**Description of Analysis**

To consider the effects of an elite goal scoring presence, we considered the results of every playoff team in the NHL since 1987. We used multiple regression to isolate the effects of elite scoring given our other predictors. In particular, the response variable (Y) in our analysis was denoted to be the number of wins achieved in any playoff year by a given team. The three previously described predictors, SRS, PDO, and elite scoring presence, were additional attributes used to differentiate teams. The following model was used to address our research question:

where represents the SRS, represents the PDO, and is an indicator variable which outputs zero if the team has no elite scorers, and one otherwise.

**Plan to Analyze**

The programming language R was used to run the multiple regression models and determine the estimates of . We also extracted the confidence intervals for these estimates, which provide more pertinent information than a point estimate alone. If the interval contains zero, then may we not conclude that an elite scoring presence has a significant effect of playoff success. Otherwise, the data may point toward one of two directions: either the confidence interval contains only positive values, meaning that we should be 95% confident that an elite scoring presence positively affects playoff success, or the confidence interval contains only negative values, meaning that we should be 95% confident that an elite scoring presence negatively affects playoff success.

Additionally, we will note if either of the other two predictors fail to be significant in explaining playoff success. We will also ensure that the conditions of normality, homoskedasticity, linearity, and independence are satisfied. We use will a residual plot and a normal probability plot to assess these conditions. Any outliers, high leverage points, and influential points will also be scrutinized, not only because they will provide interesting information about the teams that produced significant residuals, but also because they may significantly affect the model.

**Results**

**Overview**

In this study, we were interested in the analyzing the effects of high-scoring NHL players on the playoff success of their respective teams. In the following sections, we will present some information about the NHL teams we studied, our plan for analysis of these teams, and the results of our study. We restricted our analysis to the seasons after 1986, since this is when the present-day playoff format was implemented. In addition to an elite scoring presence, we considered the luck of these teams, measured as PDO, and their weighted average margin of victory, measured as SRS. If these other predictors prove to be significant while elite scoring presence fails to be, we may be able to draw conclusions about the star players that some NHL teams are built around.

**Description of Population**

The subjects of this study were the 528 NHL teams who made the playoffs between 1987 and 2020 inclusive. We collected regular season data corresponding to each of these teams, in addition to our response variable, the number of playoff wins. Each year exactly 16 teams made the playoffs. Since we measured data over 34 seasons, we have included 34 teams that won the Stanley Cup. These teams are accordingly labeled with 16 playoff wins. At the other extreme end, we coincidentally feature 34 teams that were swept in the first round, recording zero wins during their postseason run. The median number of wins was 3.5, indicating that the typical team lost in the first round. This is absolutely the case, as exactly half of the teams studied failed to the advance past their first opponent. When it comes to our predictor of interest, elite scorers, only 65 teams had at least one such player rostered, or only about 1 in 8.

Figure 1 yields the distribution of these elite scorers over time. We can see that an elite scoring presence was more common on playoff teams in the 1990s than present day. Save for a significant drop-off in the early 2000s and a subsequent rebound, elite scoring appears to be an increasingly rare feature among playoff teams as time goes on. It is noteworthy that in only six years of our study, the postseason tournament featured zero teams with an elite scoring presence. However, Figure 1 shows that there was rarely much more than a couple of teams who exhibit this trait in any given year.

**Figure 1.**

*Playoff Teams with Elite Scoring Presence over Time*

Chart, bar chart

Description automatically generated

*Note.* This graph counts the number of playoff teams that feature an elite scoring presence, defined to be one or more players with 50 or more adjusted goals during the corresponding regular season, in each year of our study.

Figures 2 and 3 present information about the relationship between the continuous predictors used in the study, SRS and PDO, and the response. Of particular importance is that both relationships appear to be at least slightly positive, with SRS being the more strongly correlated predictor. Supplementally, Table 1 in the Appendix features additional information about the predictors and the response.

**Figure 2.**

*Association between PDO and Playoff Wins*

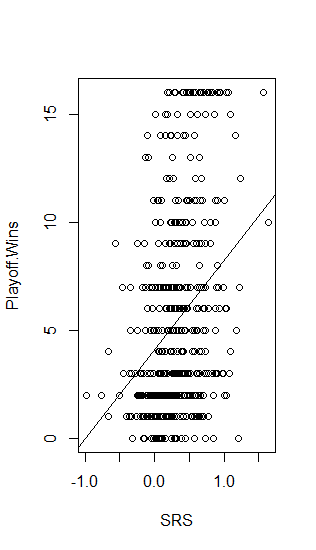
**Diagram

Description automatically generated**

*Note.* Each data point represents an individual team. The line of best fit illustrates the significant positive linear relationship between PDO, a luck measure, and Playoff Wins.

**Figure 3.**

*Association between SRS and Playoff Wins*



*Note.* Each data points represents a team. The line of best fit illustrates the significant positive linear relationship between SRS, an adjusted margin of victory, and Playoff Wins.

**Appendix**

**Table 1.**

*Summary of Select Attributes*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | Five Number Summary | | | | |
| Measure | Mean | SD | Minimum | First Quartile | Median | Third Quartile | Maximum |
| SRS | 0.31 | 0.35 | -0.99 | 0.08 | 0.29 | 0.52 | 1.64 |
| PDO | 100.70 | 1.18 | 96.80 | 99.90 | 100.60 | 101.50 | 103.80 |
| Elite Scoring | 0.12 | 0.33 | — | — | — | — | — |
| Playoff Wins | 5.39 | 4.61 | 0.00 | 2.00 | 3.50 | 7.25 | 16.00 |

*Note.* Five Number Summary values were not provided for the Elite Scoring predictor, which, due its binary nature, would not present particularly informative data in this case. SRS represents weighted margin of victory, which not only considers average margin of victory but also opponent strength. PDO measures luck, where 100 is average, less than 100 signals bad luck, and greater than 100 signals good luck.