Pokémon Total Stats by Type, Evolution, & Legendary Status

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How Pokémon Works
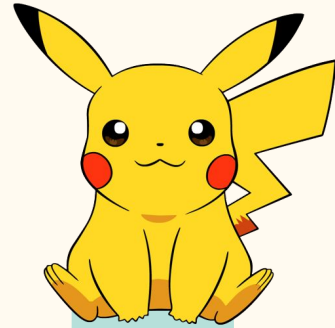
1st

Find Them

2nd

Battle

3rd

Catch

How it Works

Do Pokémon change over time?

- As you train, they can level up, obtain buffs, gain abilities, and evolve.
- We will be simplifying the estimates of stats to the base stats at each evolution.

What differences between Pokémon are we accounting for?

- Type, Secondary Type, and Evolution, Legendary Status
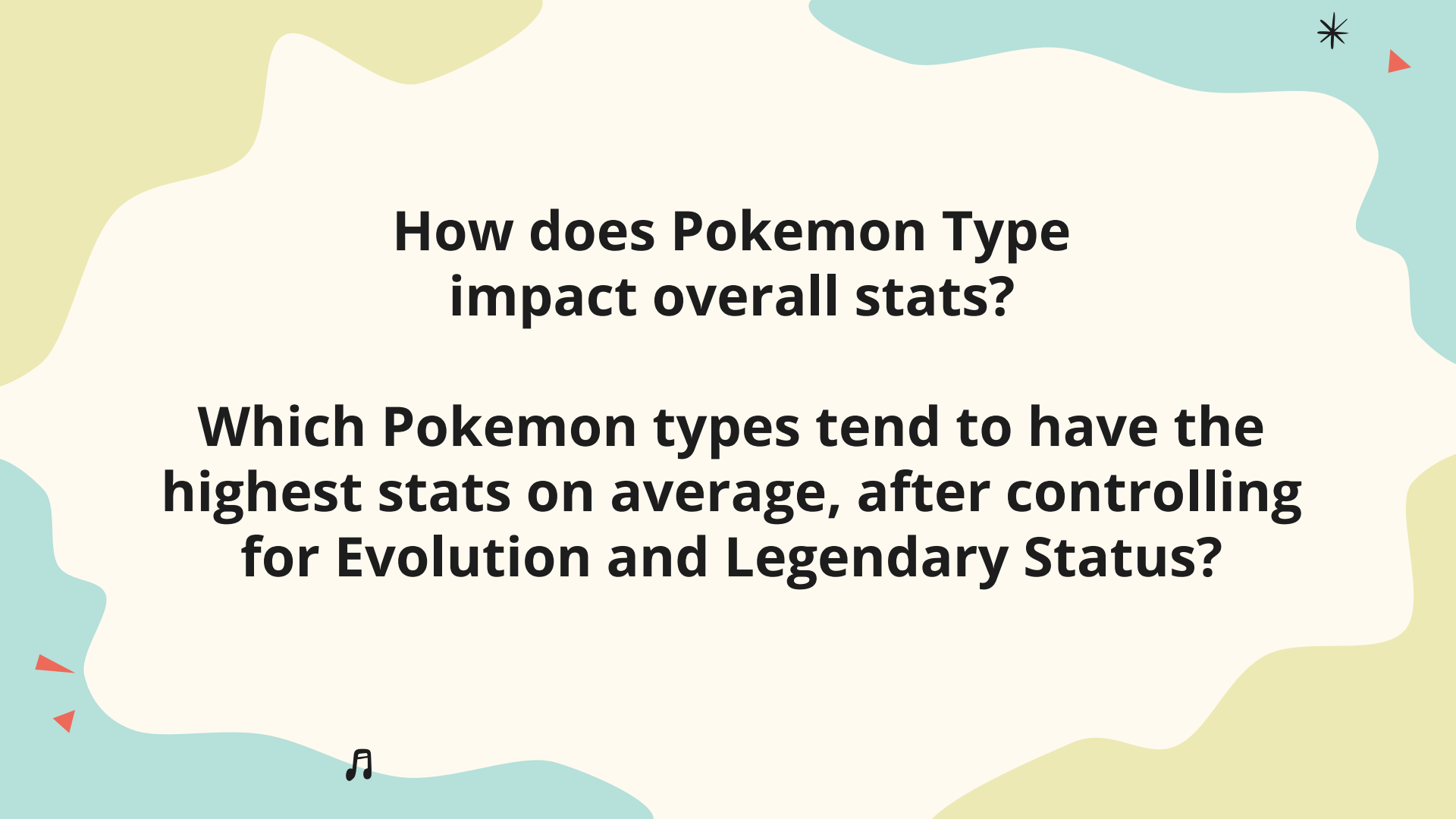
What are Legendary Pokémon?

- The pokémon you get after beating the game
- They are oftentimes much stronger than normal pokémon
- They do not evolve

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Data & Research Question

How does Pokemon Type impact overall stats?

Which Pokemon types tend to have the highest stats on average, after controlling for Evolution and Legendary Status?

Our Data

The data set was sourced from Alberto Barradas on kaggle.com

| Name	Unique for each evolution of each pokémon "species"
Type	Category of pokémon that determines what kind abilities it gets
Second Type	If they have a secondary type, what a pokémon's secondary type if
Total Stats	Sum of each pokémon's HP, Attack, Defense, Special Attack, Special Defense, & Speed
Generation	Pokémon games have been released in 6 generations over time
Evolution	= 1, 2, 3, 4. *Not all pokémon have all evolutions
Legendary Status	= 1 if observation is a legendary pokémon, 0 otherwise

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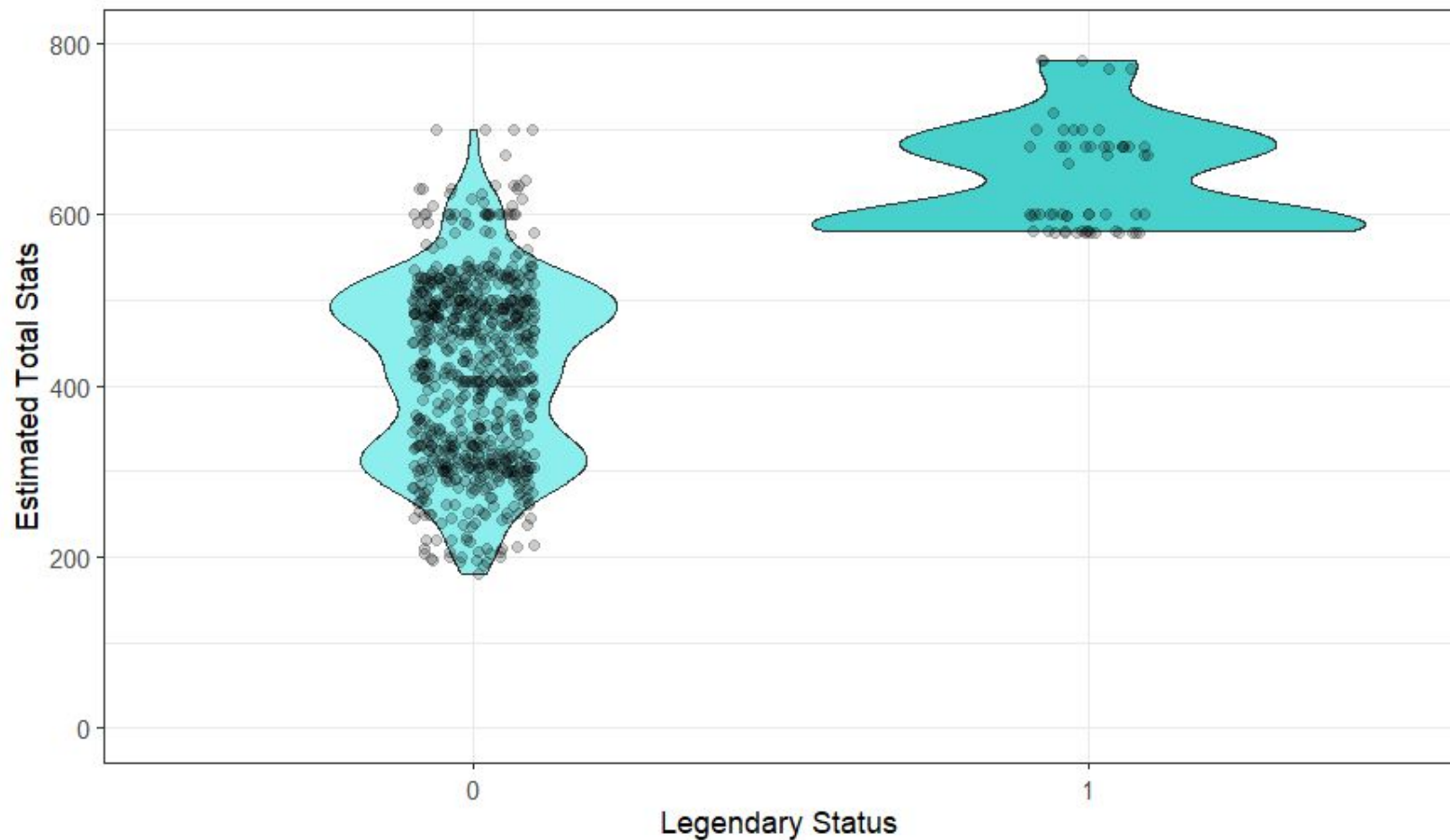# EDA & Data Visualization

Pokemon Total Stats by Type
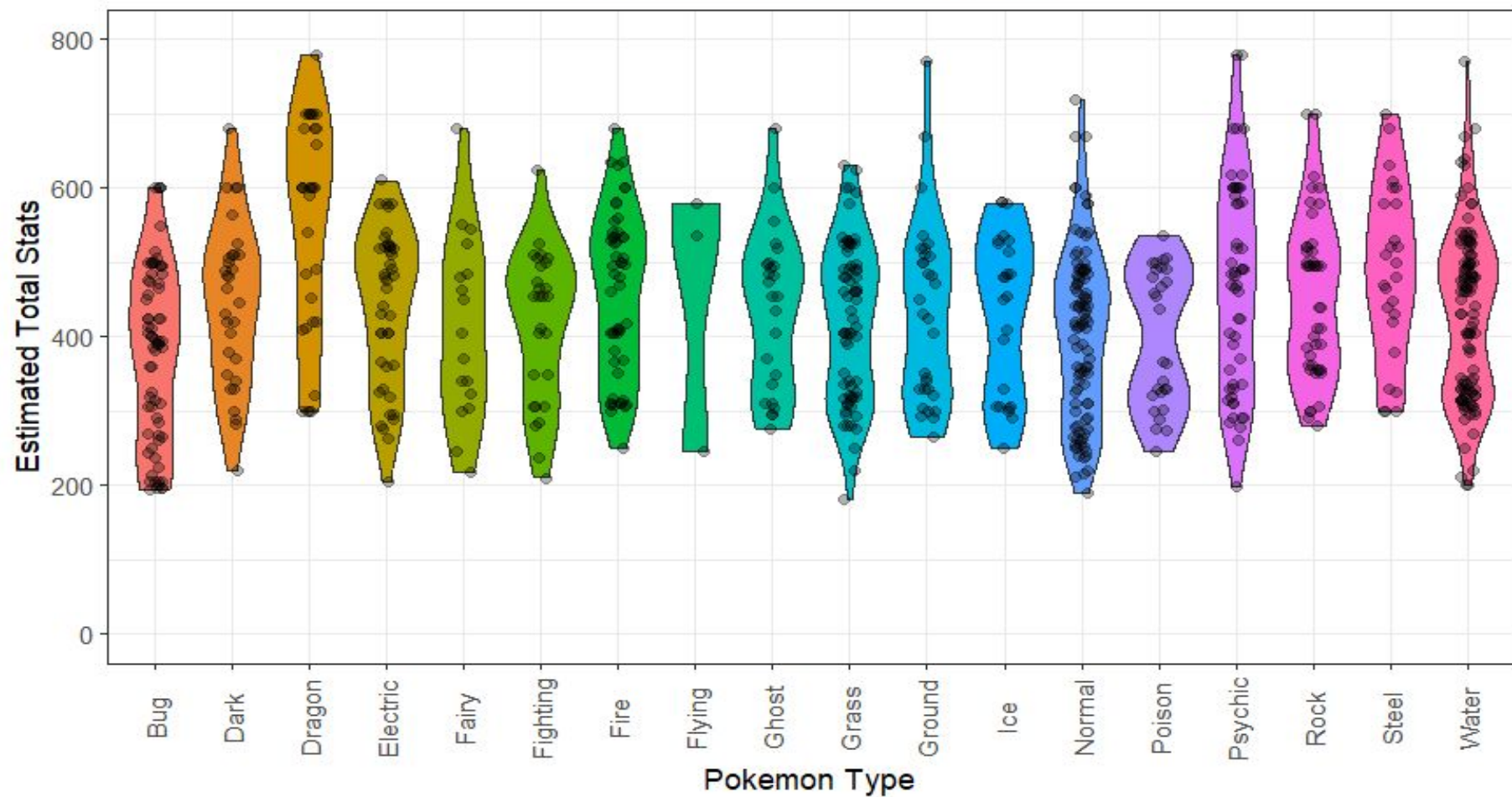
Pokemon Total Stats by Generation
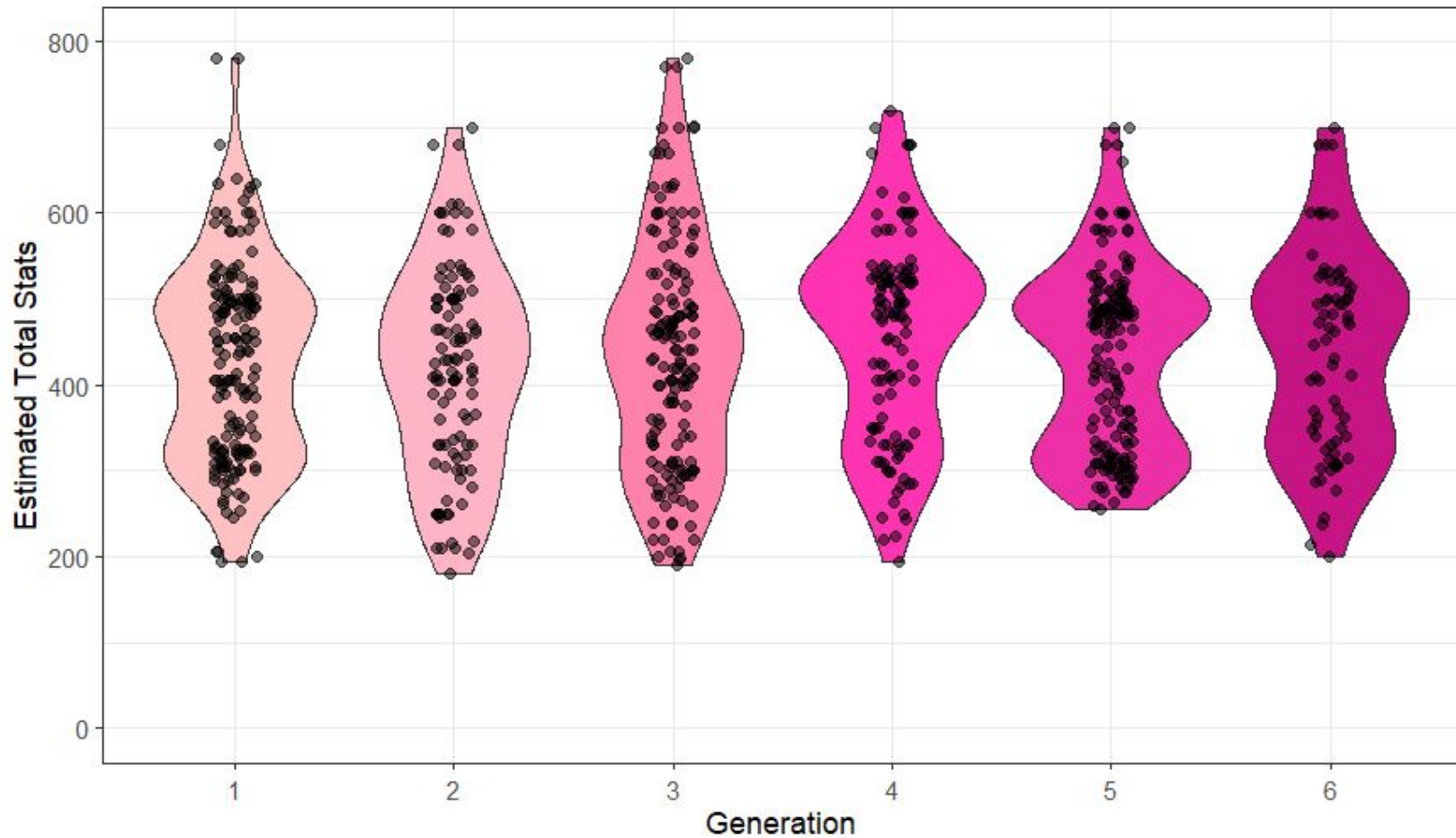
Pokemon Total Stats by Evolution
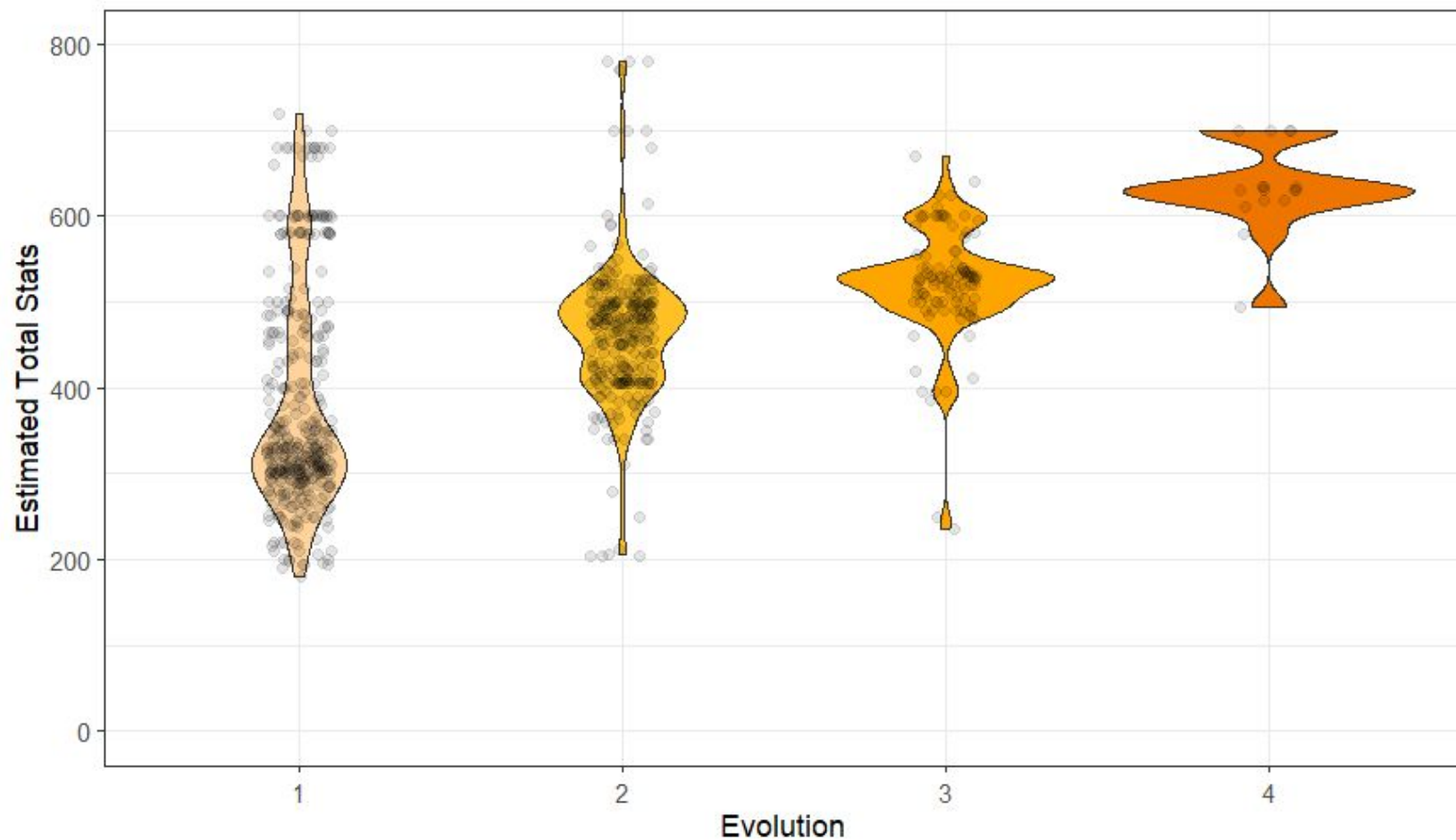
Pokemon Total Stats by Legendary Status

3

Descriptive Model & Priors

Sampling Model

$$\text{Total Stats}_i = \sum_{j=1}^{18} \beta_j \text{ Pokémon Type} + \beta_{19} \text{ Evolution}_i + \beta_{20} \text{ Legendary}_i + \varepsilon_i$$

Where $\varepsilon_i \sim N(0, \sigma^2)$ and Legendary$_i$ is an indicator variable for legendary status that is 1 when the pokemon is legendary and 0 otherwise.

Priors were formulated based on past experience playing Pokémon.

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Results

Estimated Average Total Stats

Pokémon Type	Mean Total Stats	95% CI Lower Bound	95% CI Upper Bound
Bug	399.99	399.8	400.18
Dark	382.90	355.22	411.38
Dragon	398.78	370.78	427.48
Electric	365.00	341.46	389.49
Fairy	346.37	309.49	383.45
Fighting	362.99	334.03	392.81

Estimated Average Total Stats

Pokémon Type	Mean Total Stats	95% CI Lower Bound	95% CI Upper Bound
Fire	362.62	340.80	384.54
Flying	412.18	346.81	478.31
Ghost	366.56	336.02	397.10
Grass	347.68	328.59	366.81
Ground	359.23	331.70	386.55
Ice	358.30	326.57	389.14

Estimated Average Total Stats

Pokémon Type	Mean Total Stats	95% CI Lower Bound	95% CI Upper Bound
Normal	356.81	341.36	372.18
Poison	354.53	325.85	383.37
Psychic	362.39	340.40	385.15
Rock	382.85	359.37	406.96
Steel	377.10	347.23	407.62
Water	362.62	347.25	378.04

Results Data Visualization

Five Most Desirable Pokemon Types
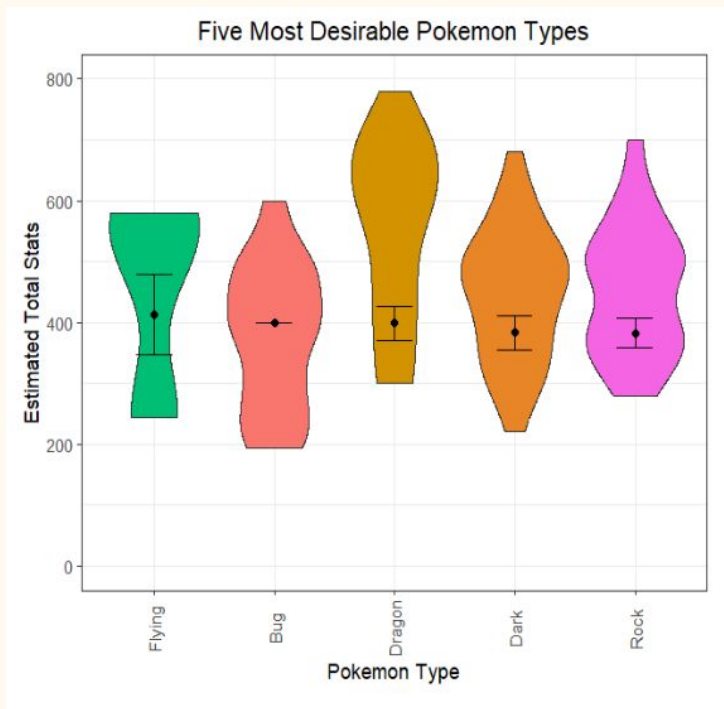
Want: Flying, Bug, Dragon, Dark, Rock

Five Least Desirable Pokemon Types
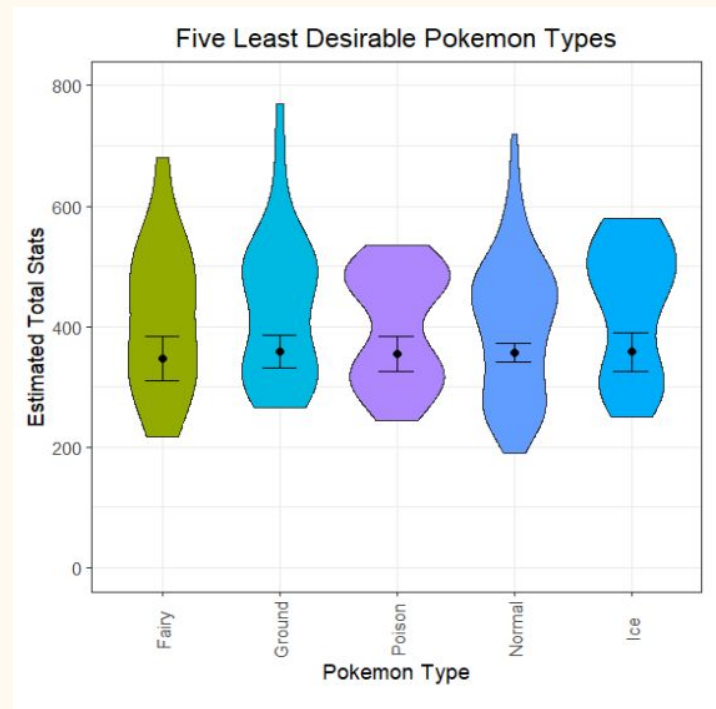
Avoid: Fairy, Ground, Poison, Normal, Ice

Next Steps & Ideas for Further Research

★ Construct Posterior Predictive Distributions

  ○ Check that they mimic the data with reasonable accuracy

★ Seek data that includes the most recent Pokémon

★ Separate it by Pokémon game

★ Re-run analysis excluding legendary Pokémon

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References

Resources

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