Conclusion

Overall, the models improved in quality when more parameters were added, but only up to a point. The inclusion of interactions between the variables considered had variable impacts on both model quality and estimates of variables coefficients. While the interaction between using a specified move, Stealth Rock, and the inclusion of a specific Pokémon provided a more meaningful estimation of a player's liklihood to win a Pokémon battle, it did not meaningfully improve the model beyond the simple inclusion of Pokémon and Mega-Pokémon composition. Nonetheless, interacting the use of Stealth Rock with other move variables provided more definite results, both in improving model quality and highlighting the robustness of using Stealth Rock with other moves. Overall, only two of the four entry hazards were statistically significant across model specifications. These moves were Stealth Rock and sticky web respectively, and both contributed a positive impact on the marginal probability of win outcome. Surprisingly, the interaction of Stealth Rock with sticky web was not as definite and varied considerable across model specifications. Nonetheless there is evidence that different entry hazards contribute differently to a player's win outcome, and the use of Stealth Rock and dragon tail contributed a positive marginal effect on a player's game outcome via a utilization of move synergy. This result should be taken with a grain of salt however, as the the coefficent of using both Stealth Rock and dragon tail was always smaller in magnitude to only using Stealth Rock.

There are a number of different methods to extend this study. These include the expansion of the Pokémon roster, the expansion of the moveset considered, the expansion of the number of interactions between the variables used, and the expansion of the data to include different Pokémon battling formats. Each will be detailed in the order provided.

The most obvious extension to this study is the inclusion of more Pokémon. With the recent release of Pokémon Sun and Moon, both Pokémon and variants of previous Pokémon expanded the number of possible Pokémon to choose from. With 81 new Pokémon to choose from, there is a clear opportunity to see if the same results found in this study have continued to dominant the Pokémon battling scene. Similarly, Pokémon Sun and Moon added 80 new moves. Though no new entry hazards were added in the latest iteration, there are a host of other moves to consider. These include both the 80 new moves and moves simply not detailed previously. Additionally, the number of specific moves considered in this study is limited.With well over 700 different moves even before Sun and Moon, this point can apply even to the data used in this study.

Furthermore, the only format used in this study is the OU format. It would be interesting to see if the use of entry hazards had the same effect when either the Pokémon were not chosen by the player, as found in Random Battles, or if the roster of Pokémon was further restricted, as is found in lower tier battle formats such as Under Used. If the results of this study were verified in other formats, the study would greatly improve its external validity.

It is important to bear in mind that the observations used only span the course of a day. By expanding this to a weeks, or even a months, worth of data, the results may lead to entirely different conclusions. At the very least however, this study has proved that entry hazards significantly impact the marginal probability of winning a game. These results are robust to a series of specifications, which include Pokémon choice, Mega-Pokémon choice, and interactions between different moves. Additionally, the inclusion of each of these components improved the quality of models, but only up to a point. Given the number of parameters explored in this study, it is interesting to see an drop in model quality after parameters were included to provide a rough indicator of what Pokémon used Stealth Rock.

Out of all the formal and informal hypotheses explored in this study, one remains consistently true: Pokémon remains a complex game that cannot be diluted into simple prescriptions of using one Pokémon over another. The world of Pokémon is expansive and consistently evolving, but is always open to inquiry for those willing to explore and dig through the data.

Table 1: Pokémon Summary Table 1-40

Statistic	Mean	St. Dev.
Abomasnow	0.008	0.087
Absol	0.012	0.107
Accelgor	0.003	0.051
Aerodactyl	0.013	0.114
Aggron	0.014	0.118
Alakazam	0.067	0.249
Alomomola	0.006	0.076
Altaria	0.034	0.182
Ambipom	0.009	0.092
Amoonguss	0.016	0.125
Ampharos	0.010	0.099
Arbok	0.001	0.032
Arcanine	0.025	0.155
Archeops	0.003	0.054
Ariados	0.001	0.033
Armaldo	0.002	0.046
Aromatisse	0.001	0.026
Articuno	0.002	0.046
Audino	0.002	0.049
Aurorus	0.002	0.046
Avalugg	0.003	0.053
Azelf	0.011	0.103
Azumarill	0.105	0.307
Banette	0.006	0.076
Barbaracle	0.002	0.046
Basculin	0.0001	0.010
Bastiodon	0.001	0.036
Beartic	0.001	0.028
Beautifly	0.0004	0.019
Beedrill	0.015	0.121
Beheeyem	0.001	0.029
Bellossom	0.0004	0.020
Bibarel	0.0005	0.022
Bisharp	0.082	0.274
Blastoise	0.022	0.148
Blissey	0.018	0.135
Bouffalant	0.002	0.039
Braviary	0.002	0.045
Breloom	0.074	0.262

Table 2: Pokémon Summary Table 41-80

Statistic	Mean	St. Dev.
Bronzong	0.005	0.069
Butterfree	0.002	0.040
Cacturne	0.002	0.046
Camerupt	0.003	0.052
Carbink	0.001	0.027
Carnivine	0.0002	0.013
Carracosta	0.002	0.044
Castform	0.0005	0.022
Celebi	0.031	0.174
Chandelure	0.020	0.140
Chansey	0.059	0.236
Charizard	0.139	0.346
Chatot	0.002	0.048
Cherrim	0.0005	0.022
Chesnaught	0.010	0.101
Chimecho	0.0001	0.012
Cinccino	0.005	0.067
Clawitzer	0.002	0.044
Claydol	0.002	0.041
Clefable	0.102	0.303
Clefairy	0.0004	0.019
Cloyster	0.020	0.140
Cobalion	0.005	0.067
Cofagrigus	0.007	0.084
Combusken	0.001	0.032
Conkeldurr	0.068	0.252
Corsola	0.0004	0.020
Cradily	0.005	0.072
Crawdaunt	0.013	0.113
Cresselia	0.008	0.091
Crobat	0.017	0.128
Crustle	0.001	0.036
Cryogonal	0.001	0.035
Darmanitan	0.018	0.133
Dedenne	0.003	0.052
Delcatty	0.0003	0.018
Delibird	0.001	0.037
Delphox	0.006	0.077
Dewgong	0.0003	0.017
Diancie	0.042	0.200
Diggersby	0.012	0.110

Table 3: Pokémon Summary Table 81-120

Statistic	Mean	St. Dev.
Ditto	0.008	0.089
Dodrio	0.001	0.025
Donphan	0.015	0.120
Doublade	0.008	0.090
Dragalge	0.007	0.084
Dragonair	0.0002	0.014
Dragonite	0.088	0.283
Drapion	0.007	0.085
Drifblim	0.002	0.045
Druddigon	0.002	0.039
Dugtrio	0.008	0.092
Dunsparce	0.001	0.025
Duosion	0.00002	0.005
Durant	0.003	0.053
Dusclops	0.005	0.072
Dusknoir	0.003	0.058
Dustox	0.0001	0.011
Eelektross	0.006	0.080
Electivire	0.012	0.111
Electrode	0.001	0.026
Emboar	0.004	0.061
Emolga	0.002	0.049
Empoleon	0.013	0.115
Entei	0.012	0.107
Escavalier	0.003	0.056
Espeon	0.026	0.159
Excadrill	0.101	0.302
Exeggutor	0.002	0.046
Exploud	0.003	0.053
Farfetchd	0.0002	0.016
Fearow	0.0003	0.016
Feraligatr	0.015	0.121
Ferroseed	0.0004	0.021
Ferrothorn	0.134	0.340
Flareon	0.003	0.056
Fletchinder	0.0001	0.011
Floatzel	0.002	0.044
Florges	0.010	0.101
Flygon	0.005	0.072
Forretress	0.017	0.129

Table 4: Pokémon Summary Table 121-160

Statistic	Mean	St. Dev.
Fraxure	0.0001	0.008
Froslass	0.006	0.078
Furfrou	0.001	0.031
Furret	0.001	0.024
Gabite	0.0003	0.018
Gallade	0.028	0.165
Galvantula	0.017	0.130
Garbodor	0.001	0.031
Garchomp	0.164	0.370
Gardevoir	0.057	0.232
Gastrodon	0.010	0.100
Gengar	0.119	0.324
Gigalith	0.001	0.033
Girafarig	0.0002	0.014
Glaceon	0.003	0.056
Glalie	0.002	0.047
Gligar	0.001	0.030
Gliscor	0.091	0.287
Gogoat	0.001	0.034
Golbat	0.001	0.035
Golduck	0.001	0.030
Golem	0.005	0.068
Golurk	0.002	0.047
Goodra	0.026	0.160
Gorebyss	0.001	0.025
Gothitelle	0.001	0.028
Gourgeist	0.0002	0.013
Granbull	0.001	0.037
Grumpig	0.0003	0.017
Gurdurr	0.0002	0.013
Gyarados	0.052	0.222
Hariyama	0.002	0.041
Haunter	0.001	0.026
Hawlucha	0.016	0.125
Haxorus	0.013	0.115
Heatmor	0.0001	0.011
Heatran	0.134	0.341
Heliolisk	0.008	0.088
Heracross	0.025	0.155
Hippowdon	0.044	0.204

Table 5: Pokémon Summary Table 161-200

Statistic	Mean	St. Dev.
Hitmonchan	0.003	0.054
Hitmonlee	0.004	0.065
Hitmontop	0.003	0.056
Honchkrow	0.006	0.079
Hoopa	0.002	0.039
HoopaU	0.000	0.000
Houndoom	0.008	0.089
Huntail	0.0002	0.014
Hydreigon	0.017	0.131
Hypno	0.001	0.026
Illumise	0.0001	0.010
Infernape	0.029	0.169
Jellicent	0.007	0.086
Jirachi	0.051	0.220
Jolteon	0.023	0.150
Jumpluff	0.001	0.032
Jynx	0.001	0.038
Kabutops	0.006	0.077
Kadabra	0.0001	0.011
Kangaskhan	0.001	0.030
Kecleon	0.003	0.054
Keldeo	0.054	0.227
Kingdra	0.016	0.126
Kingler	0.002	0.047
Klang	0.0001	0.008
Klefki	0.043	0.204
Klinklang	0.002	0.041
Kricketune	0.0003	0.018
Krokorok	0.0001	0.012
Krookodile	0.012	0.111
Kyurem	0.002	0.046
KyuremB	0.000	0.000
LandorusT	0.000	0.000
Lanturn	0.004	0.064
Lapras	0.008	0.089
Latias	0.063	0.244
Latios	0.091	0.287
Leafeon	0.003	0.055
Leavanny	0.001	0.034
Ledian	0.0003	0.018

Table 6: Pokémon Summary Table 201-240

Statistic	Mean	St. Dev.
Lickilicky	0.001	0.038
Liepard	0.002	0.049
Lilligant	0.002	0.046
Linoone	0.002	0.047
Lopunny	0.053	0.224
Lucario	0.021	0.145
Ludicolo	0.007	0.086
Lumineon	0.0002	0.013
Lunatone	0.001	0.028
Luvdisc	0.00005	0.007
Luxray	0.004	0.066
Machamp	0.012	0.109
Machoke	0.001	0.023
Magcargo	0.001	0.025
Magmortar	0.004	0.062
Magneton	0.003	0.050
Magnezone	0.049	0.215
Malamar	0.006	0.075
Mamoswine	0.017	0.131
Manaphy	0.049	0.217
Mandibuzz	0.016	0.125
Manectric	0.044	0.204
Mantine	0.001	0.035
Maractus	0.0003	0.017
Marowak	0.002	0.041
Masquerain	0.001	0.028
Mawile	0.001	0.033
Medicham	0.033	0.178
Meganium	0.002	0.042
Meloetta	0.004	0.061
Meowstic	0.004	0.061
Mesprit	0.0004	0.021
Metagross	0.065	0.247
Metang	0.0001	0.011
Mew	0.041	0.199
Mienshao	0.007	0.081
Mightyena	0.0004	0.021
Milotic	0.025	0.155
Miltank	0.003	0.050
Minun	0.0001	0.011

Table 7: Pokémon Summary Table 241-280

Statistic	Mean	St. Dev.
Misdreavus	0.0002	0.016
Mismagius	0.004	0.063
Moltres	0.001	0.035
Monferno	0.00005	0.007
Mothim	0.0001	0.011
MrMime	0.001	0.029
Muk	0.002	0.049
Murkrow	0.001	0.032
Musharna	0.001	0.027
Nidoking	0.017	0.128
Nidoqueen	0.003	0.054
Ninetales	0.014	0.116
Ninjask	0.004	0.060
Noctowl	0.001	0.029
Noivern	0.009	0.092
Octillery	0.001	0.029
Omastar	0.004	0.060
Pachirisu	0.0004	0.020
Pangoro	0.003	0.056
Parasect	0.0003	0.017
Pawniard	0.0002	0.014
Pelipper	0.001	0.027
Persian	0.002	0.039
Phione	0.0001	0.010
Pidgeot	0.015	0.120
Piloswine	0.001	0.035
Pinsir	0.032	0.176
Plusle	0.00004	0.007
Politoed	0.023	0.149
Poliwrath	0.002	0.042
PorygonZ	0.008	0.089
Porygon2	0.009	0.095
Primeape	0.001	0.035
Prinplup	0.0001	0.009
Probopass	0.001	0.038
Purugly	0.0004	0.021
Pyroar	0.002	0.043
Quagsire	0.014	0.116
Quilladin	0.000	0.000
Qwilfish	0.001	0.025

Table 8: Pokémon Summary Table 281-320

Statistic	Mean	St. Dev.
Raichu	0.005	0.071
Raikou	0.052	0.221
Rampardos	0.001	0.038
Rapidash	0.001	0.039
Raticate	0.001	0.032
Regice	0.001	0.034
Regigigas	0.001	0.028
Regirock	0.001	0.028
Registeel	0.001	0.037
Relicanth	0.0002	0.013
Reuniclus	0.008	0.086
Rhydon	0.001	0.032
Rhyperior	0.008	0.091
Roselia	0.00004	0.007
Roserade	0.012	0.107
Rotom	0.0005	0.021
RotomC	0.000	0.000
RotomF	0.000	0.000
RotomH	0.000	0.000
RotomS	0.000	0.000
RotomW	0.000	0.000
Sableye	0.066	0.248
Salamence	0.018	0.132
Samurott	0.003	0.054
Sandslash	0.002	0.039
Sawk	0.002	0.042
Sawsbuck	0.002	0.044
Sceptile	0.025	0.157
Scizor	0.127	0.333
Scolipede	0.015	0.120
Scrafty	0.009	0.096
Scyther	0.001	0.030
Seaking	0.001	0.026
Seismitoad	0.007	0.084
Serperior	0.075	0.263
Servine	0.0001	0.009
Seviper	0.001	0.030
Sharpedo	0.009	0.094
Shaymin	0.002	0.047
Shedinja	0.005	0.074

Table 9: Pokémon Summary Table 321-360

Statistic	Mean	St. Dev.
Shiftry	0.002	0.046
Shuckle	0.013	0.111
Sigilyph	0.007	0.083
Simipour	0.0001	0.010
Simisage	0.0003	0.017
Simisear	0.0002	0.012
Skarmory	0.076	0.265
Skuntank	0.001	0.029
Slaking	0.003	0.055
Slowbro	0.060	0.237
Slowking	0.007	0.084
Slurpuff	0.006	0.076
Smeargle	0.007	0.082
Sneasel	0.0001	0.011
Snorlax	0.019	0.138
Solrock	0.001	0.024
Spinda	0.001	0.024
Spiritomb	0.003	0.057
Stantler	0.001	0.027
Staraptor	0.020	0.142
Starmie	0.079	0.270
Steelix	0.007	0.081
Stoutland	0.002	0.041
Stunfisk	0.0004	0.020
Sudowoodo	0.001	0.024
Suicune	0.011	0.105
Sunflora	0.0002	0.012
Swalot	0.0004	0.019
Swampert	0.034	0.180
Swanna	0.001	0.024
Swellow	0.003	0.055
Swoobat	0.001	0.035
Sylveon	0.069	0.253
Talonflame	0.126	0.332
Tangela	0.001	0.025
Tangrowth	0.004	0.063
Tauros	0.002	0.039
Tentacruel	0.020	0.140
Terrakion	0.013	0.112
Throh	0.001	0.033

Table 10: Pokémon Summary Table 361-400

Statistic	Mean	St. Dev.
Thundurus	0.053	0.225
ThundurusT	0.000	0.000
Togekiss	0.037	0.190
Togetic	0.001	0.035
Torkoal	0.003	0.053
Tornadus	0.001	0.031
TornadusT	0.000	0.000
Torterra	0.005	0.071
Toxicroak	0.009	0.095
Trevenant	0.008	0.091
Tropius	0.001	0.036
Typhlosion	0.007	0.082
Tyranitar	0.091	0.287
Tyrantrum	0.006	0.078
Umbreon	0.027	0.161
Unfezant	0.001	0.023
Unown	0.0002	0.014
Ursaring	0.002	0.042
Uxie	0.001	0.036
Vanilluxe	0.001	0.028
Vaporeon	0.016	0.126
Venomoth	0.002	0.040
Venusaur	0.072	0.258
Vespiquen	0.001	0.028
Vibrava	0.00001	0.003
Victini	0.022	0.148
Victreebel	0.001	0.038
Vigoroth	0.001	0.026
Vileplume	0.002	0.044
Virizion	0.002	0.040
Vivillon	0.003	0.057
Volbeat	0.001	0.031
Volcarona	0.039	0.194
Vullaby	0.0001	0.010
Wailord	0.0004	0.021
Walrein	0.002	0.042
Wartortle	0.0002	0.015
Watchog	0.0002	0.013
Weavile	0.076	0.265

Table 11: Pokémon Summary Table 401-415

Statistic	Mean	St. Dev.
Weezing	0.006	0.077
Whimsicott	0.012	0.111
Whiscash	0.0004	0.019
Wigglytuff	0.001	0.027
Wobbuffet	0.001	0.037
Wormadam	0.00001	0.003
WormadamSandy	0.0001	0.008
WormadamTrash	0.00003	0.005
Xatu	0.003	0.054
Yanmega	0.003	0.054
Zangoose	0.003	0.052
Zapdos	0.021	0.142
Zebstrika	0.001	0.035
Zoroark	0.010	0.098
Zweilous	0.00001	0.004
Zygarde	0.006	0.077

Appendix A: Summary Statistics of Pokémon

Appendix B: Summary Statistics of Mega-Pokémon

In the main Rmd file

In Chapter @ref(ref-labels):

Table 12: Summary Table Mega-Pokémon

Statistic	Mean	St. Dev.
Abomasite	0.006	0.075
Absolite	0.006	0.075
Aerodactylite	0.011	0.103
Aggronite	0.009	0.096
Alakazite	0.008	0.090
Altarianite	0.036	0.187
Ampharosite	0.034	0.182
Audinite	0.008	0.087
Banettite	0.002	0.042
Beedrillite	0.006	0.074
Blastoisinite	0.014	0.116
Cameruptite	0.002	0.049
Charizarditex	0.075	0.263
Charizarditey	0.060	0.238
Diancite	0.039	0.193
Galladite	0.026	0.159
Garchompite	0.019	0.136
Gardevoirite	0.047	0.212
Glalitite	0.002	0.045
Gyaradosite	0.027	0.162
Heracronite	0.018	0.133
Houndoominite	0.006	0.078
Latiasite	0.006	0.080
Latiosite	0.008	0.087
Lopunnite	0.053	0.225
Manectite	0.041	0.199
Medichamite	0.031	0.174
Metagrossite	0.054	0.226
Pidgeotite	0.014	0.119
Pinsirite	0.032	0.176
Sablenite	0.048	0.215
Sceptilite	0.021	0.143
Scizorite	0.060	0.238
Sharpedonite	0.006	0.078
Slowbronite	0.015	0.123
Steelixite	0.004	0.065
Swampertite	0.022	0.146
Tyranitarite	0.019	0.136
Venusaurite	0.058	0.234