



Spelling · Bees

(in space)

Will + Teju + Kami



Topic Intro & Motivation

Astronauts!

We were interested in:



- ★ something that fit our theme, *but more importantly*
- ★ **professional / personal attributes** that might contribute to an **astronaut's career experience**
 - Useful for aspiring astronauts and perhaps reveals underlying trends in the space industry



Data Intro

Collected by Tatsuya Corlett, Mariya Stavnichuk, and Svetlana Komarova, beginning in 2020

Compiled by Tom Mock (Tidy Tuesday)

- Data on every mission spanning from **1961-2019**
- **1277** observations, **24** variables
 - Majority categorical
- Focus on `total_hrs_sum`, `military_civilian`, `year_of_birth`, `sex`, `nationality`

astronauts.csv

variable	class	description
id	double	ID
number	double	Number
nationwide_number	double	Number within country
name	character	Full name
original_name	character	Name in original language
sex	character	Sex
year_of_birth	double	Year of birth
nationality	character	Nationality
military_civilian	character	Military status
selection	character	Name of selection program

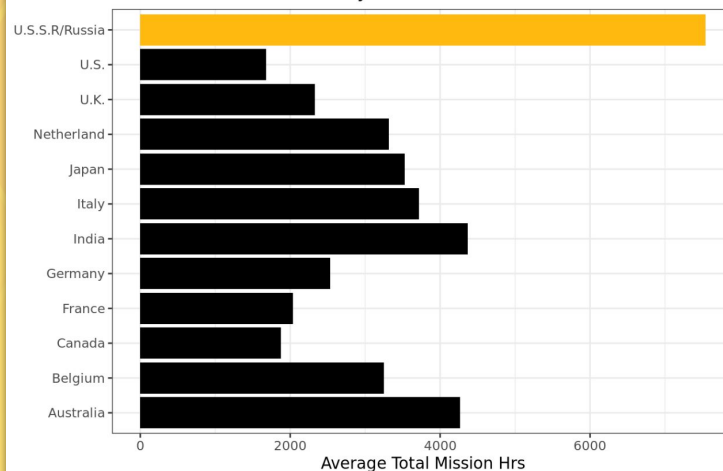
Exploratory Analysis



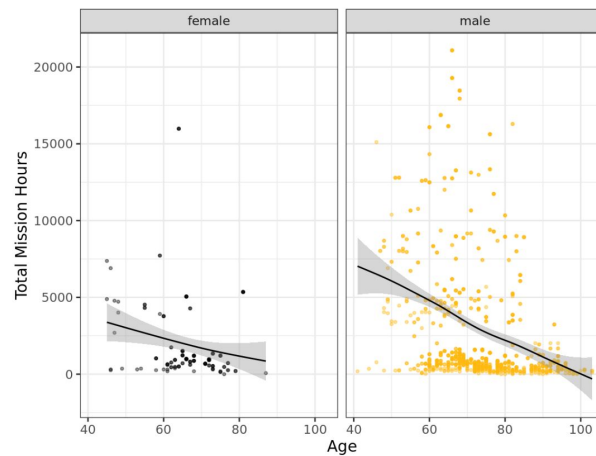
Some of Our Initial Findings:

- Greater population of males in dataset (not pictured)
- Russian astronauts have greatest average total mission hours
- Negative relationship between age and mission hours

Average Total Mission Hrs Of Astronauts Based on Their Nationality



Relationship Between Sex, Age, and Mission Hours



Modeling



- **Logistic:** predicting probability of military status from time in space

$$\log(p/1 - p) = 0.435 - 0.00000699 \times total_hrs_sum$$



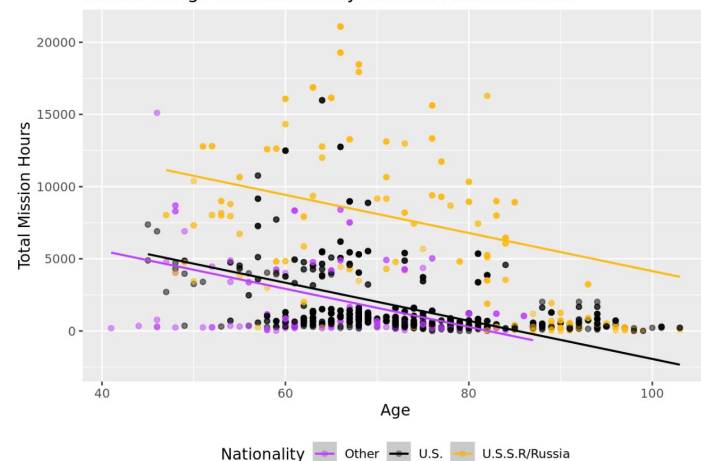
- **Linear:** predicting time in space from age & nationality

$$\widehat{totalhours} = 10837.30 - 131.97 \times age + 420.78 \times U.S. + 6506.22 \times Russia$$

- **Linear:** predicting time in space from gender

$$\widehat{time_in_space_women} = 1957.80 + 1137.97 \times male$$

Effects of Age and Nationality on Total Mission Hours

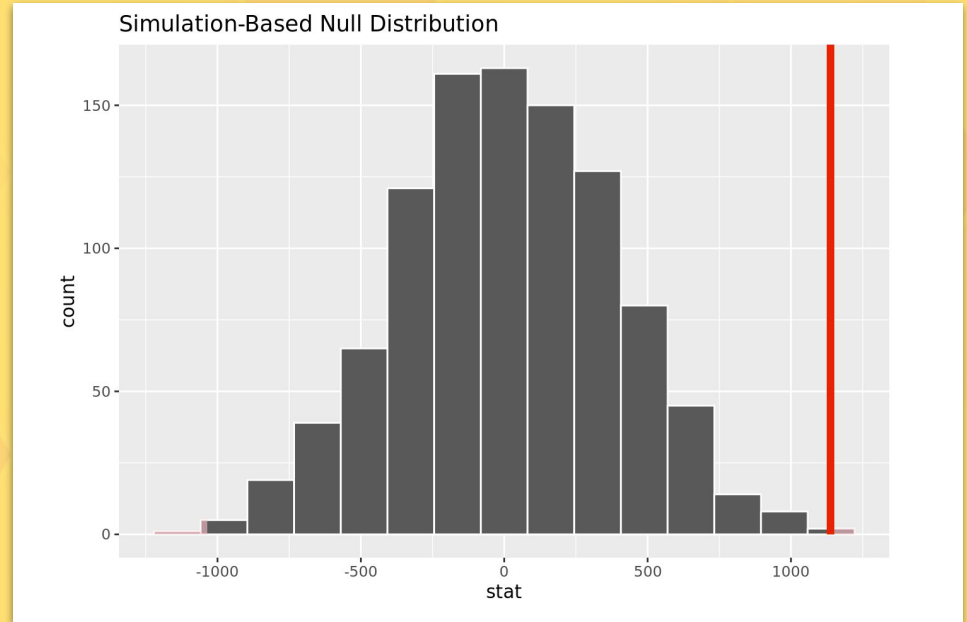




Hypothesis Testing + Bootstrapping

Our Findings:

- Difference between avg time spent in space between males and females?
 - p-value = 0.002, under null hypothesis

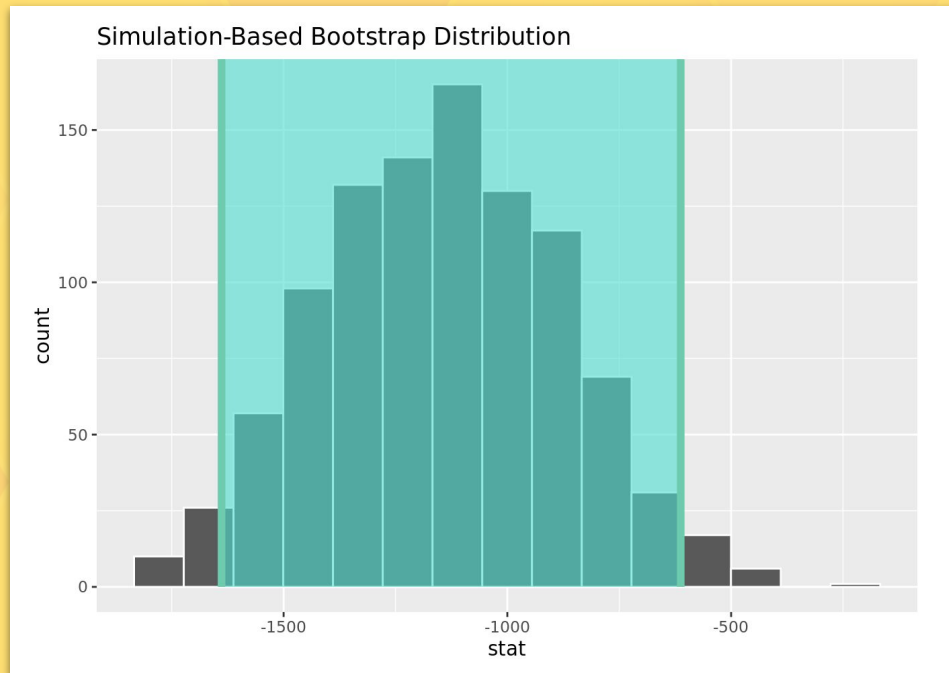




Hypothesis Testing + Bootstrapping

Our Findings:

- Difference between avg time spent in space between males and females?
 - p-value = 0.002, under the discernible level of 0.05
- 95% confident that females spent between 612.6 to 1638.6 less hours in space than males



Conclusions



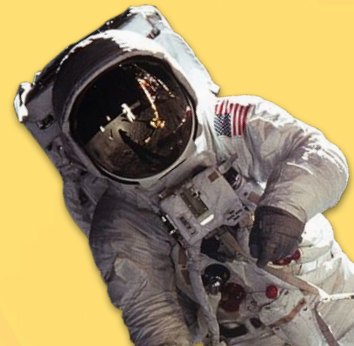
- **Military status not a strong predictor** of time in space
- **Statistically significant different mean total mission hours** between sexes
 - Bias concerns: females are a **minority** in this dataset
- **Negative relationship** between age and mission hours
 - Implication that younger astronauts are gaining more mission experience
- **Significant relationship** between **mission hours and nationality**
 - **Russian** astronauts have a statistically higher average mission hours compared to other nationalities



Ideas for Future Work



- Investigate potential relationship sex and total mission hours based on **nationality**
- Investigate potential relationship between sex and total mission hours **over time**





Thank · You



a polite expression of one's gratitude.

