PROBLEM:
The client, a cat adoption agency, has received numerous complaints from potential adopters regarding the lack of a filter for wool-sucking tendencies in their available cats. Due to the popularity of the famous wool-sucking ClickClock influencer, BuddyTheCat, there is now a high demand for cats with this adorable behavior. However, the kennel managers expressed concerns about the resource-intensive nature of assessing this trait individually for each cat during the intake evaluation process. Therefore, we need a solution to identify suckers and non-suckers without significantly increasing the time spent per cat by more than 1-2 minutes.

APPROACH:
To address this issue, we utilized existing public data to develop a machine-learning classifier that can predict which cats are likely to display wool-sucking behavior. Our focus was on leveraging information already collected during the intake evaluation, such as aggression towards people, other cats, and whether the cat is indoors or outdoors.

The dataset we obtained consisted of 5696 cats, rated on a scale of 0-7 for the frequency of wool-sucking behavior. To overcome class imbalance (see Figures 1, 2), we binarized the target feature. We then experimented with different Logistic Regression models for classification.
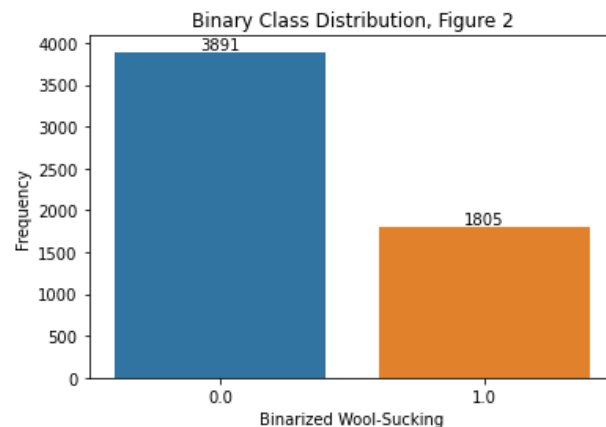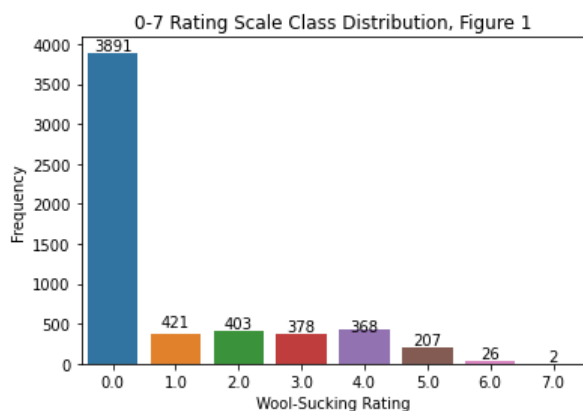

FINDINGS AND FURTHER RESEARCH:
We observed a significant improvement of 92% in our ability to identify suckers using a class-balanced logistic regression model with our test set. Several features emerged as highly predictive, including breed, excessive grooming behavior, neutering status, and self- or vet-identified behavior problems.

Five of the ten most common breed groups (A) for "extreme suckers" (those that suck on a weekly or daily basis) also appeared in the top positive breed predictors (B) for wool-sucking which can be seen in Figure 3. Some of these breed groups, such as Saint Birman and Oriental breeds, align with previous research highlighting their association with wool-sucking behavior.

Breed Group Intersection, Figure 3
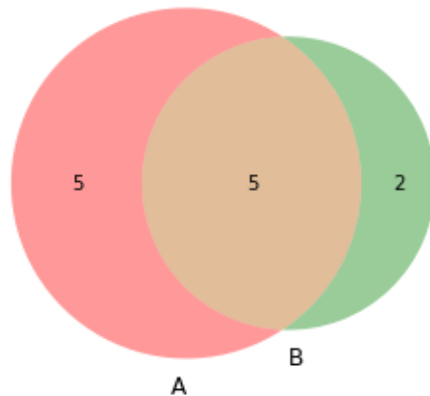
Importantly, we found that a significantly higher proportion of extreme suckers engage in excessive grooming compared to non-suckers (as shown in Figure 4). This finding suggests a potential correlation between excessive grooming and wool-sucking behavior. This is congruent with the idea that both behaviors are self-soothing and might frequently co-occur.

Excessive Grooming: Non-Suckers vs. Extreme Suckers, Figure 4
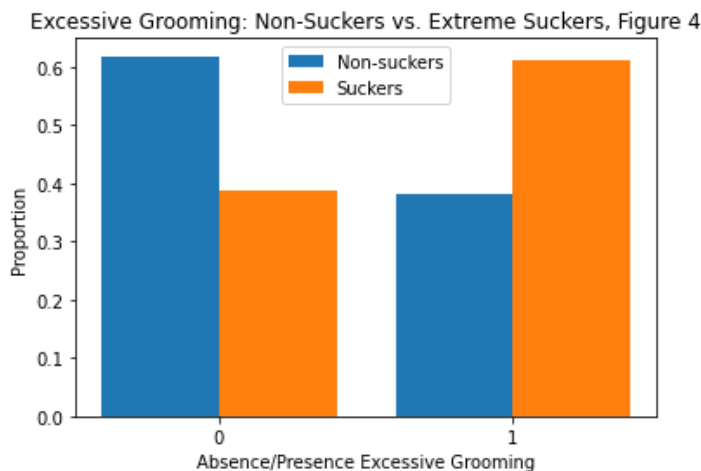
Based on our findings, we recommend that the client ensure they have staff members capable of accurately identifying breed groups during the intake process. Additionally, we suggest that kennel technicians monitor and record hairball incidents, as excessive grooming is known to be associated with hairball problems. These recommendations should not significantly increase evaluation time, with the latter adding no more than a minute to a technician's routine monitoring schedule.

To further enhance our understanding of wool-sucking behavior, we propose continuing research on this dataset to capture the variability in suckers, including mild (monthly/yearly) suckers and extreme (weekly/daily) suckers. We also believe that exploring ensemble models could potentially yield better results for this unique dataset.