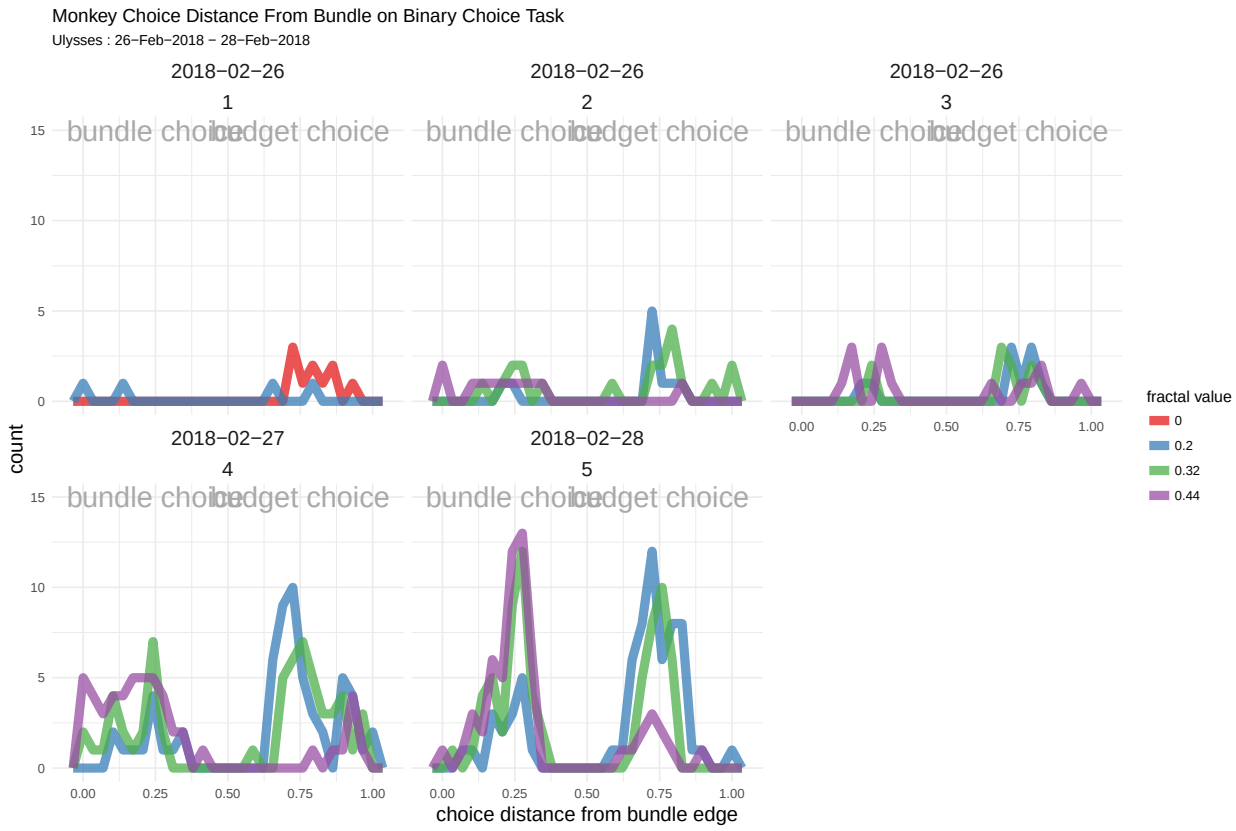
Binary Choice Analysis

Robert Hickman

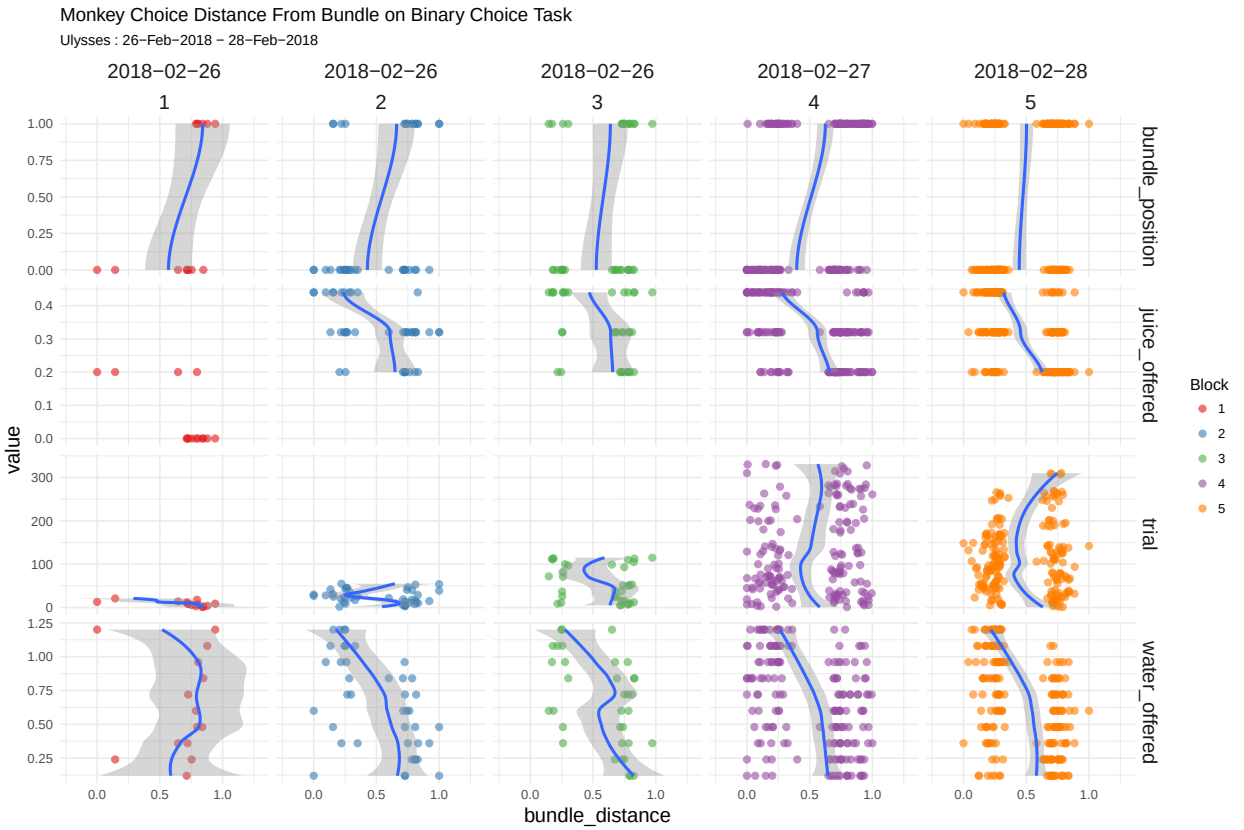
22 February 2018

```
monkey <- "Ulysses"
today <- "28-Feb-2018"
look_back <- "26-Feb-2018"
```

```
p1
```




```
p2
```



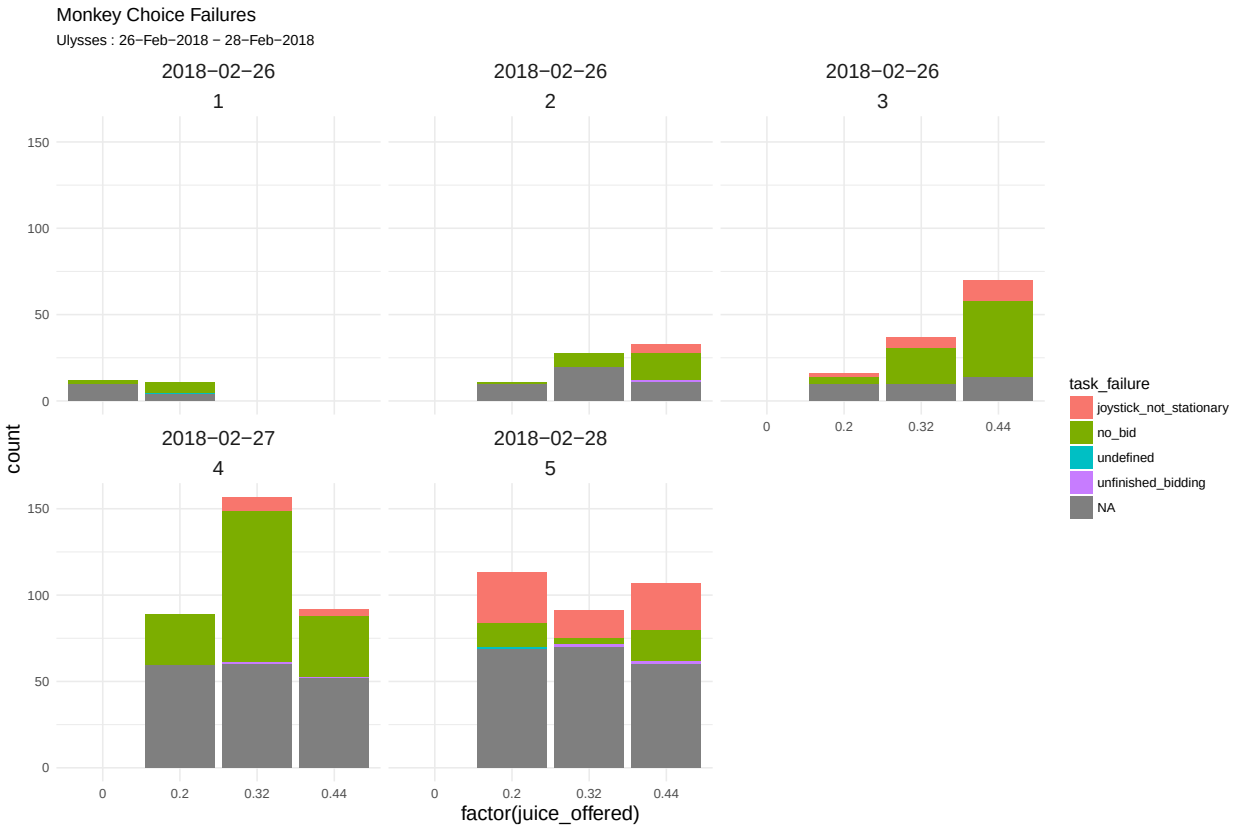

```
#generate a model of likelihood to choice for the fractal dependent on it's position,
#value and associated water
model <- glm(data = task_data,
             fractal_choice ~ bundle_position + water_offered + juice_offered + trial + date,
             family = "binomial")

#summarise the parameters
summary(model)
```

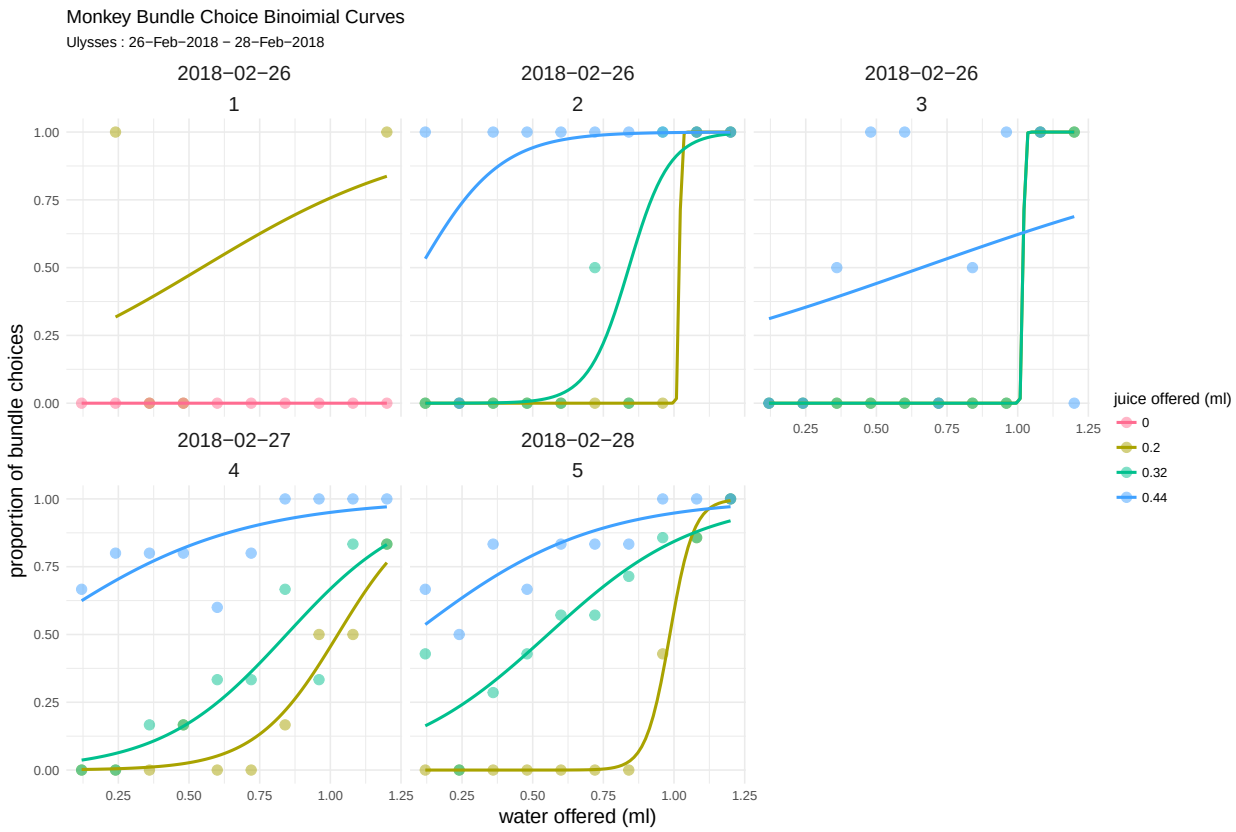
```
##
## Call:
## glm(formula = fractal_choice ~ bundle_position + water_offered +
##     juice_offered + trial + date, family = "binomial", data = task_data)
##
## Deviance Residuals:
##      Min        1Q    Median        3Q       Max
## -3.01361  -0.56462  -0.09897   0.57856   2.92138
##
## Coefficients:
##                   Estimate Std. Error z value Pr(>|z|)
## (Intercept)     -1.095e+04  3.367e+03  -3.253  0.00114 **
## bundle_position -1.327e+00  2.813e-01  -4.717  2.4e-06 ***
## water_offered    4.784e+00  5.131e-01   9.324  < 2e-16 ***
## juice_offered    1.785e+01  1.846e+00   9.665  < 2e-16 ***
## trial           -2.209e-03  1.583e-03  -1.395  0.16295
## date             6.222e-01  1.914e-01   3.251  0.00115 **
## ---
```

```
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 636.23  on 459  degrees of freedom
## Residual deviance: 350.72  on 454  degrees of freedom
##   (407 observations deleted due to missingness)
## AIC: 362.72
##
## Number of Fisher Scoring iterations: 6
```

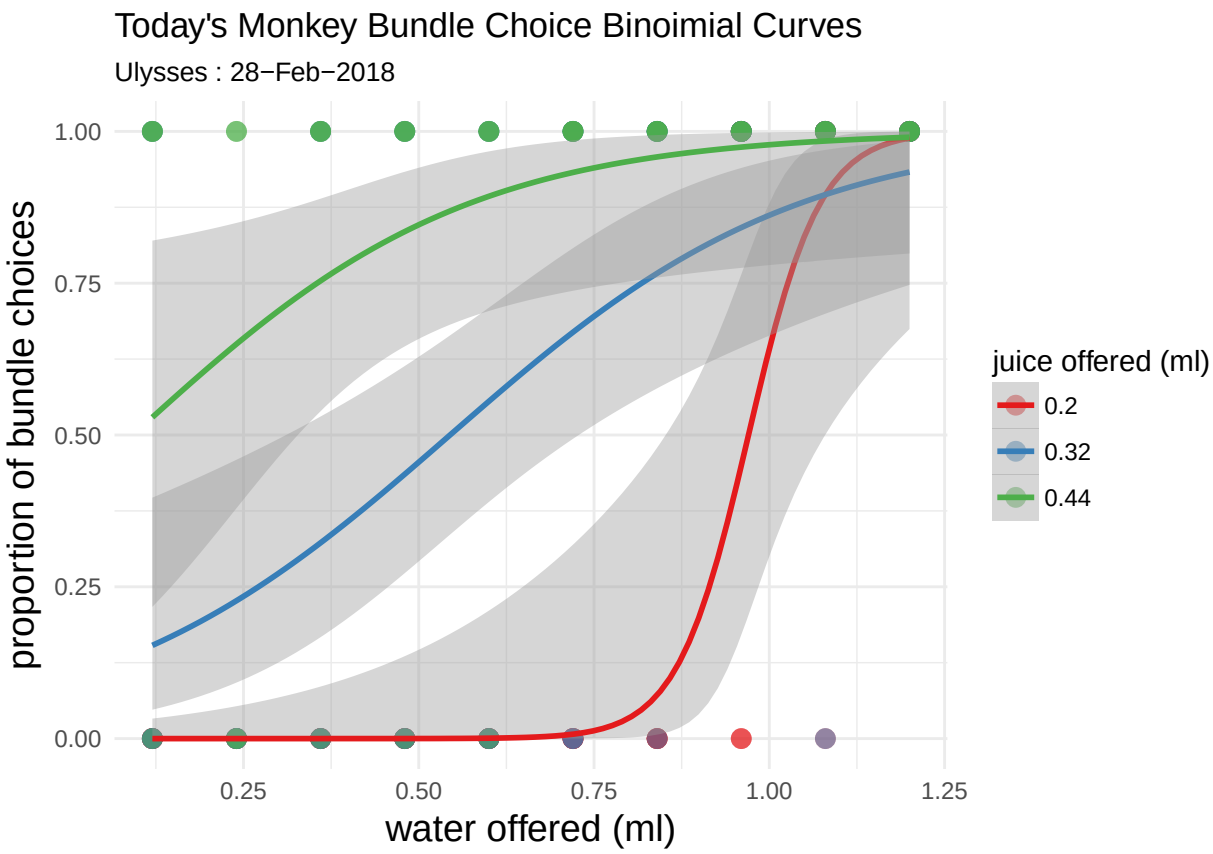
```
p3
```




```
p4
```


Monkey Bundle Choice Binoimial Curves
Ulysses : 26−Feb−2018 − 28−Feb−2018
2018−02−26
1
2018−02−26
2
2018−02−26
3
2018−02−27
4
2018−02−28
5
proportion of bundle choices
water offered (ml)
juice offered (ml)
0
0.2
0.32
0.44

p5




```
library(zoo)
```

```
## Warning: package 'zoo' was built under R version 3.4.3
```

```
##
## Attaching package: 'zoo'
```

```
## The following objects are masked from 'package:base':
##
##     as.Date, as.Date.numeric
```

```
p6 <- task_data %>%
  .[order(block_no, trial)] %>%
  .[,correct := cumsum(is.na(task_failure)), by = block_no] %>%
  .[,progression := correct - shift(correct), by = block_no] %>%
  .[,progression2 := rollapplyr(progression, mean, width = 10), by = block_no] %>%
  #.[, res := rollapplyr(progression, 1:.N, mean), by = block_no]
  ggplot(., aes(x = trial, y = correct)) +
  geom_path(size = 2, aes(colour = progression2)) +
  facet_wrap(~date + block_no)
```

```
## Warning in `[.data.table`(., , `:=`(progression2, rollapplyr(progression, :
## Supplied 14 items to be assigned to group 1 of size 23 in column
## 'progression2' (recycled leaving remainder of 9 items).
```

```
## Warning in `[.data.table`(., , `:=`(progression2, rollapplyr(progression, :
## Supplied 63 items to be assigned to group 2 of size 72 in column
## 'progression2' (recycled leaving remainder of 9 items).
```

```
## Warning in `[.data.table`(., , `:=`(progression2, rollapplyr(progression, :
## Supplied 114 items to be assigned to group 3 of size 123 in column
## 'progression2' (recycled leaving remainder of 9 items).

## Warning in `[.data.table`(., , `:=`(progression2, rollapplyr(progression, :
## Supplied 329 items to be assigned to group 4 of size 338 in column
## 'progression2' (recycled leaving remainder of 9 items).

## Warning in `[.data.table`(., , `:=`(progression2, rollapplyr(progression, :
## Supplied 302 items to be assigned to group 5 of size 311 in column
## 'progression2' (recycled leaving remainder of 9 items).
```

```
p6
```