BCb Analysis- Early March

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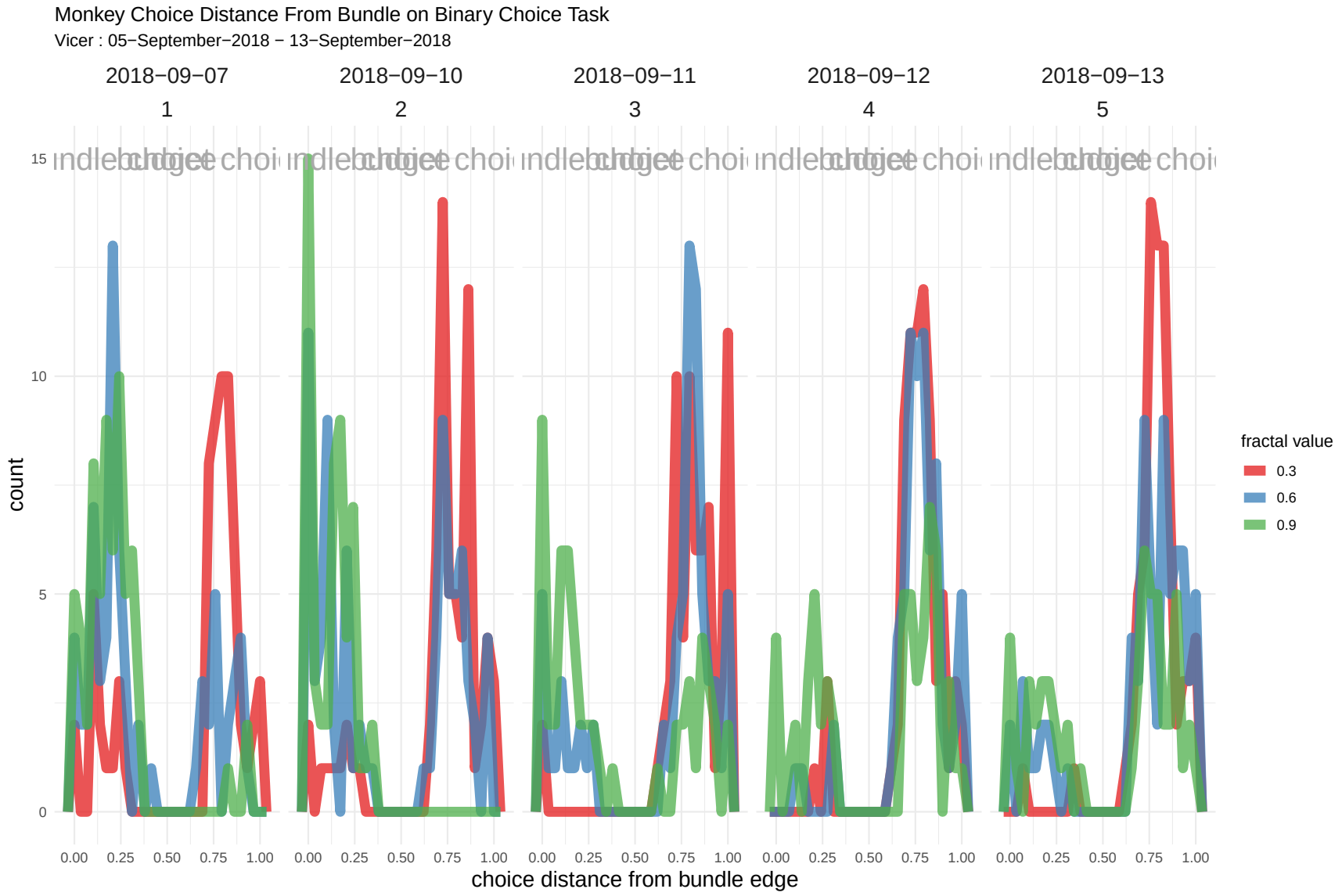
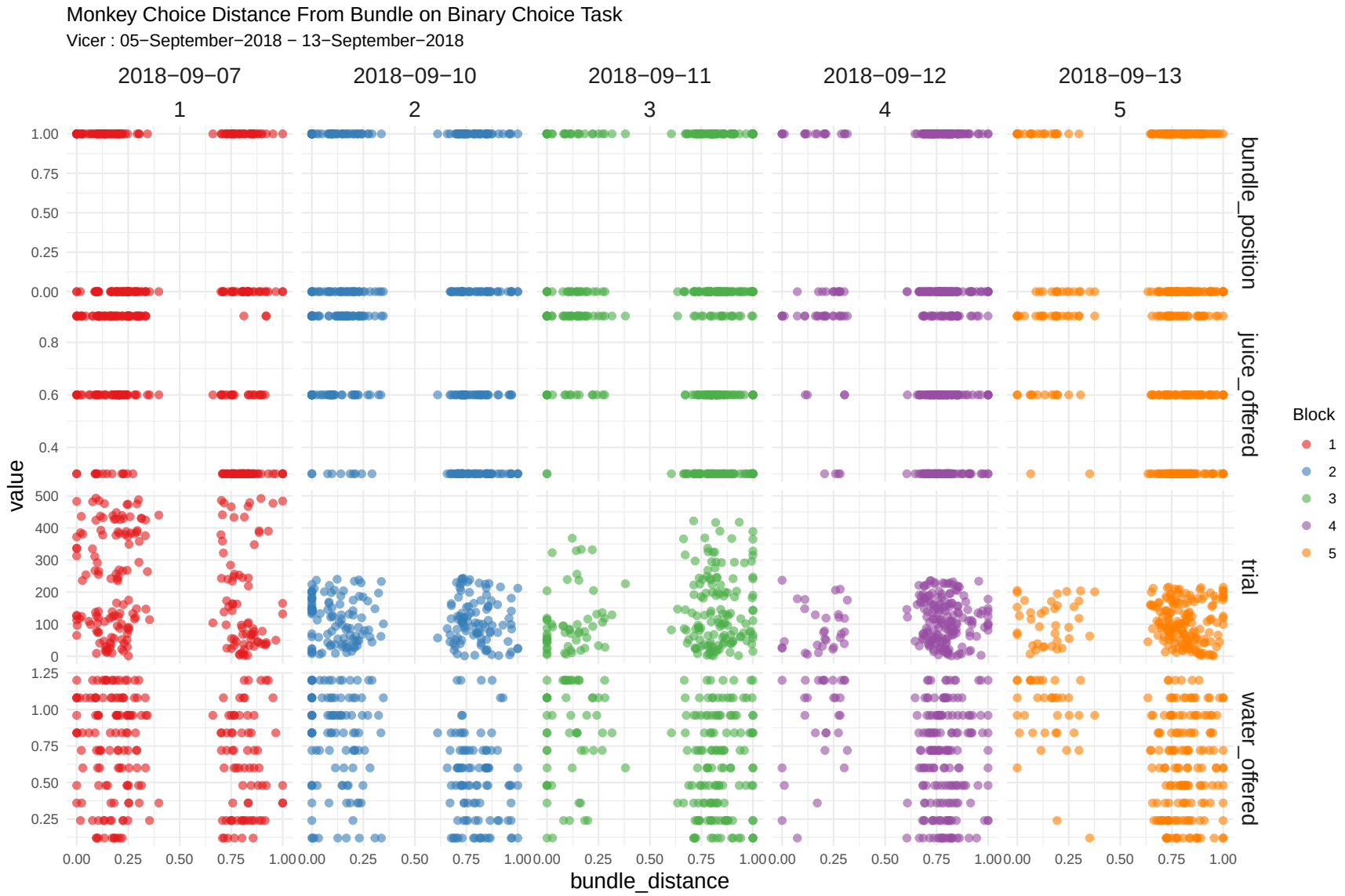
```
monkey <- "Vicer"
today <- "13-September-2018"
look_back <- "05-September-2018"

start_trial <- 0
stop_trial <- 400

merge_days <- TRUE
```

```
#task_data %<>% .[is.na(task_failure), completed_trials := 1:.N, by = "block_no"] %>%
#  .[completed_trials < 181] %>%
#  .[completed_trials > 59]
```

```
p1
```


Monkey Choice Distance From Bundle on Binary Choice Task
Vicer : 05−September−2018 − 13−September−2018
2018−09−07
1
2018−09−10
2
2018−09−11
3
2018−09−12
4
2018−09−13
5
count
0
5
10
15
0.00
0.25
0.50
0.75
1.00
choice distance from bundle edge
fractal value
0.3
0.6
0.9

```
p2
```


Monkey Choice Distance From Bundle on Binary Choice Task
Vicer : 05−September−2018 − 13−September−2018
2018−09−07
2018−09−10
2018−09−11
2018−09−12
2018−09−13
1
2
3
4
5
bundle_position
juice_offered
trial
water_offered
value
bundle_distance
Block
1
2
3
4
5

```r
#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
## -3.5236  -0.5198  -0.1756   0.4117   3.8882
##
## Coefficients:
##                   Estimate Std. Error z value Pr(>|z|)
## (Intercept)      1.228e+04  1.048e+03  11.717   <2e-16 ***
## bundle_position  3.091e-01  1.943e-01   1.591   0.1116
## water_offered    4.080e+00  3.633e-01  11.231   <2e-16 ***
## juice_offered    8.587e+00  6.032e-01  14.236   <2e-16 ***
## trial           -2.350e-03  9.384e-04  -2.505   0.0123 *
## date            -6.912e-01  5.896e-02 -11.722   <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 1293.87  on 995  degrees of freedom
## Residual deviance:  682.97  on 990  degrees of freedom
##   (640 observations deleted due to missingness)
## AIC: 694.97
##
## Number of Fisher Scoring iterations: 6
```

```r
#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 = 488, number of trials = 996, p-value =
## 0.5472
## alternative hypothesis: true probability of success is not equal to 0.5
## 95 percent confidence interval:
##  0.4584811 0.5214981
## sample estimates:
## probability of success
##              0.4899598
```

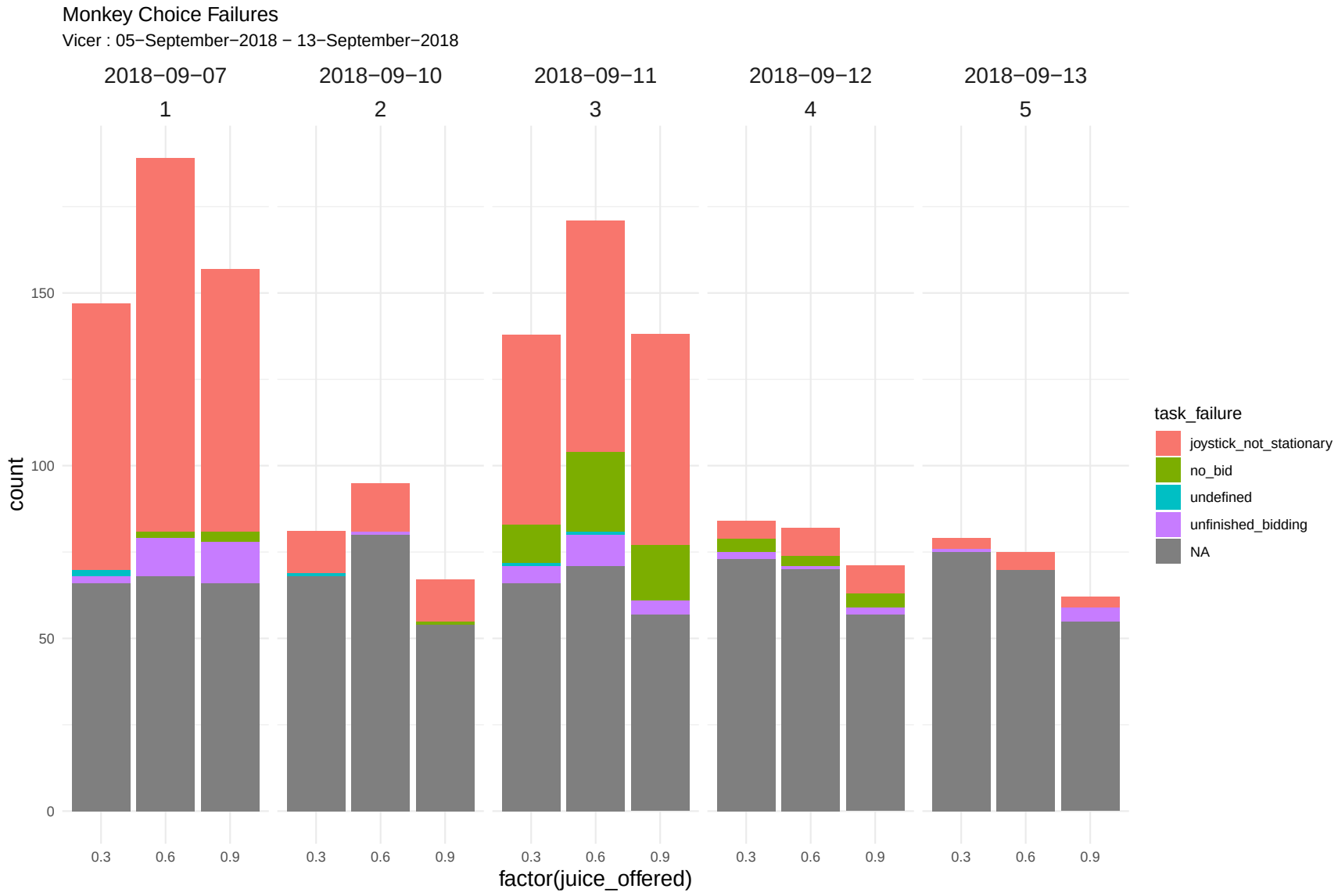
```r
#generate a model of likelihood to choice for the fractal dependent on it's position,
#value and associated water
model <- glm(data = dplyr::filter(task_data, block_no == max(block_no)),
             fractal_choice ~ bundle_position + water_offered + as.factor(juice_offered) + trial + date,
             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
## -2.2666  -0.3425  -0.1435  -0.0221   4.6452
##
## Coefficients: (1 not defined because of singularities)
##                               Estimate Std. Error z value Pr(>|z|)
## (Intercept)                 -12.090458   1.970015  -6.137 8.40e-10 ***
## bundle_position               0.781906   0.561728   1.392 0.163933
## water_offered                 7.601928   1.435435   5.296 1.18e-07 ***
## as.factor(juice_offered)0.6   3.091471   0.860159   3.594 0.000326 ***
## as.factor(juice_offered)0.9   5.407780   0.995542   5.432 5.57e-08 ***
## trial                         0.006179   0.004335   1.425 0.154102
## 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: 191.556  on 199  degrees of freedom
## Residual deviance:  93.067  on 194  degrees of freedom
##   (16 observations deleted due to missingness)
## AIC: 105.07
##
## Number of Fisher Scoring iterations: 7
```

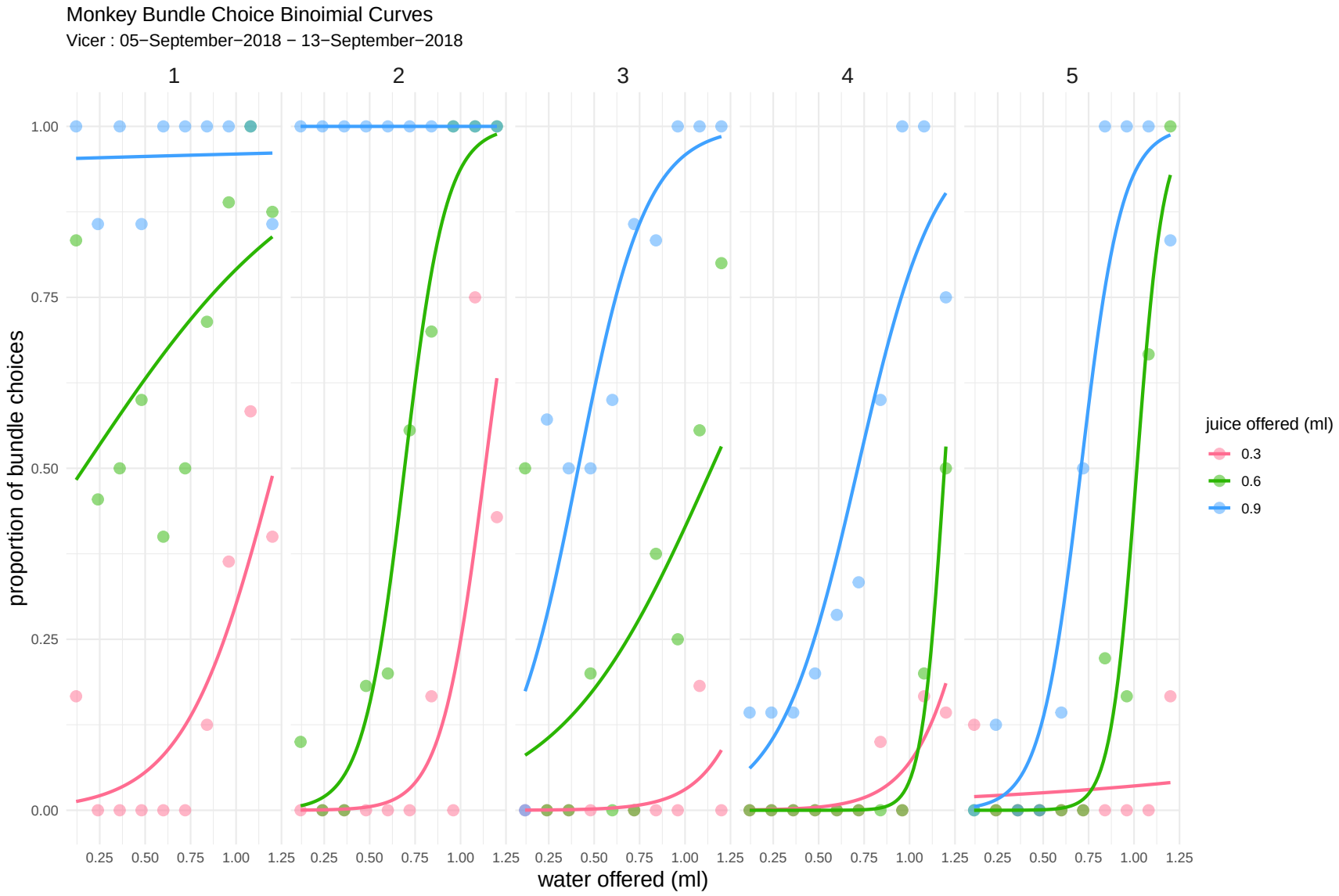
```r
#test for side bias with an exact binomial test
binom.test(c(nrow(task_data %>%
                    .[c(bundle_position != fractal_choice & block_no == max(block_no))]),
             nrow(task_data %>%
                    .[c(bundle_position == fractal_choice & block_no == max(block_no))])))
```

```
##
##  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 = 101, number of trials = 200, p-value =
## 0.9437
## alternative hypothesis: true probability of success is not equal to 0.5
## 95 percent confidence interval:
##  0.4335867 0.5762629
## sample estimates:
## probability of success
##                  0.505
```

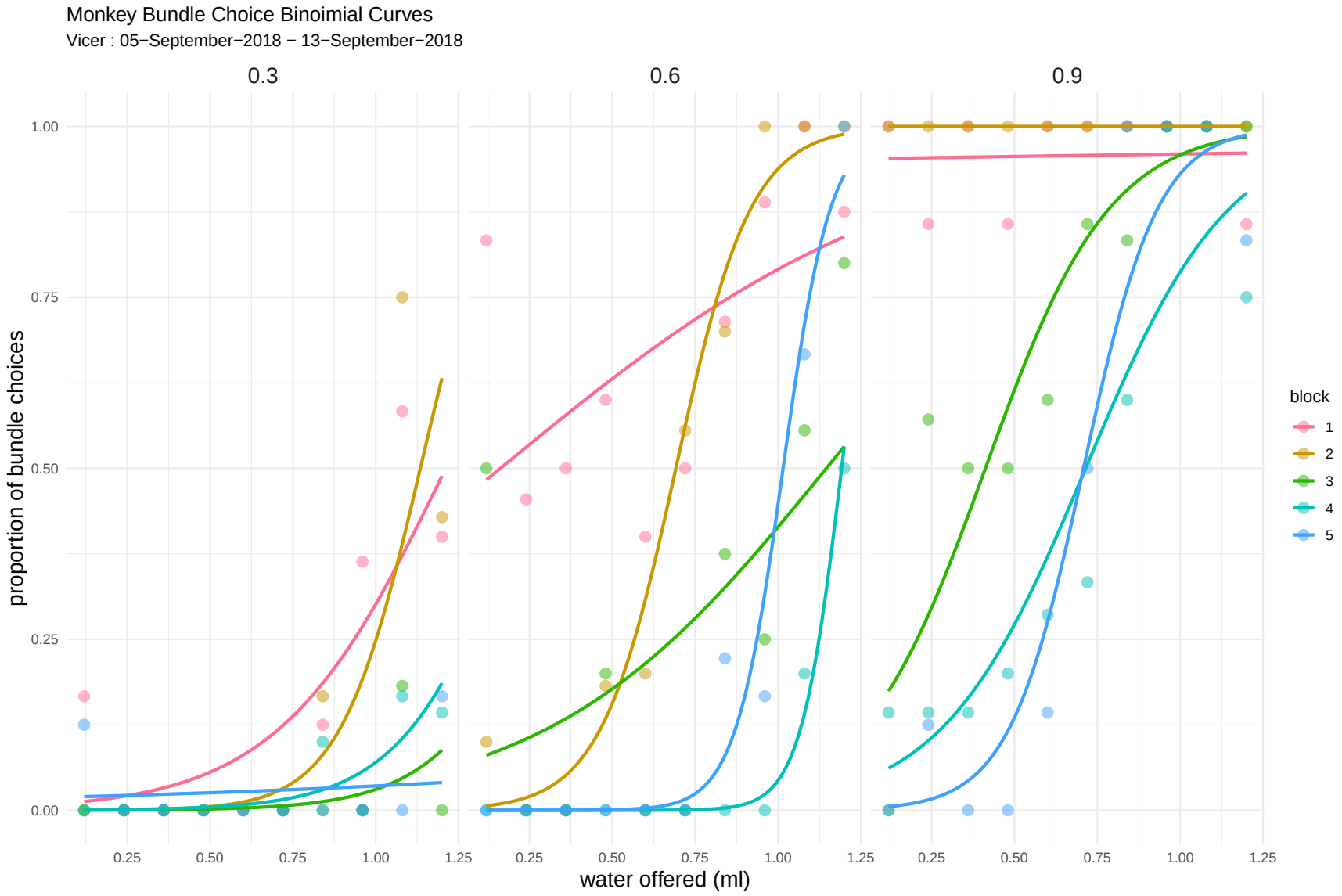
```
p3
```


Monkey Choice Failures
Vicer : 05−September−2018 − 13−September−2018
2018−09−07
1
2018−09−10
2
2018−09−11
3
2018−09−12
4
2018−09−13
5
count
0
50
100
150
0.3
0.6
0.9
factor(juice_offered)
task_failure
joystick_not_stationary
no_bid
undefined
unfinished_bidding
NA

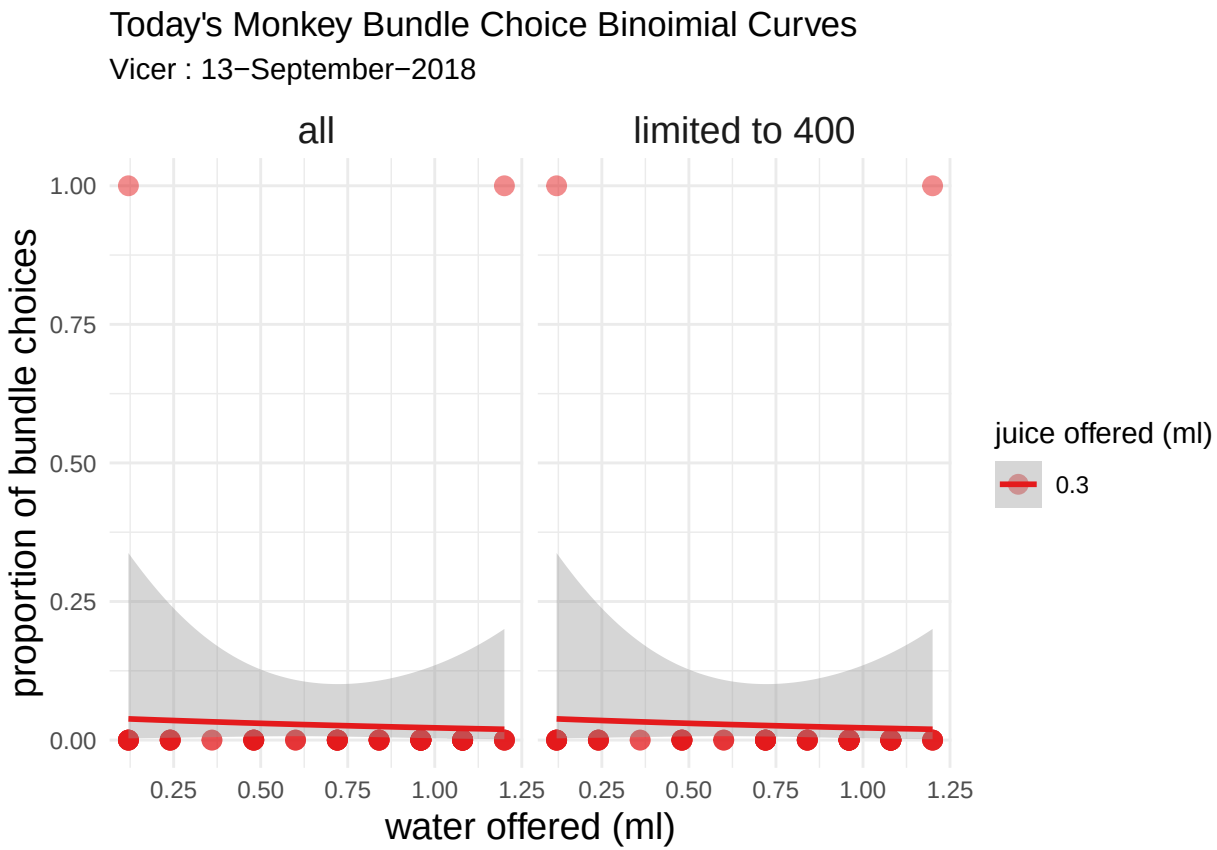
```
p4
```


Monkey Bundle Choice Binoimial Curves
Vicer : 05−September−2018 − 13−September−2018
1
2
3
4
5
1.00
0.75
0.50
0.25
0.00
proportion of bundle choices
0.25
0.50
0.75
1.00
1.25
water offered (ml)
juice offered (ml)
0.3
0.6
0.9

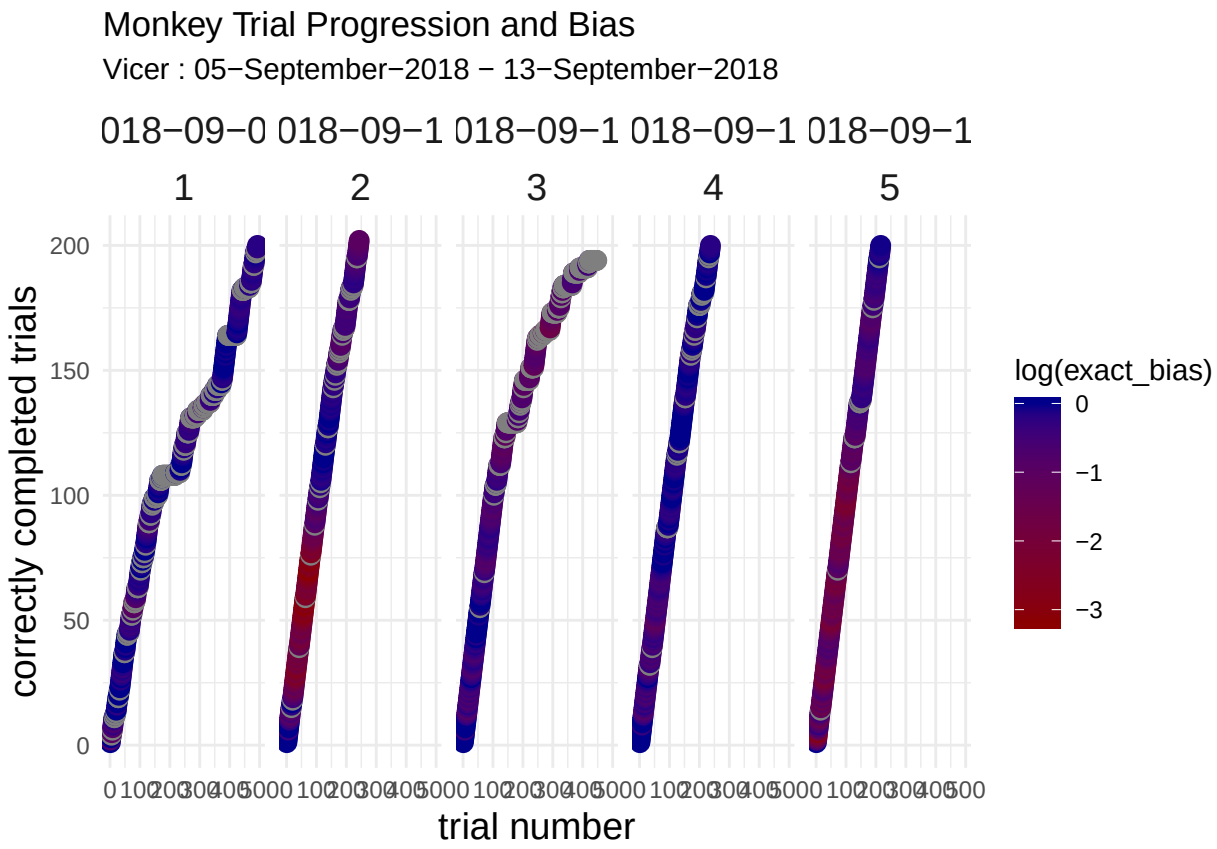
```
p5
```


Monkey Bundle Choice Binoimial Curves
Vicer : 05−September−2018 − 13−September−2018
0.3
0.6
0.9
proportion of bundle choices
1.00
0.75
0.50
0.25
0.00
0.25
0.50
0.75
1.00
1.25
water offered (ml)
block
1
2
3
4
5

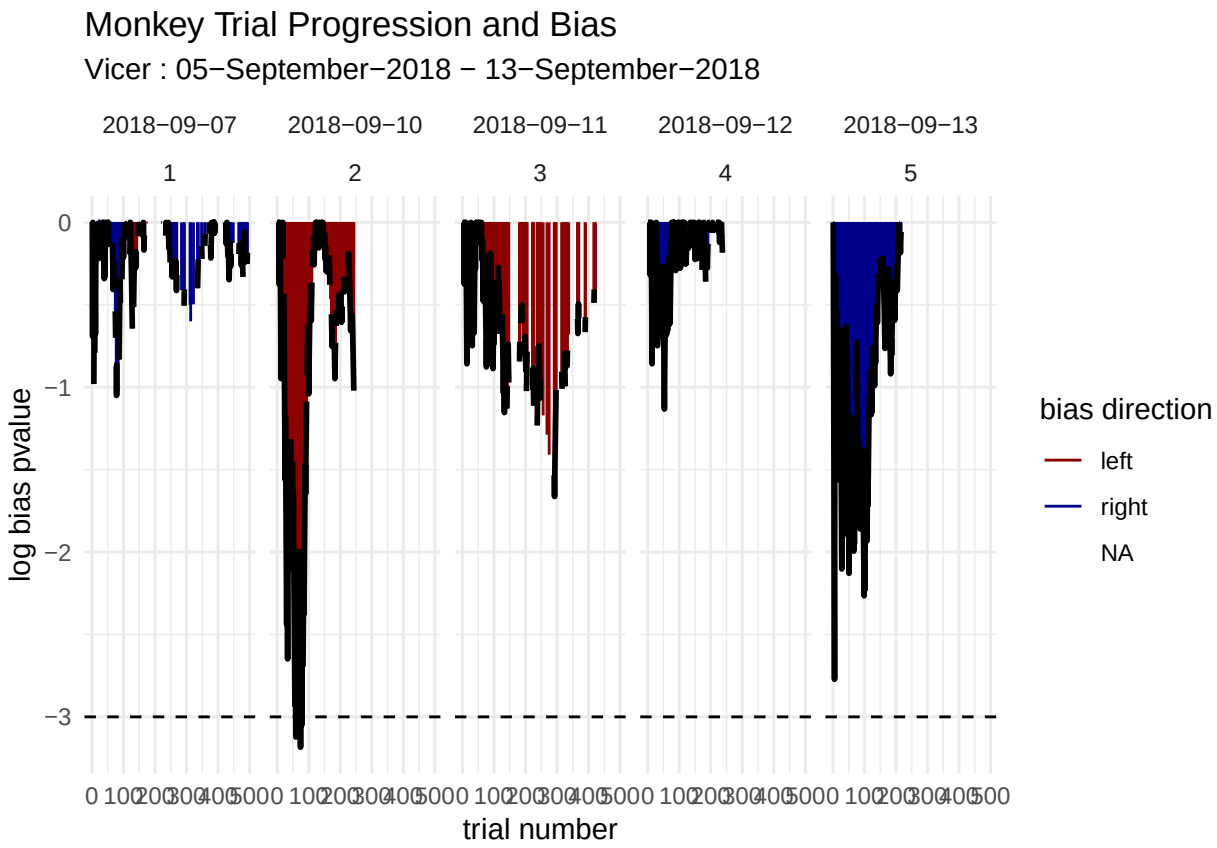
```
p6
```


Today's Monkey Bundle Choice Binoimial Curves
Vicer : 13−September−2018
all
limited to 400
proportion of bundle choices
1.00
0.75
0.50
0.25
0.00
0.25
0.50
0.75
1.00
1.25
water offered (ml)
juice offered (ml)
0.3

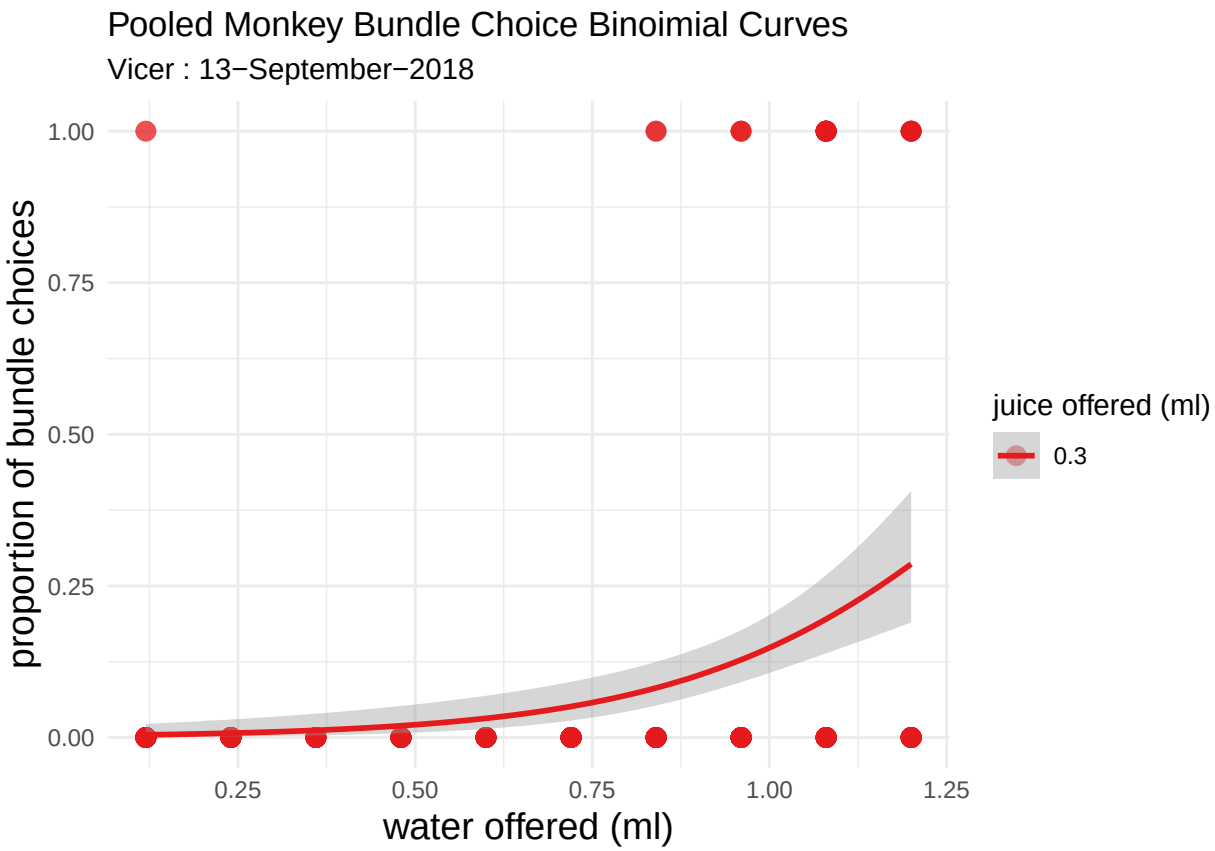
```
p7
```


Monkey Trial Progression and Bias
Vicer : 05−September−2018 − 13−September−2018
018−09−0 018−09−1 018−09−1 018−09−1 018−09−1
1
2
3
4
5
correctly completed trials
200
150
100
50
0
trial number
log(exact_bias)
0
−1
−2
−3

```
p8
```


Monkey Trial Progression and Bias
Vicer : 05−September−2018 − 13−September−2018
2018−09−07
2018−09−10
2018−09−11
2018−09−12
2018−09−13
1
2
3
4
5
0
−1
−2
−3
log bias pvalue
trial number
bias direction
left
right
NA

```
p9
```


Pooled Monkey Bundle Choice Binoimial Curves
Vicer : 13−September−2018
proportion of bundle choices
1.00
0.75
0.50
0.25
0.00
0.25
0.50
0.75
1.00
1.25
water offered (ml)
juice offered (ml)
0.3