Projeto_Pokemon

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```
knitr::opts_chunk$set(echo = FALSE)
```

Bibliotecas

Essas foram as bibliotecas importadas para a realização desta análise.

```
## The following package(s) will be installed:
## - summarytools [1.1.1]
## These packages will be installed into "~/RSTUDIO/Trabalho_Pokemon/renv/library/windows/R-4.4/x86_64-
##
## # Installing packages --------------------------------------------------------
## - Installing summarytools ...                  OK [linked from cache]
## Successfully installed 1 package in 17 milliseconds.

## The following package(s) will be installed:
## - renv [1.1.1]
## These packages will be installed into "~/RSTUDIO/Trabalho_Pokemon/renv/library/windows/R-4.4/x86_64-
##
## # Installing packages --------------------------------------------------------
## - Installing renv ...                          OK [linked from cache]
## Successfully installed 1 package in 15 milliseconds.

## The following package(s) will be installed:
## - tidyverse [2.0.0]
## These packages will be installed into "~/RSTUDIO/Trabalho_Pokemon/renv/library/windows/R-4.4/x86_64-
##
## # Installing packages --------------------------------------------------------
## - Installing tidyverse ...                     OK [linked from cache]
## Successfully installed 1 package in 16 milliseconds.

## The following package(s) will be installed:
## - ggplot2 [3.5.1]
## These packages will be installed into "~/RSTUDIO/Trabalho_Pokemon/renv/library/windows/R-4.4/x86_64-
##
## # Installing packages --------------------------------------------------------
## - Installing ggplot2 ...                       OK [linked from cache]
## Successfully installed 1 package in 15 milliseconds.
```

```
## The following package(s) will be installed:
## - readr [2.1.5]
## These packages will be installed into "~/RSTUDIO/Trabalho_Pokemon/renv/library/windows/R-4.4/x86_64-w
##
## # Installing packages --------------------------------------------------------
## - Installing readr ...                          OK [linked from cache]
## Successfully installed 1 package in 16 milliseconds.

## The following package(s) will be installed:
## - dplyr [1.1.4]
## These packages will be installed into "~/RSTUDIO/Trabalho_Pokemon/renv/library/windows/R-4.4/x86_64-w
##
## # Installing packages --------------------------------------------------------
## - Installing dplyr ...                          OK [linked from cache]
## Successfully installed 1 package in 16 milliseconds.

## The following package(s) will be installed:
## - summarytools [1.1.1]
## These packages will be installed into "~/RSTUDIO/Trabalho_Pokemon/renv/library/windows/R-4.4/x86_64-w
##
## # Installing packages --------------------------------------------------------
## - Installing summarytools ...                   OK [linked from cache]
## Successfully installed 1 package in 15 milliseconds.

## The following package(s) will be installed:
## - readxl [1.4.3]
## These packages will be installed into "~/RSTUDIO/Trabalho_Pokemon/renv/library/windows/R-4.4/x86_64-w
##
## # Installing packages --------------------------------------------------------
## - Installing readxl ...                         OK [linked from cache]
## Successfully installed 1 package in 15 milliseconds.

## The following package(s) will be installed:
## - knitr [1.49]
## These packages will be installed into "~/RSTUDIO/Trabalho_Pokemon/renv/library/windows/R-4.4/x86_64-w
##
## # Installing packages --------------------------------------------------------
## - Installing knitr ...                          OK [linked from cache]
## Successfully installed 1 package in 16 milliseconds.

## The following package(s) will be installed:
## - dlookr [0.6.3]
## These packages will be installed into "~/RSTUDIO/Trabalho_Pokemon/renv/library/windows/R-4.4/x86_64-w
##
## # Installing packages --------------------------------------------------------
## - Installing dlookr ...                         OK [linked from cache]
## Successfully installed 1 package in 17 milliseconds.

## -- Attaching core tidyverse packages ------------------------ tidyverse 2.0.0 --
## v dplyr     1.1.4     v readr     2.1.5
## v forcats   1.0.0     v stringr   1.5.1
## v ggplot2   3.5.1     v tibble    3.2.1
```

```
## v lubridate 1.9.4     v tidyr     1.3.1
## v purrr     1.0.4
## -- Conflicts ---------------------------------------- tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
## i Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts to become error
##
## Anexando pacote: 'summarytools'
##
##
## O seguinte objeto é mascarado por 'package:tibble':
##
##     view
##
##
## Registered S3 methods overwritten by 'dlookr':
##   method          from
##   plot.transform  scales
##   print.transform scales
##
##
## Anexando pacote: 'dlookr'
##
##
## O seguinte objeto é mascarado por 'package:tidyr':
##
##     extract
##
##
## O seguinte objeto é mascarado por 'package:base':
##
##     transform
```

Base de dados Pokemon

A ideia do projeto é dentro da base de dados estipular quais pokemons dentro das 6 gerações catalogadas são os mais fortes utilizando a coluna que registra os dados de ataque básico. A seguir vamos carregas a nossa base de dados:

Análises iniciais da tabela

Contagem do número de linhas da tabela.

```
##     n
## 1 800
```

Visualização das colunas da tabela.

Vamos visualizar o topo da base de dados para vermos os dados que teremos para trabalhar.

X.	Name	Type.1	Type.2	HP	Attack	Defense	Sp..Atk	Sp..Def	Speed	Generation	Legendary
1	Bulbasaur	Grass	Poison	45	49	49	65	65	45	1	False
2	Ivysaur	Grass	Poison	60	62	63	80	80	60	1	False
3	Venusaur	Grass	Poison	80	82	83	100	100	80	1	False
4	Mega Venusaur	Grass	Poison	80	100	123	122	120	80	1	False
5	Charmander	Fire		39	52	43	60	50	65	1	False
6	Charmeleon	Fire		58	64	58	80	65	80	1	False

Tipos de dados da base de dados

Vamos visualizar o tipo de dados de cada coluna da nossa tabela.

```
## # A tibble: 12 x 6
##    variables  types     missing_count missing_percent unique_count unique_rate
##    <chr>      <chr>             <int>           <dbl>        <int>       <dbl>
##  1 X.         integer               0               0          800      1
##  2 Name       character             0               0          800      1
##  3 Type.1     character             0               0           18      0.0225
##  4 Type.2     character             0               0           19      0.0238
##  5 HP         integer               0               0           94      0.118
##  6 Attack     integer               0               0          111      0.139
##  7 Defense    integer               0               0          103      0.129
##  8 Sp..Atk    integer               0               0          105      0.131
##  9 Sp..Def    integer               0               0           92      0.115
## 10 Speed      integer               0               0          108      0.135
## 11 Generation integer               0               0            6      0.0075
## 12 Legendary  character             0               0            2      0.0025
```

Frequência por tipo

Vamos visualizar a frequência com que cada tipo.1 aparece na nossa tabela.

```
## Error in table(names(candidates))[["tested"]]: índice fora dos limites
```

```
## Warning in parse_call(mc = match.call(), caller = "freq"): metadata extraction
## terminated unexpectedly; inspect results carefully
```

```
## Frequencies
## df$Type.1
## Type: Character
##
##                  Freq   % Valid   % Valid Cum.   % Total   % Total Cum.
## -------------- ------ --------- -------------- --------- --------------
##            Bug     69      8.62           8.62      8.62           8.62
##           Dark     31      3.88          12.50      3.88          12.50
##         Dragon     32      4.00          16.50      4.00          16.50
##       Electric     44      5.50          22.00      5.50          22.00
##          Fairy     17      2.12          24.12      2.12          24.12
##       Fighting     27      3.38          27.50      3.38          27.50
```

```
##           Fire     52      6.50          34.00      6.50          34.00
##         Flying      4      0.50          34.50      0.50          34.50
##          Ghost     32      4.00          38.50      4.00          38.50
##          Grass     70      8.75          47.25      8.75          47.25
##         Ground     32      4.00          51.25      4.00          51.25
##            Ice     24      3.00          54.25      3.00          54.25
##         Normal     98     12.25          66.50     12.25          66.50
##         Poison     28      3.50          70.00      3.50          70.00
##        Psychic     57      7.12          77.12      7.12          77.12
##           Rock     44      5.50          82.62      5.50          82.62
##          Steel     27      3.38          86.00      3.38          86.00
##          Water    112     14.00         100.00     14.00         100.00
##           <NA>      0                                0.00         100.00
##          Total    800    100.00         100.00    100.00         100.00
```

Primeira comparação de poder de ataque

Vamos usar um um código para trazer de cada geração registrada o pokemon mais forte e mais fraco.

```
## # A tibble: 6 x 5
##   Generation Mais_Forte          max_atack Mais_Fraco min_atack
##        <int> <chr>                   <int> <chr>          <int>
## 1          1 Mega Mewtwo X             190 Chansey            5
## 2          2 Mega Heracross            185 Shuckle           10
## 3          3 Primal Groudon            180 Feebas            15
## 4          4 Mega Garchomp             170 Happiny            5
## 5          5 Kyurem Black Kyurem       170 Munna             25
## 6          6 Mega Diancie              160 Spewpa            22
```

Buscando outliers

Poderemos ver se há pokemons que fogem a média dos outros.

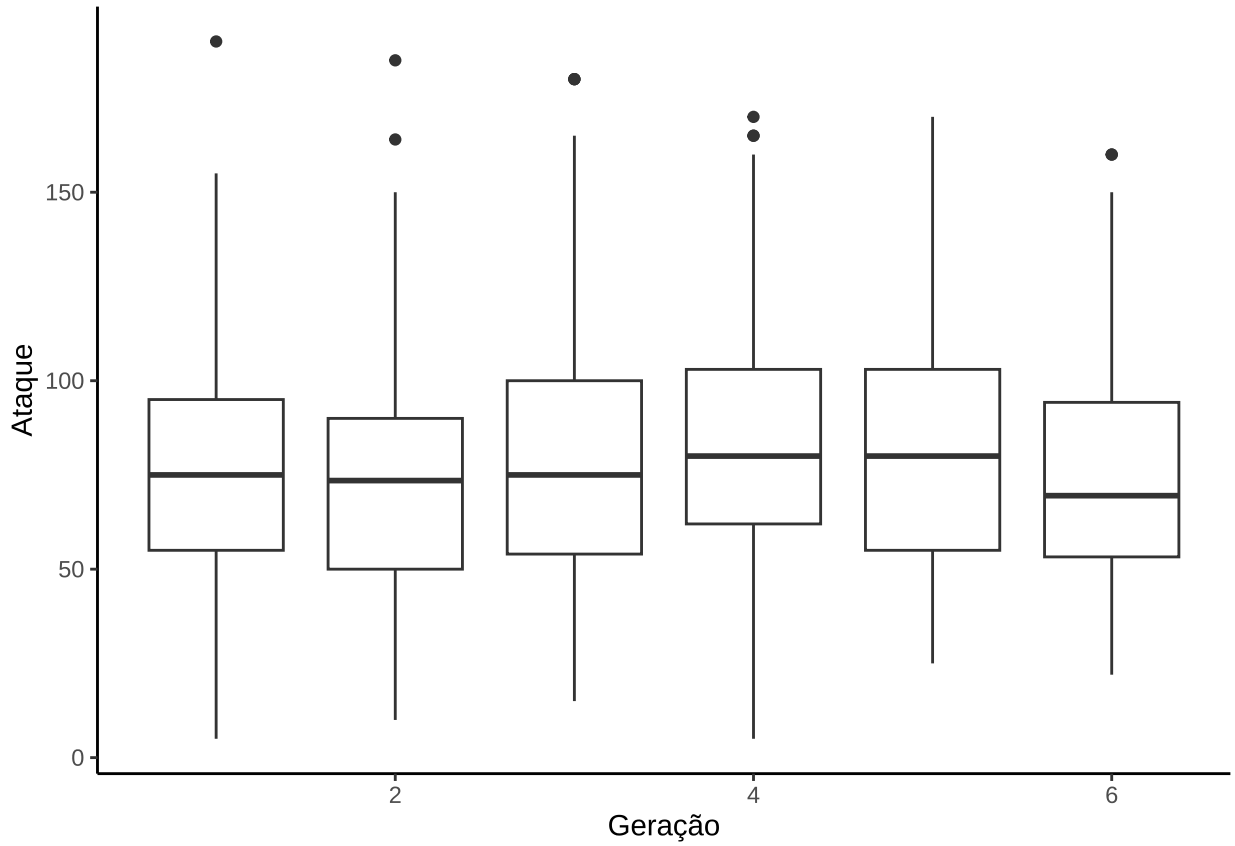
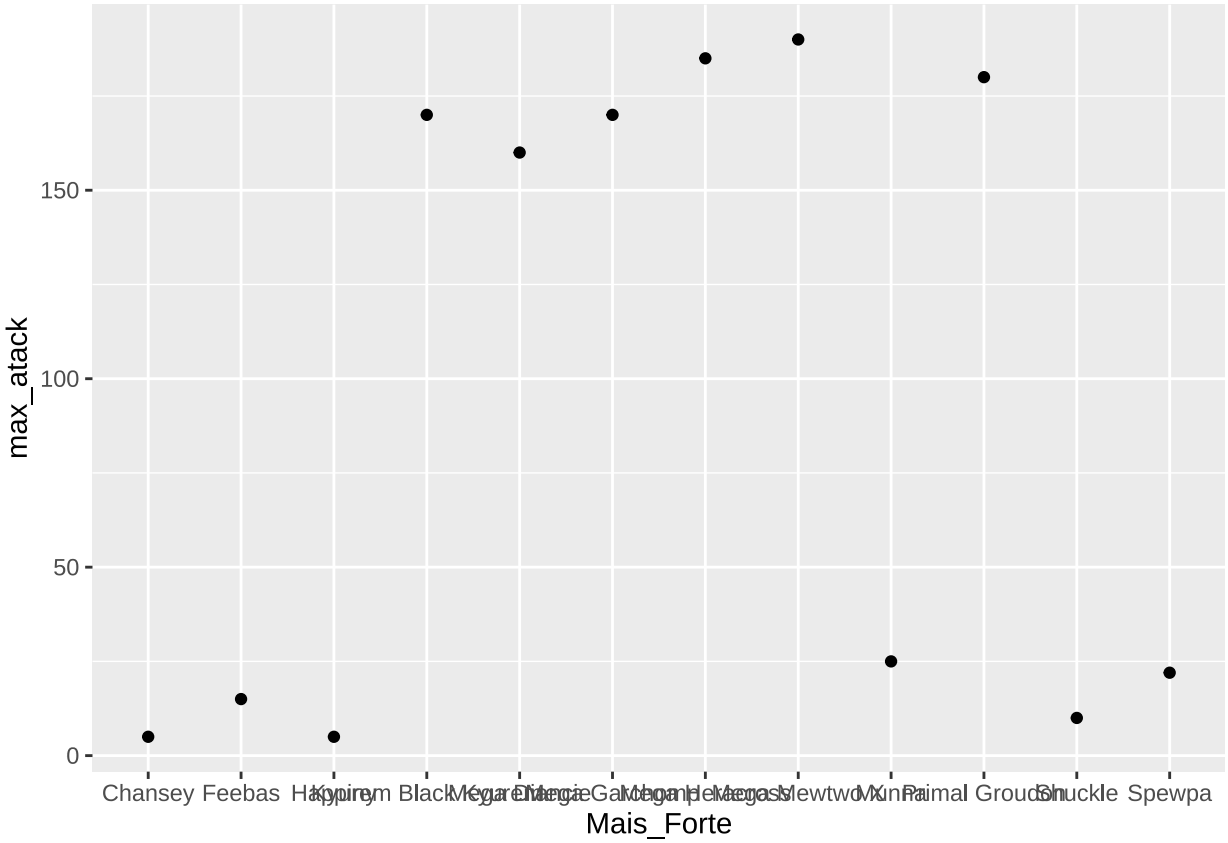


Gráfico de apresentação

Veremos o gráfico apresentando os dados dos pokemons mais fortes e fracos de cada geração.



Mais forte por tipo.1

Veremos a lista dos mais fortes pokemons por seu tipo.

```
## # A tibble: 18 x 3
##    Type.1   Mais_forte_tipo1         max_forte
##    <chr>    <chr>                        <int>
##  1 Psychic  Mega Mewtwo X                  190
##  2 Bug      Mega Heracross                 185
##  3 Dragon   Mega Rayquaza                  180
##  4 Ground   Primal Groudon                 180
##  5 Ghost    Mega Banette                   165
##  6 Rock     Rampardos                      165
##  7 Fire     Mega Blaziken                  160
##  8 Normal   Slaking                        160
##  9 Water    Mega Gyarados                  155
## 10 Dark     Mega Absol                     150
## 11 Steel    Aegislash Blade Forme          150
## 12 Fighting Mega Lucario                   145
## 13 Grass    Mega Abomasnow                 132
## 14 Fairy    Xerneas                        131
## 15 Ice      Mamoswine                      130
## 16 Electric Electivire                     123
## 17 Flying   Tornadus Incarnate Forme       115
## 18 Poison   Toxicroak                      106
```

Media de ataque

A média de ataque dos pokemons calculada na geração.

```
## # A tibble: 6 x 2
##   Generation media
##        <int> <dbl>
## 1          1  76.6
## 2          2  72.0
## 3          3  81.6
## 4          4  82.9
## 5          5  82.1
## 6          6  75.8
```

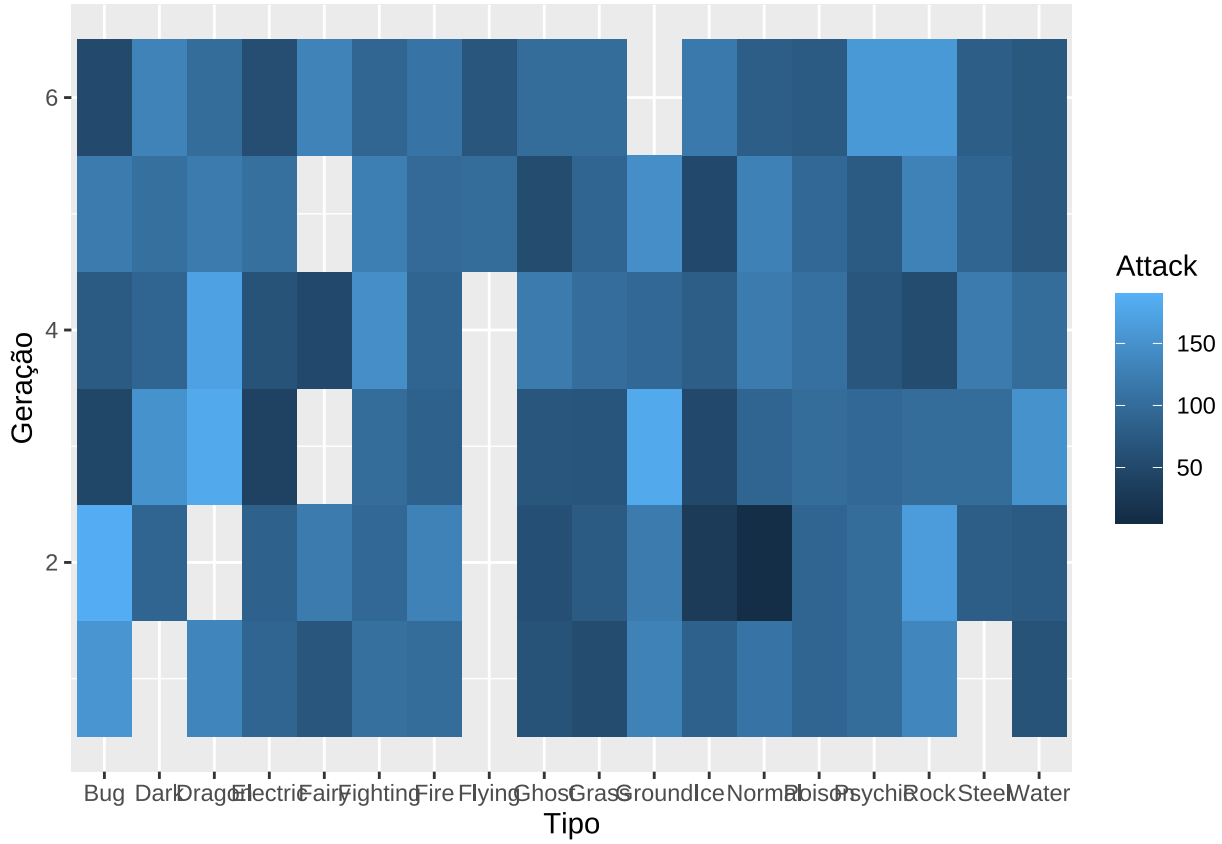
Estatísticas de ataque

Estatistica de ataque dos pokemons calculada por geração.

```
## # A tibble: 6 x 5
##   Generation media desvio prim_quartil terc_quartil
##        <int> <dbl>  <dbl>        <dbl>        <dbl>
## 1          1  76.6   30.7         55           95
## 2          2  72.0   32.7         50           90
## 3          3  81.6   36.6         54          100
## 4          4  82.9   32.8         62          103
## 5          5  82.1   30.4         55          103
## 6          6  75.8   29.2         53.2         94.2
```

Comparação de tipo e geração com base no ataque

Gráfico trazendo 3 parametros para demonstração: Geração, Tipo e Ataque



Função DESC

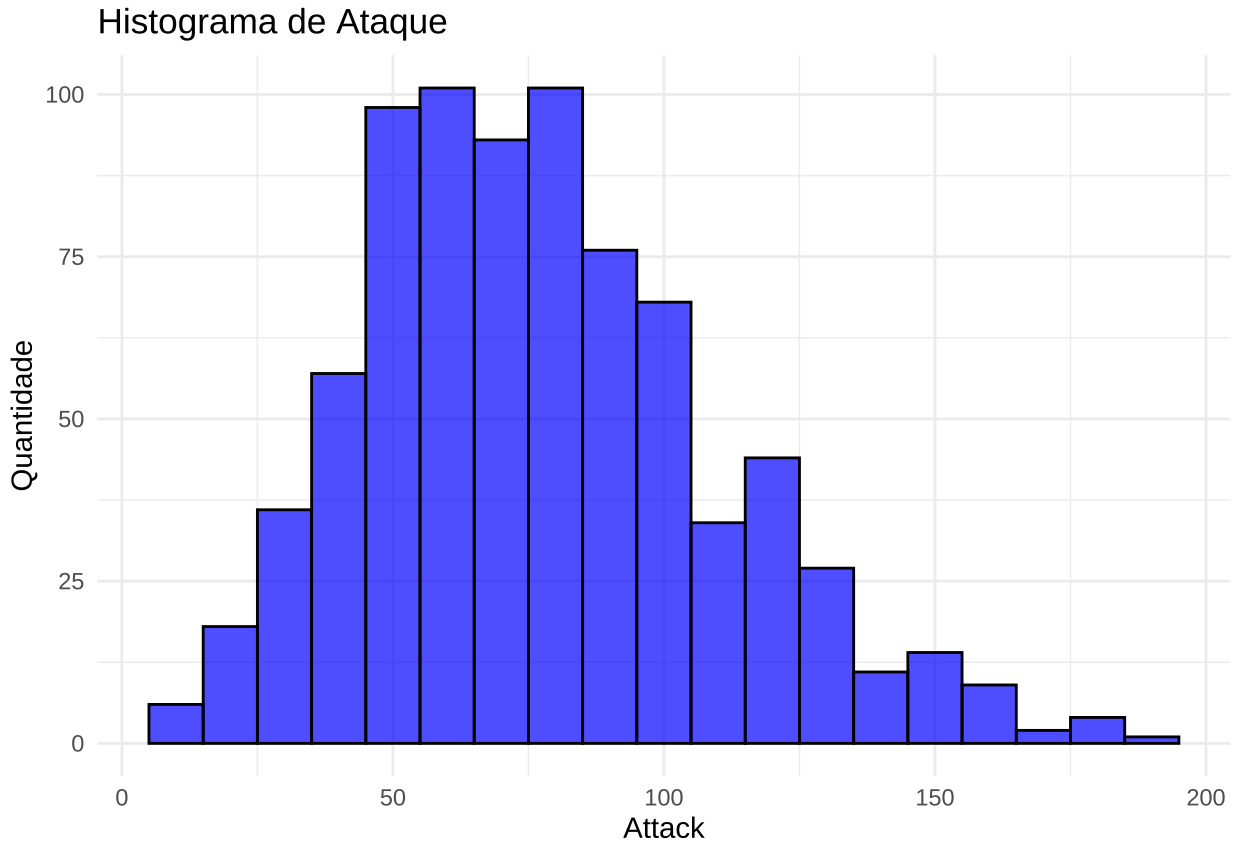
```
## Adding missing grouping variables: `Generation`

## Descriptive Statistics
##  by Generation
## Data Frame: df
## N: 800
##
##                         1        2        3        4        5        6
## ----------------- -------- -------- -------- -------- -------- --------
##              Mean    76.64    72.03    81.62    82.87    82.07    75.80
##           Std.Dev    30.74    32.71    36.59    32.78    30.37    29.18
##               Min     5.00    10.00    15.00     5.00    25.00    22.00
##                Q1    55.00    50.00    53.00    62.00    55.00    53.00
##            Median    75.00    73.50    75.00    80.00    80.00    69.50
##                Q3    95.00    90.00   100.00   103.00   103.00    95.00
##               Max   190.00   185.00   180.00   170.00   170.00   160.00
##               MAD    29.65    31.88    37.06    29.65    37.06    28.91
##               IQR    40.00    40.00    46.00    41.00    48.00    41.00
##                CV     0.40     0.45     0.45     0.40     0.37     0.38
##          Skewness     0.58     0.63     0.63     0.31     0.34     0.83
##       SE.Skewness     0.19     0.23     0.19     0.22     0.19     0.27
##          Kurtosis     0.55     0.72    -0.14    -0.06    -0.59     0.40
##           N.Valid   166.00   106.00   160.00   121.00   165.00    82.00
```

```
##                 N   166.00   106.00   160.00   121.00   165.00    82.00
##         Pct.Valid   100.00   100.00   100.00   100.00   100.00   100.00
```

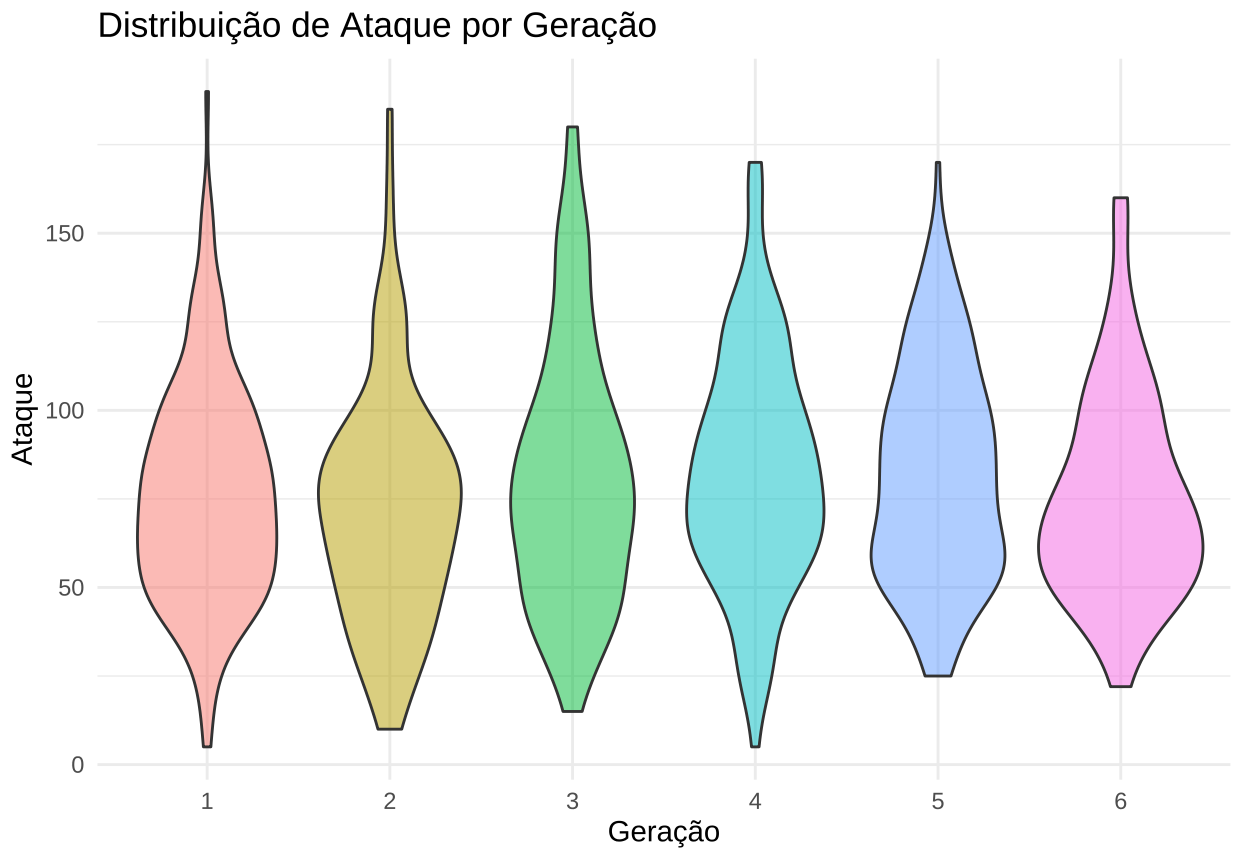
Histograma de poder de ataque por quantidade

Separação por quantidade de pokemons nivelado por seu poder de ataque com bins = 10



Distribuição de ataque separado por geração

Aqui podemos analisar separadamente cada geração com o gráfico violino o lado para o qual a calda pende, mostrando uma curva assimétrica com calda prolongada para direita.



Scatterplot entre ataque e defesa

Veremos um scatterplot entre ataque e defesa separados por tipo.1 de pokemon vendo se há correlação ao fato de um pokemon com alto ataque também tem um alto índice de defesa ou não.

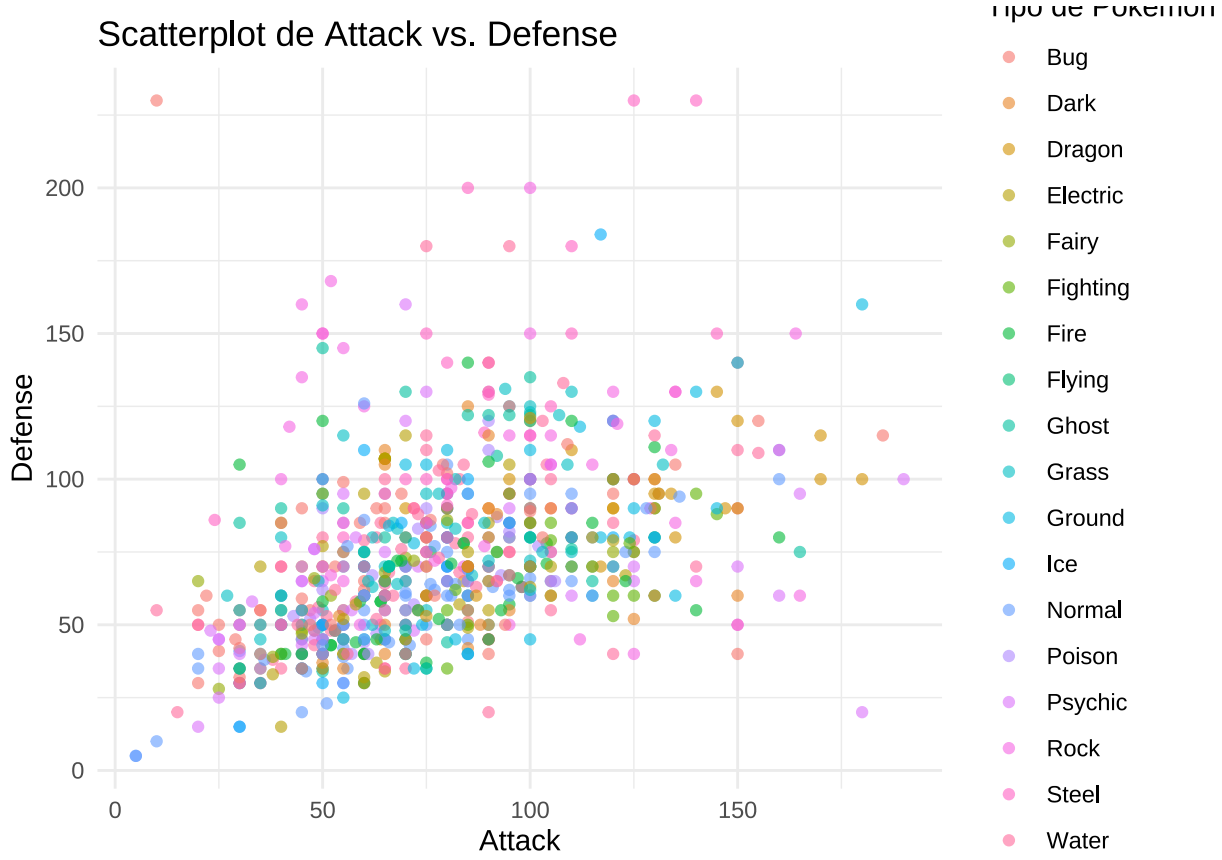
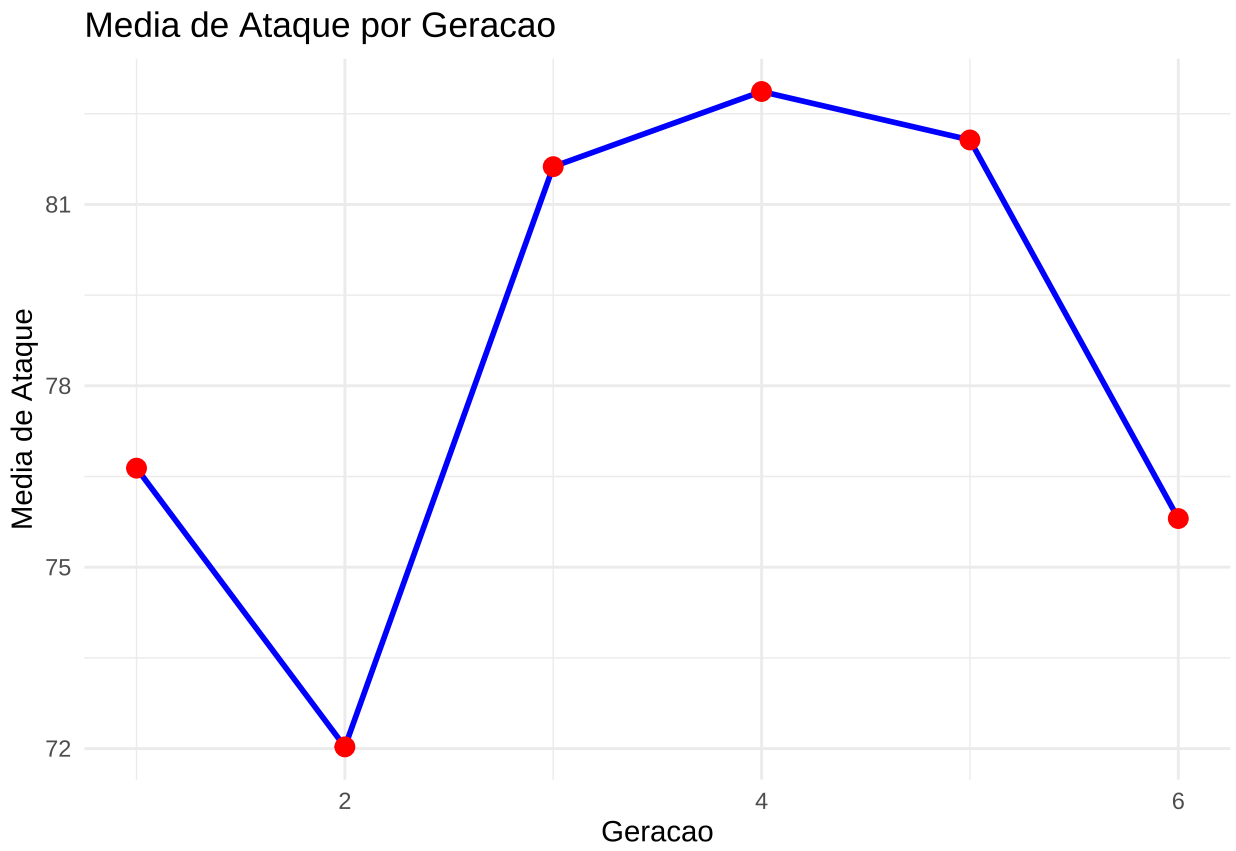


Gráfico de linha

Veremos um gráfico de linha calculando a médita de ataque por geração.

```
## Warning: Using ‘size‘ aesthetic for lines was deprecated in ggplot2 3.4.0.
## i Please use ‘linewidth‘ instead.
## This warning is displayed once every 8 hours.
## Call ‘lifecycle::last_lifecycle_warnings()‘ to see where this warning was
## generated.
```



Note that the `echo = FALSE` parameter was added to the code chunk to prevent printing of the R code that generated the plot.