

# Visualizations

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## Visualizations

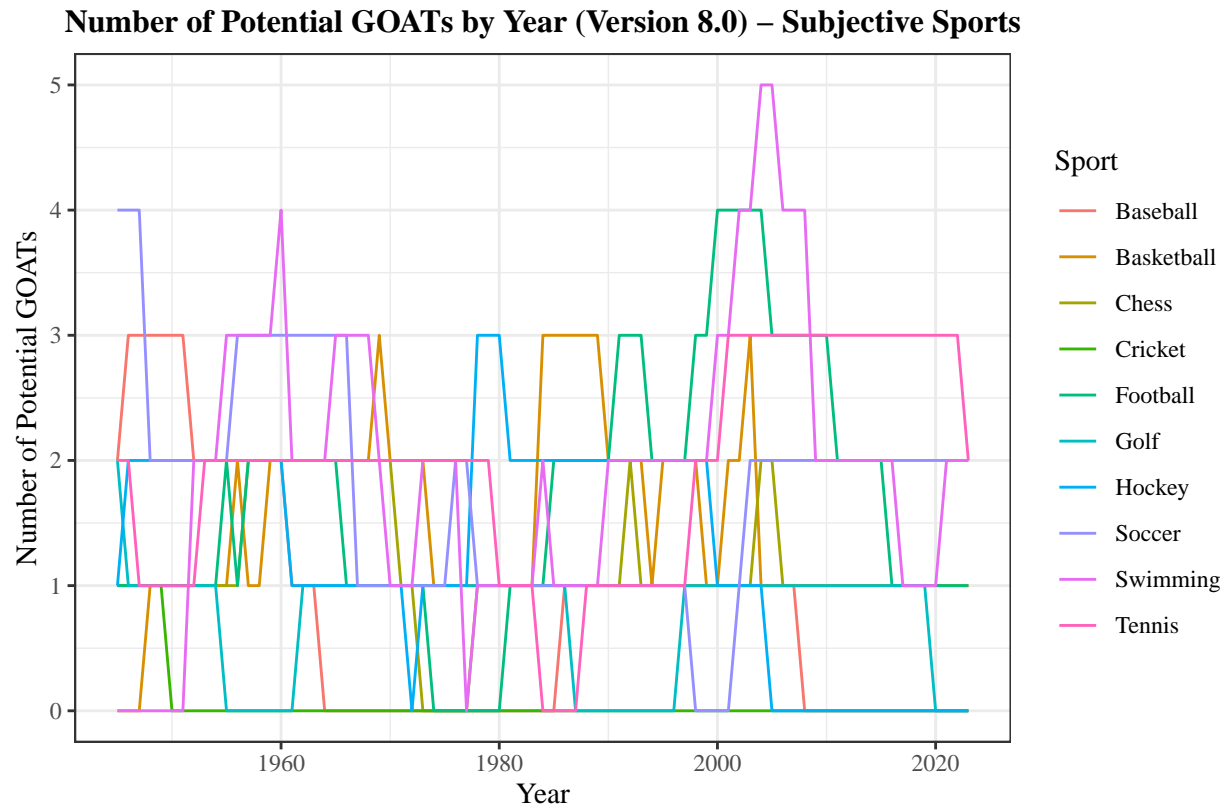


Figure 1

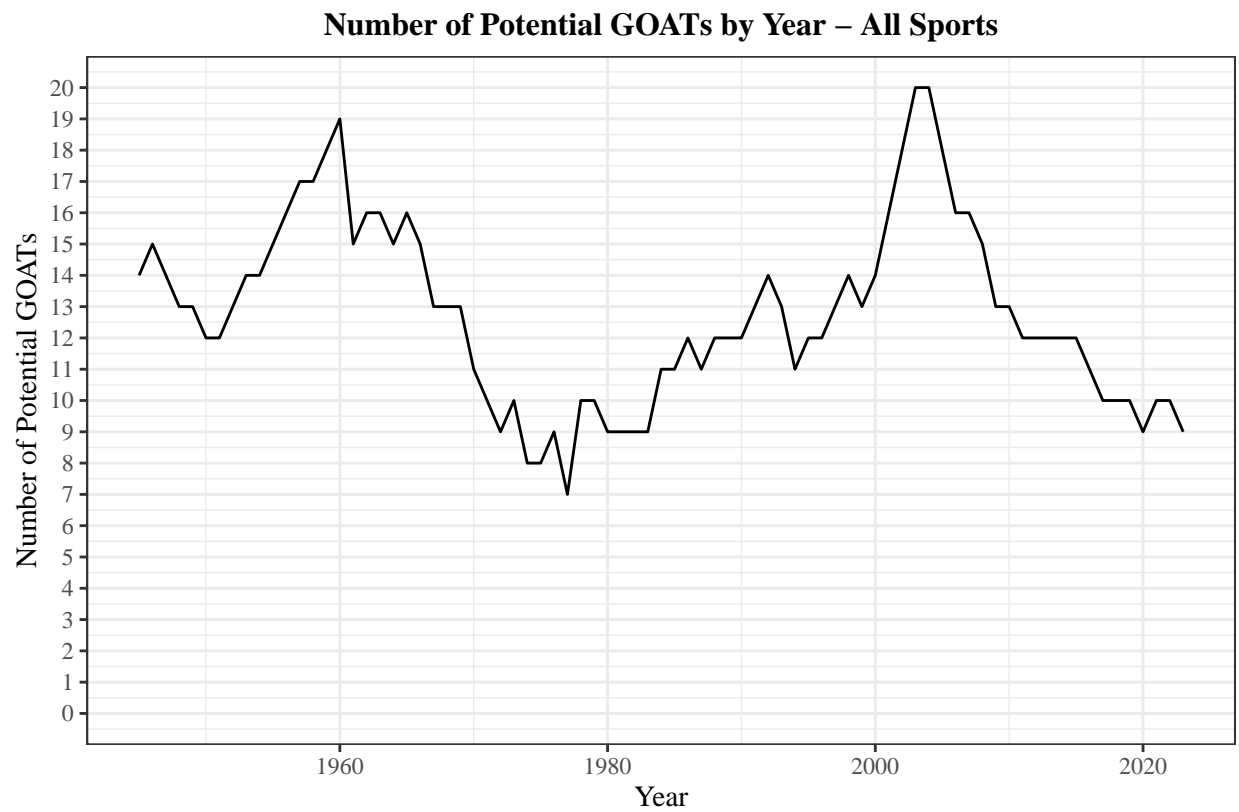


Figure 2

Figures 3-13 shed light onto the following question: **In a given sport, for a given year (from 1945 to the present), how many legitimate GOAT candidates are playing?**

## Soccer

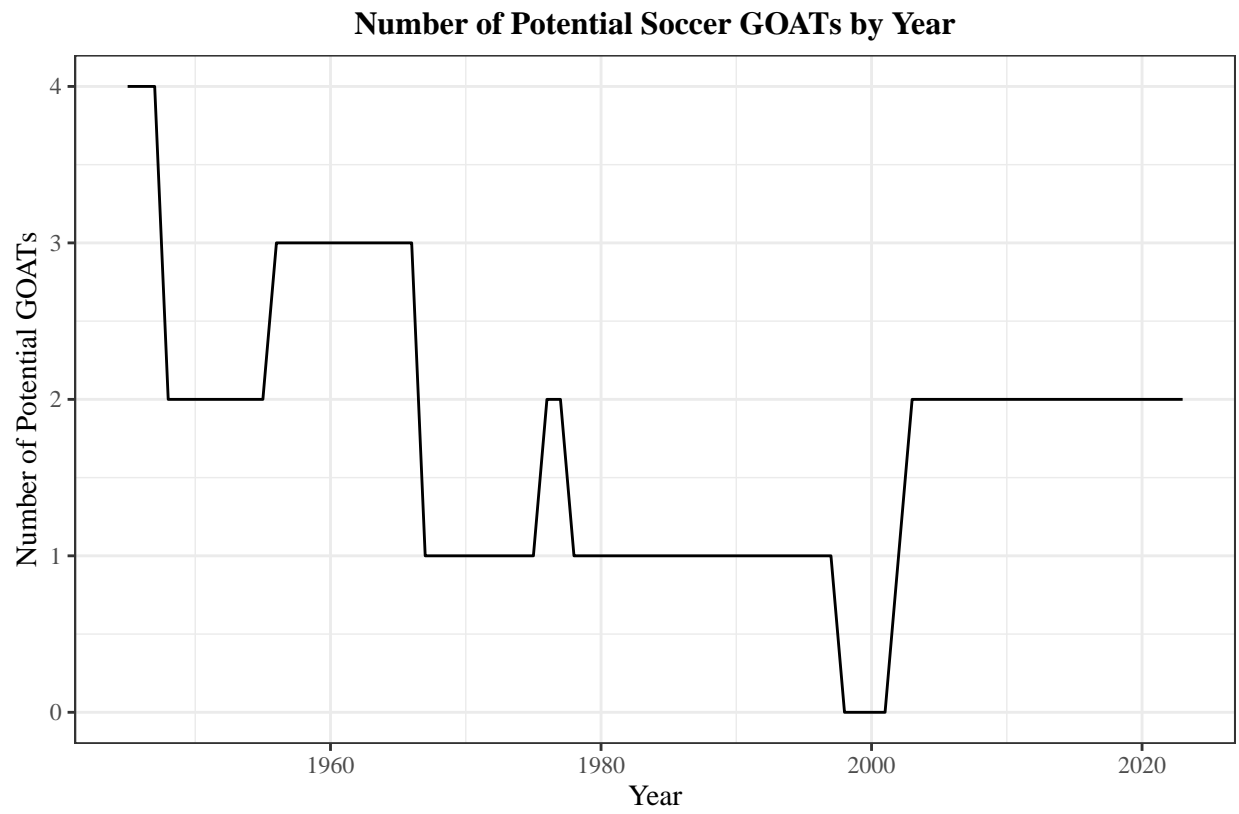


Figure 3

## Cricket

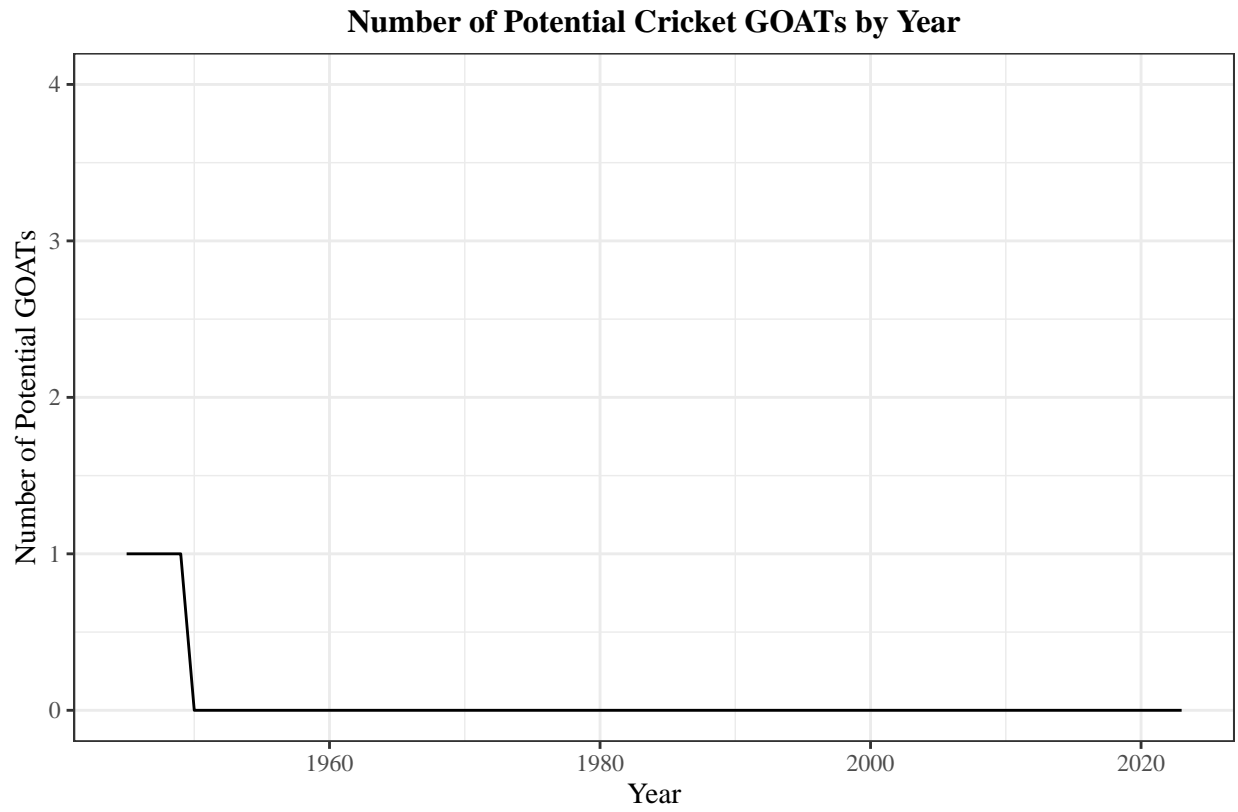


Figure 4

## Tennis

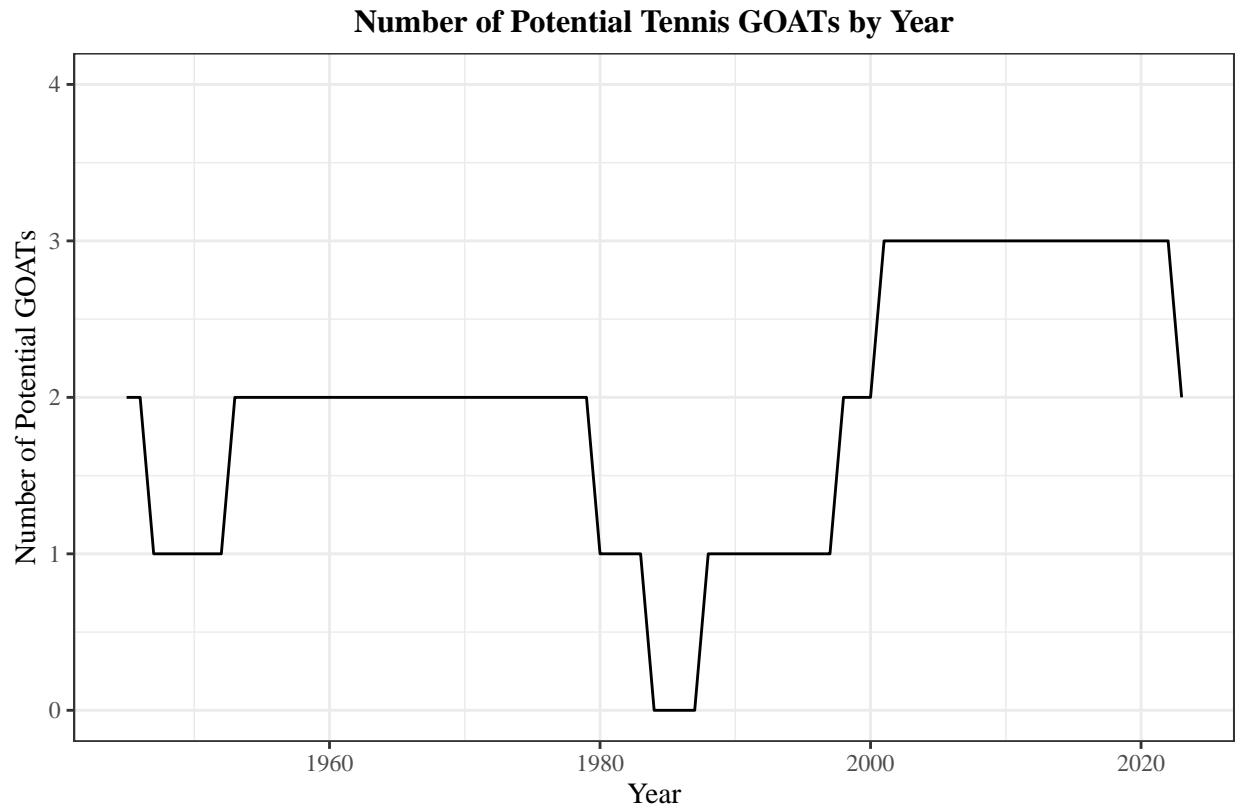


Figure 5

Basketball

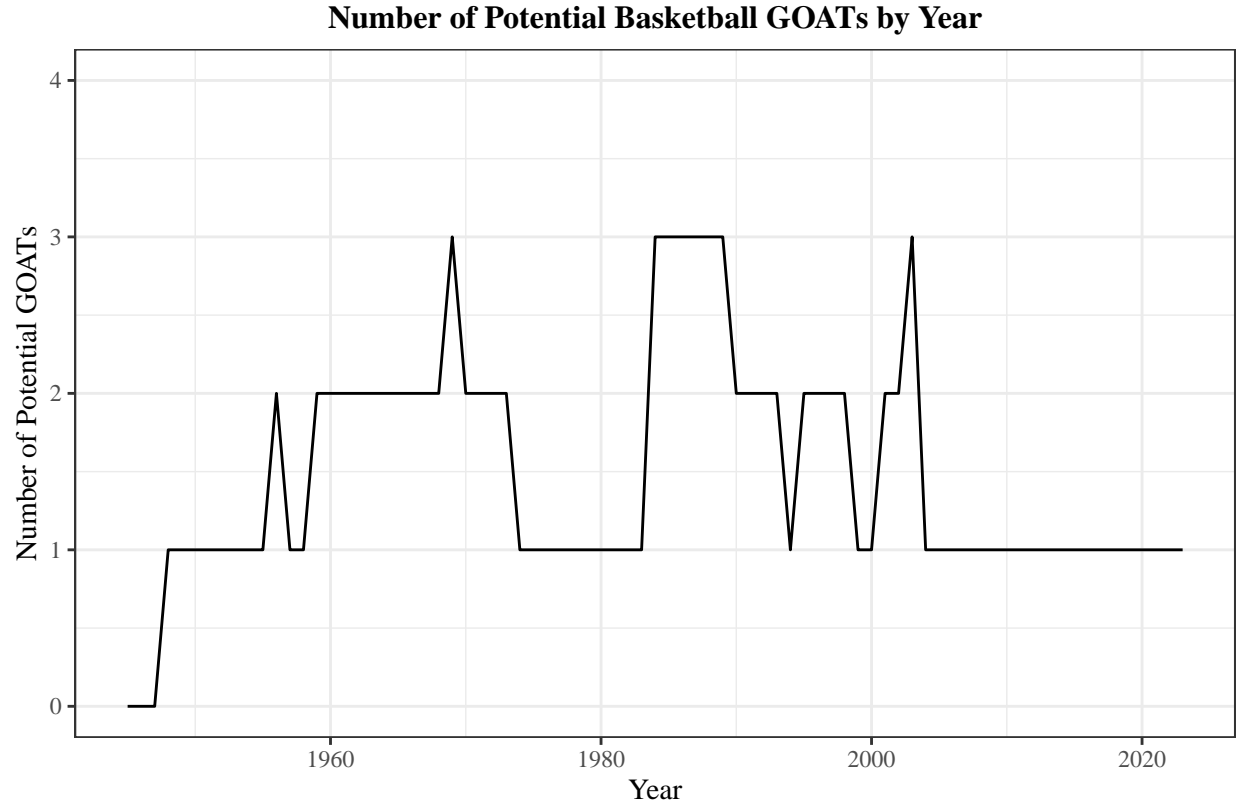


Figure 6



## Baseball

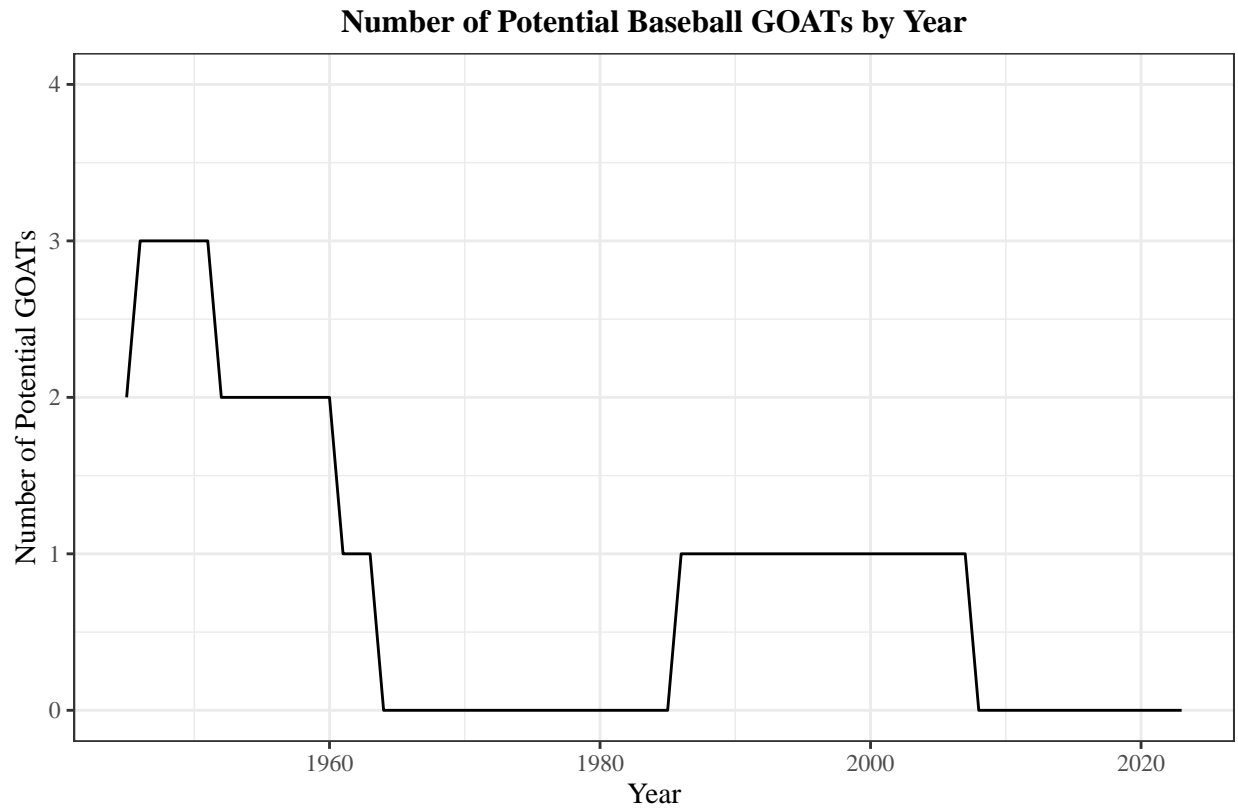


Figure 7

## Football

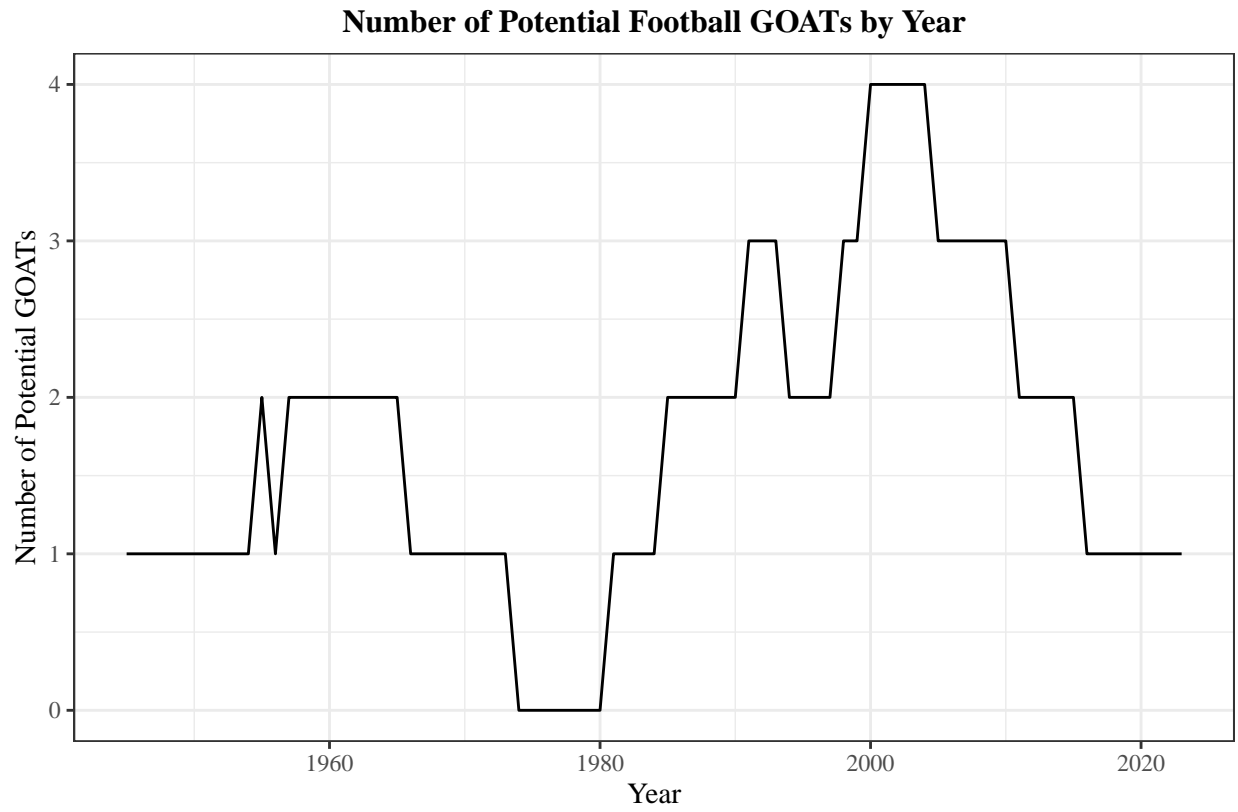


Figure 8

## Hockey

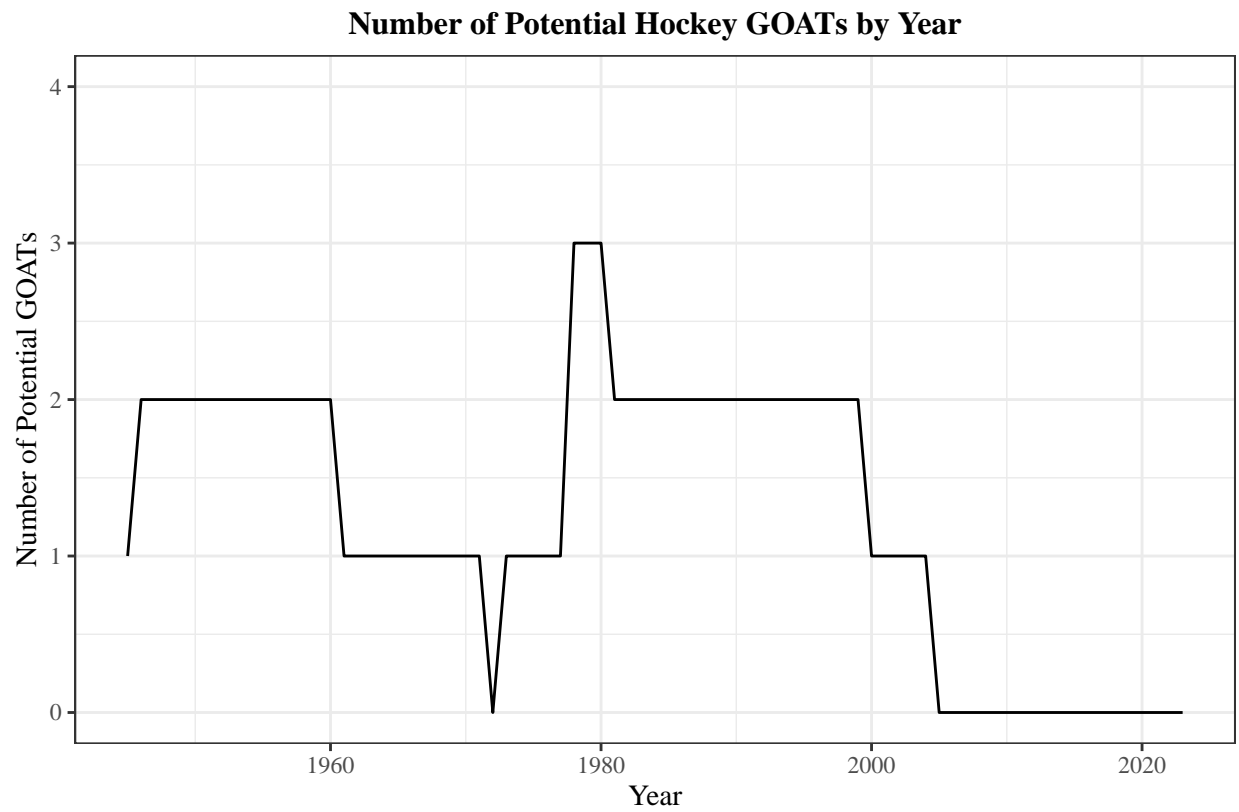


Figure 9

## Golf

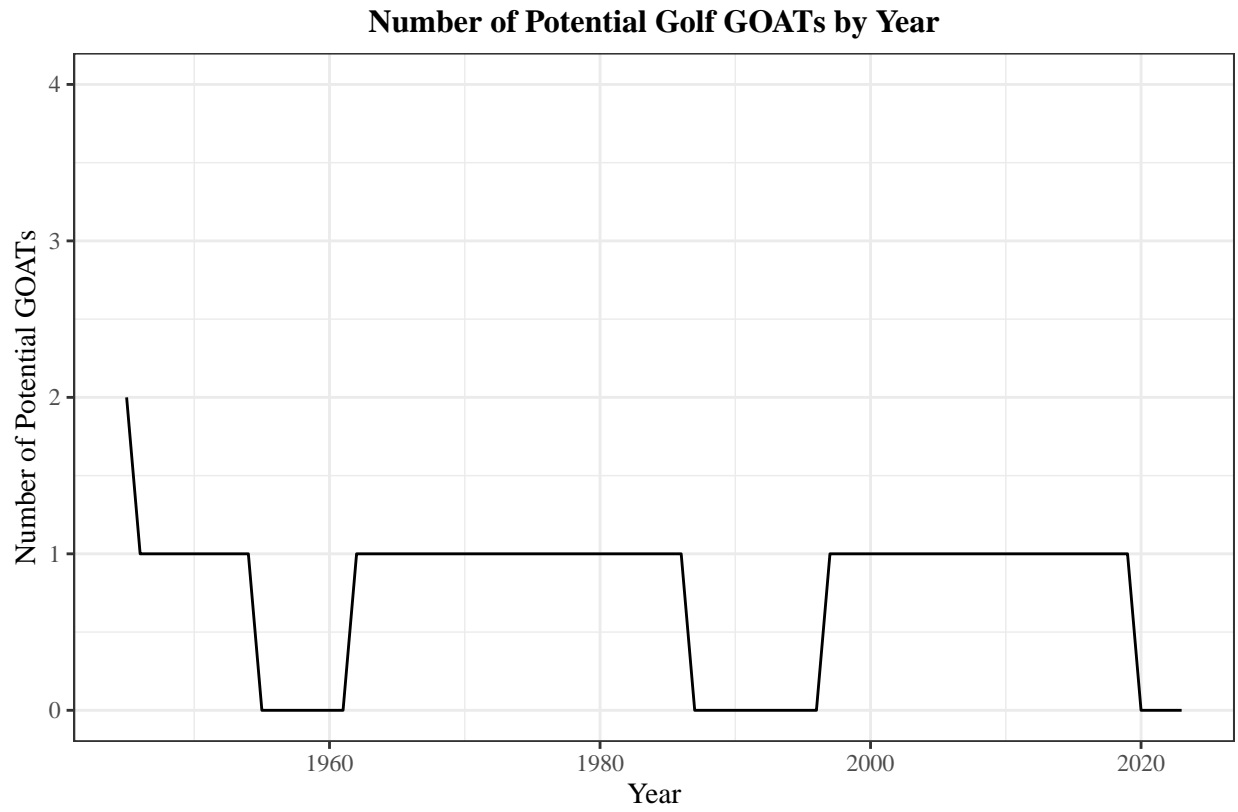


Figure 10

## Objective Sports

## Chess

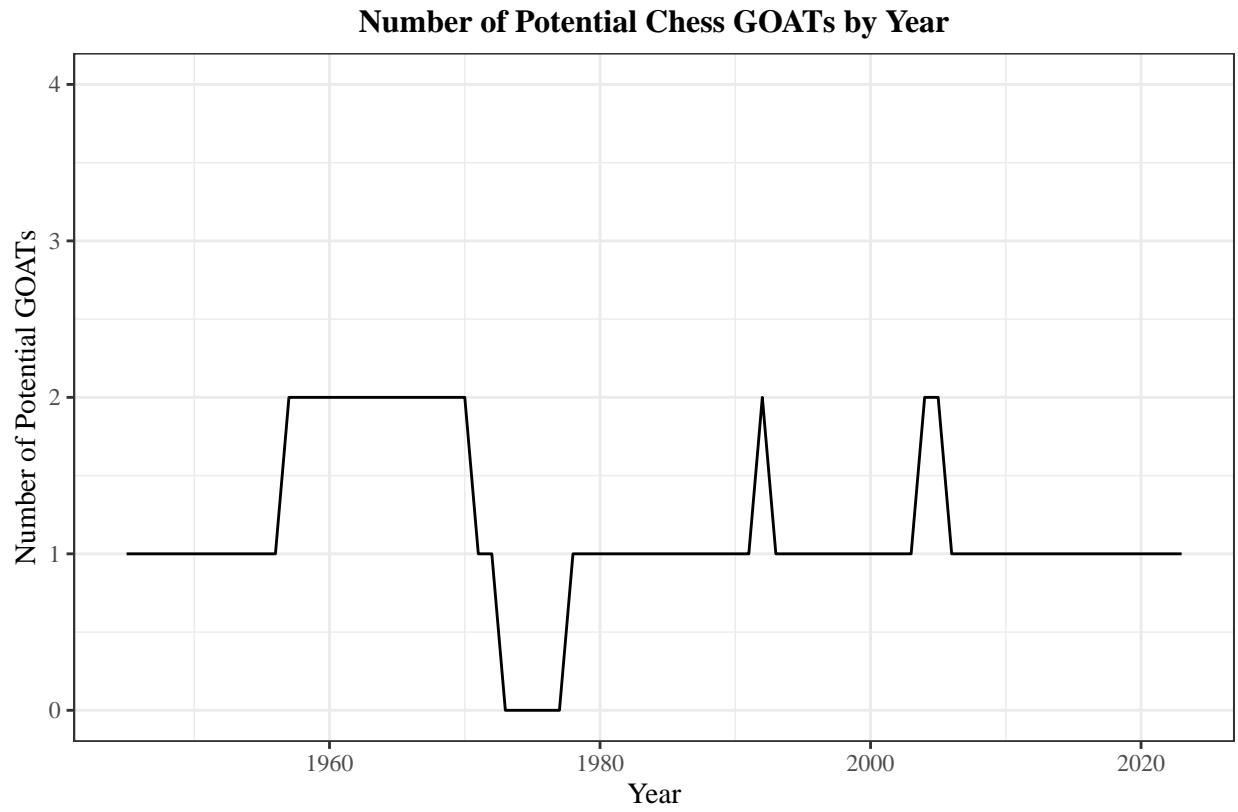


Figure 11

## Swimming

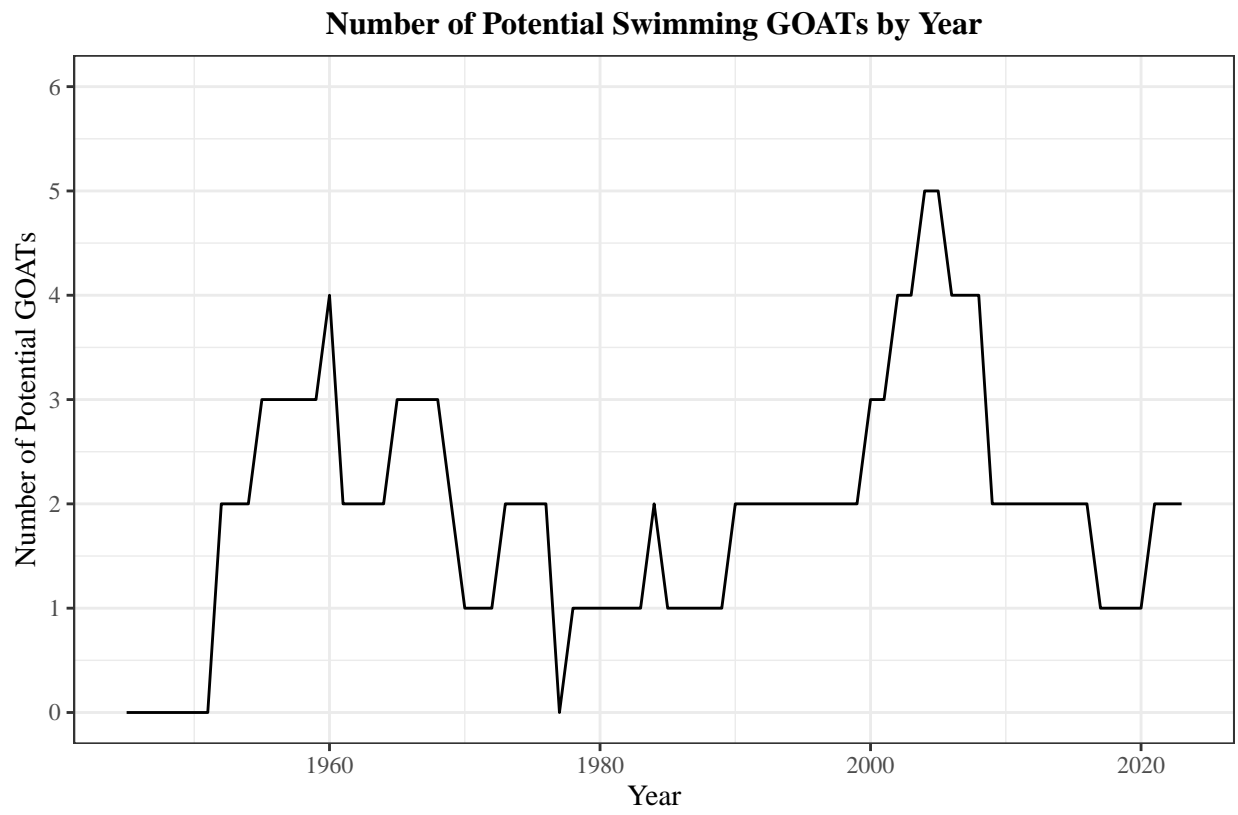


Figure 12

For some sports - more specifically, swimming and running, both of which we deemed to be “objective” sports - it was very difficult to define a career length, as there is **very** little data on each athlete’s first and last year competing. Moreover, because we defined GOAT candidates in these sports as competitors who had held the world record in a particular race at least once, players could theoretically have a career span < 1 year. To give an extreme example ...

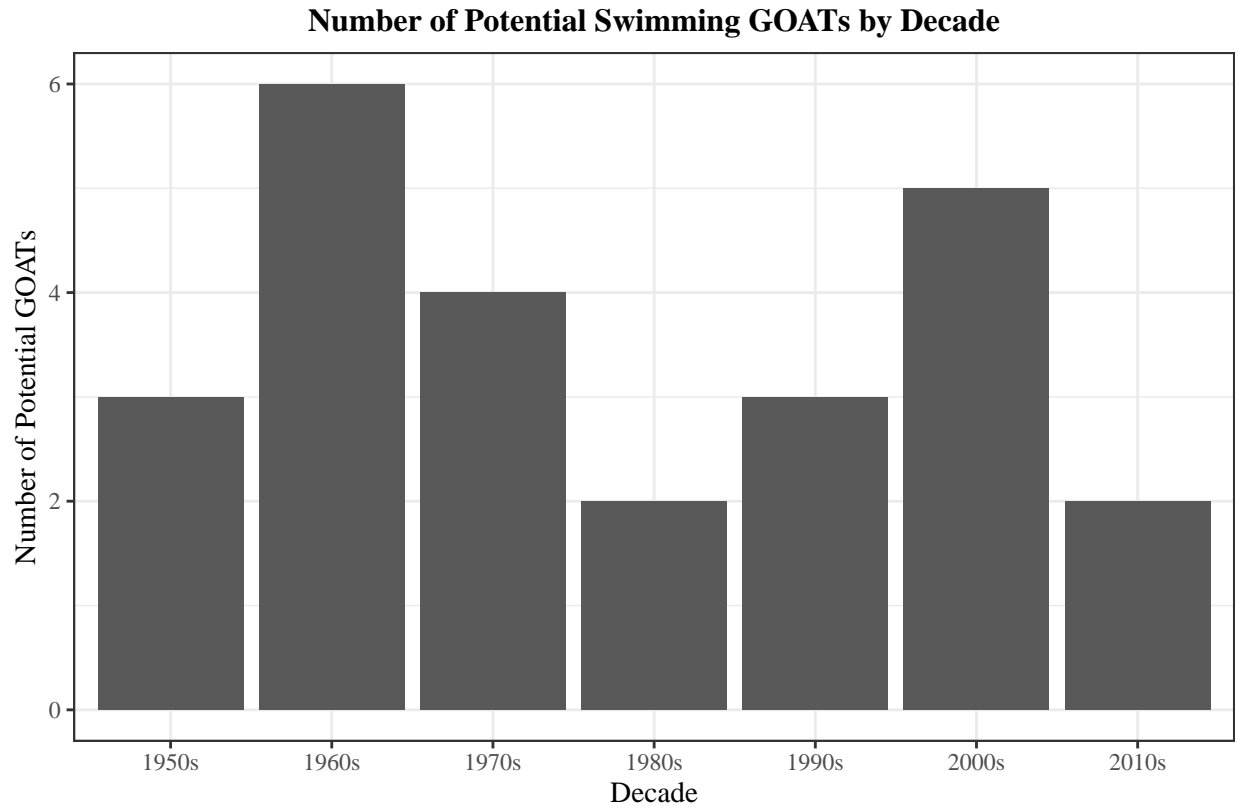


Figure 12.1



## Running

## Commentary & Notes

### *Cricket*

- There have not been any GOAT candidates in a while (before 1950). The GOAT for cricket is Sir Donald Bradman. Is this contention valid? Have there legitimately been no GOAT candidates in this long? If so, is there something intrinsic about cricket that makes it so difficult to find GOAT-quality players? Or is Bradman just such a statistical anomaly?
- Would Sir Donald Bradman be as good as he was if he were to play today?

### *Hockey & Golf*

- The patterns that are seen with these sports appear to resemble what most people would likely expect: GOAT candidates occur sporadically without any legitimate pattern. Additionally, there has not been a GOAT in a while, and data does not suggest that there will be a GOAT candidate anytime soon (although this may be different if Tiger Woods is finally included as a GOAT candidate for golf).

### *Soccer, Tennis, Basketball, Football*

- Tennis also seems interesting because there were **22** consecutive years where there were at least **3** GOAT candidates playing at the same time. This 22-year window spans from 2001 to 2022.
- With basketball, there has been at least one GOAT candidate (playing) for a while.
- An interesting note about football is that there were **4** GOAT candidates playing from 2000-2004. I personally wonder if this increase in GOAT candidates can be attributed to the inflation of the importance of the quarterback position, as 3 of the 4 candidates were quarterbacks (Brett Favre, Peyton Manning, and Tom Brady). Of course, the presence of 4 GOAT candidates can also be chalked up to mere coincidence, or simply the fact that we have multiple (2) lists of GOATs for football.

### *Chess*

- Nothing in particular stands out

### *Swimming*

- One observation about swimming is that the career lengths are very short compared to other sports. We also see an uptick in greats in the early 2000's.

### *Running*

We also wanted to include visualizations that answer a different question: what is the cadence at which a sport's record is broken?

## Tables and Visualizations Related to Career Longevity

Table 1: Average Career Length by Sport for GOAT Candidates

Sport	Average Career Length (Years)
Chess	28.2
Hockey	23.5
Soccer	21.9
Baseball	20.7
Tennis	19.9
Cricket	19.3
Golf	17.9
Basketball	16.7
Football	15.3
Swimming	9.6

Table 2: Average Career Length for Each Subjective Sport

Sport	Average Career Length (Years)
Soccer <sup>a</sup>	8.6
Tennis <sup>b</sup>	6.12
Golf <sup>c</sup>	5.95
Hockey <sup>d</sup>	5.72
Baseball <sup>e</sup>	5.6
Basketball <sup>f</sup>	4.8
Football <sup>g</sup>	3.3
Cricket <sup>h</sup>	12.5

**Note:** <sup>a</sup> <https://jamanetwork.com/journals/jamaneurology/fullarticle/2782750> <sup>b</sup> <https://www.sciencedirect.com/science/article/abs/pii/S0927537121000865#tbl0001> <sup>c</sup> <https://books.google.com/books?hl=en&lr=&id=594WCQAAQBAJ&oi=fnd&pg=PA152&ots=gFrFml8OoE&sig=Grtp8yTxcZ1OOk4ZzqYLrpgLT-o#v=onepage&q&f=false> <sup>d</sup> <https://www.cbsnews.com/minnesota/news/good-question-how-long-can-athletes-stay-in-the-game/> <sup>e</sup> <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3184466/> <sup>f</sup> [https://www.espn.com/nba/story/\\_/page/nextforplayers-111114/nba-players-do-next](https://www.espn.com/nba/story/_/page/nextforplayers-111114/nba-players-do-next) <sup>g</sup> [https://www.espn.com/blog/nflnation/post/\\_/id/207780/current-and-former-nfl-players-in-the-drivers-seat-after-completing-mba-program](https://www.espn.com/blog/nflnation/post/_/id/207780/current-and-former-nfl-players-in-the-drivers-seat-after-completing-mba-program) <sup>h</sup> <https://www.espn.com/story/how-long-is-a-career-272194>

Table 3: Number of Years with 0 GOAT Candidates by Sport (since 1945)

Sport	#
Cricket	74
Baseball	38
Golf	21
Hockey	20
Swimming	8
Football	7
Chess	5
Soccer	4

Sport	#
Tennis	4
Basketball	3

Average # of GOAT candidates per year conditional on not having 0

Table 4: Average # of GOAT Candidates per Year per Sport (Conditional on there being at least one)

Sport	Average
Baseball	1.54
Basketball	1.54
Chess	1.23
Cricket	1.00
Football	1.86
Golf	1.02
Hockey	1.68
Soccer	1.83
Swimming	2.15
Tennis	2.03

#### Years with No Potential GOATs vs. Average Career Length for GOAT Candidates

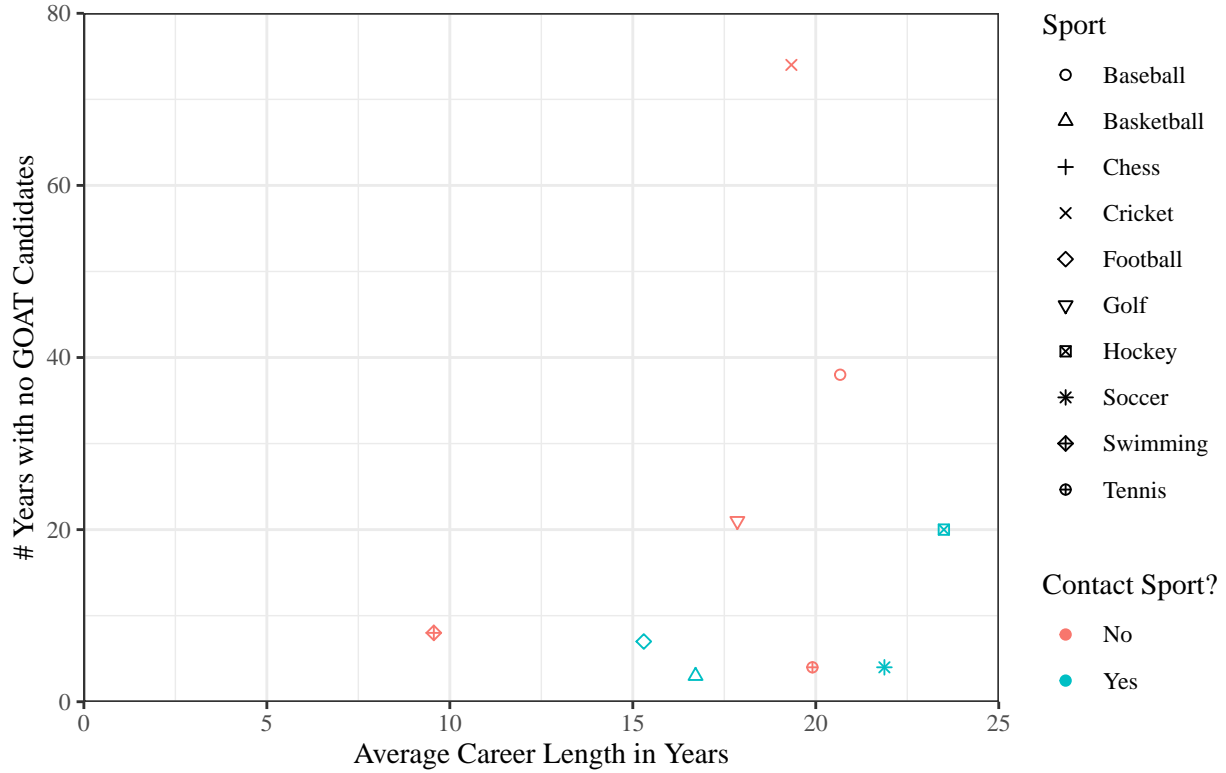


Figure 14

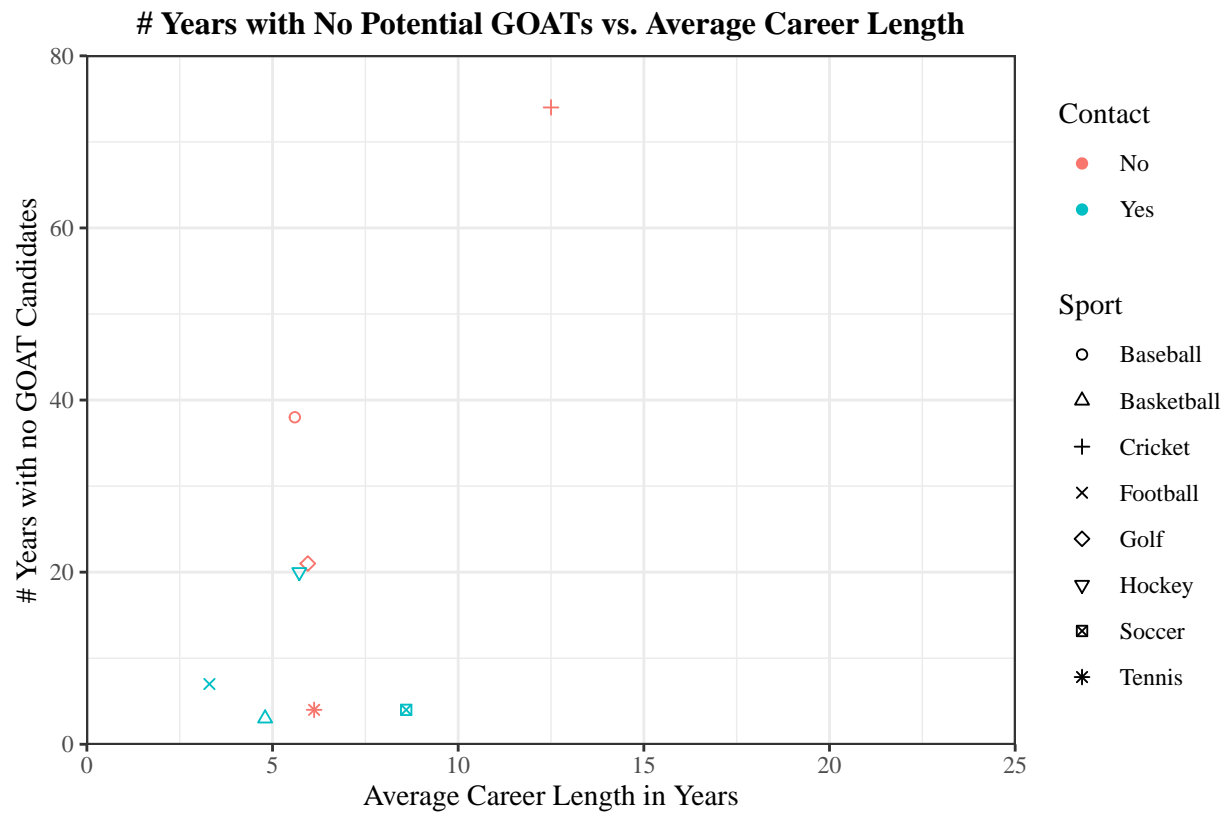


Figure 15

## Commentary and Notes

**Figure 15** - One would expect to see a **negative** relationship between the average career length and the number of years with ZERO potential GOATs.

- “Medical Conditions Affecting Sports Participation” published by *The American Academy of Pediatrics*
- Link to article: <https://publications.aap.org/pediatrics/article/121/4/841/70953/Medical-Conditions-Affecting-Sports-Participation?autologincheck=redirected>
- In this article, sports are divided into three main categories: (1) contact, (2) limited-contact, and (3) non contact
  - Additionally, contact sports are sub-divided into: (1) collision and (2) contact sports
  - “In collision sports (eg, boxing, ice hockey, football, lacrosse, and rodeo), athletes purposely hit or collide with each other or with inanimate objects (including the ground) with great force. In contact sports (eg, basketball and soccer), athletes routinely make contact with each other or with inanimate objects but usually with less force than in collision sports. In limited-contact sports (eg, softball and squash), contact with other athletes or with inanimate objects is infrequent or inadvertent. However, some limited-contact sports (eg, skateboarding) can be as dangerous as collision or contact sports. Even in noncontact sports (eg, power lifting), in which contact is rare and unexpected, serious injuries can occur.”
- Above, I will classify **basketball, football, hockey, and soccer** as **contact** sports; conversely, all other sports will be classified as **limited contact or non contact**.
  - Overall, no trends in particular seem to stick out. Although football and basketball (both of which are contact sports) both seem to have shorter average career lengths, one cannot say this for all contact sports compared to non-contact sports.
  - **Potential limitation/inconsistency** - for golf (a non-contact) the average career length may appear to be shorter than it actually is because I used the first and last years a player won a major for a career span.

## Data Collection Assumptions

- For tennis, I imputed a player's active years using the years given in the *Stadium Talk* article that ranked the greatest tennis players of all time.
- For golf, I imputed a player's active years as the first and last calendar years that he won a major. For example, since Tiger Woods won his first major in 1997 and his last major in 2019, his active years are listed as 1997-2019, even though he is still playing in professional golf tournaments (in fact I know he most recently played in the Genesis Open).
- Until 1995, only soccer players of European origin could win the Ballon d'Or. From 1995 to 2007, the award was open to players who played for European football clubs, regardless of their ethnicity. Only after 2007 could any player, with any club, win the award, which is why greats like Maradona and Pele never won the award.