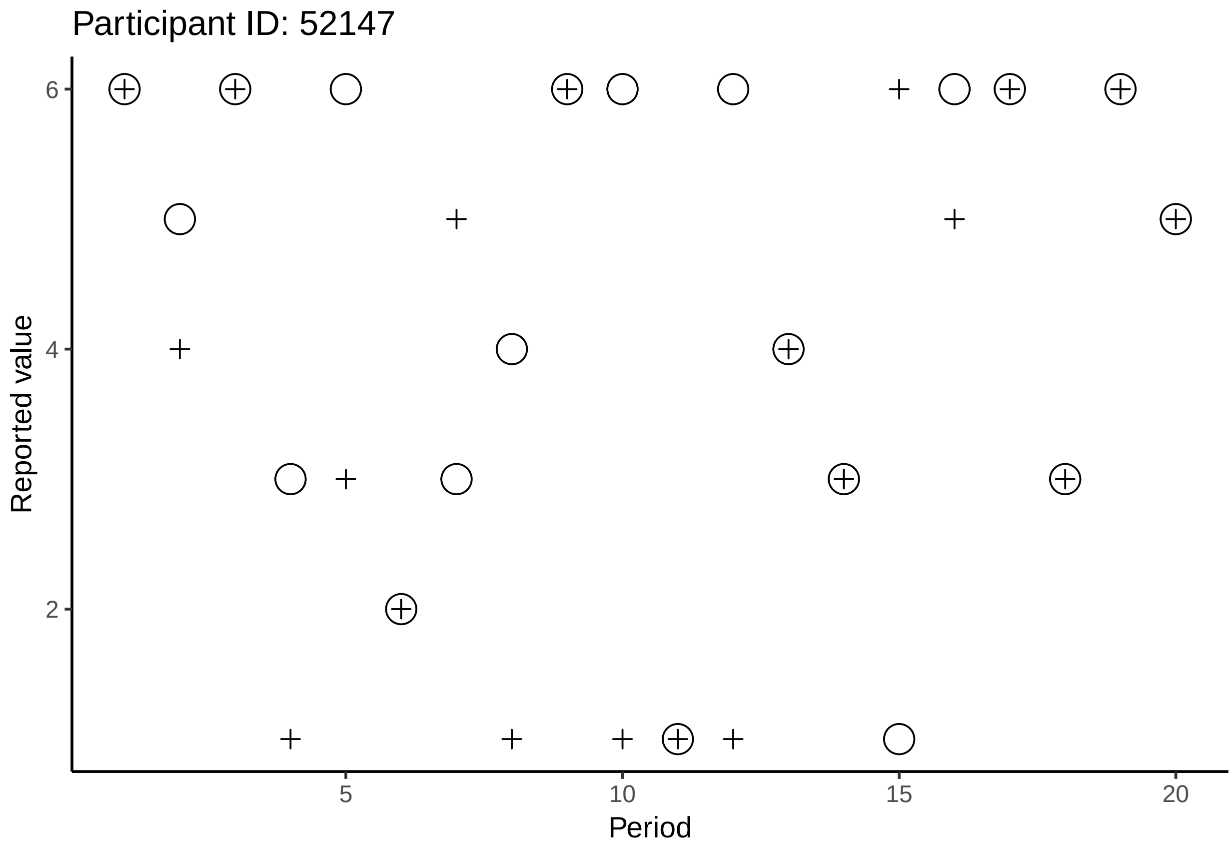
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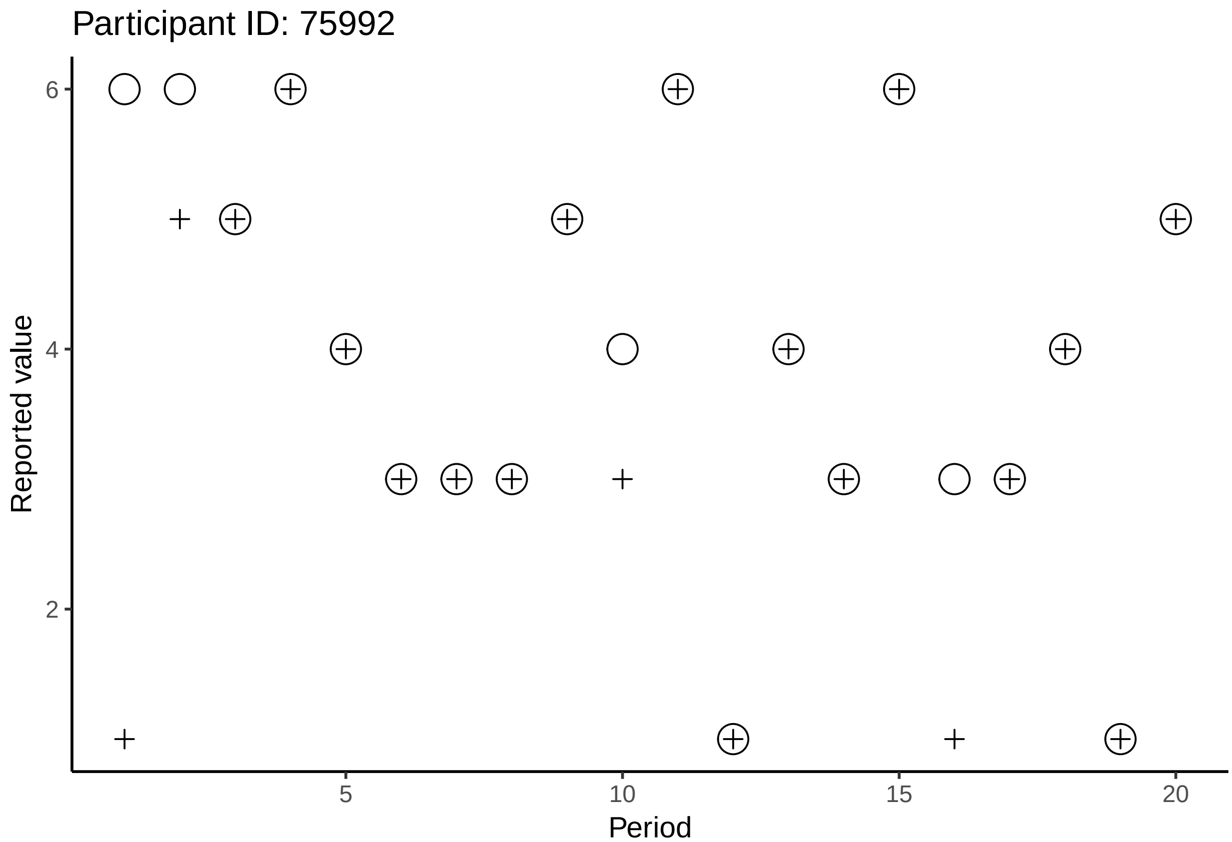
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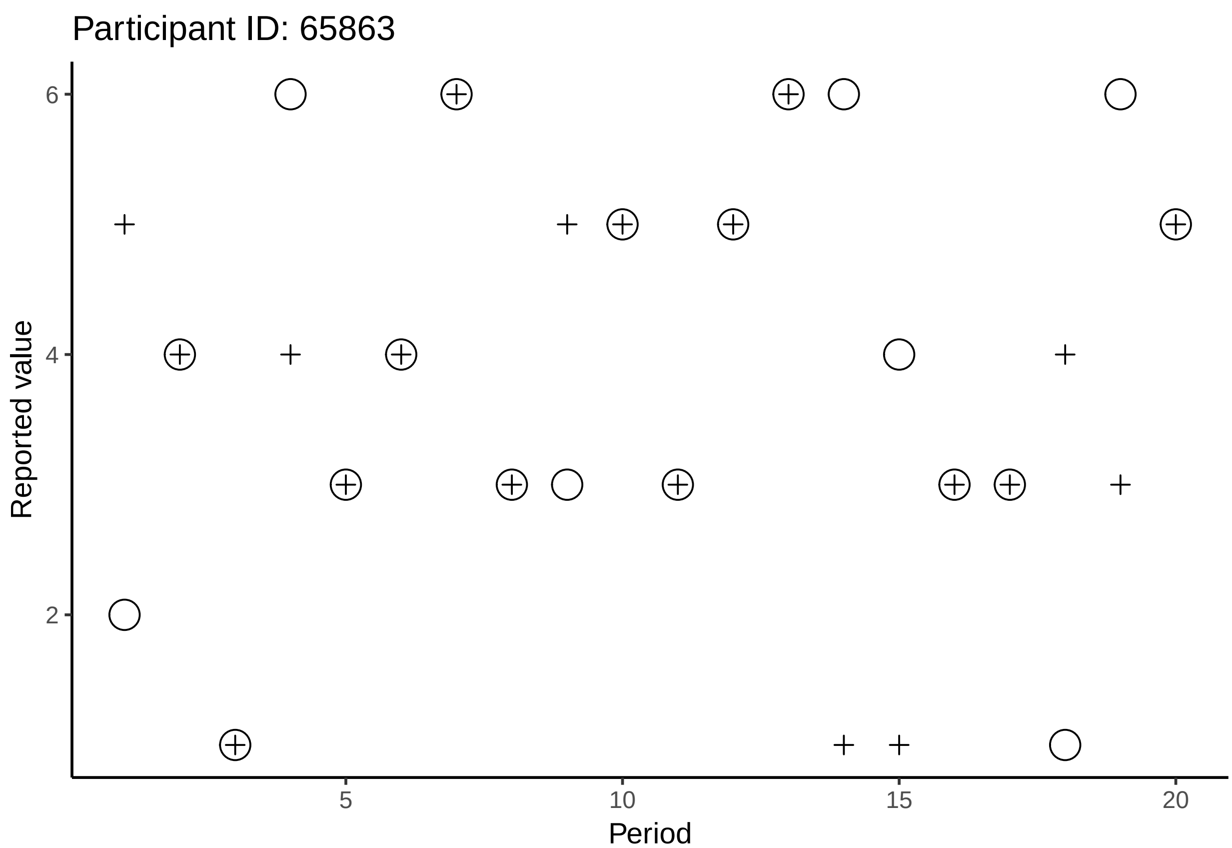

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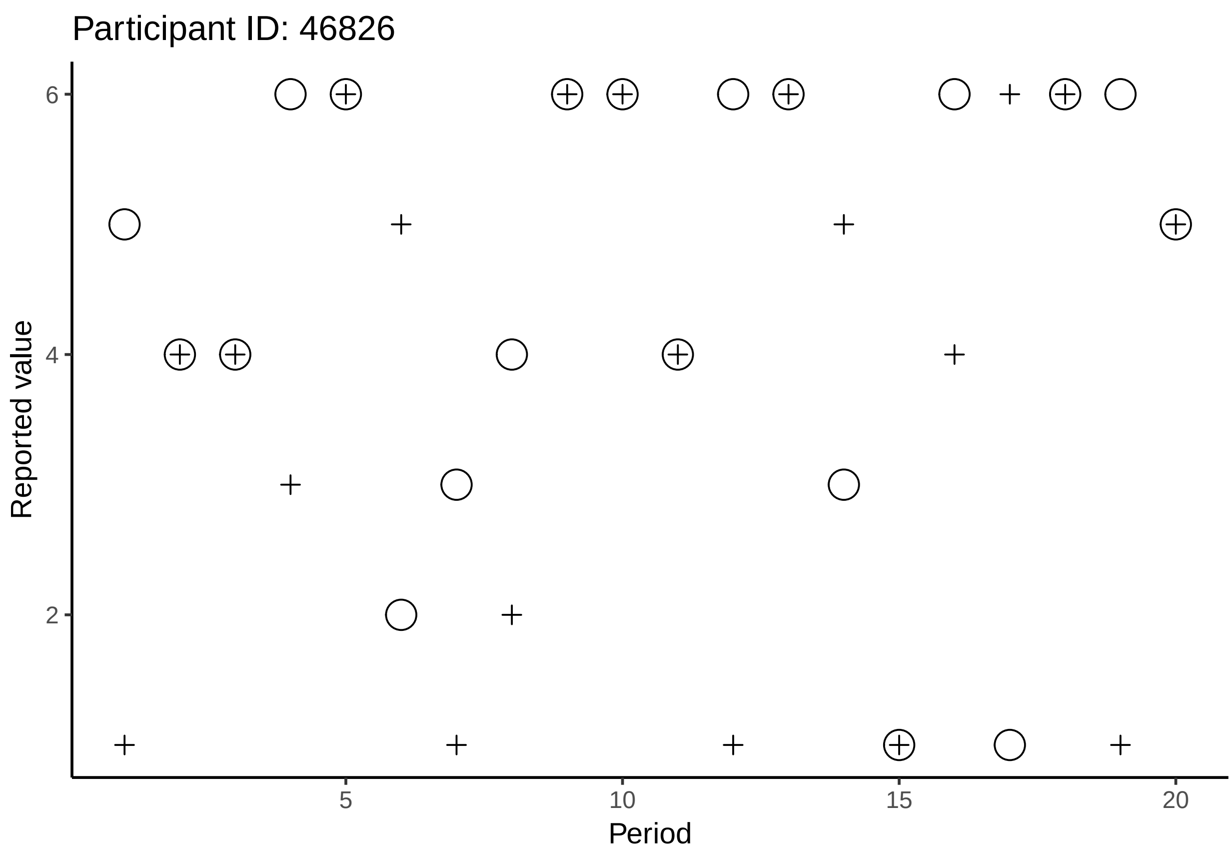
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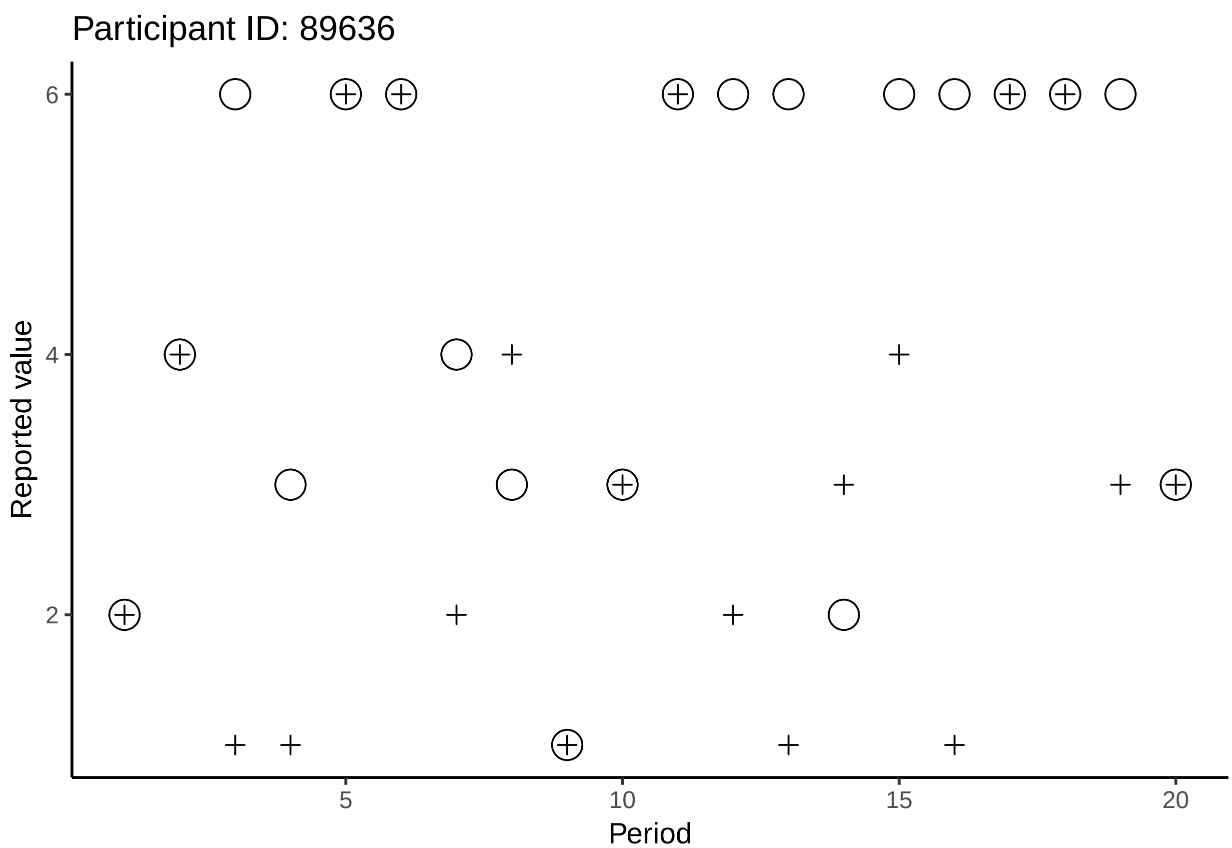

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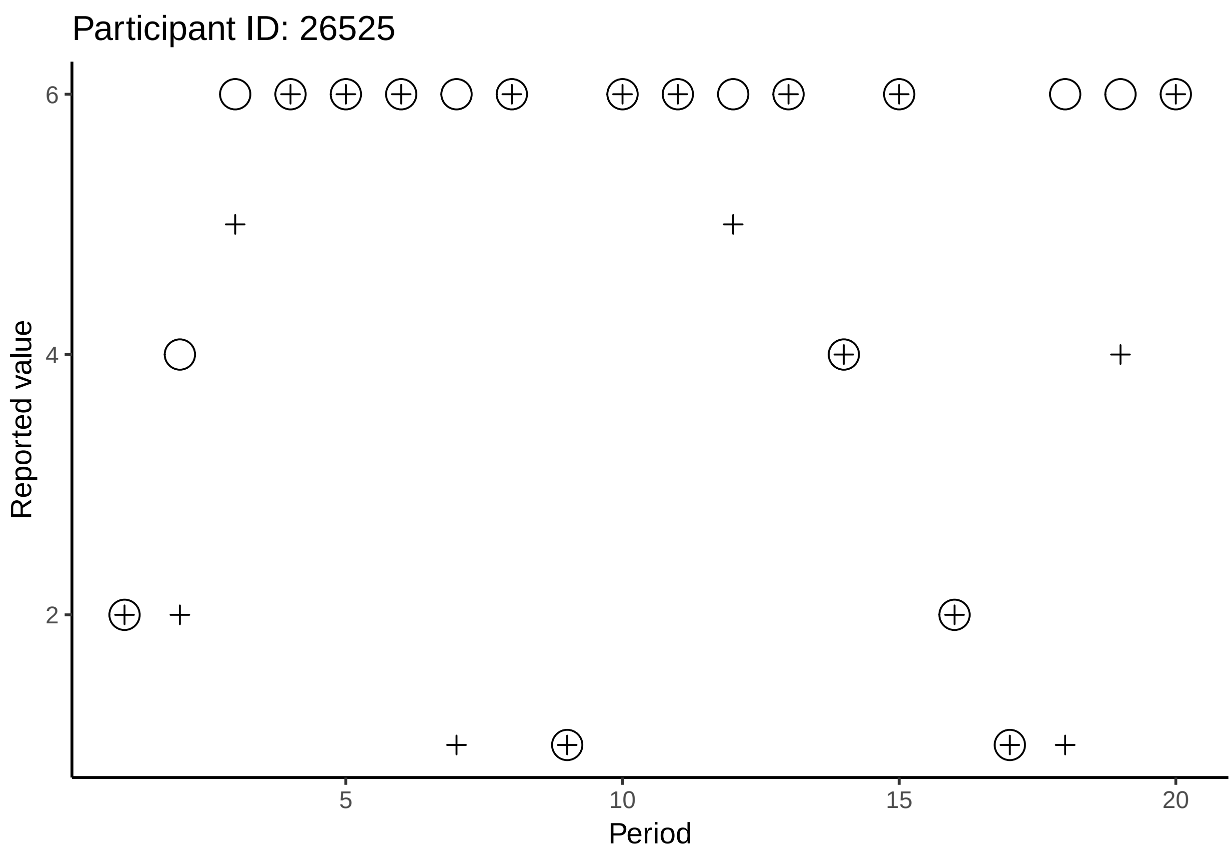
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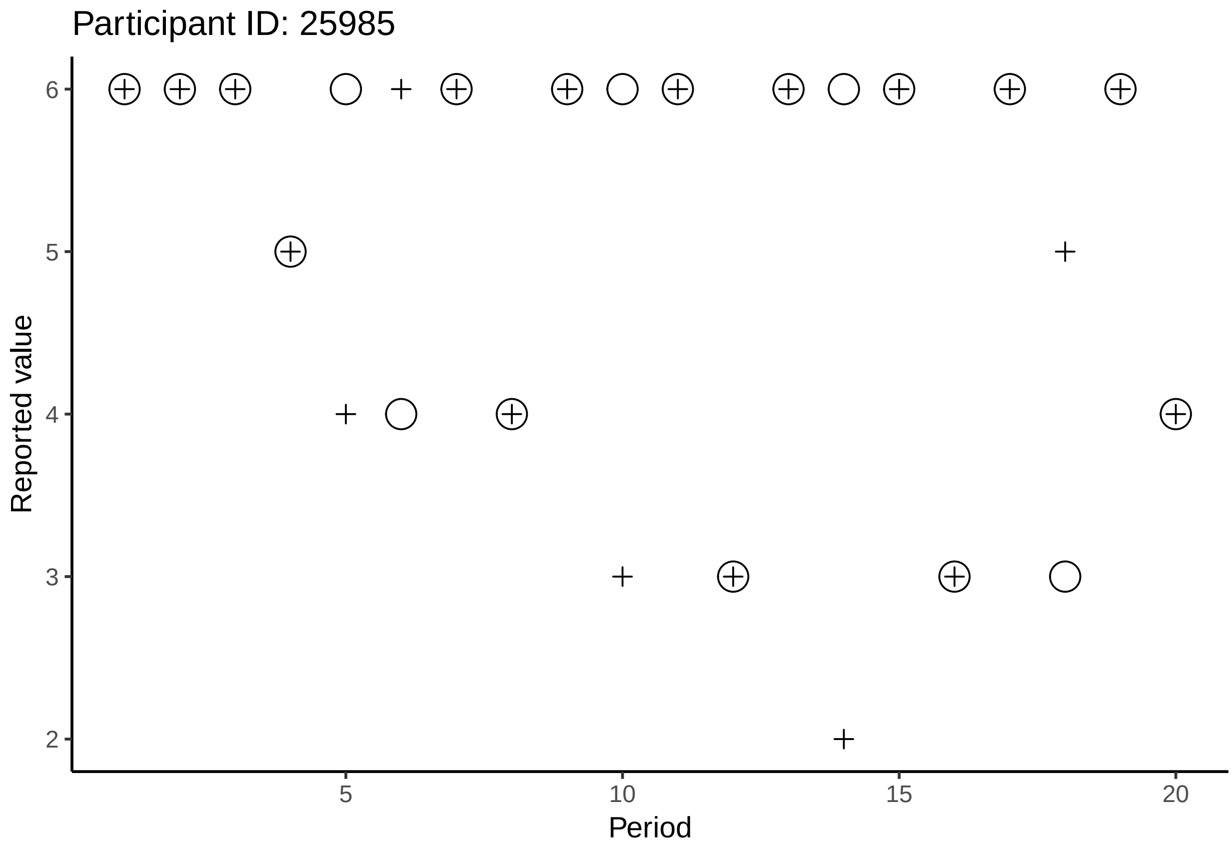
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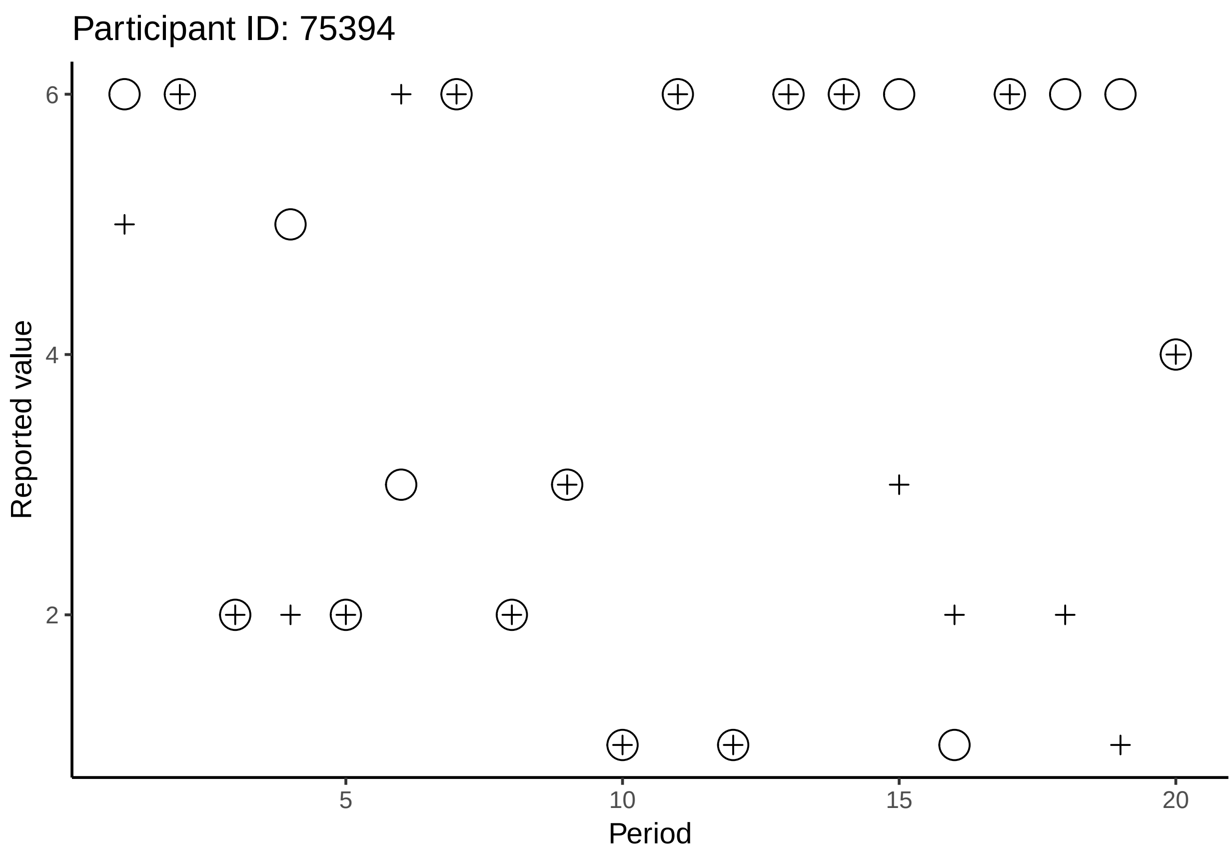
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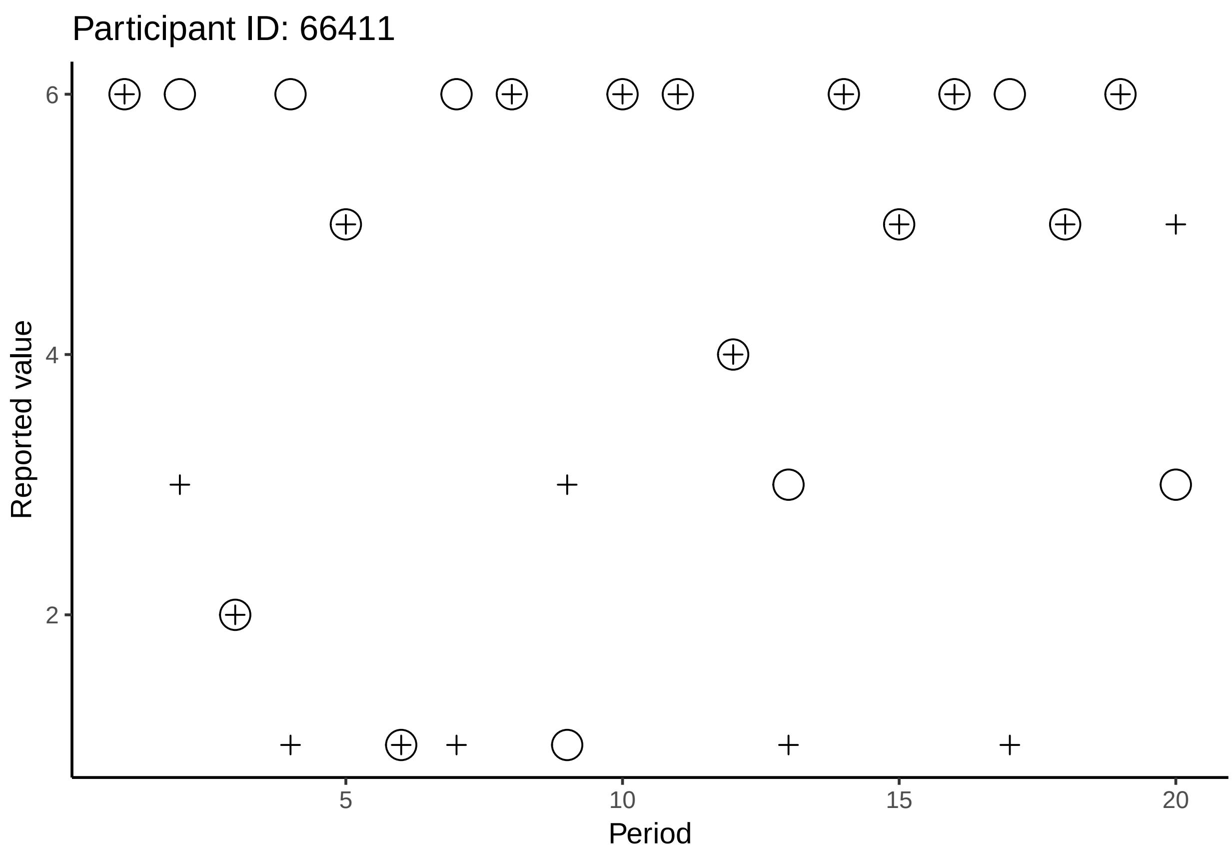
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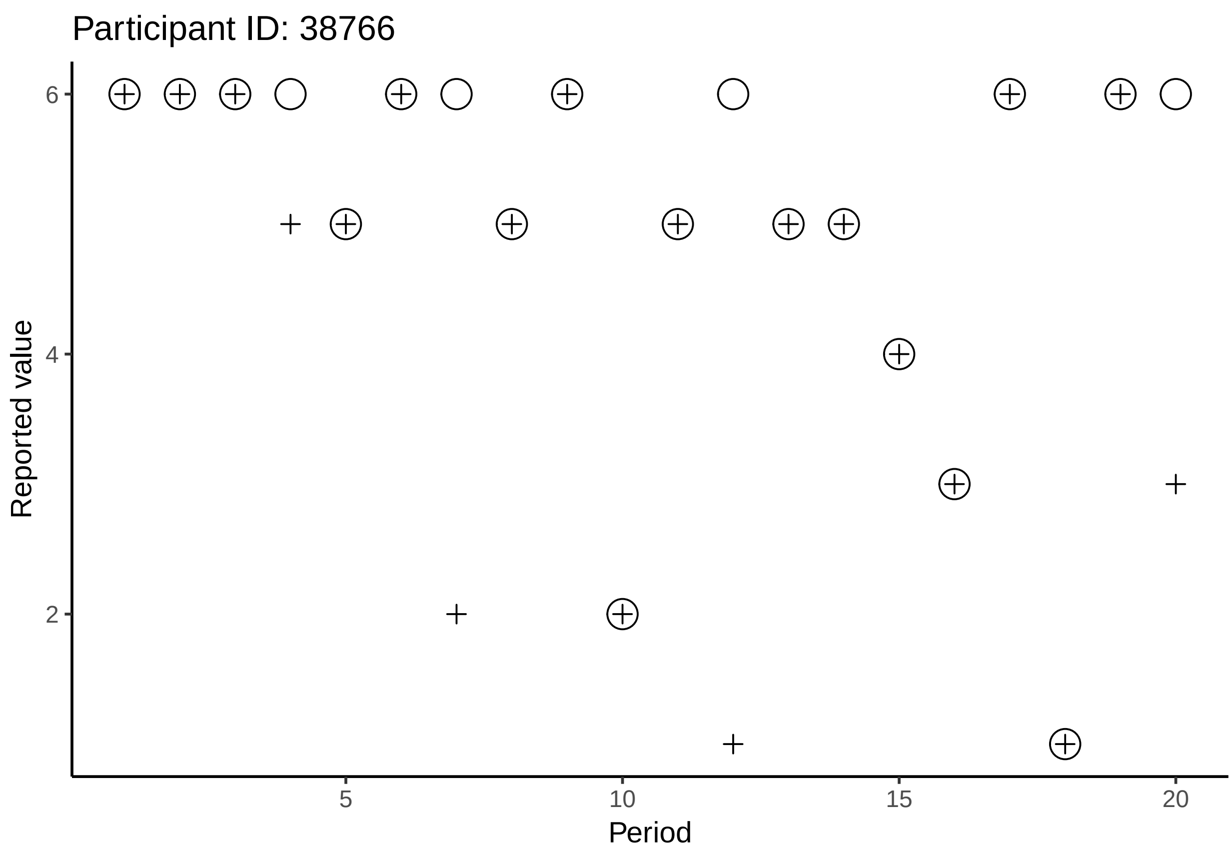
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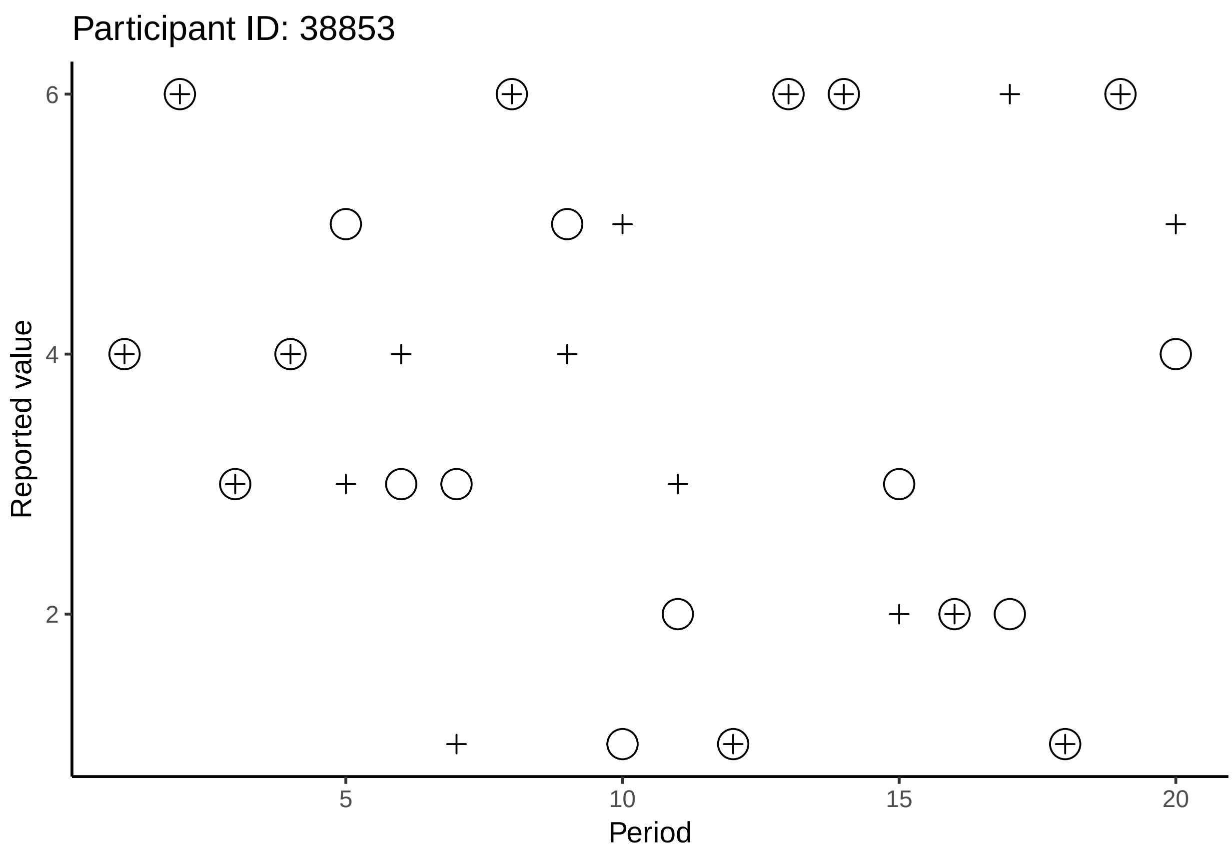

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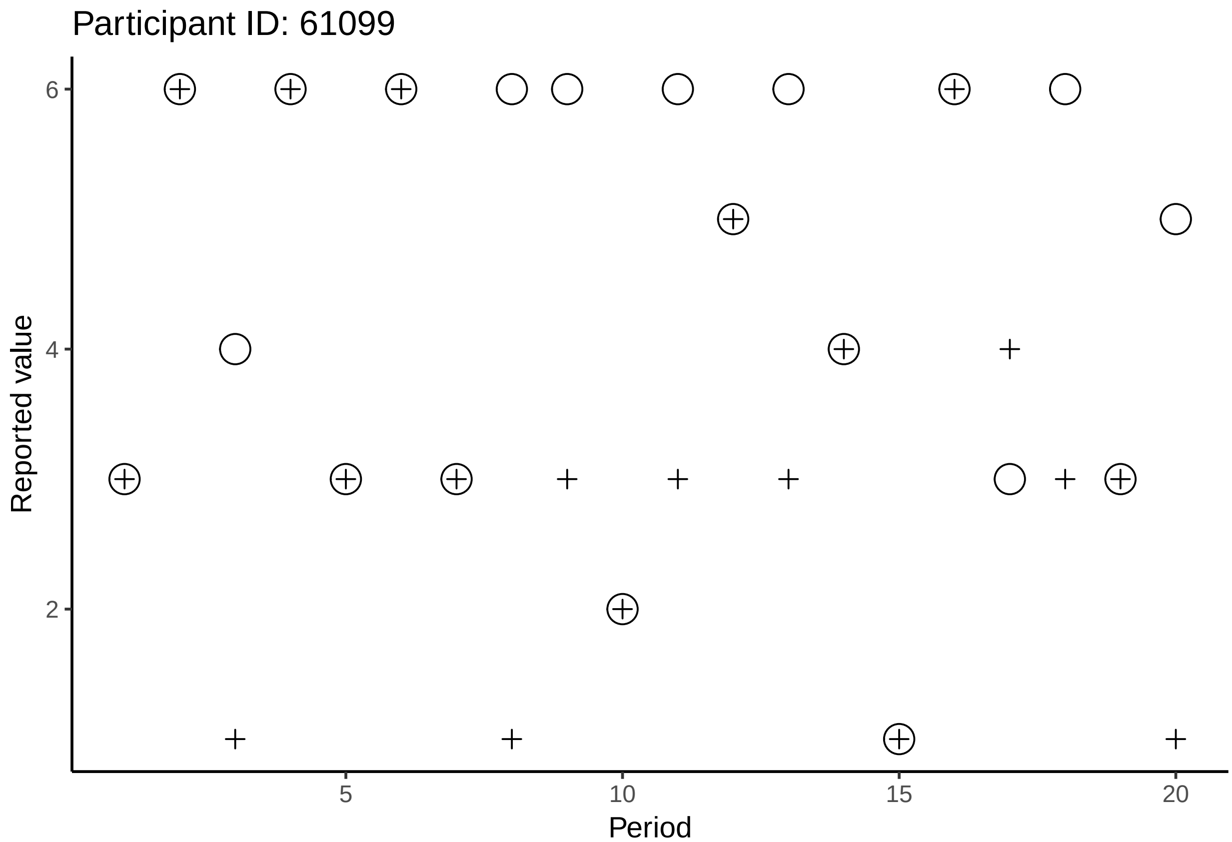
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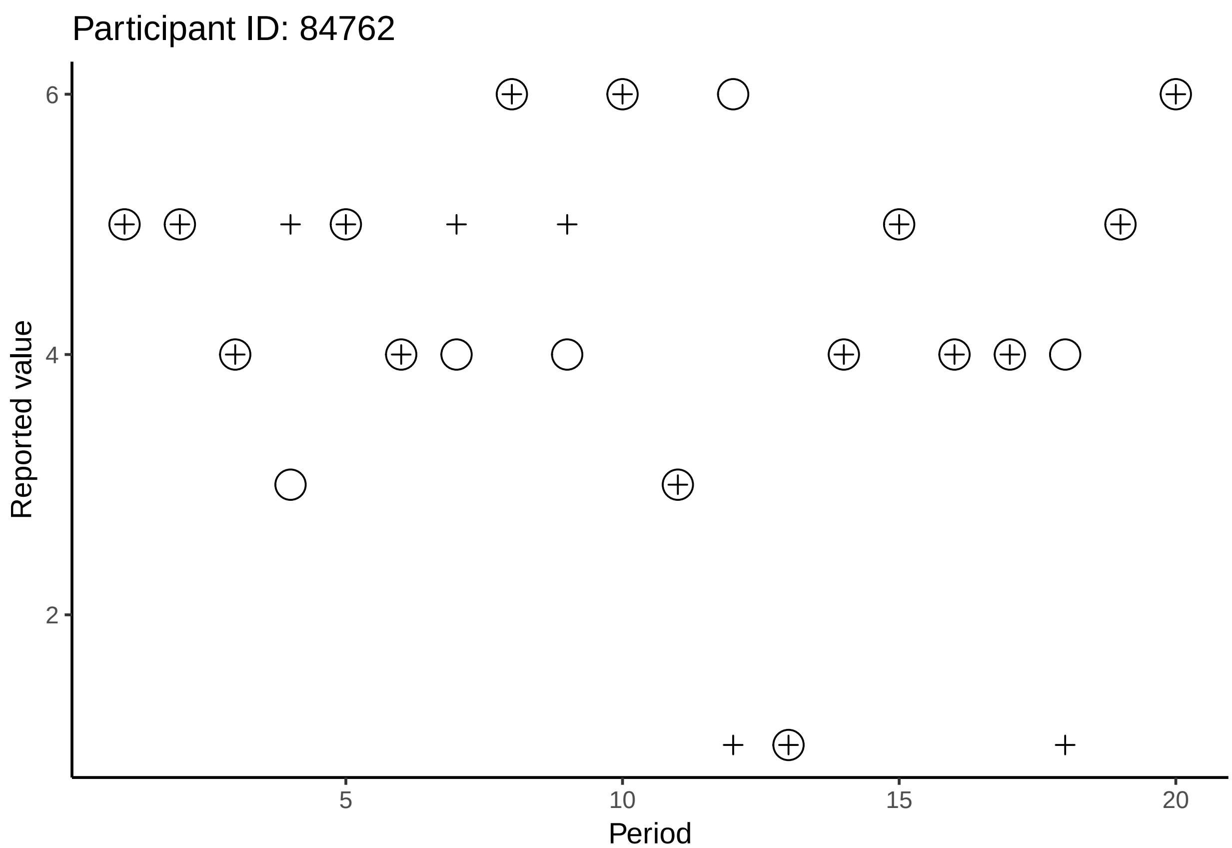
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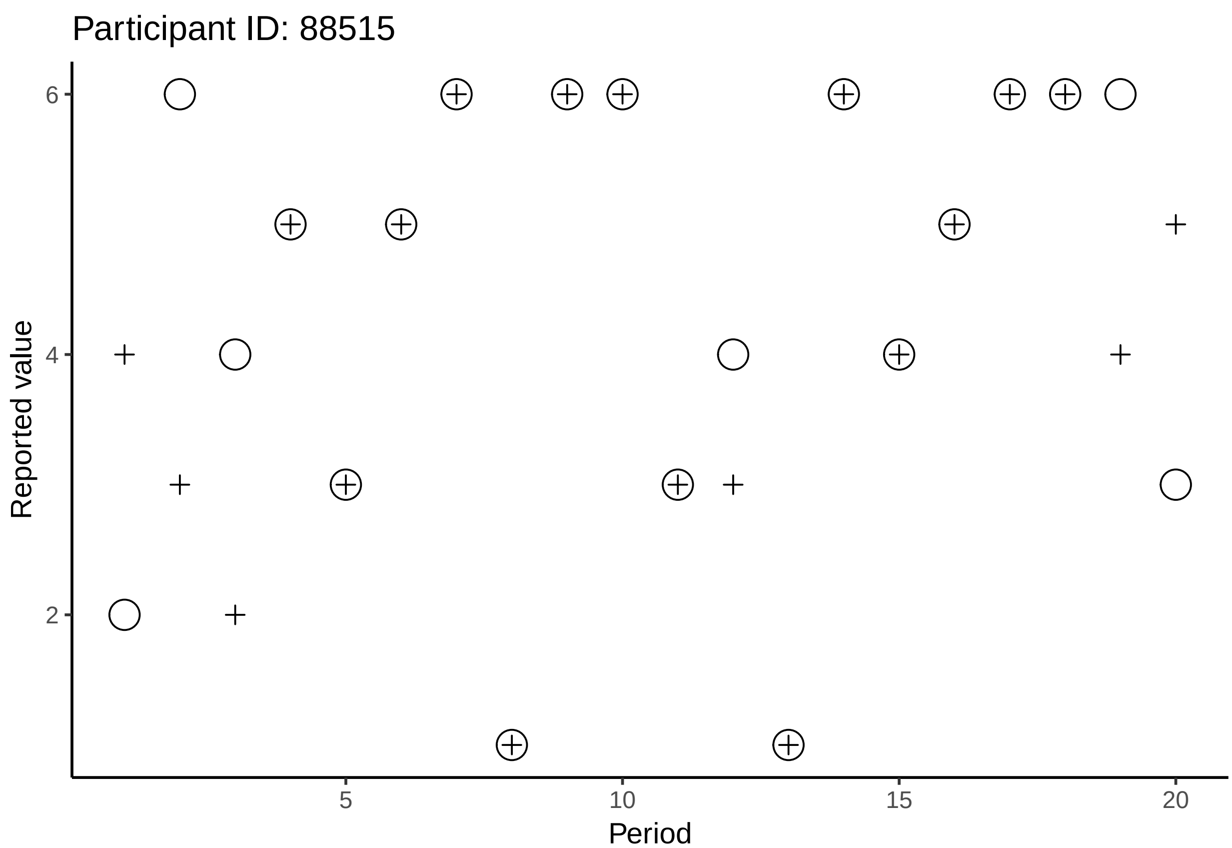
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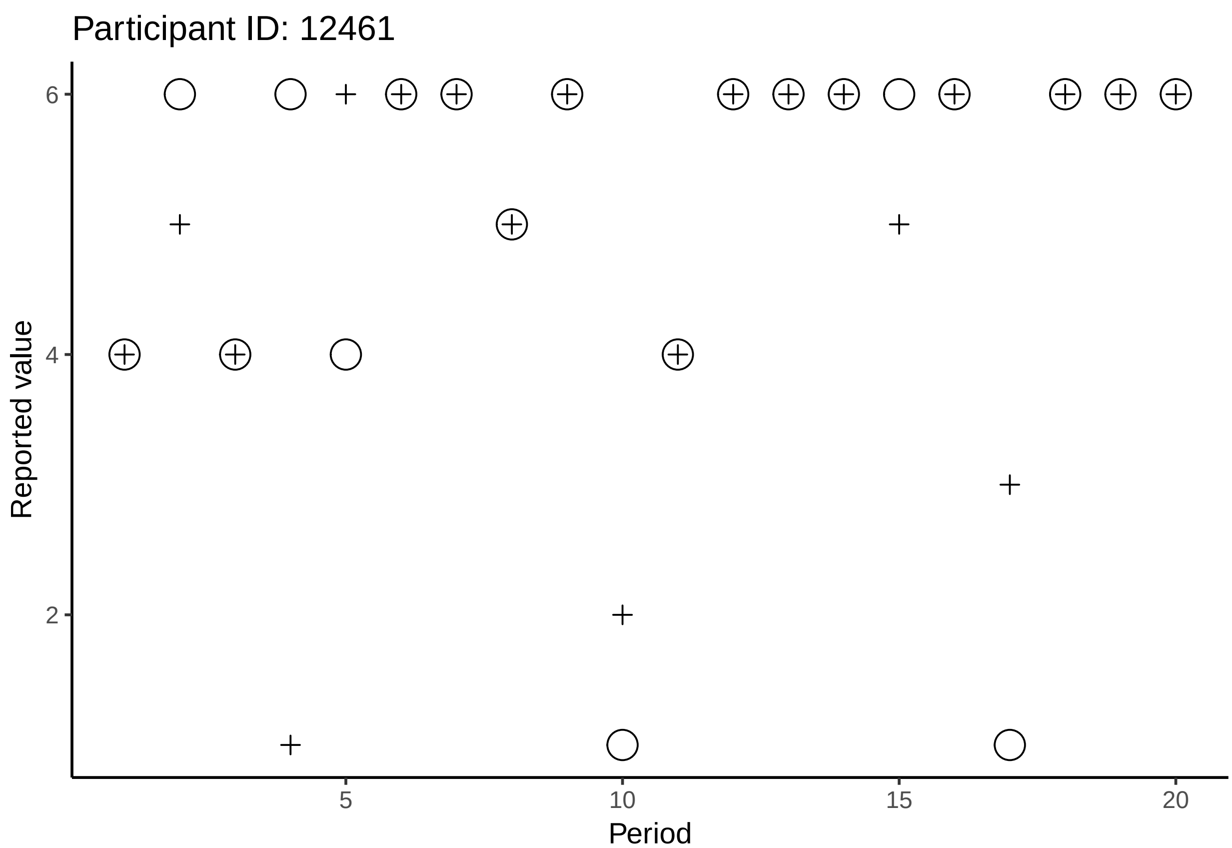
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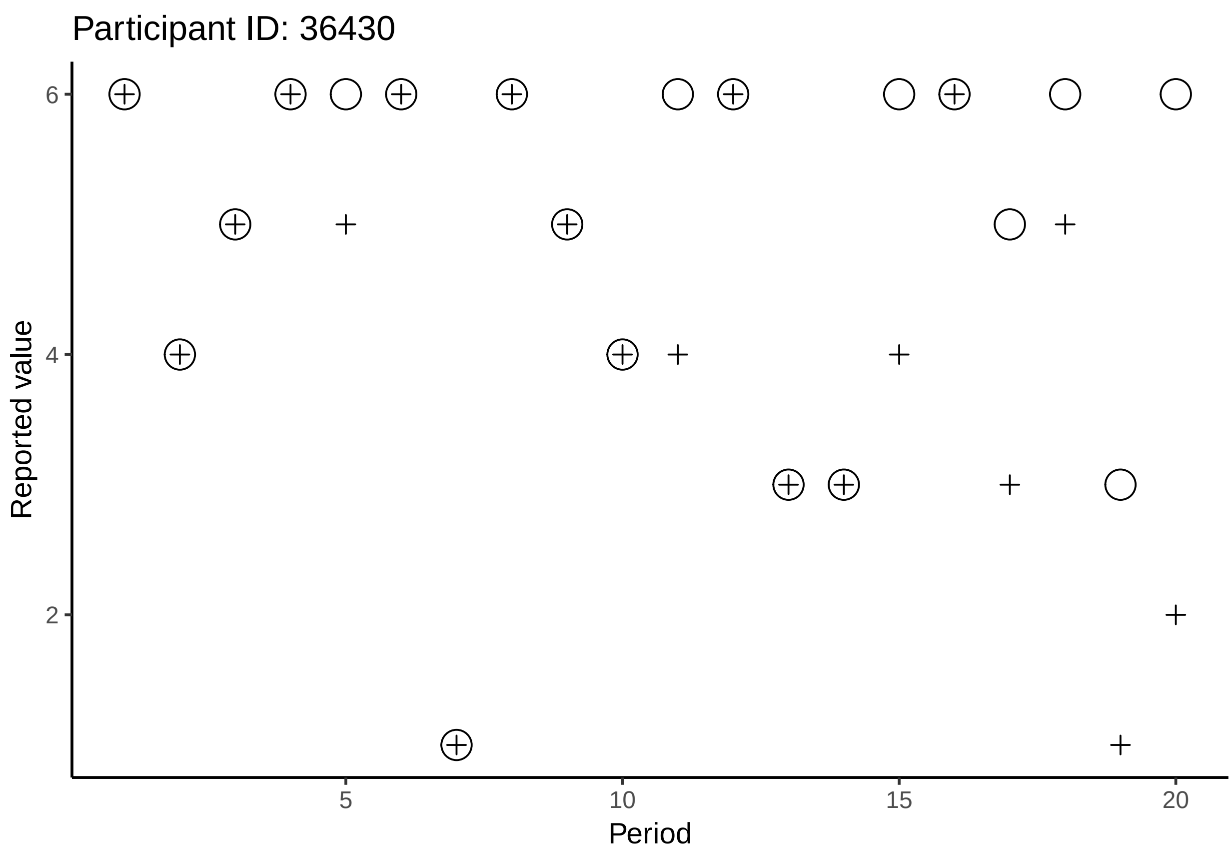

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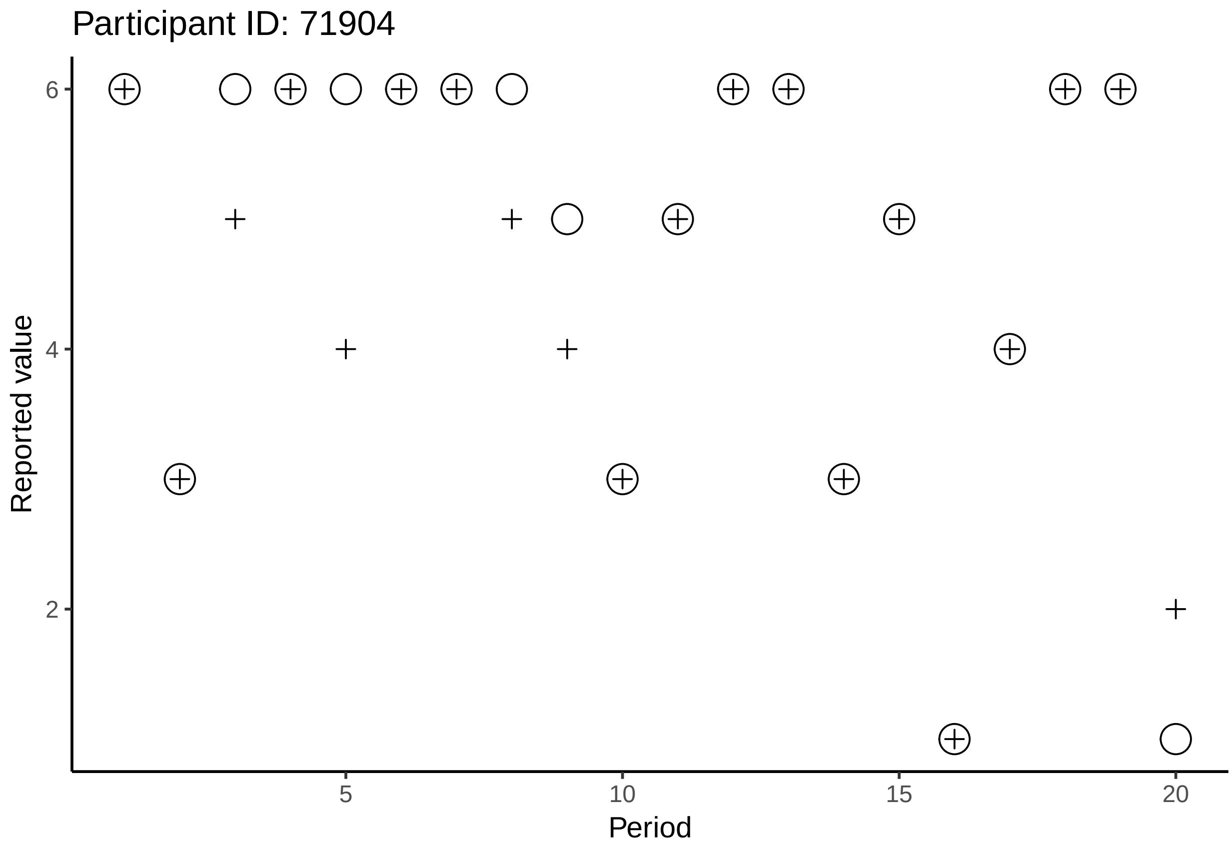
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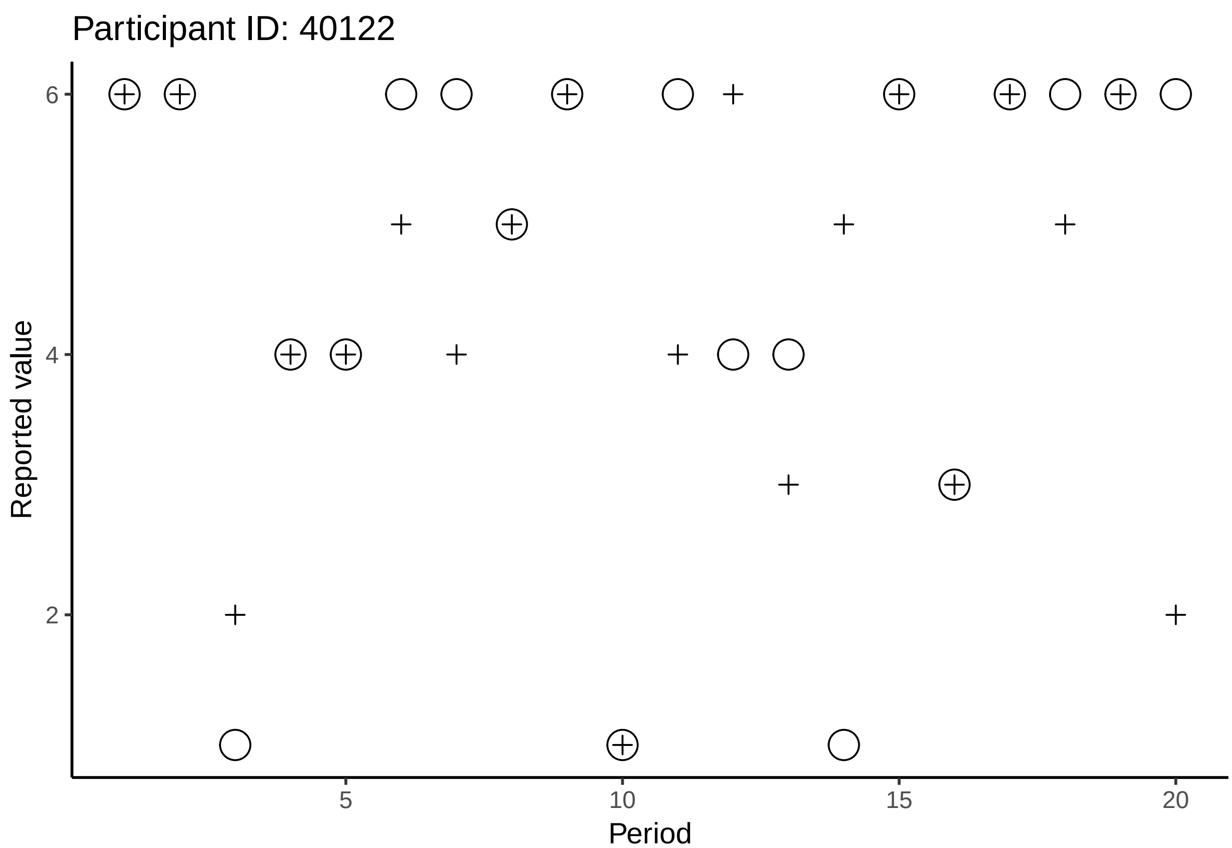

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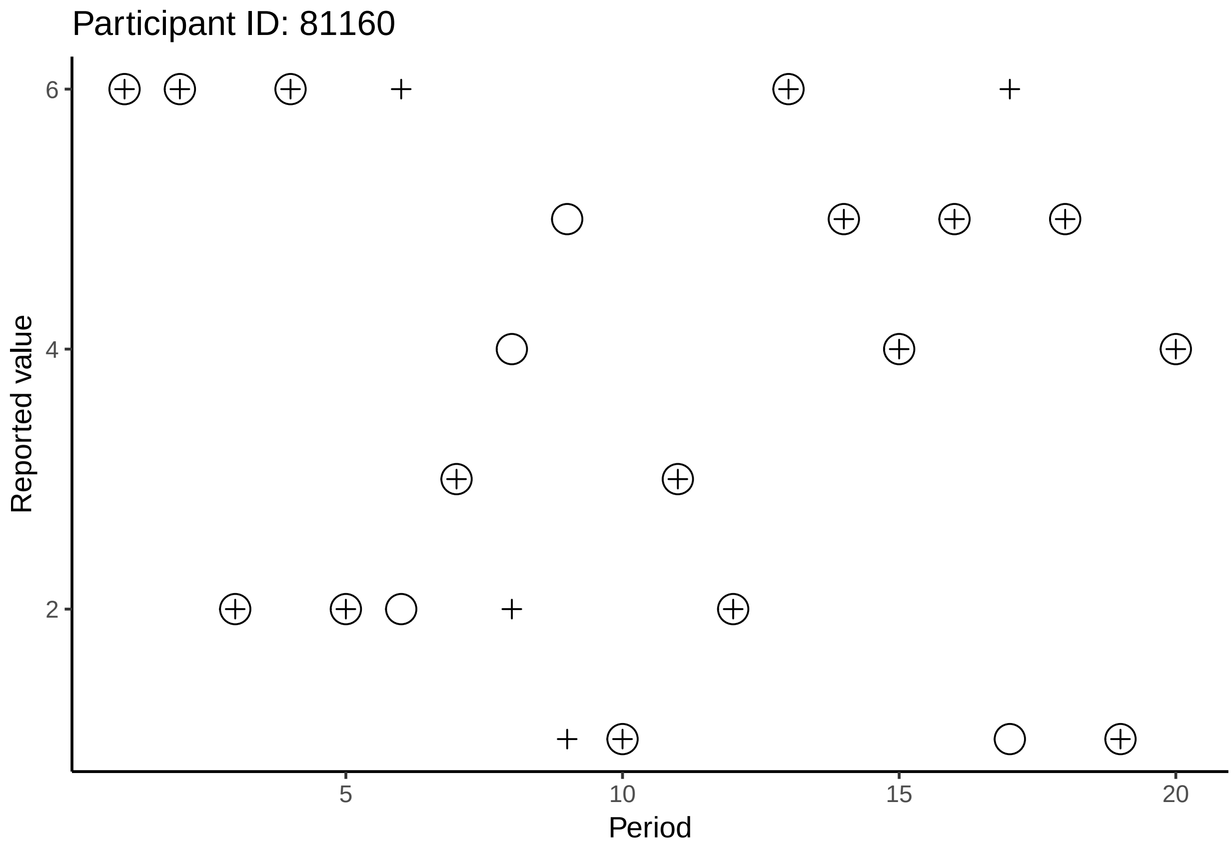
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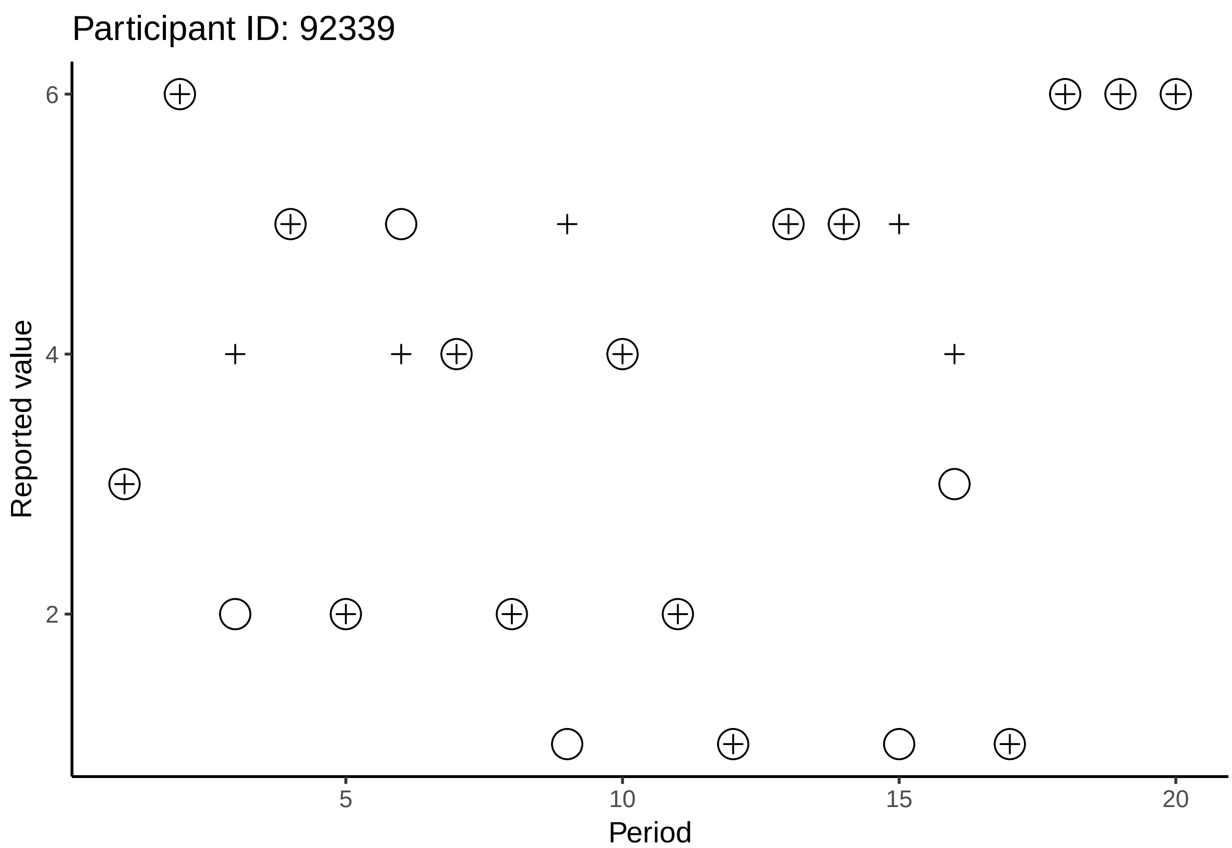
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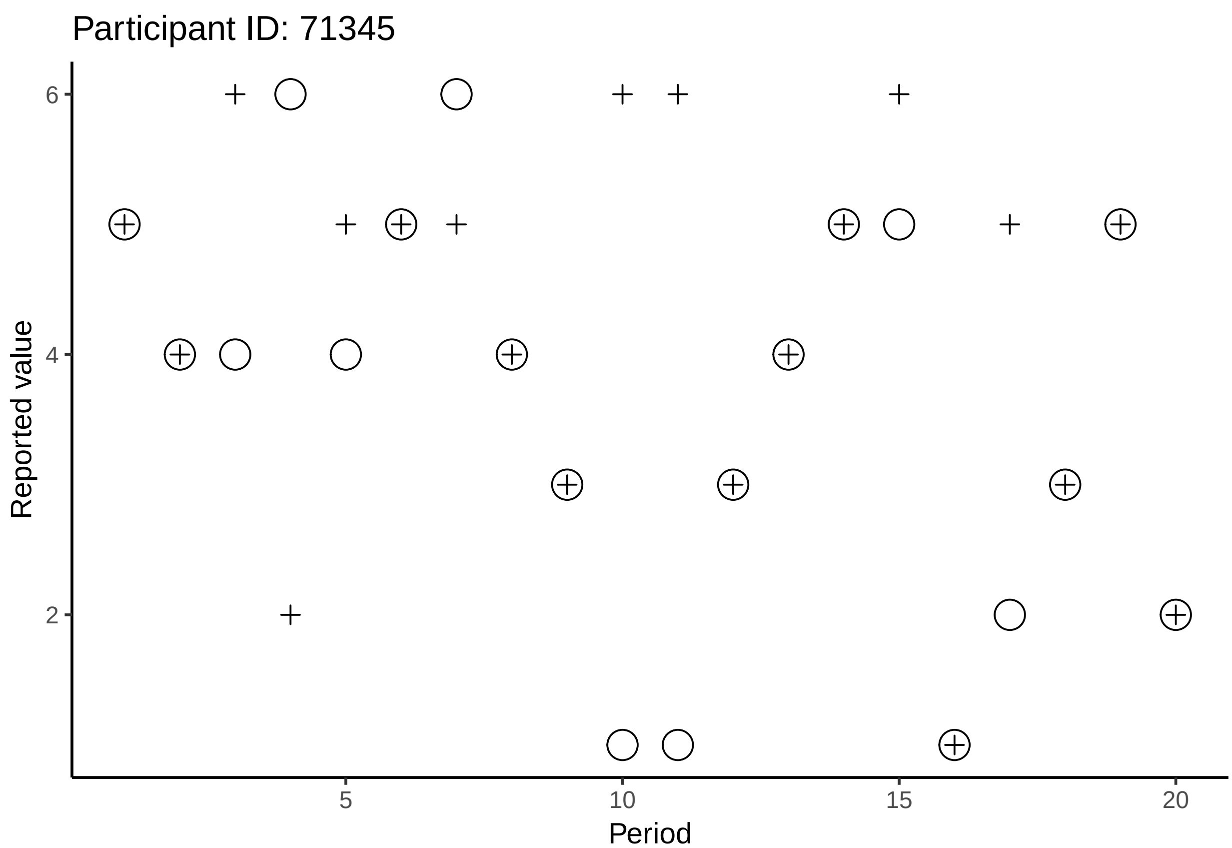

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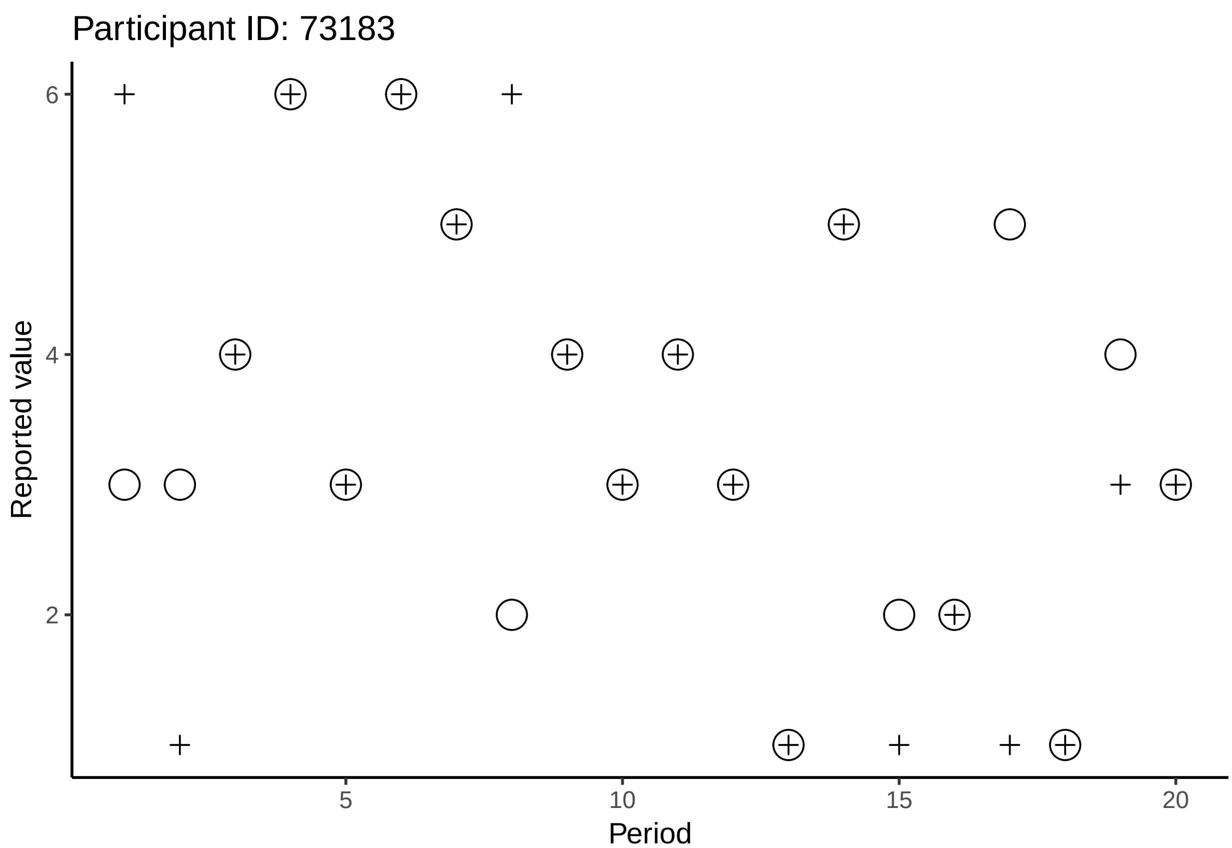
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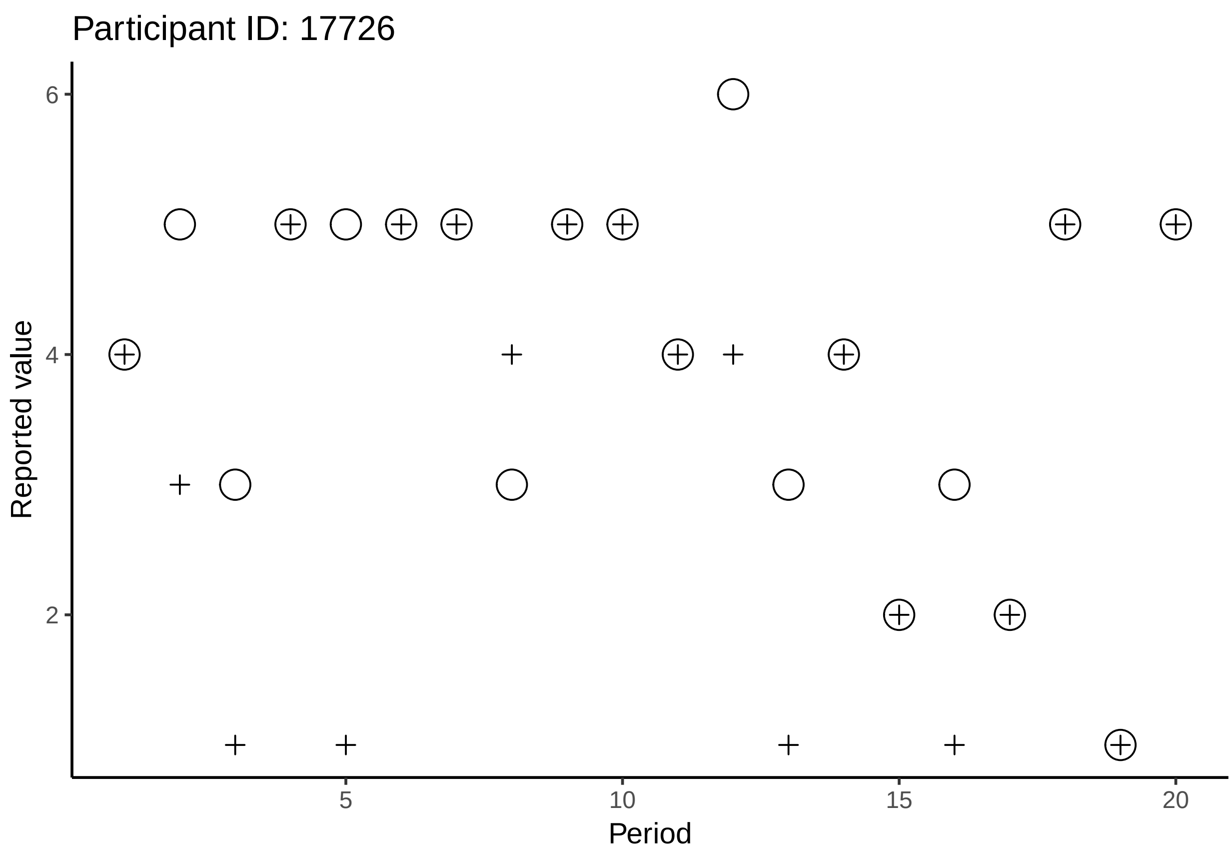
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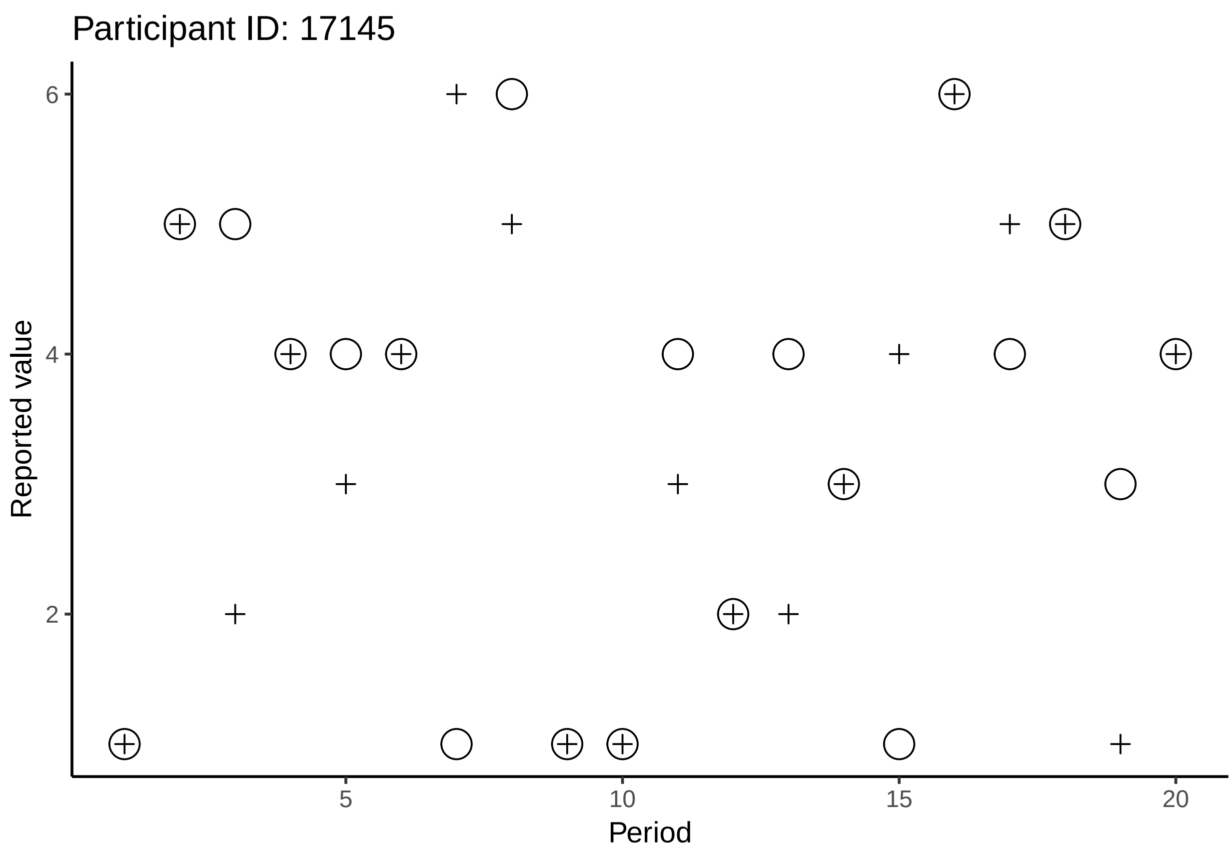
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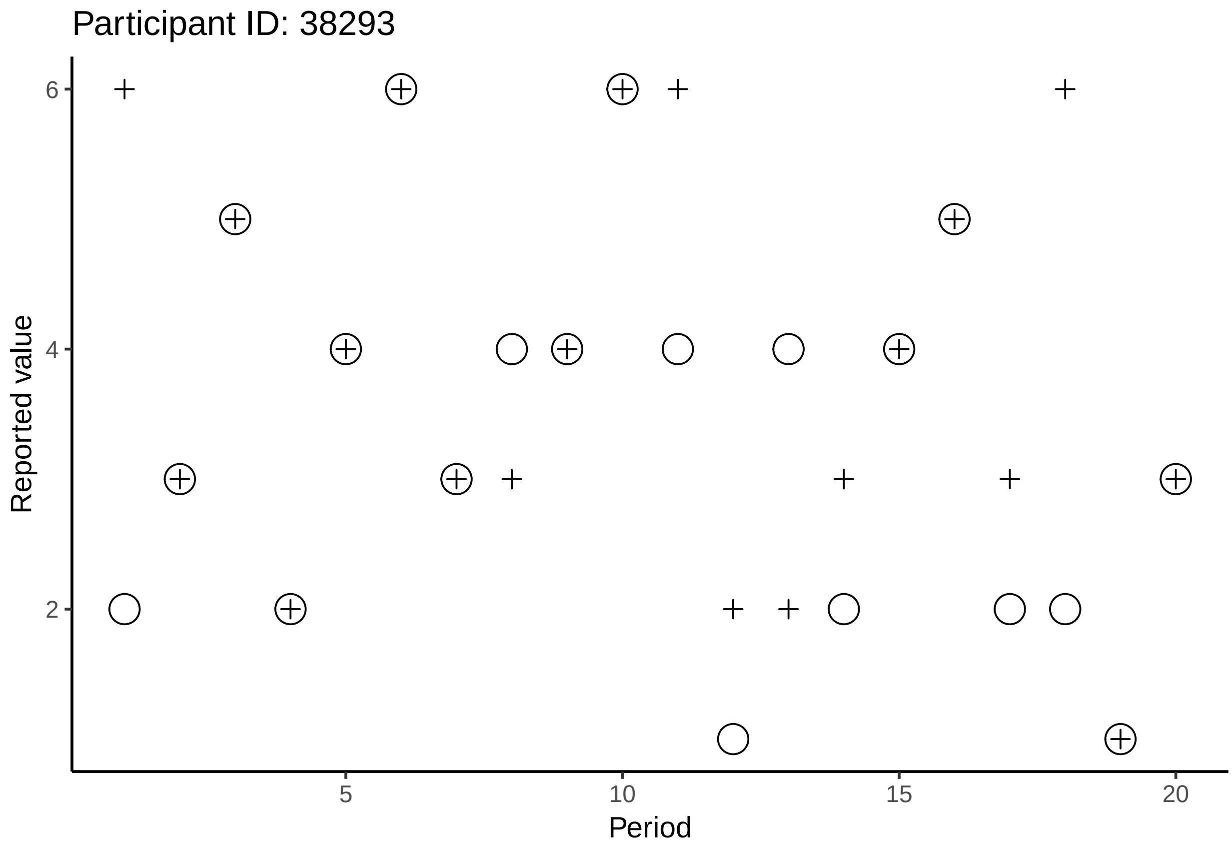
Period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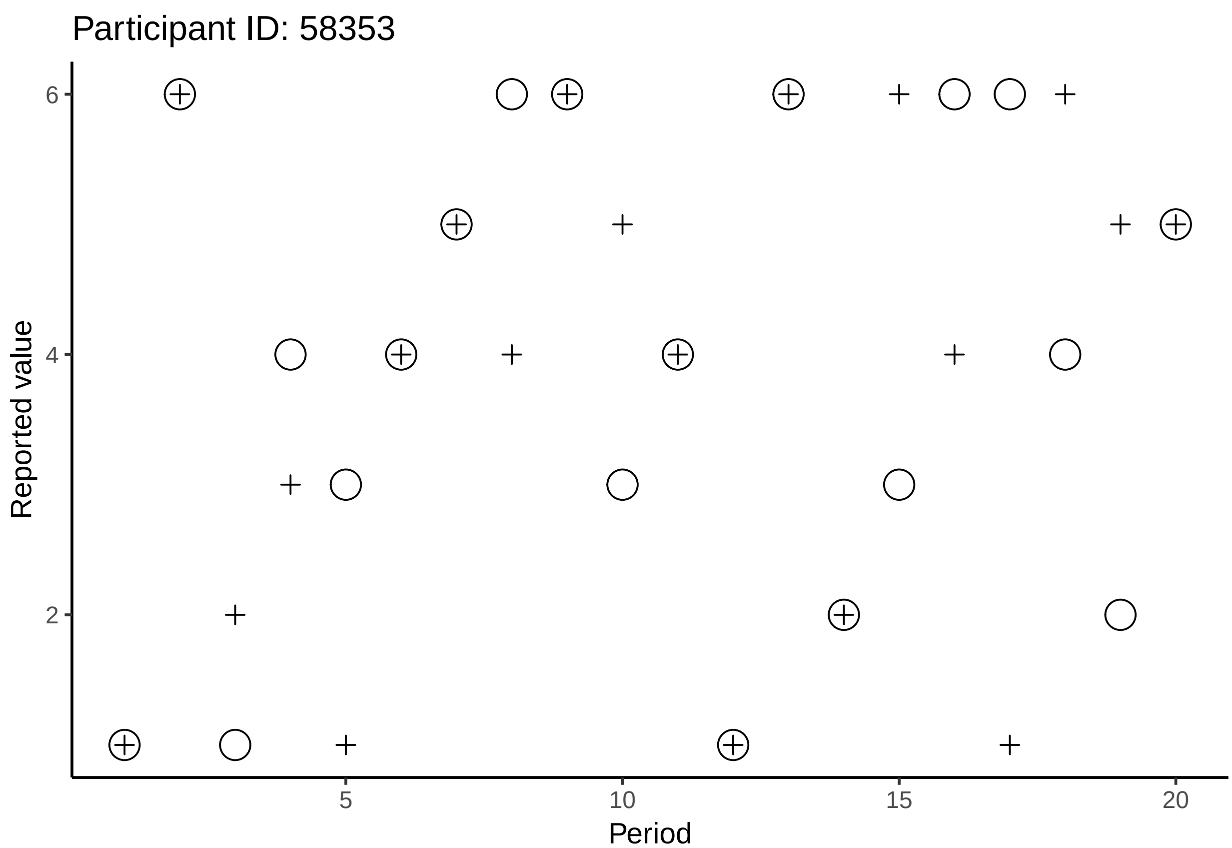
Period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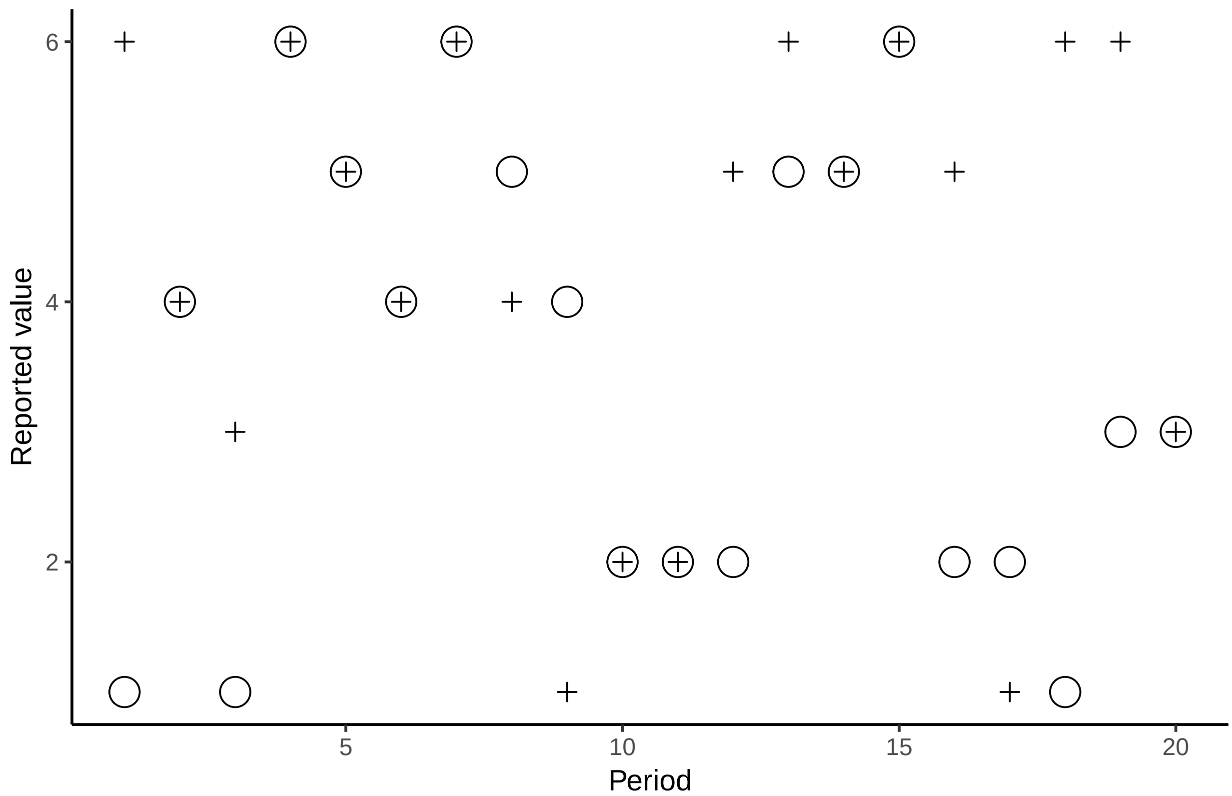
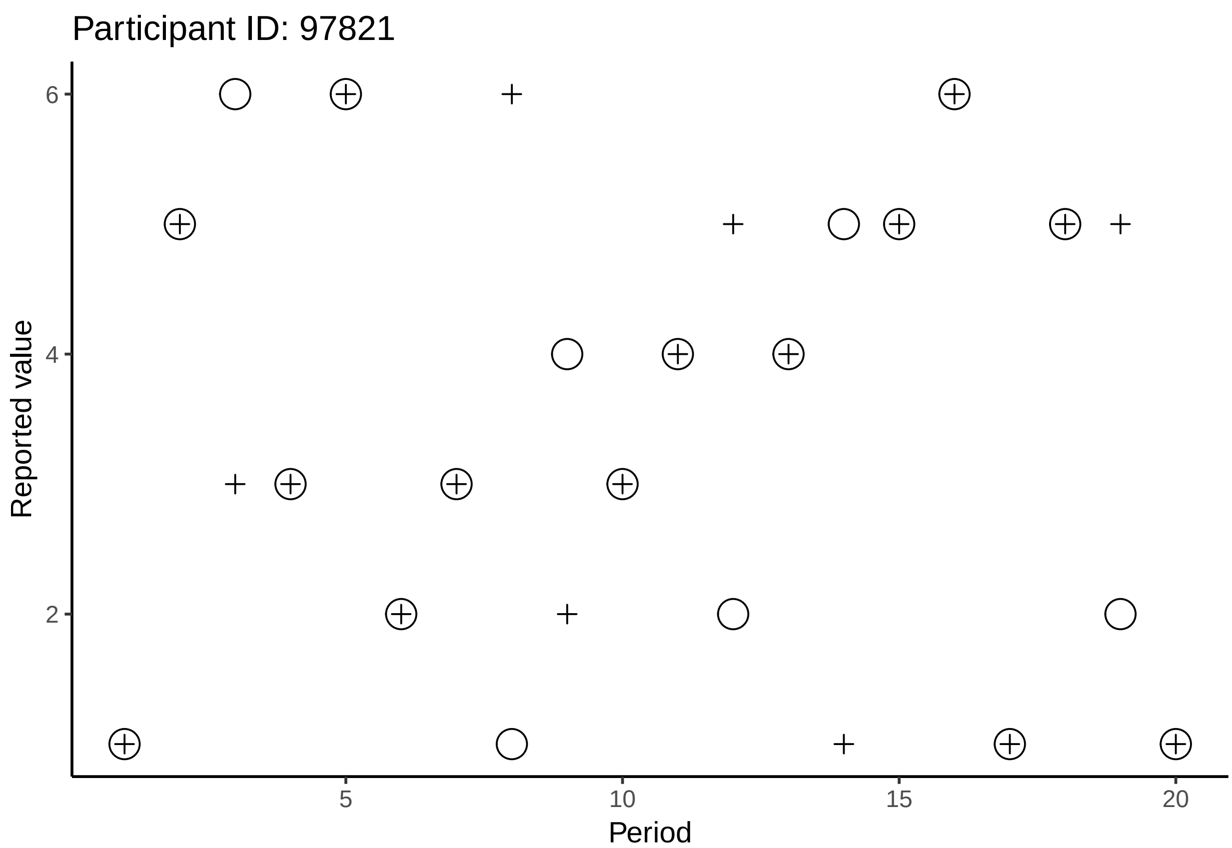
Participant ID: 55027





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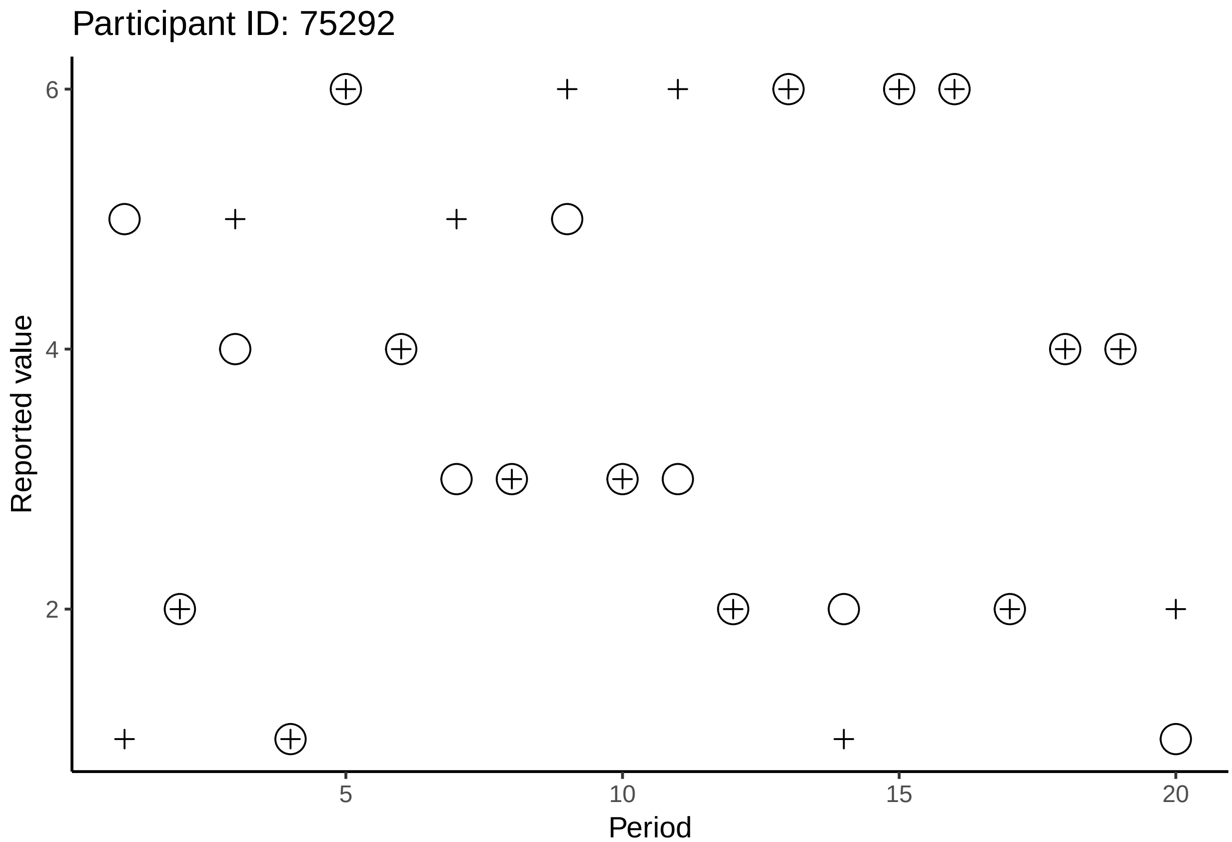
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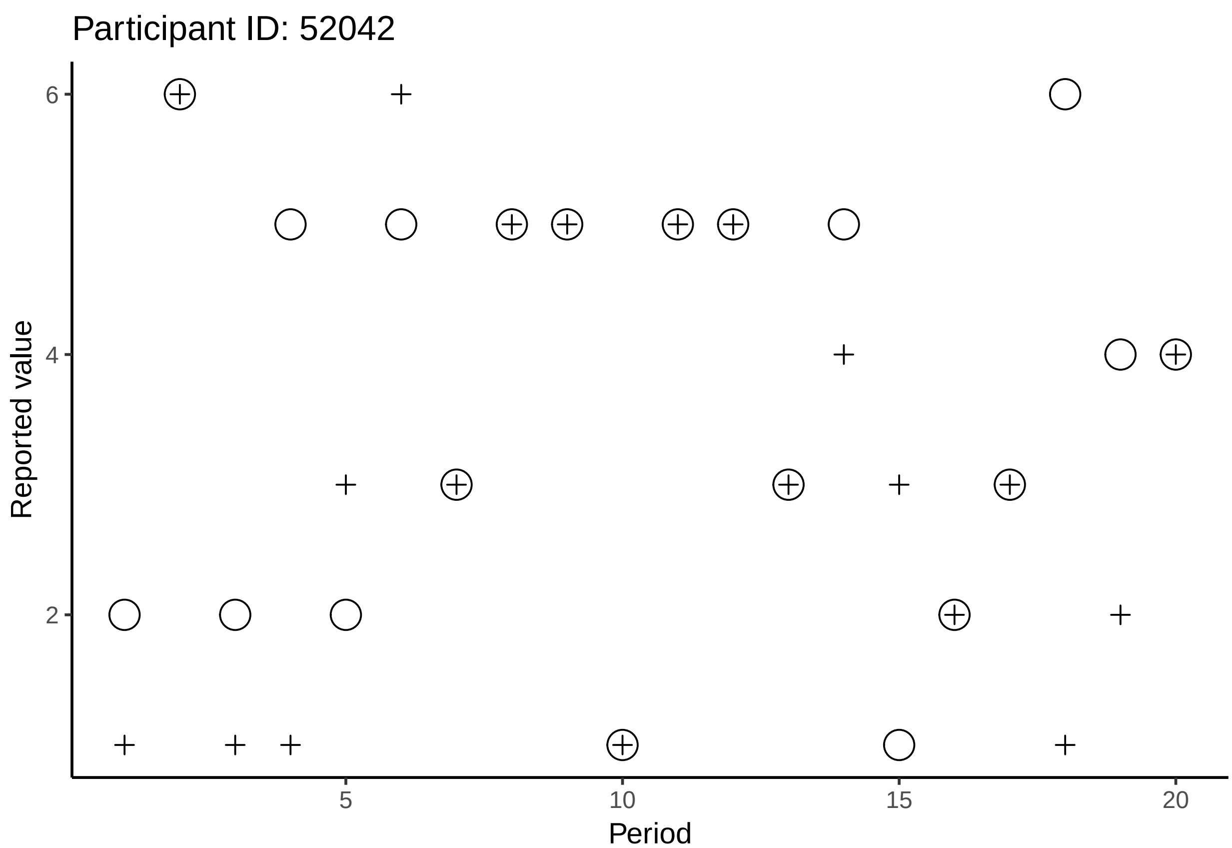
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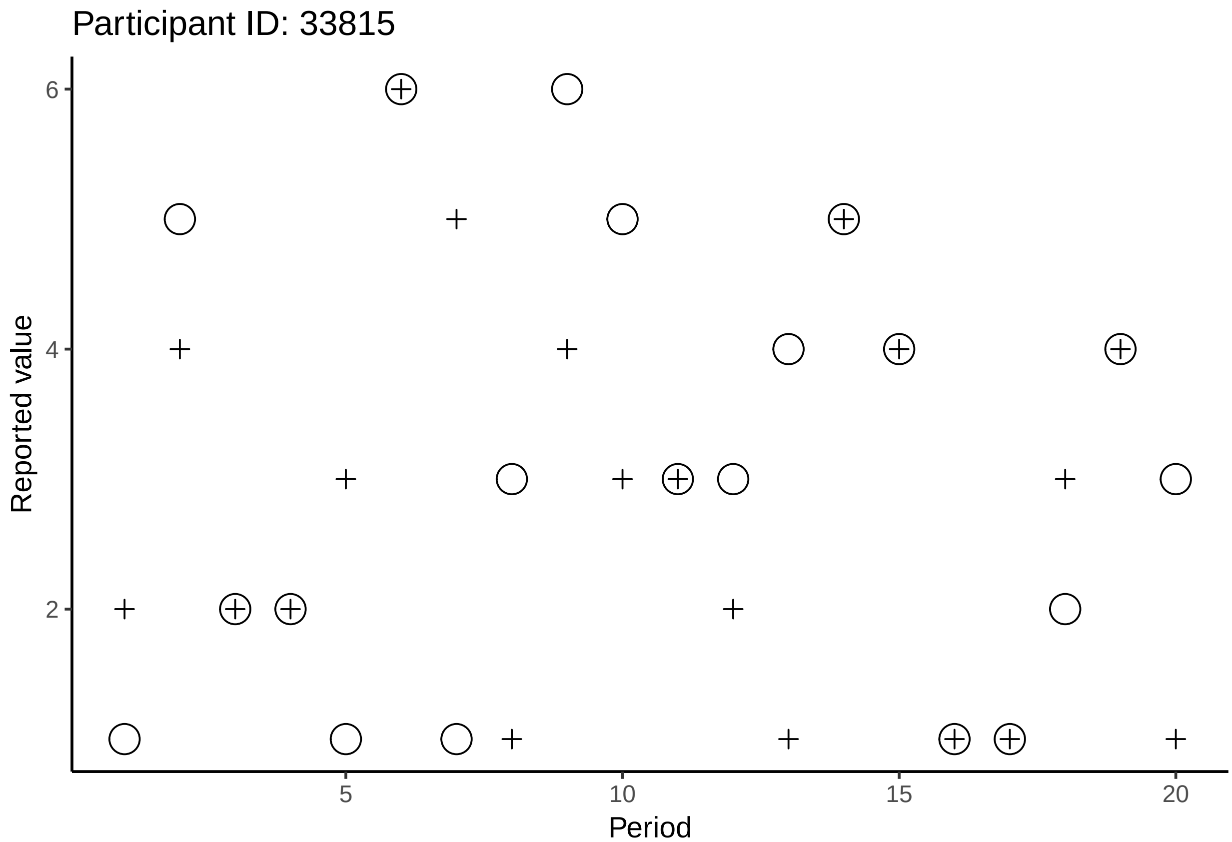
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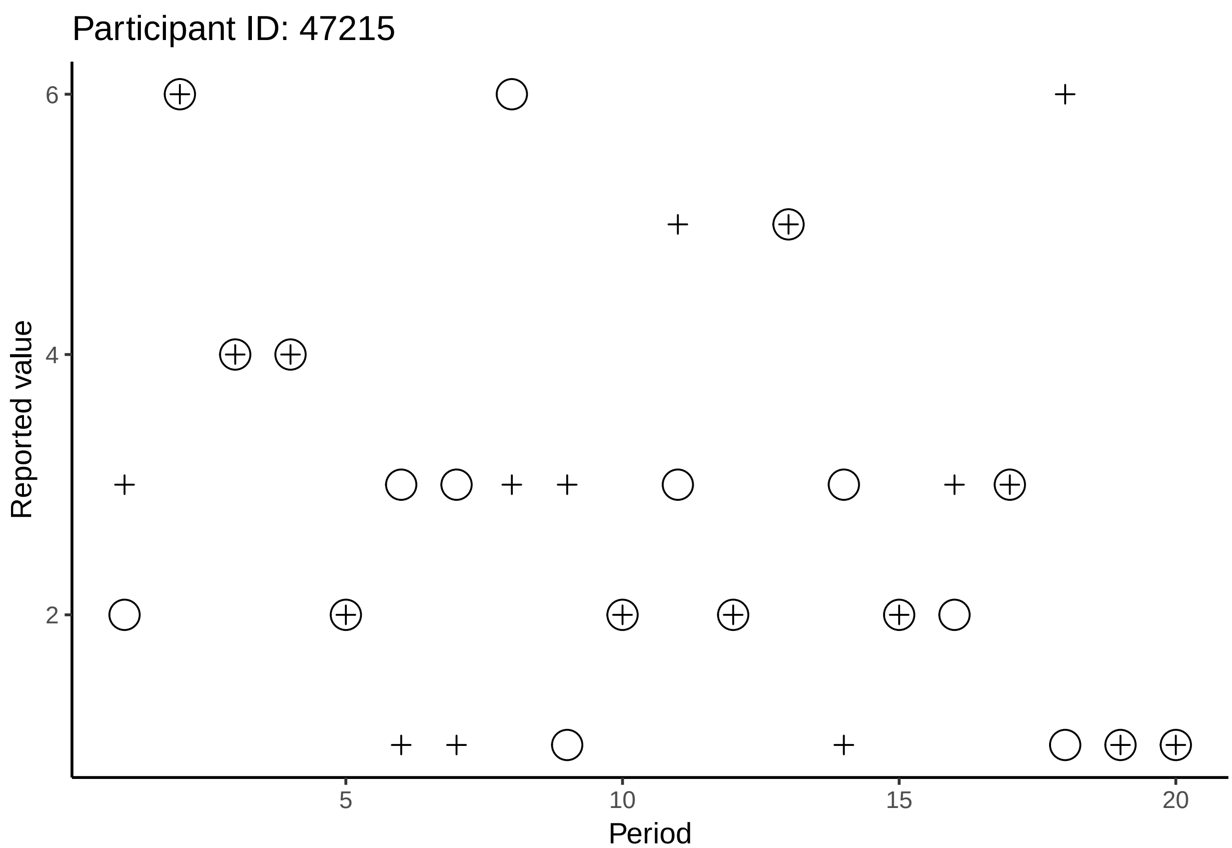
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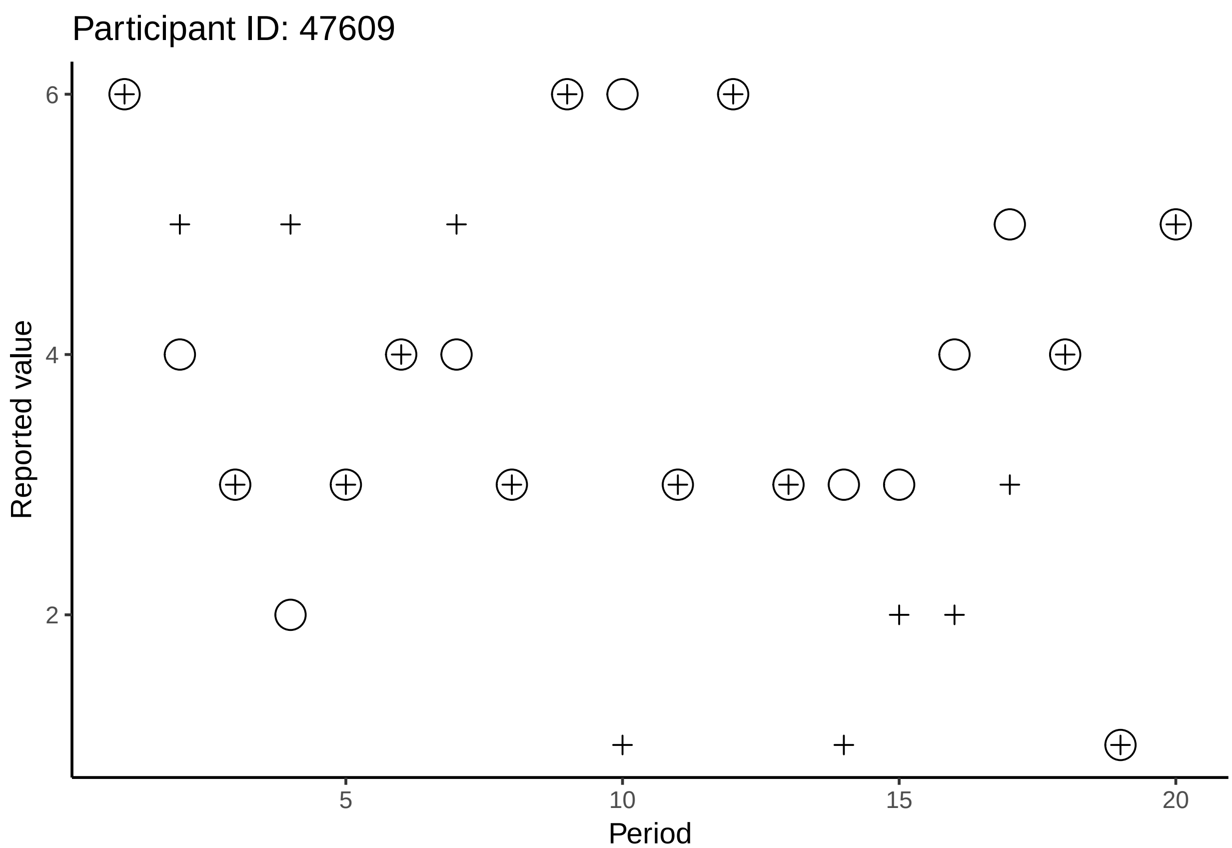
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15
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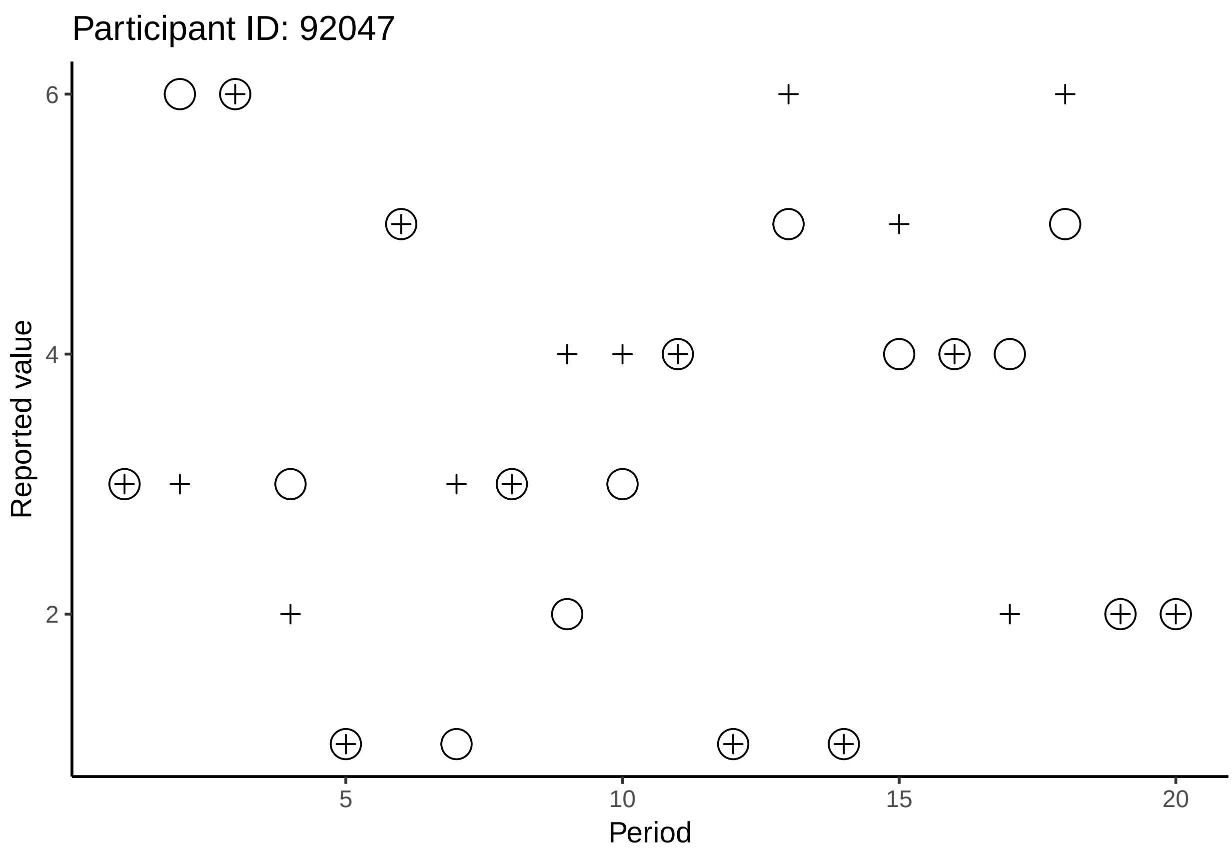
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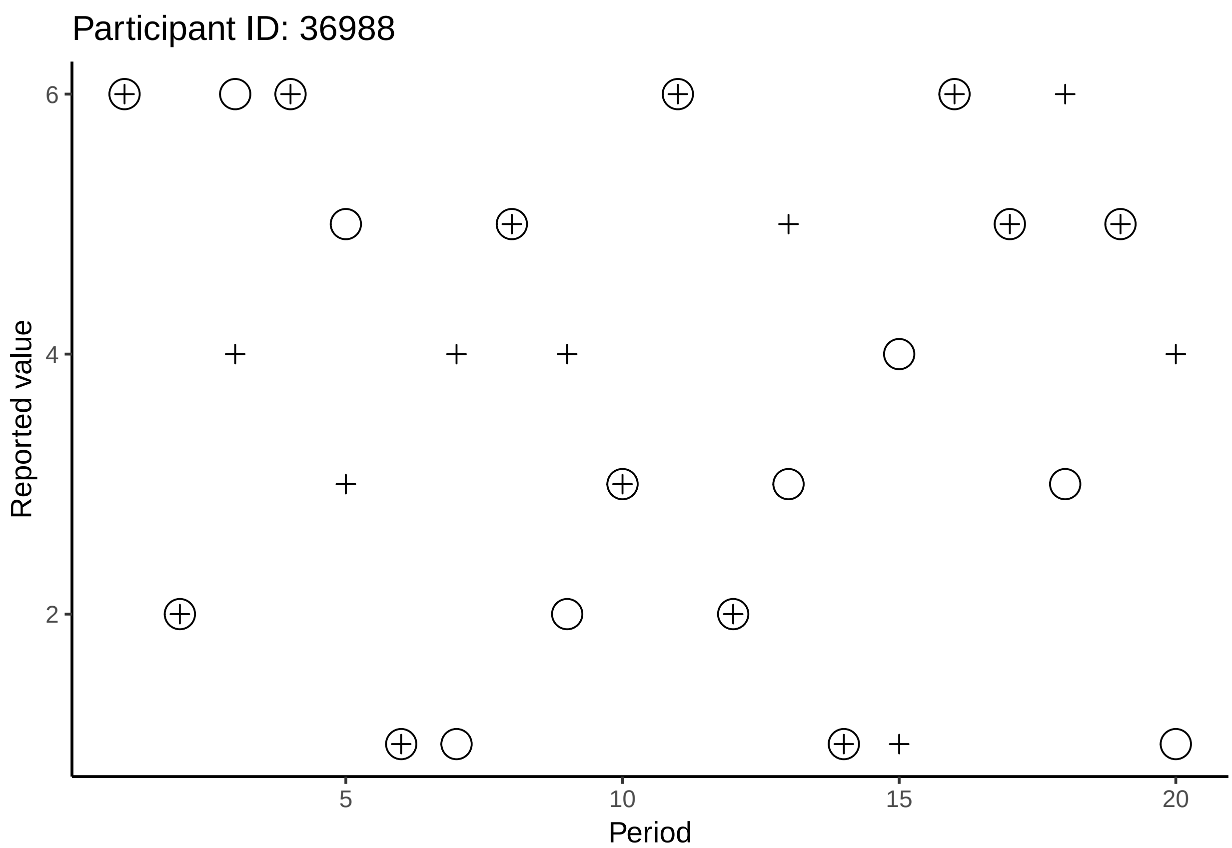
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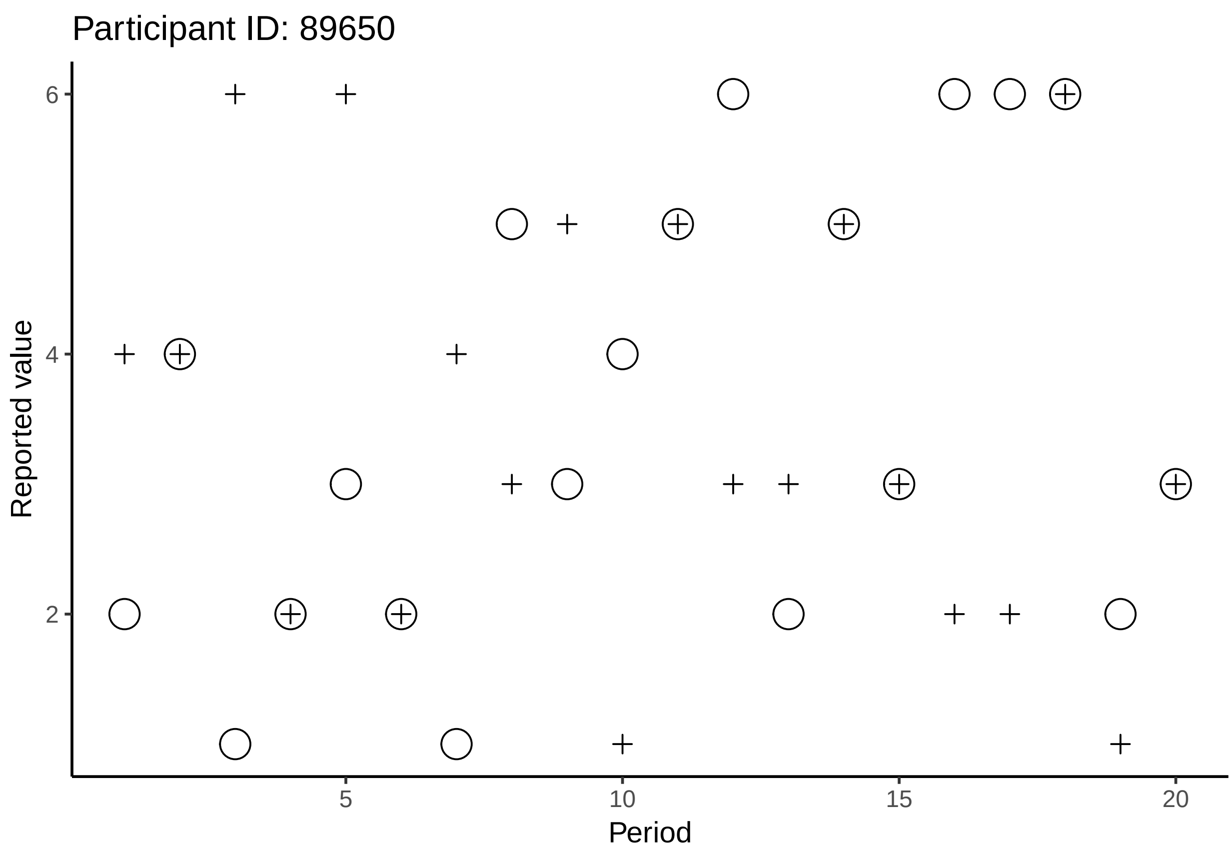
10
15
20
Period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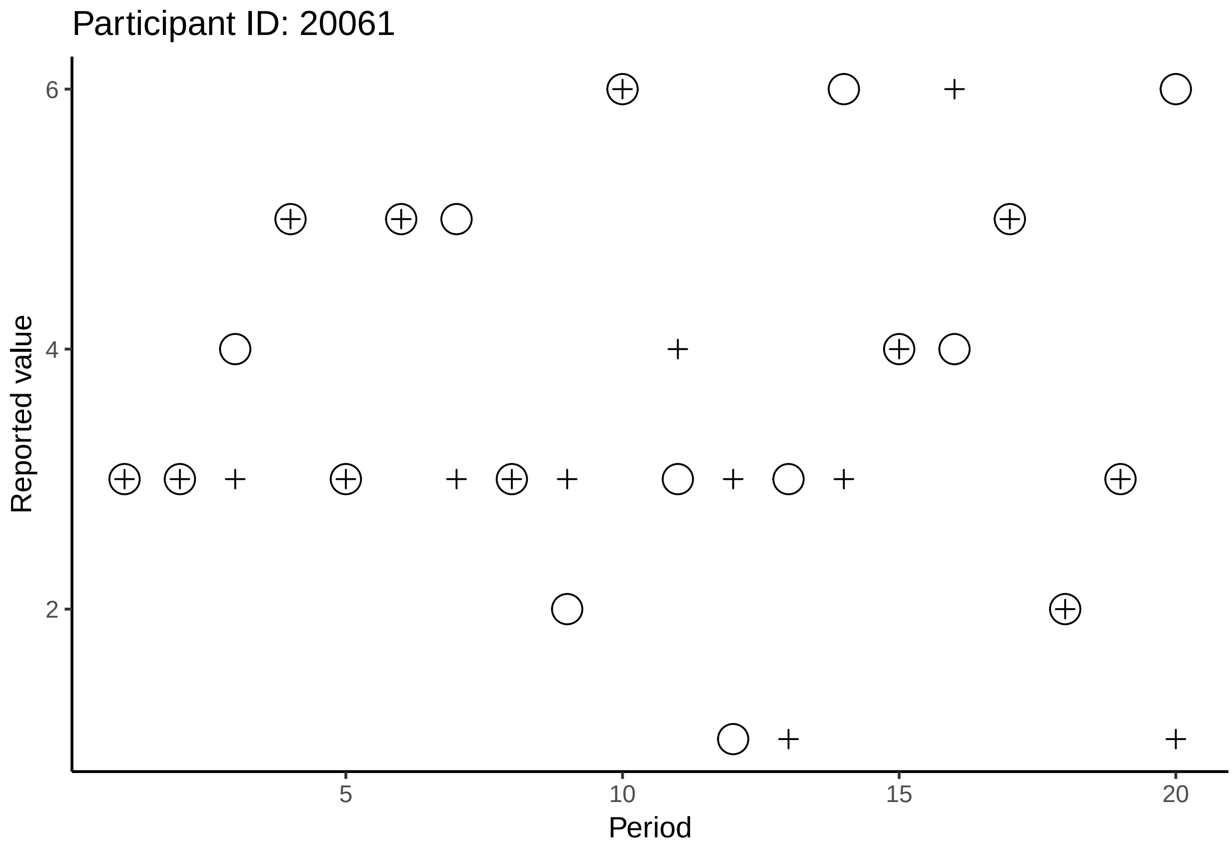
Participant ID: 20061
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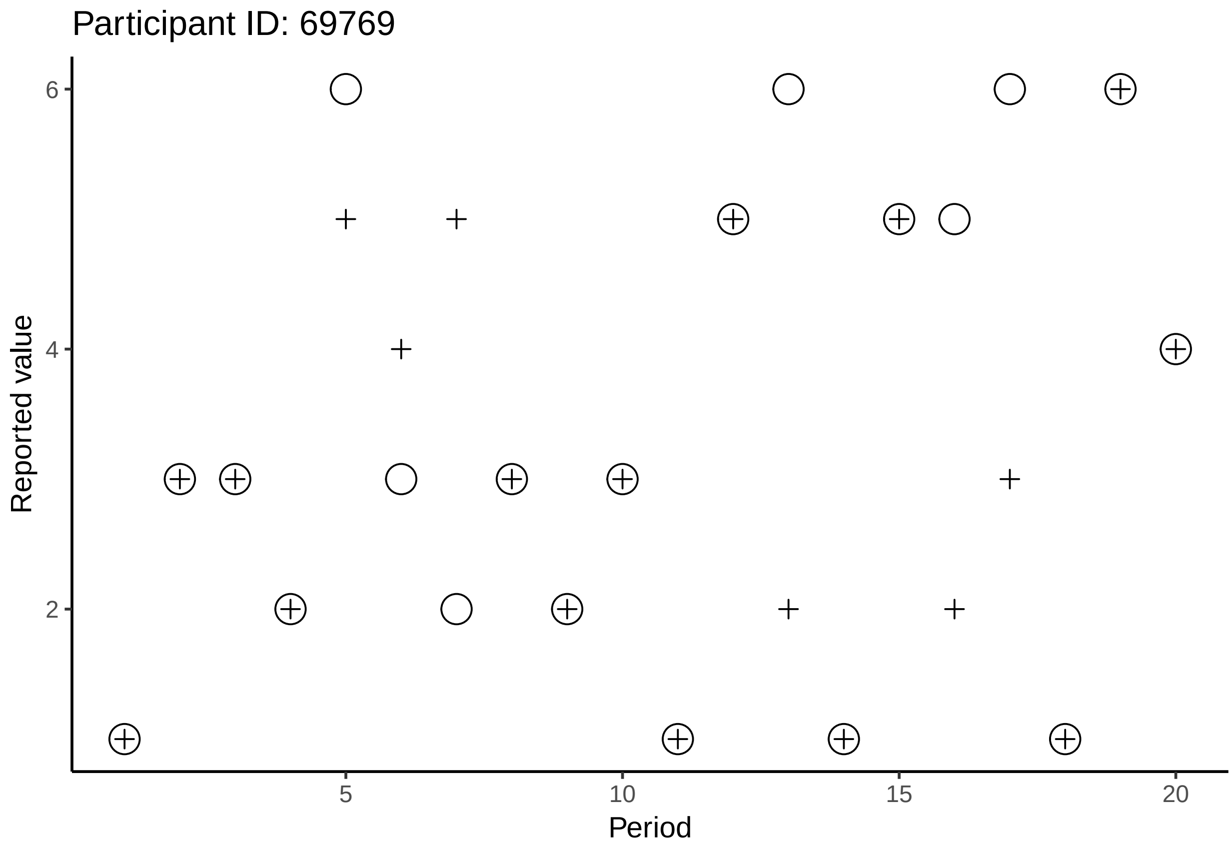
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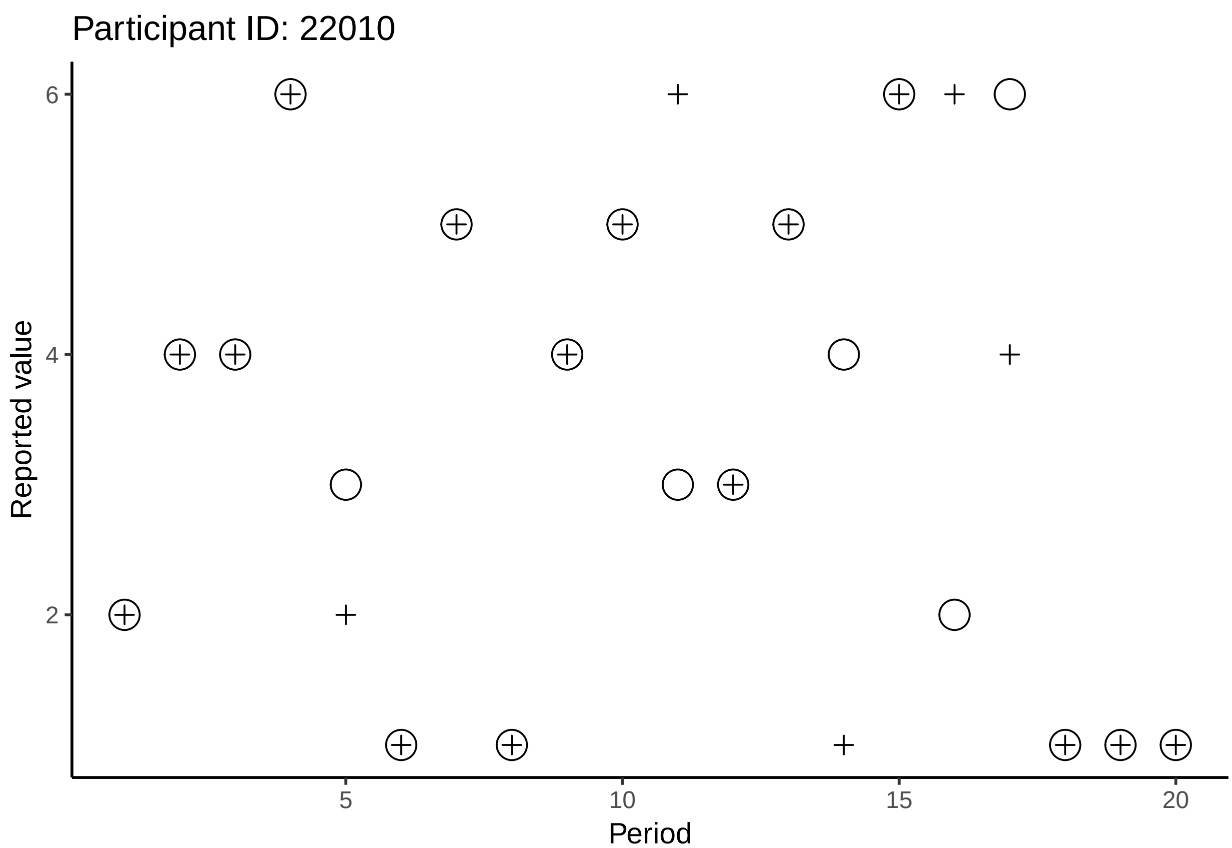
Period



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2
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10
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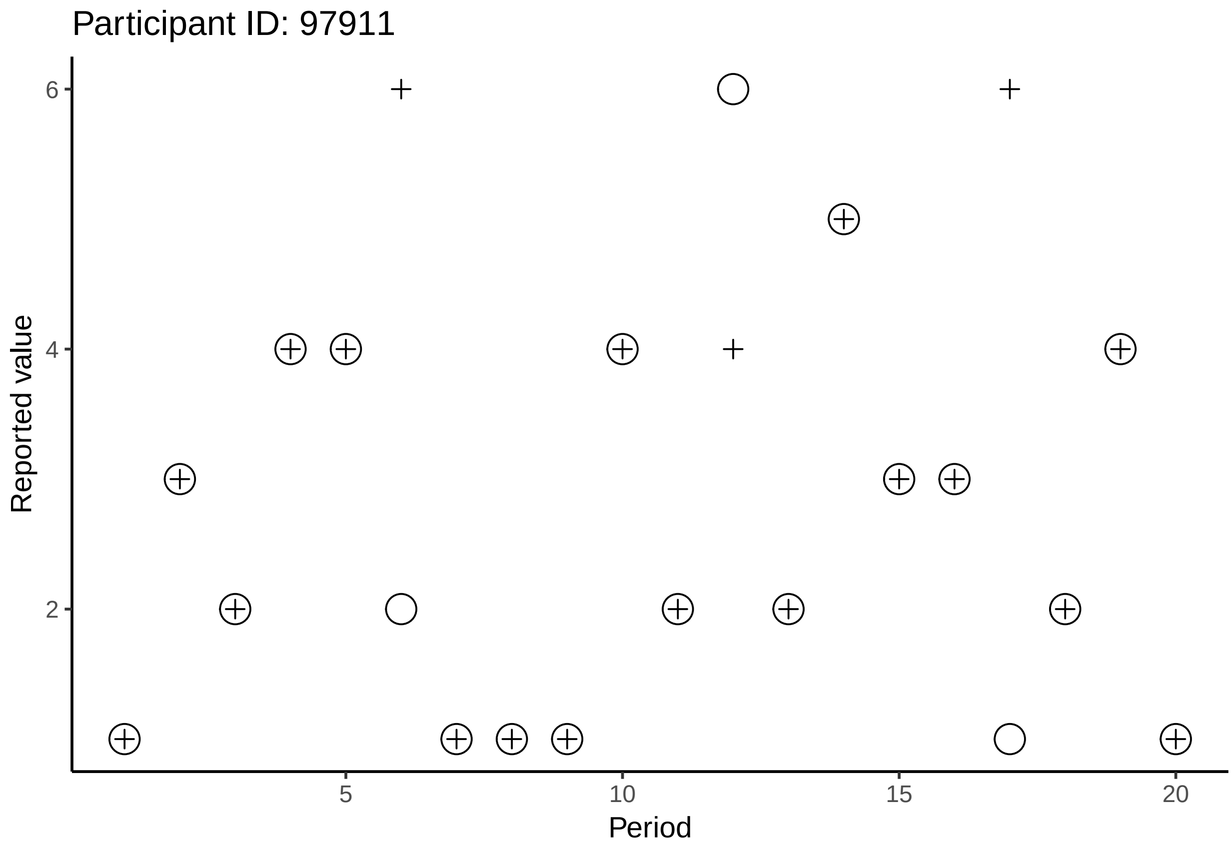
20
Period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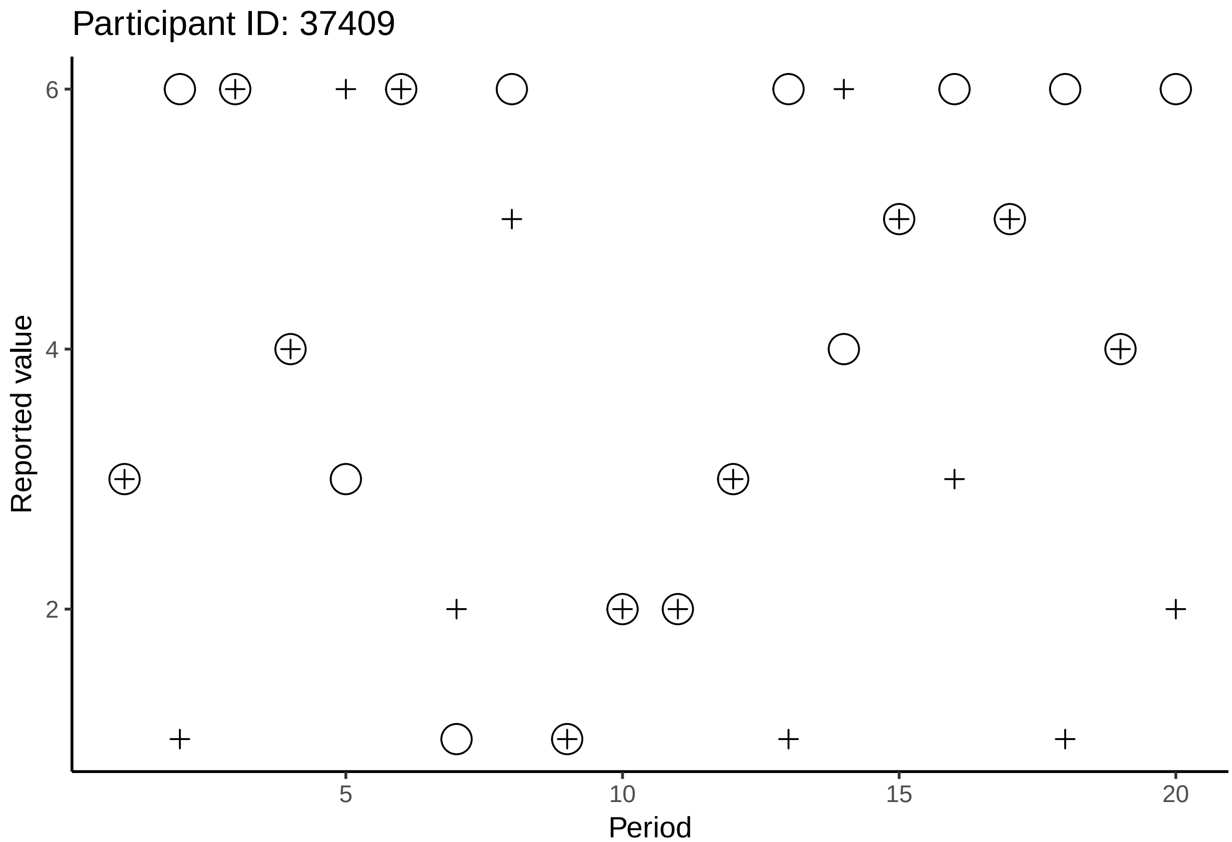
15
20
Period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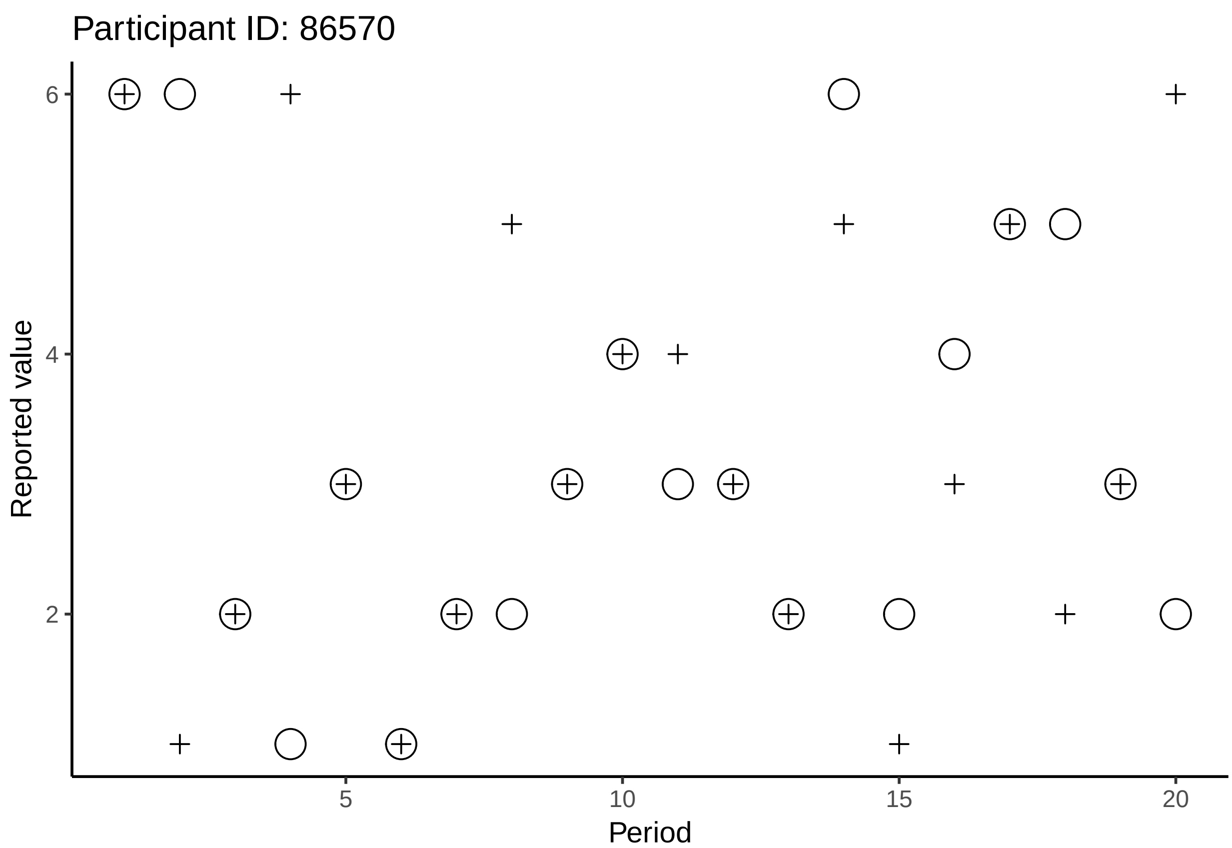
20
Period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10
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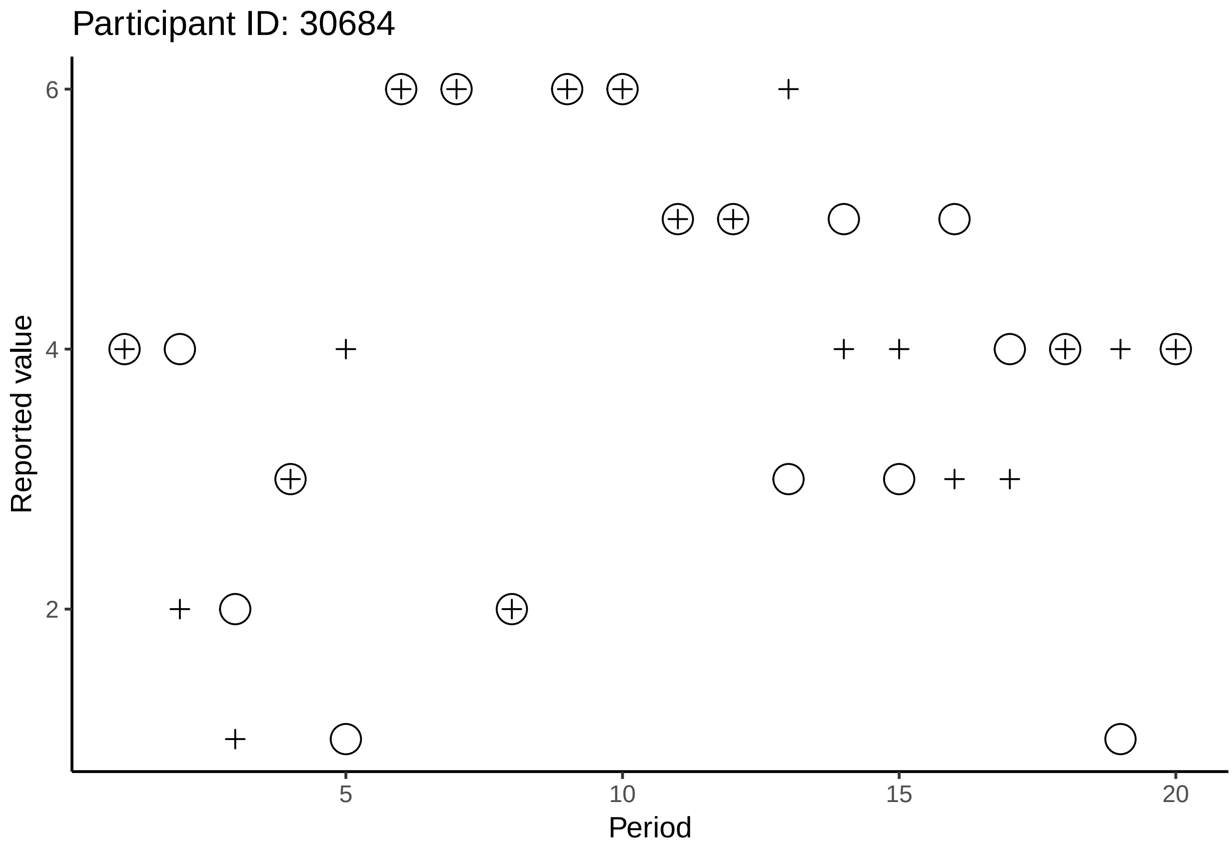
20
Period



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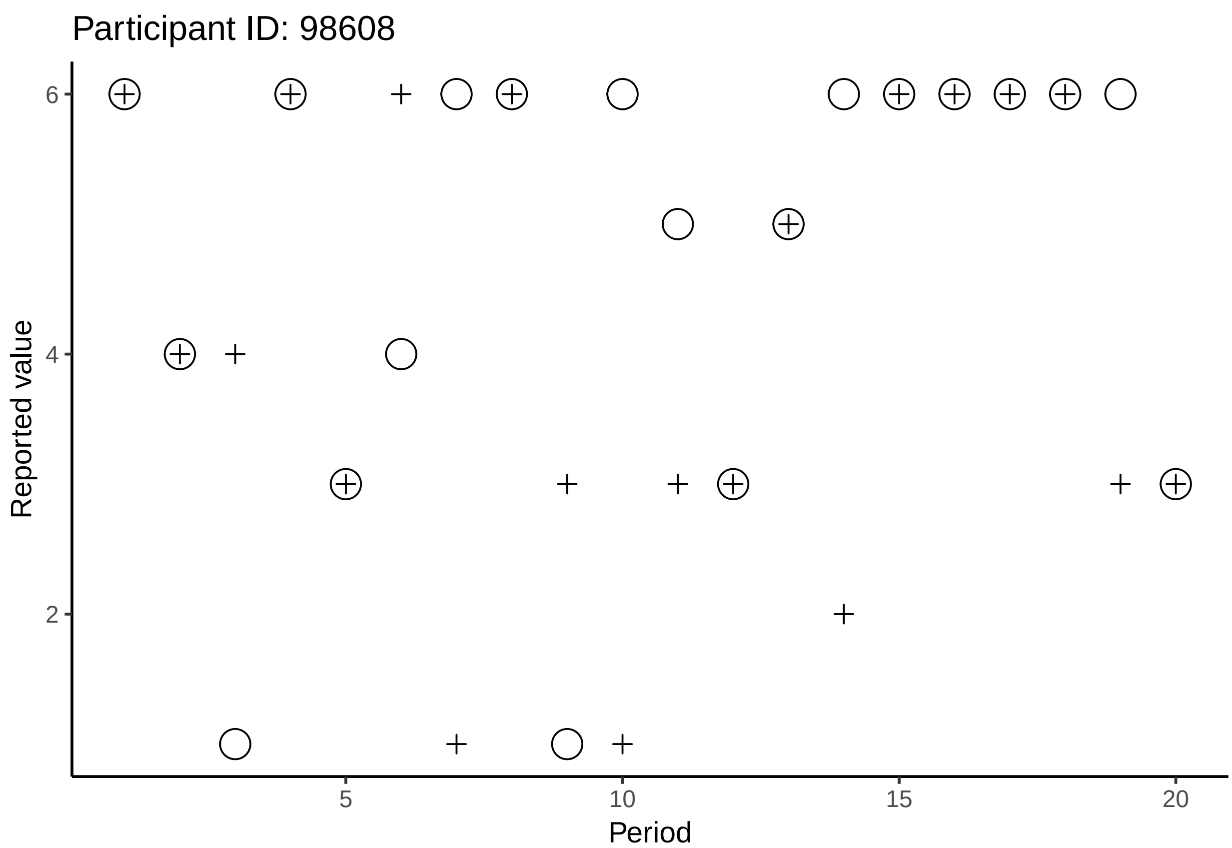
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2
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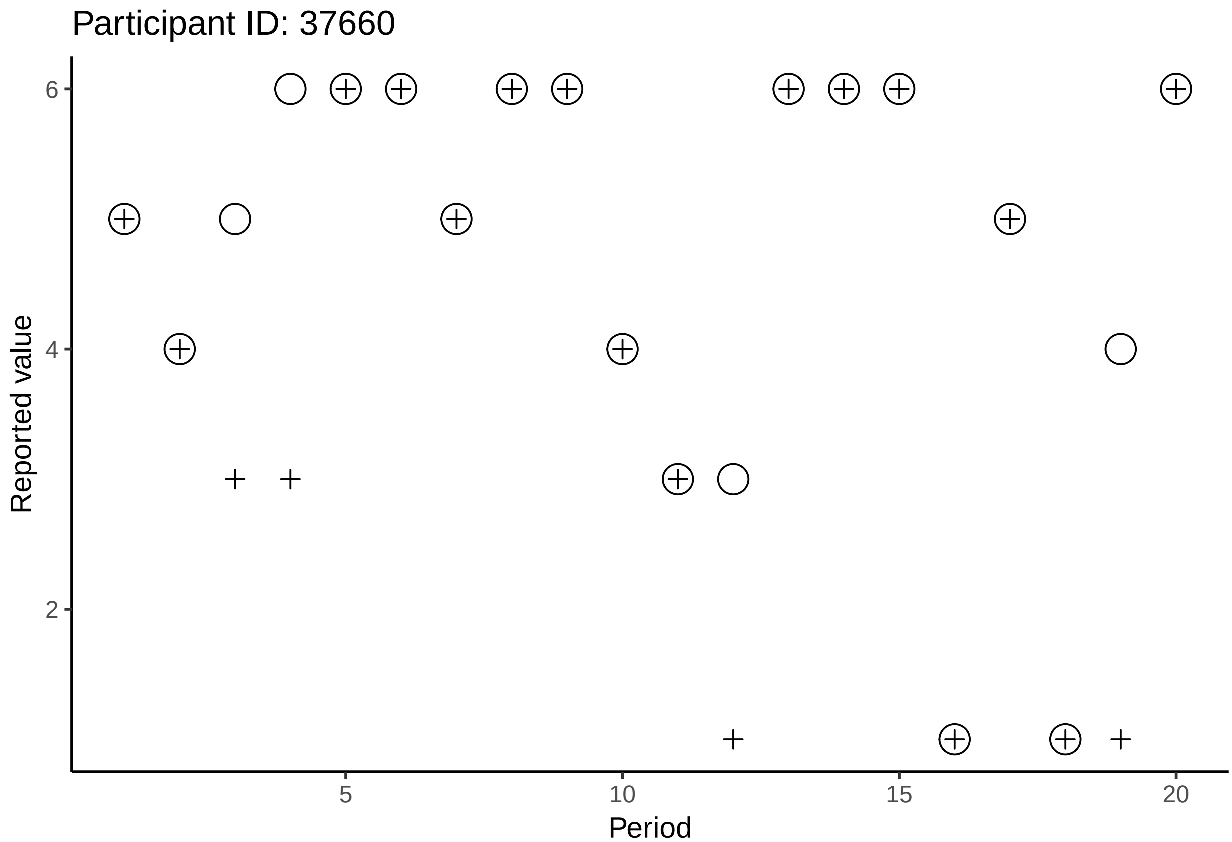
10
15
20
Period



Participant ID: 37660
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2
Period
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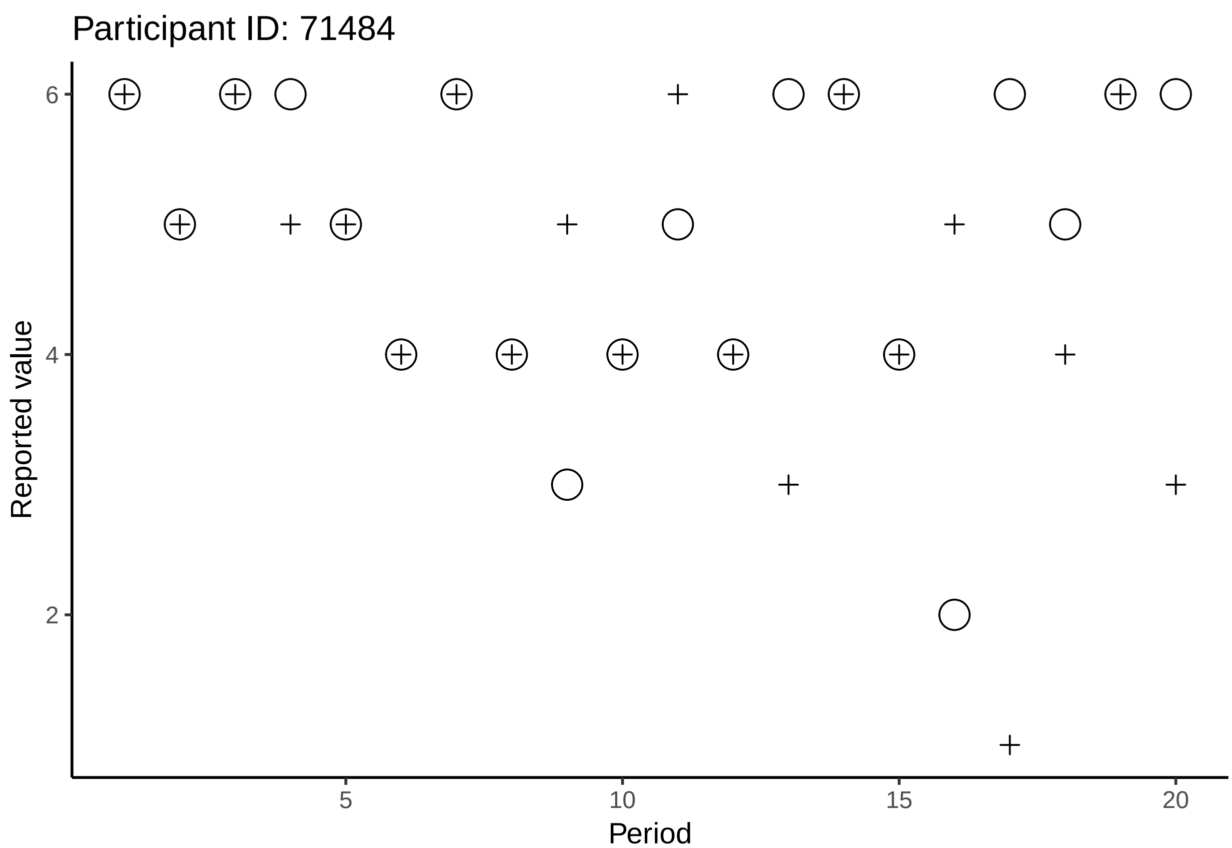
15
20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5
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15
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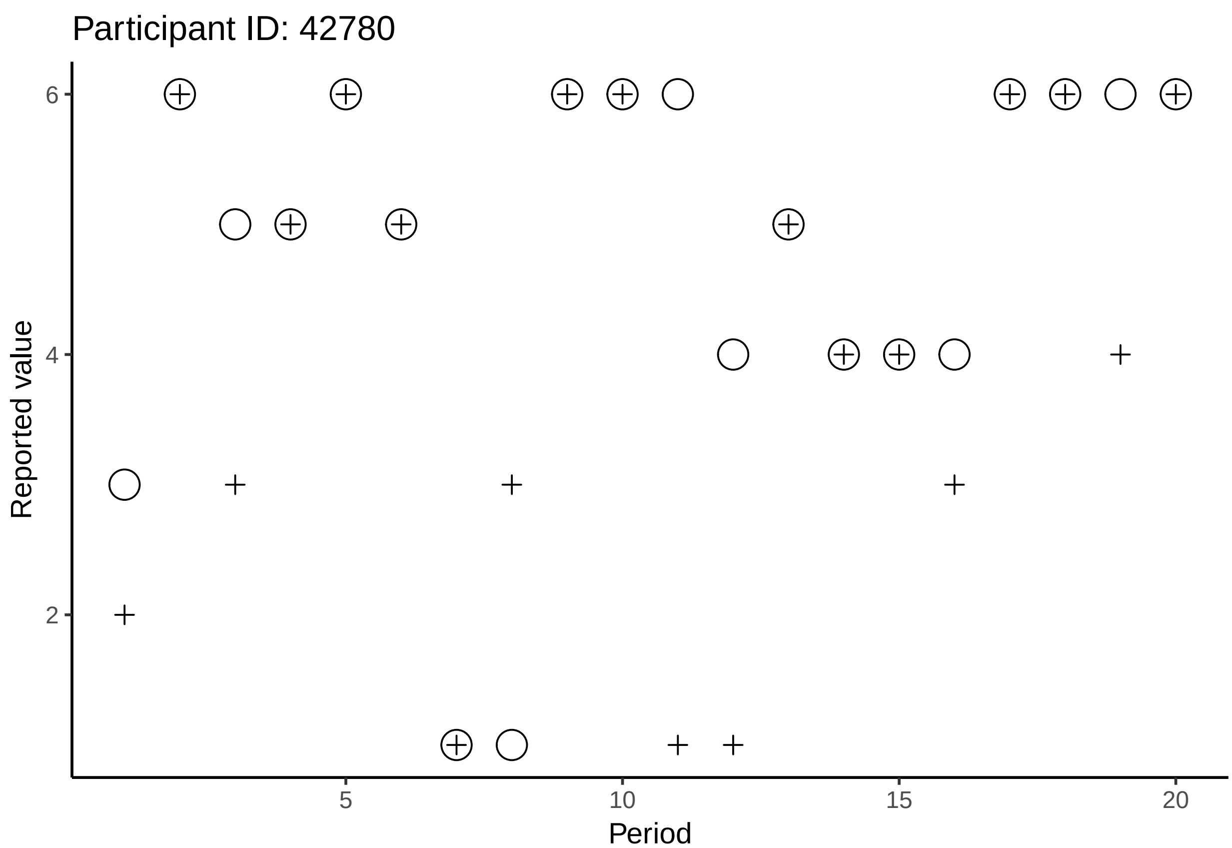
Participant ID: 42780
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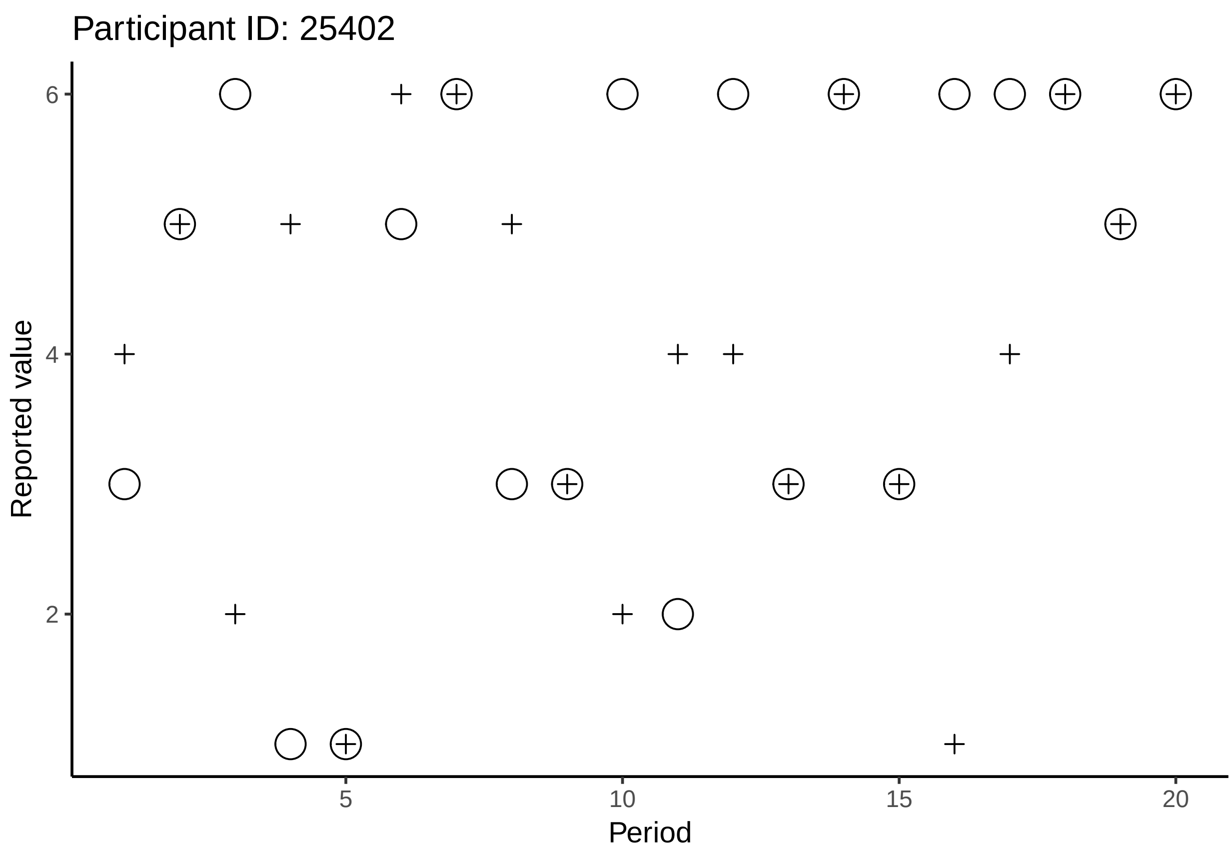
10
15
20
Period


Participant ID: 25402
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2
Period
5
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15
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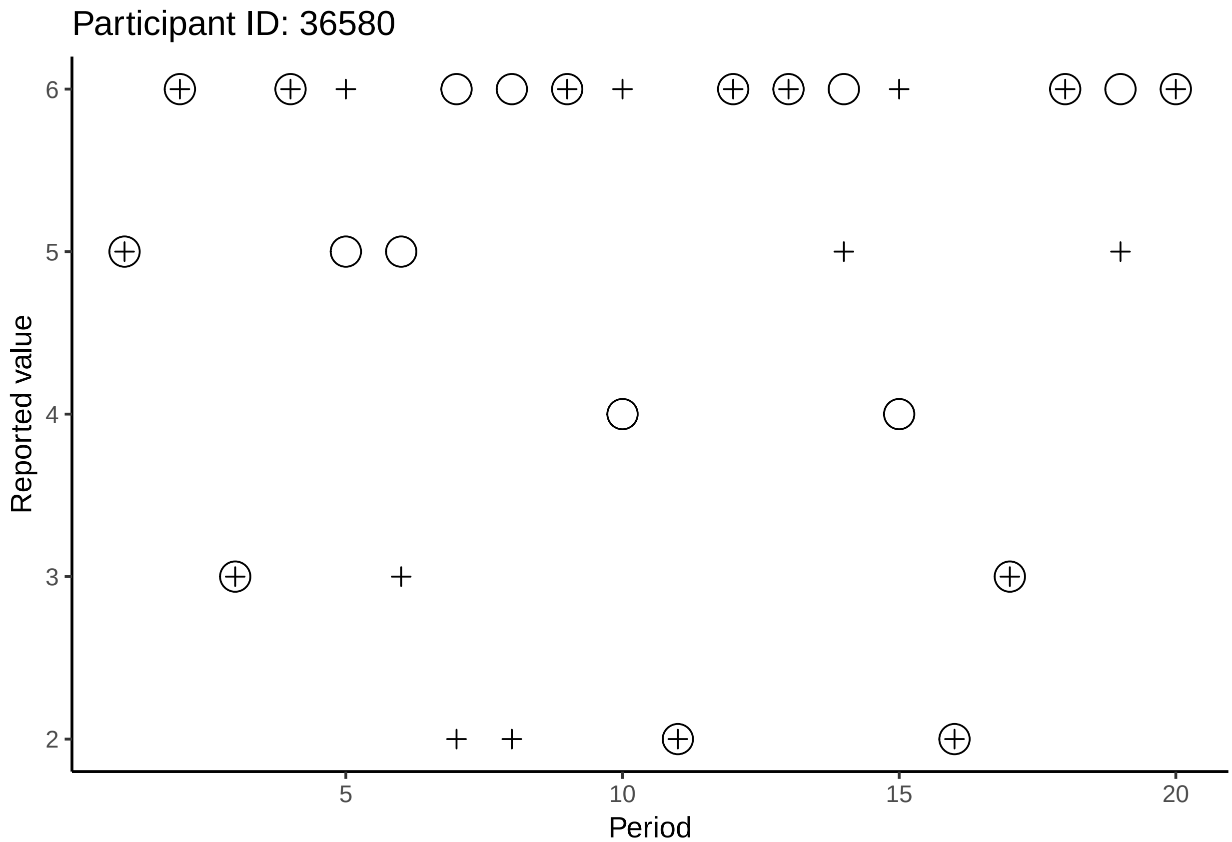
Participant ID: 36580
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Period
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3
2
5
10
15
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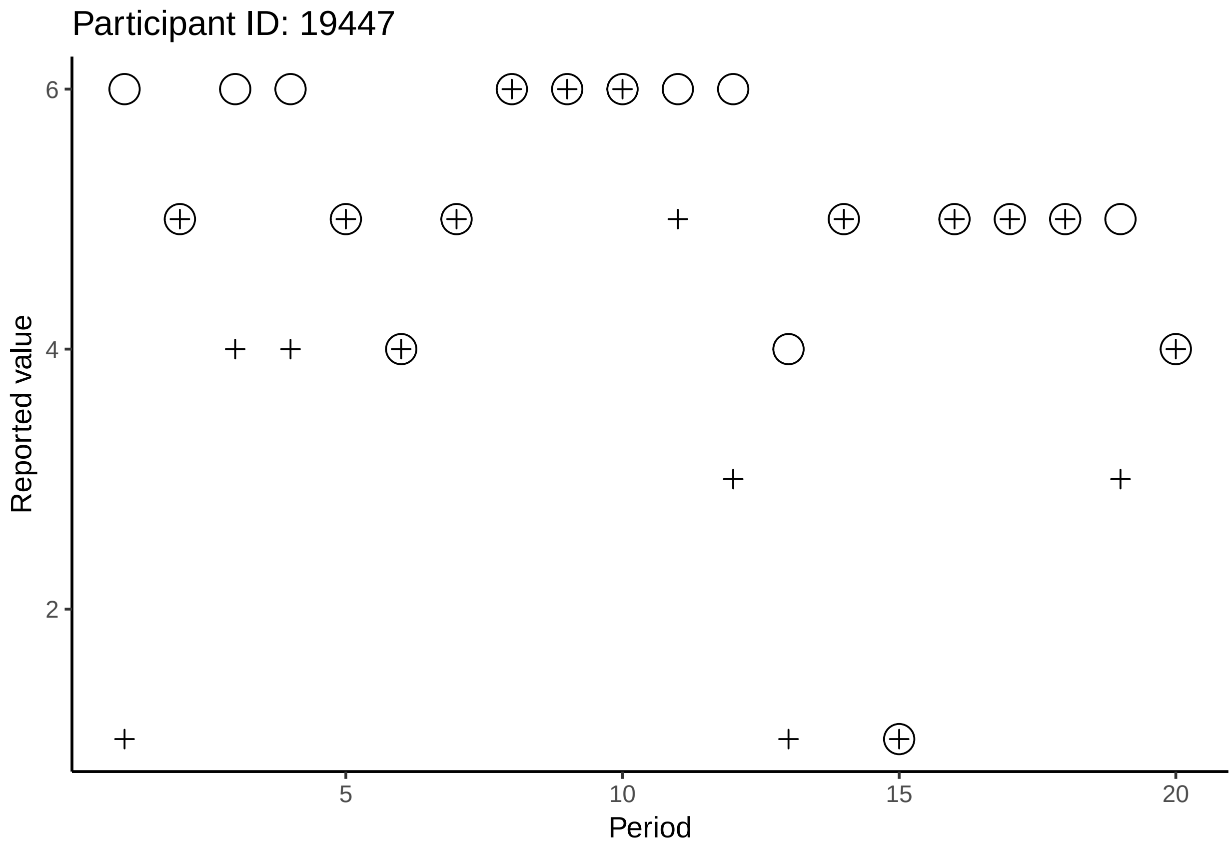

Participant ID: 19447
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Period
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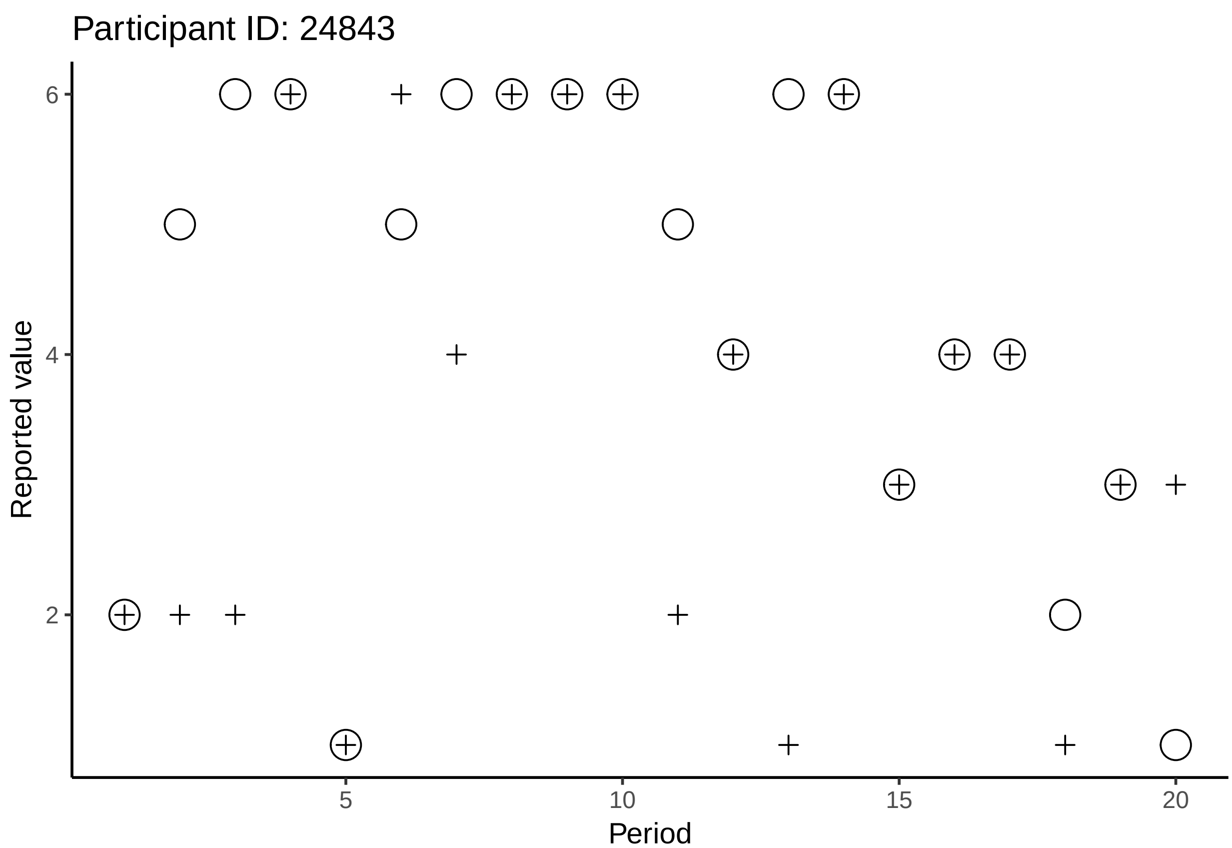
Participant ID: 24843
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Period
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5
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15
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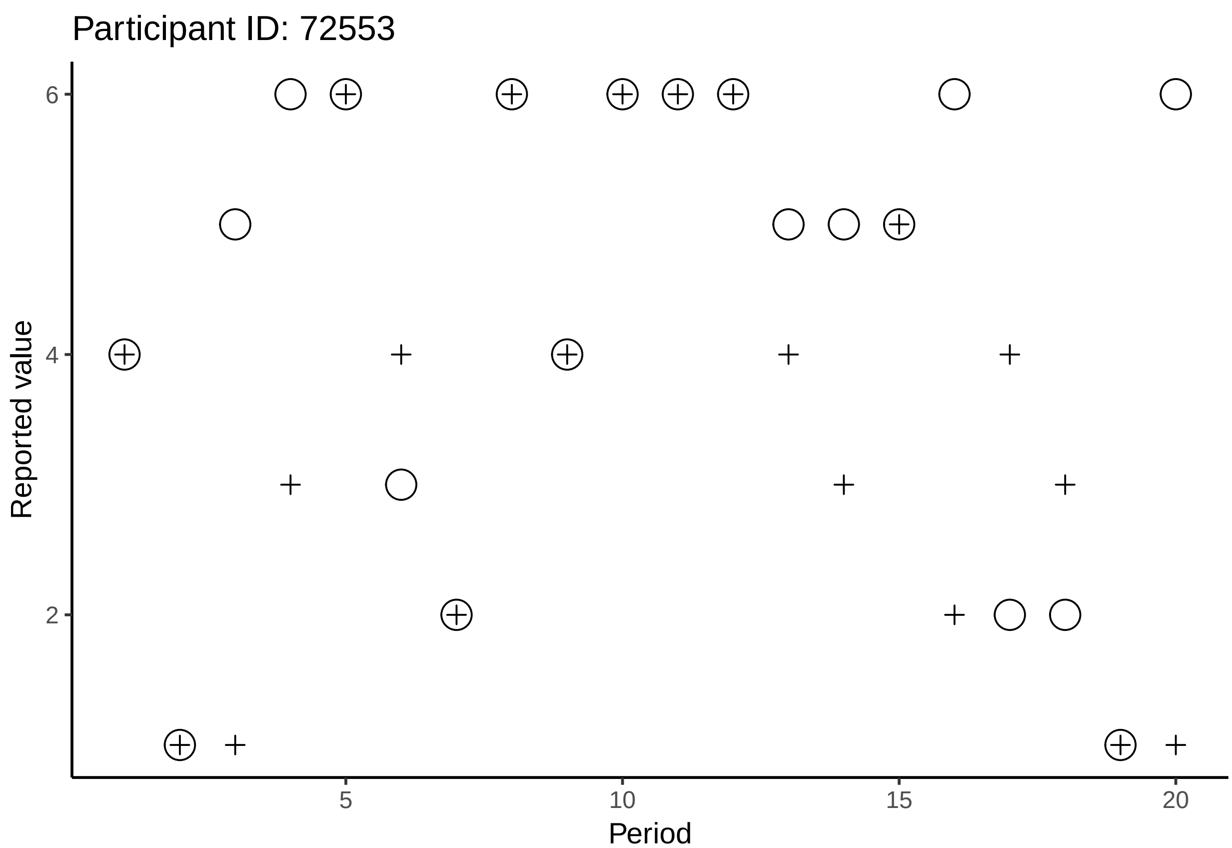
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2
Period
5
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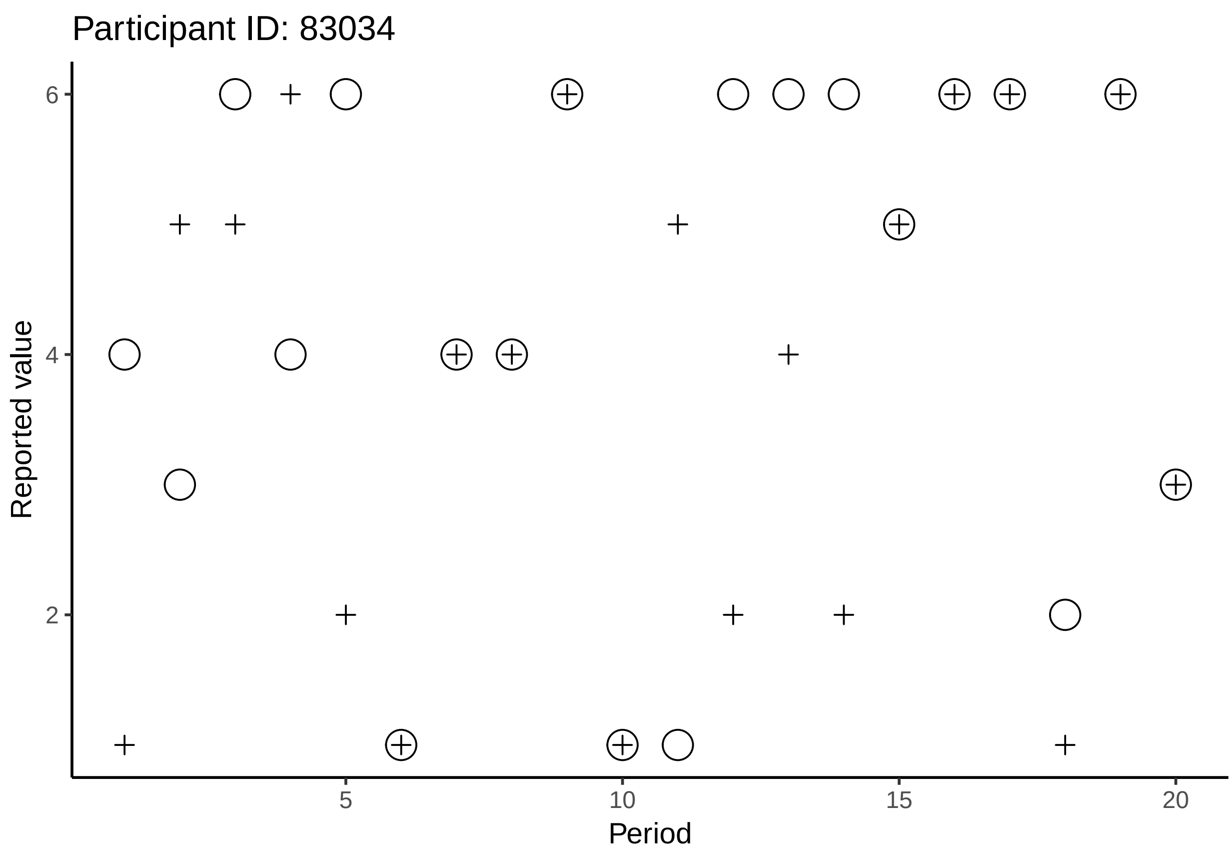
15
20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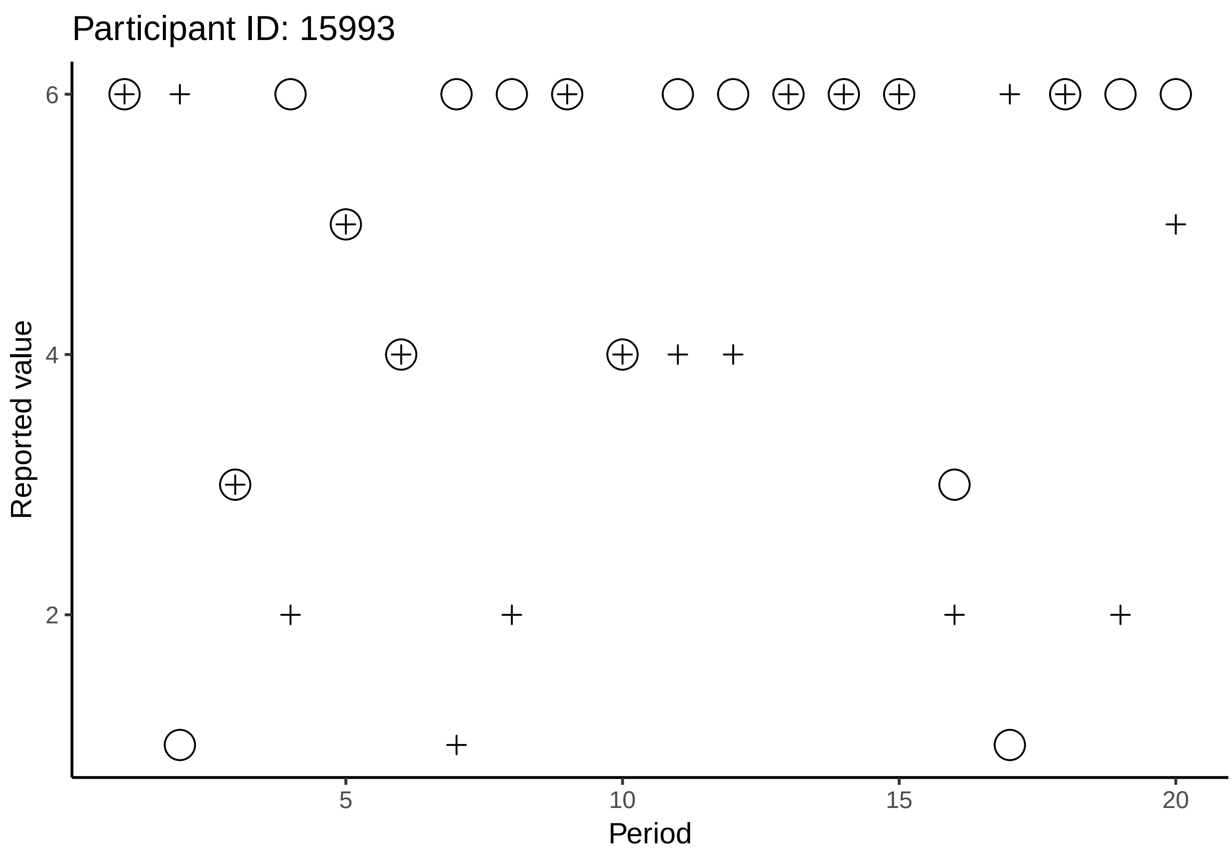
2
Period
5
10
15
20


Participant ID: 15993
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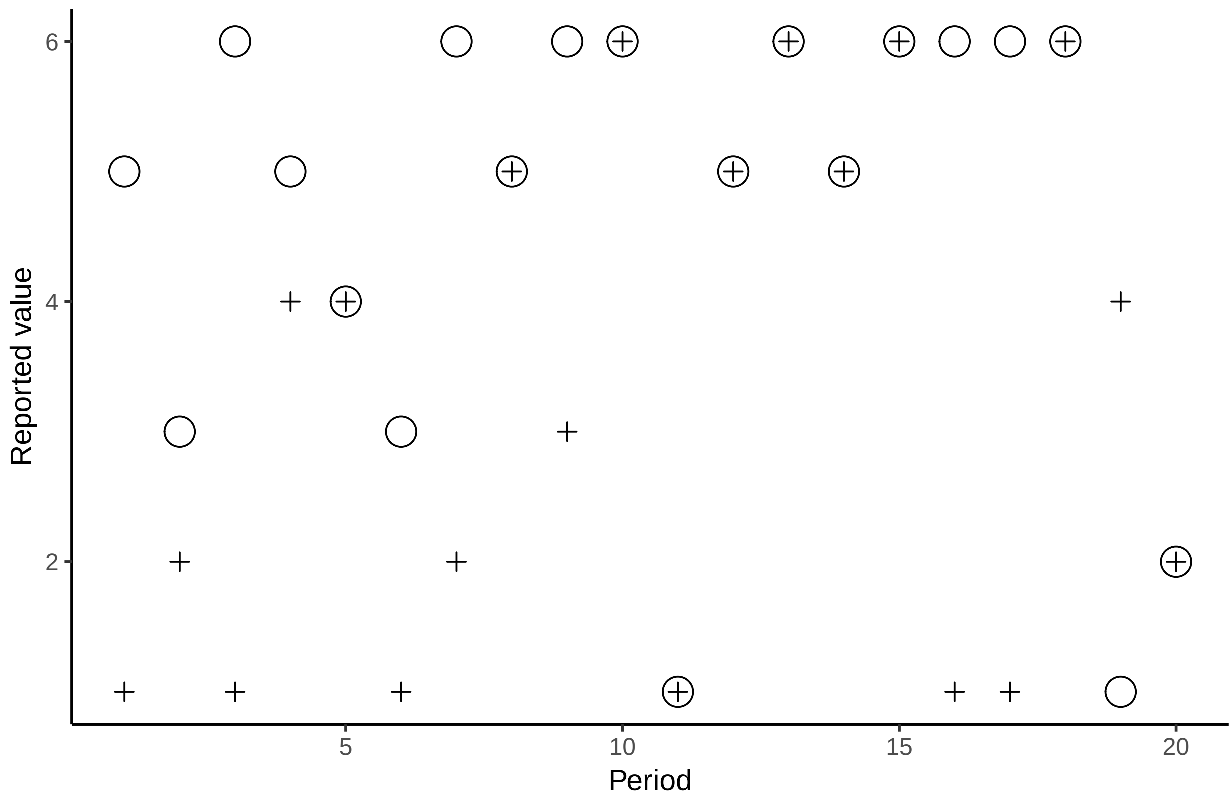
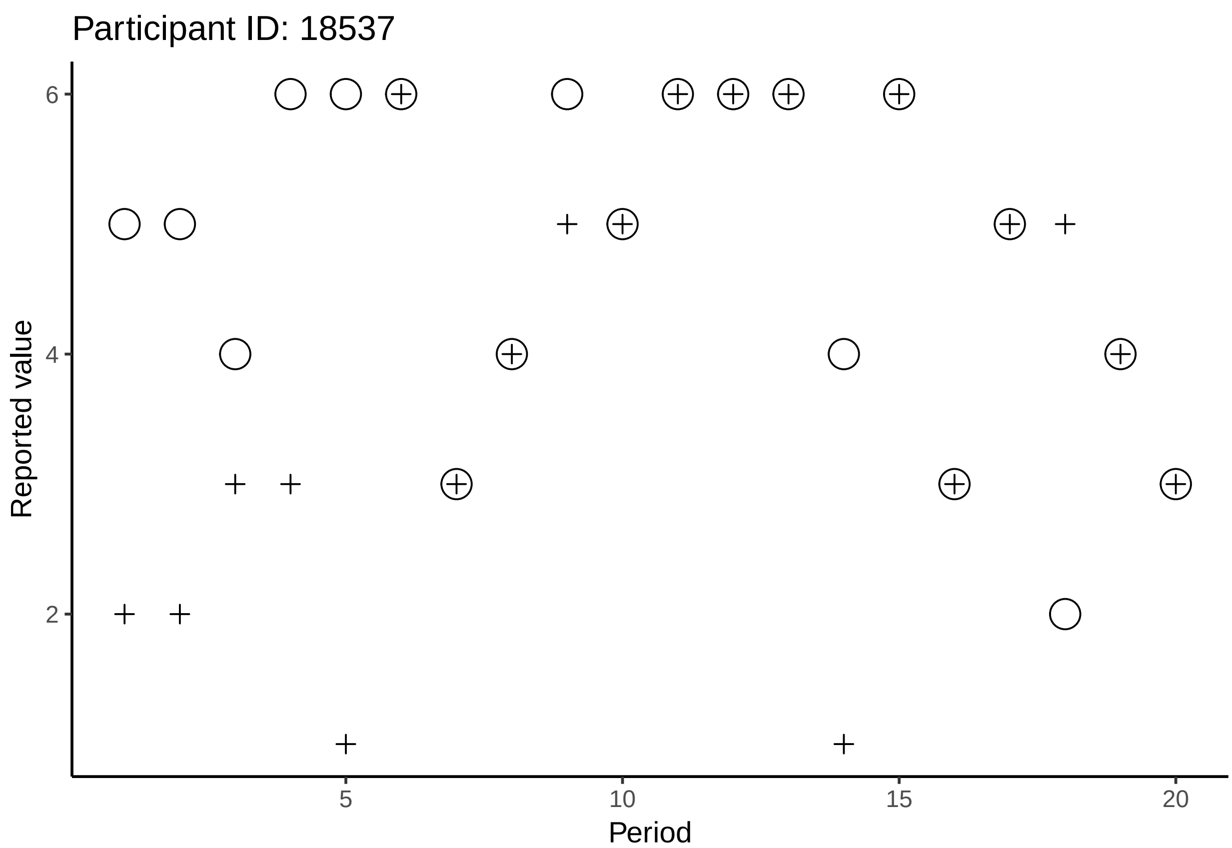
4
2
Period
5
10
15
20

Participant ID: 26303

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Period
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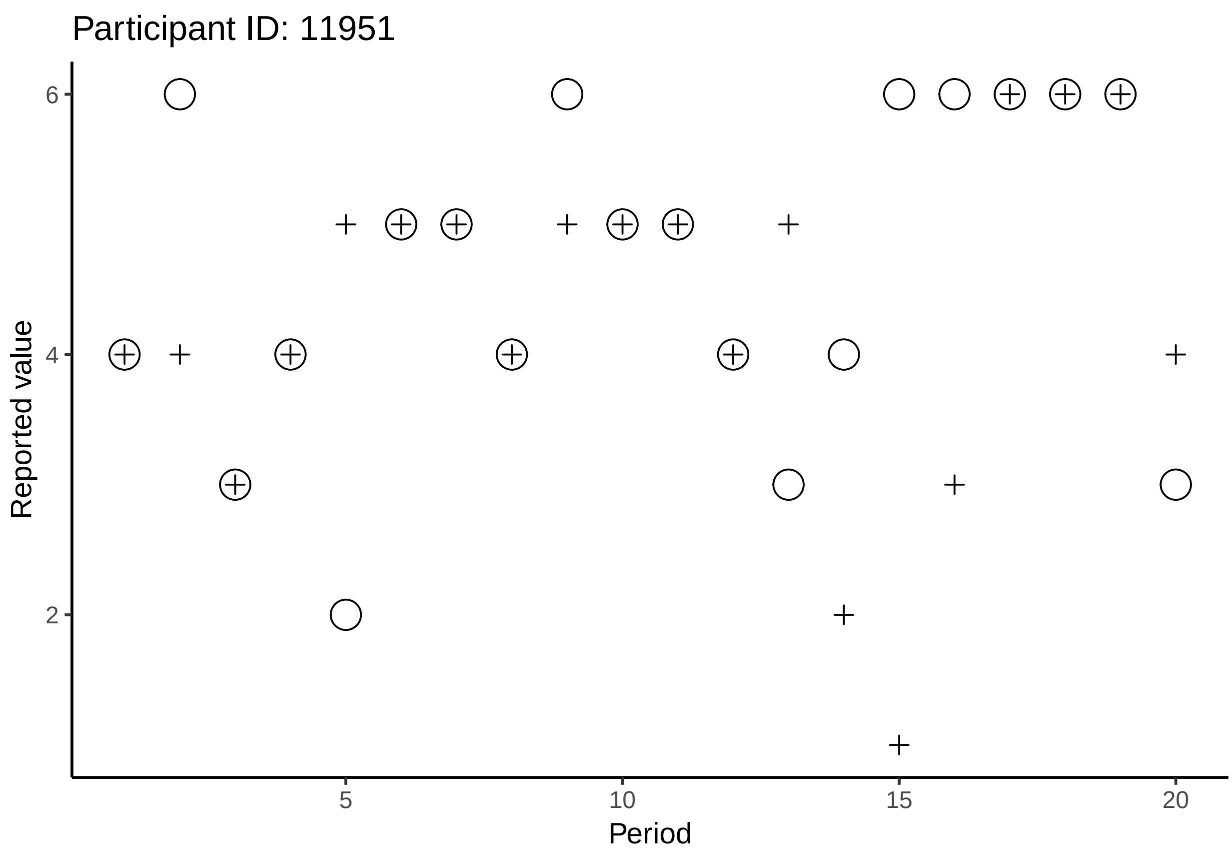
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Reported value
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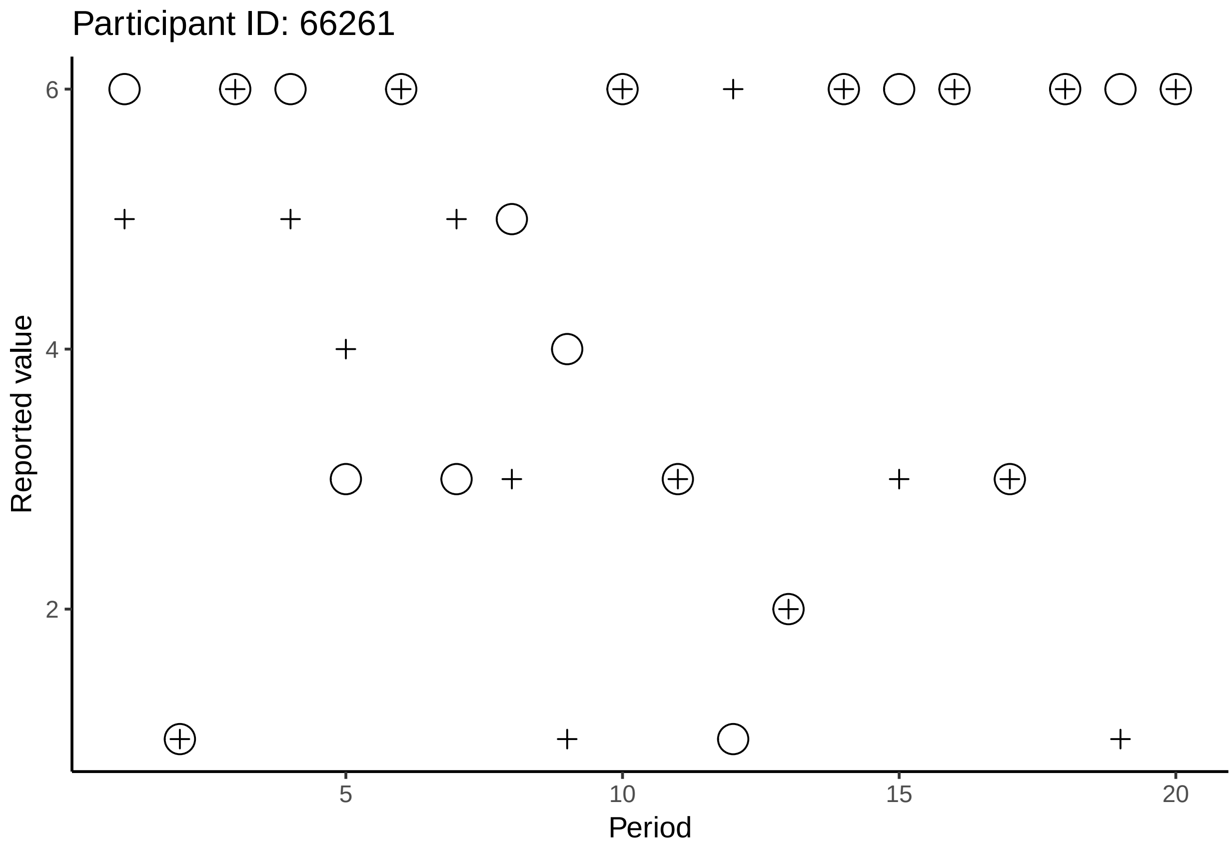
20
Period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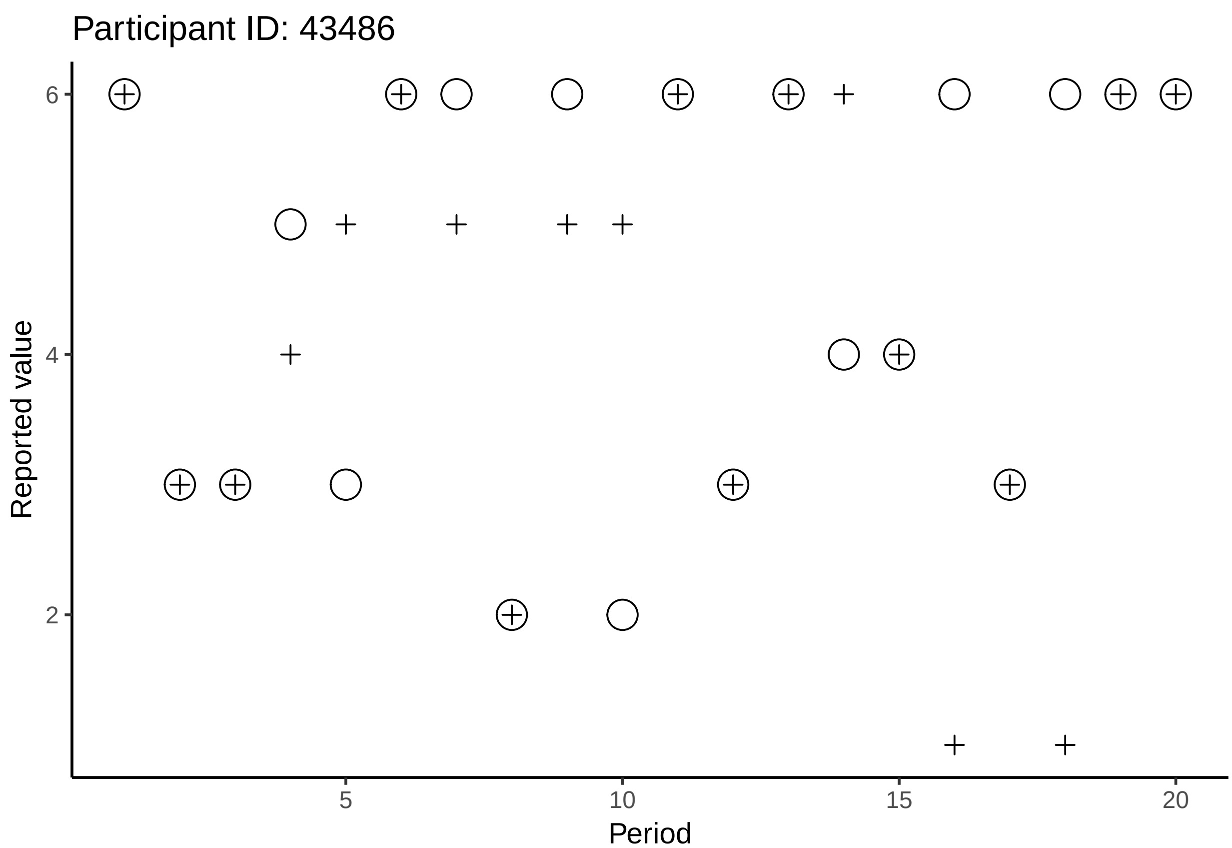
20
Period



Participant ID: 43486
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15
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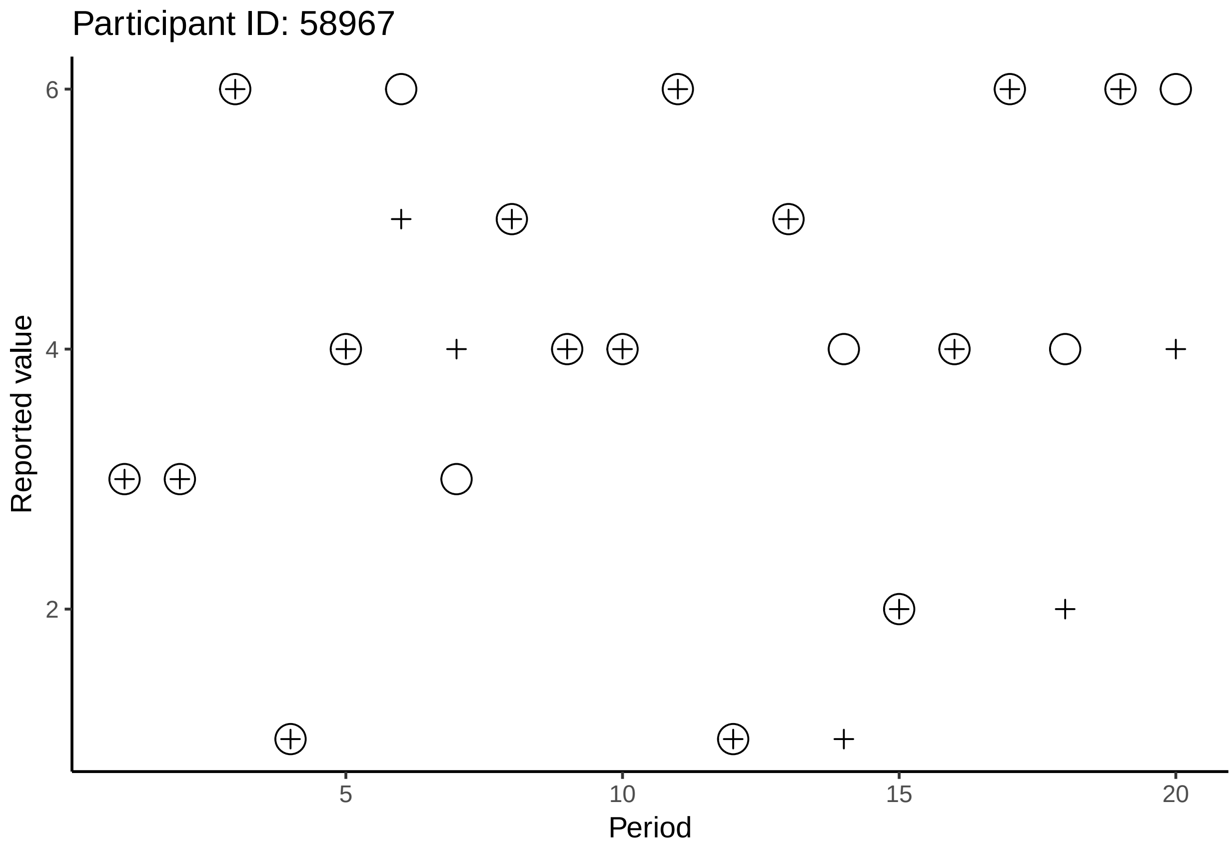
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Reported value
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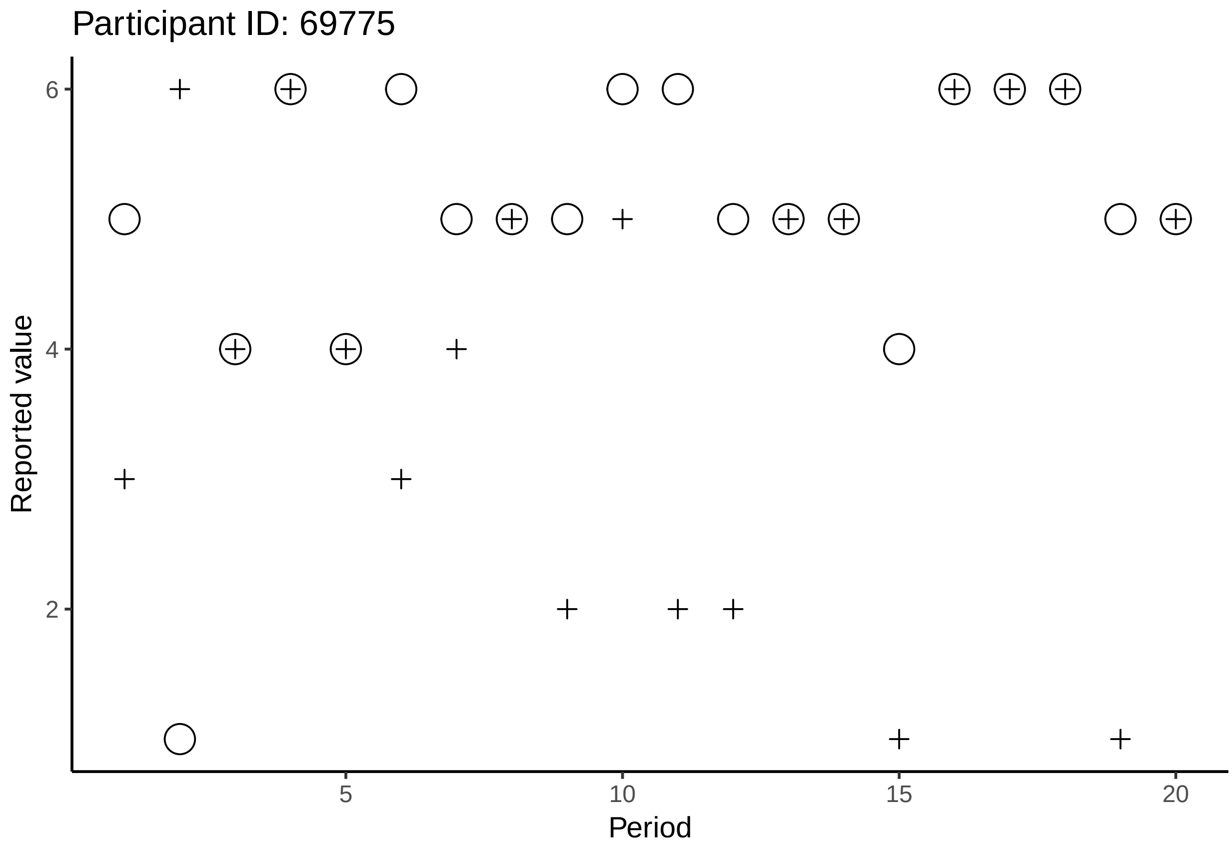
20
Period


Participant ID: 69775
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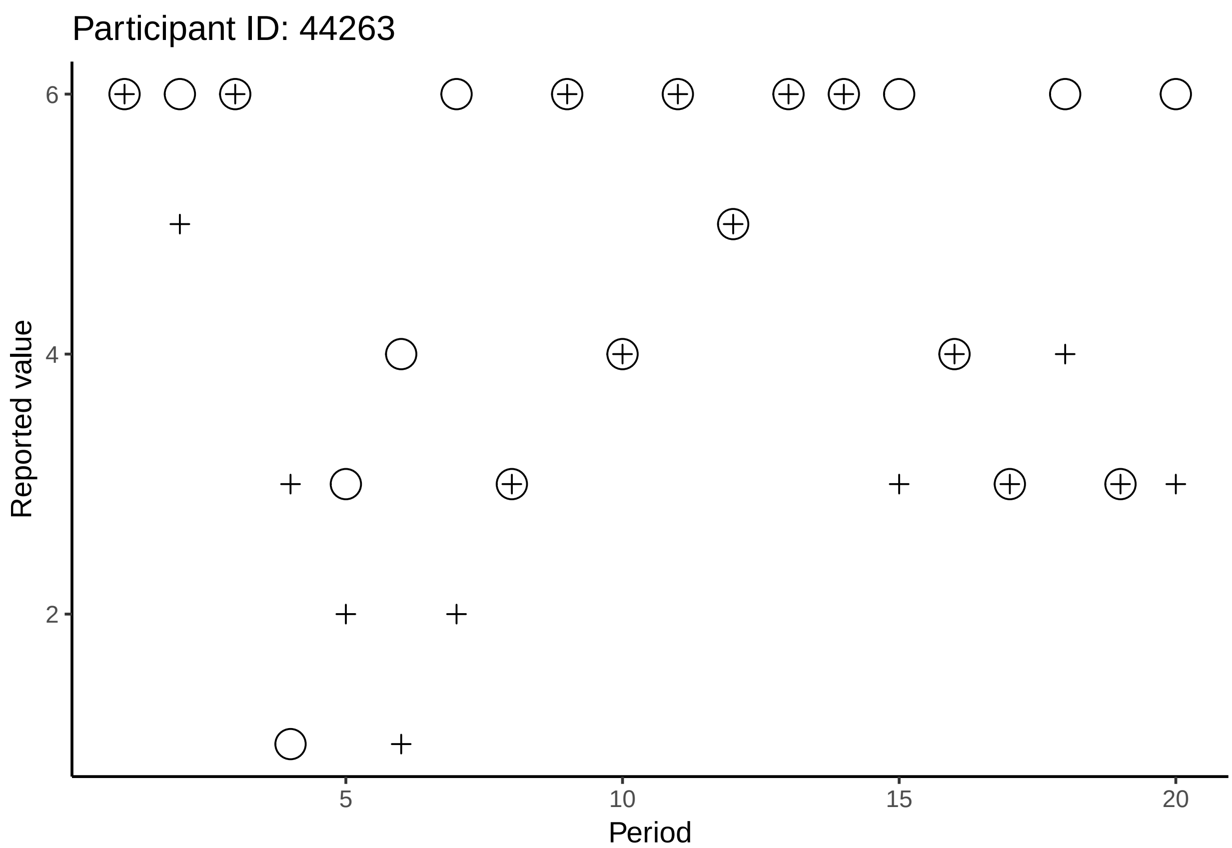
Participant ID: 44263
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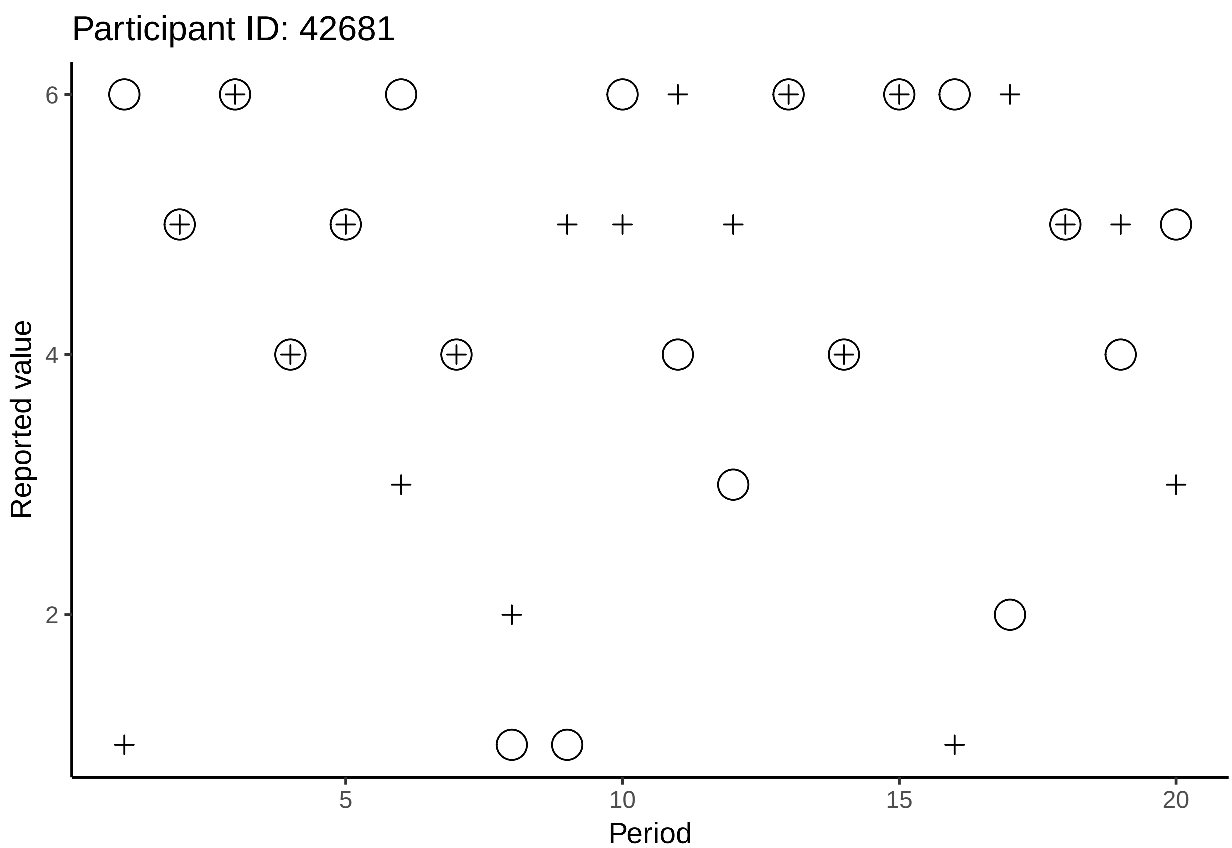
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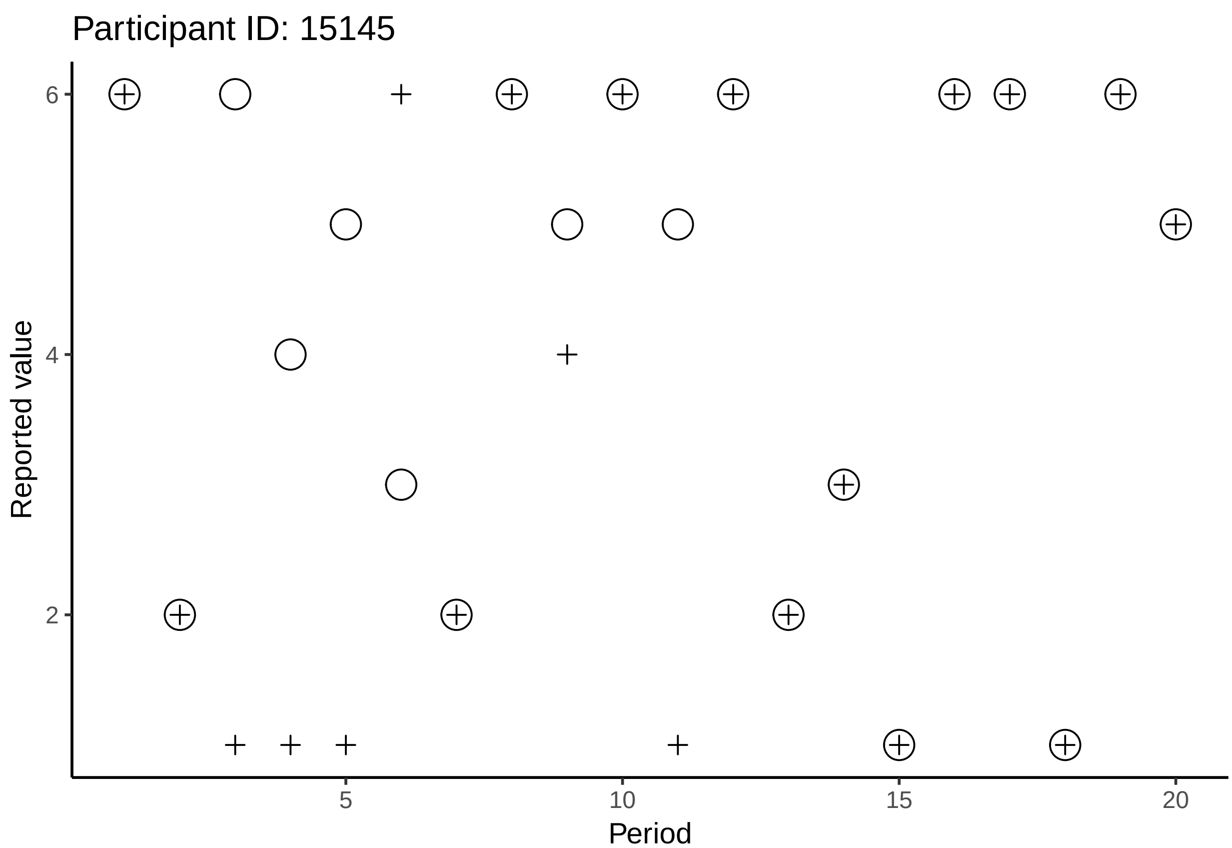

Participant ID: 15145
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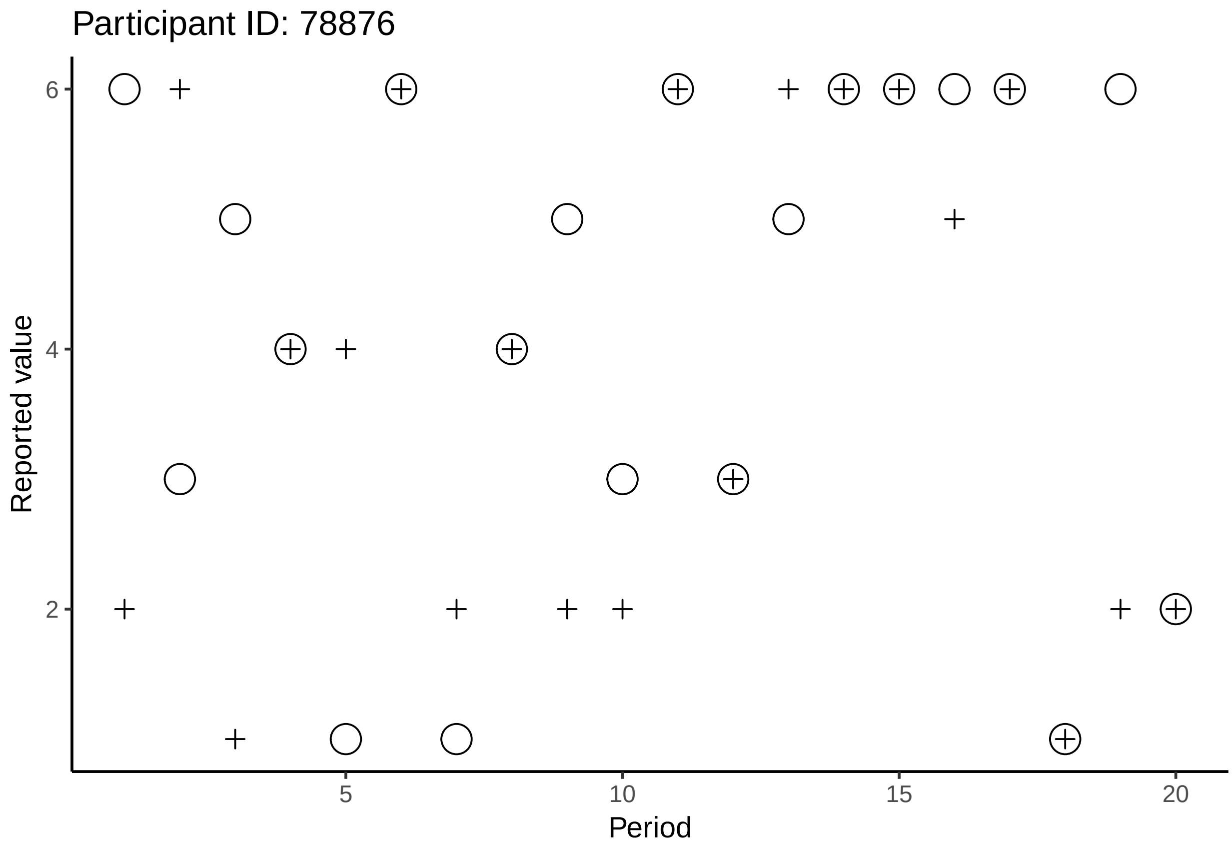
10
15
20
Period



Participant ID: 78876
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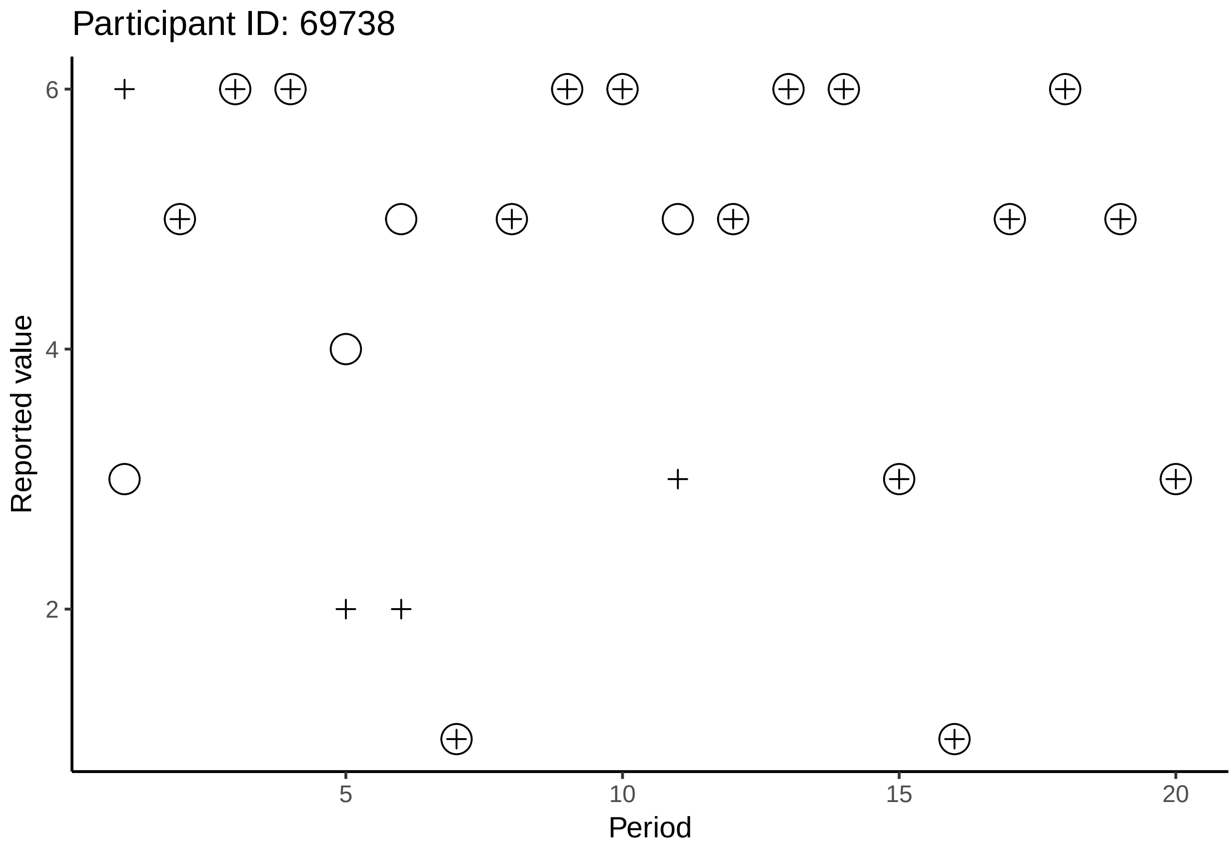
20
Period



Participant ID: 69738
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Period
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15
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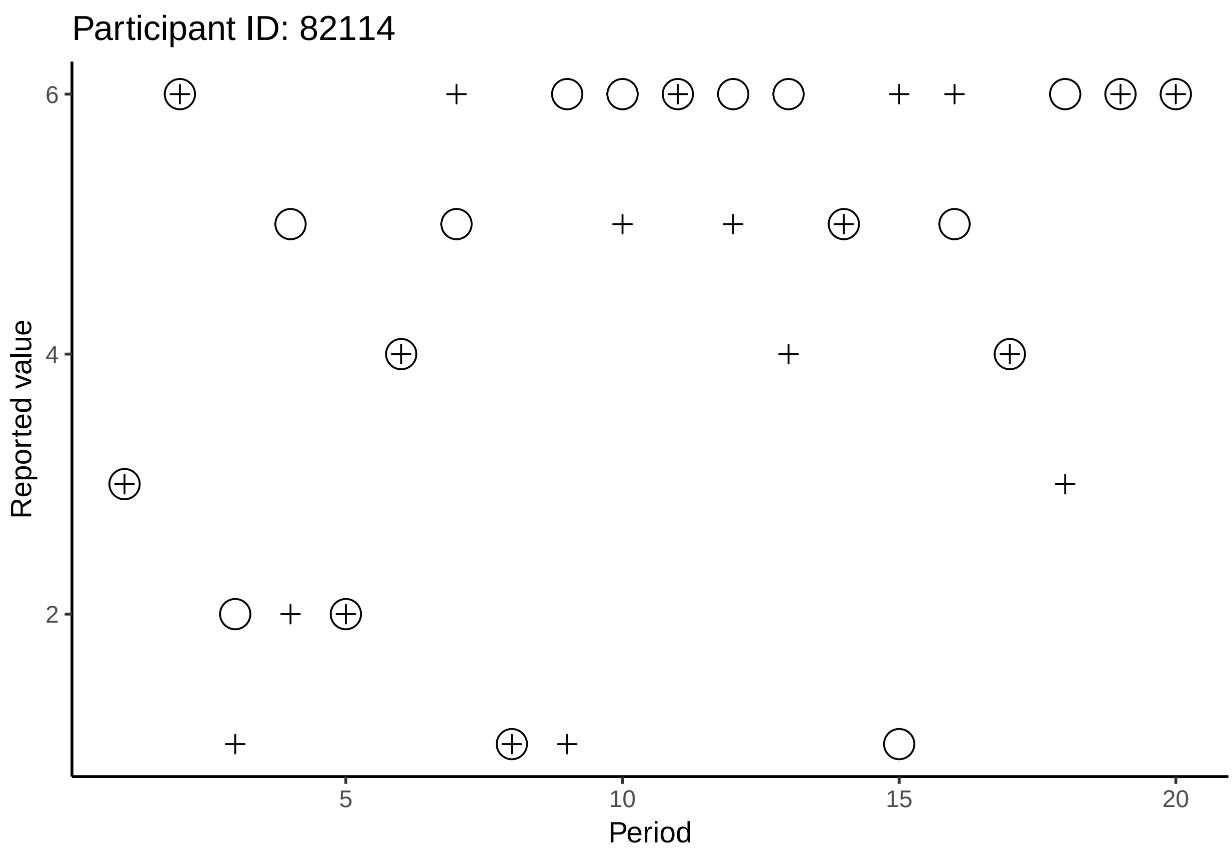
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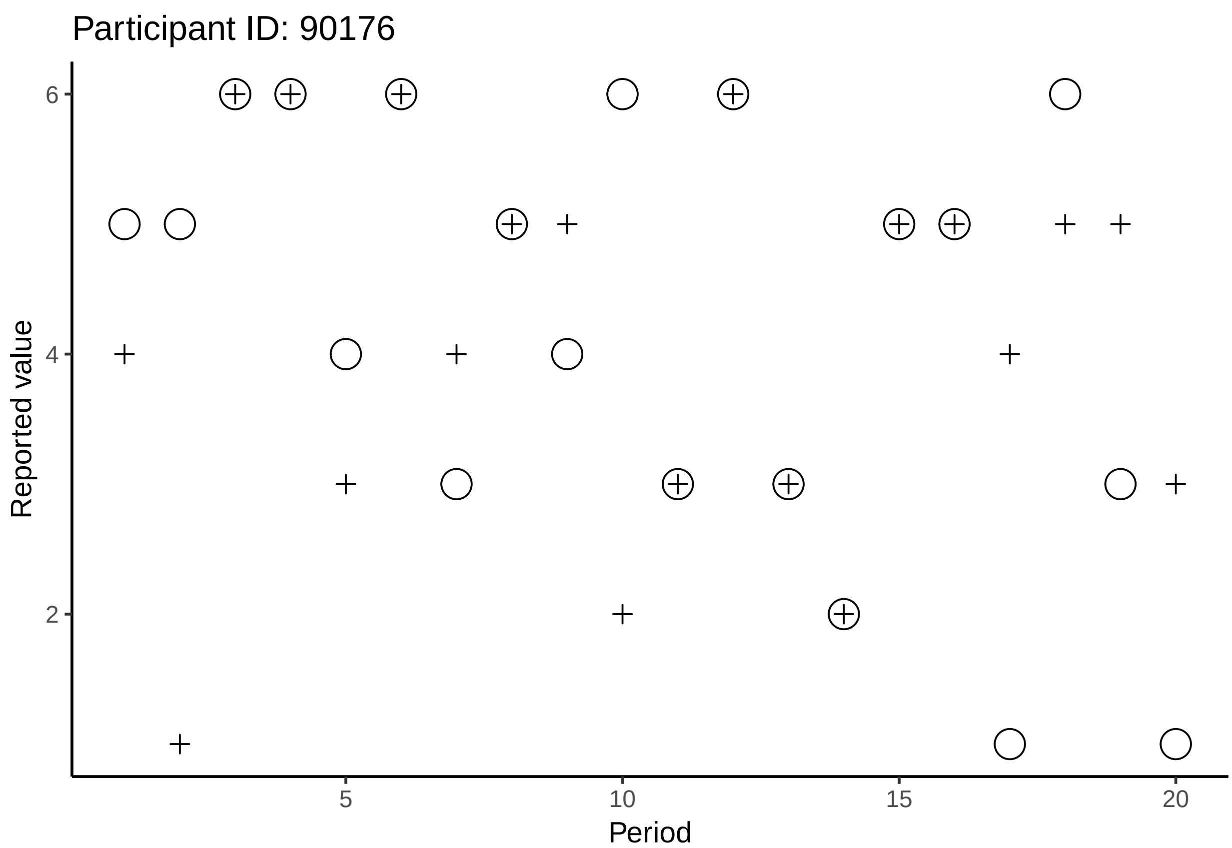
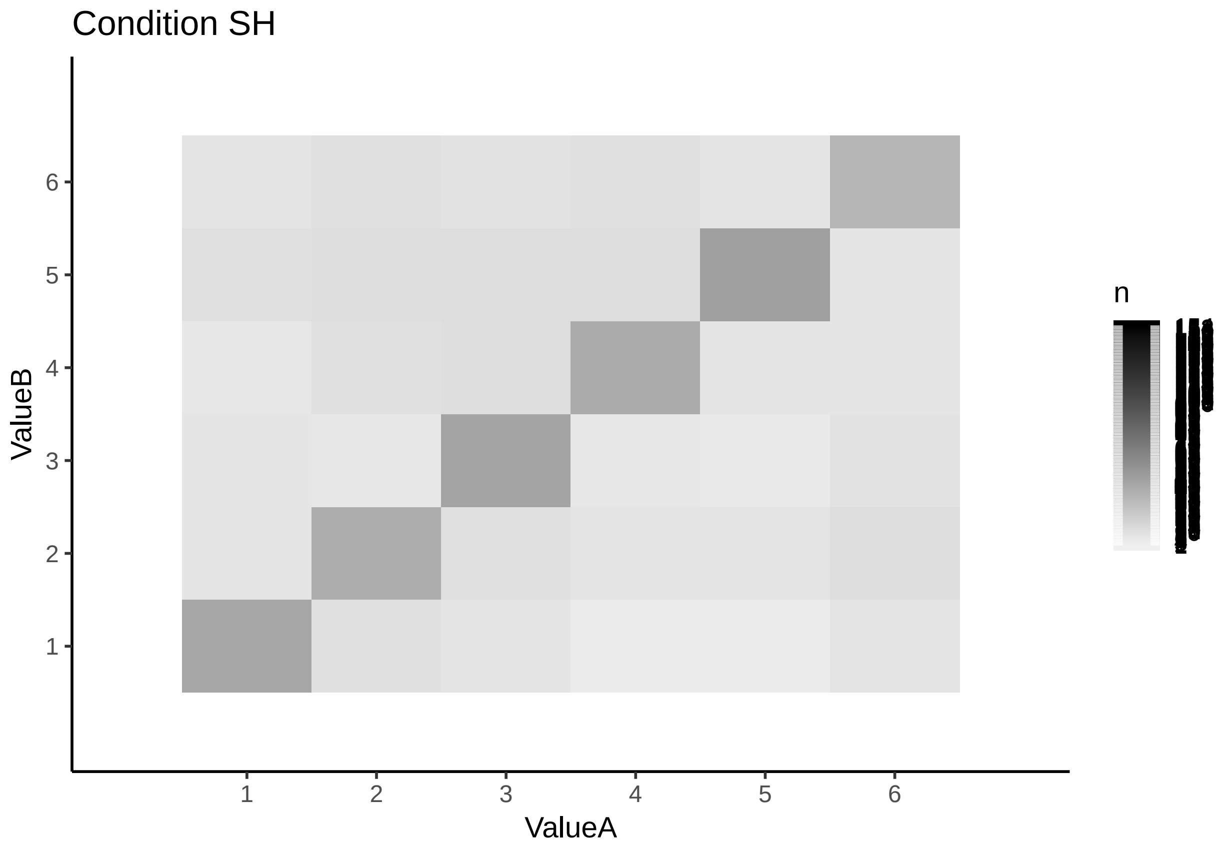
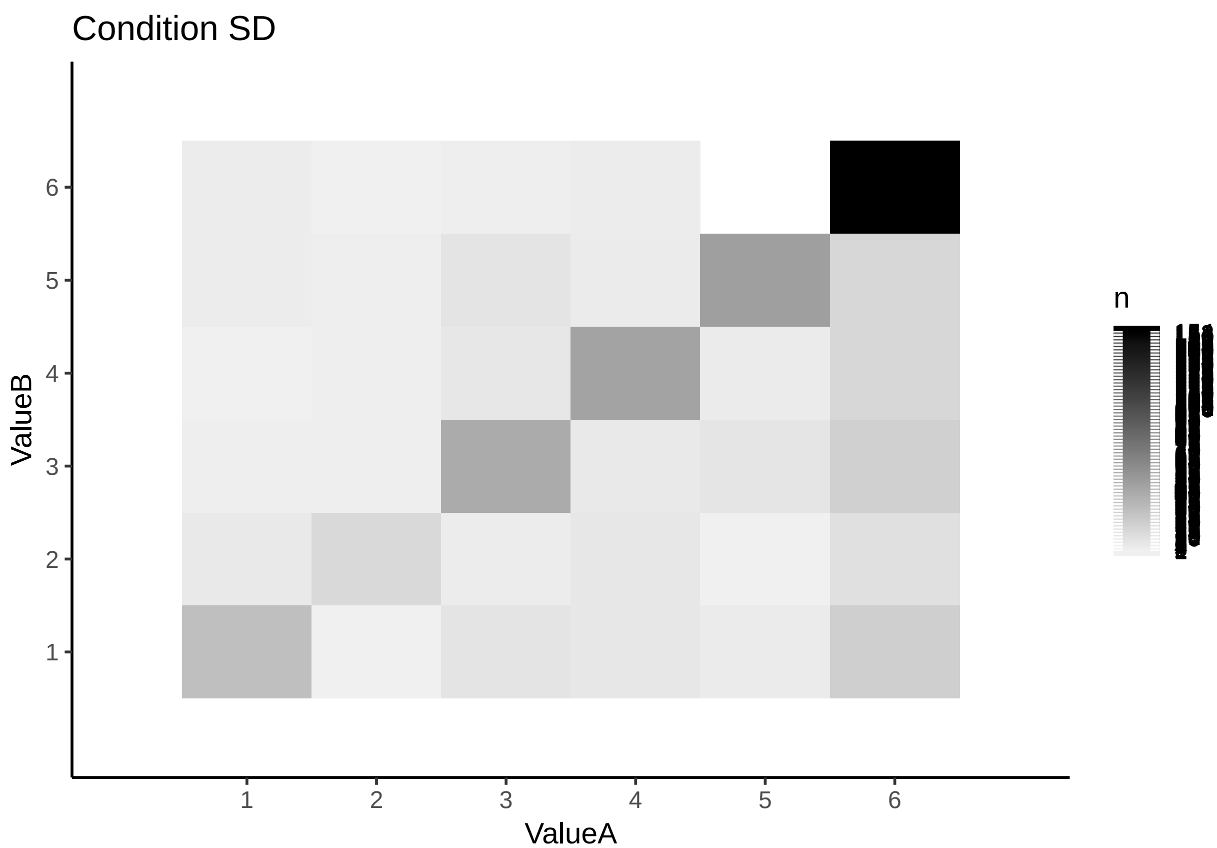
2
Period
5
10
15
20



Heat map to demonstrate the distribution of reported numbers

Like Weisel & Shalvi, 2015, Fig. 2, but instead of circles, each rectangle should be color coded according the number of observations within them.
One figure per condition.


Condition SH
ValueB
6
5
4
3
2
1
1
2
3
4
5
6
ValueA
n


Condition SD
ValueB
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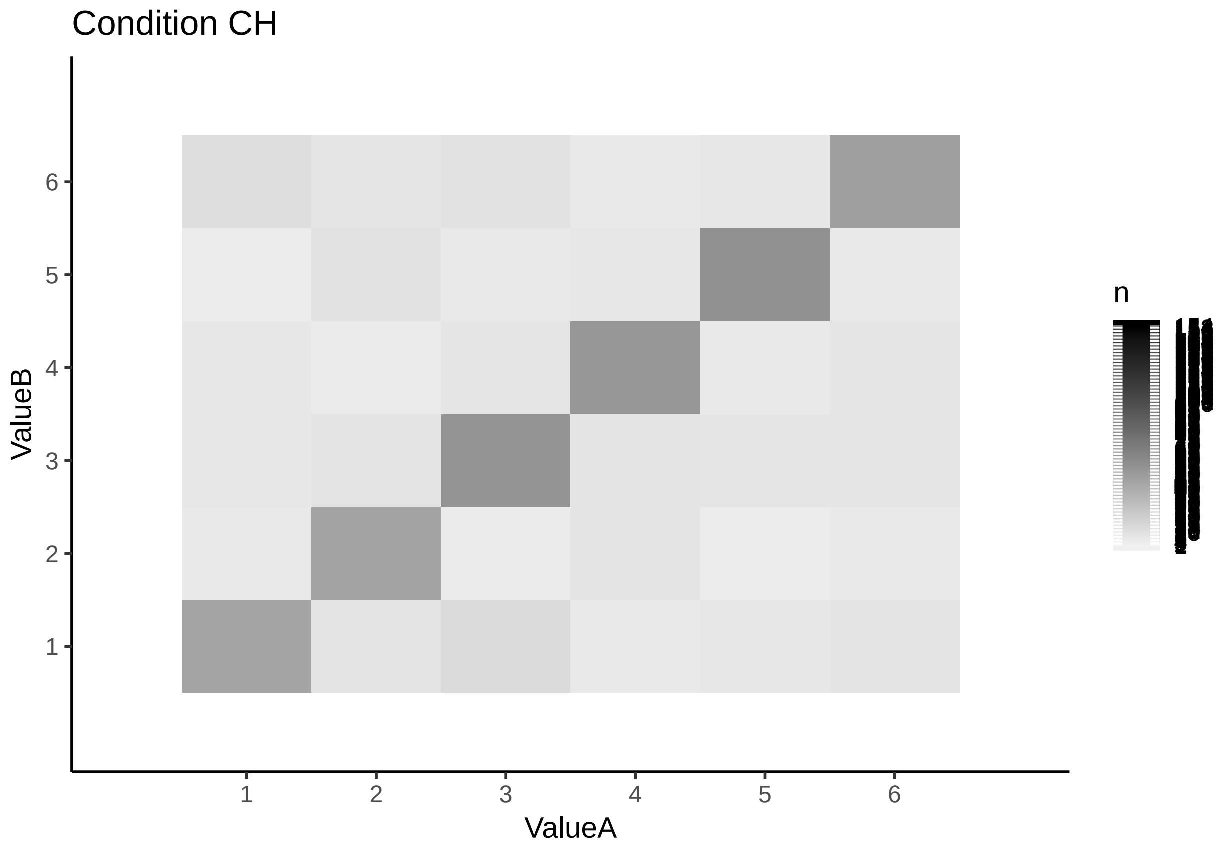
5
4
3
2
1
1
2
3
4
5
6
ValueA
n
[redacted]


Condition CH
ValueB
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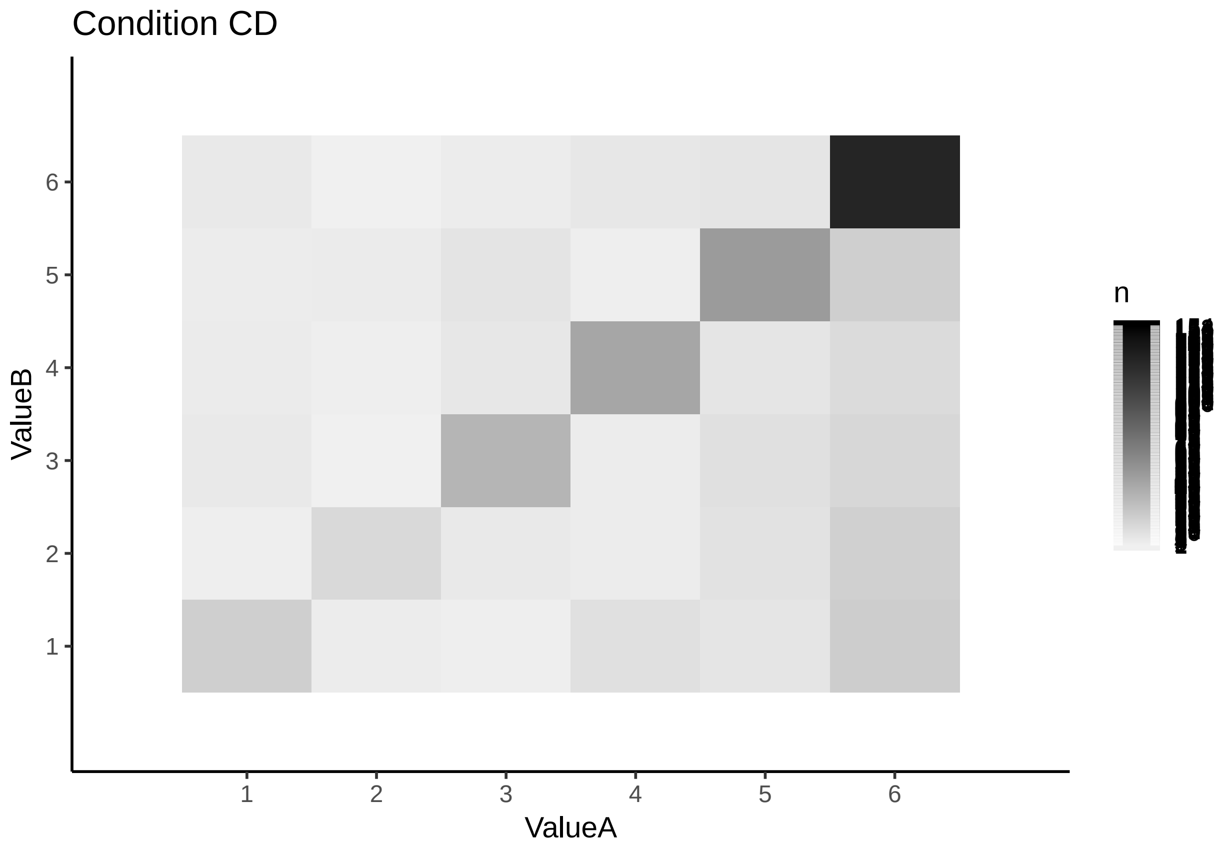
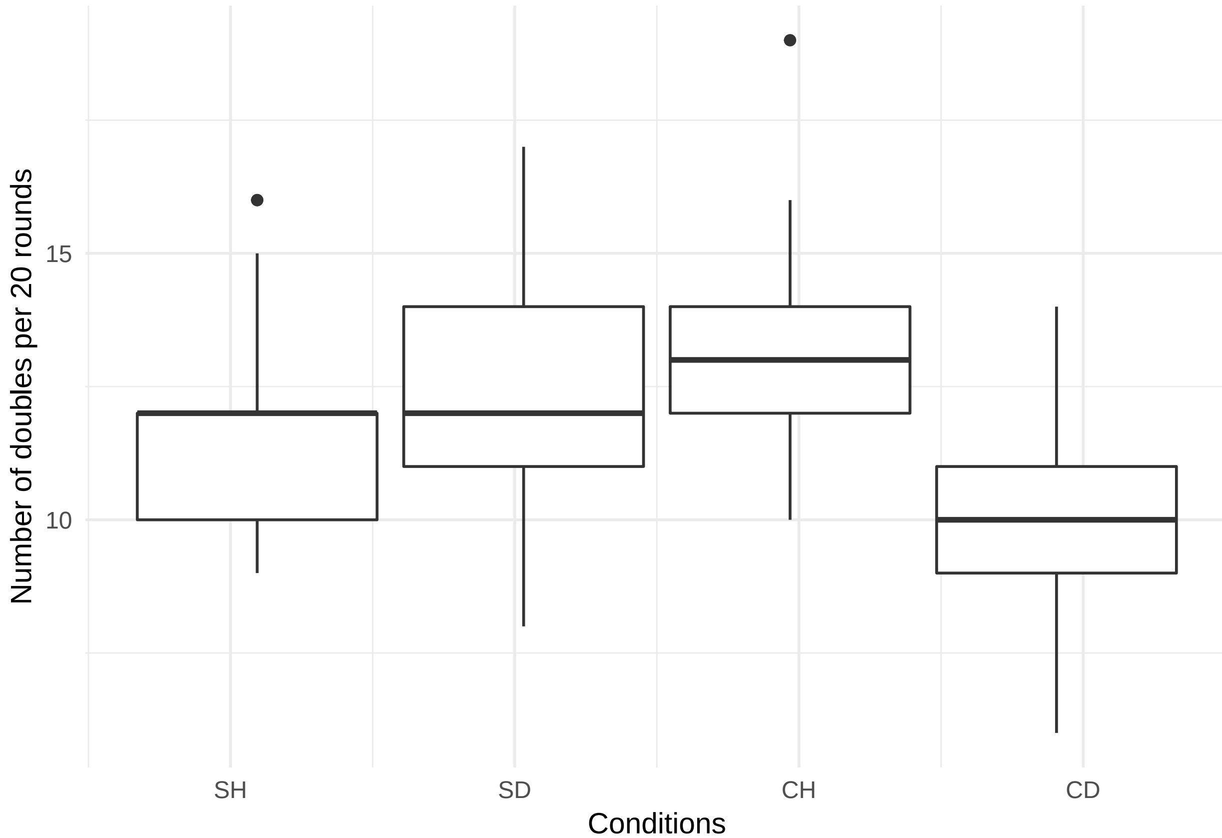
5
4
3
2
1
ValueA
1
2
3
4
5
6
n
[redacted]



Box plots of the mean number of doubles

One box for each condition on the same figure
(Mean reports: does not make sense in our case, because player A is simulated)



Statistics

Summary of data

Summary of groups:

Condition	Nbof_participants	Nbof_doubles_per_group	Avg_nbof_doubles	Median_nbof_doubles	Avg_avg_rep
SH	25	253	10.12	10	3.
SD	25	332	13.28	13	4.
CH	25	304	12.16	12	3.
CD	25	294	11.76	12	4.

Distribution of reported numbers

Our null hypothesis is that the reported values come from a uniform distribution, i.e. numbers from 1 to 6 are reported with the same probability, since we used a fair dice. Our alternative hypothesis is that participants cheat and report doubles in order to inflate their profit.

This would lead to skewed distributions when the participant playes with a dishonest simulated partner who reports larger numbers with higher probability. In case of an honest simulated partner, whose dice throw values were sampled from a uniform distribution, we expect that the participants' reported values also come from a uniform ditribution (although it is possible that participants try to signal to their supposed partners to cheat by occassionally reporting 6s, but we do not expect this to create a significant difference).

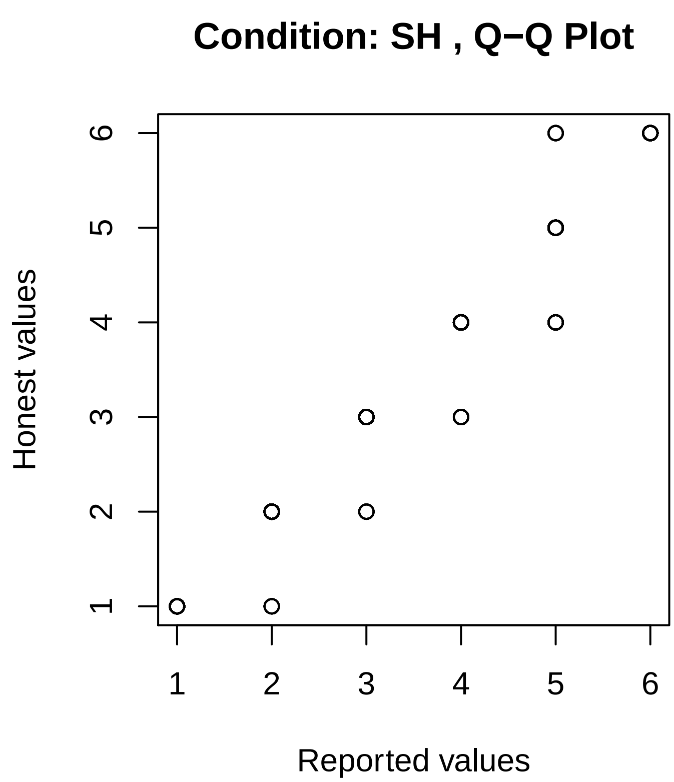
We used chi-square goodness of fit tests to test whether the reported values come from a uniform distribution, separately for each condition.

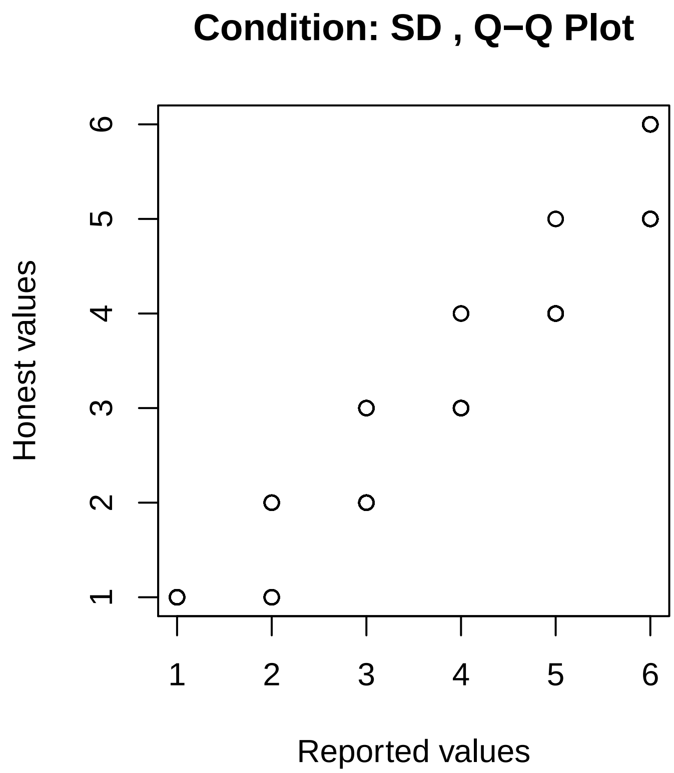
```
## [1] "SH"
## [1] "SD"
## [1] "CH"
## [1] "CD"
```

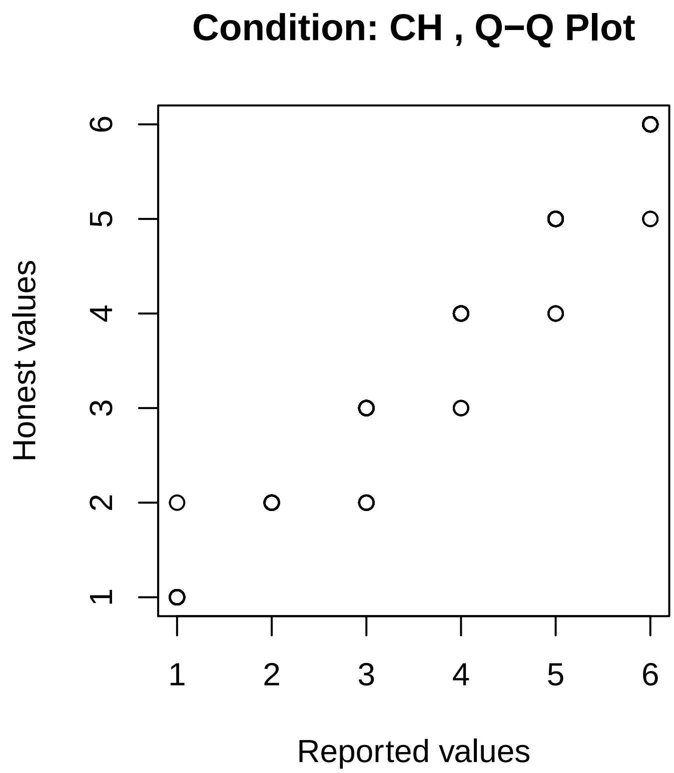
condition	df	chi.square	p_value
SH	NA	3.88	0.55
SD	NA	104.39	0.00
CH	NA	2.70	0.73
CD	NA	76.70	0.00

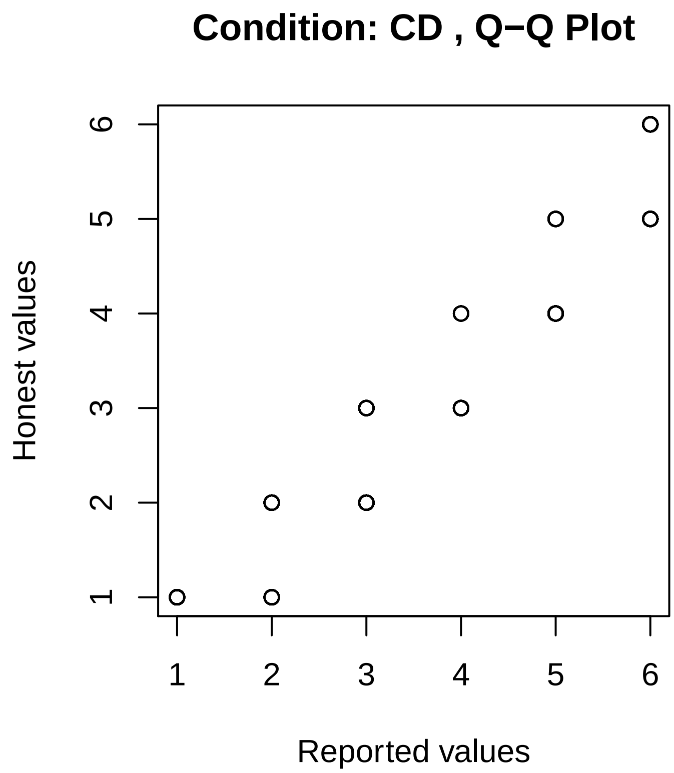
We decided not to use Kolmogorov-Smirnov, despite that it has been used previously by others (Gachter, Schulz, 2016). The large number of ties in our sample makes this test unreliable.

We also made qqplots:
HOW TO MAKE THE PLOTS SQUARE?




Condition: SD , Q−Q Plot
Honest values
Reported values
1
2
3
4
5
6
1
2
3
4
5
6


Condition: CH , Q−Q Plot
Honest values
1
2
3
4
5
6
Reported values
1
2
3
4
5
6



The number of doubles

Ultimately, participants must report doubles, thus match their reported values to that of player A, in order to increase their payoff. The chi-square test cannot detect cheating in those groups where player A is "honest", even if player B cheats on each and every round, because the distribution of reported values would still come from a uniform distribution. Testing the mean of the reported numbers against an expected value of 3.5 does not make sense for the same reasons. Therefore, we also tested, whether the number of doubles is higher than its expected value of 3.33 (the probability of throwing a double is 1/6; the expected number of doubles in 20 rounds is 20*1/6 = 3.33 in case of a fair dice and honest player).

Each participant ("dyad") is a single observation: the number of reported doubles
Wilcoxon signed-rank U test, separately for each condition
Expected value: 3.33 doubles/20 trials (16.7%; 20*1/6)

```
## [1] "SH"
## [1] "SD"
## [1] "CH"
## [1] "CD"
```

Condition	p.value	W
SH	6.0721e-06	325
SD	6.1390e-06	325
CH	5.9619e-06	325
CD	5.5887e-06	325

Compare the number of doubles in pairs of conditions

Mann-Whitney U test (or two-sample Wilcoxon test), one-sided.

The effect of dishonest partners vs honest partners in the simple game and in the charity game:

Compare	p.value	W
SH-SD	0.0000046532	85.5
CH-CD	0.7670872993	349.0

The effect of charity vs no charity with honest partner and with dishonest partner:

Compare	p.value	W
SH-CH	0.0007862764	151.5
SD-CD	0.9954019881	444.5

Linear regression to test the effect of predictors (JUDIT)

Dependent variable: number of reported doubles (interval)
Predictors: game (binary), partner (binary), fingerratio (interval)

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	13.854	2.068	6.700	0.000
GameS	-0.271	0.446	-0.608	0.545
PartnerH	-1.351	0.449	-3.011	0.003
Fingerratio	-1.195	2.017	-0.593	0.555

Residual standard error: 2.229
Multiple R-squared: 0.097
Adjusted R-squared: 0.068
F-statistic: 3.424