BDM Analysis

Robert Hickman

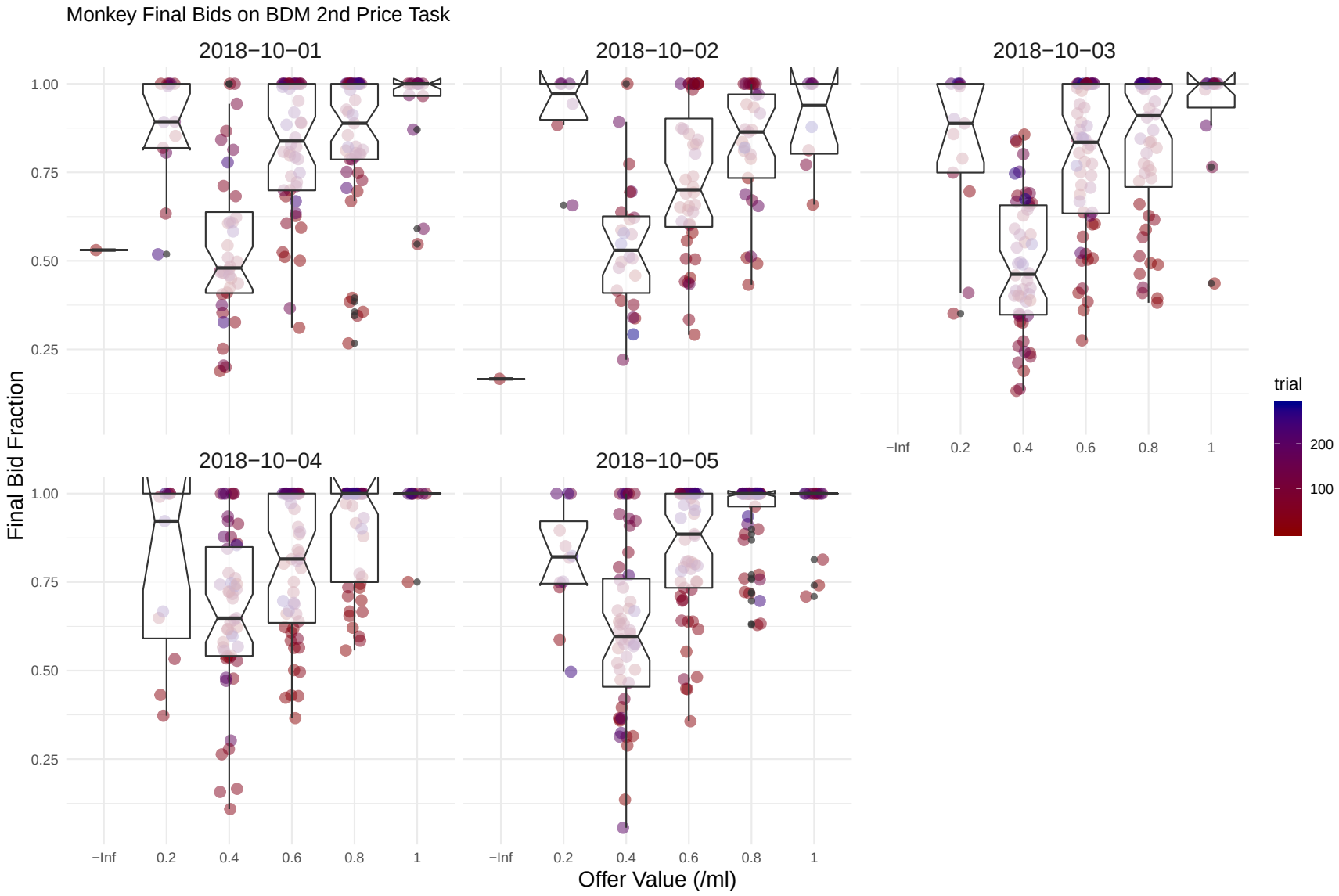
22 March 2018

```
rm(list=ls())
monkey <- "Ulysses"
today <- "05-October-2018"
look_back <- "01-October-2018"

start_trial <- 0
stop_trial <- "all"

merge_days <- FALSE

if(!is.na(look_back)){
  #use a selected range of dates
  dates <- strftime(seq(as.Date(look_back, "%d-%b-%Y"), as.Date(today, "%d-%b-%Y"), "days"), "%d-%b-%Y")
} else {
  #else use the last week of data
  dates <- strftime(seq(as.Date(today, "%d-%b-%Y") -7, as.Date(today, "%d-%b-%Y"), "days"), "%d-%b-%Y")
}
#create a string to search for in the filename
search_string <- paste0(dates, ".*", monkey, "COMPACT")

#find all the relevant data files
###Obvs change for yours
directory <- "C:/Users/WS-Guest/Desktop/task data/"
data_files <- dir(directory)
###When comparing multiple days want to unlist (generally good to see progress rather than just one days data)
specific_files <- unlist(sapply(search_string, grep, x = data_files))

#load up all the files
for(file in 1:length(specific_files)){
  data <- read.csv(paste0(directory, dir(directory)[specific_files[file]]), stringsAsFactors = FALSE, na.strings = "NaN")
  #remove the pavlovian data files
  if(ncol(data) == 12){
```

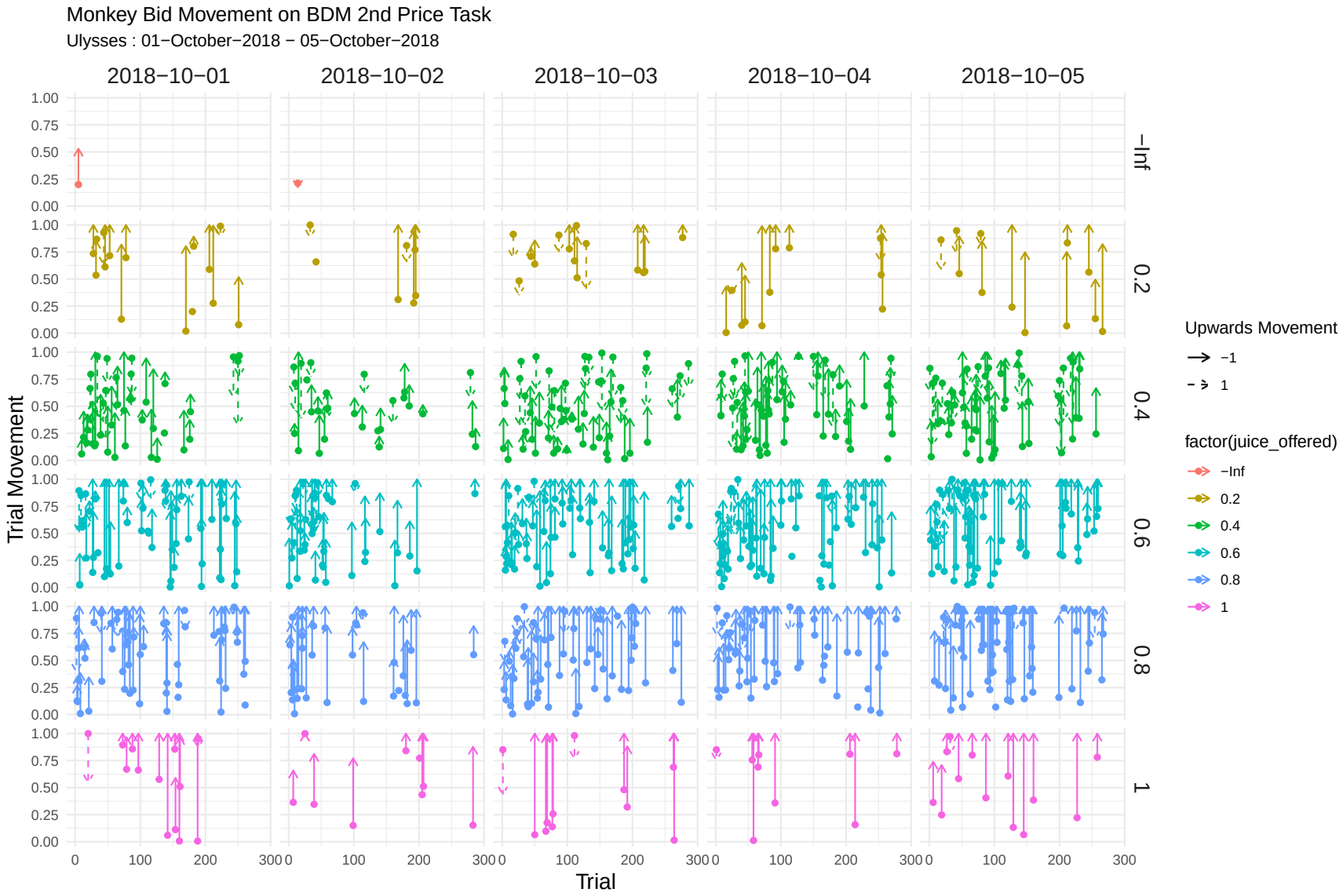
```
    #load in the data and munge it around a bit
    BDM_data <- data %>%
      setDT() %>%
      .[,trial:= 1:.N] %>%
      .[,stimulus_trial := 1:.N, by = offer_value] %>%
      .[,block_no := file] %>%
      #get the date from the filename
      .[,date := as.Date(gsub(" .*", "", dir(directory)[specific_files[file]]), "%d-%b-%Y")]
    #merge into one df
    if(!exists('task_data')){
      task_data <- BDM_data
    }  else {
      task_data <- rbindlist(list(task_data, BDM_data)) %>%
        .[order(block_no, trial)]
    }
  }
}

if(merge_days){
  task_data <- task_data %>%
    .[, block_no := as.numeric(as.factor(date))] %>%
    .[, trial := 1:.N, by = block_no]
}

#reset the block nos
task_data$block_no <- as.numeric(as.factor(task_data$block_no))
task_data$task_failure <- gsub(" .*", "", task_data$task_failure)
task_data$task_failure <- factor(task_data$task_failure)

for(sub_block in 1:length(unique(task_data$block_no))){
  data_sub <- task_data[block_no == sub_block]
  for(sub_offer in 1:length(unique(data_sub$offer_value))){
    data_subbed <- data_sub[reward == sub_offer]

    row <- data.frame(block_no = sub_block,
                      offer_value = sub_offer,
                      juice_offered = max(unique(data_subbed$reward_liquid), na.rm = TRUE))
    if(sub_block == 1 & sub_offer == 1){
```

```
      merge_df <- row
    } else {
      merge_df <- rbind(merge_df, row)
    }
  }
}

#get the rolling meap4ns
#replace 10/width with correct_trials here for full rolling mean
task_data <- task_data %>%
  .[is.na(task_failure), correct_trials := 1:.N, by = c("offer_value", "date")] %>%
  .[is.na(task_failure), rolling_mean := rollapply(monkey_final_bid, mean, align = "right", width = correct_trials), by = c("offer_value",
  .[is.na(task_failure), rolling_sd := rollapply(monkey_final_bid, sd, align = "right", width = correct_trials), by = c("offer_value", "da
  .[, rolling_se := rolling_sd / sqrt(correct_trials)]

#get the actual amount of juice/water offered per trial
task_data <- merge(task_data, merge_df, by = c("block_no", "offer_value")) %>%
  #finally select and rearrange useful columns
  .[,c("date", "block_no", "trial", "juice_offered",
      "computer_bid", "monkey_final_bid", "adjust", "start_position",
      "win", "task_failure", "reward_liquid", "budget_liquid",
      "correct_trials", "rolling_mean", "rolling_sd", "rolling_se")] %>%
  setcolorder(., c("date", "block_no", "trial", "juice_offered",
                   "computer_bid", "monkey_final_bid", "adjust", "start_position",
                   "win", "task_failure", "reward_liquid", "budget_liquid",
                   "correct_trials", "rolling_mean", "rolling_sd", "rolling_se"))

#get rid of all the crap in the environment
rm(list = ls()[-c(grep("task_data", ls()),
                  grep("monkey", ls()),
                  grep("today", ls()),
                  grep("look_back", ls()),
                  grep("_trial", ls()))])
```

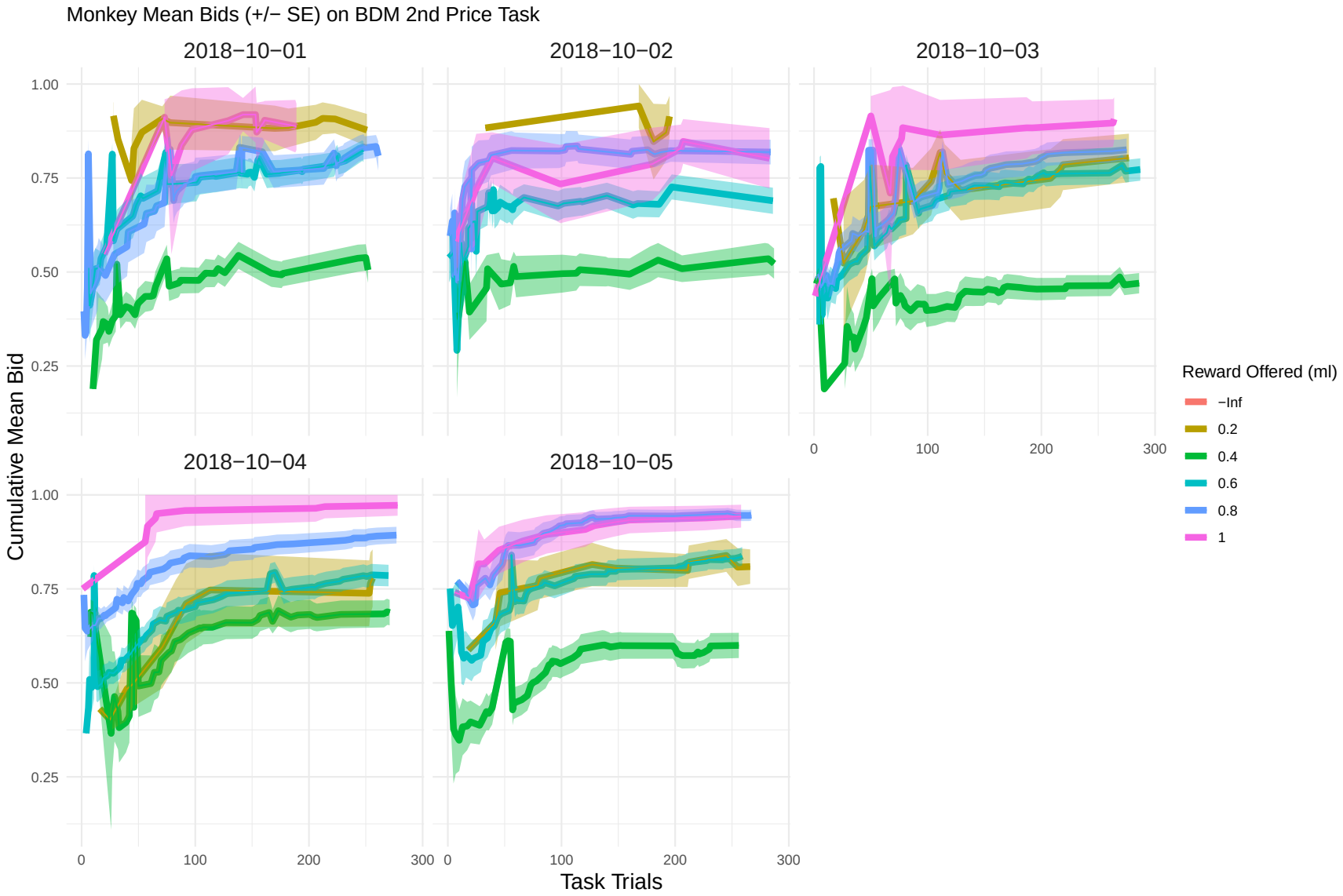
```
p1
```


Monkey Final Bids on BDM 2nd Price Task
2018−10−01
2018−10−02
2018−10−03
2018−10−04
2018−10−05
Final Bid Fraction
1.00
0.75
0.50
0.25
−Inf
0.2
0.4
0.6
0.8
1
Offer Value (/ml)
trial
200
100

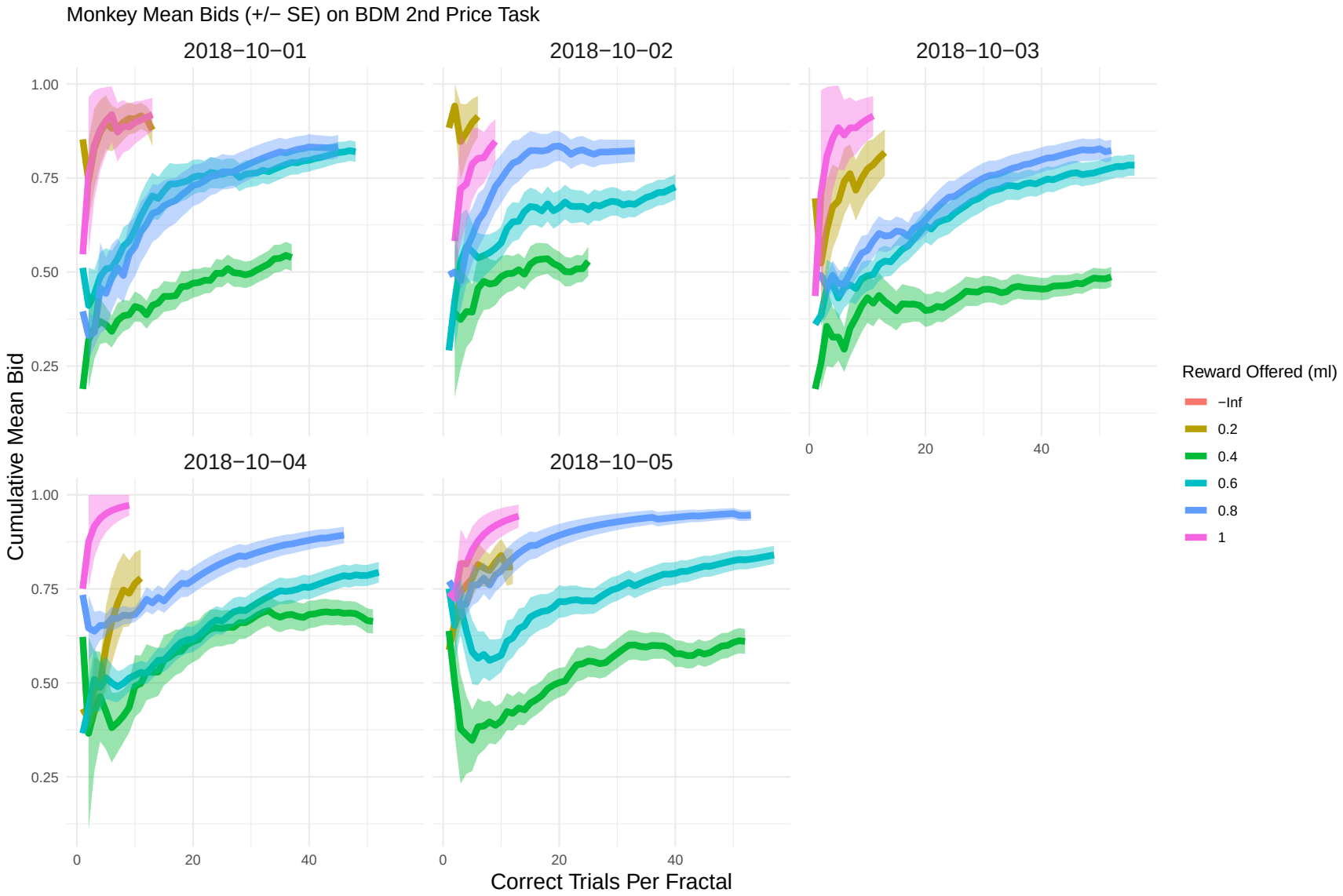
```
p2
```


Monkey Bid Movement on BDM 2nd Price Task
Ulysses : 01−October−2018 − 05−October−2018
2018−10−01
2018−10−02
2018−10−03
2018−10−04
2018−10−05
−Inf
0.2
0.4
0.6
0.8
1
Trial Movement
Trial
Upwards Movement
−1
1
factor(juice_offered)
−Inf
0.2
0.4
0.6
0.8
1

```
p3
```


Monkey Mean Bids (+/− SE) on BDM 2nd Price Task
2018−10−01
2018−10−02
2018−10−03
2018−10−04
2018−10−05
Cumulative Mean Bid
Task Trials
1.00
0.75
0.50
0.25
0
100
200
300
Reward Offered (ml)
−Inf
0.2
0.4
0.6
0.8
1

```
p3.5
```


Monkey Mean Bids (+/− SE) on BDM 2nd Price Task
2018−10−01
2018−10−02
2018−10−03
2018−10−04
2018−10−05
Cumulative Mean Bid
1.00
0.75
0.50
0.25
0
20
40
Correct Trials Per Fractal
Reward Offered (ml)
−Inf
0.2
0.4
0.6
0.8
1

```
p4
```