**Pokemon Power Creep – A Statistical Analysis**

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**Abstract**

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Imagine creating a game that must remain compelling for 25 years. How would you continuously introduce new concepts to excite and engage new and returning players? This is the problem most game developers face. There are 2 ways developers solve this problem: Break the fundamental rules of the game or introduce elements that are more powerful and impactful things than the previous. While these approaches gives the audience a more compelling game, introducing overpowered characters or mechanics will only temporarily boost the excitement, and will often lead to a disruption in overall game balance. This phenomenon is called power creep.

To better understand the nature of power creep, lets look at a popular game, League of Legends. League of Legends is a MOBA (Multiplayer Online Battle Arena) where the main premise is to take down the enemy’s nexus. After about 10 years of development, Riot has released champions that have: the potential to revive teammates (Akshan), dashes and invisibility that reset on kills (Akshan, Aurora), 4 dashes in one ability (Bel’Veth), uncapped attack speed champion (Bel’Veth), dashes every time an ability is used (Ambessa), and a champion that has a dash that is an unstoppable, airborne, gives armour and magic resistance, and does damage based on the targets maximum health in one ability (K’sante).

Pokemon does not shy away from power creep either by continuing to introduce increasingly more powerful Pokemon through its stats, abilities and moves with each new generation. For instance, giving Zacian one of the best typings in the game – fairy and steel – and giving it great overall stats with an insanely broken ability, Intrepid Sword – giving it a +1 attack boost to Zacian every time it switches in. Similarly, Urshifu breaks the game mechanics by being the first Pokemon to be able to hit through Protect/Detect/Spiky Shield (without the move Feint) with the ability Unseen Fist. Furthermore, Urshifu’s signature moves – Wicked Blow and Surging Strikes – are guaranteed to critical hit, ignoring attack drops like Intimidate or defensive boosts, making typical ways of slowing down physical Pokemon ineffective.

With 25 years of development of Pokemon, this study intends to investigate has Gamefreak statistically avoided the power creep phenomenon that is present in most series-based games? To explore this, the following research questions are addressed: is there an overall increase in stats throughout the generations? Has there an increase in the number of “good to great” types per generation? How do we define a “good” or “bad” type? Is average base power of a Pokemon move affected by power creep? Do max base stats increase as the Pokemon series progresses?

**Methodology**

This study employs mainly quantitative data such as base stats of Pokemon, type chart, movebase power and accuracy, and the generation number to compare key metrics. Data in this study was mainly collected by *PokeAPI*, which is an API (Application Programming Interface) where data about any Pokemon or generation can be gathered. Additionally, the type effectiveness chart which outlines super-effectiveness, not-very-effective, and no effect was sourced through Kaggle, which is a platform for data scientists and data analysts to analyze a variety of different publicly available datasets created by users.

Given the entire dataset was forked through GitHub, there were extensive unnecessary data was required removal to ensure data relevancy. The necessary datasets were initially cleaned through the *clean.py* program, removing any empty cells in the csv. Then, data was further processed in an SQL database, and any unnecessary data was removed here. Within the *PokemonCompleteStats.xlsx,* additional columns were added to using SQL joins and Python such as Generation ID, base stat total, and Pokemon’s typing.

**Findings/Results**

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| Figure 1 represents the average base stat total per generation, sorted by highest base stat total per generation to lowest |

*Figure 1* illustrates the highest average base stat total per generation, with the top 3 being Generation 9 (Scarlet and Violet), generation 7 (Sun and Moon), and Generation 4 (Diamond, Pearl, Platinum), with the bottom 3 being generation 1 (Red, Blue, Yellow), Generation 2 (Gold and Silver), and generation 3 (Ruby, Sapphire, Emerald). Since some generations have more or less Pokemon, the introduction of weaker or stronger Pokemon could skew the dataset for that generation. For instance, in generation 6, there were 72 Pokemon introduced. Therefore, having Pokemon like Fletchling and Bunnelby can influence the average massively.

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| Figure 2 represents the median base stat total per generation |



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| Figure 3 represents the number of abilities introduced every generation |

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| Figure 4 represents the average base power between damage classes (physical/special) per generation |

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| Figure 5 represents a vertical heatmap of the max base stats per generation |

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| Figure 6 represent the ranking of typing’s based on offensive and defensive capabilities |

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| Figure 7 represents the weighted average of typings based on how many Pokemon of a certain type were introduced in that generation |

* Discussion
  + Implications
  + Limitations + further research opportunities
* Conclusion
  + Summary of findings
  + Significance
  + Final remarks
* References
  + PokeAPI