

My Final Project Outline

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Abstract

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Introduction

The main purpose of this data analysis was to see if there were any correlation between the animal being exposed to predators (or naive to predators) and the anti-predatorial behavior of those animals. This in turn can help conservationist understand why translocation of some species might be unsuccessful and guide them in devising a better plan to successfully reintroduce endanger species that have been isolated from habitats with predators.

Methods

```
1 #Import necessary modules
2 import pandas as pd
3 import matplotlib.pyplot as plt
4 import re
5
6 #Create a function to use inside of the main data analysis function
7 def fileguard(file):
8     csv = re.compile(r'.*\.csv') #Defines the pattern to search for
9     file = csv.search(file) #Searches for the pattern given the input
10    return bool(file)
11
12 def dataanalysis(filename='', stat='', key=''):
13     filename = str(input('What .csv file would you like to analyze?'))
14     #Asks what csv file you would like to analyze and takes the csv file and reads it
15     #, and asks the user for inputs for what they want to find and for what category.
16     assert fileguard(filename) == True, "This file type cannot be used, please use a
    .csv file type" #Checks if the input for the file is a .csv file, if not it will
    propose an assertion error saying to input a .csv file
    data = pd.read_csv(filename)
```

```

17 stat = str(input('What statistic do you want to find from the data? (i.e. Max,
18 Min, Avg, Std) '))
19 assert stat.upper() == 'MAX' or stat.upper() == 'MIN' or stat.upper() == 'AVG' or
stat.upper() == 'STD', 'Please choose one of the example statistical analysis' #
Checks if the input for the type of statistic is one of the options available, if
not will propose an assertion error
19 key = str(input('What do you want to find the {} of? (i.e Slow approach,
Vigilance, Foraging)'.format(stat)))
20 assert key == 'Foraging' or key == 'Vigilance' or key == 'Slow approach', "Please
choose from one of the catagories shown above" #Checks if the input for the
catagory is one of the columns in the dataset, if not propse an assertion error.
21 #Seperates the data based on treatment type
22 catdata = data.loc[data['TREATMENT'] == 'Cat']
23 controldata = data.loc[data['TREATMENT'] == 'Control']
24 #If statements to check what statistic the user wants to find out
25 #Prints out the the behavior score depending on the statistics and rounds it to 3
sigfig
26 #Plots behavior score for each subject based on their treatment type using
matplotlib
27 if stat.upper() == 'MAX': #Max function
28     print('This is the maximum behavior score for bettongs exposed to cats:',
round(catdata[key].max(), 3))
29     print('This is the maximum behavior score for bettongs not exposed to cats:',
round(controldata[key].max(), 3))
30     plt.scatter(range(len(catdata)),catdata[key], label='Cat Exposed')
31     plt.scatter(range(len(controldata)),controldata[key], label='Control')
32     plt.legend(loc='upper right') #Creates a legend on the top right with two
labels, 'Cat Exposed' and 'Control'
33     plt.ylabel('Behavior Score') #Label the axis of the graph
34     plt.xlabel('Subject #')
35 elif stat.upper() == 'MIN': #Min function
36     print('This is the minimum behavior score for bettongs exposed to cats:',
round(catdata[key].min(), 3))
37     print('This is the minimum behavior score for bettongs not exposed to cats:',
round(controldata[key].min(), 3))
38     plt.scatter(range(len(catdata)),catdata[key], label='Cat Exposed')
39     plt.scatter(range(len(controldata)),controldata[key], label='Control')
40     plt.legend(loc='upper right')
41     plt.ylabel('Behavior Score')
42     plt.xlabel('Subject #')
43 elif stat.upper() == 'AVG': #Average function
44     print('This is the average behavior score for bettongs exposed to cats:',
round(catdata[key].mean(), 3))
45     print('This is the average behavior score for bettongs not exposed to cats:',
round(controldata[key].mean(), 3))
46     plt.scatter(range(len(catdata)),catdata[key], label='Cat Exposed')
47     plt.scatter(range(len(controldata)),controldata[key], label='Control')
48     plt.legend(loc='upper right')
49     plt.ylabel('Behavior Score')
50     plt.xlabel('Subject #')
51 elif stat.upper() == 'STD': #Standard deviation function
52     print('This is the standard deviation for behavior score for bettongs exposed
to cats:', round(catdata[key].std(), 3))
53     print('This is the standard deviation for behavior scores for bettongs not
exposed to cats:',round(controldata[key].std(), 3))
54     plt.scatter(range(len(catdata)),catdata[key], label='Cat Exposed')
55     plt.scatter(range(len(controldata)),controldata[key], label='Control')
56     plt.legend(loc='upper right')
57     plt.ylabel('Behavior Score')
58     plt.xlabel('Subject #')

```

Code for Figure 1 (see Figure 1 on page 4)

```

1 ggplot(Anti_predator, aes(Vigilance, 'Foraging', color = 'TREATMENT')) + #Using Anti_
predator dataset, call for Vigilance as my x-values and Foraging for my y-values,

```

```

    also colors the points based on treatment type
2 geom_point(size = 4, shape = 1 ) + #Changing size and shape of data point
3 scale_color_brewer(palette = "Set1") + #Changing color palette
4 geom_smooth(method = lm) + #Adding linear line of best fit
5 labs(title = "Foraging vs Vigilance\nIn Predator Treated Animals and Non-predator
    Treated Animals",
6       x = 'Behavior Score (Vigilance)', y = 'Behavior Score (Foraging)',
7       color = "Treatment Type") + #Label title, axis, and legend
8 theme_bw() #Change theme

```

Code for Figure 2 (see Figure 2 on page 4)

```

1 ggplot(Anti_predator, aes('TREATMENT', 'Vigilance', fill = TREATMENT)) + #Using Anti_
    predator dataset, call for TREATMENT as my x-value and Vigilance for my y-values,
    also colors box plots based on treatment type
2 geom_boxplot() + #Creates a box plot layer
3 geom_point() + #Creates a scatter plot layer
4 labs(title = "Vigilance Behavior in Predator Treated Animals\nvs Non-Predator
    Treated Animals",
5       x = "Treatment Type", y = 'Behavior Score (Vigilance)') + #Label title, x-axis
    , and y-axis
6 scale_fill_discrete(name = "Treatment Type") + #Label legend title
7 theme_bw() #Change theme

```

Code for Figure 3 (see Figure 3 on page 5)

```

1 ggplot(Anti_predator, aes('TREATMENT', 'Foraging', fill = TREATMENT)) + #Using Anti_
    predator dataset, call for TREATMENT as my x-value and Foraging for my y-values,
    also colors box plots based on treatment type
2 geom_boxplot() + #Creates a box plot layer
3 geom_point() + #Creates a scatter plot layer
4 labs(title = "Foraging Behavior in Predator Treated Animals\nvs Non-Predator
    Treated Animals",
5       x = "Treatment Type", y = 'Behavior Score (Foraging)') + #Label title, x-axis,
    and y-axis
6 scale_fill_discrete(name = "Treatment Type") + #Label legend title
7 theme_bw() #Change theme

```

Results

Figure 1: Shows the Foraging Behavior score vs Vigilance Behavior score for each test subject. Separates based on treatment type, whether the test subject was exposed to predators or not.

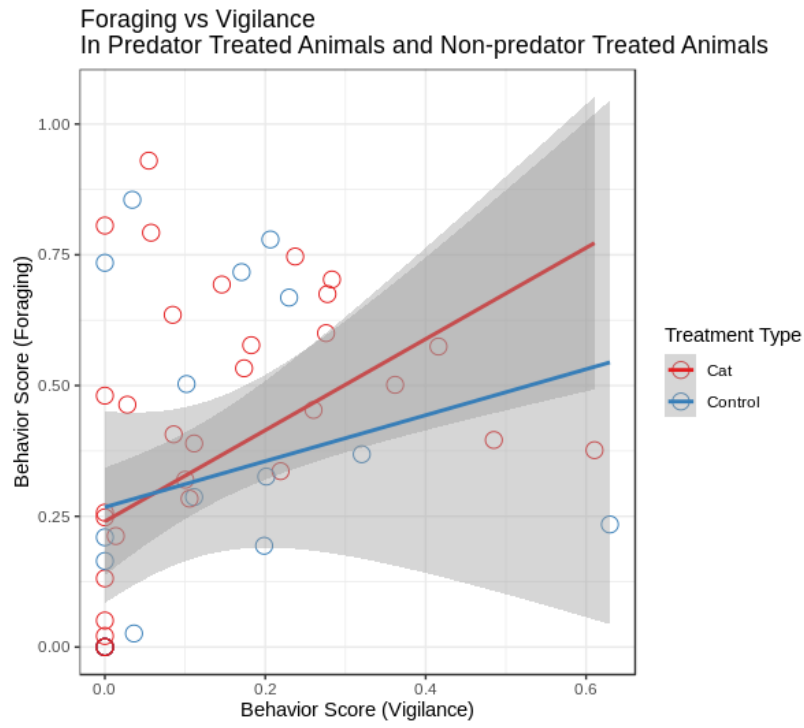


Figure 2: Box plot showing Vigilance Behavior score for each test subject based on treatment type.

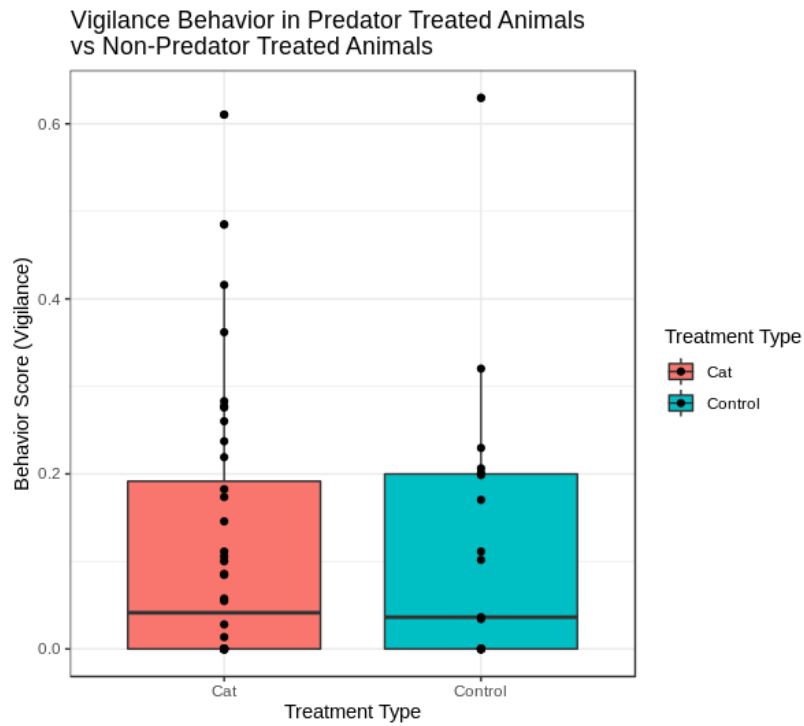
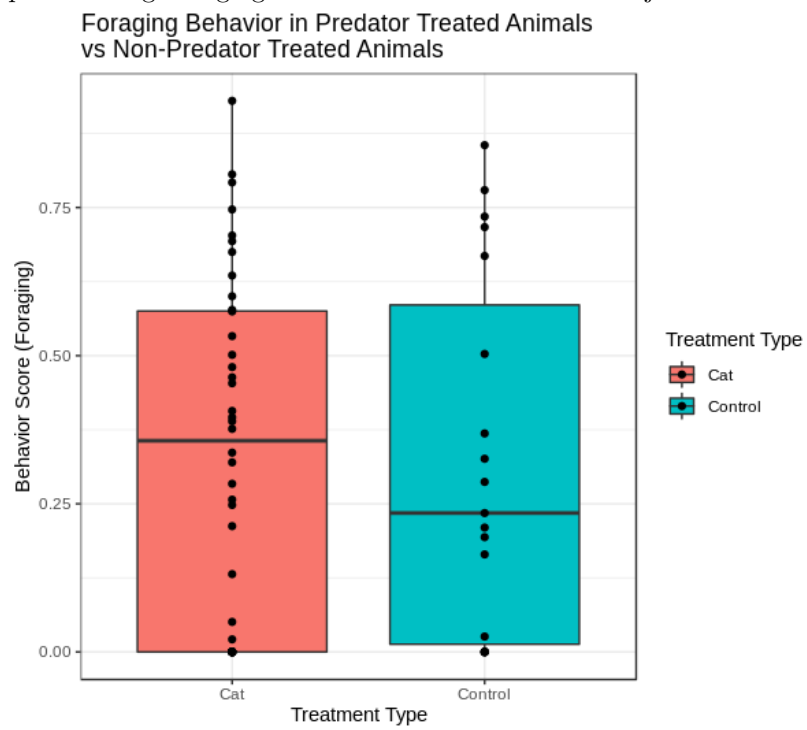


Figure 3: Box plot showing Foraging Behavior score for each test subject based on treatment type.



Discussion

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References Cited

West, Rebecca; Letnic, Mike; Blumstein, Daniel T.; Moseby, Katherine E. (2017), Predator exposure improves anti-predator responses in a threatened mammal, *Journal of Applied Ecology*, Article-journal, <https://doi.org/10.1111/1365-2664.12947>