

WCST data analysis - Step 2

Manipulate data

Read data frames and manually rated data

We have loaded the previously saved data frames and merged the manually categorized free text answers about the rule with participantdata_inc.

Exclude participants

We excluded extra participants if there were more than 78 in a condition.

Modify data

Difficulty of tasks was supposed to be a number 1-10, but it was also a free text answer, and some participants went outside the recommended range (e.g.: difficulty = 50). We capped these numbers to 10.

Statistical data analysis

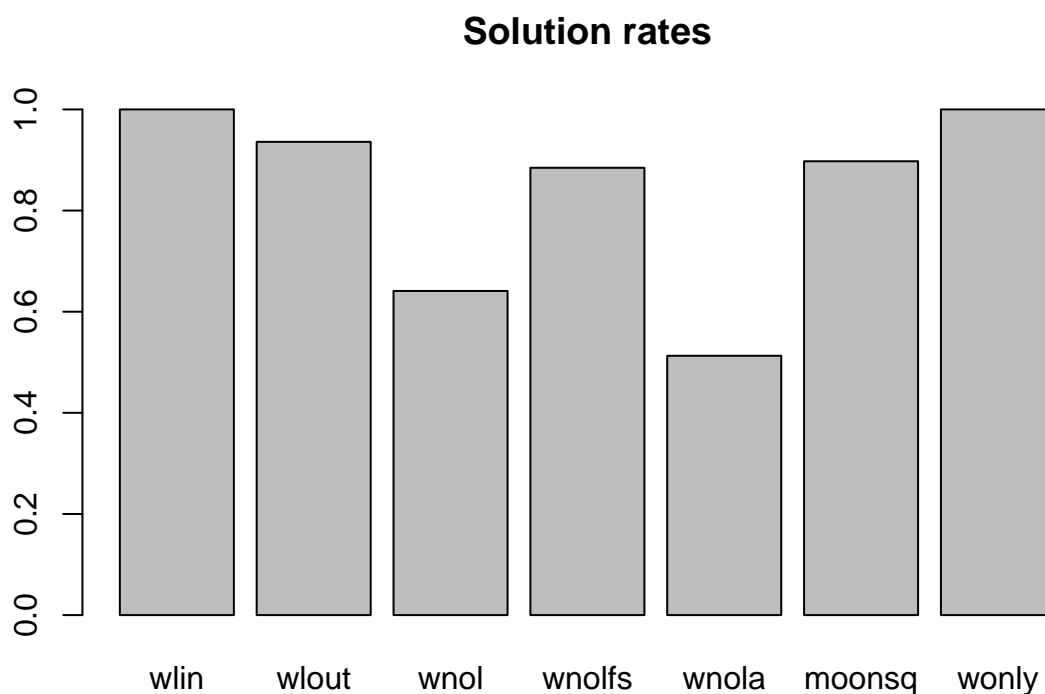
Descriptive statistics

Condition	Number of participants	Aha rate of solvers	Failure rate	Avg task time	Avg number of moves
wlin	78	0.821	0.000	1.605	31.962
wlout	78	0.932	0.064	4.286	68.756
wnol	78	0.980	0.359	8.985	166.500
wnolfs	78	0.884	0.115	6.606	124.962
wnola	78	0.900	0.487	10.360	236.103
moonsq	78	0.757	0.103	4.672	94.923
wonly	78	0.577	0.000	0.846	19.295

Difficulty of the task

Solution rate: Fisher's exact tests

We analyzed the contingency table containing the number of solvers and non-solvers in pairs of conditions. A $p < 0.05$ means that the row/column association is statistically significant.



```
##
## Fisher's Exact Test for Count Data
##
## data:  partic_groups2[c("wlin", "wlout"), c("Nbof_solvers", "Nbof_nonsolvers")]
## p-value = 0.05851
## alternative hypothesis: true odds ratio is not equal to 1
## 95 percent confidence interval:
##  0.9399603      Inf
## sample estimates:
## odds ratio
##      Inf

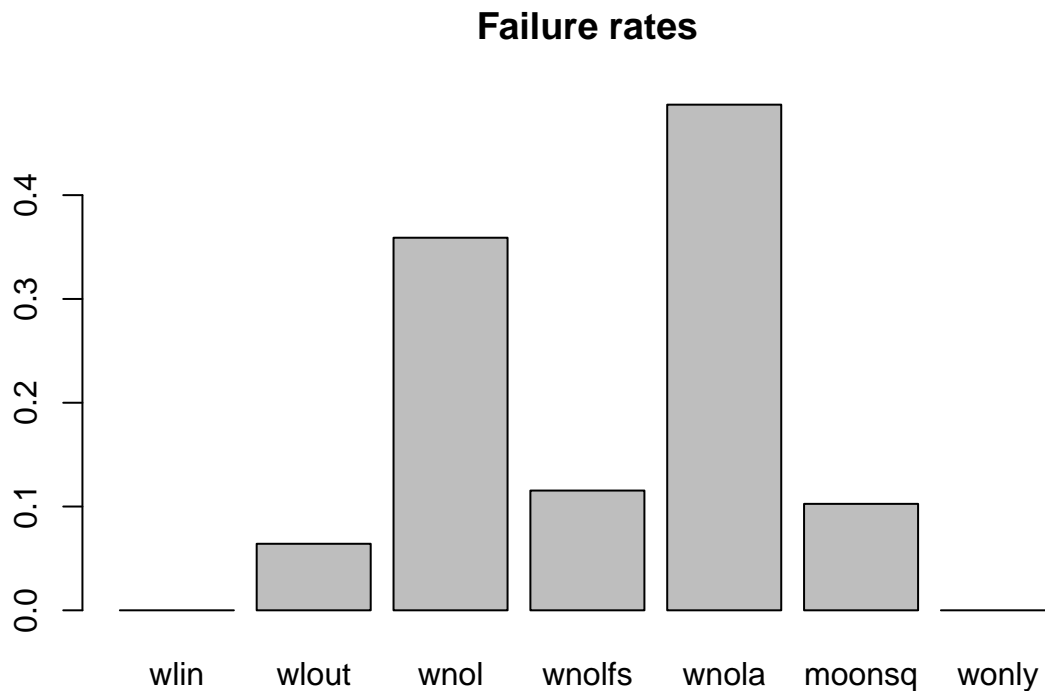
##
## Fisher's Exact Test for Count Data
##
## data:  partic_groups2[c("wlout", "wnol"), c("Nbof_solvers", "Nbof_nonsolvers")]
## p-value = 8.206e-06
## alternative hypothesis: true odds ratio is not equal to 1
## 95 percent confidence interval:
##  2.819385 28.622080
## sample estimates:
## odds ratio
##    8.07041

##
## Fisher's Exact Test for Count Data
##
```

```
## data: partic_groups2[c("wnolfs", "wnola"), c("Nbof_solvers", "Nbof_nonsolvers")]
## p-value = 5.552e-07
## alternative hypothesis: true odds ratio is not equal to 1
## 95 percent confidence interval:
## 3.029108 18.713246
## sample estimates:
## odds ratio
## 7.185509

##
## Fisher's Exact Test for Count Data
##
## data: partic_groups2[c("moonsq", "wnola"), c("Nbof_solvers", "Nbof_nonsolvers")]
## p-value = 1.641e-07
## alternative hypothesis: true odds ratio is not equal to 1
## 95 percent confidence interval:
## 3.352528 22.396910
## sample estimates:
## odds ratio
## 8.192766
```

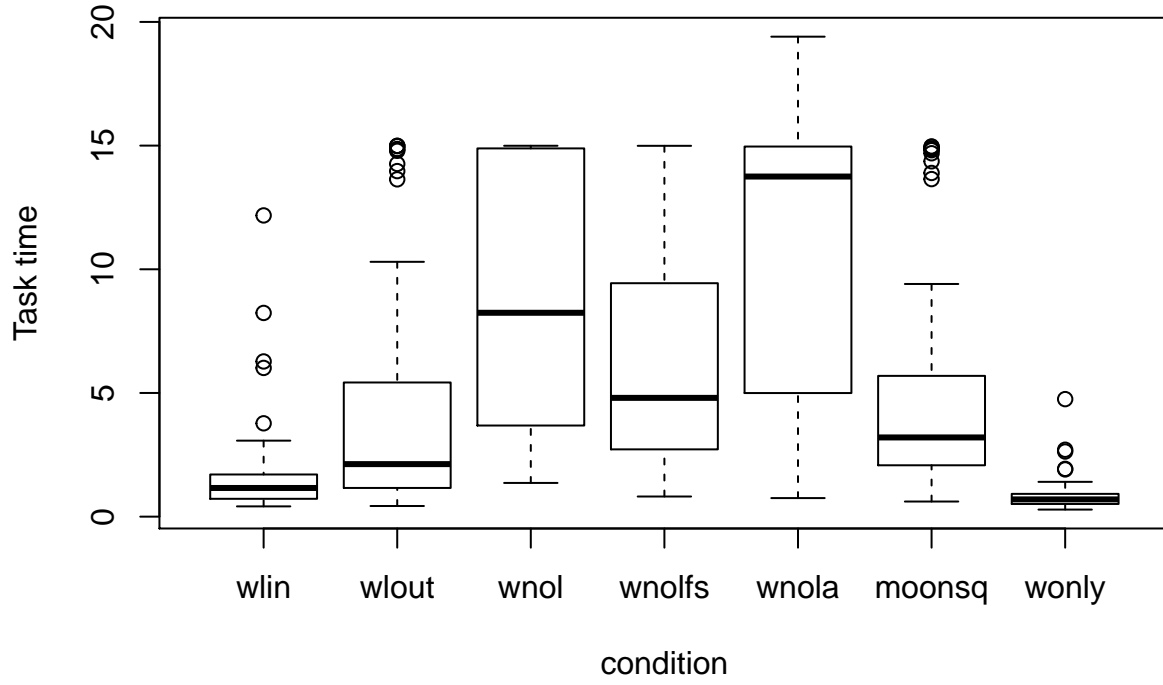
Failure rate



Solution time: ANOVA

We checked whether the data was normally distributed with Kolmogorov-Smirnoff test:

If the data is normally distributed, we use ANOVA, if it is not, we use Wilcoxon.



Binary logistic regression

Aha feelings: Fisher's exact test

