Modeling Flight Response Summary File

Data Cleaning And Exploration

Read Libraries

```
library(lme4) # fit regressions
library(rethinking) # Bayesian data analysis and plotting
library(popbio) # logistic regression plotting
library(binom) # binomial confidence intervals
#library(dplyr) # data manipulation
#library(ggformula) # ggplot plotting
#library(cowplot) # ggplot helper functions to arrange multi-panel figures
```

Read Source Files

```
source_path = paste0(dir,"/Rsrc/")

script_names = c("center_flight_data.R", # 1 function: center_data()
                 "clean_flight_data.R", # 1 function: clean_flight_data()
                 "unique_flight_data.R", # 1 function: create_delta_data()
                 "compare_models.R", # 1 function: model_comparisonsAIC()
                 "AICprobabilities.R") # 1 function: AICprobs()

for (script in script_names) {
  path = paste0(source_path, script)
  source(path)
}
```

Read the Data

```
data <- read_flight_data("data/all_flight_data-Winter2020.csv")
data_all <- data[[1]]
data_tested <- data[[2]]
d <- create_delta_data(data_tested, tested_more_than_once=FALSE)
```

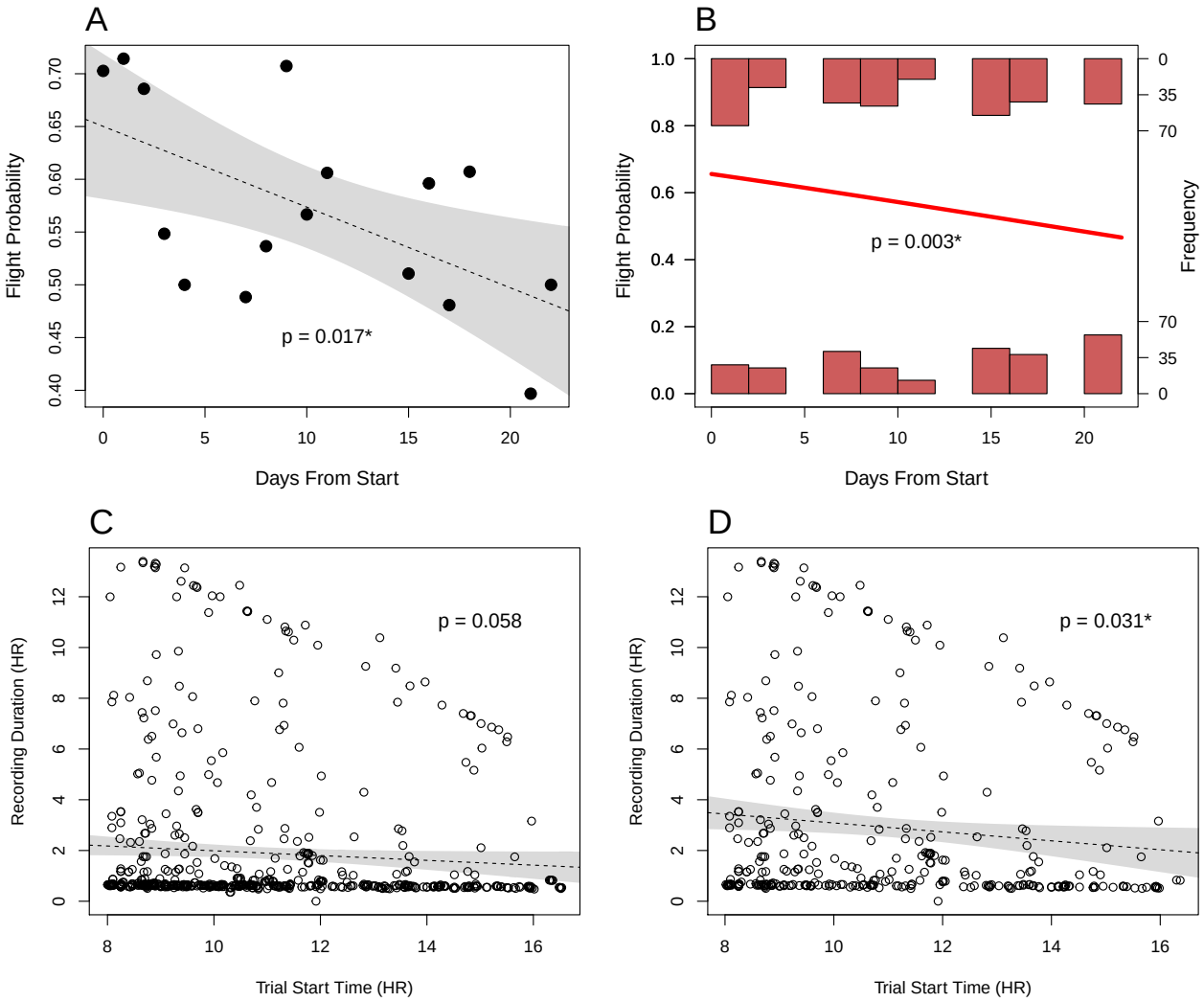
Repeating Plot Parameters & Functions

```
# scale/magnifications

c1 = 1.5 # size of points
c2 = 1.2 # size of text
c3 = 2 # size of title

# compute confidence interval
get_CI = function(x,y,m) {
```

```
  x.seq = seq(min(x) - sd(x), max(x) + sd(x), length.out=100)
  prd <- data.frame(x=x.seq) # newdata
  err <- predict(m, newdata = prd, se.fit = TRUE)
  prd$lci <- err$fit - 1.96 * err$se.fit
  prd$fit <- err$fit
  prd$uci <- err$fit + 1.96 * err$se.fit
  mu_ci <- t(matrix(c(prd$lci,prd$uci), ncol=2))
  return(list(mu_ci, prd))
}

# tailoring variables for plotting
d$mass_block<-round(d$average_mass/0.005)*0.005
d$wing2body_block<-round(d$wing2body, digits=2)
d$days_block<-round(d$avg_days, digits=0)
```

Across-Trial Flight Response

Experimental Effects



There was a negative of day a bug was tested but only when the full dataset is considered (not the unique dataset). There was a negative effect of the trial start time but only after removing bugs that didn't fly.

Single-Variate Effects