

# NHL Analysis

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# About the NHL and our project

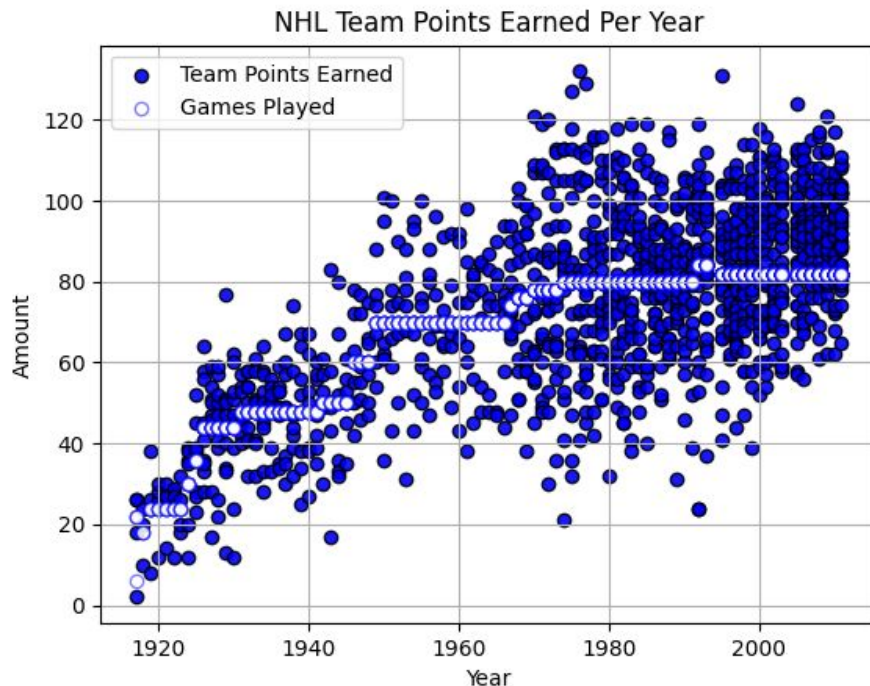
- Hockey is one of the most popular sports in North America. The National Hockey League (NHL) was founded in 1917 and has experienced significant growth and transformation over the years.
- As a professional league develops, teams improve every facet of their organizations, from arenas and fan engagement to coaching, player acquisition and development.
- There is also an improvement over time in the players themselves. Professional athletes in general have become bigger, faster, stronger and more specialized as compared to their predecessors.
- We were interested in visualizing NHL data to document the league's progression over the last 100 years.

# About the dataset

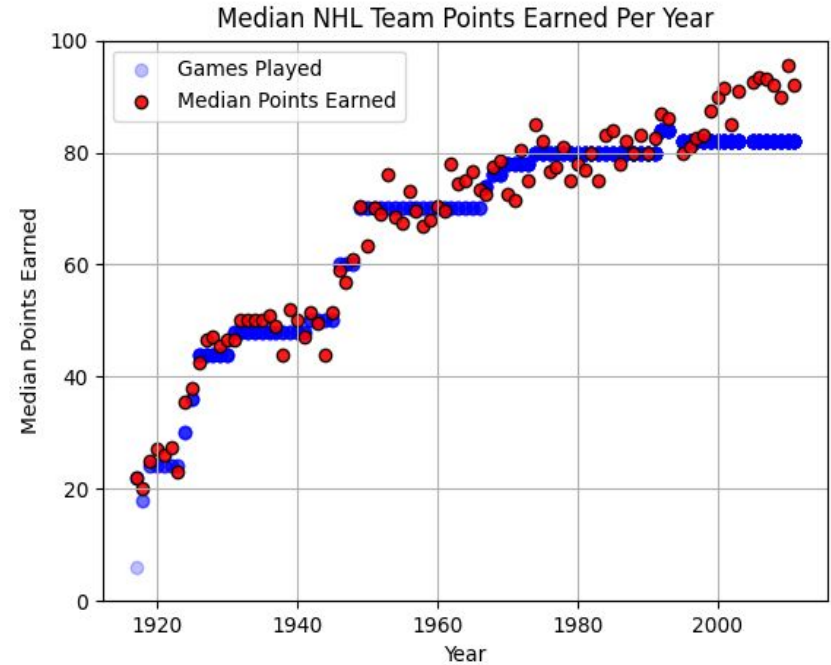
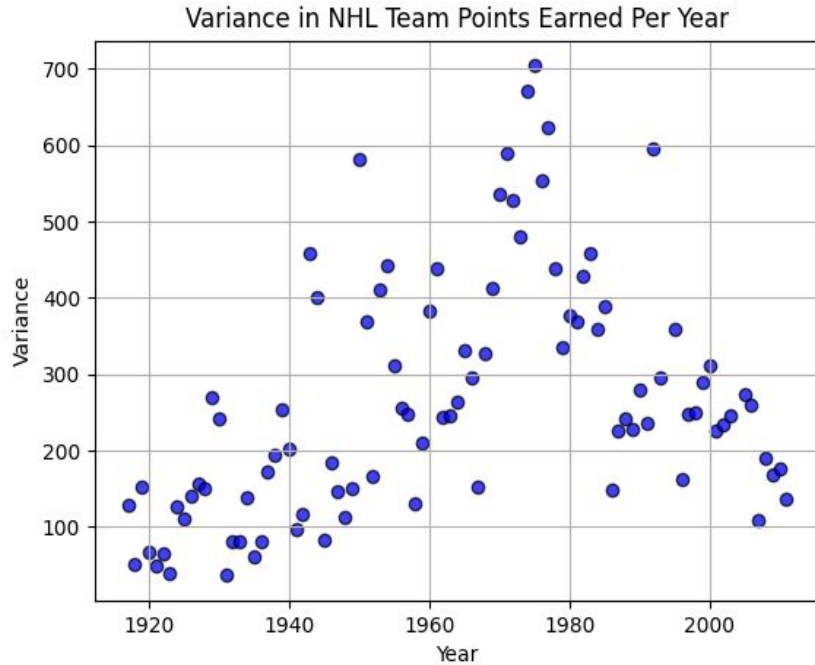
- We utilized a set of files that track a variety of NHL statistics from 1917 to present. Datasets include:
  - Team performance
  - Player scoring
  - NHL Draft results
  - League end-of-season awards
  - NHL attendance data
- How have these metrics fluctuated over time and what does that say about the evolution of the league? How can these changes be explained?

# Team Performance

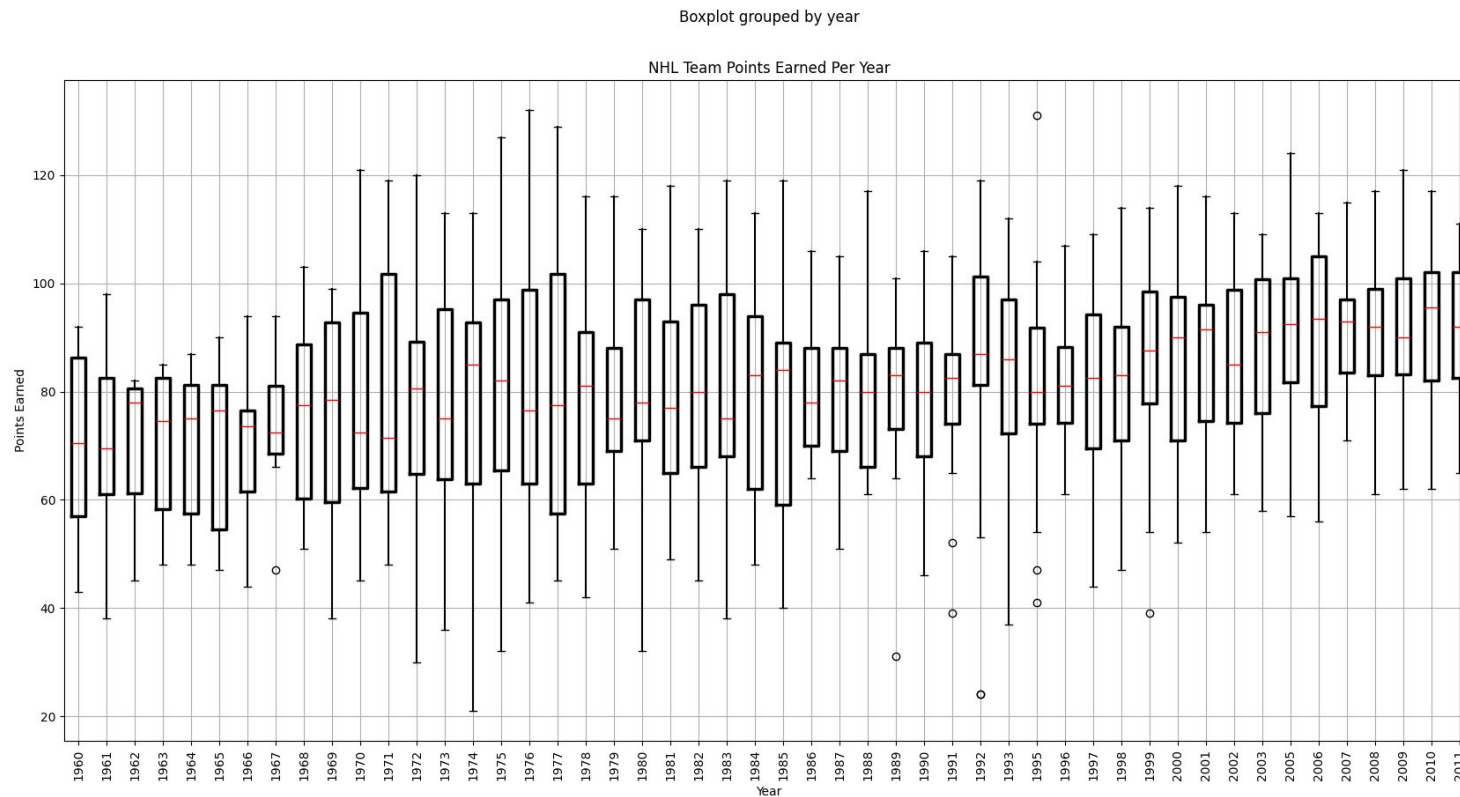
- Has team performance changed over time?
- Teams earn 2 points for a win, 0 points for a regulation loss and 1 point for an overtime loss.
- The distribution of team results is clearly condensed from the 1970's to 2011, which perhaps shows that the league's competitive balance improved.
- This is also evident when looking at the results by variance, median and quartile.



# Team Performance



# Team Performance by Quartile

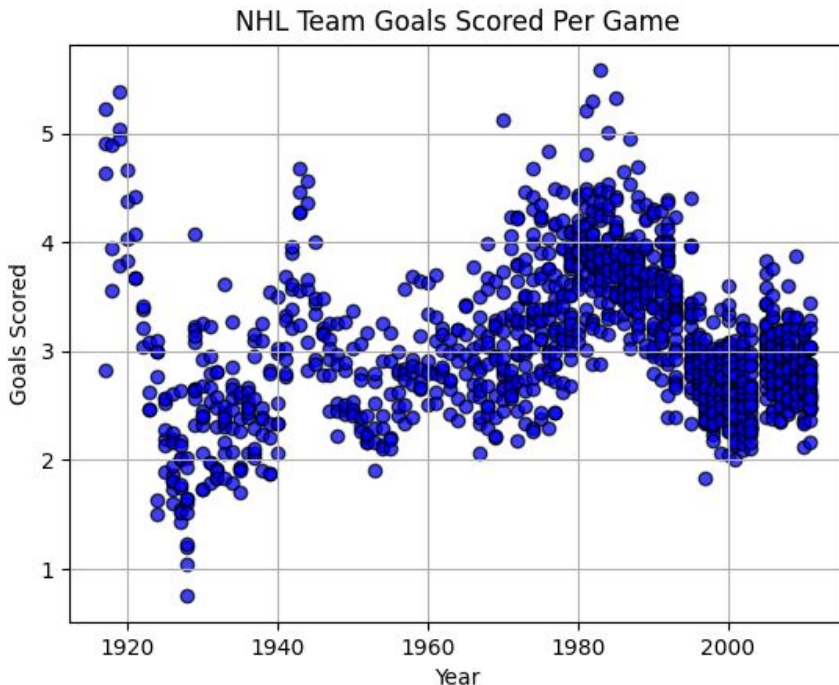


# Team Performance - Takeaways

- Over time, we found a decrease in team point variance and an increase in median points earned per year. We also noticed a decrease in size on the boxplot between the first and third quartile, specifically from the 1970's to 2011.
- These results point to a more competitive and balanced league as a whole. This can be explained by a variety of factors, including:
  - Salary cap restrictions
  - Draft structure (worst team from previous year earns the first pick)
  - Increase in player quality and development
- A balanced league provides greater entertainment value, as more teams deeper into the season have realistic chances of qualifying for the playoffs.

# Team Scoring

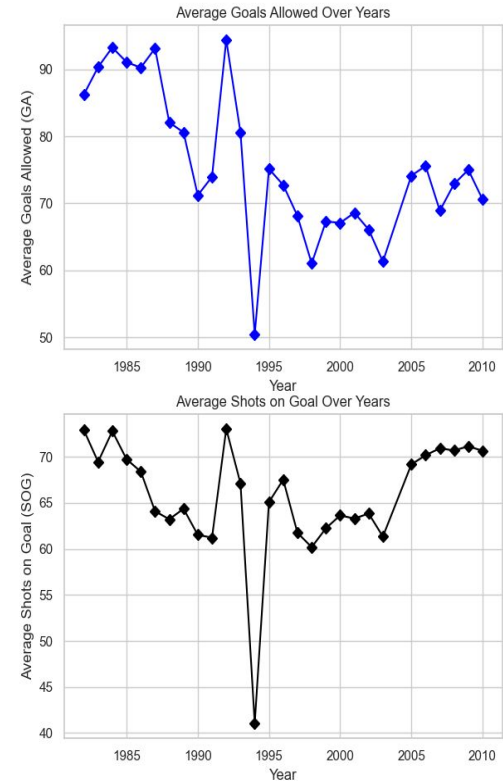
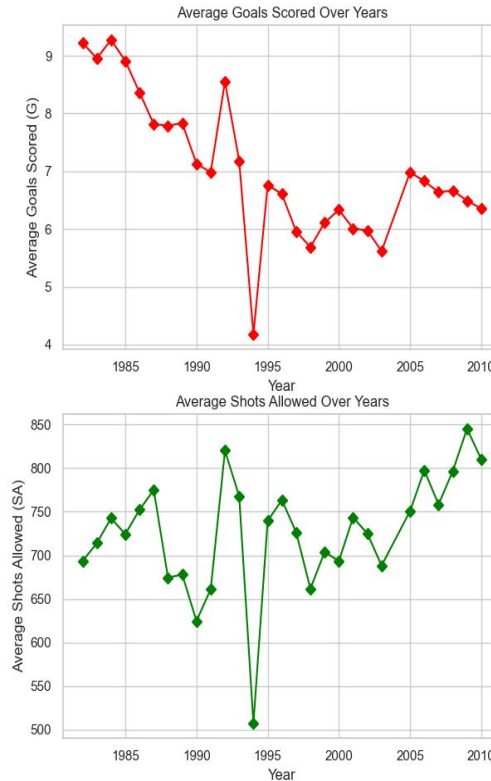
- Has goal scoring evolved over time?
- A steady increase in goals scored per game is observed from the 1950's to the 1980's.
- The subsequent decrease in goals scored per game can be attributed to a variety of factors:
  - Defense emphasis (in coaching, player development, tactics, etc.) to counteract NHL offenses.
  - The 1985 offsides rule change (which prevented players from staying in the offensive zone)





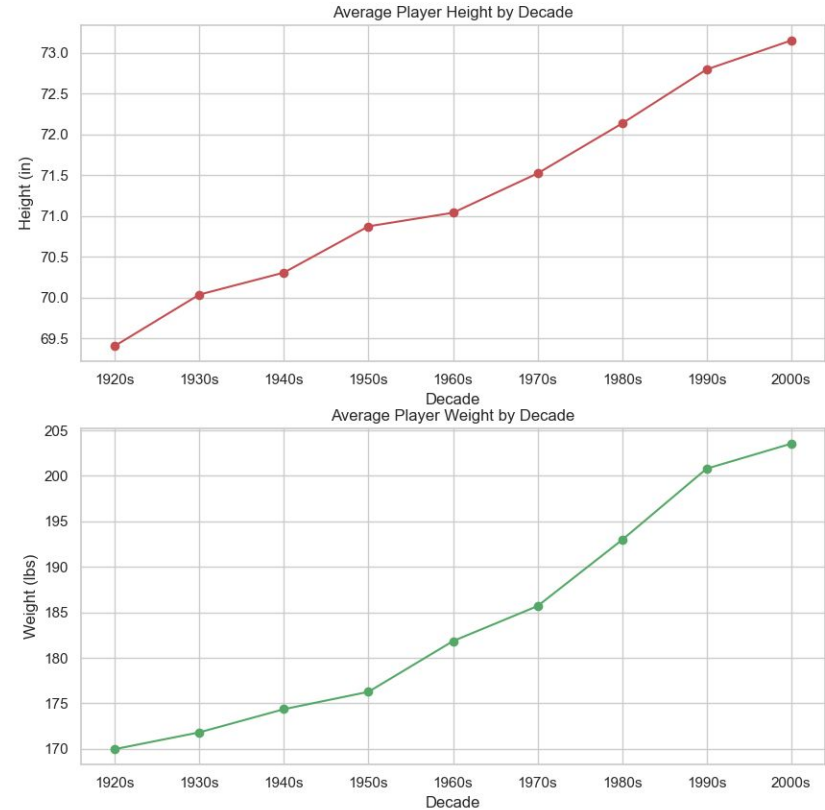
# Player Average Statistics

- **Shots Allowed and Goals Allowed:** In the early years (1982-1990), both the average shots allowed and goals allowed per game were relatively higher. Over time, there is a trend of declining number of shots and goals allowed.
- **Goals:** The average number of goals scored per game fluctuates across the years but generally follows a pattern of decrease in the later years.
- **Shots on Goal:** The average shots on goal per game also shows some variation, but there isn't a clear trend across the years.
- **Notable Events:** The years 1994 and 2012 stand out due to lockouts, resulting in fewer games played, which influenced the lower averages in all four categories for those years.



# Player Measurables

There has been a consistent rise in measurable attributes such as height and weight, providing additional evidence of the league's emphasis on acquiring larger, stronger, and faster players.



# NHL Popularity

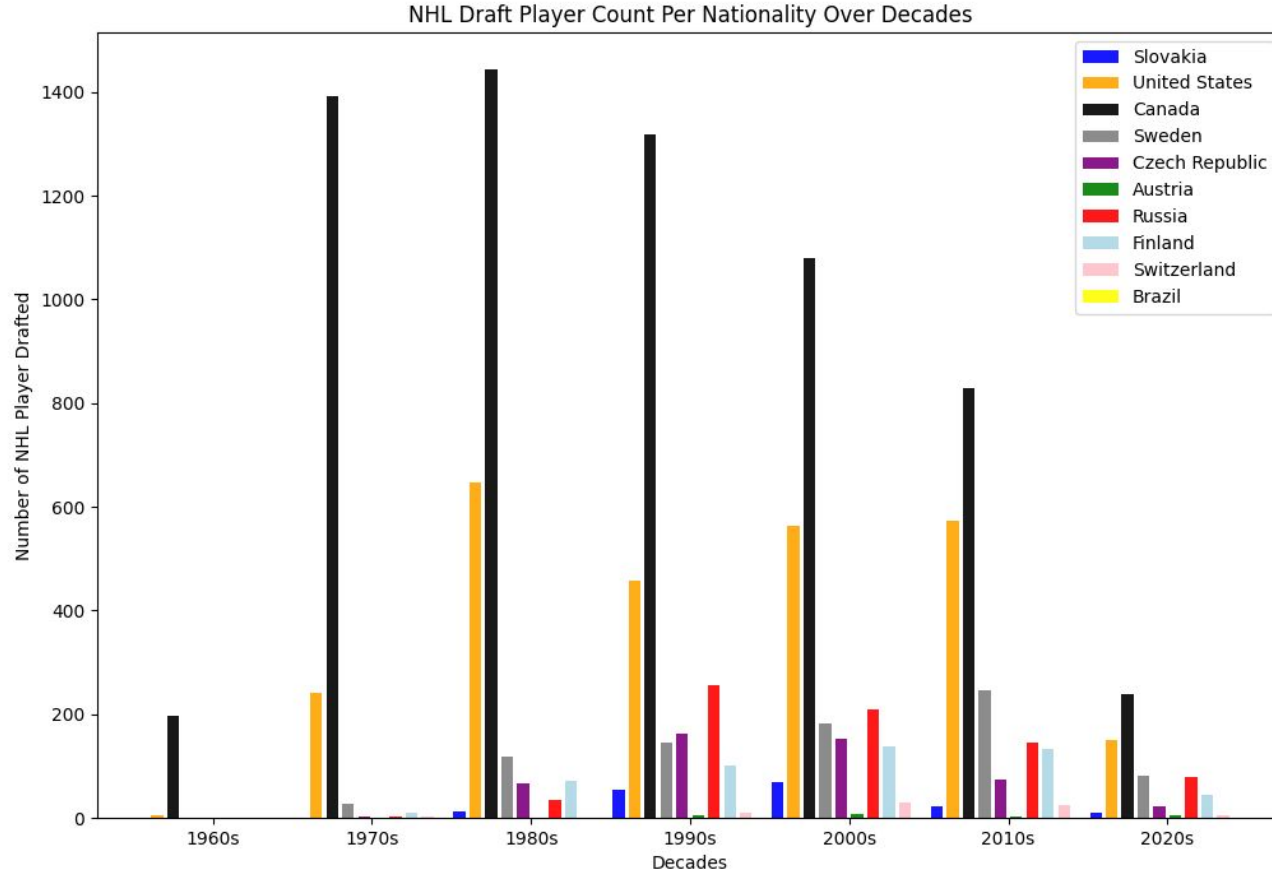


# NHL Attendance



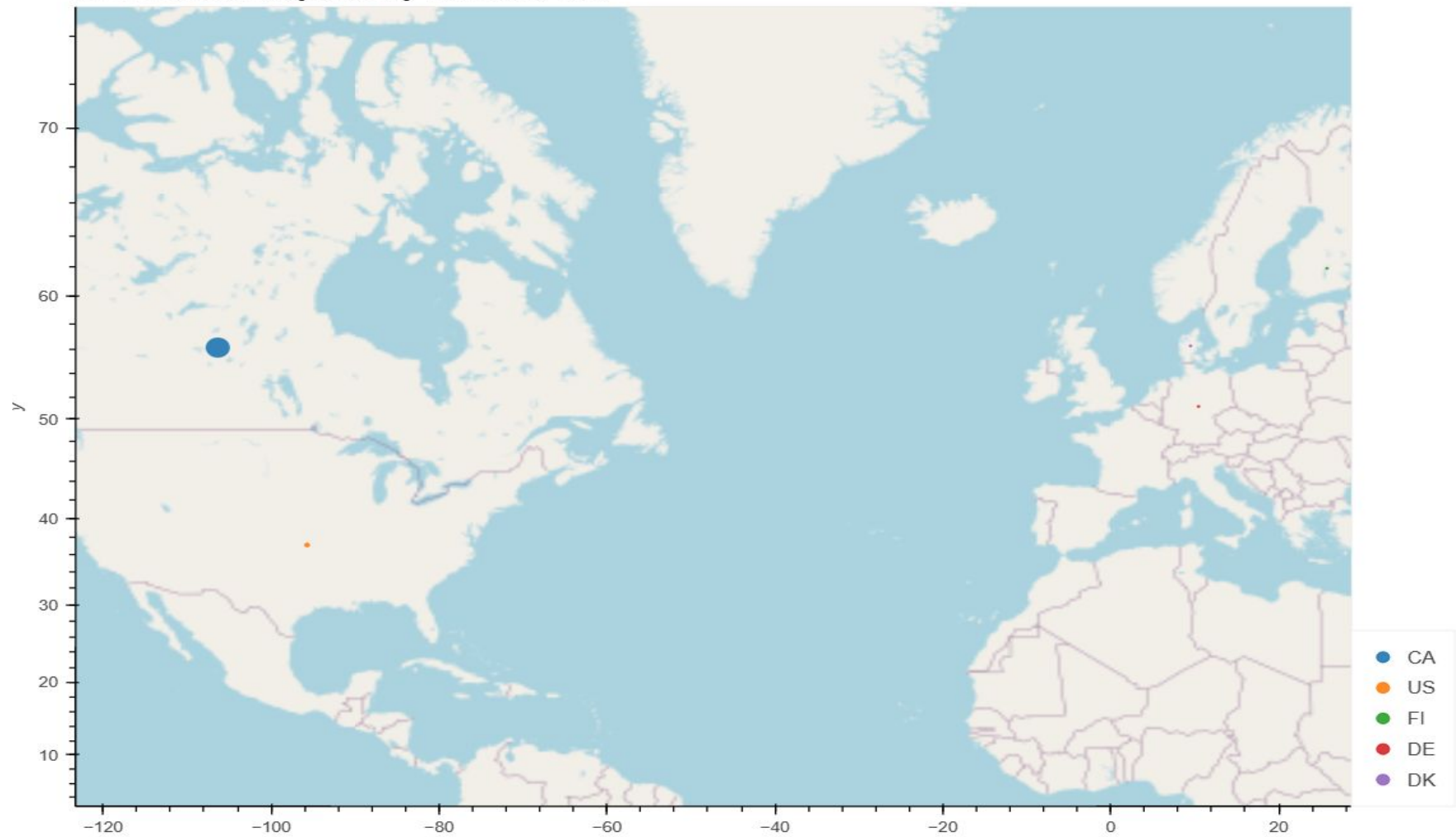
NHL fan attendance has consistently risen since the inception of the league. The only exceptions were in 1994 and 2012, during league lockouts when fewer games were played; excluding these instances, the league has generally experienced an upswing in fan attendance.

# NHL Draft Player Count Per Nationality by Decades

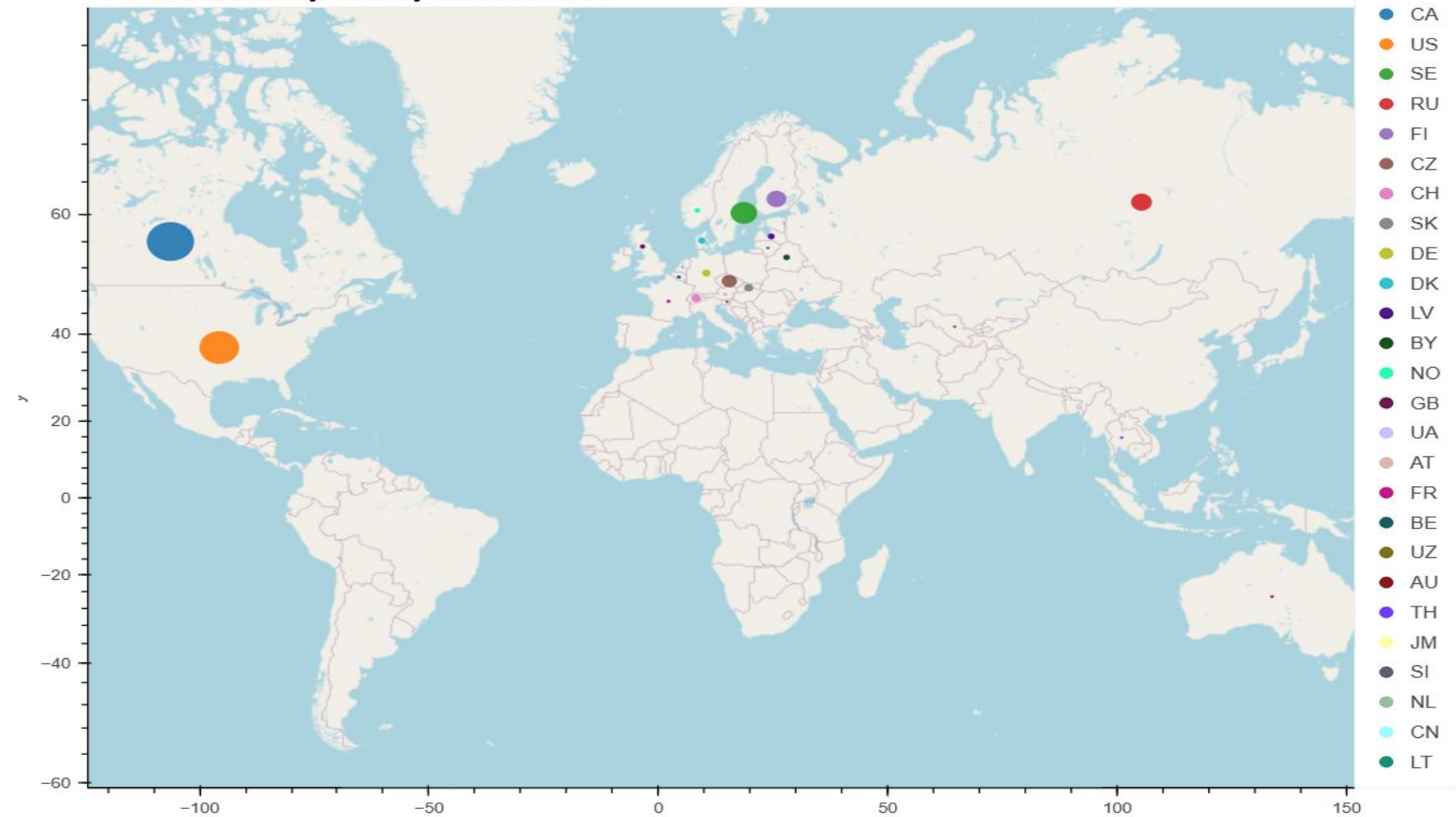


Since the 1960s, there's been a notable surge in diversity among NHL players. Back then, most drafted players were Canadians or Americans, but now, players come from over 10 different countries, with a significant increase in those with European nationalities.

NHL Draft Count by Country from 1960-1970



# NHL Draft Count by Country from 2010-2020





# Awards

- Presently, the NHL has 18 annual individual and awards
- The most recent award was inaugurated in 2010
- The first individual award was the Hart Trophy for most valuable player, first awarded in 1924
- First and Second All-Star Teams have been named since the 1930-31 NHL season
- Some of these individual awards are automatically awarded to players based on their statistics during the regular season.
- Total NHL awards to date is 2,086



Clarence S. Campbell Bowl:



Jack Adams Award:



Hart Memorial Trophy:



Bill Masterton Memorial Trophy:



Lester B. Pearson Award:



Prince of Wales Trophy:



Calder Memorial Trophy:



William M. Jennings Trophy:



James Norris Memorial Trophy:



Maurice Richard Trophy:



Presidents' Trophy:



King Clancy Memorial Trophy:



Lady Byng Memorial Trophy:



Lester Patrick Trophy:



Art Ross Trophy:



Frank J. Selke Trophy:



Conn Smythe Trophy:

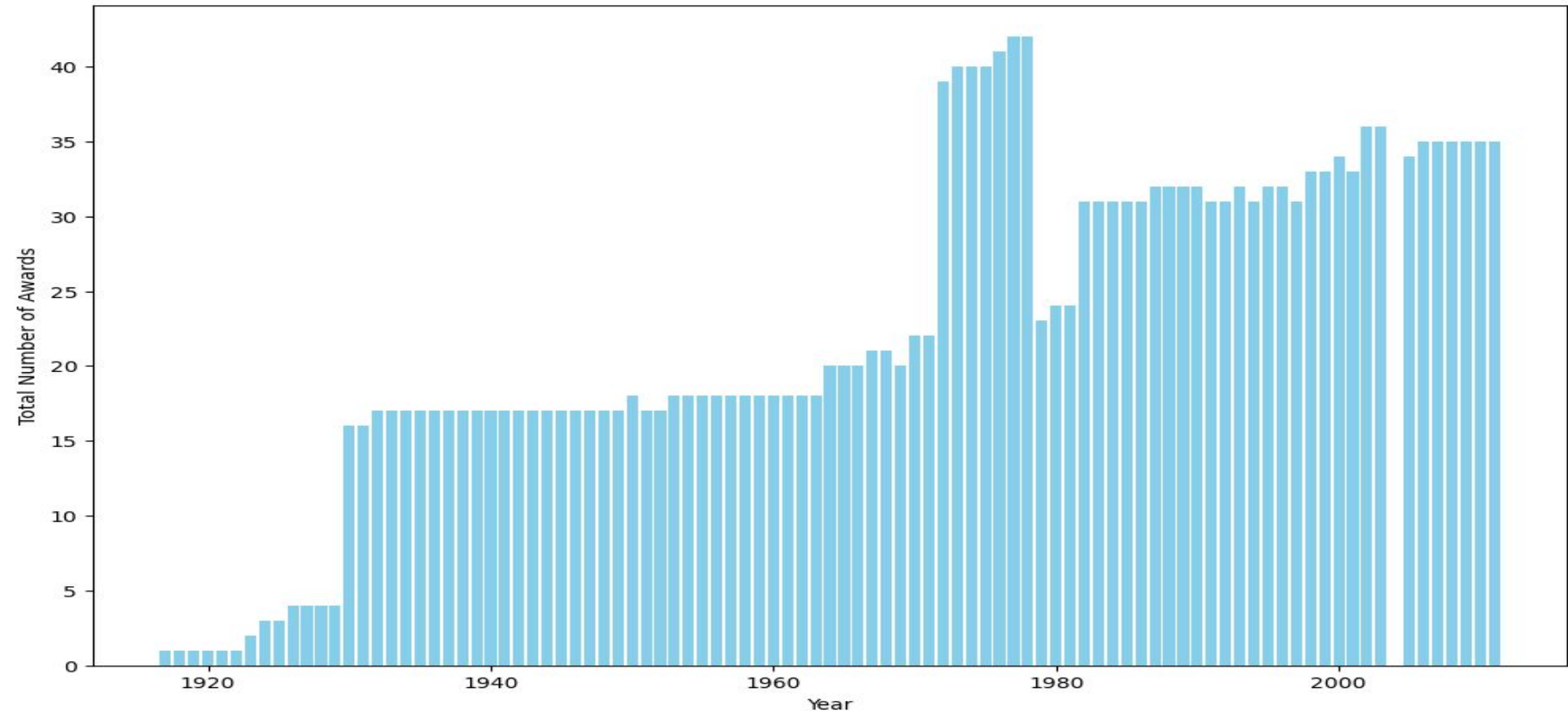


Vezina Trophy:

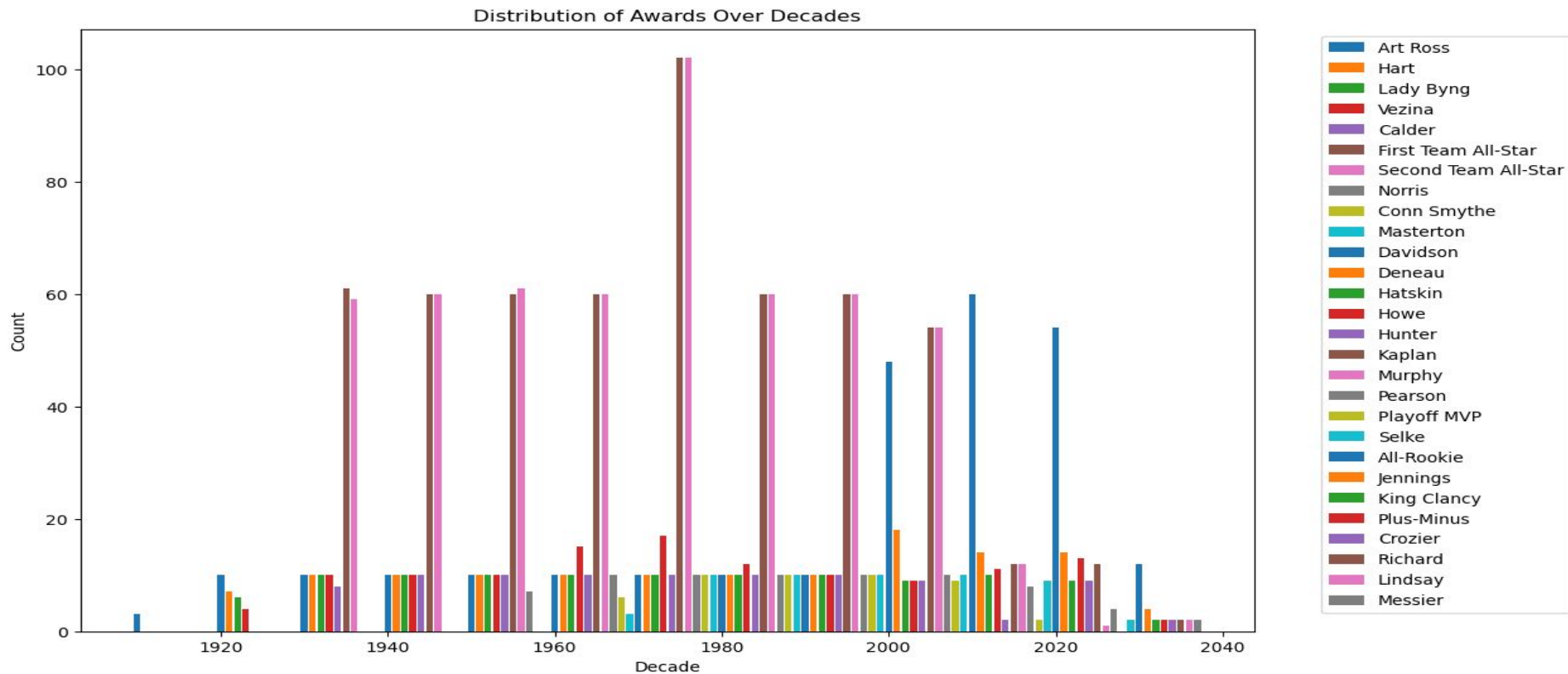


# Awards Over Years

Total Number of Awards Given Each Year

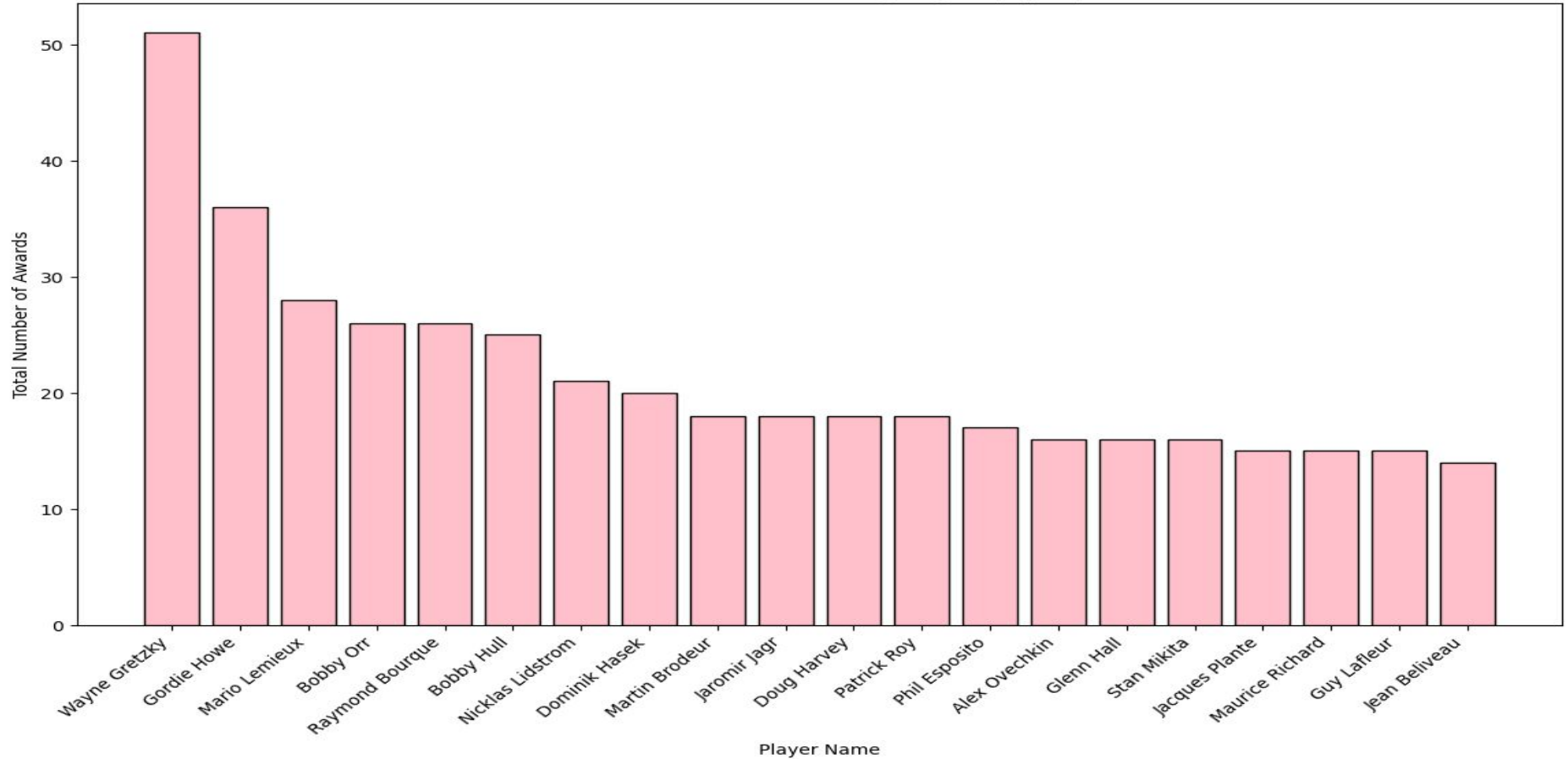


# Award Distribution Over Decades



# Award Distribution Over Players

Distribution of Awards Among Players (Top 20)



# Data Insights & Conclusions

- **Team Performance**
  - A tighter distribution of NHL team points earned per season shows an increase in the competitive balance and quality of the league.
  - Some of the factors that contributed to this trend were rule changes, salary cap restrictions, and an overall development of players and coaching.
- **Scoring**
  - A steady increase in scoring from the 1950's-early 1980's gave way to a decrease in scoring from the 1980's-early 2000's.
  - As the league developed offensively, tactical changes, rule changes, and an overall defensive emphasis helped teams better defend NHL offenses.
- **Attendance**
  - Fan attendance at NHL games has steadily risen during their modern era, which points to a more compelling product that brings people to view in-person.
- **NHL Draft**
  - What started as primarily as a league comprised of U.S. and Canadian players has evolved to attract players from other hockey-playing countries around the world.
  - More robust scouting departments help to find NHL-caliber players around the world, which in turn improve the quality of the league.
- **Awards**
  - Total yearly awards remain relatively unchanged since the 80s.
  - We can clearly see the impact of one player in this data.
  - This could be one measure of individual impact on an entire sport.
  - This finding warrants further analysis and may have implications in other sports.