# Special Teams and the Success of Scoring a Goal

By: Rishika Cherivirala, Lauren Mok, Ying Lin Zhao

# Introduction

- Whenever a penalty occurs in ice hockey, the player that takes the penalty serves in the penalty box while their team plays shorthanded. Both of these teams play their special teams, a power play or a penalty killer.

- A **power play team** has the advantage and typically plays their strongest offensive players in an attempt to maximize their scoring chances which are increased due to a greater number of players.

- **Goal:** To develop a multilinear regression model to analyze the impact of special teams and whether the number of power plays for one team increases their success in scoring a goal

# General Methodology

**Covariates of Analysis:** Player is on power play team or not, Shot type, presence of traffic, one-timer attempts, Euclidean distance to the goal, shot angle

1. Created simple Ordinary Least Squares (OLS) regression models for each of the covariates against whether or not the goal was successful.
2. Using the p-values and visualizations of each simple OLS model, we eliminated those models with a p-value of less than 0.05


Credit: Cornell Big Red 2/17/2024

# Methodology - Determining Power Play


Credit: Cornell Chronicle
Rebecca Johnston '12 in 2008

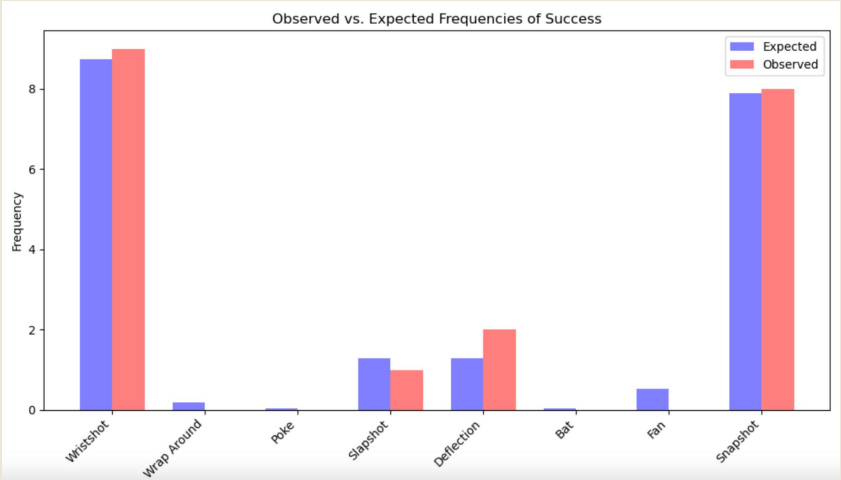
Using the number of skaters on each team at the time when a goal attempt is made, we determined the team in power play.

Creating a new binary "Power Play" column, we indicated whether or not the player associated with the goal attempt is in a power play team.

# Summary + Results

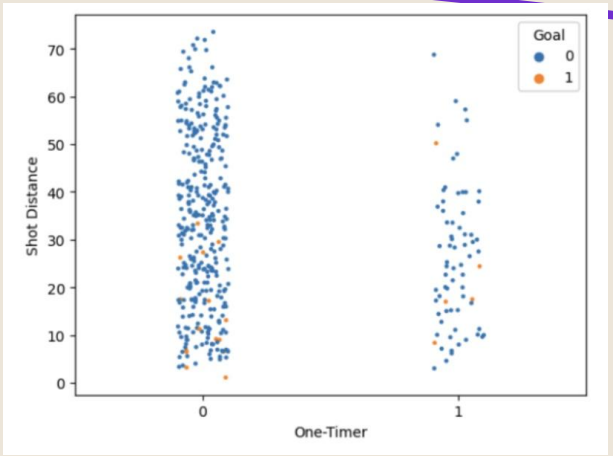
# Shot Type Model

- P-values for all shot types significantly higher than 0.05
- Snapshot and wrist shot types lead to more goals, but accounted for more than 80% of shot types
- Lack of statistical significance doesn't necessarily mean that these shot types have no impact on goal outcomes
- High p-values potentially due to data limitations



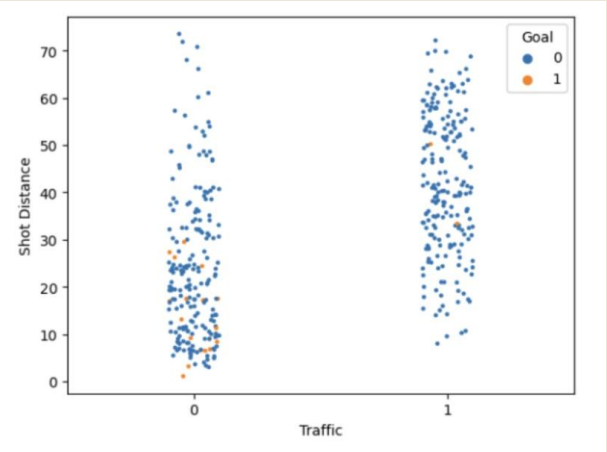
# One-Timer and Traffic Model

- Given the presence of traffic, the model predicts ~0.78% increase in the odds of a goal being made
- Insignificance of the presence of traffic likely due to the fact that players are trained to handle traffic
- Given that the shot is a one-timer, the model predicts ~18.39% increase in the odds of a goal being made
- Weak correlation between traffic and one-timers



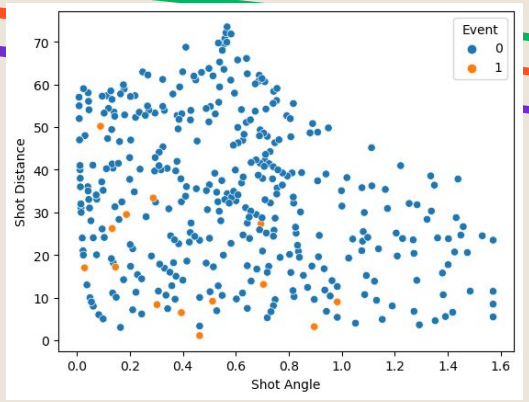

One-Timer

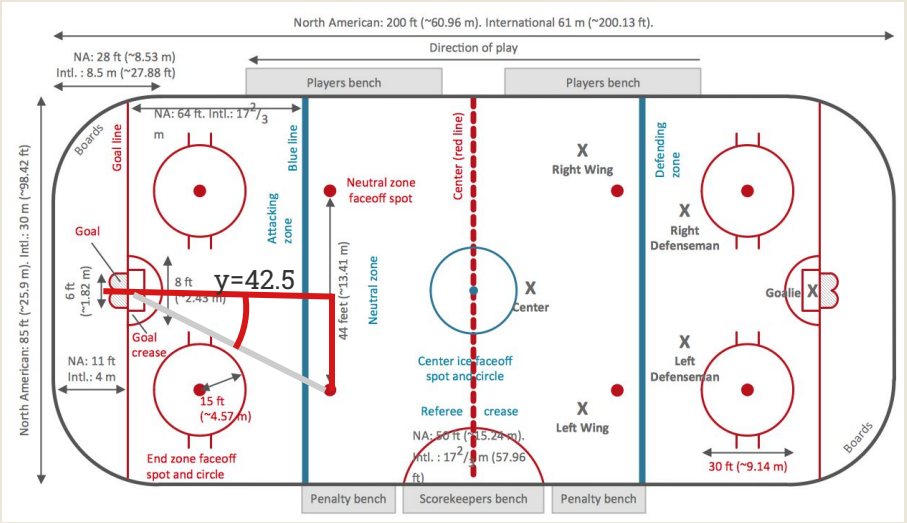
Traffic



# Distance & Angle Model

- Shot distance p-value: 0.006
  - As euclidean distance between player and goal increases by 1 unit, the probability of scoring a goal increases by approximately 33.45%.
- Shot angle p-value: 0.094
- Goals– marked by the orange dots– are clustered at around lower values of shot distance and angle.

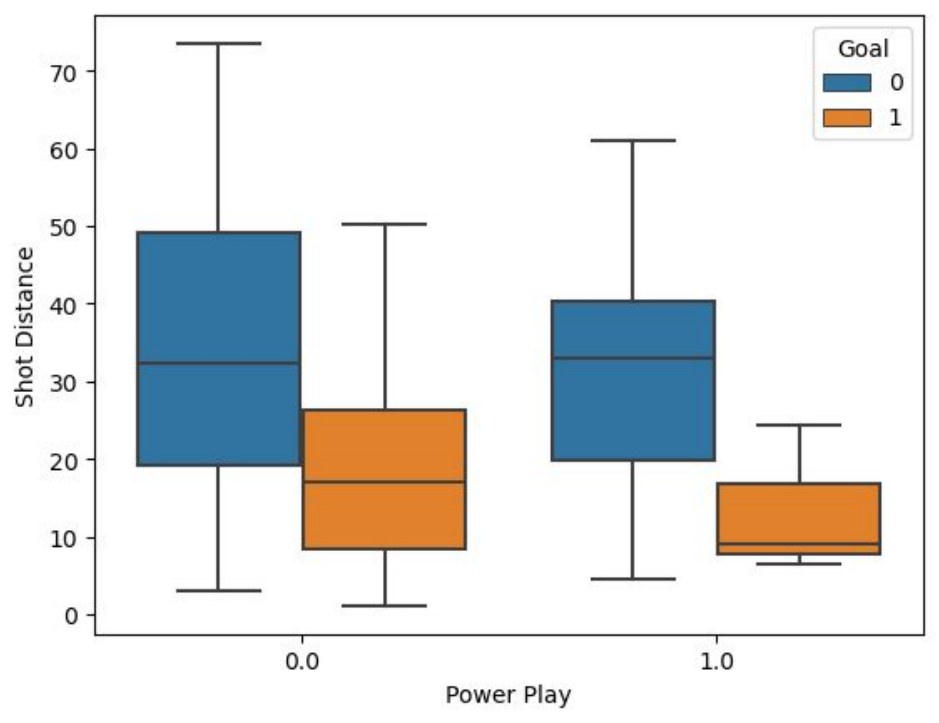



Credit: Concept Draw

# Power Play Model

- Power play p-value: 0.388
  - Being in a power play situation may not significantly affect the likelihood of scoring a goal
- The AIC analysis reveals that shot distance consistently emerges as a statistically significant predictor across various models.
- The success rate of power plays is approximately 23.81% and it takes approximately 4.2 power plays to score one goal



# Conclusion

- Based on our results, we saw that other variables except power plays play more of a role in increasing goal success.
  - Shot distance, the distance from the player to the center of the goal, plays a significant role in determining the success of a goal.
  - Players without possession of the puck should look to spread out closer to the goal to assist their team in getting closer to the goal, which increases the chance of shot success.
- Players of a power play team players should take numerical advantage of their current situation and move further apart from each other to better advance their distance to the goal.

**Limitations:** Only 20 entries of the 400+ entries are successful goals, so this can impact the coefficients and p-values of our models.