Exploratory data analysis - violence in the world and woman grand master likelihood.

ldurazo

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In this project we are going to analyze to different set of data, and see what they tell us about the likelihood of a woman grandmaster chess appearing and how it relates to violence against women in said country, this will imply a huge amount of data cleaning and interpretation before arriving to a relevant correlation. We expect in advance and acknowledge that other variables such as economic variables per country may correlate more strongly to both violence and women grandmaster players.

We may also use the term grandmaster interchangeably with just the women top player, this is both a practicality and an intentional way to recognize women in countries were grandmasters are less likely to appear but still have top ranked players.

The next block is the setup script to load data, and setup this notebook utilities.

```
chooseCRANmirror(ind = 52)
# EDA & Kaggle auth packages
install.packages(c("summarytools", "explore", "dataMaid", "devtools", "configr", "rsconnect", "dplyr"))
```

```
##
## The downloaded binary packages are in
##  /var/folders/f3/2p9snhhj759g5l1f2ztjbwdw0000gn/T//Rtmpn3udCu/downloaded_packages
```

```
devtools::install_github("ldurazo/kaggler")
```

```
## Downloading GitHub repo ldurazo/kaggler@HEAD
```

```
##
##      checking for file '/private/var/folders/f3/2p9snhhj759g5l1f2ztjbwdw0000gn/T/Rtmpn3udCu/remotes1
##   -  preparing 'kaggler':
##      checking DESCRIPTION meta-information ...  v  checking DESCRIPTION meta-information
##   -  checking for LF line-endings in source and make files and shell scripts
##   -  checking for empty or unneeded directories
##   -  building 'kaggler_0.0.0.9000.tar.gz'
##
##
```

```
library(dplyr)
```

```
##
## Attaching package: 'dplyr'
```

```
## The following objects are masked from 'package:stats':
##
##     filter, lag

## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

```
library(summarytools)
```

```
## Registered S3 method overwritten by 'pryr':
##   method      from
##   print.bytes Rcpp

## For best results, restart R session and update pander using devtools:: or remotes::install_github('ra
```

```
library(explore)
library(dataMaid)
```

```
##
## Attaching package: 'dataMaid'

## The following object is masked from 'package:dplyr':
##
##     summarize
```

```
library(configr)
library(readr)
library(rsconnect)
library(kaggler)

# files downloading
kgl_auth(creds_file = 'kaggle.json')
```

```
## <request>
## Options:
## * httpauth: 1
## * userpwd: ldurazo:48ce1a6f4b7269d4b6f8ce2d3b854199
```

```
response_violence <- kgl_datasets_download_all(owner_dataset = "andrewmvd/violence-against-women-and-gi
download.file(response_violence[["url"]], "data/violence_temp.zip", mode = "wb")
unzipResult <- unzip("data/violence_temp.zip", exdir = "data/", overwrite = TRUE)
```

```
## Warning in unzip("data/violence_temp.zip", exdir = "data/", overwrite = TRUE):
## error -1 al extraer del archivo zip
```

```
violence_data <- read_csv("data/makeovermonday-2020w10/violence_data.csv")
```

```
##
## -- Column specification --------------------------------------------------------
## cols(
##   RecordID = col_double(),
##   Country = col_character(),
##   Gender = col_character(),
##   `Demographics Question` = col_character(),
##   `Demographics Response` = col_character(),
##   Question = col_character(),
##   `Survey Year` = col_character(),
##   Value = col_double()
## )

## Warning: 1 parsing failure.
##   row col  expected    actual                                            file
## 11354  -- 8 columns 6 columns 'data/makeovermonday-2020w10/violence_data.csv'
```

```
response_chessplayers <- kgl_datasets_download_all(owner_dataset = "vikasojha98/top-women-chess-players
download.file(response_chessplayers[["url"]], "data/chess_temp.zip", mode = "wb")
unzipResult <- unzip("data/chess_temp.zip", exdir = "data/", overwrite = TRUE)
```

```
## Warning in unzip("data/chess_temp.zip", exdir = "data/", overwrite = TRUE):
## error -1 al extraer del archivo zip
```

```
chess_data <- read_csv("data/top_women_chess_players_aug_2020.csv")
```

```
##
## -- Column specification --------------------------------------------------------
## cols(
##   `Fide id` = col_double(),
##   Name = col_character(),
##   Federation = col_character(),
##   Gender = col_logical(),
##   Year_of_birth = col_double(),
##   Title = col_character(),
##   Standard_Rating = col_double(),
##   Rapid_rating = col_double(),
##   Blitz_rating = col_double(),
##   Inactive_flag = col_character()
## )
```

With these two files we can now see a summary of the data. Note that these two are html generated files available if you run this notebook. Alternatively, the explore package returns interesting results in a shiny app, turn the following statements on if you want to see the data.

```
#dfSummary(violence_data, file = "data/violence_data_summary.html")
#dfSummary(chess_data, file = "data/violence_data_summary.html")

#explore(chess_data)
#explore(violence_data)
```

We will need a file that maps the ISO-3166 country alpha 3 on the chess data, to the country name in violence data.

```r
download.file("https://raw.githubusercontent.com/lukes/ISO-3166-Countries-with-Regional-Codes/master/al
countries_mapping <- read_csv("data/iso-3166")
```

```
##
## -- Column specification --------------------------------------------------------
## cols(
##   name = col_character(),
##   `alpha-2` = col_character(),
##   `alpha-3` = col_character(),
##   `country-code` = col_character(),
##   `iso_3166-2` = col_character(),
##   region = col_character(),
##   `sub-region` = col_character(),
##   `intermediate-region` = col_character(),
##   `region-code` = col_character(),
##   `sub-region-code` = col_character(),
##   `intermediate-region-code` = col_character()
## )
```

```r
countries_mapping <- setNames(select(countries_mapping, "name", "alpha-3"), c("name", "code"))
```

Let's clean up our data by removing the NA values and transforming the percentage to a number.

```r
violence_data <- na.omit(violence_data, "Value")
violence_data$Value <- as.numeric(sub("%", "", violence_data$Value))
```

Now I want to create an aggregate of the data of my first data set of violence against women, and generate a weighted mean out of the results between men and women answering, so that I can effectively create a "violence score" per country, in a very subjective way. There are a number of better techniques to do such a process, but only for the sake of the excercise we will use this score formula.

```r
violence_data$WeightedValue <- ifelse(violence_data$Gender == "F", violence_data$Value * 0.7, violence_d
violence_data_slim <- select(violence_data, "Country", "WeightedValue")
violence_data_slim_grouped <- setNames(aggregate(violence_data_slim$WeightedValue, by = list(violence_da

head(violence_data_slim_grouped)
```

```
##       Country     Score
## 1 Afghanistan 22.528810
## 2     Albania  2.452444
## 3      Angola  7.079778
## 4     Armenia  4.011310
## 5  Azerbaijan 16.704583
## 6  Bangladesh 10.303333
```

With the score per country done, we need to do similar work with the chess players data frame.

```r
chess_data <- na.omit(chess_data, "Standard_Rating", "Rapid_rating", "Blitz_rating")
chess_data_slim <- select(chess_data, "Federation", "Standard_Rating", "Rapid_rating", "Blitz_rating")
chess_data_slim_grouped <- chess_data_slim %>%
  group_by(chess_data_slim$Federation) %>%
  summarise(across(ends_with("rating"), list(mean = mean, n = length, max = max, min = min)))
```

```
## `summarise()` ungrouping output (override with `.groups` argument)
```

```r
head(chess_data_slim_grouped)
```

```
## # A tibble: 6 x 13
##   `chess_data_sli~ Standard_Rating~ Standard_Rating~ Standard_Rating~
##   <chr>                       <dbl>            <int>            <dbl>
## 1 ALB                         1971                 1             1971
## 2 ALG                         1900                 1             1900
## 3 ARG                         1930.                2             1940
## 4 ARM                         2285                 1             2285
## 5 AUS                         1926.                4             2062
## 6 AUT                         1975                 1             1975
## # ... with 9 more variables: Standard_Rating_min <dbl>,
## #   Rapid_rating_mean <dbl>, Rapid_rating_n <int>, Rapid_rating_max <dbl>,
## #   Rapid_rating_min <dbl>, Blitz_rating_mean <dbl>, Blitz_rating_n <int>,
## #   Blitz_rating_max <dbl>, Blitz_rating_min <dbl>
```

Now, we need to join the tables with the countries table in order to finally obtain a single dataset.

```r
violence_df <- left_join(violence_data_slim_grouped, countries_mapping, by = c("Country" = "name"))
violence_df %>% arrange(!is.na(violence_df$code))
```

```
##                      Country      Score code
## 1                    Bolivia  5.3954444 <NA>
## 2  Congo Democratic Republic 22.1008333 <NA>
## 3              Cote d'Ivoire 13.1191111 <NA>
## 4            Kyrgyz Republic 10.6180247 <NA>
## 5                    Moldova  5.4929012 <NA>
## 6                   Tanzania 16.2912222 <NA>
## 7                Afghanistan 22.5288095  AFG
## 8                    Albania  2.4524444  ALB
## 9                     Angola  7.0797778  AGO
## 10                   Armenia  4.0113095  ARM
## 11                Azerbaijan 16.7045833  AZE
## 12                Bangladesh 10.3033333  BGD
## 13                     Benin  7.8707778  BEN
## 14              Burkina Faso 10.8768889  BFA
## 15                   Burundi 15.9398889  BDI
## 16                  Cambodia 11.2942222  KHM
## 17                  Cameroon 11.9049444  CMR
## 18                      Chad 23.4807778  TCD
## 19                  Colombia  1.1404444  COL
## 20                   Comoros  9.5546111  COM
## 21                     Congo 19.1671667  COG
## 22        Dominican Republic  0.7340476  DOM
## 23                     Egypt 15.1758333  EGY
## 24                   Eritrea 32.3306667  ERI
## 25                  Eswatini  5.8334444  SWZ
## 26                  Ethiopia 16.6565556  ETH
## 27                     Gabon 12.3352778  GAB
## 28                    Gambia 14.8097222  GMB
```

```
## 29                   Ghana  7.0600000  GHA
## 30               Guatemala  2.3038333  GTM
## 31                  Guinea 21.2895000  GIN
## 32                  Guyana  4.2798889  GUY
## 33                   Haiti  3.5145000  HTI
## 34                Honduras  3.0452778  HND
## 35                   India 12.5360556  IND
## 36               Indonesia  7.5503571  IDN
## 37                  Jordan  5.6417778  JOR
## 38                   Kenya 11.3071111  KEN
## 39                 Lesotho  8.9674444  LSO
## 40                 Liberia 10.6376111  LBR
## 41              Madagascar  8.1401667  MDG
## 42                  Malawi  3.6356111  MWI
## 43                Maldives  6.1069167  MDV
## 44                    Mali 22.4886667  MLI
## 45                 Morocco 31.6493333  MAR
## 46              Mozambique  3.5043333  MOZ
## 47                 Myanmar 11.9392222  MMR
## 48                 Namibia  7.3674444  NAM
## 49                   Nepal  6.4663889  NPL
## 50               Nicaragua  4.6332222  NIC
## 51                   Niger 17.0797778  NER
## 52                 Nigeria 10.1447778  NGA
## 53                Pakistan 13.1031548  PAK
## 54                    Peru  1.2701111  PER
## 55             Philippines  3.5443333  PHL
## 56                  Rwanda  9.1943889  RWA
## 57   Sao Tome and Principe  5.3686782  STP
## 58                 Senegal 13.2816667  SEN
## 59            Sierra Leone 16.9027778  SLE
## 60            South Africa  1.6648851  ZAF
## 61              Tajikistan 31.0131111  TJK
## 62             Timor-Leste 24.9147778  TLS
## 63                    Togo  7.3982222  TGO
## 64                  Turkey  4.2592308  TUR
```

```r
head(violence_df)
```

```
##       Country     Score code
## 1 Afghanistan 22.528810  AFG
## 2     Albania  2.452444  ALB
## 3      Angola  7.079778  AGO
## 4     Armenia  4.011310  ARM
## 5  Azerbaijan 16.704583  AZE
## 6  Bangladesh 10.303333  BGD
```

Notice that we have a few exemptions where the mapping did not occur correctly, in this instance we will fix them by hand. - Bolivia - Congo Democratic Republic - Cote d'Ivoire - Kyrgyz Republic - Moldova - Tanzania

```r
violence_df <- within(violence_df, code[Country == "Bolivia"] <- "BOL")
violence_df <- within(violence_df, code[Country == "Congo Democratic Republic"] <- "COD")
violence_df <- within(violence_df, code[Country == "Cote d'Ivoire"] <- "CIV")
violence_df <- within(violence_df, code[Country == "Kyrgyz Republic"] <- "KGZ")
violence_df <- within(violence_df, code[Country == "Moldova"] <- "MDA")
violence_df <- within(violence_df, code[Country == "Tanzania"] <- "TZA")
violence_df %>% arrange(!is.na(violence_df$code))
```

```
##                      Country      Score code
## 1                Afghanistan 22.5288095  AFG
## 2                    Albania  2.4524444  ALB
## 3                     Angola  7.0797778  AGO
## 4                    Armenia  4.0113095  ARM
## 5                 Azerbaijan 16.7045833  AZE
## 6                 Bangladesh 10.3033333  BGD
## 7                      Benin  7.8707778  BEN
## 8                    Bolivia  5.3954444  BOL
## 9               Burkina Faso 10.8768889  BFA
## 10                   Burundi 15.9398889  BDI
## 11                  Cambodia 11.2942222  KHM
## 12                  Cameroon 11.9049444  CMR
## 13                      Chad 23.4807778  TCD
## 14                  Colombia  1.1404444  COL
## 15                   Comoros  9.5546111  COM
## 16                     Congo 19.1671667  COG
## 17 Congo Democratic Republic 22.1008333  COD
## 18             Cote d'Ivoire 13.1191111  CIV
## 19        Dominican Republic  0.7340476  DOM
## 20                     Egypt 15.1758333  EGY
## 21                   Eritrea 32.3306667  ERI
## 22                  Eswatini  5.8334444  SWZ
## 23                  Ethiopia 16.6565556  ETH
## 24                     Gabon 12.3352778  GAB
## 25                    Gambia 14.8097222  GMB
## 26                     Ghana  7.0600000  GHA
## 27                 Guatemala  2.3038333  GTM
## 28                    Guinea 21.2895000  GIN
## 29                    Guyana  4.2798889  GUY
## 30                     Haiti  3.5145000  HTI
## 31                  Honduras  3.0452778  HND
## 32                     India 12.5360556  IND
## 33                 Indonesia  7.5503571  IDN
## 34                    Jordan  5.6417778  JOR
## 35                     Kenya 11.3071111  KEN
## 36           Kyrgyz Republic 10.6180247  KGZ
## 37                   Lesotho  8.9674444  LSO
## 38                   Liberia 10.6376111  LBR
## 39                Madagascar  8.1401667  MDG
## 40                    Malawi  3.6356111  MWI
## 41                  Maldives  6.1069167  MDV
## 42                      Mali 22.4886667  MLI
## 43                   Moldova  5.4929012  MDA
## 44                   Morocco 31.6493333  MAR
```

```
## 45                Mozambique  3.5043333  MOZ
## 46                   Myanmar 11.9392222  MMR
## 47                   Namibia  7.3674444  NAM
## 48                     Nepal  6.4663889  NPL
## 49                 Nicaragua  4.6332222  NIC
## 50                     Niger 17.0797778  NER
## 51                   Nigeria 10.1447778  NGA
## 52                  Pakistan 13.1031548  PAK
## 53                      Peru  1.2701111  PER
## 54               Philippines  3.5443333  PHL
## 55                    Rwanda  9.1943889  RWA
## 56     Sao Tome and Principe  5.3686782  STP
## 57                   Senegal 13.2816667  SEN
## 58              Sierra Leone 16.9027778  SLE
## 59              South Africa  1.6648851  ZAF
## 60                Tajikistan 31.0131111  TJK
## 61                  Tanzania 16.2912222  TZA
## 62               Timor-Leste 24.9147778  TLS
## 63                      Togo  7.3982222  TGO
## 64                    Turkey  4.2592308  TUR
```

```
head(violence_df)
```

```
##       Country     Score code
## 1 Afghanistan 22.528810  AFG
## 2     Albania  2.452444  ALB
## 3      Angola  7.079778  AGO
## 4     Armenia  4.011310  ARM
## 5  Azerbaijan 16.704583  AZE
## 6  Bangladesh 10.303333  BGD
```

Now, assuming the FIDE and ISO-3166 codes are the same, let's see how the joined data looks like. Because the countries that have women chess players may not intersect with the countries visited for questionnaire in the violence dataset, I expect plenty of this missed intersections to have NA values. For this analysis we will pay closer attention to the violence score aggregation, and see which countries have top chess players rather than joining all countries in the FIDE and ignore violence score for countries that do not have chess players.

```
merged_df <- left_join(violence_df, chess_data_slim_grouped, by = c("code" = "chess_data_slim$Federatio
merged_df %>% arrange(desc(merged_df$Score))
```

```
##                       Country      Score code Standard_Rating_mean
## 1                     Eritrea 32.3306667  ERI                   NA
## 2                     Morocco 31.6493333  MAR             1853.000
## 3                  Tajikistan 31.0131111  TJK                   NA
## 4                 Timor-Leste 24.9147778  TLS                   NA
## 5                        Chad 23.4807778  TCD                   NA
## 6                 Afghanistan 22.5288095  AFG                   NA
## 7                        Mali 22.4886667  MLI                   NA
## 8  Congo Democratic Republic 22.1008333  COD                   NA
## 9                      Guinea 21.2895000  GIN                   NA
## 10                      Congo 19.1671667  COG                   NA
```

```
## 11                  Niger 17.0797778  NER                 NA
## 12           Sierra Leone 16.9027778  SLE                 NA
## 13             Azerbaijan 16.7045833  AZE           2103.375
## 14               Ethiopia 16.6565556  ETH                 NA
## 15               Tanzania 16.2912222  TZA                 NA
## 16                Burundi 15.9398889  BDI                 NA
## 17                  Egypt 15.1758333  EGY           1995.000
## 18                 Gambia 14.8097222  GMB                 NA
## 19                Senegal 13.2816667  SEN                 NA
## 20          Cote d'Ivoire 13.1191111  CIV                 NA
## 21               Pakistan 13.1031548  PAK                 NA
## 22                  India 12.5360556  IND           2086.143
## 23                  Gabon 12.3352778  GAB                 NA
## 24                Myanmar 11.9392222  MMR                 NA
## 25               Cameroon 11.9049444  CMR                 NA
## 26                  Kenya 11.3071111  KEN                 NA
## 27               Cambodia 11.2942222  KHM                 NA
## 28           Burkina Faso 10.8768889  BFA                 NA
## 29                Liberia 10.6376111  LBR                 NA
## 30        Kyrgyz Republic 10.6180247  KGZ                 NA
## 31             Bangladesh 10.3033333  BGD                 NA
## 32                Nigeria 10.1447778  NGA                 NA
## 33                Comoros  9.5546111  COM                 NA
## 34                 Rwanda  9.1943889  RWA                 NA
## 35                Lesotho  8.9674444  LSO                 NA
## 36             Madagascar  8.1401667  MDG                 NA
## 37                  Benin  7.8707778  BEN                 NA
## 38              Indonesia  7.5503571  IDN                 NA
## 39                   Togo  7.3982222  TGO                 NA
## 40                Namibia  7.3674444  NAM                 NA
## 41                 Angola  7.0797778  AGO                 NA
## 42                  Ghana  7.0600000  GHA                 NA
## 43                  Nepal  6.4663889  NPL                 NA
## 44               Maldives  6.1069167  MDV                 NA
## 45               Eswatini  5.8334444  SWZ                 NA
## 46                 Jordan  5.6417778  JOR           1964.000
## 47                Moldova  5.4929012  MDA           2161.000
## 48                Bolivia  5.3954444  BOL           1888.000
## 49  Sao Tome and Principe  5.3686782  STP                 NA
## 50              Nicaragua  4.6332222  NIC                 NA
## 51                 Guyana  4.2798889  GUY                 NA
## 52                 Turkey  4.2592308  TUR           1940.667
## 53                Armenia  4.0113095  ARM           2285.000
## 54                 Malawi  3.6356111  MWI                 NA
## 55            Philippines  3.5443333  PHL                 NA
## 56                  Haiti  3.5145000  HTI                 NA
## 57             Mozambique  3.5043333  MOZ                 NA
## 58               Honduras  3.0452778  HND                 NA
## 59                Albania  2.4524444  ALB           1971.000
## 60              Guatemala  2.3038333  GTM                 NA
## 61           South Africa  1.6648851  ZAF                 NA
## 62                   Peru  1.2701111  PER           2158.500
## 63               Colombia  1.1404444  COL           2001.875
## 64     Dominican Republic  0.7340476  DOM                 NA
```

```
##    Standard_Rating_n Standard_Rating_max Standard_Rating_min Rapid_rating_mean
## 1                 NA                  NA                  NA                NA
## 2                  1                1853                1853          1788.000
## 3                 NA                  NA                  NA                NA
## 4                 NA                  NA                  NA                NA
## 5                 NA                  NA                  NA                NA
## 6                 NA                  NA                  NA                NA
## 7                 NA                  NA                  NA                NA
## 8                 NA                  NA                  NA                NA
## 9                 NA                  NA                  NA                NA
## 10                NA                  NA                  NA                NA
## 11                NA                  NA                  NA                NA
## 12                NA                  NA                  NA                NA
## 13                 8                2279                1871          1950.000
## 14                NA                  NA                  NA                NA
## 15                NA                  NA                  NA                NA
## 16                NA                  NA                  NA                NA
## 17                 4                2182                1832          1895.250
## 18                NA                  NA                  NA                NA
## 19                NA                  NA                  NA                NA
## 20                NA                  NA                  NA                NA
## 21                NA                  NA                  NA                NA
## 22                 7                2202                1888          1878.714
## 23                NA                  NA                  NA                NA
## 24                NA                  NA                  NA                NA
## 25                NA                  NA                  NA                NA
## 26                NA                  NA                  NA                NA
## 27                NA                  NA                  NA                NA
## 28                NA                  NA                  NA                NA
## 29                NA                  NA                  NA                NA
## 30                NA                  NA                  NA                NA
## 31                NA                  NA                  NA                NA
## 32                NA                  NA                  NA                NA
## 33                NA                  NA                  NA                NA
## 34                NA                  NA                  NA                NA
## 35                NA                  NA                  NA                NA
## 36                NA                  NA                  NA                NA
## 37                NA                  NA                  NA                NA
## 38                NA                  NA                  NA                NA
## 39                NA                  NA                  NA                NA
## 40                NA                  NA                  NA                NA
## 41                NA                  NA                  NA                NA
## 42                NA                  NA                  NA                NA
## 43                NA                  NA                  NA                NA
## 44                NA                  NA                  NA                NA
## 45                NA                  NA                  NA                NA
## 46                 1                1964                1964          1941.000
## 47                 1                2161                2161          2121.000
## 48                 1                1888                1888          1931.000
## 49                NA                  NA                  NA                NA
## 50                NA                  NA                  NA                NA
## 51                NA                  NA                  NA                NA
## 52                 3                2033                1839          1931.333
## 53                 1                2285                2285          2282.000
```

```
## 54                NA                 NA                 NA                 NA
## 55                NA                 NA                 NA                 NA
## 56                NA                 NA                 NA                 NA
## 57                NA                 NA                 NA                 NA
## 58                NA                 NA                 NA                 NA
## 59                 1               1971               1971           1788.000
## 60                NA                 NA                 NA                 NA
## 61                NA                 NA                 NA                 NA
## 62                 2               2244               2073           2126.500
## 63                 8               2257               1817           2031.000
## 64                NA                 NA                 NA                 NA
##    Rapid_rating_n Rapid_rating_max Rapid_rating_min Blitz_rating_mean
## 1              NA               NA               NA                NA
## 2               1             1788             1788          1769.000
## 3              NA               NA               NA                NA
## 4              NA               NA               NA                NA
## 5              NA               NA               NA                NA
## 6              NA               NA               NA                NA
## 7              NA               NA               NA                NA
## 8              NA               NA               NA                NA
## 9              NA               NA               NA                NA
## 10             NA               NA               NA                NA
## 11             NA               NA               NA                NA
## 12             NA               NA               NA                NA
## 13              8             2144             1623          1953.750
## 14             NA               NA               NA                NA
## 15             NA               NA               NA                NA
## 16             NA               NA               NA                NA
## 17              4             2139             1664          1883.000
## 18             NA               NA               NA                NA
## 19             NA               NA               NA                NA
## 20             NA               NA               NA                NA
## 21             NA               NA               NA                NA
## 22              7             2075             1569          1907.286
## 23             NA               NA               NA                NA
## 24             NA               NA               NA                NA
## 25             NA               NA               NA                NA
## 26             NA               NA               NA                NA
## 27             NA               NA               NA                NA
## 28             NA               NA               NA                NA
## 29             NA               NA               NA                NA
## 30             NA               NA               NA                NA
## 31             NA               NA               NA                NA
## 32             NA               NA               NA                NA
## 33             NA               NA               NA                NA
## 34             NA               NA               NA                NA
## 35             NA               NA               NA                NA
## 36             NA               NA               NA                NA
## 37             NA               NA               NA                NA
## 38             NA               NA               NA                NA
## 39             NA               NA               NA                NA
## 40             NA               NA               NA                NA
## 41             NA               NA               NA                NA
## 42             NA               NA               NA                NA
```

```
## 43             NA               NA               NA                 NA
## 44             NA               NA               NA                 NA
## 45             NA               NA               NA                 NA
## 46              1             1941             1941           1857.000
## 47              1             2121             2121           2123.000
## 48              1             1931             1931           2020.000
## 49             NA               NA               NA                 NA
## 50             NA               NA               NA                 NA
## 51             NA               NA               NA                 NA
## 52              3             2016             1802           1987.333
## 53              1             2282             2282           2275.000
## 54             NA               NA               NA                 NA
## 55             NA               NA               NA                 NA
## 56             NA               NA               NA                 NA
## 57             NA               NA               NA                 NA
## 58             NA               NA               NA                 NA
## 59              1             1788             1788           1886.000
## 60             NA               NA               NA                 NA
## 61             NA               NA               NA                 NA
## 62              2             2204             2049           2108.000
## 63              8             2312             1784           2003.250
## 64             NA               NA               NA                 NA
##    Blitz_rating_n Blitz_rating_max Blitz_rating_min
## 1              NA               NA               NA
## 2               1             1769             1769
## 3              NA               NA               NA
## 4              NA               NA               NA
## 5              NA               NA               NA
## 6              NA               NA               NA
## 7              NA               NA               NA
## 8              NA               NA               NA
## 9              NA               NA               NA
## 10             NA               NA               NA
## 11             NA               NA               NA
## 12             NA               NA               NA
## 13              8             2109             1656
## 14             NA               NA               NA
## 15             NA               NA               NA
## 16             NA               NA               NA
## 17              4             2072             1698
## 18             NA               NA               NA
## 19             NA               NA               NA
## 20             NA               NA               NA
## 21             NA               NA               NA
## 22              7             2076             1619
## 23             NA               NA               NA
## 24             NA               NA               NA
## 25             NA               NA               NA
## 26             NA               NA               NA
## 27             NA               NA               NA
## 28             NA               NA               NA
## 29             NA               NA               NA
## 30             NA               NA               NA
## 31             NA               NA               NA
```

```
## 32             NA               NA               NA
## 33             NA               NA               NA
## 34             NA               NA               NA
## 35             NA               NA               NA
## 36             NA               NA               NA
## 37             NA               NA               NA
## 38             NA               NA               NA
## 39             NA               NA               NA
## 40             NA               NA               NA
## 41             NA               NA               NA
## 42             NA               NA               NA
## 43             NA               NA               NA
## 44             NA               NA               NA
## 45             NA               NA               NA
## 46              1             1857             1857
## 47              1             2123             2123
## 48              1             2020             2020
## 49             NA               NA               NA
## 50             NA               NA               NA
## 51             NA               NA               NA
## 52              3             2026             1933
## 53              1             2275             2275
## 54             NA               NA               NA
## 55             NA               NA               NA
## 56             NA               NA               NA
## 57             NA               NA               NA
## 58             NA               NA               NA
## 59              1             1886             1886
## 60             NA               NA               NA
## 61             NA               NA               NA
## 62              2             2168             2048
## 63              8             2240             1791
## 64             NA               NA               NA
```

```
head(merged_df)
```

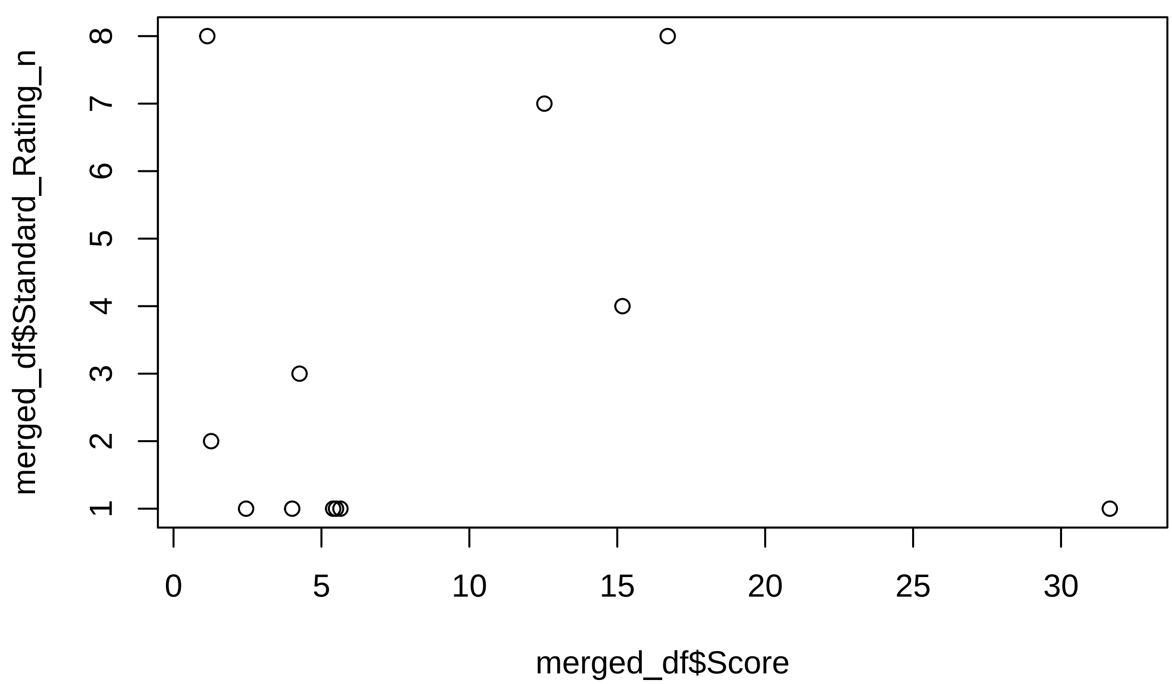
```
##       Country     Score code Standard_Rating_mean Standard_Rating_n
## 1 Afghanistan 22.528810  AFG                   NA                NA
## 2     Albania  2.452444  ALB             1971.000                 1
## 3      Angola  7.079778  AGO                   NA                NA
## 4     Armenia  4.011310  ARM             2285.000                 1
## 5  Azerbaijan 16.704583  AZE             2103.375                 8
## 6  Bangladesh 10.303333  BGD                   NA                NA
##   Standard_Rating_max Standard_Rating_min Rapid_rating_mean Rapid_rating_n
## 1                  NA                  NA                NA             NA
## 2                1971                1971              1788              1
## 3                  NA                  NA                NA             NA
## 4                2285                2285              2282              1
## 5                2279                1871              1950              8
## 6                  NA                  NA                NA             NA
##   Rapid_rating_max Rapid_rating_min Blitz_rating_mean Blitz_rating_n
## 1               NA               NA                NA             NA
## 2             1788             1788           1886.00              1
## 3               NA               NA                NA             NA
```

```
## 4             2282             2282            2275.00              1
## 5             2144             1623            1953.75              8
## 6               NA               NA                 NA             NA
##   Blitz_rating_max Blitz_rating_min
## 1               NA               NA
## 2             1886             1886
## 3               NA               NA
## 4             2275             2275
## 5             2109             1656
## 6               NA               NA
```

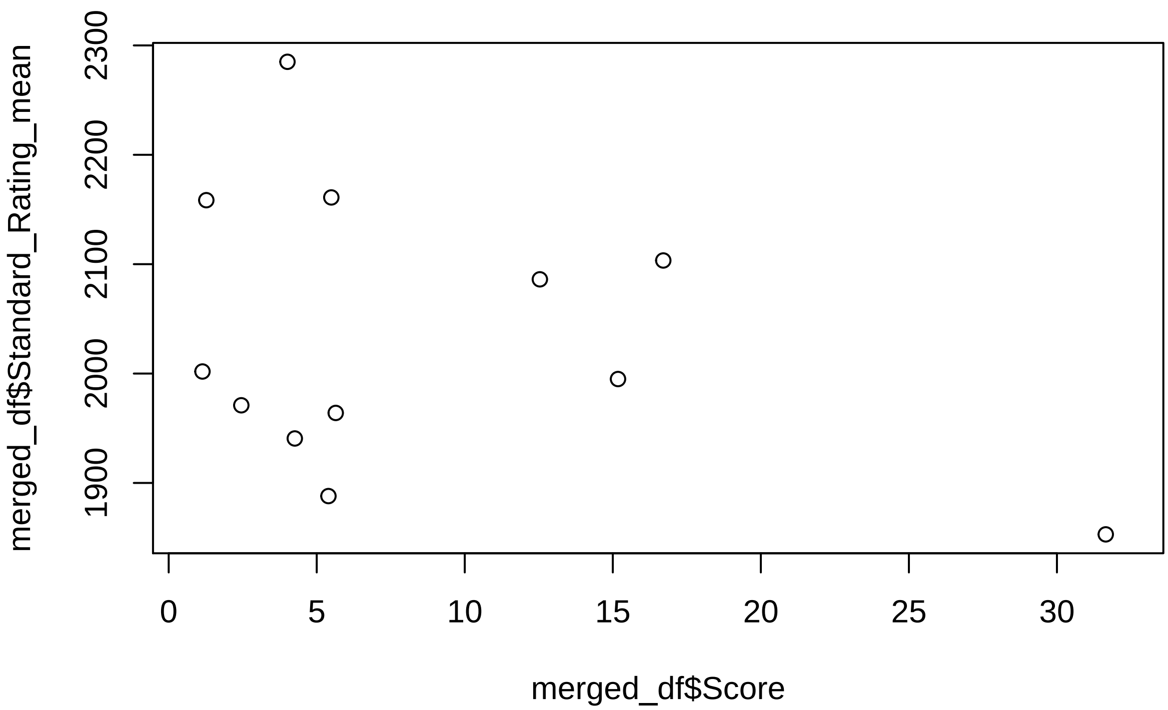
The generated output is very small due to a very small intersection between interviewed countries and top women chess players, but we will still attempt to see correlation between the violence index and the rating, and number, of players.

But first, a little data visualization.

```
plot(merged_df$Score, merged_df$Standard_Rating_n)
```




```
plot(merged_df$Score, merged_df$Standard_Rating_mean)
```



Now, let's see the correlation values.

```
merged_df_no_na <- na.omit(merged_df)
print(cor(merged_df_no_na$Score, merged_df_no_na$Standard_Rating_n))
```

```
## [1] 0.09331977
```

```
print(cor(merged_df_no_na$Score, merged_df_no_na$Standard_Rating_mean))
```

```
## [1] -0.3560483
```

```
print(cor(merged_df_no_na$Score, merged_df_no_na$Rapid_rating_mean))
```

```
## [1] -0.507026
```

```
print(cor(merged_df_no_na$Score, merged_df_no_na$Blitz_rating_mean))
```

```
## [1] -0.6013585
```

From the previous result we see two interesting observations after peaking into the aggregated data:

- 1) Because the tiny size of the sample, the correlation between the violence score and the number of players is meaningless.

- 2) there is a moderate negative correlation between the violence score and the rating of players on all three categories, that means that as the violence index increases, there is an apparent negative impact into how well the players of that country perform.

Now we will create a dataset out of our aggregated data.

```
write.csv(merged_df,"data/violence_chess_ds.csv", row.names = TRUE)
write.csv(chess_data_slim_grouped,"data/chess_aggregate_ds.csv", row.names = TRUE)
```

Before wrapping up, let's create a data report of our dataset

```
makeDataReport(merged_df,
               render = FALSE,
               file = "codebook.Rmd",
               codebook = TRUE,
               replace = TRUE,
               reportTitle = "Violence index and women chess players across the world")
```