BCb Analysis- Early March

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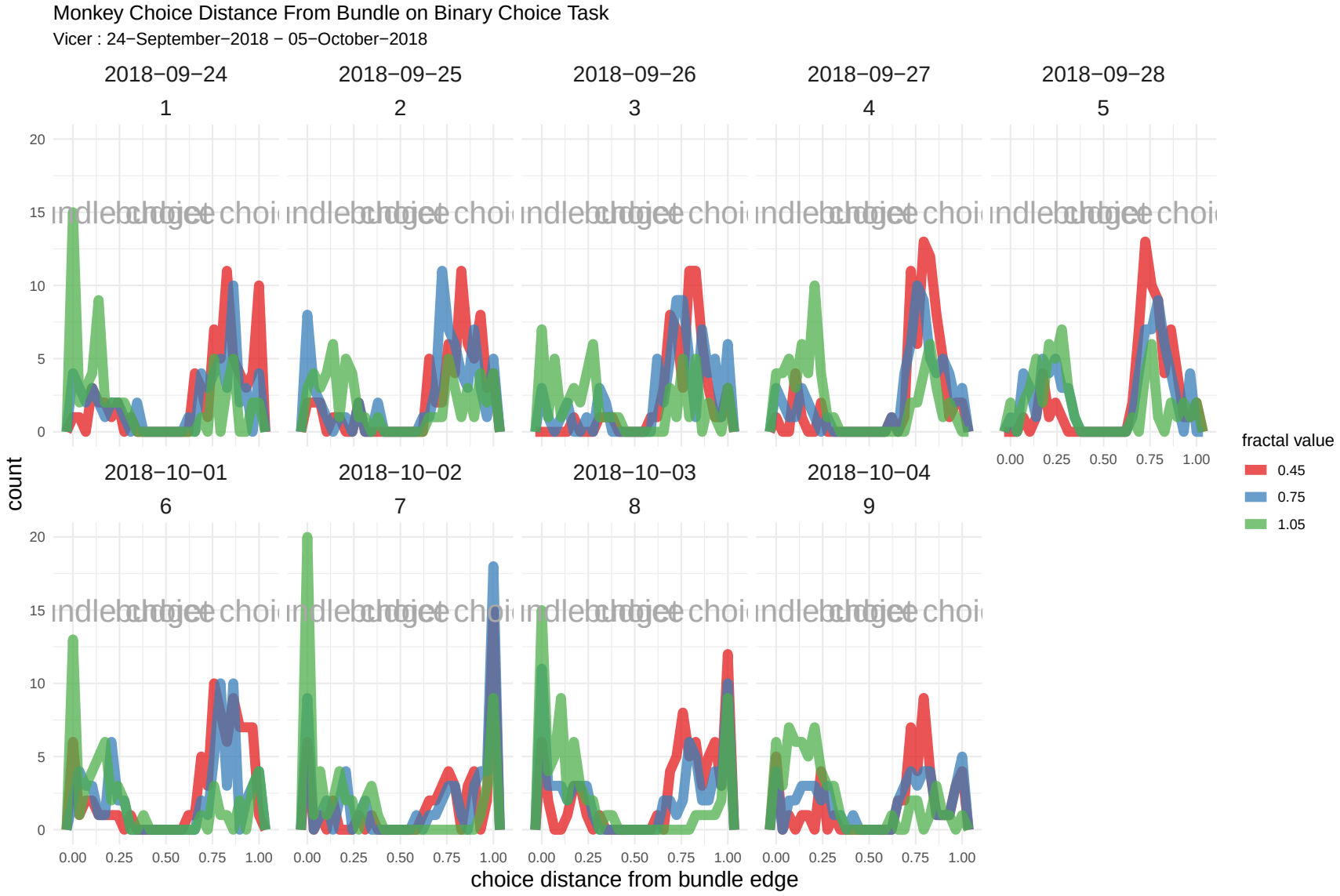
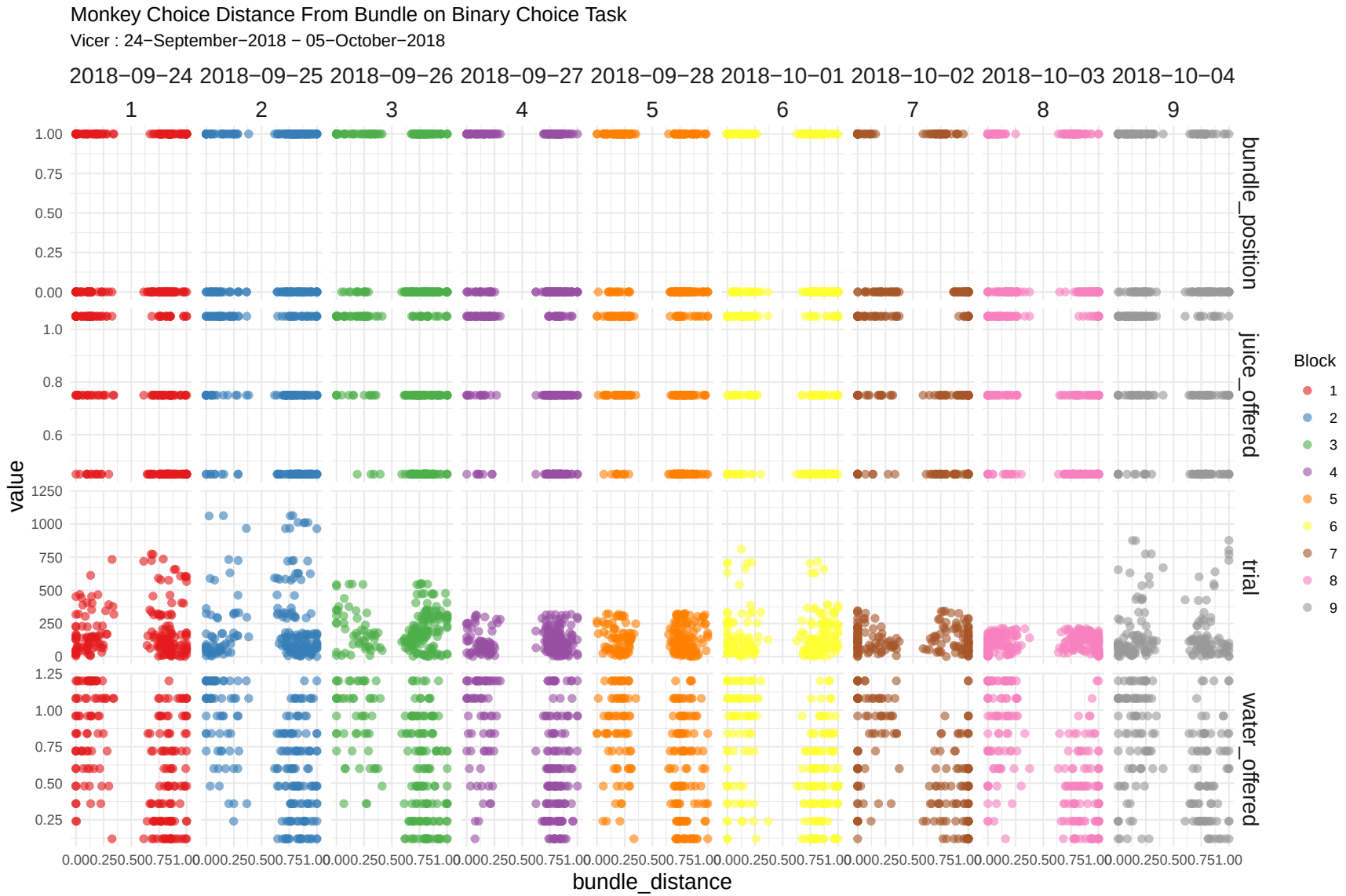
```
monkey <- "Vicer"
today <- "05-October-2018"
look_back <- "24-September-2018"

start_trial <- 0
stop_trial <- "all"

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 : 24−September−2018 − 05−October−2018
2018−09−24
1
2018−09−25
2
2018−09−26
3
2018−09−27
4
2018−09−28
5
2018−10−01
6
2018−10−02
7
2018−10−03
8
2018−10−04
9
count
choice distance from bundle edge
fractal value
0.45
0.75
1.05

```
p2
```


Monkey Choice Distance From Bundle on Binary Choice Task
Vicer : 24−September−2018 − 05−October−2018
2018−09−24
2018−09−25
2018−09−26
2018−09−27
2018−09−28
2018−10−01
2018−10−02
2018−10−03
2018−10−04
1
2
3
4
5
6
7
8
9
bundle_position
juice_offered
trial
water_offered
value
bundle_distance
Block
1
2
3
4
5
6
7
8
9

```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
## -3.2123  -0.4602  -0.1074   0.3855   3.7517
##
## Coefficients:
##                   Estimate Std. Error z value Pr(>|z|)
## (Intercept)     -3.052e+03  4.149e+02  -7.357 1.88e-13 ***
## bundle_position  2.047e+00  1.733e-01  11.808  < 2e-16 ***
## water_offered    6.733e+00  3.577e-01  18.821  < 2e-16 ***
## juice_offered    9.167e+00  4.990e-01  18.369  < 2e-16 ***
## trial           -1.150e-03  4.863e-04  -2.364   0.0181 *
## date             1.707e-01  2.329e-02   7.329 2.32e-13 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 2310.3  on 1726  degrees of freedom
## Residual deviance: 1097.1  on 1721  degrees of freedom
##   (3857 observations deleted due to missingness)
## AIC: 1109.1
##
## 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 = 701, number of trials = 1727, p-value =
## 5.313e-15
## alternative hypothesis: true probability of success is not equal to 0.5
## 95 percent confidence interval:
##  0.3826330 0.4294997
## sample estimates:
## probability of success
##              0.4059062
```

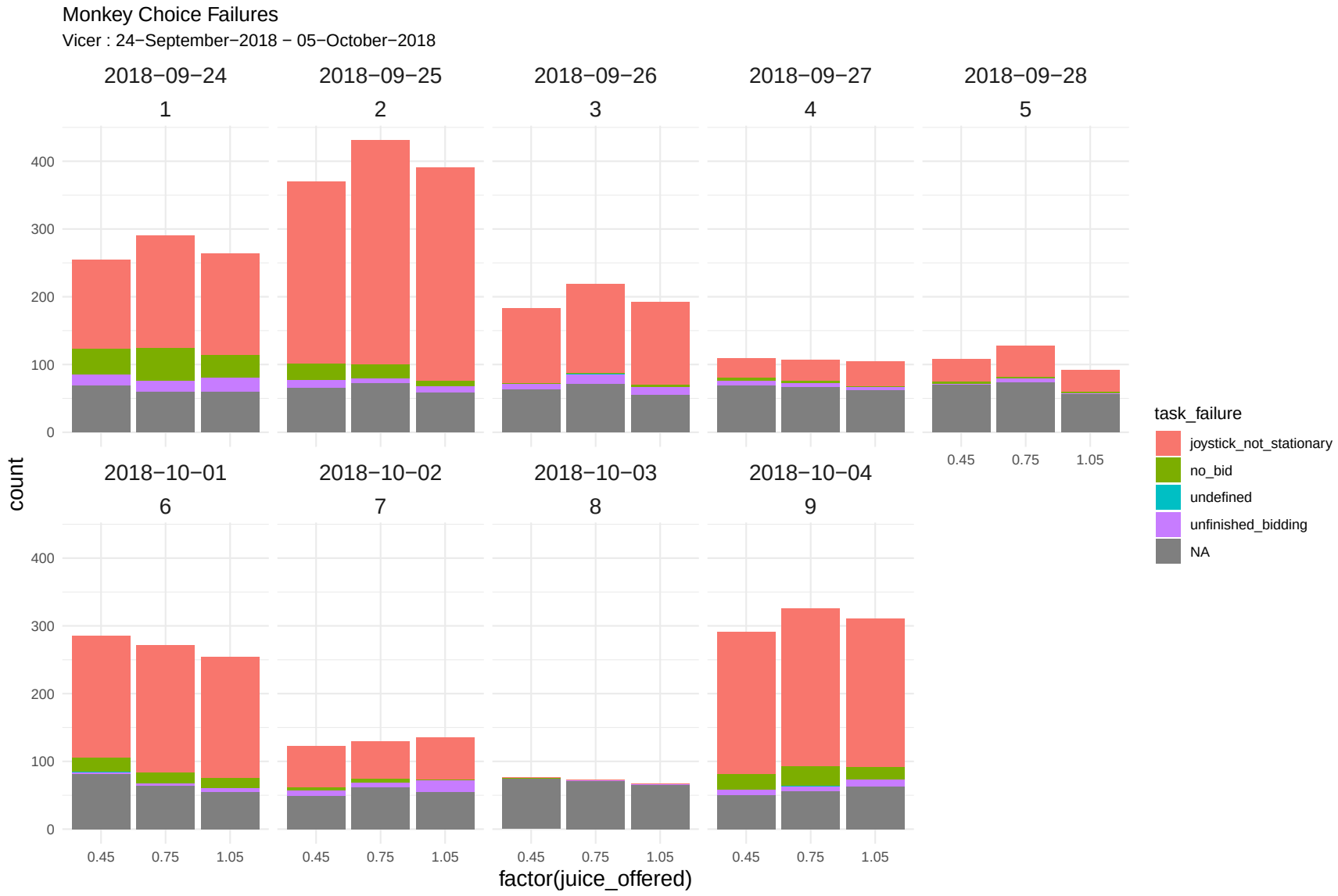
```r
#generate a model of likelihood to choice for the fractal dependent on it's position,
#value and associated water
model <- glm(data = dplyr::filter(task_data, block_no == max(block_no)),
             fractal_choice ~ bundle_position + water_offered + as.factor(juice_offered) + trial + date,
             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
## -2.88528  -0.54327   0.05954   0.54406   2.07653
##
## Coefficients: (1 not defined because of singularities)
##                                Estimate Std. Error z value Pr(>|z|)
## (Intercept)                  -7.6205173  1.2621280  -6.038 1.56e-09 ***
## bundle_position               2.7430264  0.5606023   4.893 9.93e-07 ***
## water_offered                 5.5002948  1.0132716   5.428 5.69e-08 ***
## as.factor(juice_offered)0.75  2.5276814  0.6667585   3.791  0.00015 ***
## as.factor(juice_offered)1.05  5.3225744  0.9103461   5.847 5.01e-09 ***
## trial                        -0.0005681  0.0011667  -0.487  0.62627
## 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: 235.29  on 169  degrees of freedom
## Residual deviance: 118.78  on 164  degrees of freedom
##   (757 observations deleted due to missingness)
## AIC: 130.78
##
## Number of Fisher Scoring iterations: 6
```

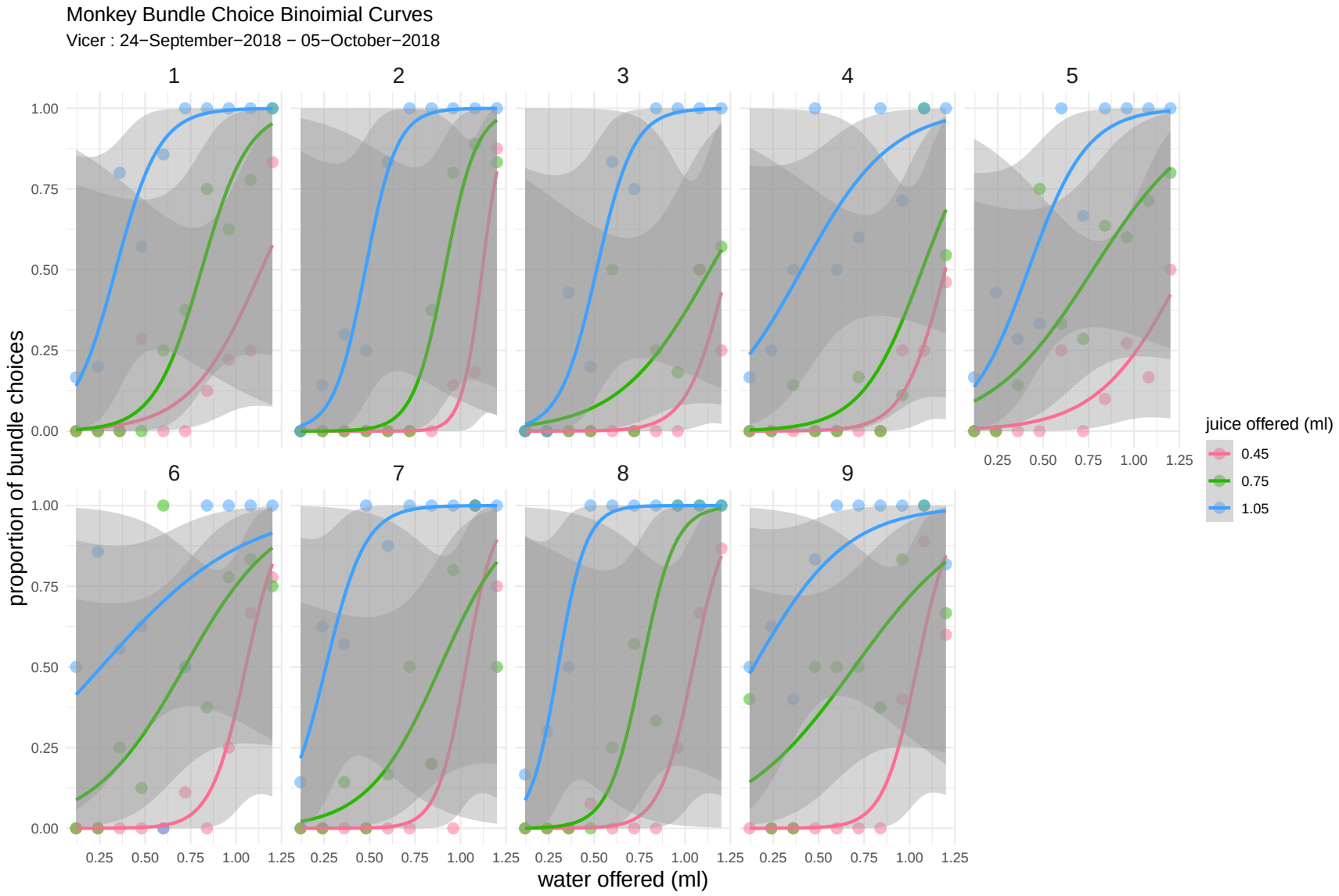
```r
#test for side bias with an exact binomial test
binom.test(c(nrow(task_data %>%
                    .[c(bundle_position != fractal_choice & block_no == max(block_no))]),
             nrow(task_data %>%
                    .[c(bundle_position == fractal_choice & block_no == max(block_no))])))
```

```
##
##  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 = 60, number of trials = 170, p-value =
## 0.0001549
## alternative hypothesis: true probability of success is not equal to 0.5
## 95 percent confidence interval:
##  0.2813102 0.4297998
## sample estimates:
## probability of success
##              0.3529412
```

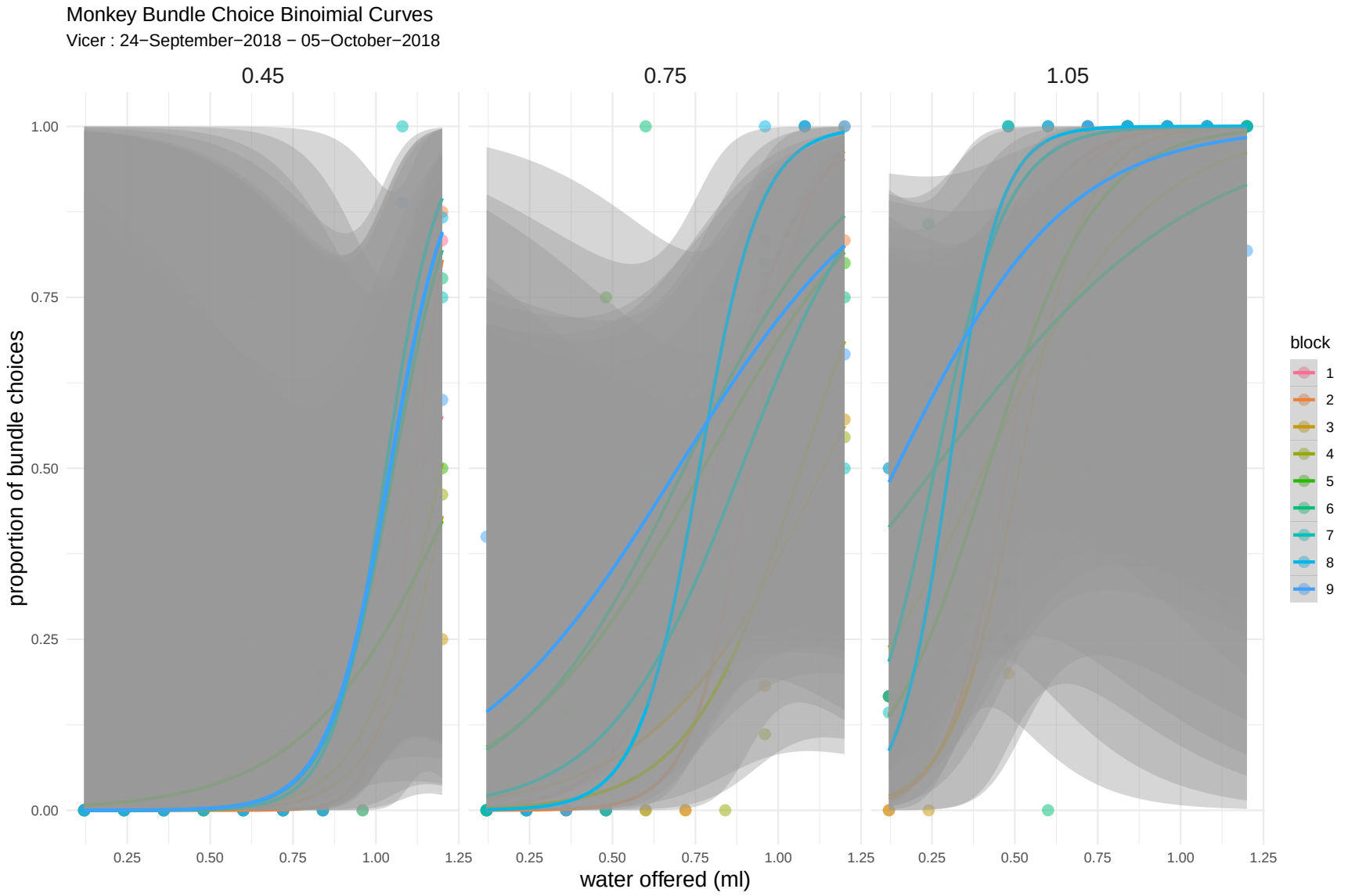
```
p3
```


Monkey Choice Failures
Vicer : 24−September−2018 − 05−October−2018
2018−09−24
1
2018−09−25
2
2018−09−26
3
2018−09−27
4
2018−09−28
5
2018−10−01
6
2018−10−02
7
2018−10−03
8
2018−10−04
9
count
0
100
200
300
400
0.45
0.75
1.05
factor(juice_offered)
task_failure
joystick_not_stationary
no_bid
undefined
unfinished_bidding
NA

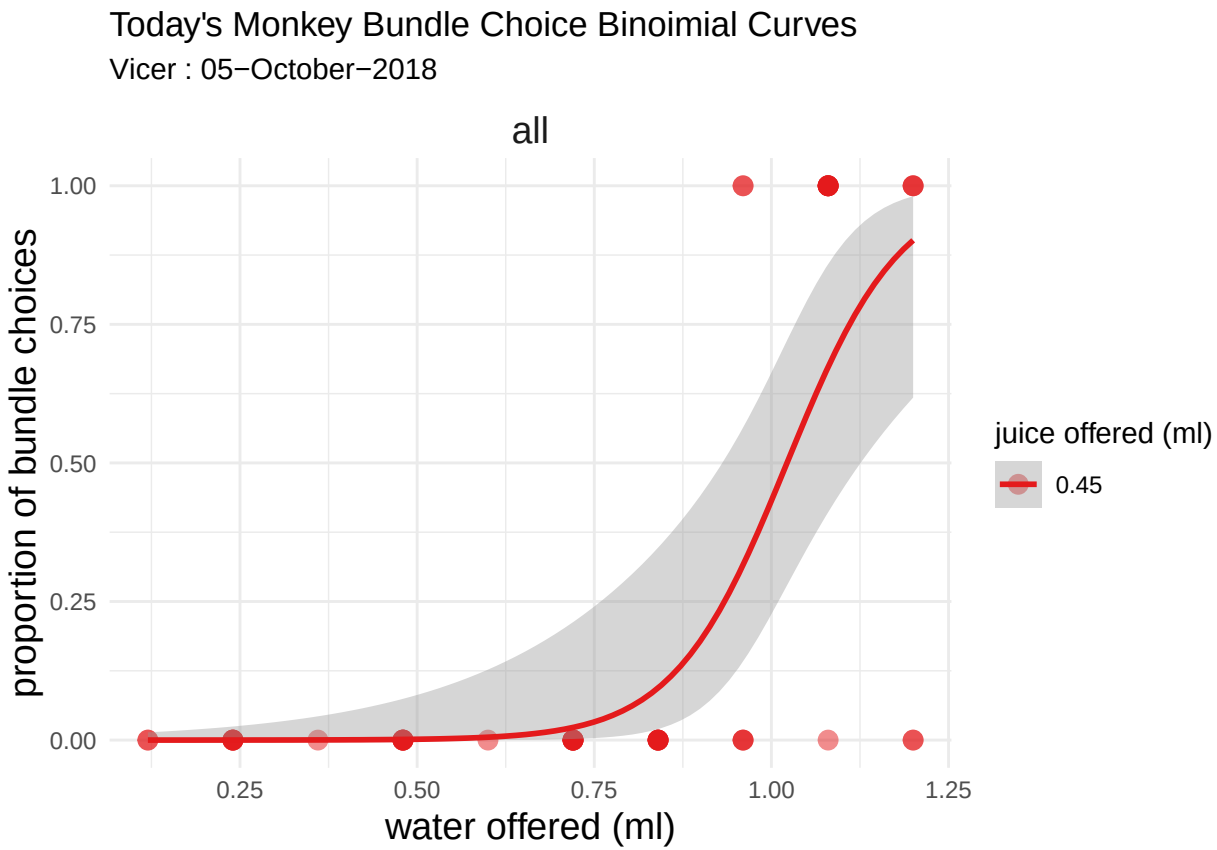
```
p4
```


Monkey Bundle Choice Binoimial Curves
Vicer : 24−September−2018 − 05−October−2018
1
2
3
4
5
6
7
8
9
proportion of bundle choices
water offered (ml)
0.00
0.25
0.50
0.75
1.00
1.25
juice offered (ml)
0.45
0.75
1.05

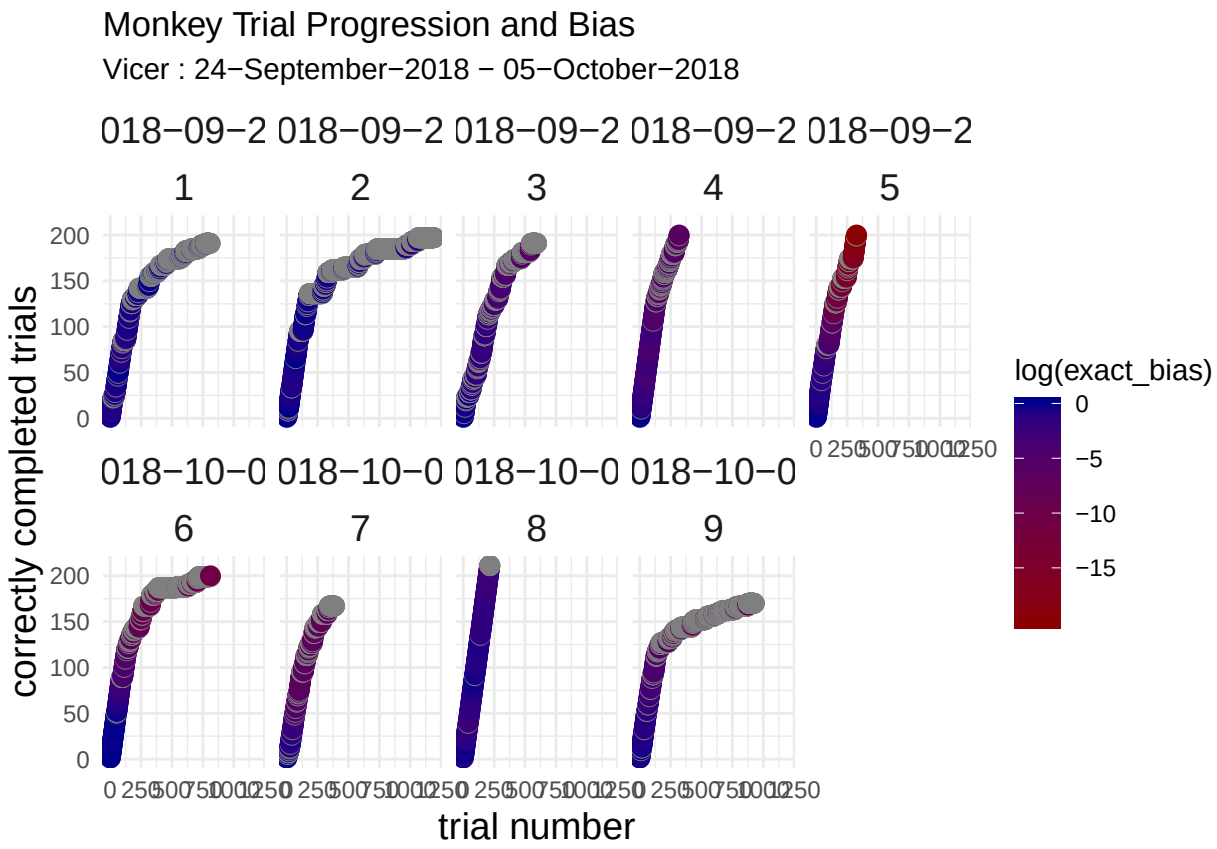
```
p5
```


Monkey Bundle Choice Binoimial Curves
Vicer : 24−September−2018 − 05−October−2018
0.45
0.75
1.05
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
6
7
8
9

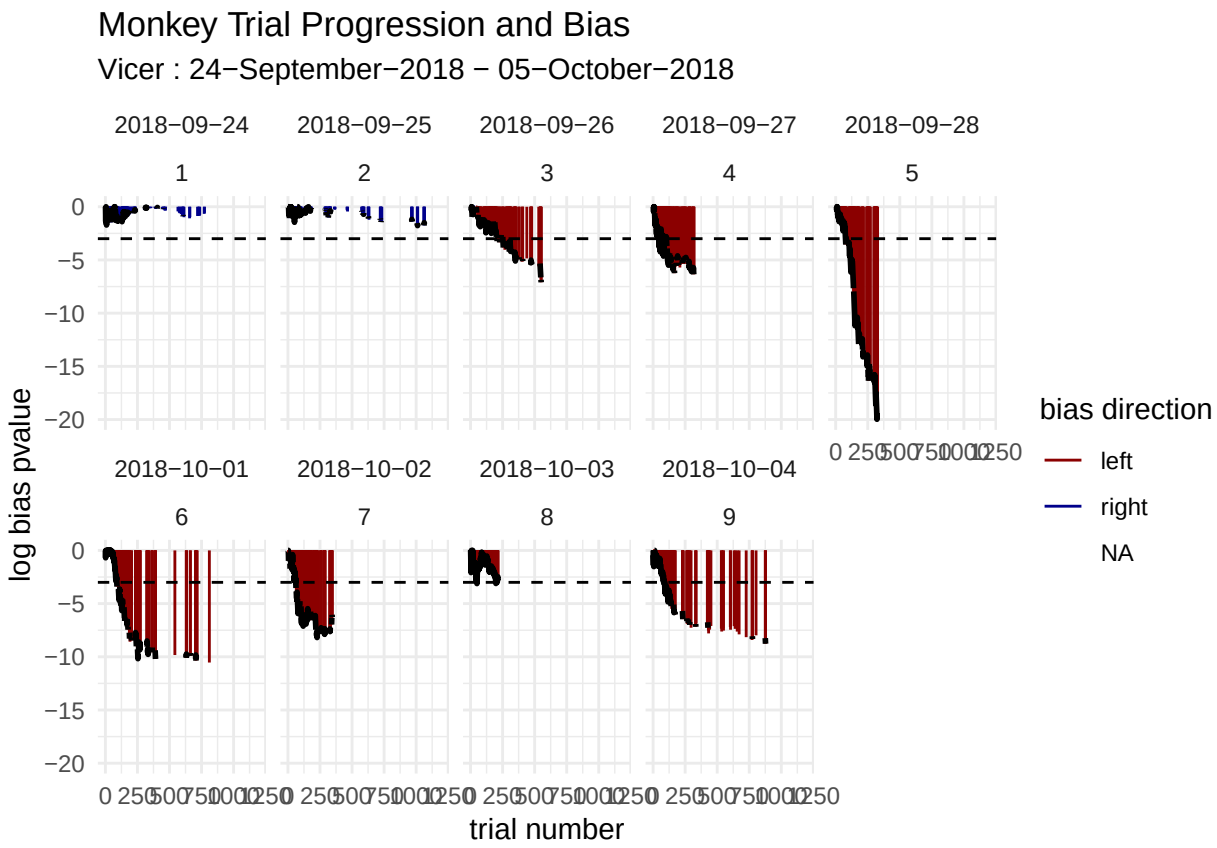
```
p6
```


Today's Monkey Bundle Choice Binoimial Curves
Vicer : 05−October−2018
all
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)
0.45

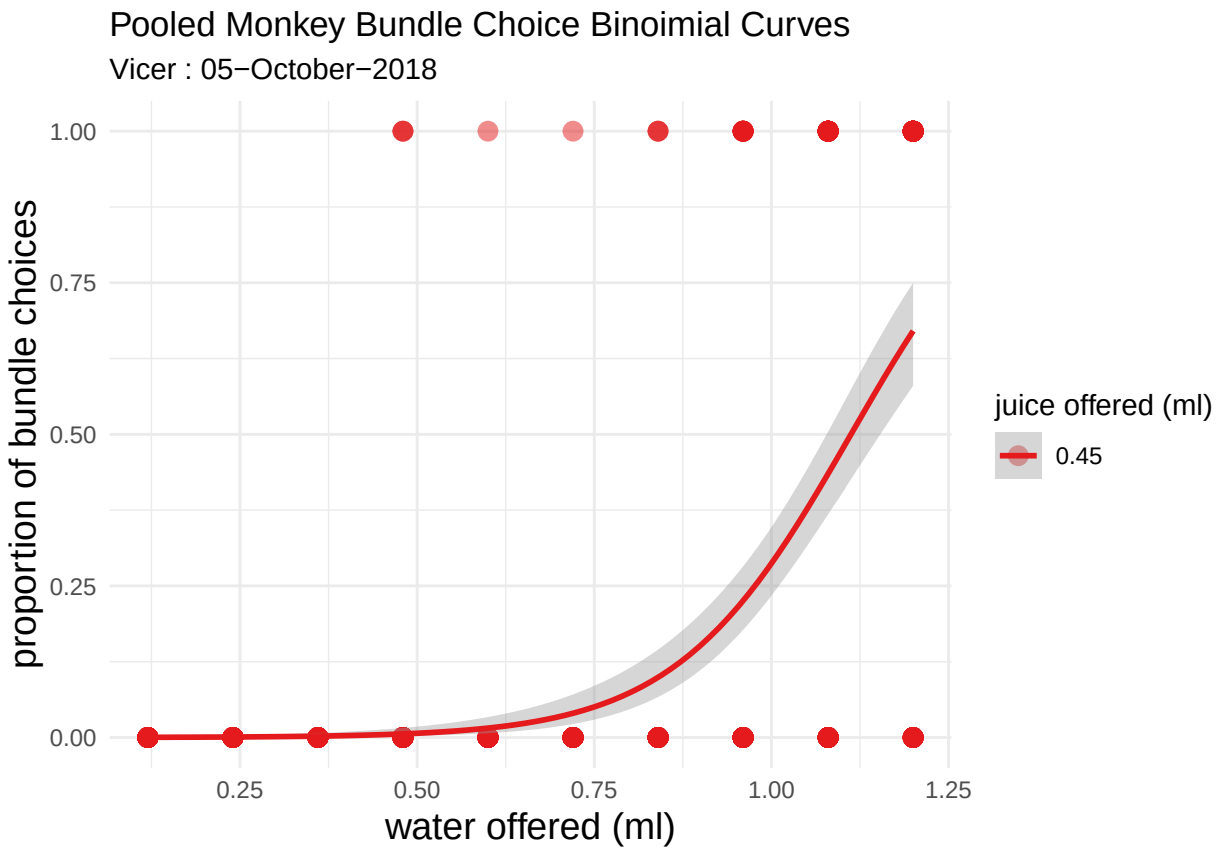
```
p7
```


Monkey Trial Progression and Bias
Vicer : 24−September−2018 − 05−October−2018
018−09−2
018−09−2
018−09−2
018−09−2
018−09−2
1
2
3
4
5
018−10−0
018−10−0
018−10−0
018−10−0
6
7
8
9
correctly completed trials
trial number
log(exact_bias)
0
−5
−10
−15

```
p8
```


Monkey Trial Progression and Bias
Vicer : 24−September−2018 − 05−October−2018
2018−09−24
2018−09−25
2018−09−26
2018−09−27
2018−09−28
1
2
3
4
5
2018−10−01
2018−10−02
2018−10−03
2018−10−04
6
7
8
9
0
−5
−10
−15
−20
0 250 500 750 1000 1250
log bias pvalue
trial number
bias direction
left
right
NA

```
p9
```


Pooled Monkey Bundle Choice Binoimial Curves
Vicer : 05−October−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)
0.45