

# Binary Choice Analysis

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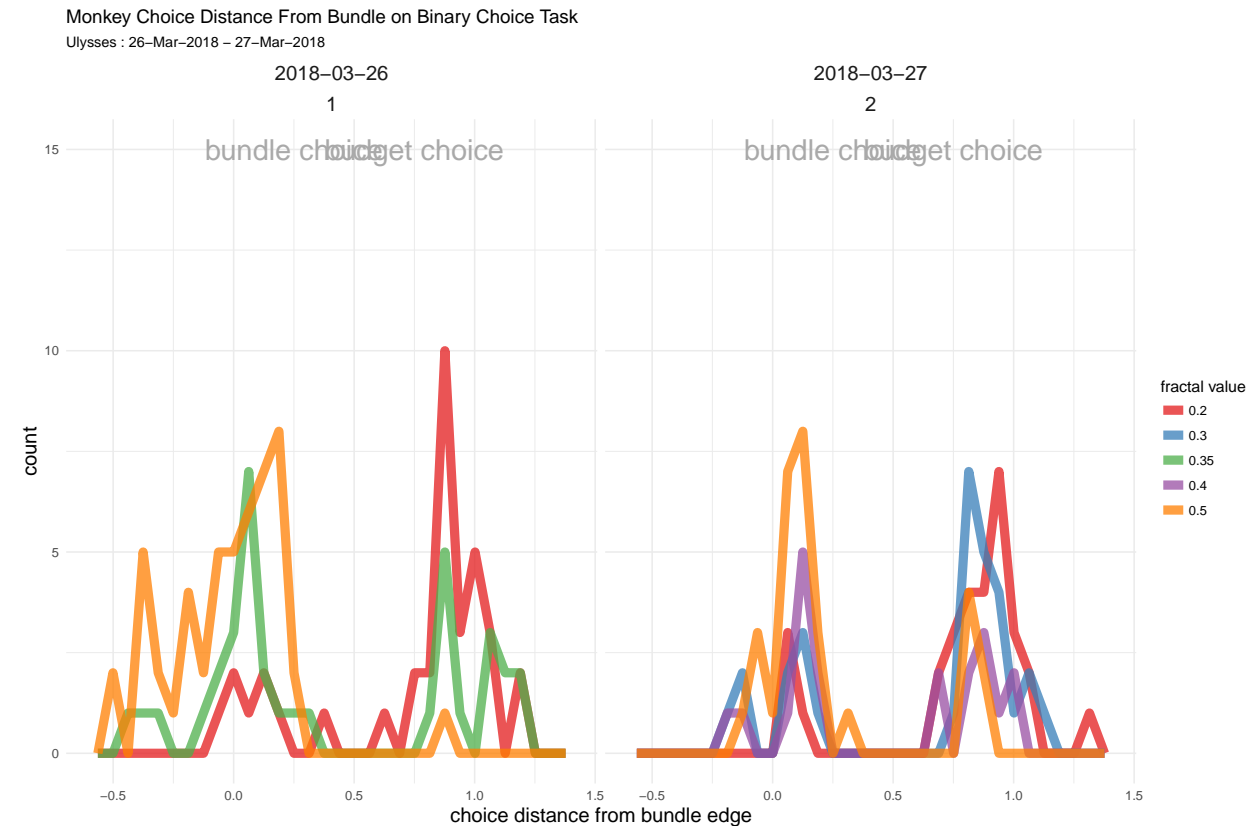
*22 February 2018*

```
monkey <- "Ulysses"  
today <- "27-Mar-2018"  
look_back <- "26-Mar-2018"
```

```
start_trial <- 0  
stop_trial <- "all"
```

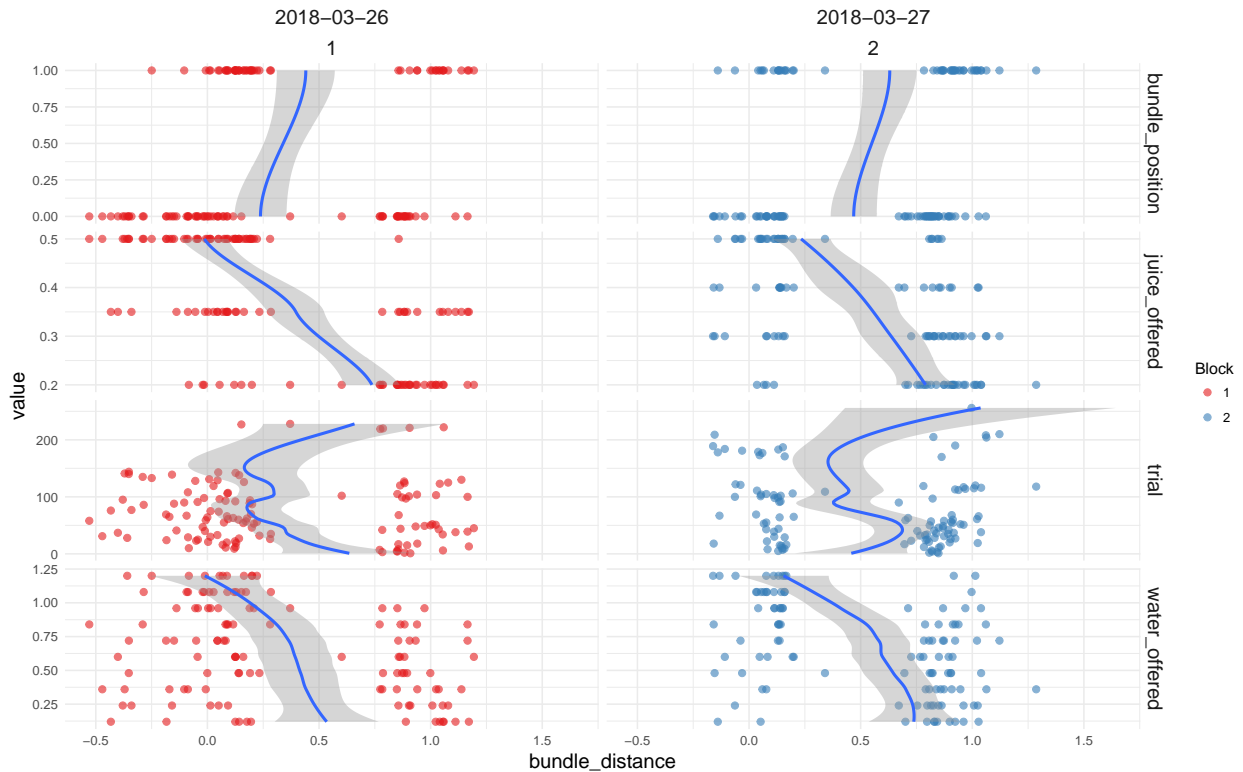
```
merge_days <- TRUE
```

p1



p2

Monkey Choice Distance From Bundle on Binary Choice Task  
 Ulysses : 26-Mar-2018 ~ 27-Mar-2018



```
#generate a model of likelihood to choice for the fractal dependent on it's position,
#value and associated water
model <- glm(data = task_data,
             fractal_choice ~ bundle_position + water_offered + juice_offered + trial + date,
             family = "binomial")

#summarise the parameters
summary(model)

##
## Call:
## glm(formula = fractal_choice ~ bundle_position + water_offered +
##     juice_offered + trial + date, family = "binomial", data = task_data)
##
## Deviance Residuals:
##      Min       1Q   Median       3Q      Max
## -2.87990  -0.35455   0.03984   0.37350   2.19798
##
## Coefficients:
##              Estimate Std. Error z value Pr(>|z|)
## (Intercept)  3.296e+04  8.552e+03  3.854 0.000116 ***
## bundle_position  6.662e-02  4.505e-01  0.148 0.882445
## water_offered  6.548e+00  1.029e+00  6.364 1.97e-10 ***
## juice_offered  2.248e+01  3.138e+00  7.164 7.85e-13 ***
## trial         7.780e-03  3.671e-03  2.120 0.034036 *
## date         -1.872e+00  4.855e-01 -3.855 0.000116 ***
## ---
```

```

## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##    Null deviance: 318.67  on 230  degrees of freedom
## Residual deviance: 131.56  on 225  degrees of freedom
##    (275 observations deleted due to missingness)
## AIC: 143.56
##
## Number of Fisher Scoring iterations: 6
#test for side bias with an exact binomial test
binom.test(c(nrow(task_data %>%
              .[c(bundle_position != fractal_choice)]),
            nrow(task_data %>%
              .[c(bundle_position == fractal_choice)])))

##
## Exact binomial test
##
## data:  c(nrow(task_data %>% .[c(bundle_position != fractal_choice)]),      nrow(task_data %>% .[c(bun
## number of successes = 120, number of trials = 231, p-value =
## 0.5987
## alternative hypothesis: true probability of success is not equal to 0.5
## 95 percent confidence interval:
##  0.4529969 0.5854579
## sample estimates:
## probability of success
##          0.5194805
#generate a model of likelihood to choice for the fractal dependent on it's position,
#value and associated water
model <- glm(data = dplyr::filter(task_data, block_no == max(block_no)),
             fractal_choice ~ bundle_position + water_offered + as.factor(juice_offered) + trial + date,
             family = "binomial")

#summarise the parameters
summary(model)

##
## Call:
## glm(formula = fractal_choice ~ bundle_position + water_offered +
##      as.factor(juice_offered) + trial + date, family = "binomial",
##      data = dplyr::filter(task_data, block_no == max(block_no)))
##
## Deviance Residuals:
##      Min       1Q   Median       3Q      Max
## -2.49022  -0.35892  -0.06268   0.31206   1.79770
##
## Coefficients: (1 not defined because of singularities)
##              Estimate Std. Error z value Pr(>|z|)
## (Intercept)    -9.061903    1.915983  -4.730 2.25e-06 ***
## bundle_position  -0.537936    0.652149  -0.825 0.409447
## water_offered     7.264913    1.576696   4.608 4.07e-06 ***
## as.factor(juice_offered)0.3  1.388542    0.900562   1.542 0.123107

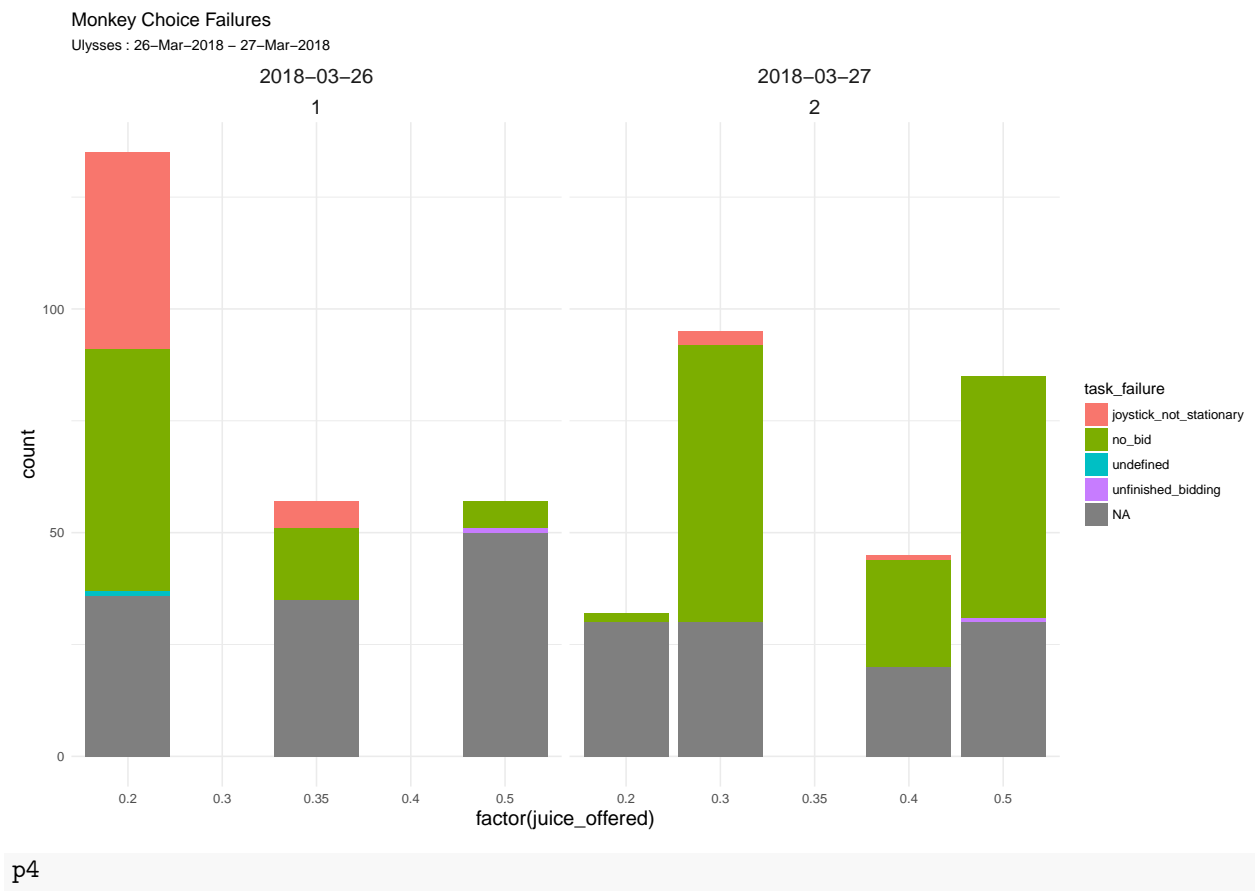
```

```

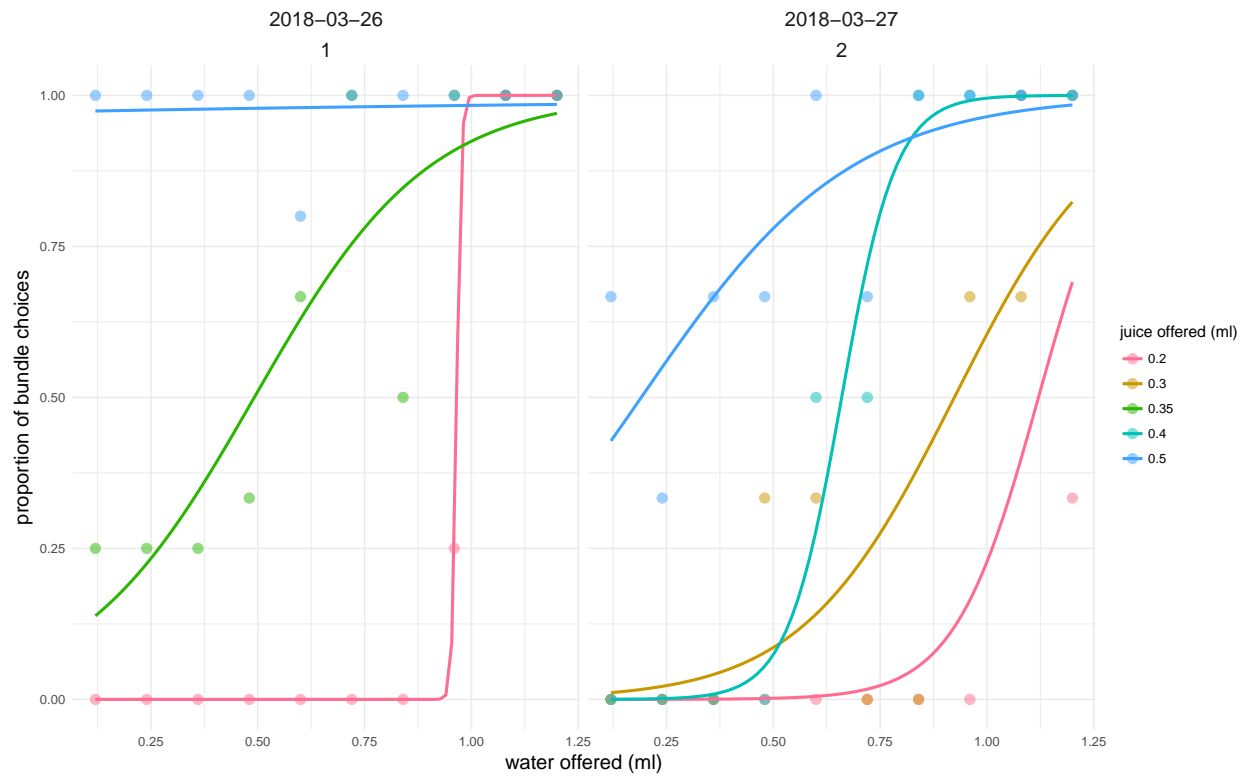
## as.factor(juice_offered)0.4 3.850167 1.141969 3.372 0.000748 ***
## as.factor(juice_offered)0.5 6.173764 1.369588 4.508 6.55e-06 ***
## trial 0.013358 0.005653 2.363 0.018118 *
## date NA NA NA NA
## ---
## Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
## Null deviance: 150.16 on 109 degrees of freedom
## Residual deviance: 65.12 on 103 degrees of freedom
## (147 observations deleted due to missingness)
## AIC: 79.12
##
## Number of Fisher Scoring iterations: 6
#test for side bias with an exact binomial test
binom.test(c(nrow(task_data %>%
              .[c(bundle_position != fractal_choice & block_no == max(block_no))]),
            nrow(task_data %>%
              .[c(bundle_position == fractal_choice & block_no == max(block_no))])))

##
## Exact binomial test
##
## data: c(nrow(task_data %>% .[c(bundle_position != fractal_choice & block_no == max(block_no))])
## number of successes = 58, number of trials = 110, p-value = 0.6338
## alternative hypothesis: true probability of success is not equal to 0.5
## 95 percent confidence interval:
## 0.4298119 0.6232286
## sample estimates:
## probability of success
## 0.5272727
p3

```



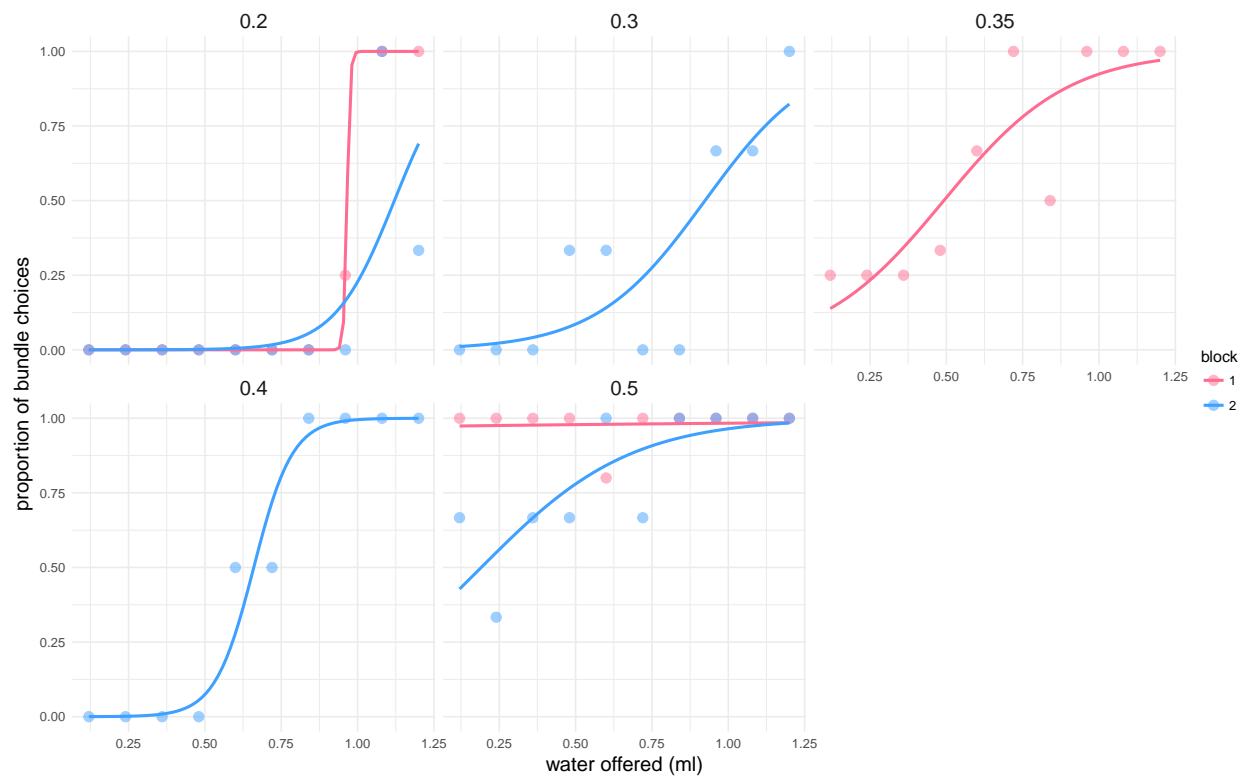
Monkey Bundle Choice Binoimial Curves  
 Ulysses : 26-Mar-2018 - 27-Mar-2018



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# Monkey Bundle Choice Binoimial Curves

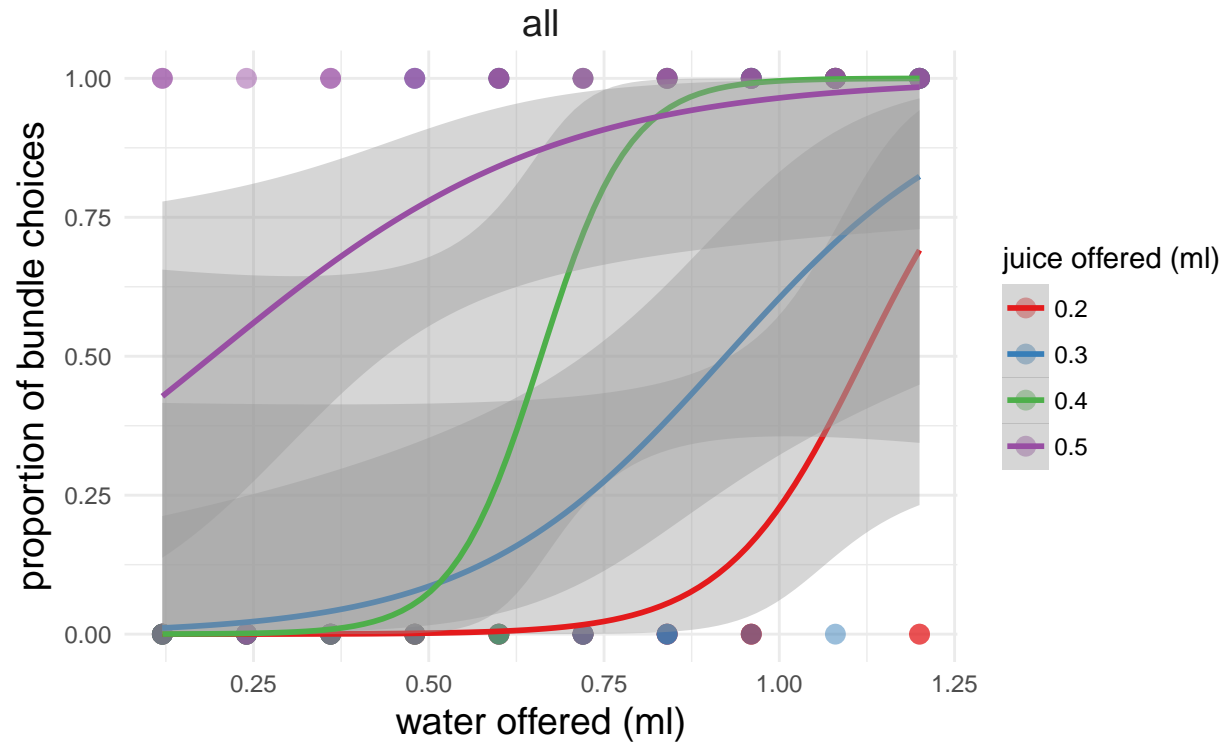
Ulysses : 26-Mar-2018 – 27-Mar-2018



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## Today's Monkey Bundle Choice Binoimial Curves

Ulysses : 27-Mar-2018

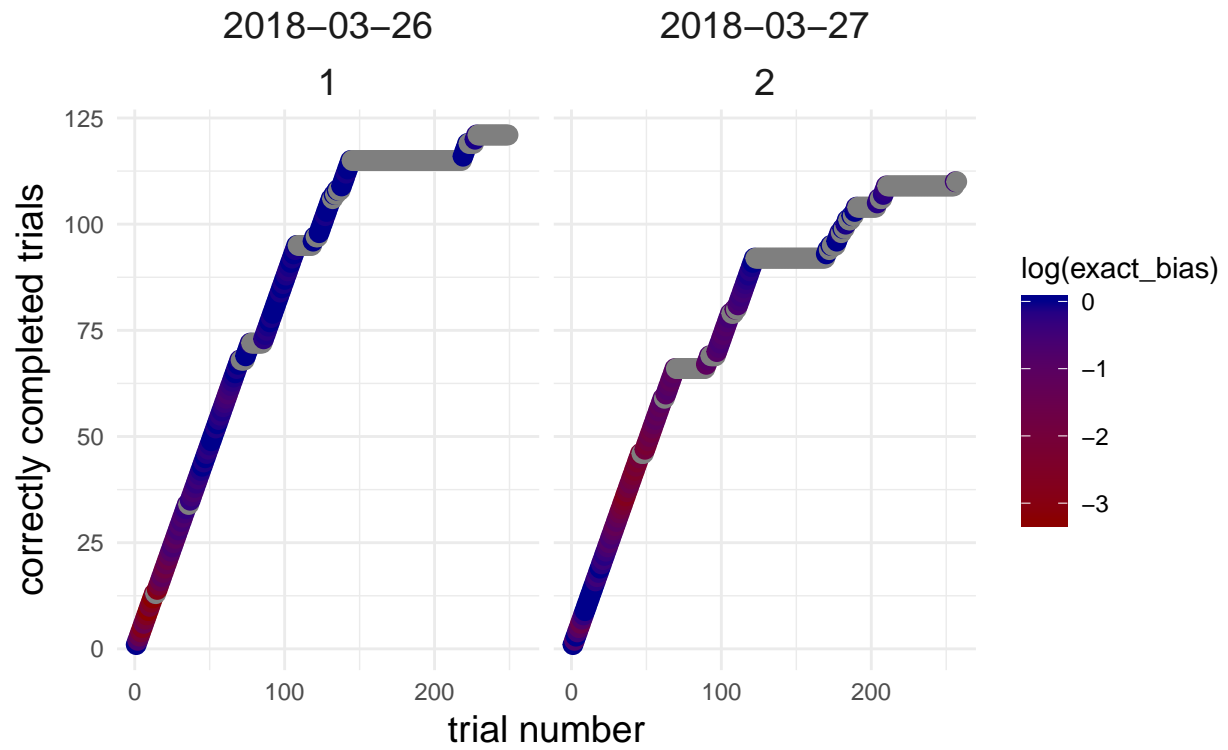


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# Monkey Trial Progression and Bias

Ulysses : 26-Mar-2018 – 27-Mar-2018



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# Monkey Trial Progression and Bias

Ulysses : 26-Mar-2018 – 27-Mar-2018

