Winter Olympics Data Analysis

ggplotheads: Sydney Fox, Lindsay Gross, Noah Hirshfield, Jake Marrs, Ben Yacht

Our Research Question

To what extent does an athlete's age, gender, and country influence their Winter Olympic success?

Success is defined by gold medals won, average medal rank, or total number of medals won depending on the test

Our hypothesis:

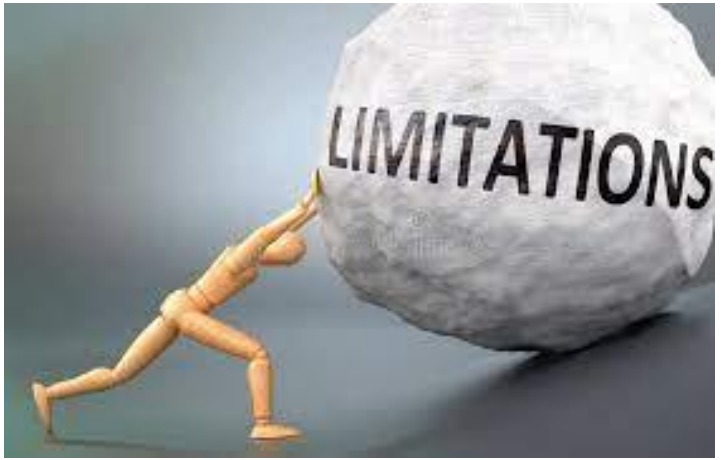
- Younger athletes will have more gold medals won, on average, than older athletes.
- Within each country, men will outperform women (receive more gold medals on average)
- Mean age of male medalists > mean age of female medalists
- Countries will have greater success in events more popular to their region of the world

Data

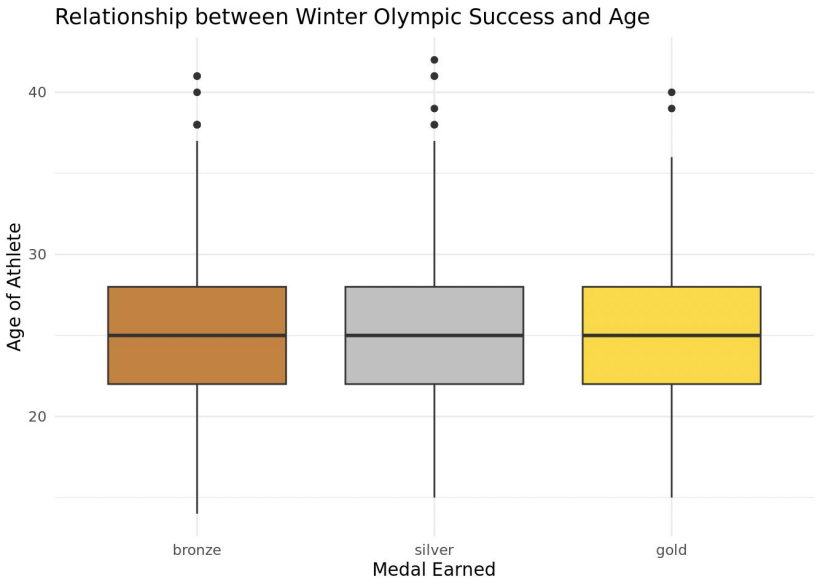
- Data collected in 2018 and scraped from Sports Reference by Randi Griffin
- Observations represent **every athlete or team** who has won a medal at the Winter Olympics (1924-2014)
- 2865 observations.
- 9 values:
    a. Year
    b. Sport
    c. Event
    d. Country
    e. Gender
    f. Medal Rank
    g. Medal
    h. Name of Athlete or Team
    i. Age of Athlete

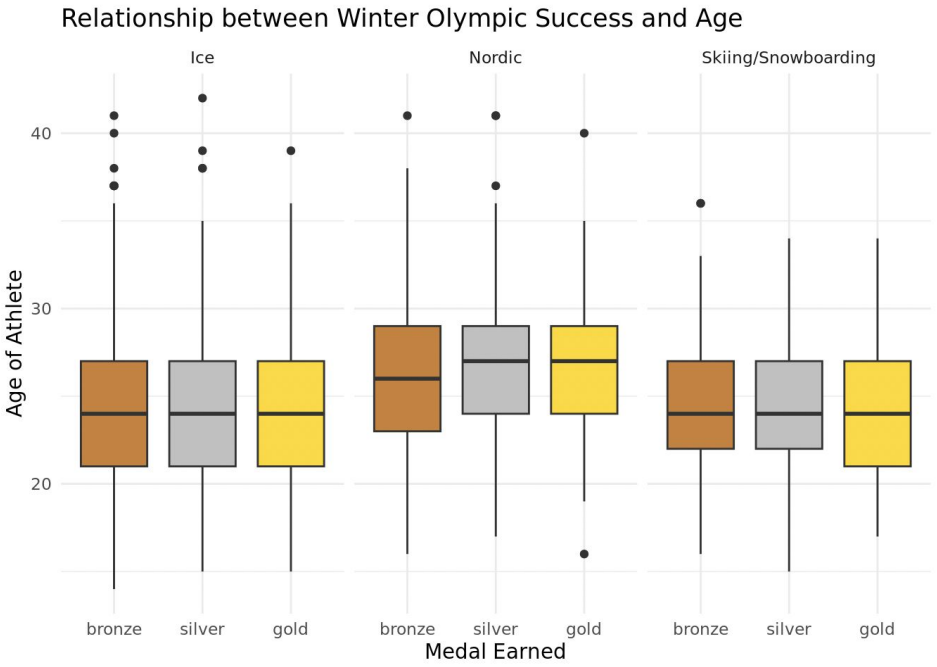
Possible Limitations

- Data was removed from Sports Reference
  - Does not include 2018 or 2022 Olympics
- Country names change over time
- Some athletes names have extraneous characters



Analyzing Age





Analyzing Age

```
#| label: linear-reg-age-years
linear_reg() |>
  set_engine("lm") |>
  fit(`Age of Athlete` ~ Year, data = Gold) |>
  tidy()
```

A tibble: 2 × 5

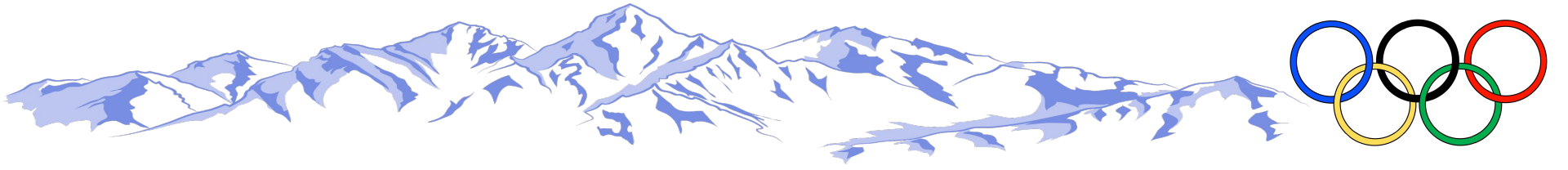
term <chr>	estimate <dbl>	std.error <dbl>	statistic <dbl>	p.value <dbl>
(Intercept)	5.963239983	12.67189637	0.4705878	0.6380768
Year	0.009607821	0.00637889	1.5061899	0.1324546

2 rows

$$\widehat{Athlete\_Age} = 5.963 + 0.0096 * Year$$

```
# A tibble: 1 × 2
  lower upper
  <dbl> <dbl>
1  24.8  25.3
```

We are 90% confident the true mean age of gold medal winning winter Olympic athletes is between 24.80165 and 25.29201 years old.



Analyzing Gender

We hypothesize that the mean age of medal winning male athletes is greater than the mean age of female medalists.

Null Hypothesis:

$\mu_m = \mu_f$

The mean age of male medalists is equal to the mean age of female medalists.

Alternative Hypothesis:

$\mu_m \neq \mu_f$

The mean age of male medalists is not equal to the mean age of female medalists.

$\bar{x} = 0.89543$

```
# A tibble: 1 × 1
  p_value
    <dbl>
1       0
```

We hypothesize that men, overage, will have more success than American females in Winter Olympics.

Null hypothesis:

$\mu_m = \mu_f$

Alternative Hypothesis:

$\mu_m \neq \mu_f$

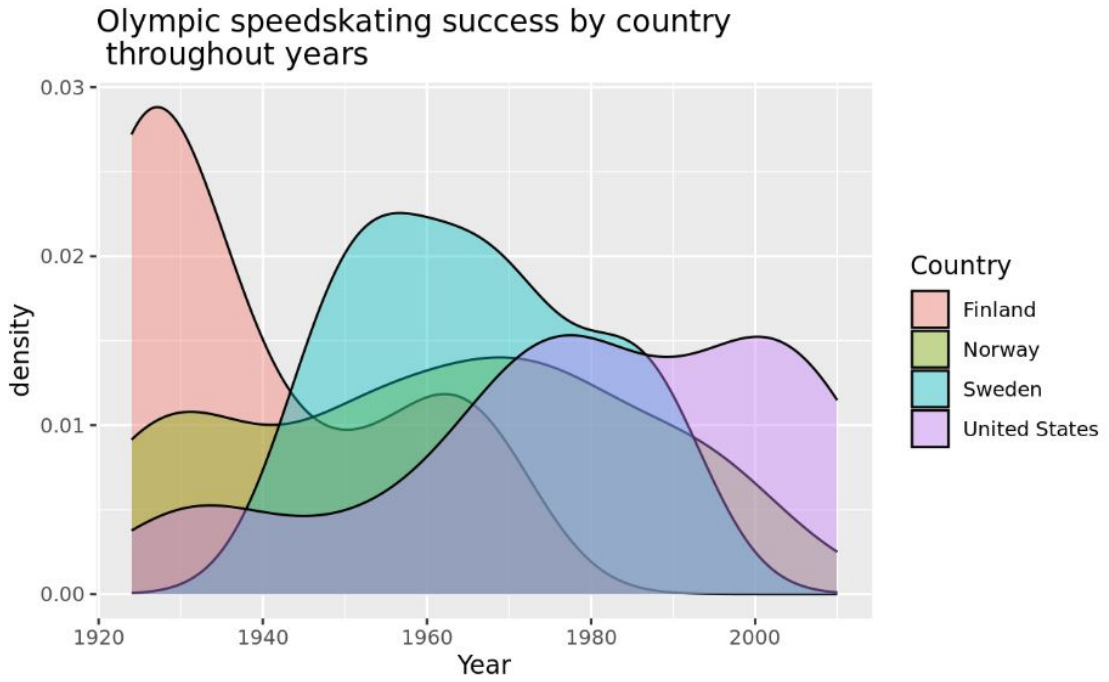
$\bar{x} = -0.027865$

A tibble: 1 × 1

p_value <dbl>
0.71

1 row

Analyzing Country



Scandinavian Athletes:

A tibble: 3 × 3

category <chr>	n <int>	prob <dbl>
Ice	49	0.23333333
Nordic	143	0.68095238
Skiing/Snowboarding	18	0.08571429

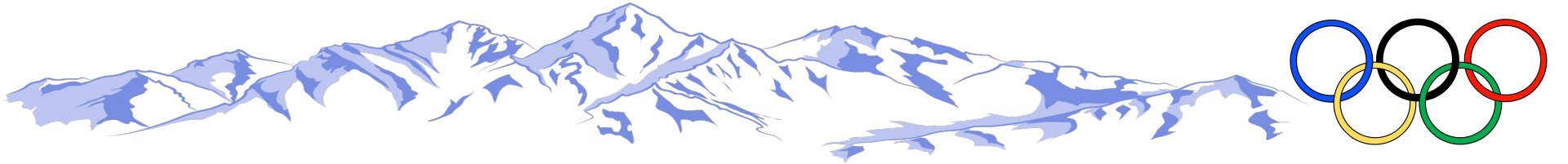
3 rows

All Athletes:

A tibble: 3 × 3

category <chr>	n <int>	prob <dbl>
Ice	440	0.4588113
Nordic	312	0.3253389
Skiing/Snowboarding	207	0.2158498

3 rows



Conclusions + future work

- An athlete of a certain age is equally likely to win a bronze, silver or gold medal, but older athletes are more likely to win a medal in a Nordic event.
- Gender has no relationship with success within the United States.
- An athlete's home country can play a role in the sport that they win the medal in (their success in certain events).

Moving forward:

- Add the 2018 and 2022 values
- Look at results from the Summer Olympics as a comparison
- Join other Winter Olympic data sets including times and event-specific data

Resources

“About Sports Reference.” Sports, https://www.sports-reference.com/about.html.

Griffin, Randi. “Randi Griffin.” Randigriffin.com, http://www.randigriffin.com/2018/05/27/olympic-history-1-web-scraping.html.

“List of Winter Olympic Sports.” Topend Sports, https://www.topendsports.com/events/winter/sports/index.htm#:~:text=Winter%20Olympic%20Sports%20for%202022&text=The%2015%20sport%20disciplines%20of,more%20specific%20events%2C%20as%20listed.

Rogers, Simon. “Olympic Medal Winners: Every One since 1896 as Open Data.” The Guardian, Guardian News and Media, 25 June 2012, https://www.theguardian.com/sport/datablog/2012/jun/25/olympic-medal-winner-list-data.