Data exploration

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1. Prepare the data

1.1 Load the required packages

```
using Pkg, Weave, CSV, DataFrames, Plots
```

1.2 Import the data

```
data = DataFrame(CSV.File(joinpath(path, "03_final-data",
                                   "03_final-data_2021",
                                   "final-data.csv")))
```

2. Inspect the data

2.1 Distribution of predator behaviour

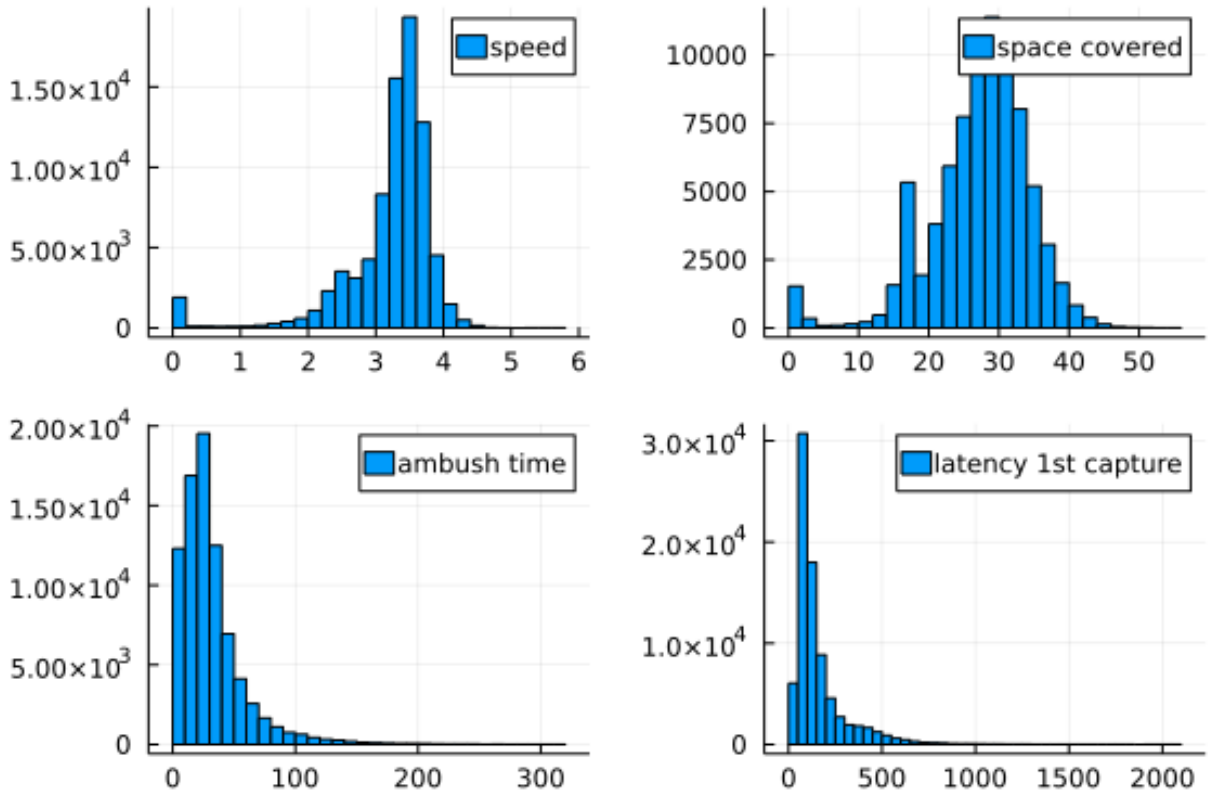
In this section, we will inspect the distribution of the different predator behaviors. We provide the distribution of the raw variables and their transformations.

The transformations include :

- square root
- log

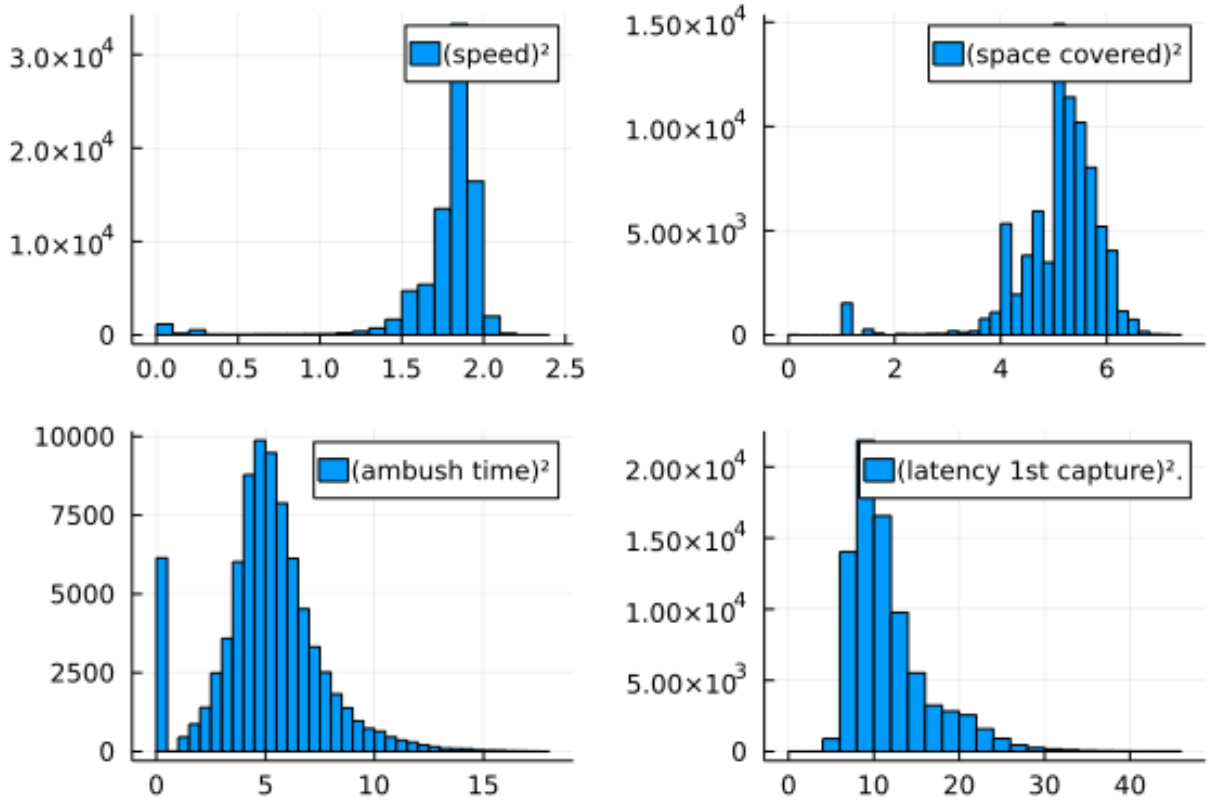
2.1.1 Raw variables

```
# Predator behavior
a = histogram(data.pred_speed,
              bins = 40,
              label = "speed")
b = histogram(data.pred_amount_tiles_visited,
              bins = 40,
              label = "space covered")
c = histogram(data.ambush_time_close,
              bins = 40,
              label = "ambush time")
d = histogram(data.latency_1st_capture,
              bins = 40,
              label = "latency 1st capture")

e = histogram(data.total_chase_duration,
              bins = 40,
              label = "chase duration")

plot(a, b, c, d, layout = 4)
```



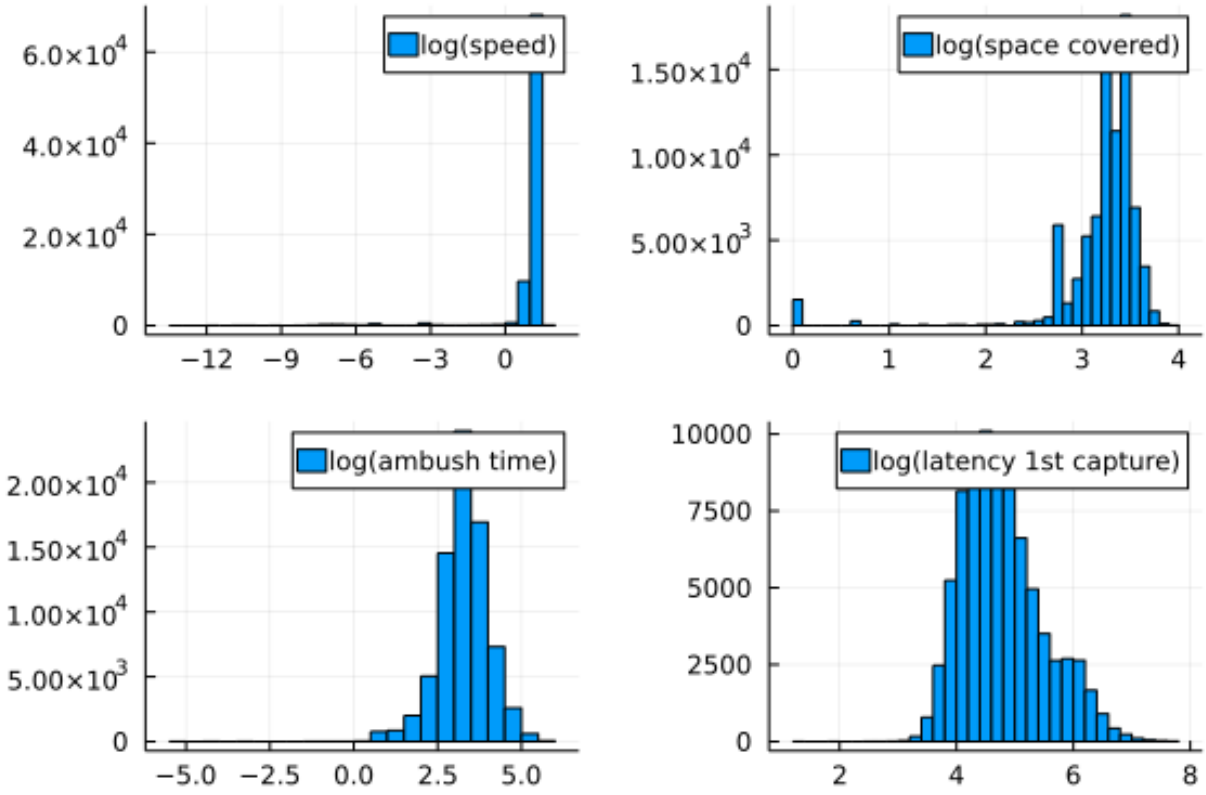
2.1.2 Square root-transformed variables

```
# Square root of predator behavior
a1 = histogram(sqrt.(data.pred_speed),
               bins = 40,
               label = "(speed)²")
b1 = histogram(sqrt.(data.pred_amount_tiles_visited),
               bins = 40,
               label = "(space covered)²")
c1 = histogram(sqrt.(data.ambush_time_close),
               bins = 40,
               label = "(ambush time)²")
d1 = histogram(sqrt.(data.latency_1st_capture),
               bins = 40,
               label = "(latency 1st capture)².")

plot(a1, b1, c1, d1, layout = 4)
```



2.1.3 Log-transformed variables

```
# Log of predator behavior
a2 = histogram(log.(data.pred_speed),
               bins = 40,
               label = "log(speed)")
b2 = histogram(log.(data.pred_amount_tiles_visited),
               bins = 40,
               label = "log(space covered)")
c2 = histogram(log.(data.ambush_time_close),
               bins = 40,
               label = "log(ambush time)")
d2 = histogram(log.(data.latency_1st_capture), bins = 40,
               label = "log(latency 1st capture)")

plot(a2, b2, c2, d2, layout = 4)
```



2.2 Distribution of prey behavior

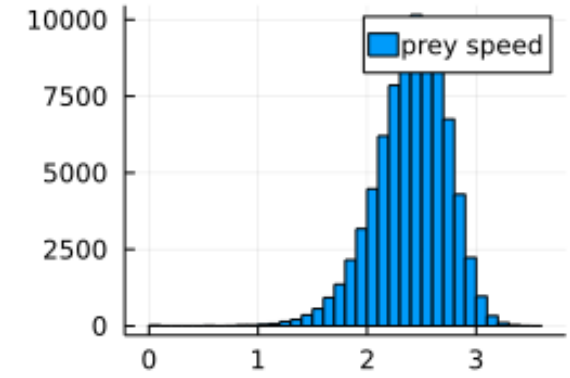
We now inspect the distribution of the prey behaviors. The prey behaviors were calculated using the average values of the 4 prey within a match. We provide the distribution of the raw variables and their transformations.

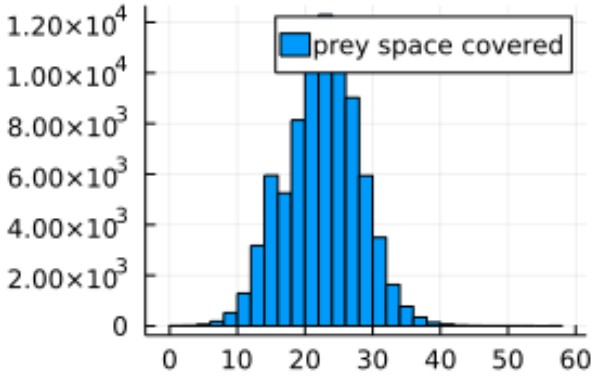
The transformations include :

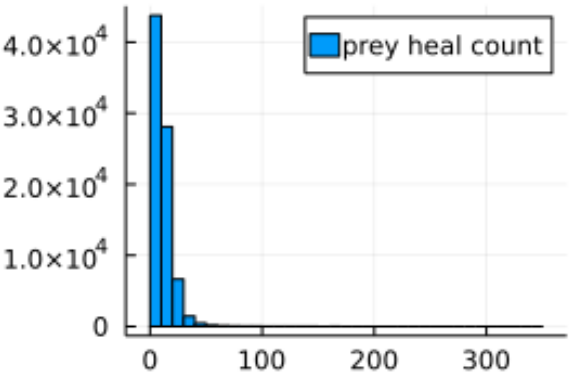
- square root
- log

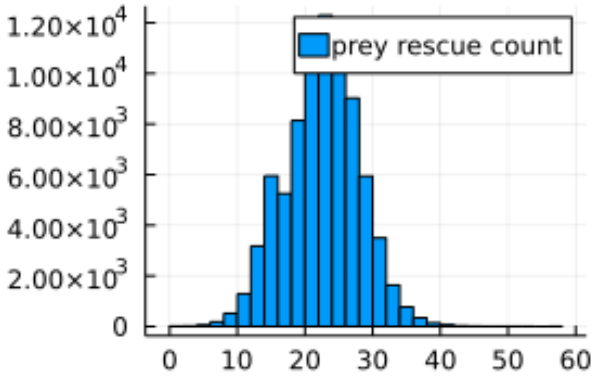
2.2.1 Raw variables

```
# Prey behavior
f = histogram(data.prey_avg_speed,
                bins = 40,
                label = "prey speed")
g = histogram(data.prey_avg_amount_tiles_visited,
                bins = 40,
                label = "prey space covered")

h = histogram(data.prey_total_heal_count,
                bins = 40,
                label = "prey heal count")

i = histogram(data.prey_avg_amount_tiles_visited,
                bins = 40,
                label = "prey rescue count")

plot(f, g, h, i, layout = 4)
```


prey speed
10000
7500
5000
2500
0
0
1
2
3

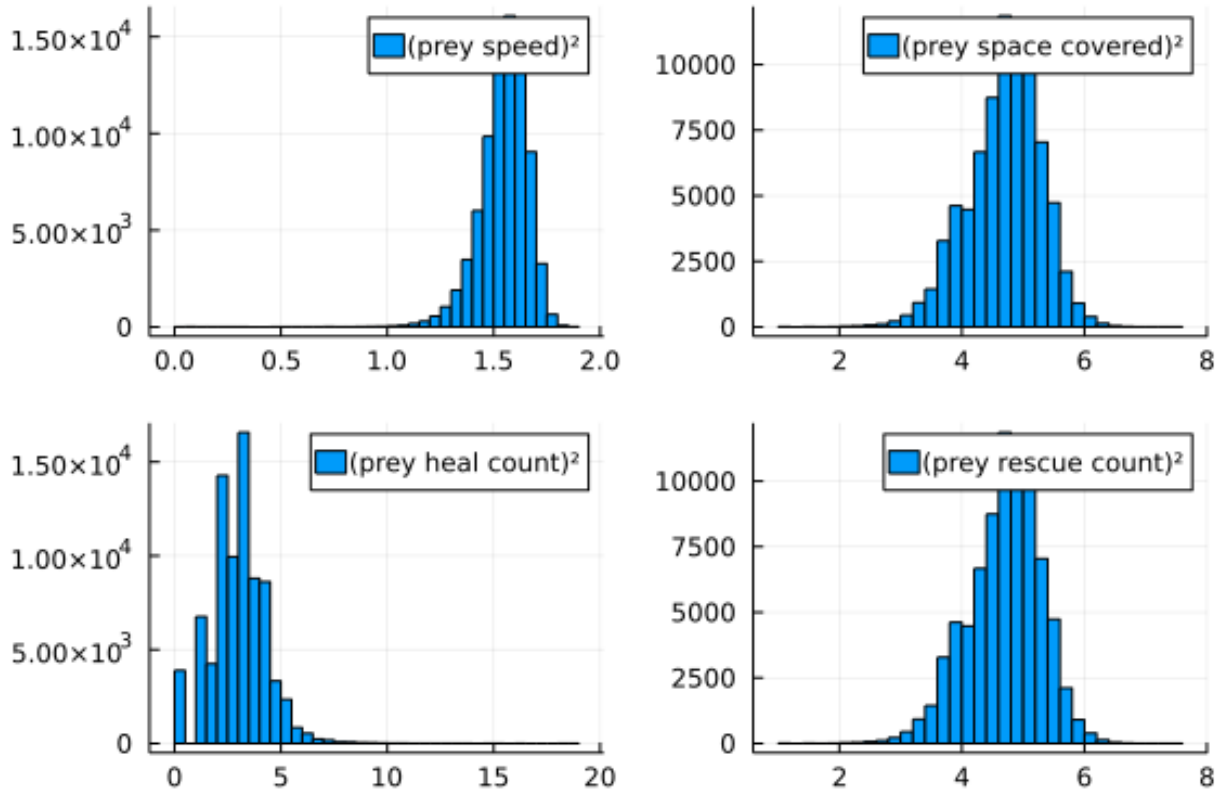

prey space covered
1.20×10^4
1.00×10^4
8.00×10^3
6.00×10^3
4.00×10^3
2.00×10^3
0
0
10
20
30
40
50
60

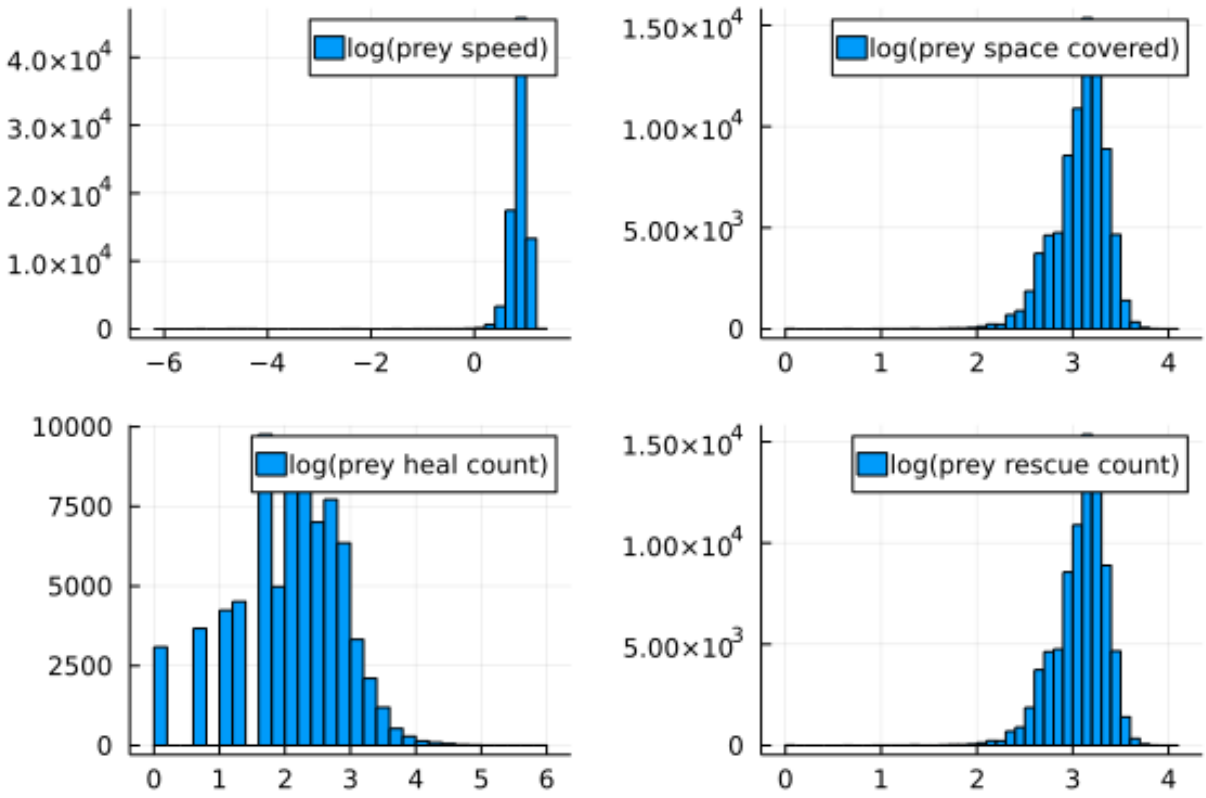

prey heal count
4.0×10^4
3.0×10^4
2.0×10^4
1.0×10^4
0
0
100
200
300


prey rescue count
1.20×10^4
1.00×10^4
8.00×10^3
6.00×10^3
4.00×10^3
2.00×10^3
0
0
10
20
30
40
50
60

2.2.2 Square root-transformed variables

```
# Prey behavior
f1 = histogram(sqrt.(data.prey_avg_speed),
               bins = 40,
               label = "(prey speed)²")
g1 = histogram(sqrt.(data.prey_avg_amount_tiles_visited),
               bins = 40,
               label = "(prey space covered)²")

h1 = histogram(sqrt.(data.prey_total_heal_count),
               bins = 40,
               label = "(prey heal count)²")

i1 = histogram(sqrt.(data.prey_avg_amount_tiles_visited),
               bins = 40,
               label = "(prey rescue count)²")

plot(f1, g1, h1, i1, layout = 4)
```



2.2.3 Log-transformed variables

```
# Prey behavior
f2 = histogram(log.(data.prey_avg_speed),
               bins = 40,
               label = "log(prey speed)")
g2 = histogram(log.(data.prey_avg_amount_tiles_visited),
               bins = 40,
               label = "log(prey space covered)")

h2 = histogram(log.(data.prey_total_heal_count),
               bins = 40,
               label = "log(prey heal count)")

i2 = histogram(log.(data.prey_avg_amount_tiles_visited),
               bins = 40,
               label = "log(prey rescue count)")

plot(f2, g2, h2, i2, layout = 4)
```