football

2023-03-23

```
## Warning: package 'dplyr' was built under R version 4.2.2

##
## 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

## Warning: package 'tidyr' was built under R version 4.2.2

## Warning: package 'tidyverse' was built under R version 4.2.2

## -- Attaching packages --------------------------------------- tidyverse 1.3.2 --

## v ggplot2 3.4.0     v purrr   1.0.1
## v tibble  3.1.8     v stringr 1.5.0
## v readr   2.1.3     v forcats 0.5.2

## Warning: package 'ggplot2' was built under R version 4.2.2

## Warning: package 'tibble' was built under R version 4.2.2

## Warning: package 'readr' was built under R version 4.2.2

## Warning: package 'purrr' was built under R version 4.2.2

## Warning: package 'stringr' was built under R version 4.2.2

## Warning: package 'forcats' was built under R version 4.2.2

## -- Conflicts ------------------------------------------ tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()

## Warning: package 'reshape2' was built under R version 4.2.2
```

```
##
## Attaching package: 'reshape2'
##
## The following object is masked from 'package:tidyr':
##
##     smiths
```

```
## Warning: package 'kableExtra' was built under R version 4.2.3
```

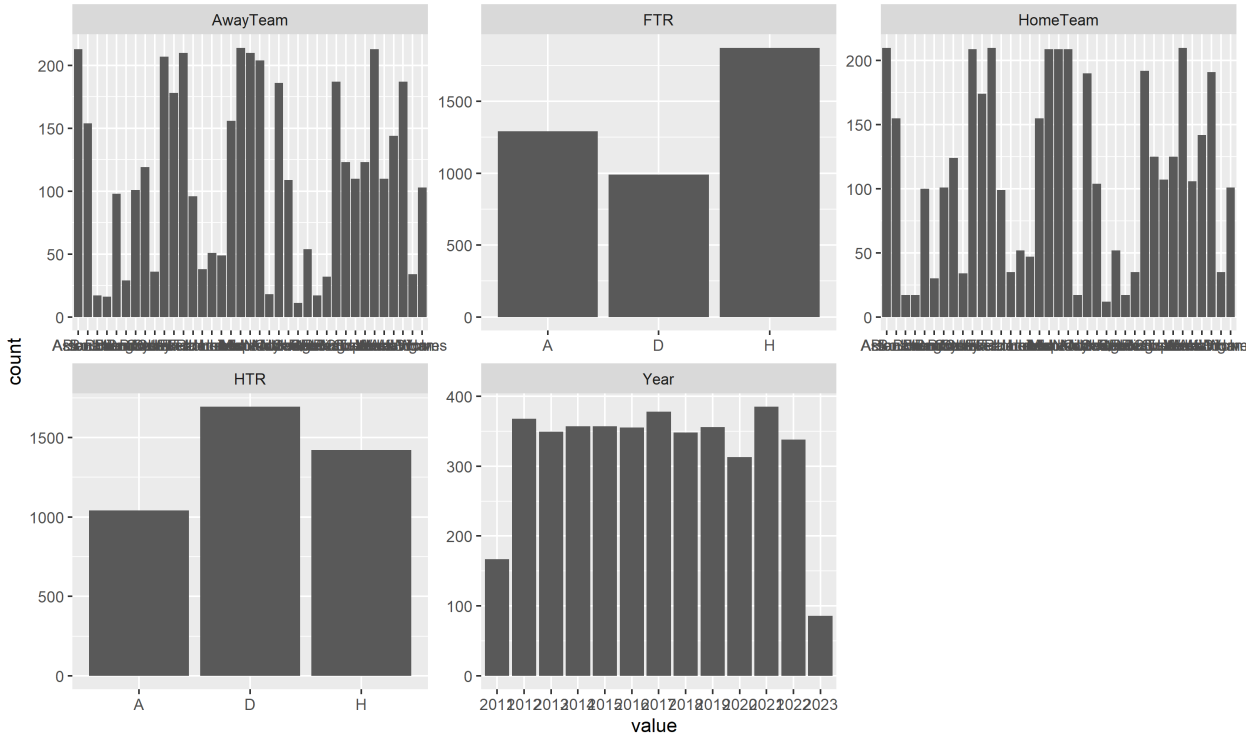
```
##
## Attaching package: 'kableExtra'
##
## The following object is masked from 'package:dplyr':
##
##     group_rows
```

```
## Rows: 4450 Columns: 21
## -- Column specification --------------------------------------------------------
## Delimiter: ","
## chr  (5): Date, HomeTeam, AwayTeam, FTR, HTR
## dbl (16): FTHG, FTAG, HTHG, HTAG, HS, AS, HST, AST, HF, AF, HC, AC, HY, AY, ...
##
## i Use `spec()` to retrieve the full column specification for this data.
## i Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

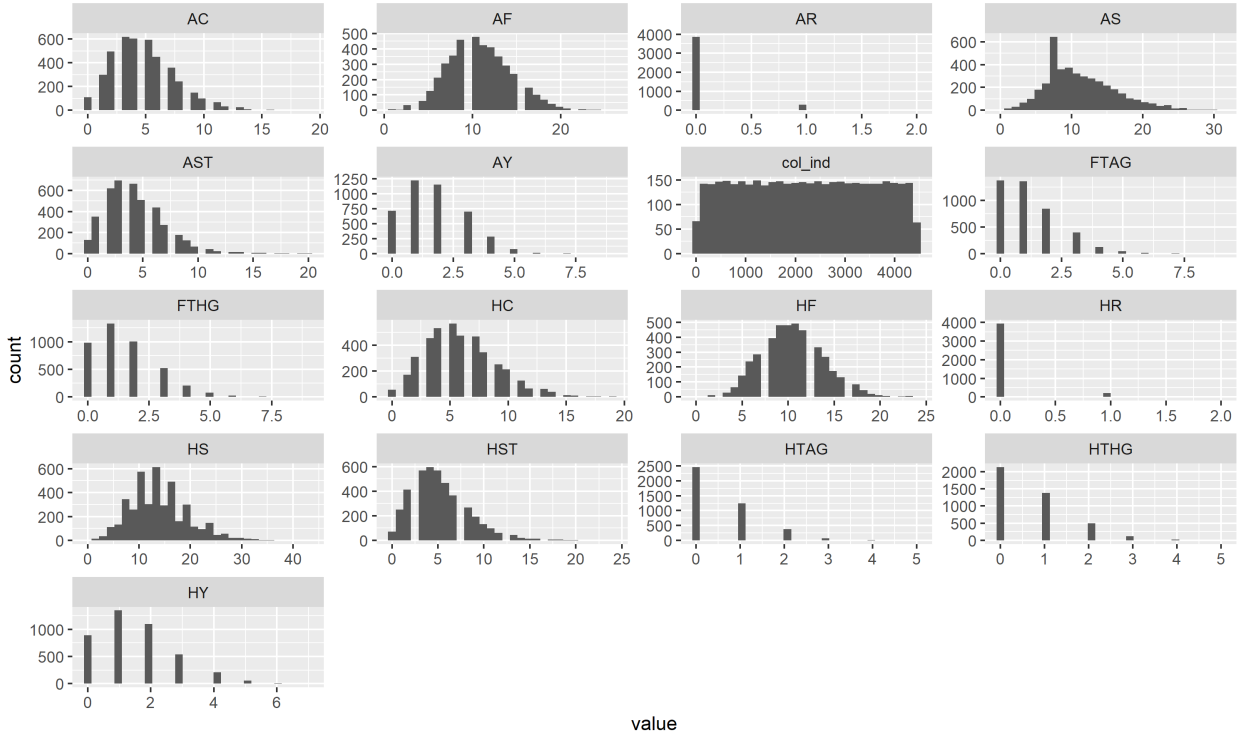
```
## tibble [4,450 x 22] (S3: tbl_df/tbl/data.frame)
##  $ HomeTeam: Factor w/ 37 levels "Arsenal","Aston Villa",..: 3 13 18 22 25 36 29 34 19 1 ...
##  $ AwayTeam: Factor w/ 37 levels "Arsenal","Aston Villa",..: 37 2 30 1 4 23 10 20 31 18 ...
##  $ FTHG    : num [1:4450] 1 0 1 0 0 1 0 1 4 0 ...
##  $ FTAG    : num [1:4450] 2 0 1 0 4 1 0 2 0 2 ...
##  $ FTR     : Factor w/ 3 levels "A","D","H": 1 2 2 2 1 2 2 1 3 1 ...
##  $ HTHG    : num [1:4450] 1 0 1 0 0 1 0 1 0 0 ...
##  $ HTAG    : num [1:4450] 1 0 0 0 1 1 0 1 0 0 ...
##  $ HTR     : Factor w/ 3 levels "A","D","H": 2 2 3 2 1 2 2 2 2 2 ...
##  $ HS      : num [1:4450] 16 13 11 6 13 18 6 14 26 10 ...
##  $ AS      : num [1:4450] 13 7 15 9 13 13 20 11 8 13 ...
##  $ HST     : num [1:4450] 8 9 4 1 7 11 3 8 19 6 ...
##  $ AST     : num [1:4450] 4 1 6 4 7 3 11 5 5 8 ...
##  $ HF      : num [1:4450] 14 10 17 9 9 11 12 16 9 11 ...
##  $ AF      : num [1:4450] 10 18 12 11 16 8 12 9 2 6 ...
##  $ HC      : num [1:4450] 12 2 6 2 3 7 4 6 7 9 ...
##  $ AC      : num [1:4450] 6 3 3 5 2 3 6 5 4 5 ...
##  $ HY      : num [1:4450] 4 2 4 3 1 2 2 3 0 2 ...
##  $ AY      : num [1:4450] 2 4 4 5 2 2 2 2 0 2 ...
##  $ HR      : num [1:4450] 0 0 0 0 1 0 0 0 0 1 ...
##  $ AR      : num [1:4450] 0 0 0 1 0 0 0 0 0 0 ...
##  $ Year    : chr [1:4450] "2011" "2011" "2011" "2011" ...
##  $ col_ind : int [1:4450] 1 2 3 4 5 6 7 8 9 10 ...
```

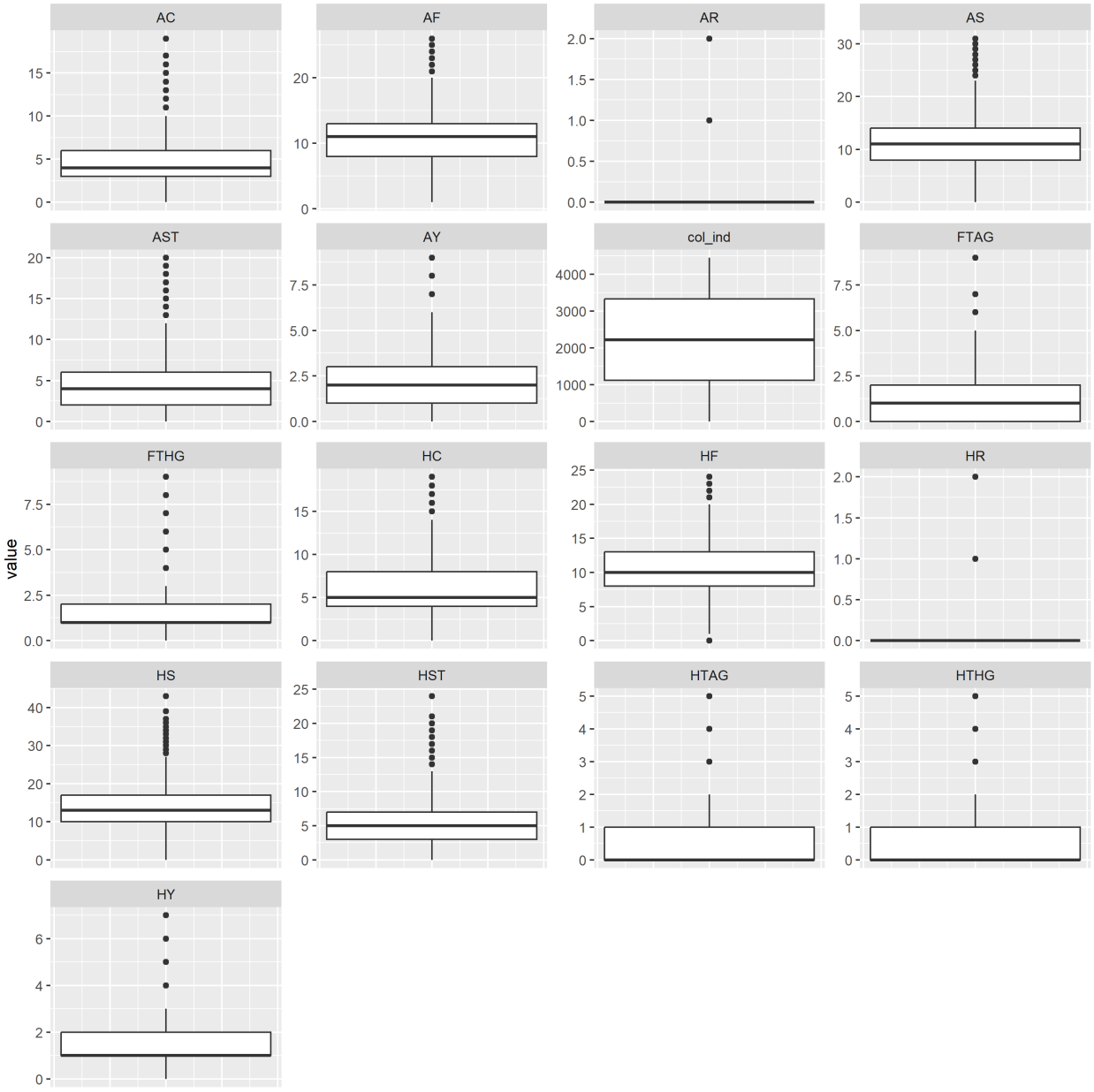
```
## Numerical Columns within dataset:  FTHG FTAG HTHG HTAG HS AS HST AST HF AF HC AC HY AY HR AR col_ind
```

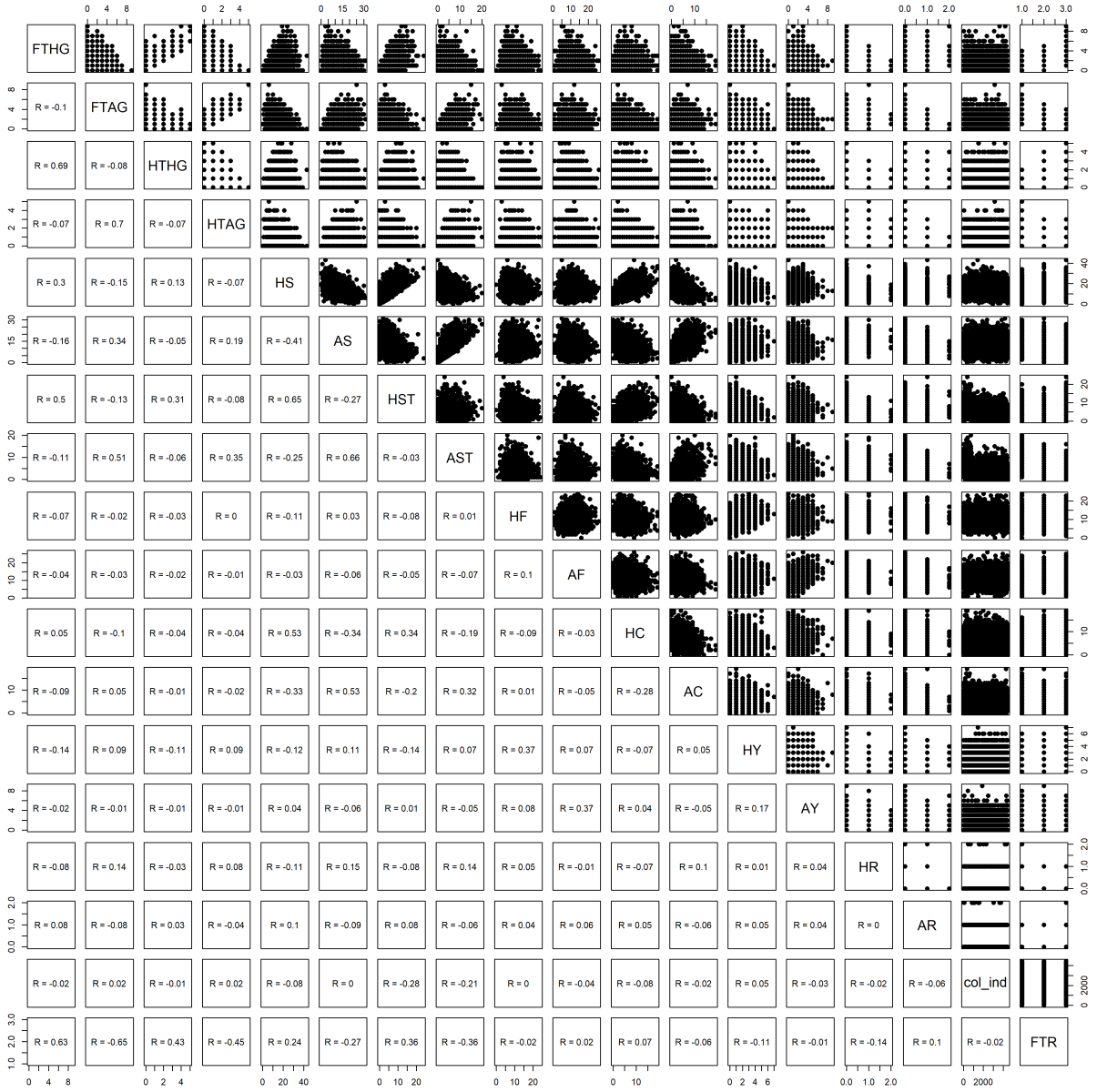
```
## Categorical Columns within dataset:  HomeTeam AwayTeam FTR HTR Year
```




```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```




AC
AF
AR
AS
AST
AY
col_ind
FTAG
FTHG
HC
HF
HR
HS
HST
HTAG
HTHG
HY
value




```
## NULL

## Warning in par(usr): argument 1 does not name a graphical parameter

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```

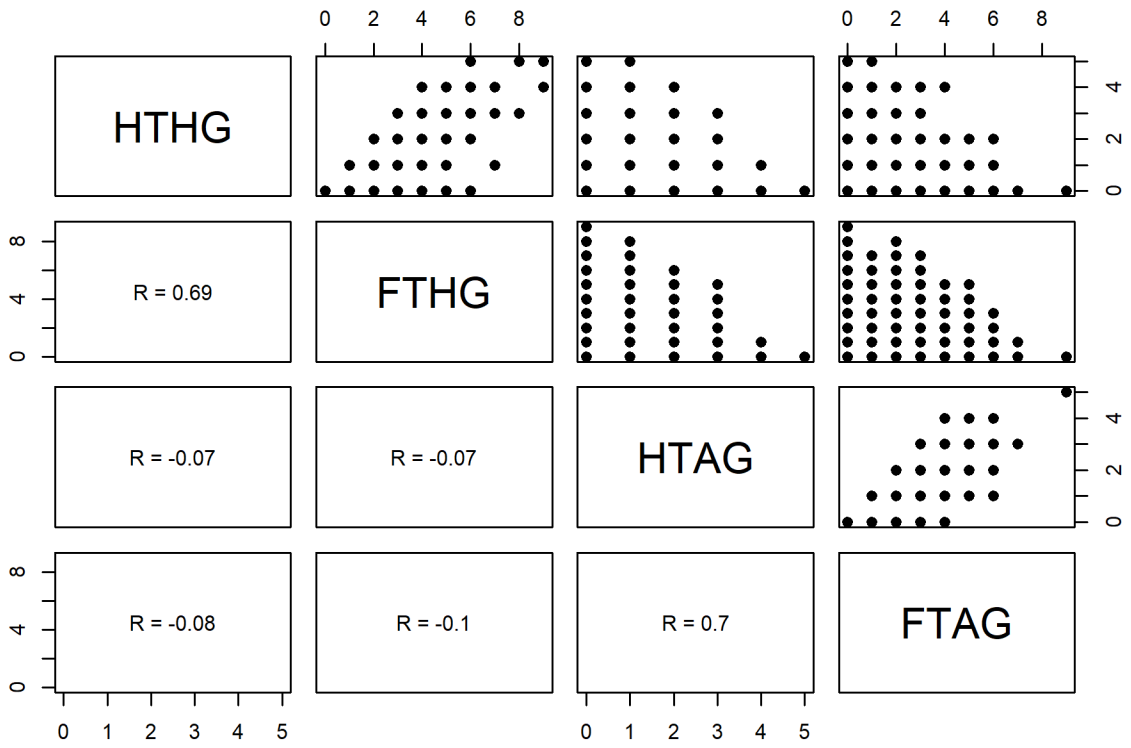


```
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```
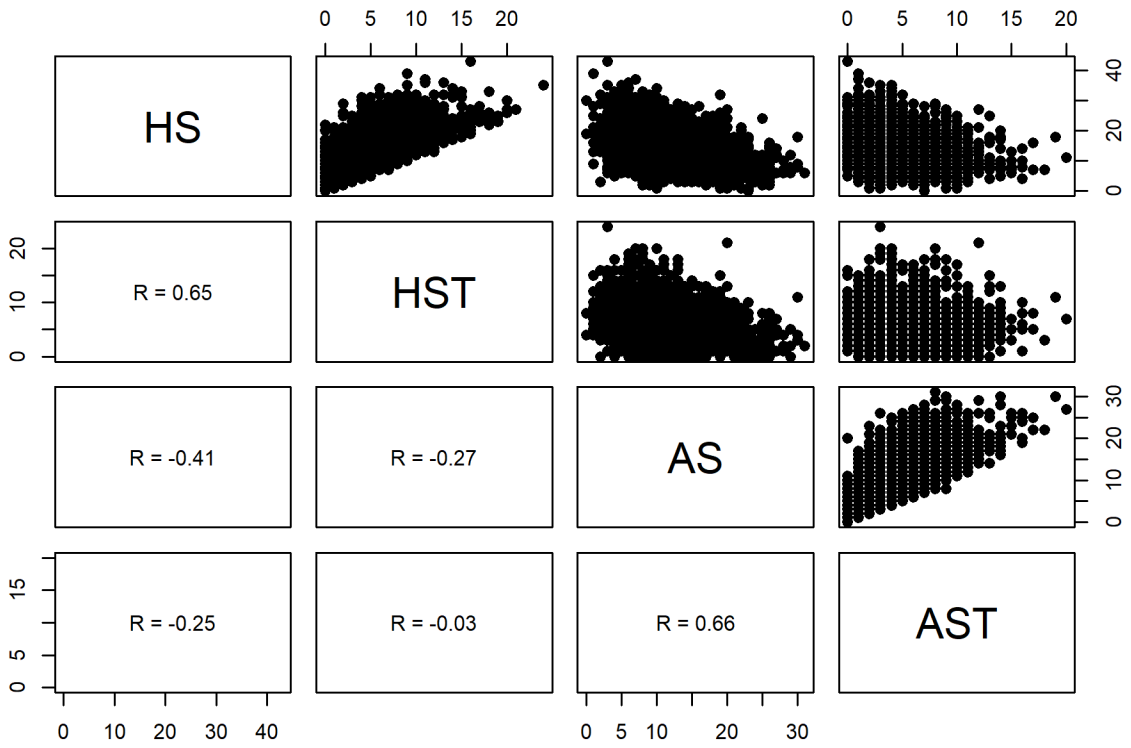
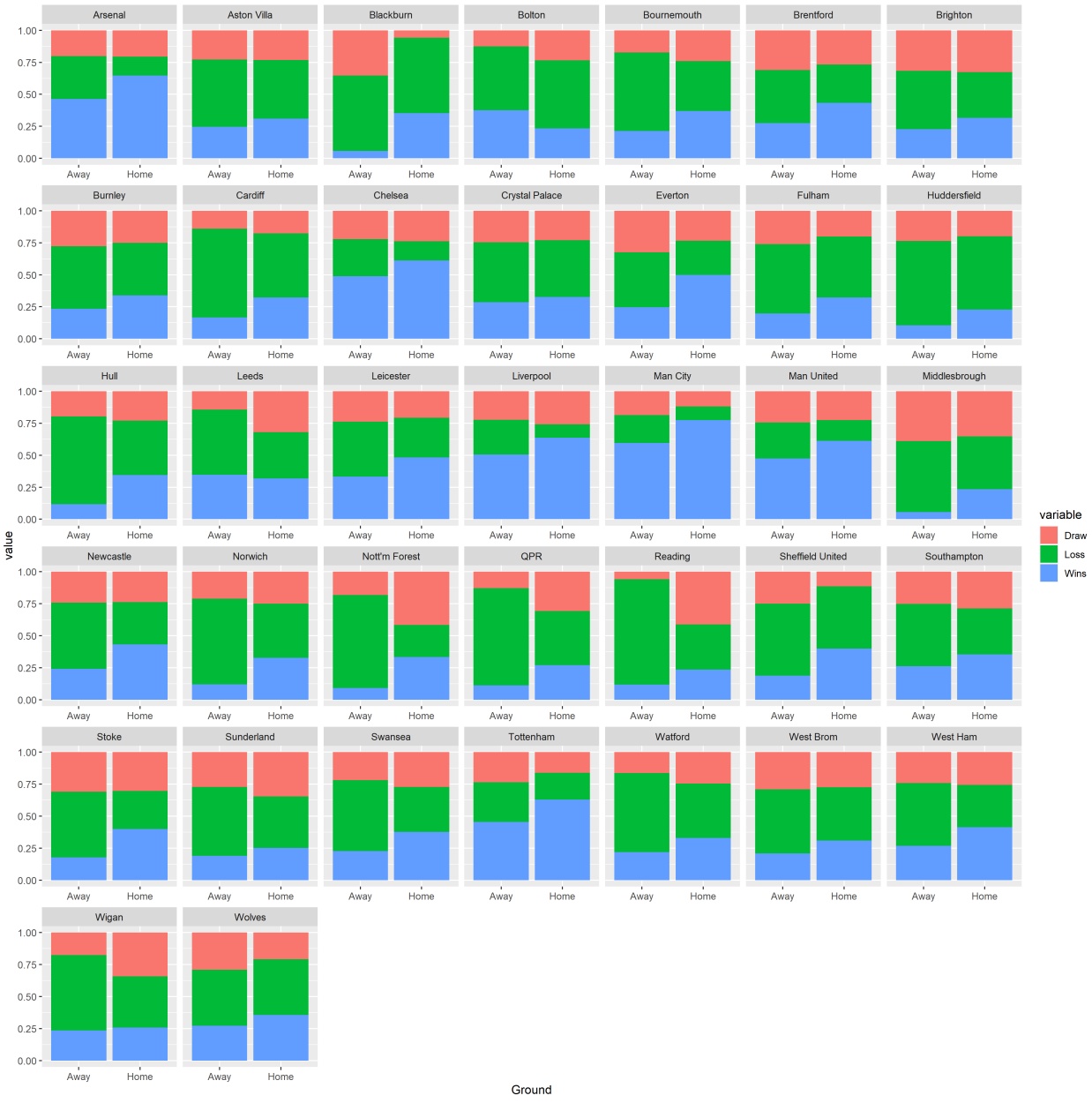
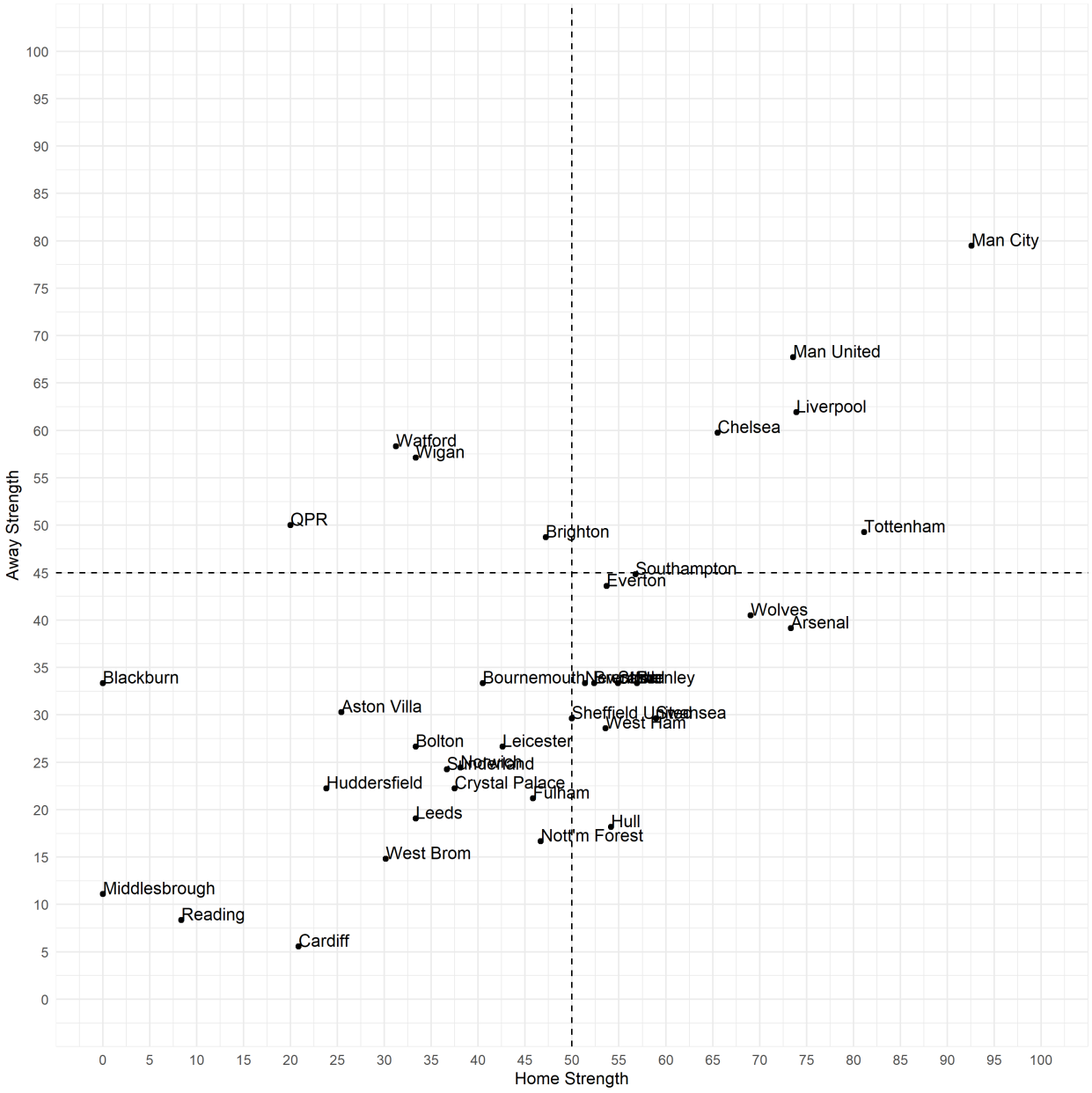


HS
HST
AS
AST
R = 0.65
R = -0.41
R = -0.27
R = -0.25
R = -0.03
R = 0.66
0 5 10 15 20
0 20 40
0 10 20
0 10 20 30
0 5 15
0 10 20 30 40
0 5 10 20 30


Arsenal
Aston Villa
Blackburn
Bolton
Bournemouth
Brentford
Brighton
Burnley
Cardiff
Chelsea
Crystal Palace
Everton
Fulham
Huddersfield
Hull
Leeds
Leicester
Liverpool
Man City
Man United
Middlesbrough
Newcastle
Norwich
Nott'm Forest
QPR
Reading
Sheffield United
Southampton
Stoke
Sunderland
Swansea
Tottenham
Watford
West Brom
West Ham
Wigan
Wolves
value
1.00
0.75
0.50
0.25
0.00
Away
Home
Ground
variable
Draw
Loss
Wins




```
## tibble [4,157 x 15] (S3: tbl_df/tbl/data.frame)
##  $ HomeTeam: Factor w/ 37 levels "Arsenal","Aston Villa",..: 3 13 18 22 25 36 29 34 1 2 ...
##  $ AwayTeam: Factor w/ 37 levels "Arsenal","Aston Villa",..: 37 2 30 1 4 23 10 20 18 3 ...
##  $ FTR     : Factor w/ 3 levels "A","D","H": 1 2 2 2 1 2 2 1 1 3 ...
##  $ HTHG    : int [1:4157] 1 0 1 0 0 1 0 1 0 2 ...
##  $ HTAG    : int [1:4157] 1 0 0 0 1 1 0 1 0 0 ...
##  $ HST     : int [1:4157] 8 9 4 1 7 11 3 8 6 6 ...
##  $ AST     : int [1:4157] 4 1 6 4 7 3 11 5 8 6 ...
##  $ HF      : int [1:4157] 14 10 17 9 9 11 12 16 11 9 ...
##  $ AF      : int [1:4157] 10 18 12 11 16 8 12 9 6 13 ...
##  $ HC      : int [1:4157] 12 2 6 2 3 7 4 6 9 5 ...
##  $ AC      : int [1:4157] 6 3 3 5 2 3 6 5 5 4 ...
##  $ HY      : int [1:4157] 4 2 4 3 1 2 2 3 2 3 ...
##  $ AY      : int [1:4157] 2 4 4 5 2 2 2 2 2 0 ...
```

```
##  $ HR      : int [1:4157] 0 0 0 0 1 0 0 0 1 0 ...
##  $ AR      : int [1:4157] 0 0 0 1 0 0 0 0 0 0 ...

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```
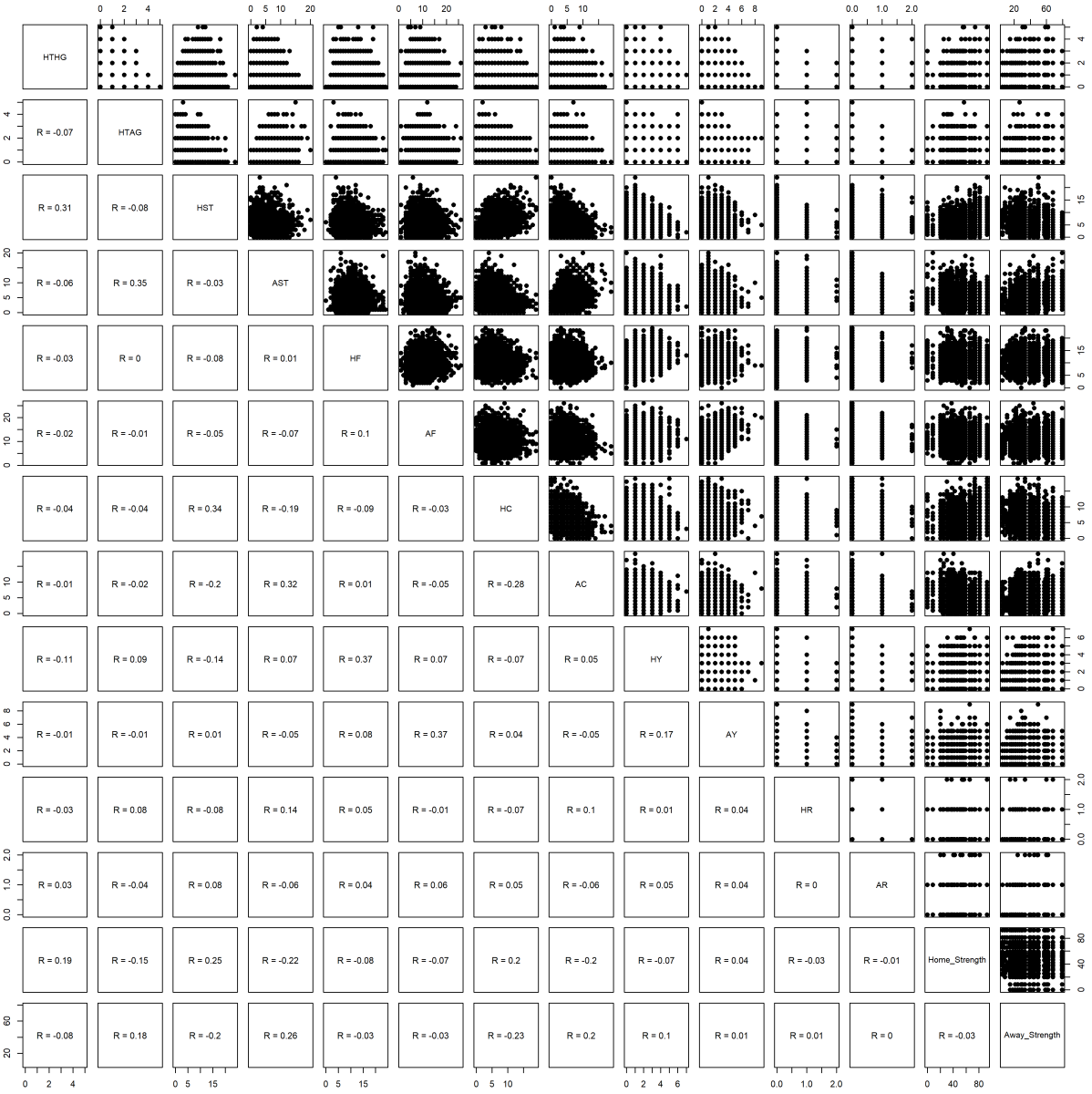
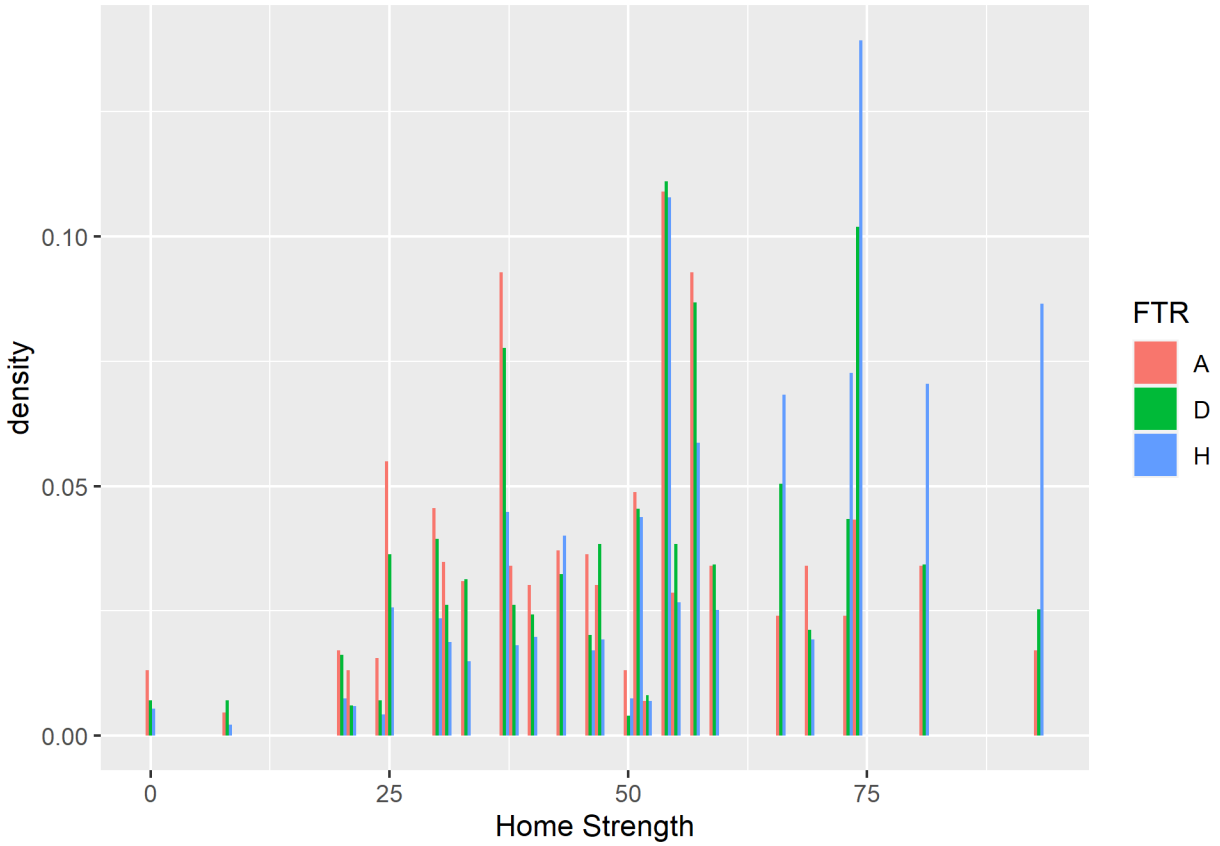
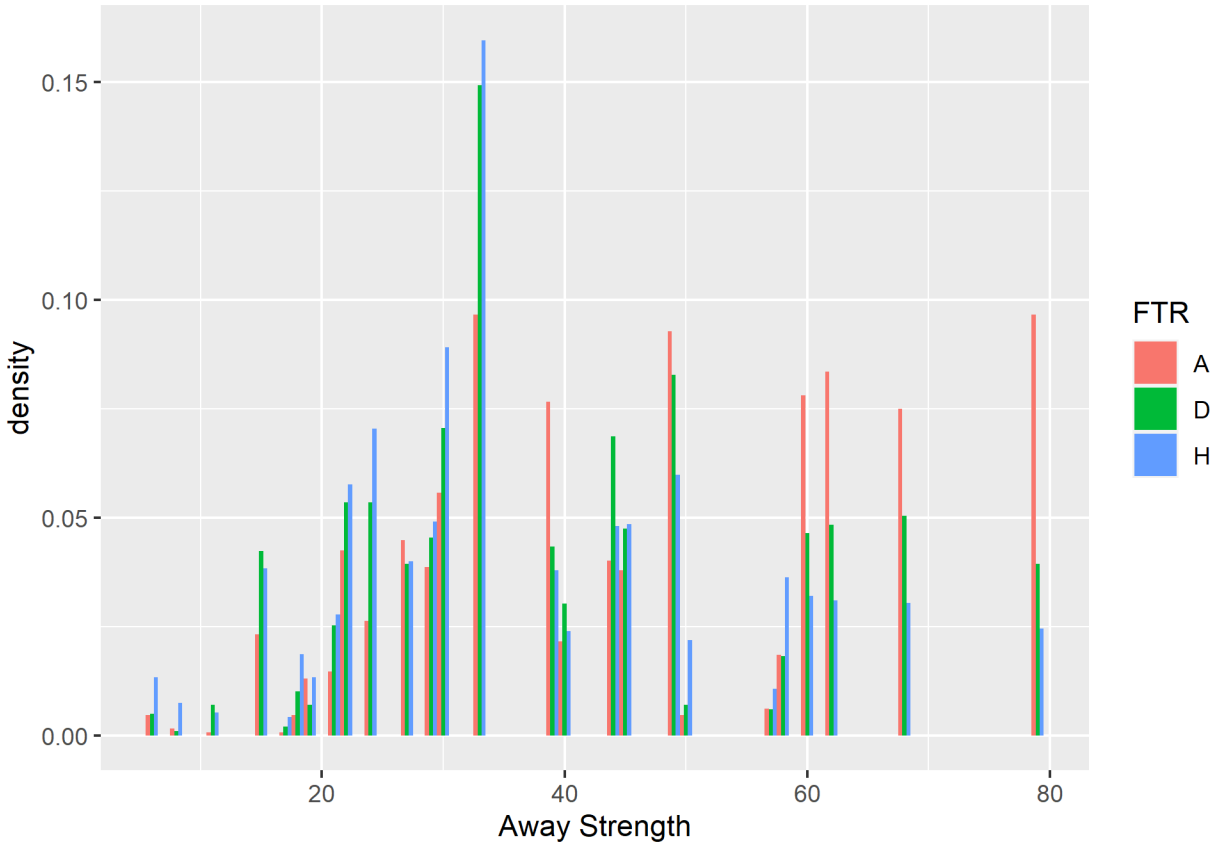
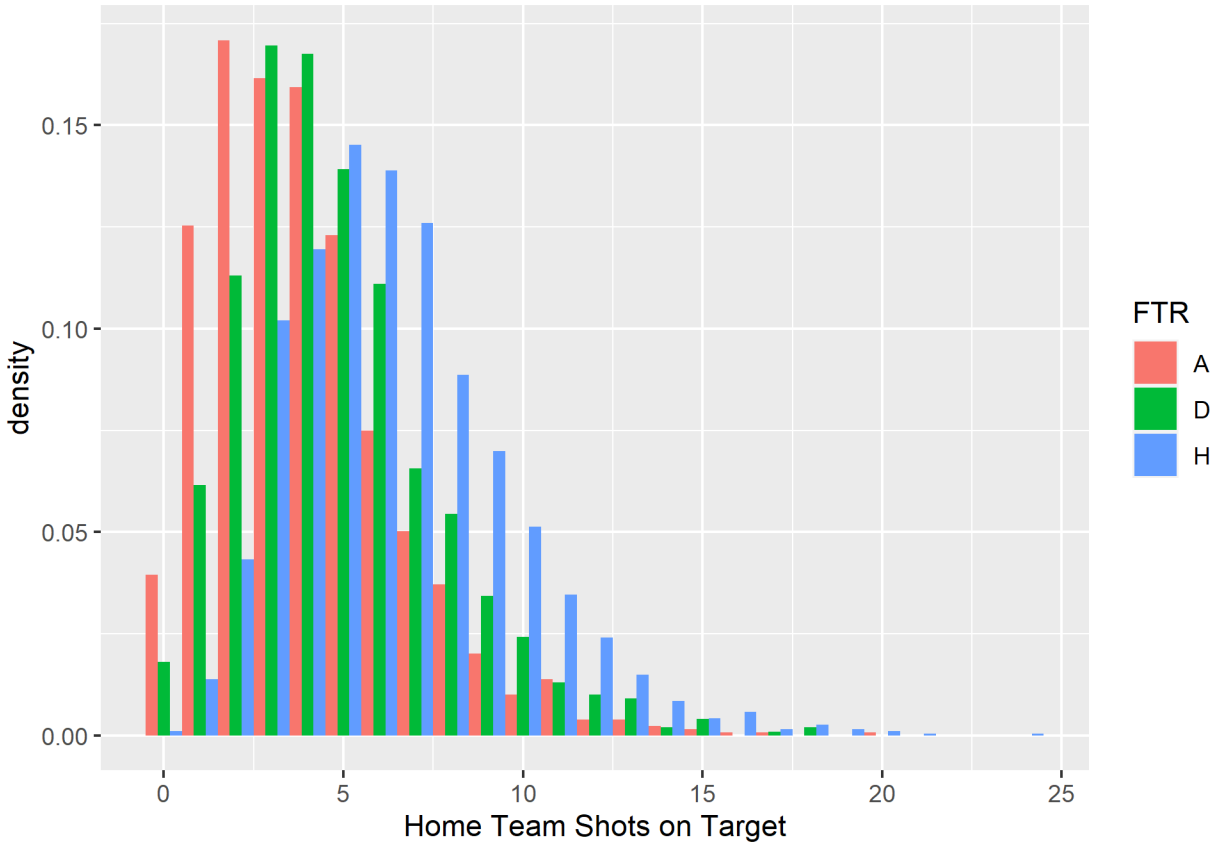
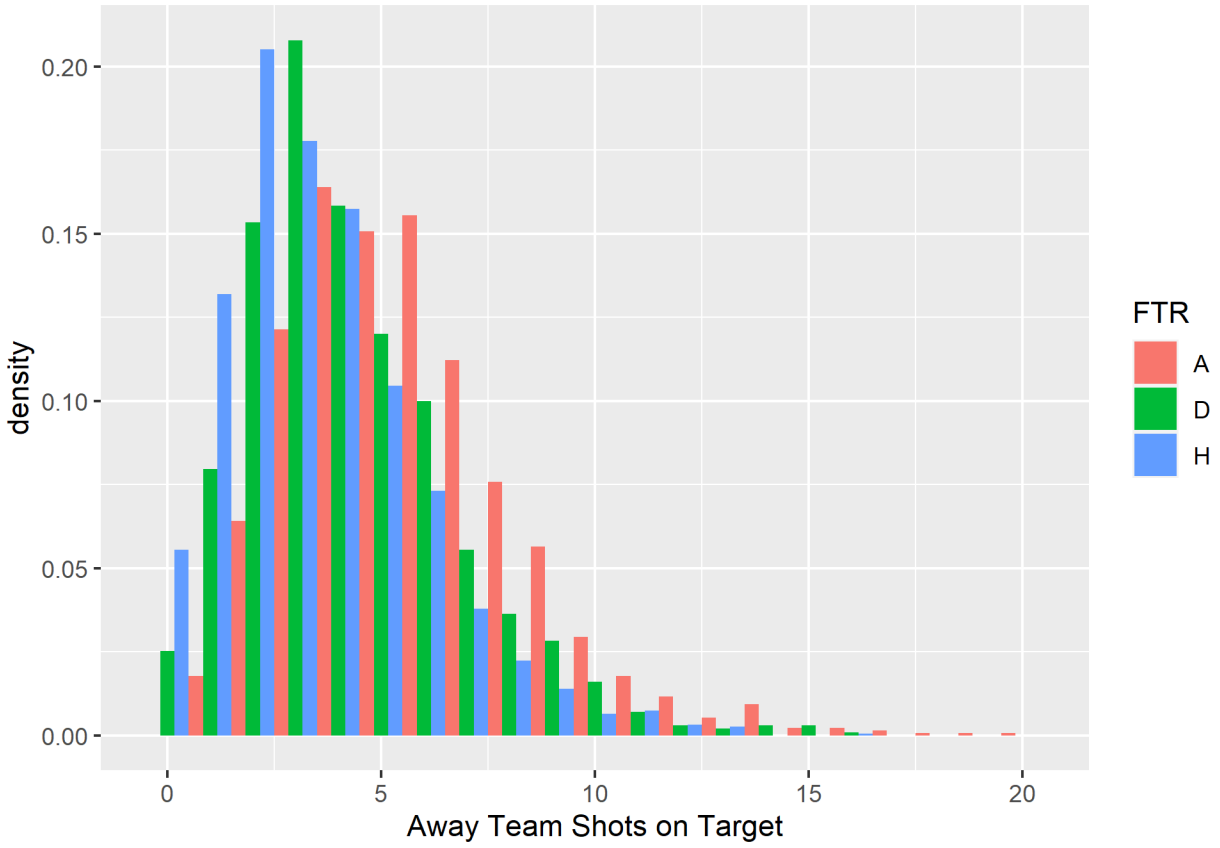
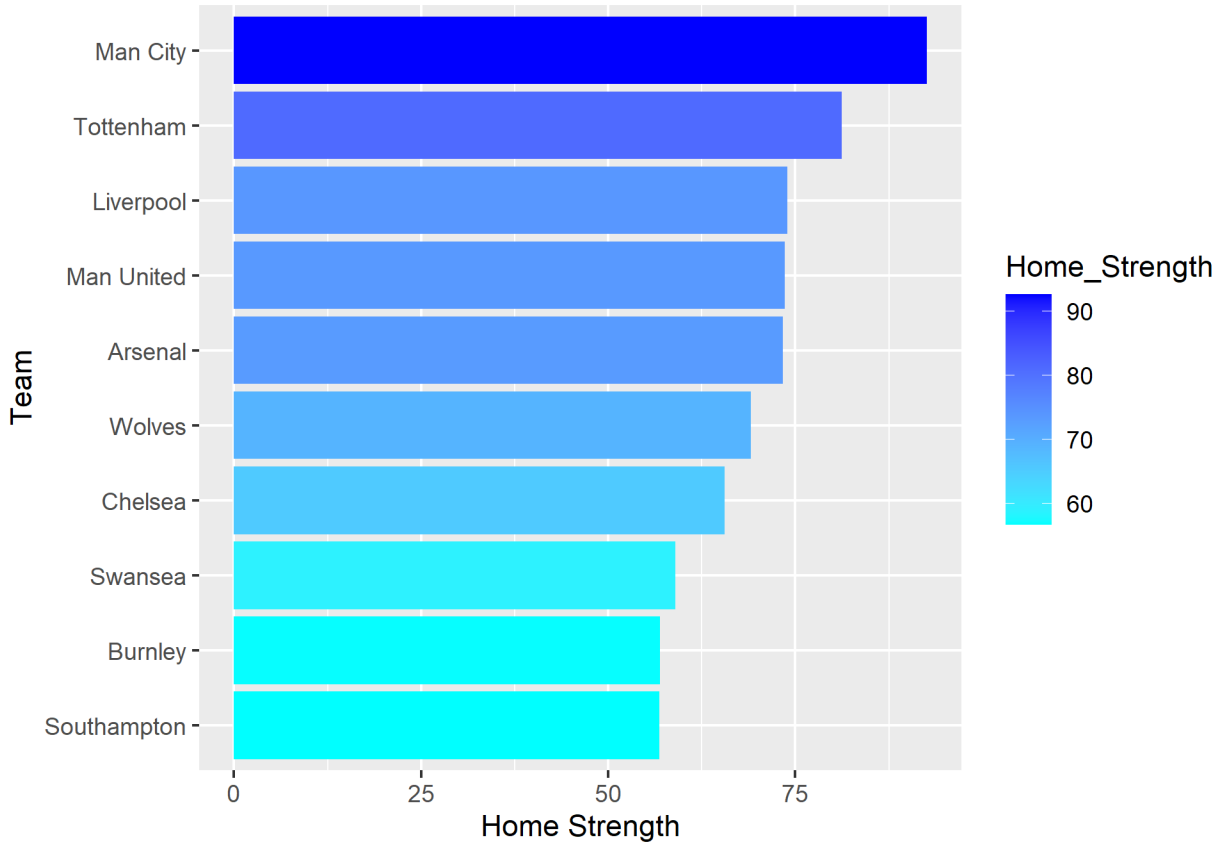


HTHG
R = -0.07
HTAG
R = 0.31
R = -0.08
HST
R = -0.06
R = 0.35
R = -0.03
AST
R = -0.03
R = 0
R = -0.08
R = 0.01
HF
R = -0.02
R = -0.01
R = -0.05
R = -0.07
R = 0.1
AF
R = -0.04
R = -0.04
R = 0.34
R = -0.19
R = -0.09
R = -0.03
HC
R = -0.01
R = -0.02
R = -0.2
R = 0.32
R = 0.01
R = -0.05
R = -0.28
AC
R = -0.11
R = 0.09
R = -0.14
R = 0.07
R = 0.37
R = 0.07
R = -0.07
R = 0.05
HY
R = -0.01
R = -0.01
R = 0.01
R = -0.05
R = 0.08
R = 0.37
R = 0.04
R = -0.05
R = 0.17
AY
R = -0.03
R = 0.08
R = -0.08
R = 0.14
R = 0.05
R = -0.01
R = -0.07
R = 0.1
R = 0.01
R = 0.04
HR
R = 0.03
R = -0.04
R = 0.08
R = -0.06
R = 0.04
R = 0.06
R = 0.05
R = -0.06
R = 0.05
R = 0.04
R = 0
AR
R = 0.19
R = -0.15
R = 0.25
R = -0.22
R = -0.08
R = -0.07
R = 0.2
R = -0.2
R = -0.07
R = 0.04
R = -0.03
R = -0.01
Home_Strength
R = -0.08
R = 0.18
R = -0.2
R = 0.26
R = -0.03
R = -0.03
R = -0.23
R = 0.2
R = 0.1
R = 0.01
R = 0.01
R = 0
R = -0.03
Away_Strength

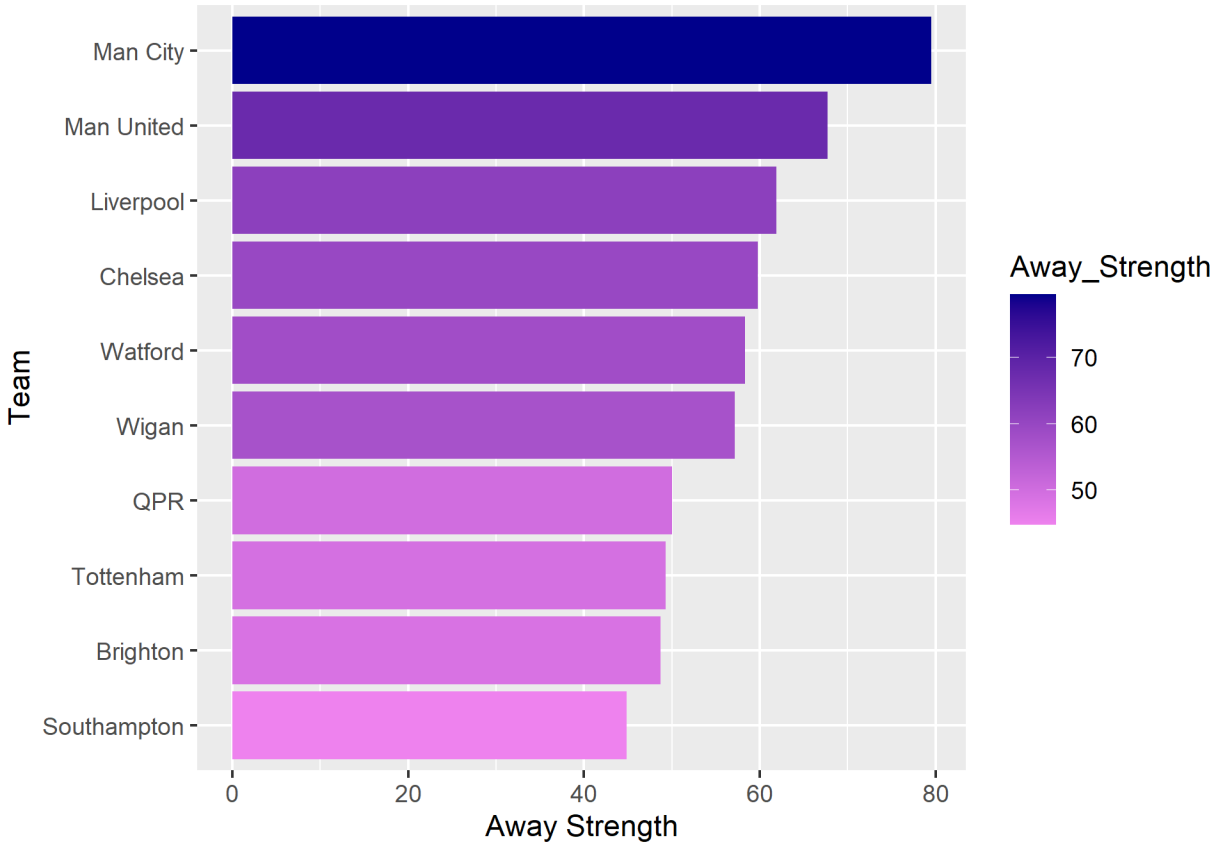

density
0.10
0.05
0.00
0
25
50
75
Home Strength
FTR
A
D
H


0.15
0.10
0.05
0.00
density
20
40
60
80
Away Strength
FTR
A
D
H


density
0.15
0.10
0.05
0.00
0
5
10
15
20
25
Home Team Shots on Target
FTR
A
D
H


0.20
0.15
0.10
0.05
0.00
density
0
5
10
15
20
Away Team Shots on Target
FTR
A
D
H


Man City
Tottenham
Liverpool
Man United
Arsenal
Wolves
Chelsea
Swansea
Burnley
Southampton
Team
0
25
50
75
Home Strength
Home_Strength
90
80
70
60


Man City
Man United
Liverpool
Chelsea
Watford
Wigan
QPR
Tottenham
Brighton
Southampton
Team
0
20
40
60
80
Away Strength
Away_Strength
70
60
50