

Austin Animal Shelter Capstone

July 20, 2018

1 Improving Pit Bull Adoptions

The Austin Animal Shelter (AAS) is the largest No Kill Shelter in the United States. As a government shelter, it is required to take all animals that are found, surrendered, or seized in Travis County, Texas, regardless of age, breed, or health. In order to maintain its No Kill rating, generally defined as euthanizing less than 10% of animals taken in, the AAS needs to partner with other shelters and organizations to take care of the pets when there is no more capacity at AAS. They have been successful in these efforts, but the partner organizations are often stretched thin as well.

Another well-known issue in the pet rescue world is pit bull. For a variety of reasons, shelters in the United States are often plagued with high numbers of pit bulls and pit bull mixes. This problem is made worse by the fact that pit bulls are often difficult to get adopted. Legal restrictions in some cities, home insurance exemptions for pit bull damage, and breed characteristics often eliminate them from consideration for many potential adopters. However, the fact is that a large number of pit bulls would make great pets, and are not considered by potential owners.

##Here's what we're gonna do.....

In examining this issue, we will look at a data set from AAS. It contains the records of all the dogs processed by AAS from October 2013 to February 2018.

1.1 Data Set Analysis

```
In [3]: # import needed modules
        %matplotlib inline
        import pandas as pd
        import numpy as np
        import seaborn as sns
        from matplotlib import pyplot as plt
        from scipy import stats

        #import file
        AAS_dogs_raw = pd.read_csv('AAS_dogs.csv')
        AAS_dogs = AAS_dogs_raw
        AAS_dogs.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 44242 entries, 0 to 44241
Data columns (total 13 columns):
Unnamed: 0          44242 non-null int64
```

```

age_upon_outcome      44237 non-null object
animal_id             44242 non-null object
animal_type           44242 non-null object
breed                 44242 non-null object
color                 44242 non-null object
date_of_birth         44242 non-null object
datetime              44242 non-null object
monthyear             44242 non-null object
name                  37186 non-null object
outcome_subtype       13575 non-null object
outcome_type          44238 non-null object
sex_upon_outcome      44240 non-null object
dtypes: int64(1), object(12)
memory usage: 4.4+ MB

```

We first need to identify the pit bull dogs. Even this name is controversial because the term “pit bull” is often applied loosely to dogs showing characteristics from several breeds. We won’t try to solve that issue here, but will be using the shelter-assigned breed. Any dog that lists pit bull somewhere in its identified breed will be identified as one.

```

In [7]: AAS_dogs['pitbreed'] = AAS_dogs['breed'].str.contains('Pit Bull')
        print('Pit Bulls:', AAS_dogs['animal_id'][AAS_dogs['pitbreed'] == True].count())
        print('Non Pit Bulls:', AAS_dogs['animal_id'][AAS_dogs['pitbreed'] == False].count())
        print('Total Dogs:', AAS_dogs['animal_id'].count())

```

```

Pit Bulls: 7413
Non Pit Bulls: 36829
Total Dogs: 44242

```

As you can see, pit bulls make up about 17% of the dogs that have gone through AAS. I now want to look at a couple statistics about what happens to those dogs. specifically, I want to look at the transfer ratio. This is the number of dogs transferred divided by the number of dogs adopted.

I’m using transfers because those are dogs that leave the shelter to one of AAS’s partner organizations. Ideally, AAS would be able to get these dogs adopted themselves, eliminating the need for the time, stress, and expense of moving the dog.

```

In [9]: ### Adoption and Transfer rates
        pit_adopts = AAS_dogs['outcome_type'][(AAS_dogs['pitbreed'] == True) & (AAS_dogs['outcome_type'] != 'Transferred')]
        pit_trans = AAS_dogs['outcome_type'][(AAS_dogs['pitbreed'] == True) & (AAS_dogs['outcome_type'] == 'Transferred')]
        print('Pit Adoptions:', pit_adopts)
        print('Pit Transfers:', pit_trans)

        nonpit_adopts = AAS_dogs['outcome_type'][(AAS_dogs['pitbreed'] == False) & (AAS_dogs['outcome_type'] != 'Transferred')]
        nonpit_trans = AAS_dogs['outcome_type'][(AAS_dogs['pitbreed'] == False) & (AAS_dogs['outcome_type'] == 'Transferred')]
        print('Non Pit Adoptions:', nonpit_adopts)
        print('Non Pit Transfers:', nonpit_trans)

```

```
Pit Adoptions: 2727
Pit Transfers: 1490
Non Pit Adoptions: 17325
Non Pit Transfers: 8028
```

1.1.1 Transfer Ratio

```
In [13]: pit_ratio = pit_trans / pit_adopts
        nonpit_ratio = nonpit_trans / nonpit_adopts
        print('Pit Bull Ratio:', pit_ratio)
        print('Non Pit Bull Ratio:', nonpit_ratio)
```

```
Pit Bull Ratio: 0.5463879721305464
Non Pit Bull Ratio: 0.4633766233766234
```

As we can see, the Pit Bull transfer ratio is over 8 percent higher for pit bulls. If we could get that dropped, that would be over 100 dogs that would have gone to a new home rather than being sent to an overloaded partner.

```
In [14]: # few other useful statistics
```

```
#total counts
```

```
nonpitcount = AAS_dogs['pitbreed'][AAS_dogs['pitbreed'] == False].count()
pitcount = AAS_dogs['pitbreed'][AAS_dogs['pitbreed']].count()
total_count = AAS_dogs['pitbreed'].count()
print("non pit count:", nonpitcount)
print("pit count:", pitcount)
print("total", total_count)
```

```
#total adoption rate
```

```
pit_adopt_rate = pit_adopts / pitcount
nonpit_adopt_rate = nonpit_adopts / nonpitcount
print('Pit Adoption Rate:', pit_adopt_rate)
print('Non pit Adoption Rate:', nonpit_adopt_rate)
```

```
non pit count: 36829
pit count: 7413
total 44242
Pit Adoption Rate: 0.367867260218535
Non pit Adoption Rate: 0.4704173341660105
```

As we can see, the adoption rates as a total of intaken dogs is much lower, but this number is complicated by the fact that there are more outcomes than simply adoption and transfer, which is why I am only using the transfer ratio.

pit bull returns, other statuses

1.2 Research Proposal

I propose that we create a campaign to inform potential pet adopters about the benefits of owning a pitbull. Many potential owners reject this option immediately, so we will make sure they know what they are passing up. Because many eventual owners visit several times, it can be difficult to pin down exactly what helped them make the decision.

Hypothesis: Showing potential dog adopters an informative flyer will lower the pit bull transfer ratio.

Null Hypothesis: Showing the potential adopters a flyer will not lower the pit bull transfer ratio.

The rollout plan: We will perform sequential A/B testing to visitors to the shelter. The control group will be the first month when no flyer was offered. The next month, when a visitor looks at dogs, they will be offered a copy of the "Why you should consider adopting a pitbull" flyer.

Testing the solution: After the test month, we will recalculate the transfer ratios for the pit bull and non pit bull groups. It is likely that one month won't be enough to see a large swing, but it should be enough to note a difference if there is one. Then we will continue the test for six more months, 3 control months, three test.

Success metric: We will consider this a success if the pit bull transfer ratio decreases 5%.

Secondary metrics: We will also be looking at adoption rates for pit bulls and for pitbulls vs. other animals to see if there is any cannibalization from increasing one breed's adoptions.

In []: