

BCb Analysis- Early March

Robert Hickman

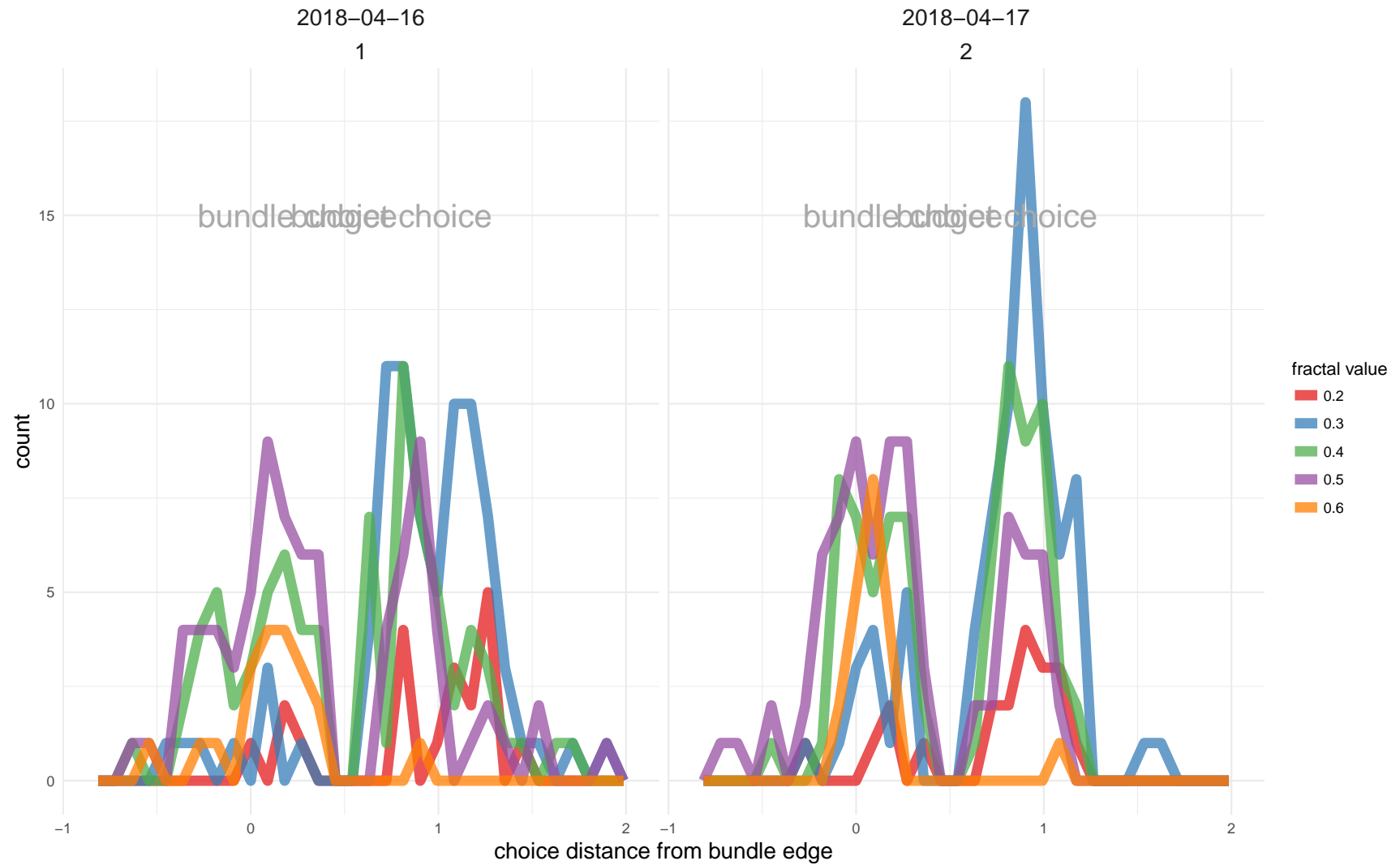
05 April 2018

```
monkey <- "Ulysses"  
today <- "17-Apr-2018"  
look_back <- "16-Apr-2018"  
  
start_trial <- 0  
stop_trial <- 160  
  
merge_days <- TRUE
```

p1

Monkey Choice Distance From Bundle on Binary Choice Task

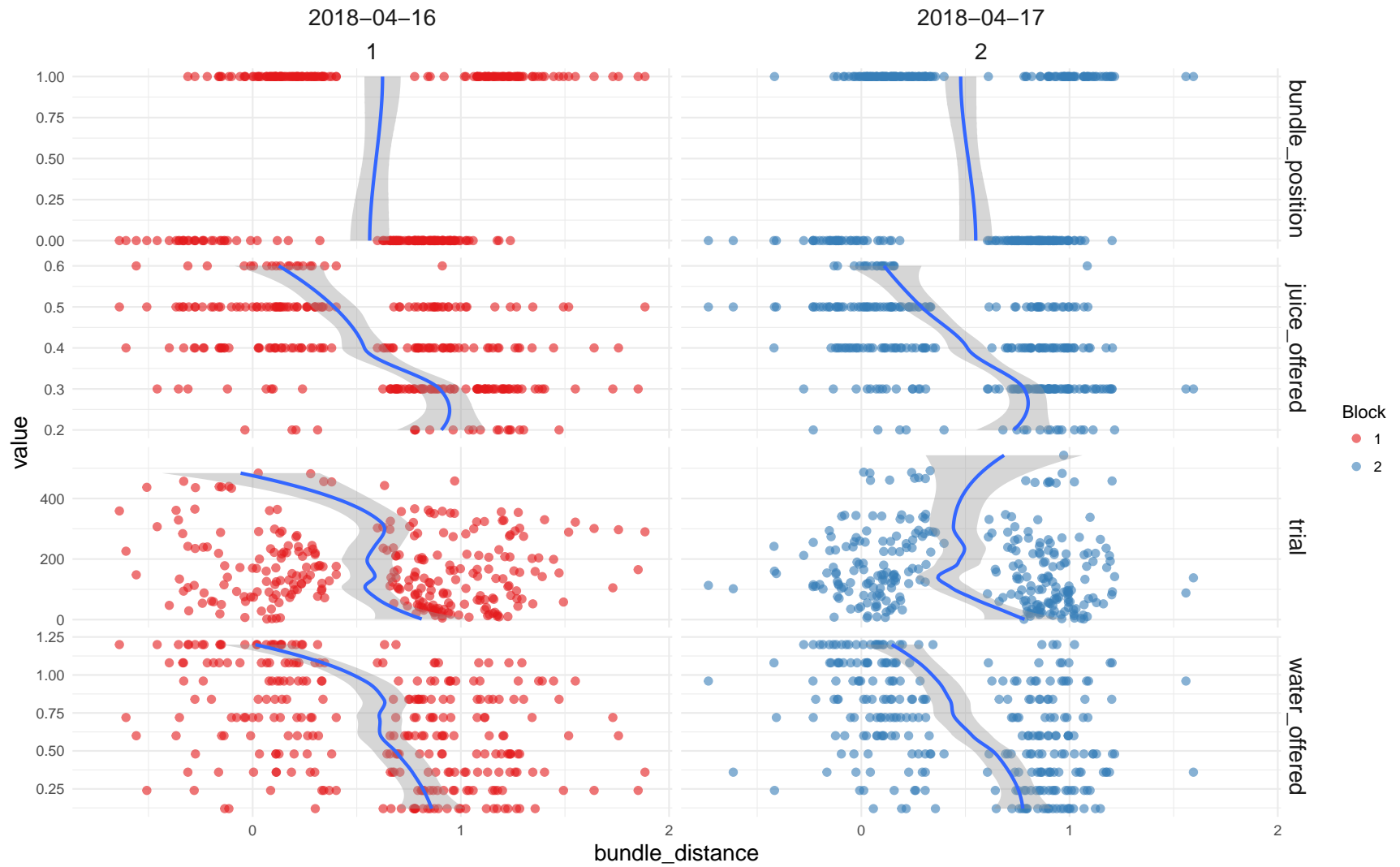
Ulysses : 16-Apr-2018 – 17-Apr-2018



p2

Monkey Choice Distance From Bundle on Binary Choice Task

Ulysses : 16-Apr-2018 – 17-Apr-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
## -2.6711  -0.5639  -0.1387   0.5486   2.9834
##
## Coefficients:
##              Estimate Std. Error z value Pr(>|z|)
## (Intercept)  -8.769e+03  4.305e+03  -2.037   0.0417 *
## bundle_position  1.899e+00  2.636e-01   7.202 5.92e-13 ***
## water_offered   4.378e+00  4.471e-01   9.791 < 2e-16 ***
## juice_offered   1.563e+01  1.565e+00   9.982 < 2e-16 ***
## trial          4.247e-03  1.039e-03   4.086 4.38e-05 ***
## date           4.965e-01  2.441e-01   2.034  0.0419 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##      Null deviance: 769.45  on 559  degrees of freedom
## Residual deviance: 428.15  on 554  degrees of freedom
## (467 observations deleted due to missingness)
## AIC: 440.15
##
## 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(bundle_position == fractal_choice)]))
## number of successes = 196, number of trials = 560, p-value =
## 1.16e-12
## alternative hypothesis: true probability of success is not equal to 0.5
## 95 percent confidence interval:
##  0.3104843 0.3911080
## sample estimates:
## probability of success
##                0.35

```

```

#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
## -2.85347  -0.53937  -0.08876   0.48949   2.18027
##
## Coefficients: (1 not defined because of singularities)
##              Estimate Std. Error z value Pr(>|z|)
## (Intercept)    -6.121705   0.930999  -6.575 4.85e-11 ***
## bundle_position     2.166791   0.414595   5.226 1.73e-07 ***
## water_offered      4.841541   0.674168   7.182 6.89e-13 ***
## as.factor(juice_offered)0.3 -1.528136   0.723879  -2.111 0.034769 *
## as.factor(juice_offered)0.4  0.700019   0.668828   1.047 0.295268
## as.factor(juice_offered)0.5  2.402304   0.704090   3.412 0.000645 ***
## as.factor(juice_offered)0.6  3.755705   1.271950   2.953 0.003150 **
## trial              0.005268   0.001608   3.276 0.001055 **
## 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: 387.25  on 279  degrees of freedom
## Residual deviance: 205.79  on 272  degrees of freedom
## (263 observations deleted due to missingness)
## AIC: 221.79

```

```
##
```

```
## 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))]), nrow(task_data %>% .[c(bundle_pos
```

```
## number of successes = 97, number of trials = 280, p-value =
```

```
## 3.079e-07
```

```
## alternative hypothesis: true probability of success is not equal to 0.5
```

```
## 95 percent confidence interval:
```

```
## 0.2907989 0.4053484
```

```
## sample estimates:
```

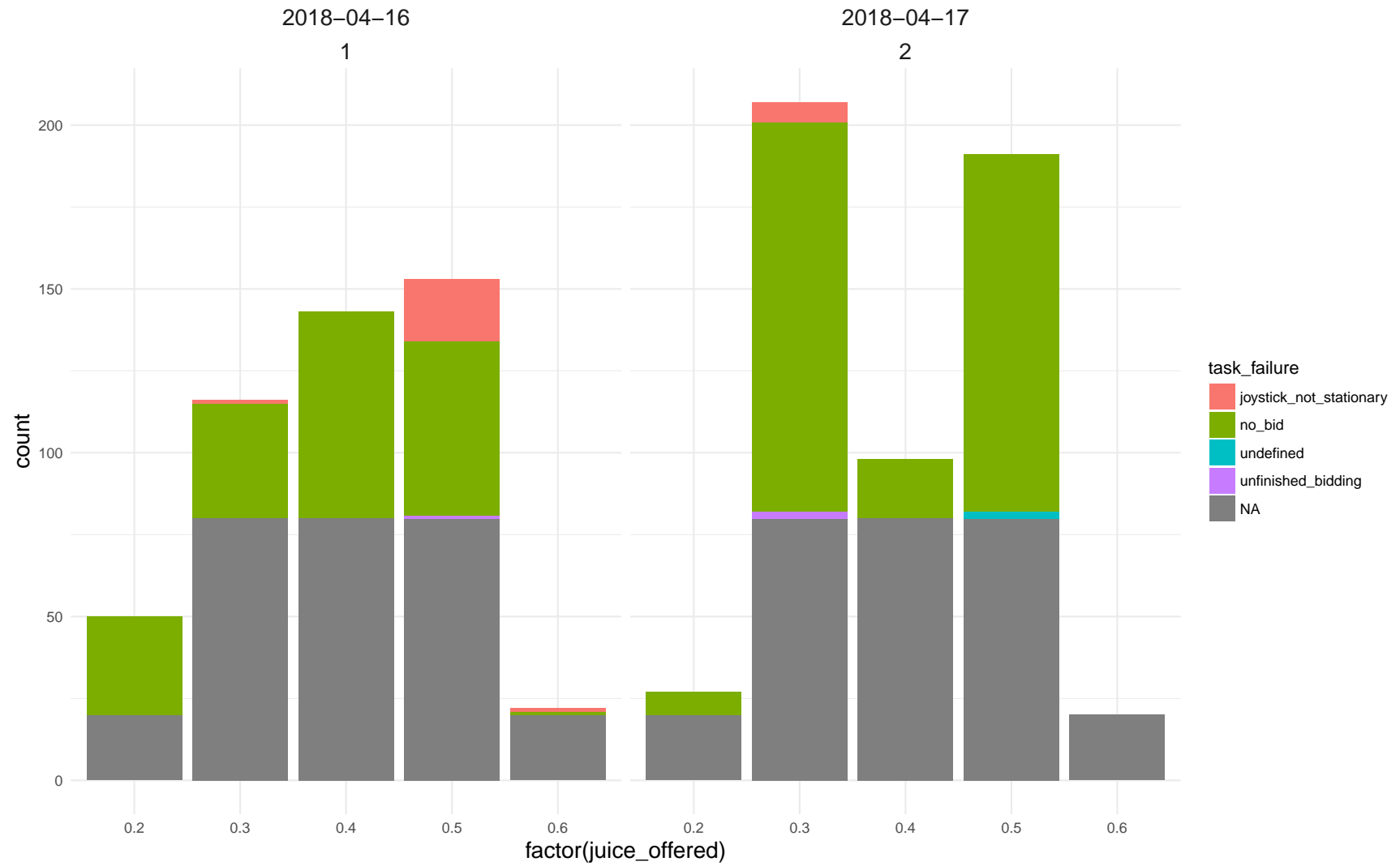
```
## probability of success
```

```
## 0.3464286
```

p3

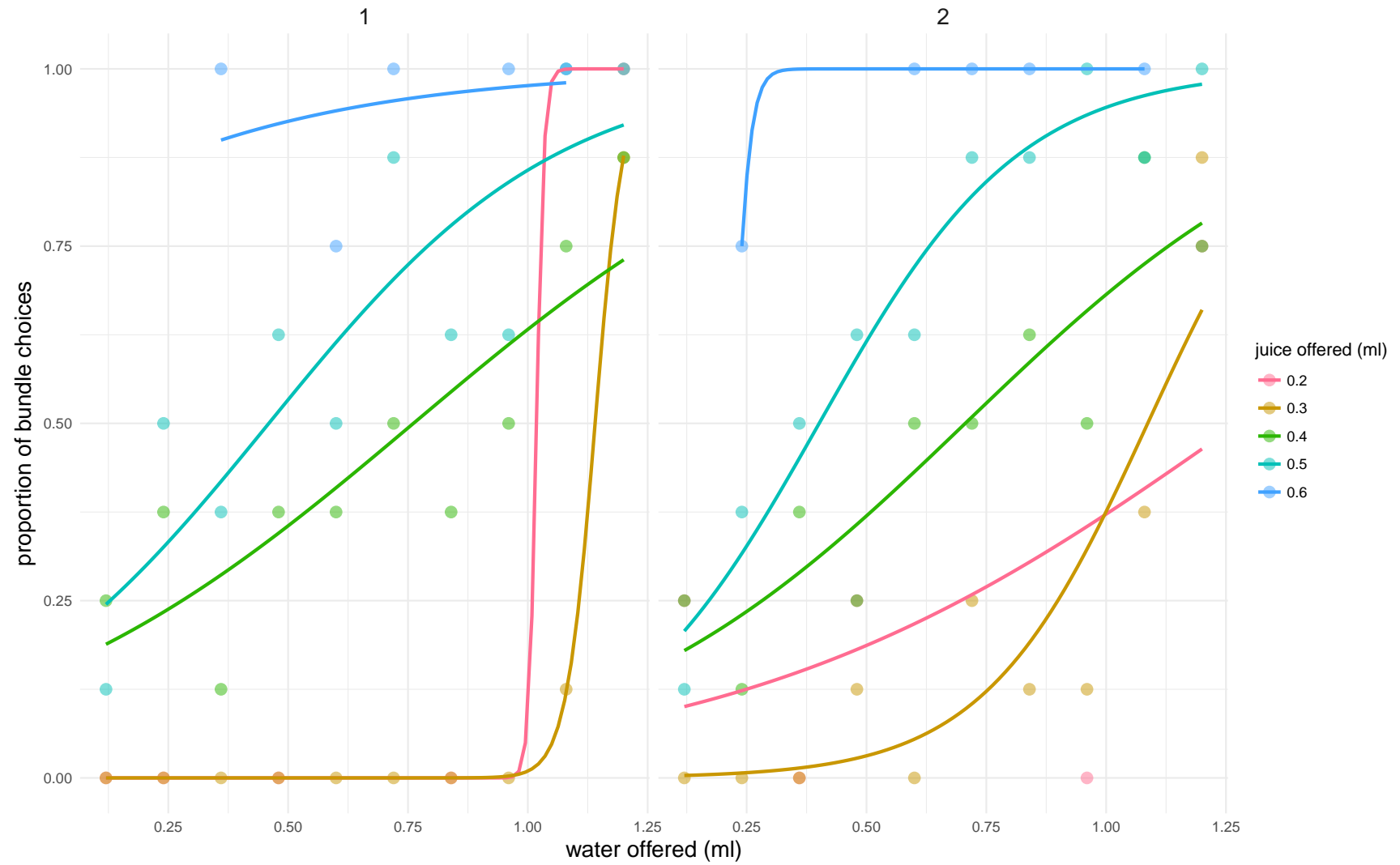
Monkey Choice Failures

Ulysses : 16-Apr-2018 – 17-Apr-2018



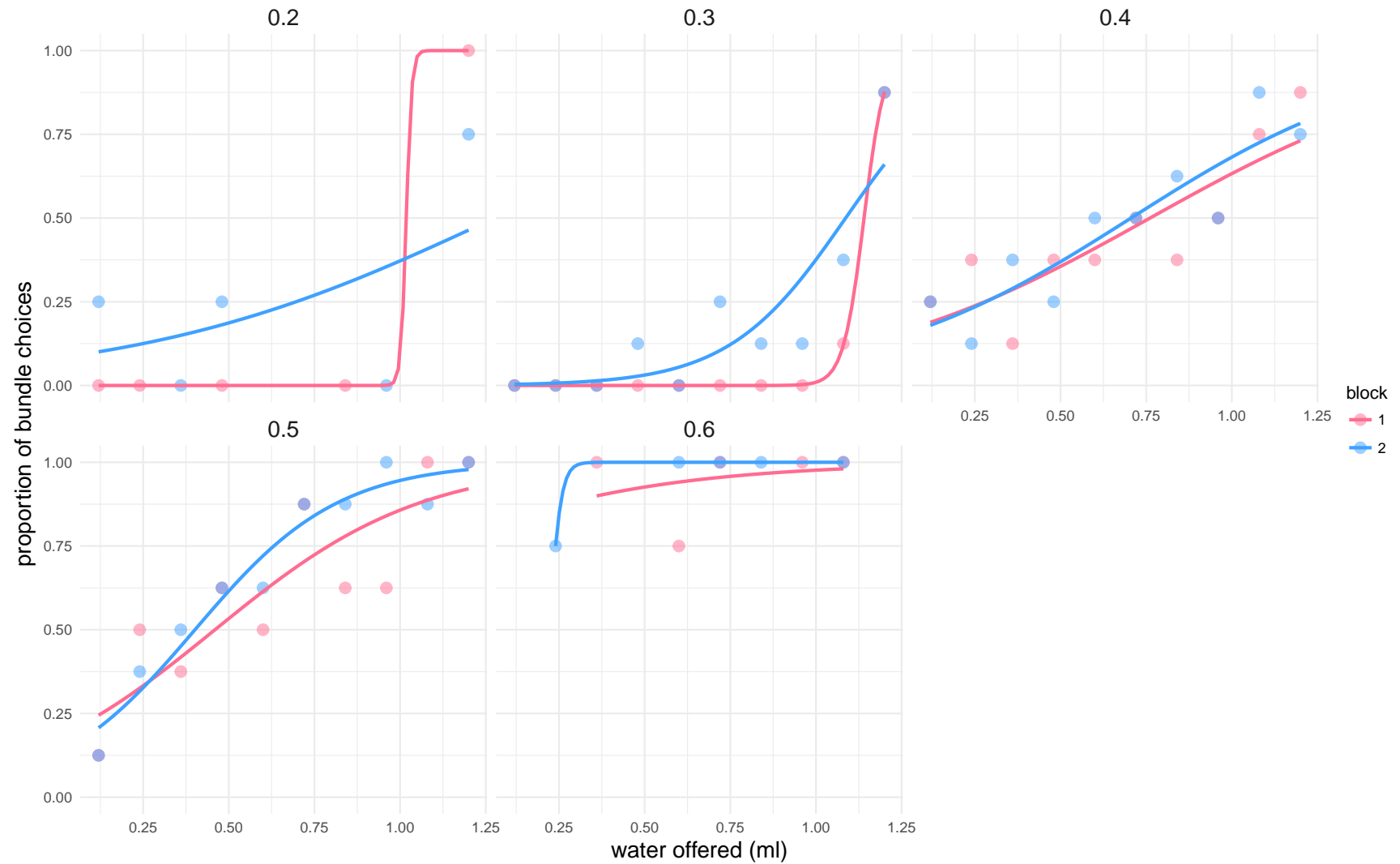
Monkey Bundle Choice Binoimial Curves

Ulysses : 16-Apr-2018 – 17-Apr-2018



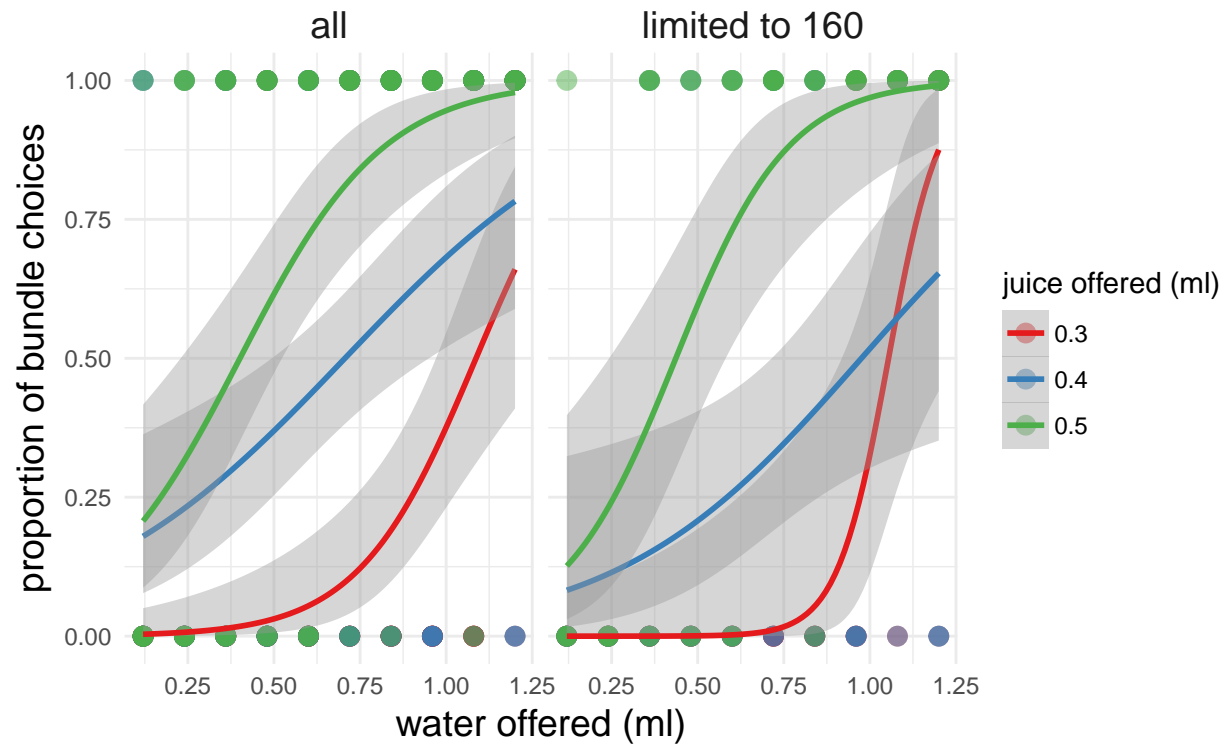
Monkey Bundle Choice Binoimial Curves

Ulysses : 16-Apr-2018 – 17-Apr-2018



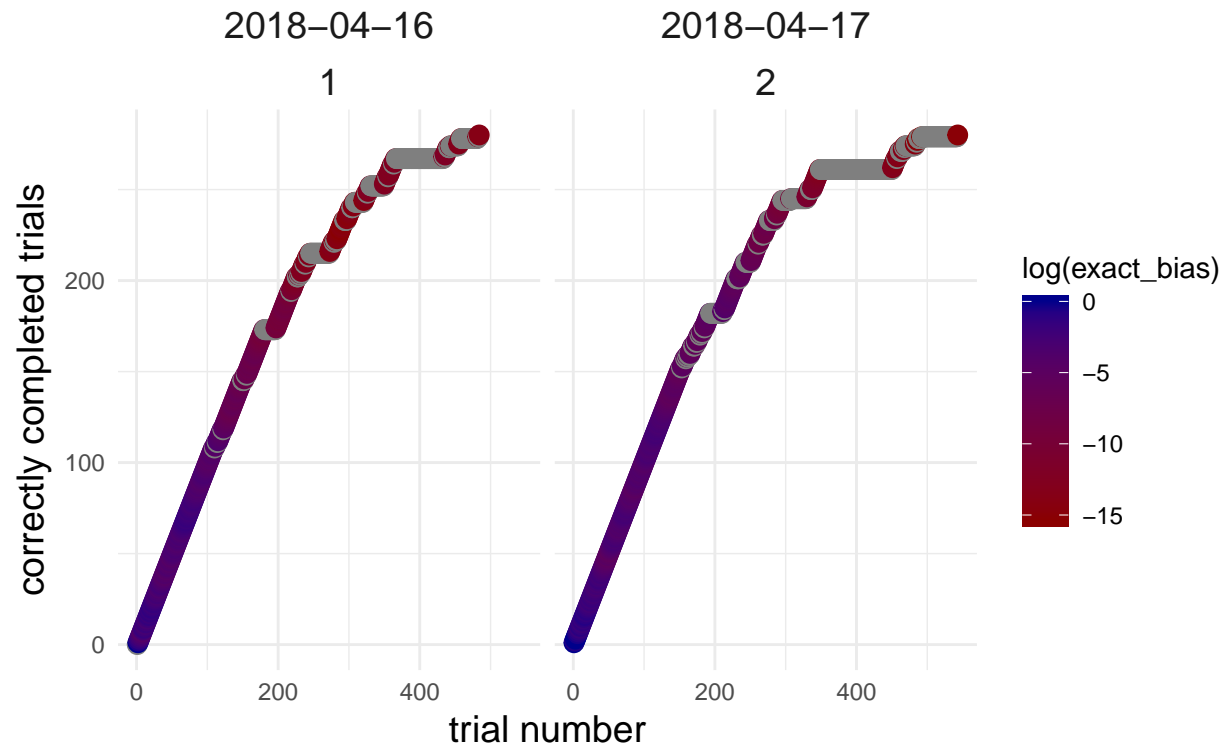
Today's Monkey Bundle Choice Binoimial Curves

Ulysses : 17-Apr-2018



Monkey Trial Progression and Bias

Ulysses : 16-Apr-2018 – 17-Apr-2018



Monkey Trial Progression and Bias

Ulysses : 16-Apr-2018 – 17-Apr-2018

