

# Binary Choice Analysis

*Robert Hickman*

Data shown for:

date

## [1] "14-Dec-2017"

monkey

## [1] "Ulysses"

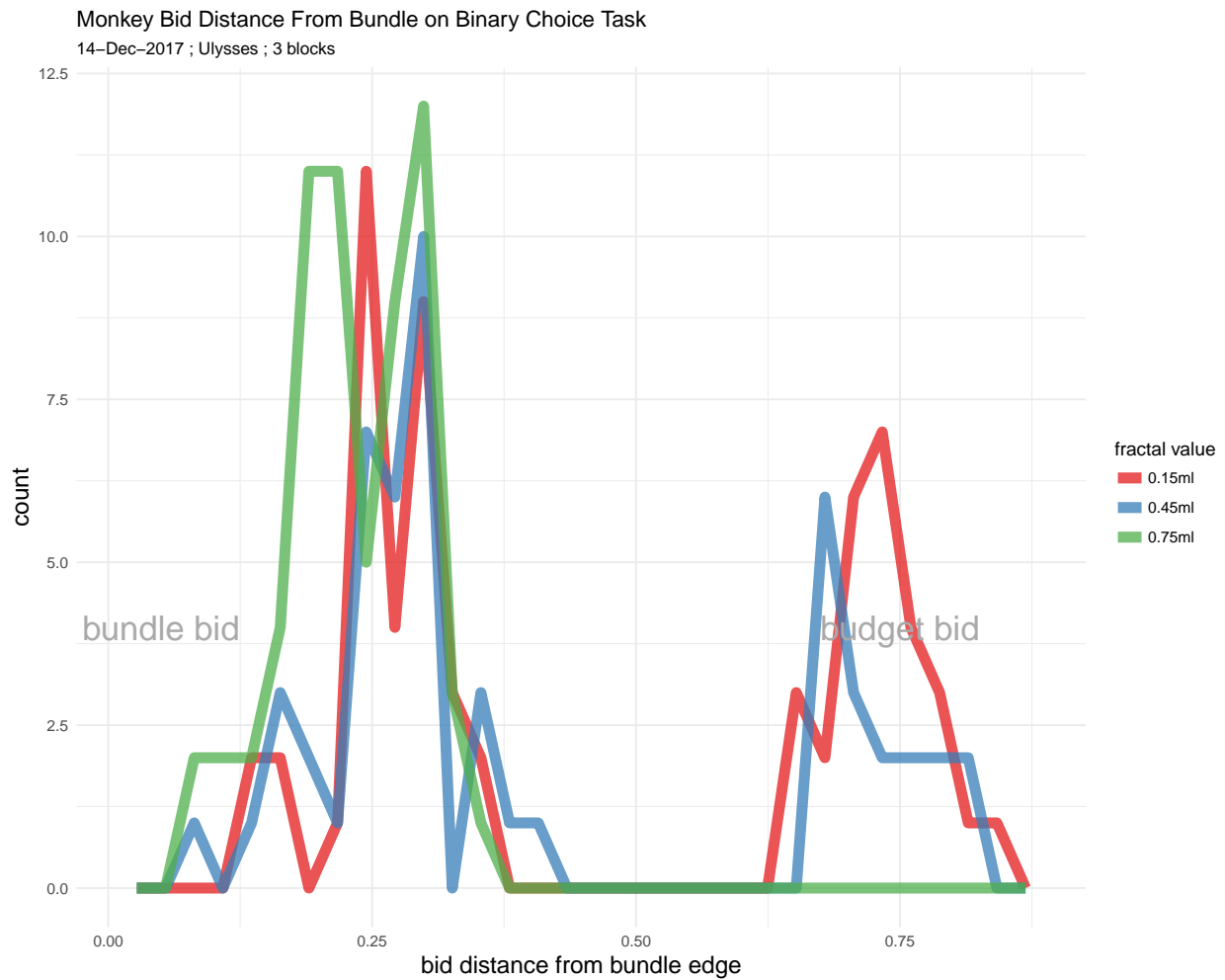
*#plot p1*

p1



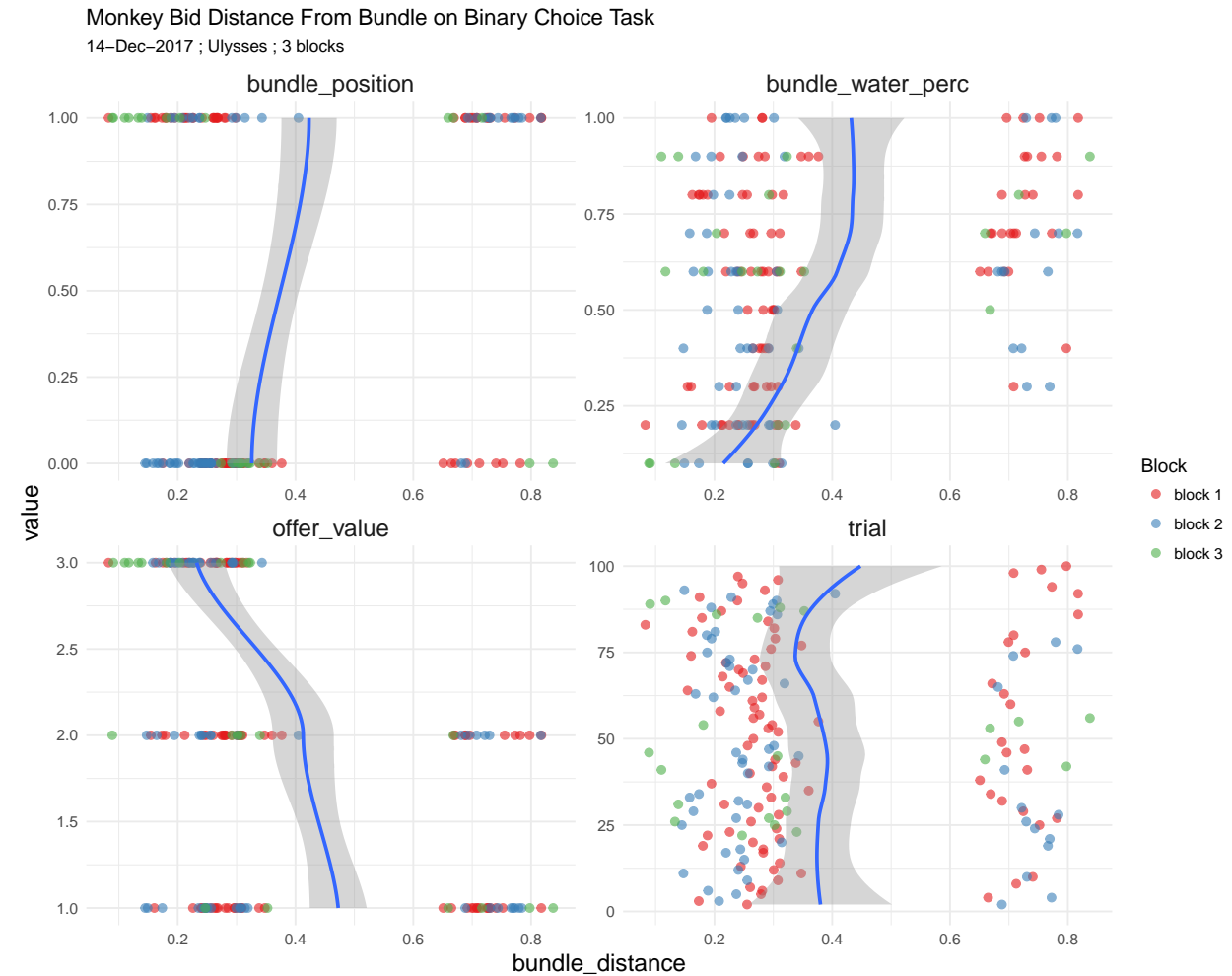
Graph of choices for each block. Circles indicate bid selecting the bundle, squares are bid selecting the budget. A fractal bid position of 1 means that the bundle is on the left hand side of the screen. Bids range from -1 (all the way to the left) to 1 (all the way to the right)

#plot p2  
p2



Graph showing all choices and how far away they are from the edge of the screen on the bundle side. 0 indicates full movement to the bundle side of the screen and 1 represent full movement away. Count is over all blocks for all values of the fractal (in ml of juice).

```
#plot p3
p3
```



Graphs of various factors against the distance from the bundle side of the screen the monkey bids.

A bundle position of 1 indicates that the bundle is on the left hand side of the screen. A bundle water percentage of 1 indicates that the bundle contains no water [CHECK THIS- PRETTY SURE ITS CORRECT], whereas zero means it contains the full 1.2ml. Offer values of 1, 2, and 3 represent 0.15ml, 0.45ml, and 0.75mls of apple and mango juice (150ml in 950ml of water).

Fit lines use LOESS method.

```

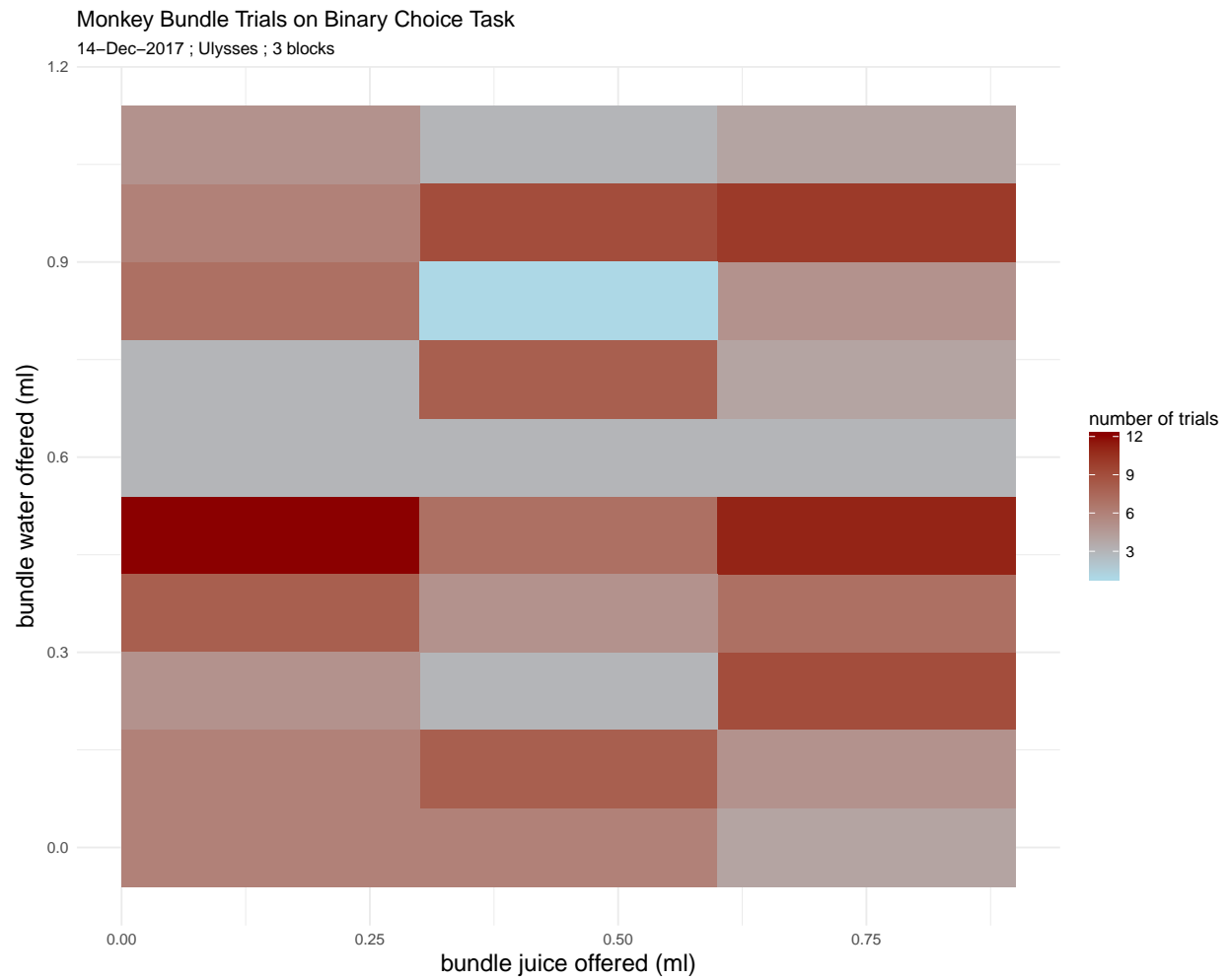
#generate a model of likelihood to bid for the fractal dependent on it's position,
#value and associated water
model <- glm(data = task_data,
             fractal_bid ~ bundle_position + bundle_water_perc + offer_value + trial,
             family = "binomial")

#summarise the parameters
summary(model)

##
## Call:
## glm(formula = fractal_bid ~ bundle_position + bundle_water_perc +
##      offer_value + trial, family = "binomial", data = task_data)
##
## Deviance Residuals:
##      Min       1Q   Median       3Q      Max
## -2.48705  -0.04299   0.19981   0.56319   1.82328
##
## Coefficients:
##              Estimate Std. Error z value Pr(>|z|)
## (Intercept)    1.572e+00  8.986e-01   1.750   0.0802 .
## bundle_position -2.474e+00  5.457e-01  -4.535 5.76e-06 ***
## bundle_water_perc -4.287e+00  1.011e+00  -4.239 2.24e-05 ***
## offer_value     2.021e+00  3.802e-01   5.317 1.06e-07 ***
## trial          4.862e-05  8.153e-03   0.006   0.9952
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##      Null deviance: 197.94  on 175  degrees of freedom
## Residual deviance: 115.80  on 171  degrees of freedom
## (126 observations deleted due to missingness)
## AIC: 125.8
##
## Number of Fisher Scoring iterations: 6

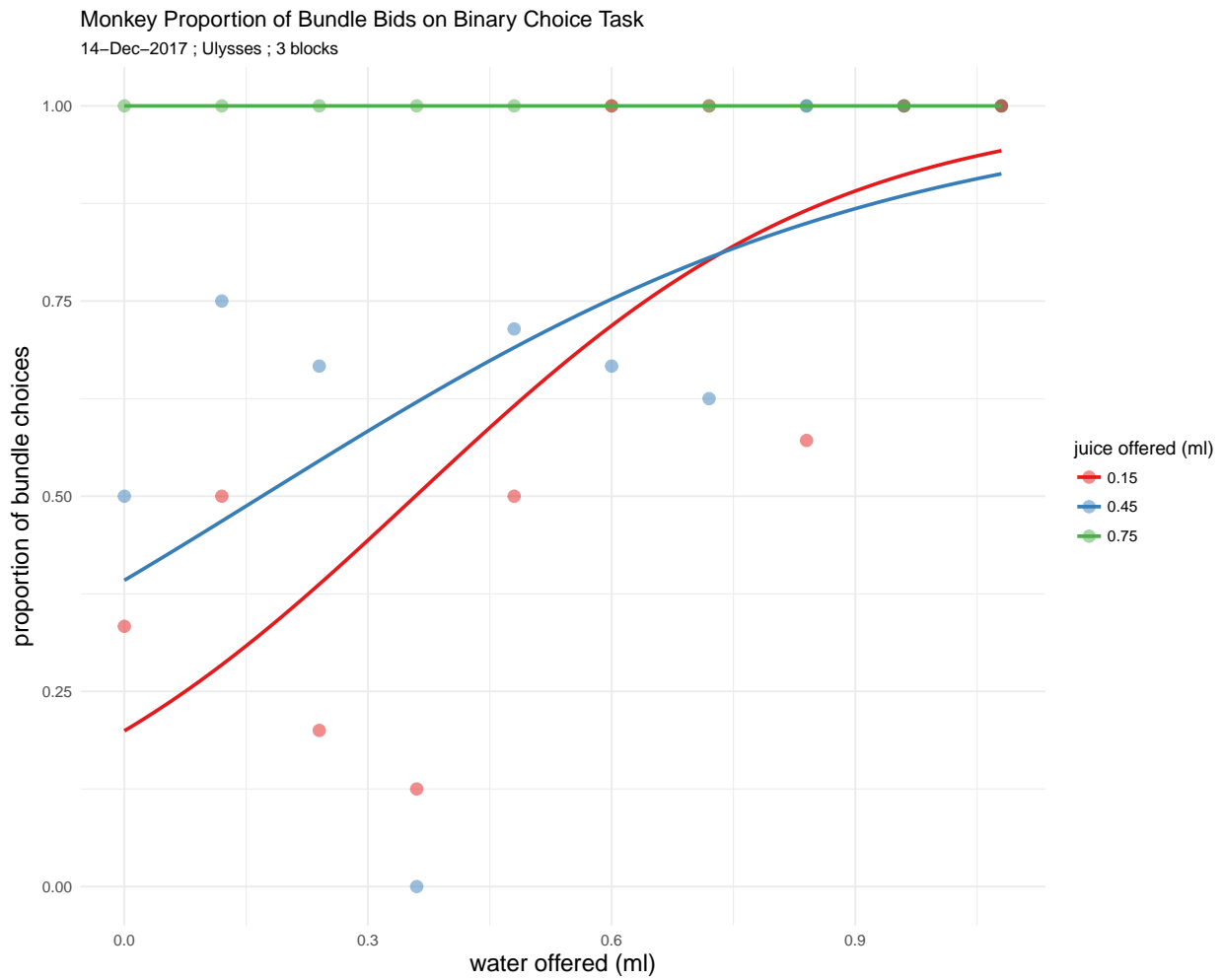
```

#plot p4  
p4



Graph showing the number of trials the monkey carried out for each bundle combination. Does not include failed trials.

#plot p5  
p5



Graph showing the proportion of bids for the bundle that a monkey makes, separated by the values of the juice offered in the bundles. Fits using a binomial glm model.