Exploratory Data Analysis - Report

December 8, 2020

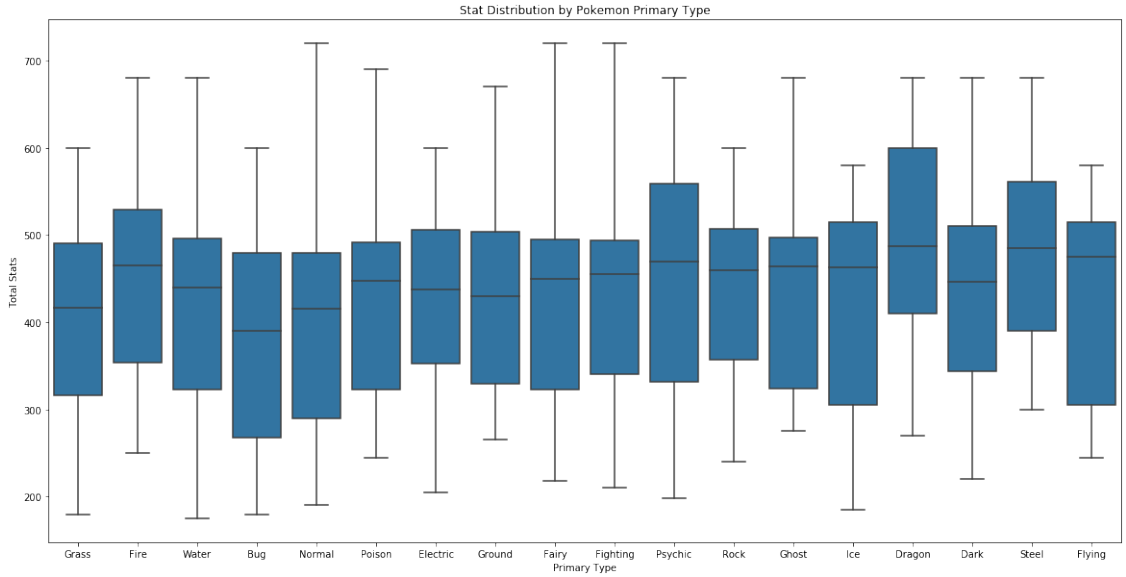
1 Exploratory Data Analysis

This is a report detailing the exploratory data analysis conducted for our Pokemon database. For specific detail on the coding process that produced these visualizations, please see the associated IPYNB file.

2 Stat Distribution Overview

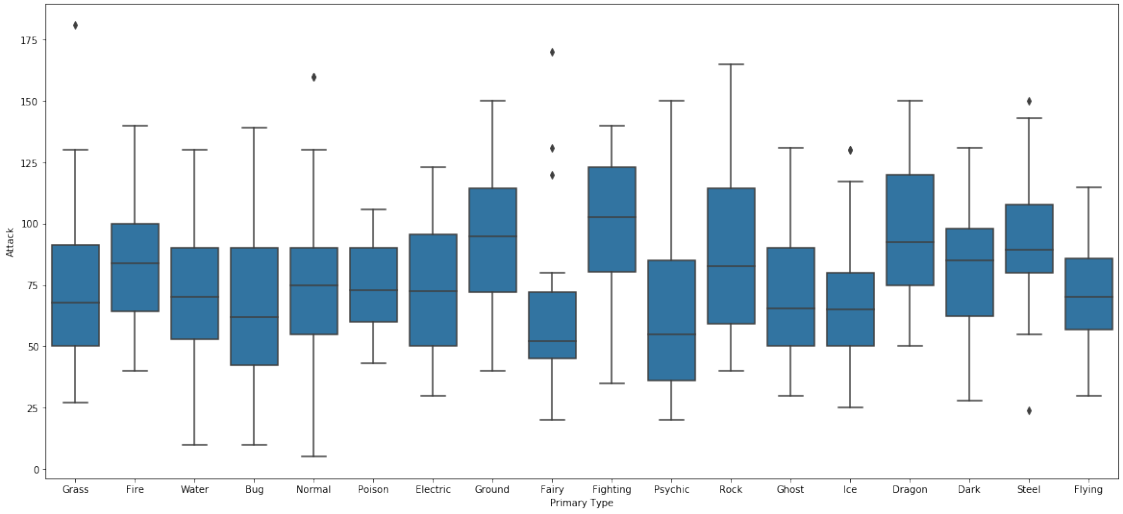
The first point of curiosity was to see how the total stat distribution varied based on Primary Pokemon Type (E.g. Are there any Pokemon types that seem to be stronger overall than others?)

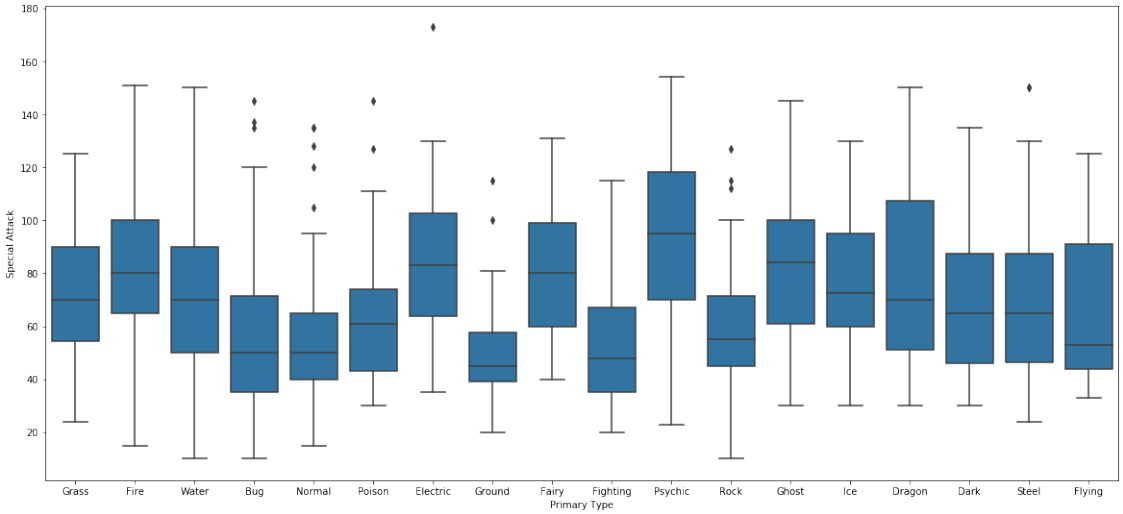
[32]:



How do these distributions look for more specific stats like Attack or Special Attack?

[36]:





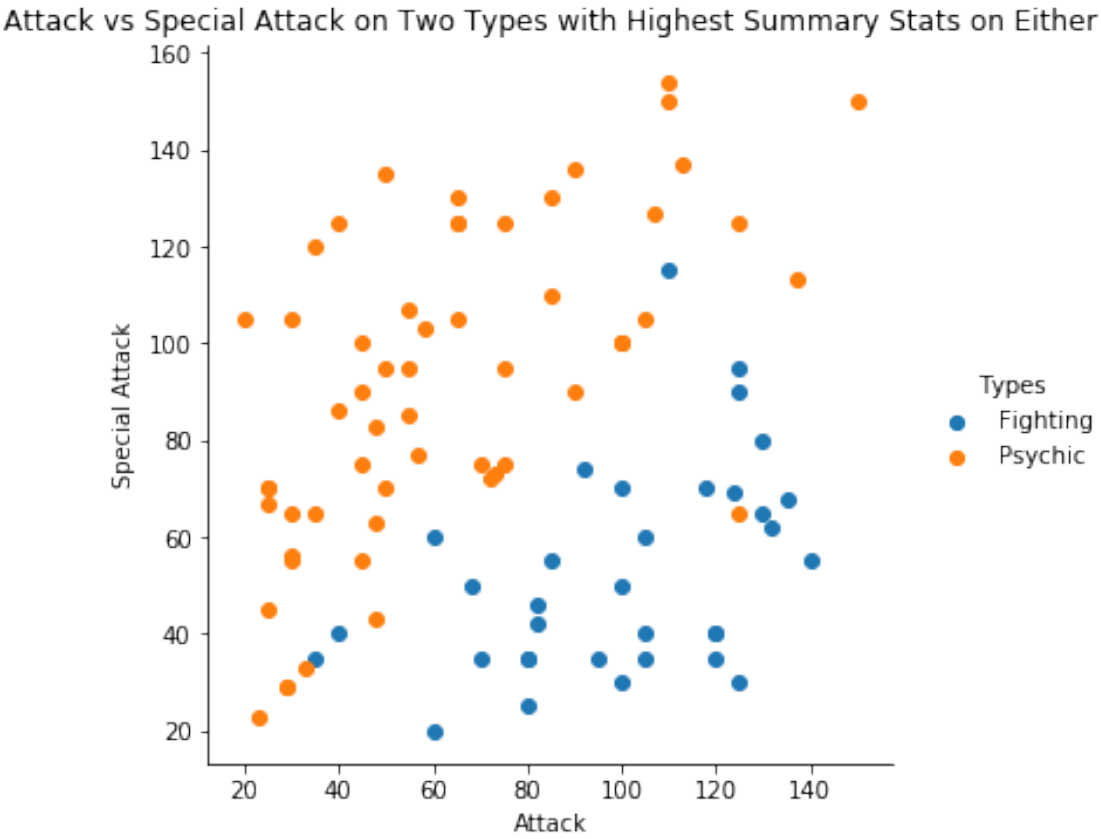
3 Observations

- Dragon type seems to be boast the strongest overall stats, with the highest median and quartile values of any primary type in Total Stats, and consistently one of the top contenders when looking at any of the stats individually. However, some of the strongest Pokemon in the game are actually Normal, Fairy, and Fighting type as represented by each of those three boxplots having a higher maximum than Dragon's max.
- Some types which have higher than average stats in Attack or Special Attack tend to have lower than average stats in the counterpart category. This disparity is particularly noticeable with Fighting type, which has the highest quartile values for Attack in the game, but some of the lowest for Special Attack, and Psychic type, which demonstrates the vice versa scenario with relatively low Attack but the highest Special Attack. (We can delve further into the relationship betwen these two variables)

4 Relationship between Attack and Special Attack

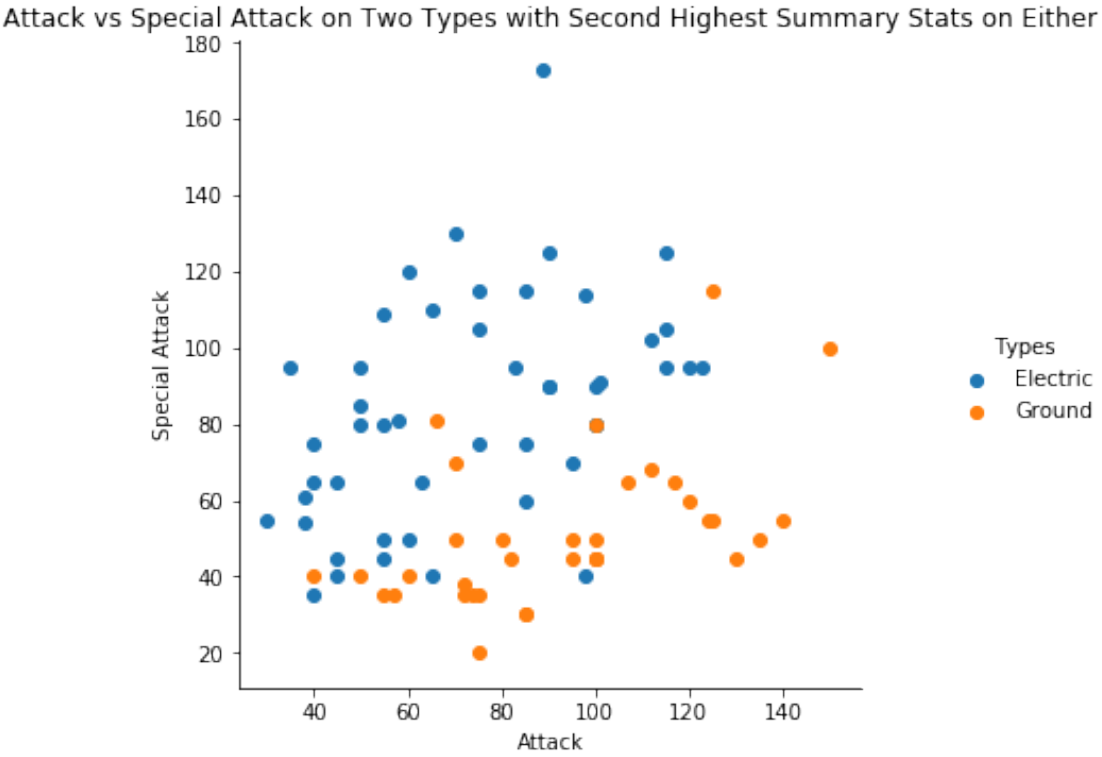
Below is a plot that shows each Fighting and Psychic Pokemon's Attack and Special Attack (Fighting and Psychic types are the two types with the highest overall Attack and Special Attack).

[38]:



Below is another plot that shows each Electric and Ground Pokemon's Attack and Special Attack (Electric and Ground types are the two types with the second highest overall Attack and Special Attack).

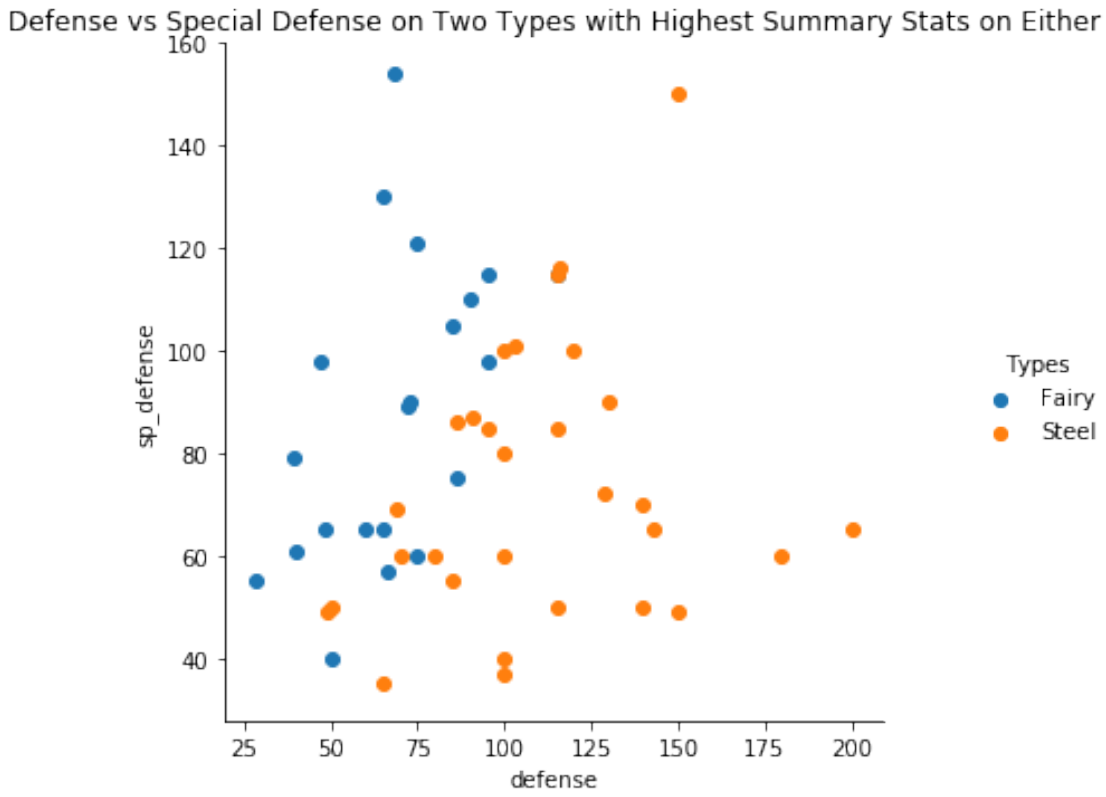
[13]:



5 Let's see if this relationship holds true for types that prefer Defense or Special Defense

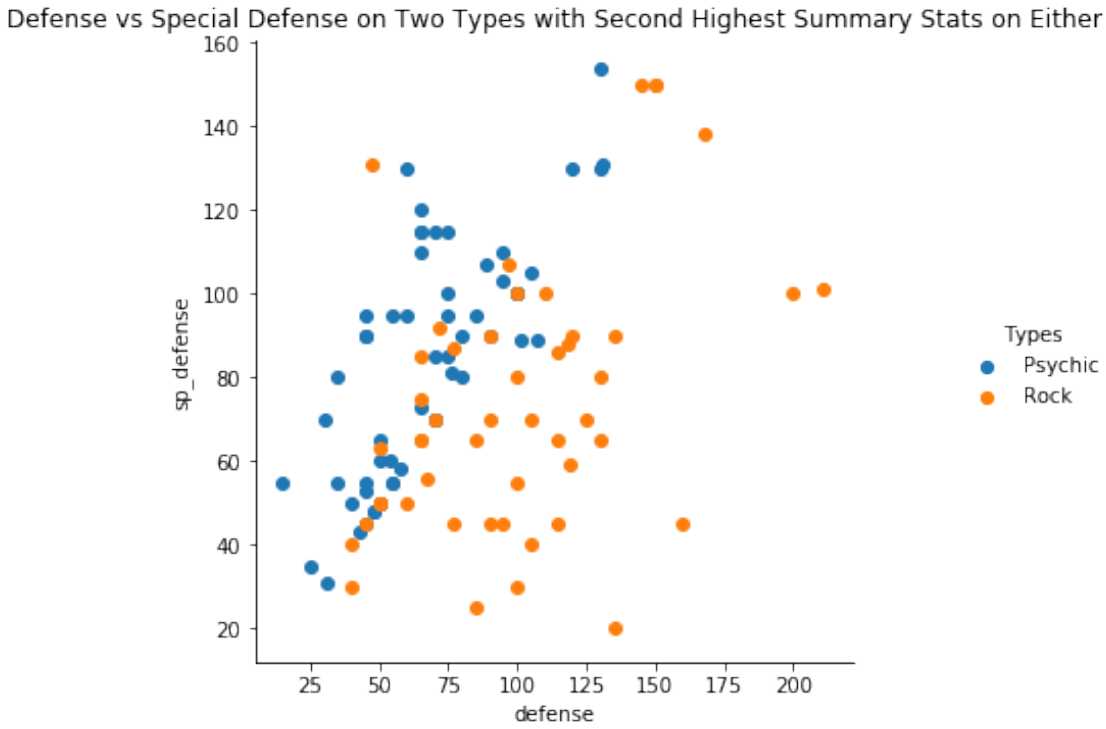
Similar to our Attack vs. Special Attack analysis above, below is a plot that shows each Fairy and Steel type Pokemon's Defense and Special Defense totals.

[14]:



And again, here is the same plot, but with the two types (Psychic and Rock) that have the second highest summary statistics on Defense and Special Defense respectively.

[39]:



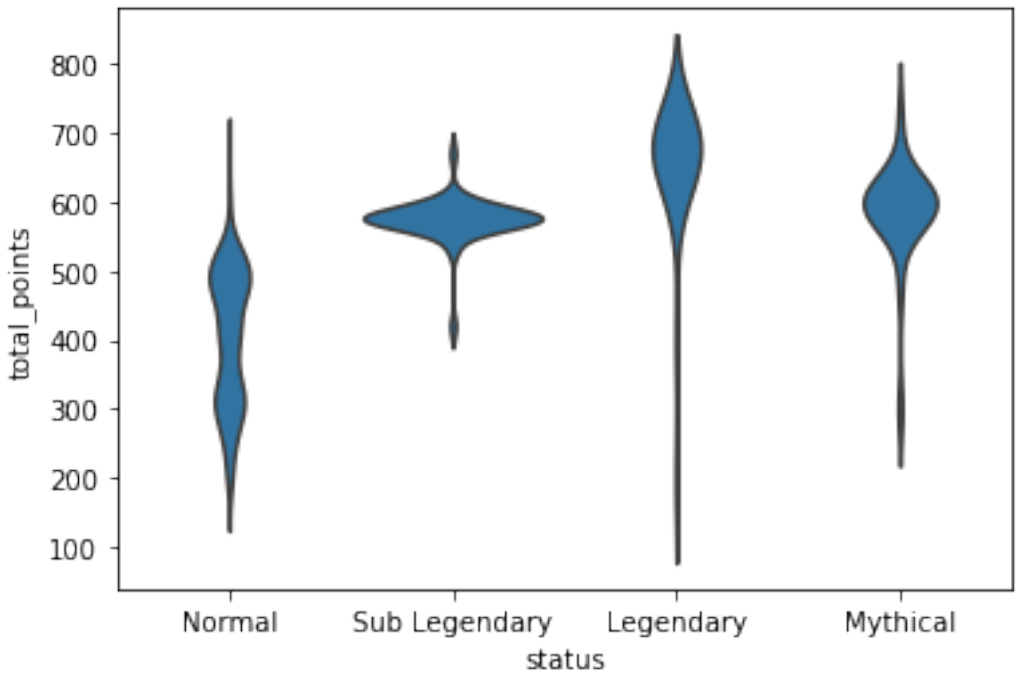
6 Pokemon Stat Overview by Status

Now that we've observed trends in Pokemon types and leanings towards specific Attack or Defense styles, let's look at what the stat distribution looks like for each Pokemon status (Normal, Sub Legendary, Legendary, or Mythical Pokemon) type.

Below is a violin plot showing total stat distributions for each Pokemon status type.

[17]:

[17]: `<matplotlib.axes._subplots.AxesSubplot at 0x20f187dbb88>`



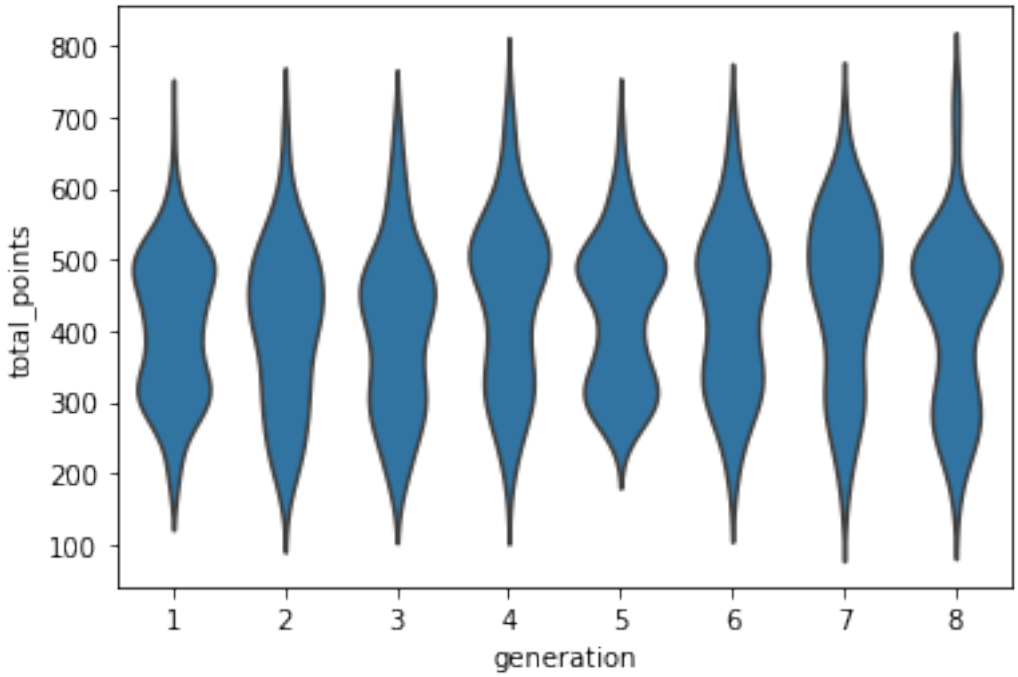
There is a clear upward trend in overall stats/power going from Normal Pokemon up to Sub Legendary and then Legendary Pokemon. Although Mythical Pokemon are considered to be even rarer than just regular Legendary Pokemon, the plot actually shows that their total stats are typically slightly below that of regular Non-Mythical Legendaries.

7 Stat Distributions by Generation

Now let's see how Generation plays an effect on total stats.

[18]:

[18]: <matplotlib.axes._subplots.AxesSubplot at 0x20f18688a48>

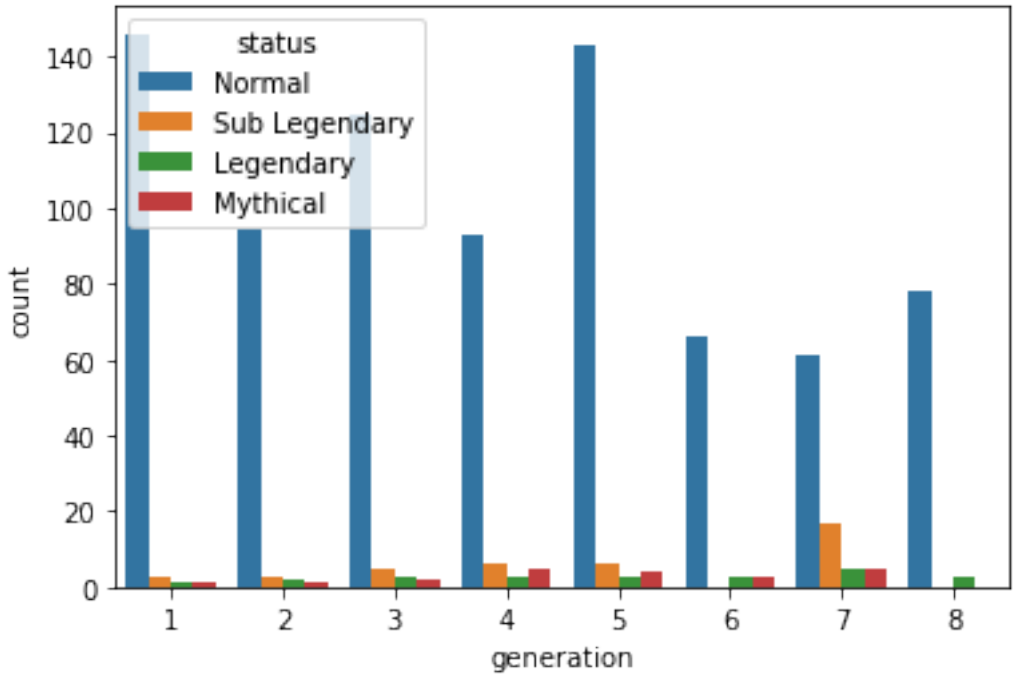


It appears that most of the generations are very well balanced against each other, all demonstrating a bimodal distribution with one peak around 300 and another around 500. Some of the more recent generations (e.g. 7 and 8) have a higher concentration around the higher stat end/~500 stat total, and generation 4 appears to have a slight edge in overall strength, but for the most part is still well balanced against the rest.

8 Pokemon Type and Status Juxtaposed Overview

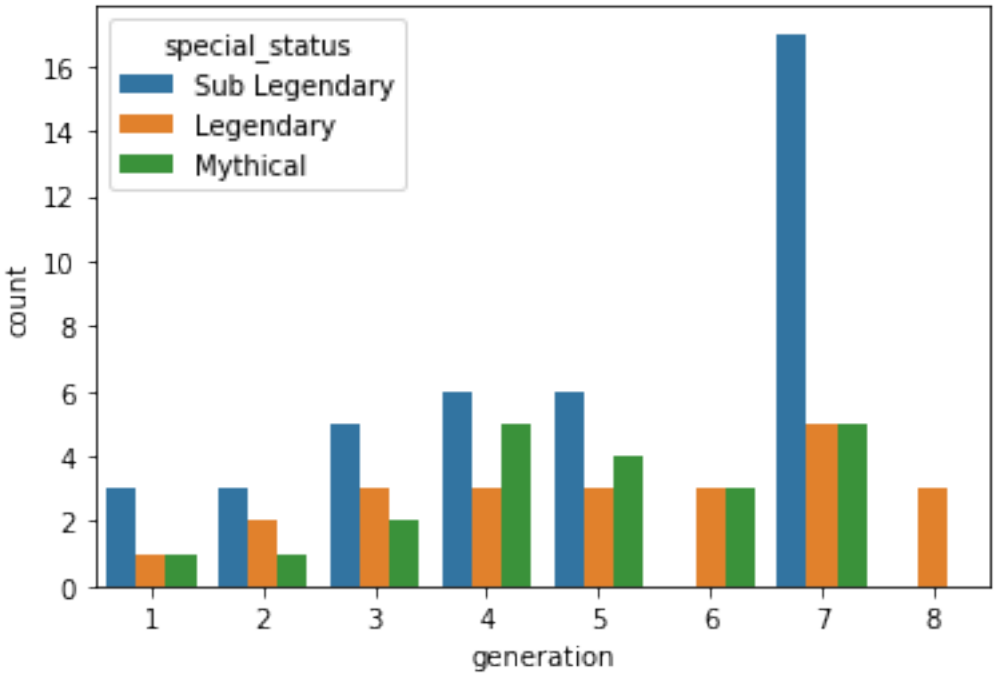
Now let's see if the slight differences between generational stat distributions reflects similarly in the differences in the number of Pokemon of different status types for each of these generations.

[19]:



This plot is a bit difficult to see so let's only take a closer look at just the non-normal Pokemon.

[21]:

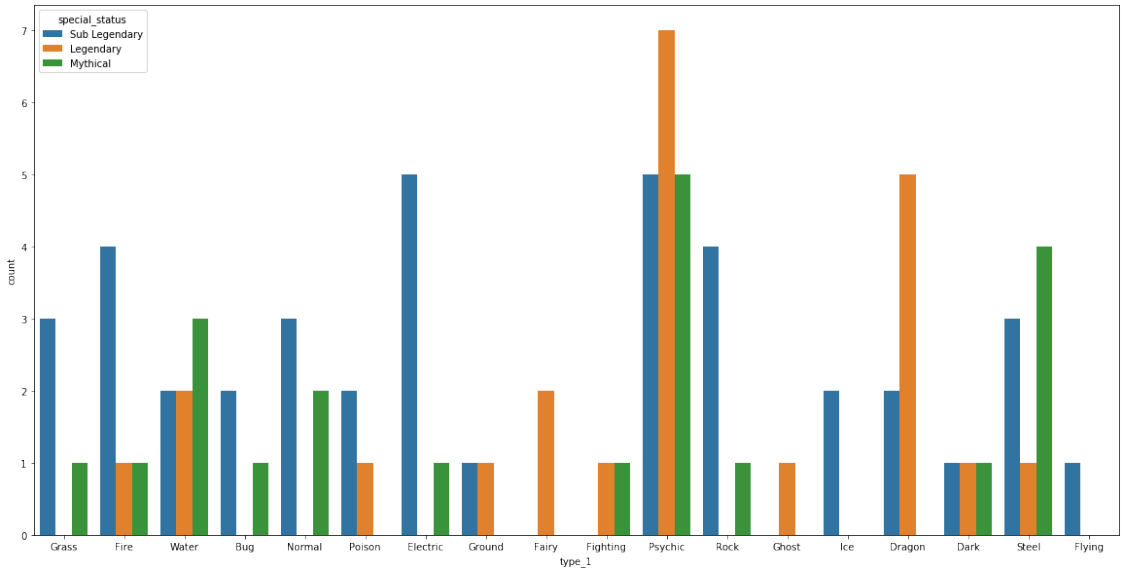


In general, it seems that as the generations progress, Nintendo adds more special pokemon (Sub Legendary, Legendary, and Mythical) with a slight dip around Generation 6 before reaching a peak in Generation 7 and then dropping back down in Generation 8.

9 Pokemon Type and Status Juxtaposed Overview

Now let's look at how many special pokemon there are by primary type.

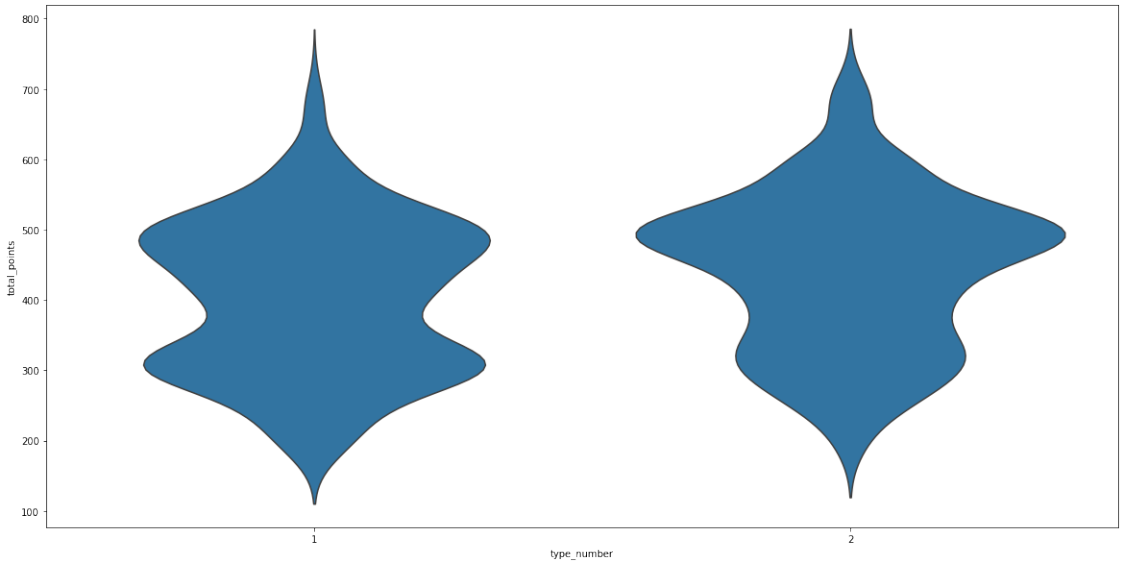
[22]:



Psychic type has the most "special" Pokemon, with the highest number of Sub Legendary (tied with Electric for 5), Legendary (7), and Mythical (5) Pokemon overall. This is interesting since when we first looked at overall stat distributions by type, Dragon type stood out as the slight winner above other types, and since we observed in the status analysis portion that being a "special" Pokemon tends to mean boasting much higher stats than "Normal" Pokemon, we would've expected Dragon types to have a much larger amount of special status Pokemon types than is the reality shown here.

10 Now let's find out if Pokemon with two types are generally stronger or have different stat distributions to that of mono type Pokemon.

[23]:



A higher proportion of dual type Pokemon are ones that fall into the higher 450-550 stat total range compared to the weaker side of the spectrum that ranges from 250-350 in total. For monotype Pokemon, they demonstrate a more even bimodal distribution with around equal peaks at the 250-350 lower peak as well as the 450-550 upper peak.

11 Finally, how about weight and height of Pokemon? Do they demonstrate any sort of trends in the overall stats of a Pokemon?

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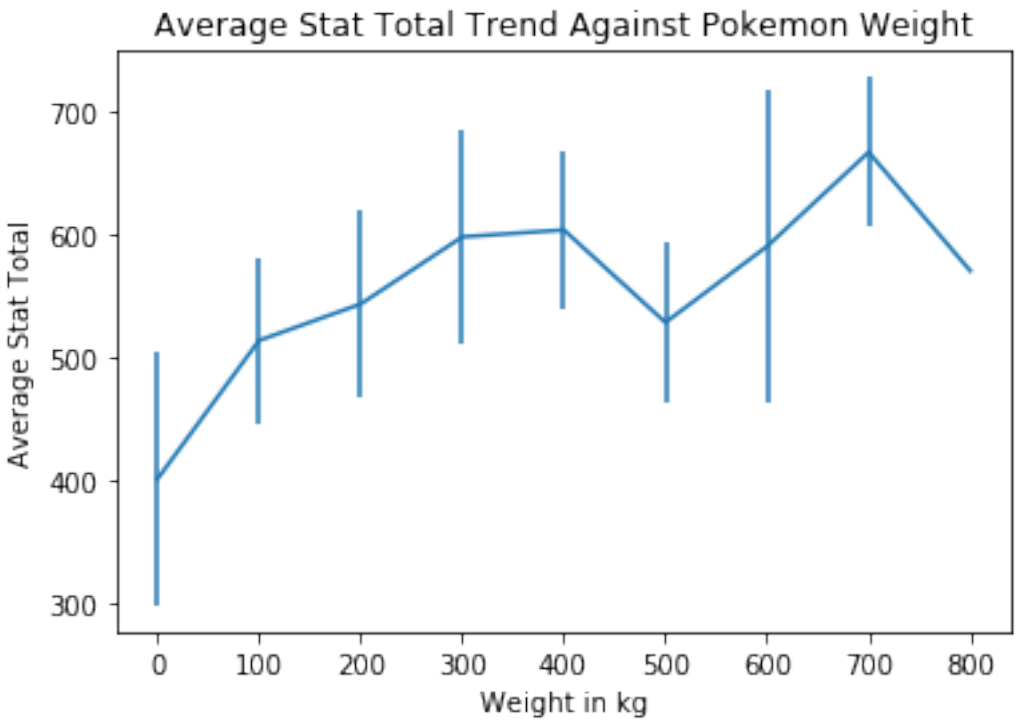
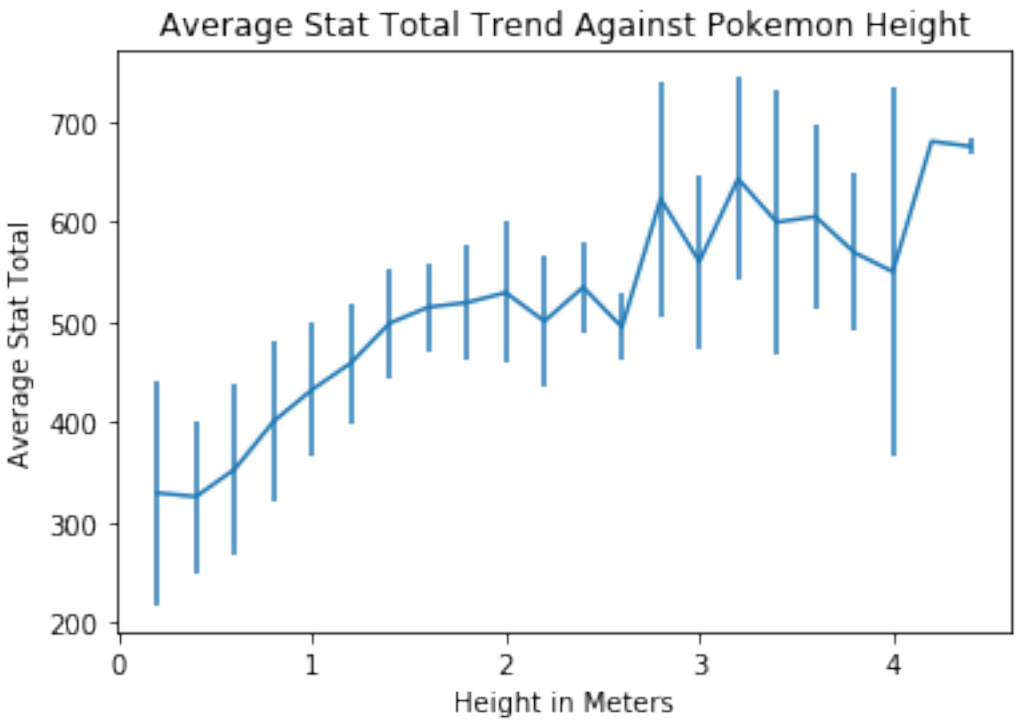


There is an overall upwards trend between Pokemon weights and average stat total/strength.

[27]:



Likewise to weight, there is an upwards trend between Pokemon height and average stat total/strength.