POKÉMON

DATA EXPLORATION AND VISUALISATION

Heléne du Plessis

DATA AND INFO

This data exploration and analysis was conducted on an Excel database of Pokémon, consisting of four sheets: Pokemon, Moves, Evolution, and TypeChart. The column names of the two sheets used in this project are outlined below.

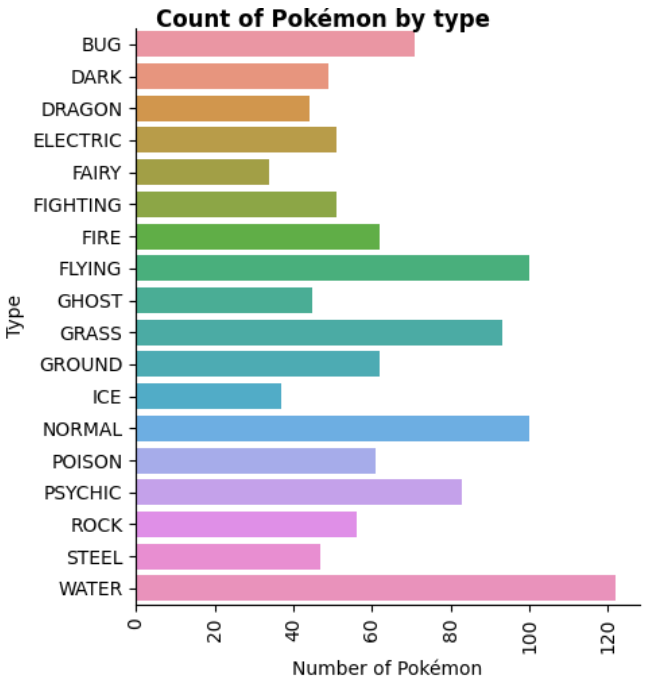
Pokemon: #, Name, Type, HP, Attack, Defense, Speed, Special Attack, Special Defense

Evolution: Evolving from, Evolving to, Level, Condition, Evolution Type

The data exploration and visualisation was conducted in Python 3, with the following software packpages: Matplotlib, Numpy, Pandas, Seaborn, and SciKit Learn.

The attribute data was normalised to allow for direct comparison between each of the attributes. Linear normalisation was used (Max-Min, and standardising to 100).

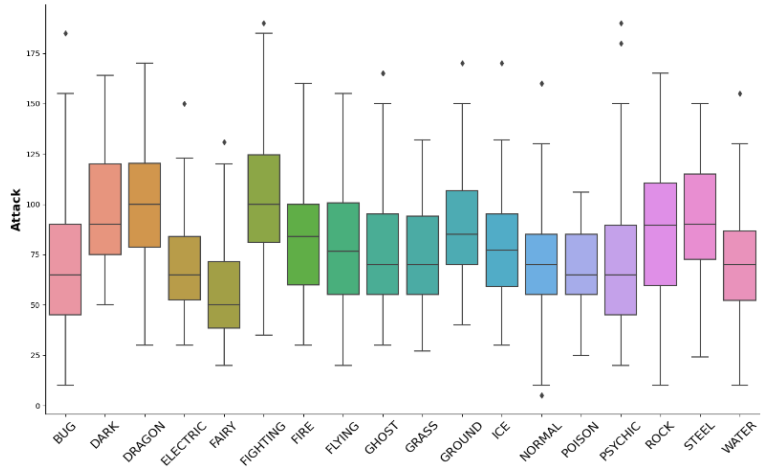
COUNT PLOT OF POKÉMON BY TYPE

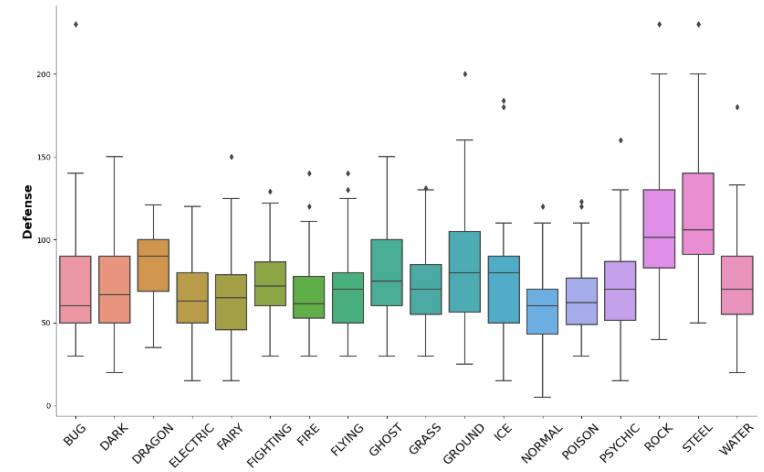


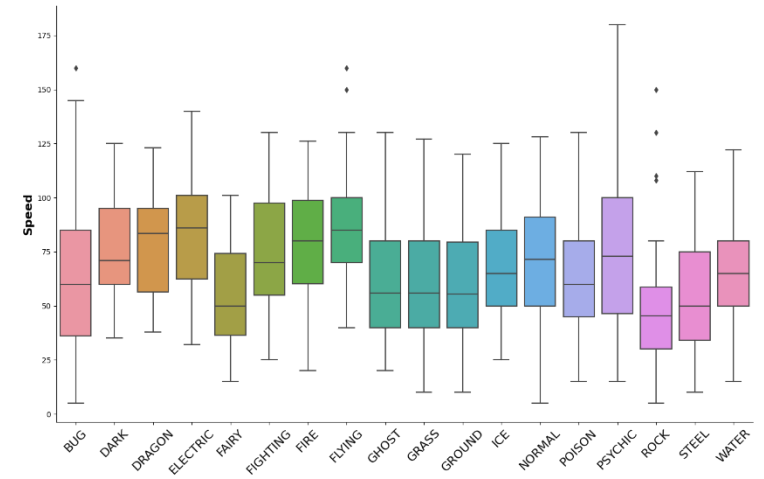
This count plot shows the number of Pokémon falling into each of the type categories. The chart shows that many Pokémon are Water type, while far fewer are Ice or Fairy. Water type Pokémon out number Normal Pokémon, which may have been expected to be the largest group.

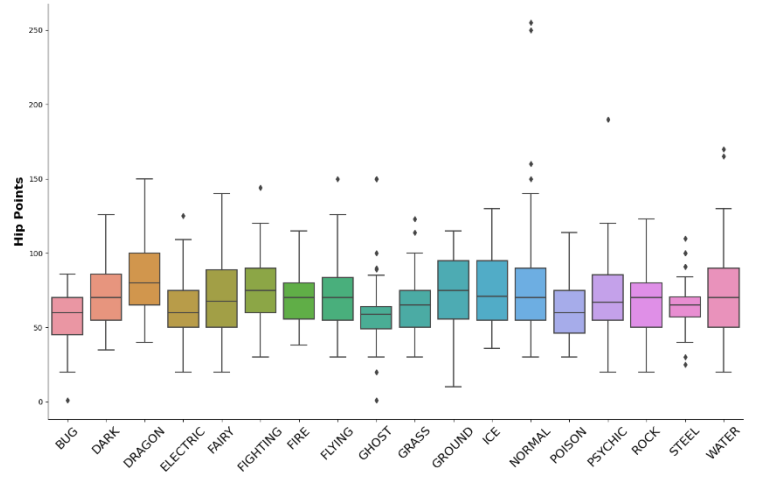
Most Pokémon fall into two type categories (*e.g.* Pidgey is both Normal and Flying). The graph would therefore not show unique Pokémon numbers if you summed the bars together.

BOX PLOT OF POKÉMON BY TYPE







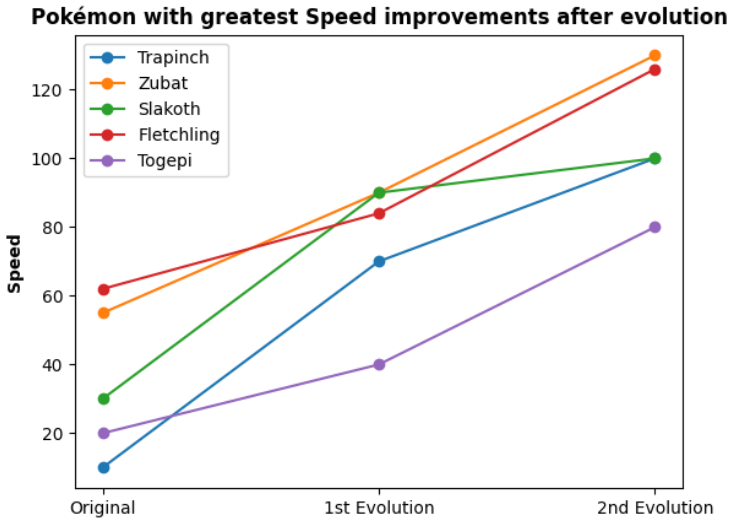


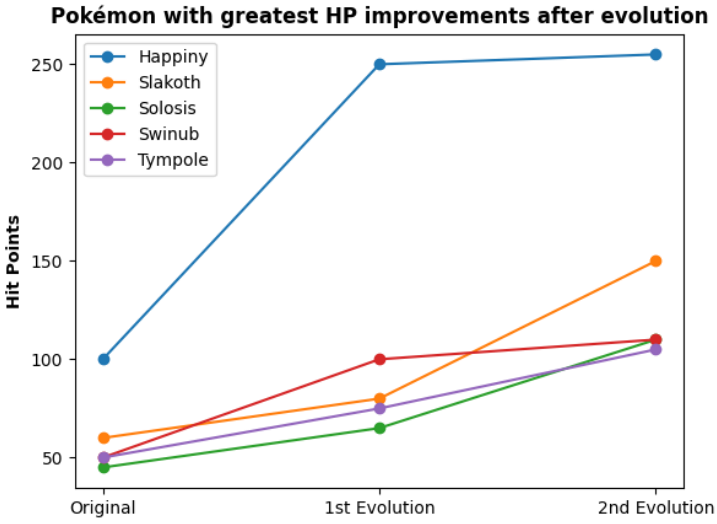
These box plots showcase the range of stats by Pokémon type for the four main characteristics of Pokémon: **Attack**, **Defense**, **Hit Points**, and **Speed**. They allow for easy comparison of group means, interquartile ranges, and outliers across groups.

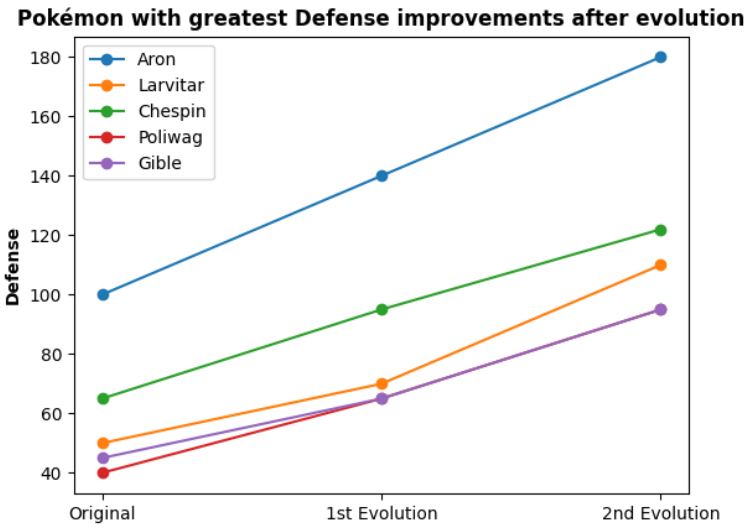
The box section of the plot shows the range (from the 25th-75th percentile), while the black line in the box shows the group's median. The whiskers of the plot show the spread of the distribution (in this case, 1.5x the IQR). Outliers are shown as floating points above or below the box and whiskers.

This type of graph allows for insights like Rock-type Pokémon are the slowest group based on **Speed** – with Steel-type as a close second. To compensate for this, both Types have the highest overall **Defense** scores, as you would expect (heavily armoured, but slow). The outliers for **Speed** within the Rock-type are interesting, because they are some of the fastest Pokémon in the setting, within the slowest group overall.

LINE CHARTS – ATTRIBUTE IMPROVEMENT AFTER TWO EVOLUTIONS







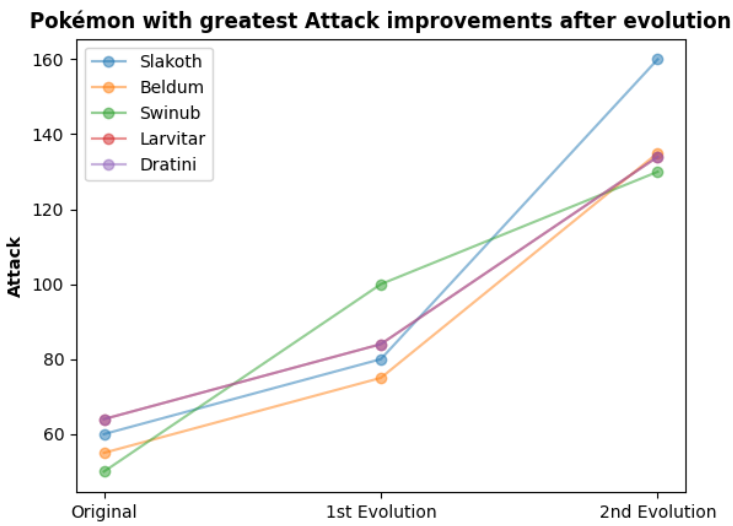
These line charts demonstrate which Pokémon are worth investing in for one or more evolutions if you have an interest in leveraging a particular attribute (**Speed**, **Attack**, *etc.*).

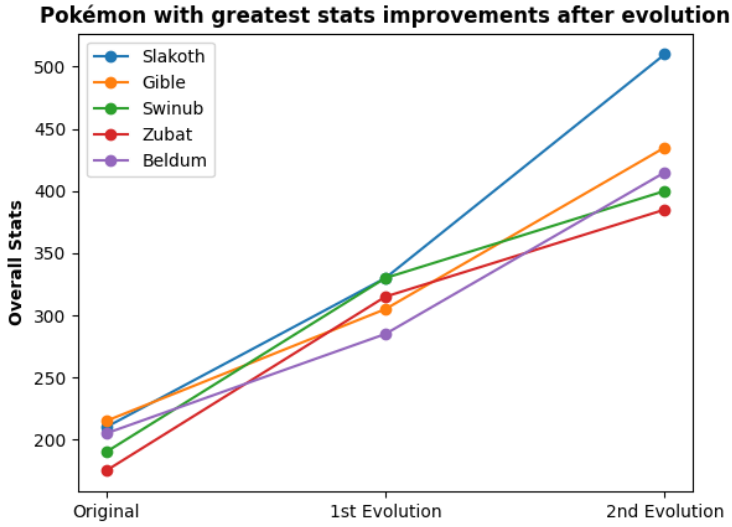
These charts show the top 5, but this number can be easily adjusted by altering the sub-setting code.

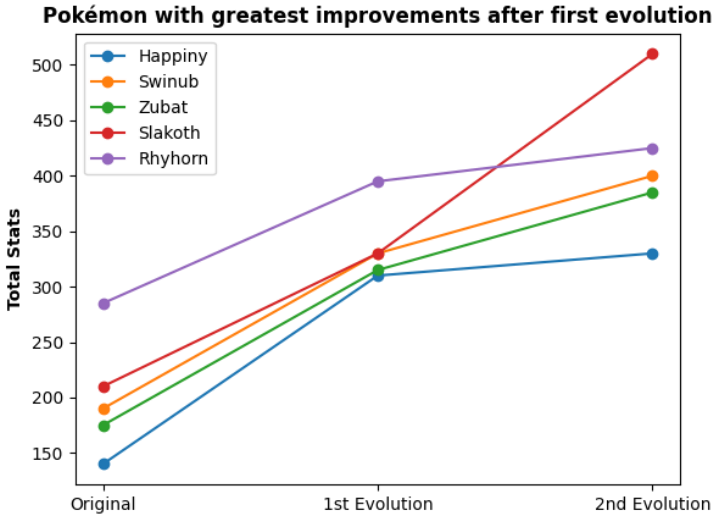
These charts allow for multiple kinds of insights – for instance, Happiny has an extremely large increase in **Hit Points** after its first evolution, and a negligible increase after its second. This suggests that it would make a good candidate for the first evolution, but not necessarily for the second in terms of **Speed**.

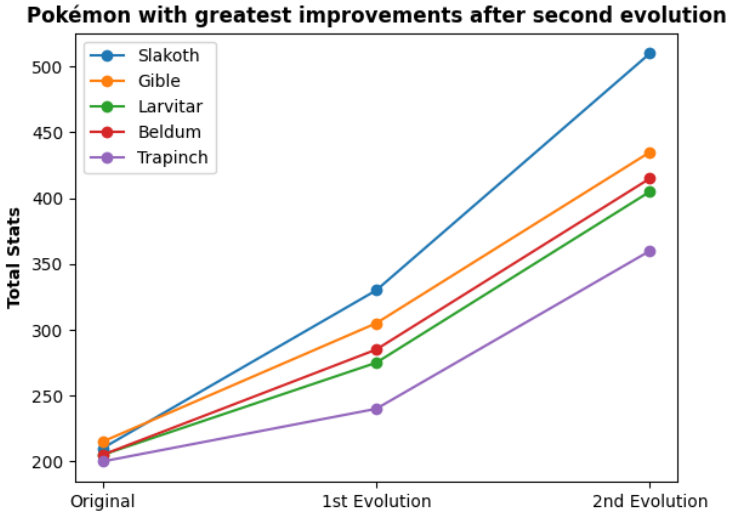
It is also interesting to note when the same Pokémon occurs in multiple top 5 attribute increase charts – in this case the Slakoth (a Normal Pokémon) appears in three of the four charts, with only **Defense** improvements not appearing in the top 5. This is especially apparent in the chart showing overall stats improvements, with the Slakoth showing the greatest improvement, particularly after the second evolution.

When comparing attribute score increases between first and second evolutions, it becomes apparent that some Pokémon receive a significant initial boost with their first evolution, while their second is somewhat underwhelming. Others receive their significant boost only after the second evolution. Only one Pokémon falls in the top 5 for both the first and second evolutions – the Slakoth.









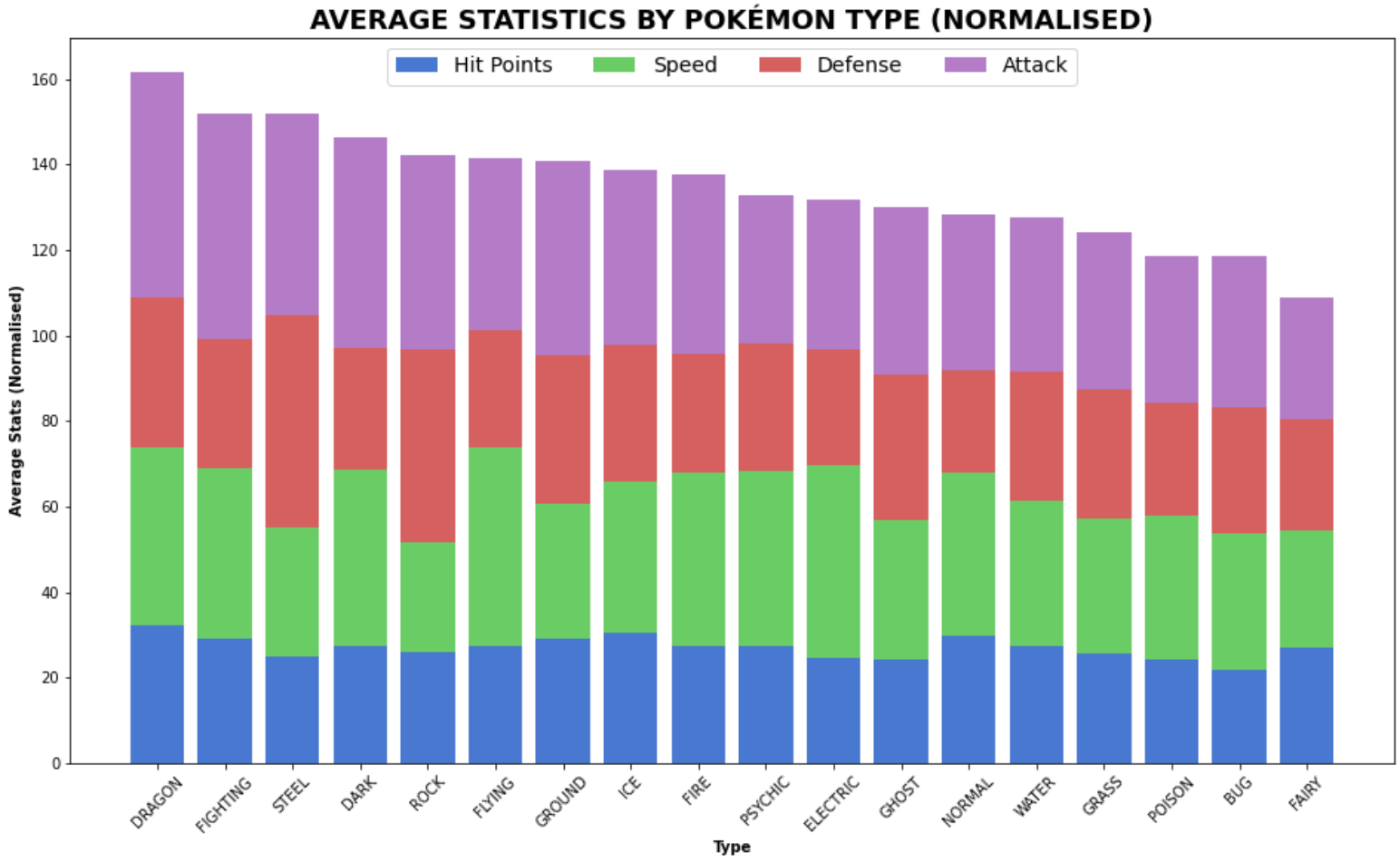
STACKED BAR CHARTS

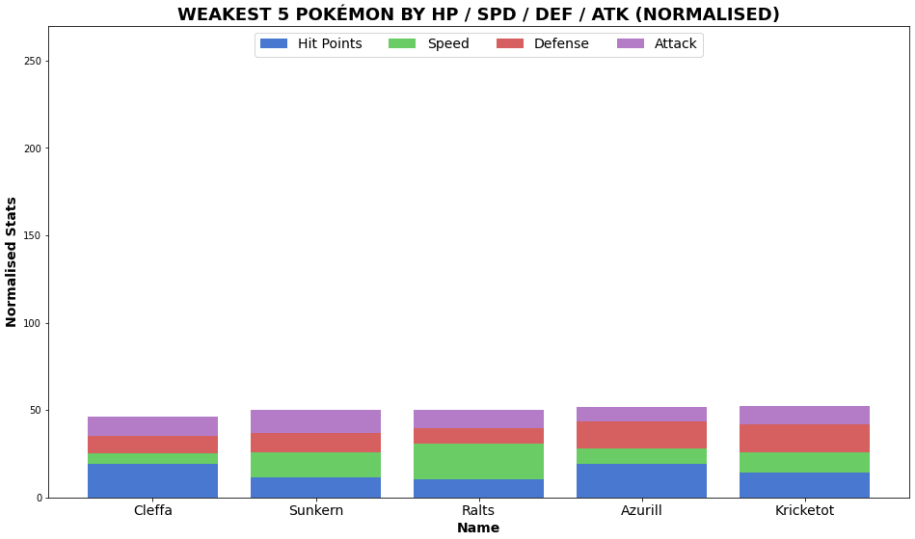
Stacked bar charts are a good way of comparing multiple columns across groups or rows. For these charts the attribute scores were normalised in order to be directly comparable to one another on the same scale.

In this case I wanted to see which Pokémon type had the best average attribute stats overall, and how much each attribute contributed to their total.

Dragon Pokémon have the greatest average stats overall, with a greater **Attack** score at the expense of **Defense**.. Fighting Pokémon come in second, with Steel in a close third place.

Fairy has the lowest stats on average, although they have higher average **Hit Points** than many other groups despite having lower stats overall.

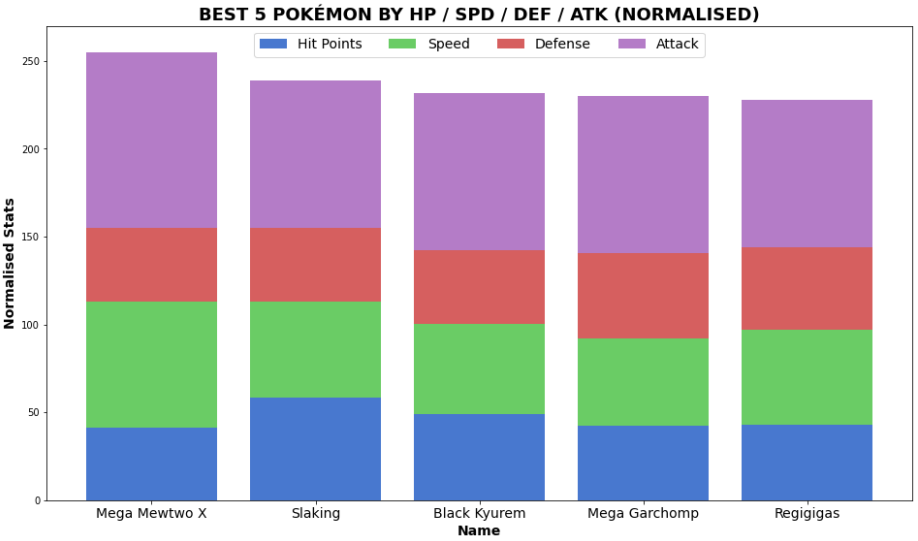




I thought it would be interesting to compare the five weakest Pokémon with the five strongest (in terms of their overall attribute stats).

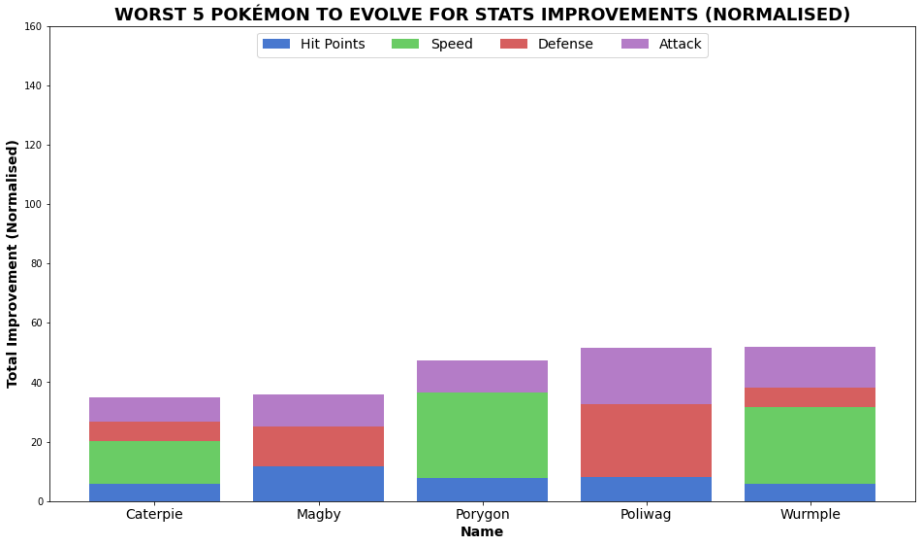
I set the y-axis range to be the same for both graphs, so they are directly comparable.

The weakest Pokémon in the entire data set is the Cleffa (a Fairy type Baby Pokémon).

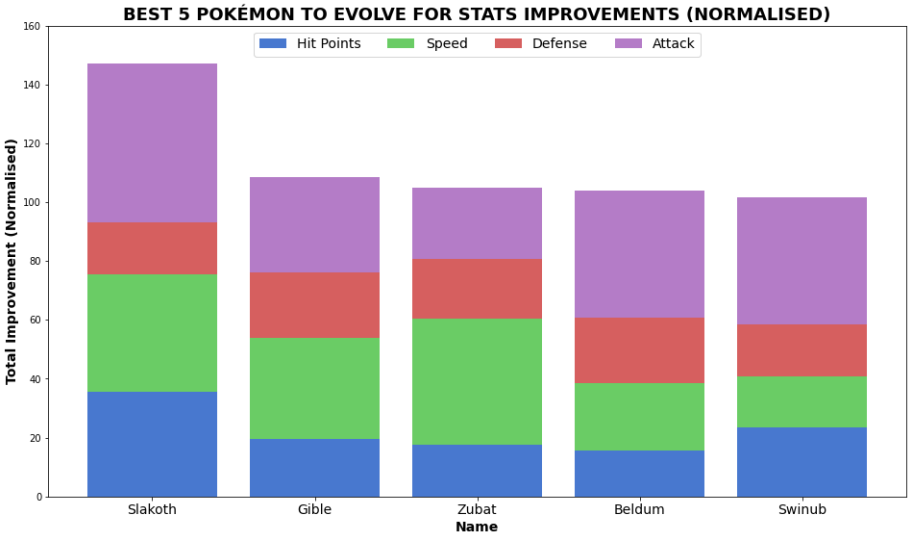


Two of the five strongest Pokémon are Mega evolution Pokémon – which are intended to be the ultimate version of that particular Pokémon. Black Kyurem (a legendary Dragon/Ice type Pokémon) is also included in the top 5, along with the surprising result of the Slaking (the final evolved form of the Slakoth). The final member of the top 5 is the Regigigas (a Normal legendary Pokémon).

I wanted to compare the best and worst Pokémon to evolve in terms of their improvements in stats after two evolutions.



The Caterpie (a Bug Pokémon) has the lowest increase in stats in this dataset. Three of the Pokémon in the bottom five showed no increase for one of their attributes after two evolutions. There was no increase in **Speed** for the Magby (a Fire Baby Pokémon) and the Poliwag (a Water Pokémon), and no increase in **Defense** for the Porygon (a Normal Pokémon).



The Slakoth (unsurprisingly, given earlier charts) has the largest increase in stats after two evolutions. It has a significantly larger increase than the Pokémon in second place, the Gible (a dual-type Dragon/Ground Pokémon).

CONCLUSION

The Slakoth is one of the most under-rated Pokémon given its power after two evolutions. It falls into the top 5 strongest Pokémon, despite not being Legendary, Mythical, or having a Mega evolution variant. After each evolution it receives large increases in each of its attributes, and only its **Defense** attribute increase is not in its respective top 5. Although there are Pokémon which may beat each of its stats individually (*i.e.* have a higher **Attack**, or more **Hit Points**), when all stats are considered together, only the female Mega Mewtwo is higher.

Pokémon images from pokemon·com, credit goes to the Pokémon Company