Exploratory Data Analysis

Kevin Thompson, Sean Kennedy, Sachin Chavan

September 29, 2019

1.1: Load data

```
load("../analysis/data/.RData")
load("../analysis/data/RData.dms")
```

1.2: Structures QBCrossSectional and QBPanels

1.2.1 QB (Quarterback)

```
str(QBCrossSectional)
```

```
## Classes 'tbl_df', 'tbl' and 'data.frame':    453 obs. of  21 variables:
##  $ PlayerID                   : num  6739 4314 13320 18857 14536 ...
##  $ Week                       : num  13 3 10 5 8 4 3 4 8 15 ...
##  $ Position                   : chr  "QB" "QB" "QB" "QB" ...
##  $ Opponent                   : chr  "NYJ" "HOU" "MIA" "KC" ...
##  $ TeamIsHome                 : logi  FALSE TRUE TRUE TRUE TRUE TRUE ...
##  $ GameDate                   : Date, format: "2017-12-03" "2017-09-24" ...
##  $ PassingCompletions         : num  19 25 21 16 26 25 29 22 19 20 ...
##  $ PassingAttempts            : num  33 35 35 31 41 34 49 29 30 31 ...
##  $ PassingCompletionPercentage: num  57.6 71.4 60 51.6 63.4 73.5 59.2 75.9 63.3 64.5 ...
##  $ PassingYards               : num  366 378 254 261 452 283 373 316 402 242 ...
##  $ PassingYardsPerAttempt     : num  11.1 10.8 7.3 8.4 11 8.3 7.6 10.9 13.4 7.8 ...
##  $ PassingTouchdowns          : num  4 5 4 5 4 4 4 3 4 4 ...
##  $ PassingInterceptions       : num  0 0 0 0 1 1 0 1 3 0 ...
##  $ PassingRating              : num  136 146 120 120 123 ...
##  $ RushingAttempts            : num  1 1 5 3 4 4 7 8 8 14 ...
##  $ RushingYards               : num  70 6 95 31 30 24 26 44 67 58 ...
##  $ RushingYardsPerAttempt     : num  70 6 19 10.3 7.5 6 3.7 5.5 8.4 4.1 ...
##  $ RushingTouchdowns          : num  0 0 0 0 0 1 0 1 0 0 ...
##  $ FumblesLost                : num  0 1 0 0 0 0 0 0 0 0 ...
##  $ FantasyPoints              : num  37.6 35.7 35.7 35.5 35.1 ...
##  $ Team                       : chr  "KC" "NE" "CAR" "HOU" ...
```

1.2.2 QB (Panel Data)

```
str(QBPanels)
```

```
## List of 17
##  $ Opponent                   :Classes 'tbl_df', 'tbl' and 'data.frame': 56 obs. of  18 variables:
##   ..$ PlayerID: num [1:56] 611 732 2428 2593 3807 ...
##   ..$ 1       : chr [1:56] NA "CHI" "DET" "SEA" ...
##   ..$ 2       : chr [1:56] "CLE" "GB" "IND" "ATL" ...
##   ..$ 3       : chr [1:56] NA "DET" "DAL" "CIN" ...
##   ..$ 4       : chr [1:56] "PIT" "BUF" "SF" "CHI" ...
##   ..$ 5       : chr [1:56] "OAK" NA "PHI" "DAL" ...
##   ..$ 6       : chr [1:56] NA "MIA" "TB" NA ...
```

```
##   ..$ 7       : chr [1:56] "MIN" "NE" NA NA ...
##   ..$ 8       : chr [1:56] "MIA" "NYJ" NA NA ...
##   ..$ 9       : chr [1:56] "TEN" "CAR" NA NA ...
##   ..$ 10      : chr [1:56] NA "DAL" NA NA ...
##   ..$ 11      : chr [1:56] "GB" "SEA" NA NA ...
##   ..$ 12      : chr [1:56] "HOU" "TB" NA NA ...
##   ..$ 13      : chr [1:56] "DET" NA NA NA ...
##   ..$ 14      : chr [1:56] "PIT" NA NA NA ...
##   ..$ 15      : chr [1:56] "CLE" "TB" NA "CAR" ...
##   ..$ 16      : chr [1:56] "IND" "NO" NA NA ...
##   ..$ 17      : chr [1:56] "CIN" "CAR" NA NA ...
##  $ TeamIsHome                :Classes 'tbl_df', 'tbl' and 'data.frame': 56 obs. of  18 variables:
##   ..$ PlayerID: num [1:56] 611 732 2428 2593 3807 ...
##   ..$ 1       : logi [1:56] NA FALSE FALSE TRUE FALSE TRUE ...
##   ..$ 2       : logi [1:56] TRUE TRUE FALSE FALSE TRUE FALSE ...
##   ..$ 3       : logi [1:56] NA FALSE TRUE TRUE FALSE TRUE ...
##   ..$ 4       : logi [1:56] TRUE TRUE TRUE TRUE FALSE TRUE ...
##   ..$ 5       : logi [1:56] FALSE NA FALSE FALSE NA FALSE ...
##   ..$ 6       : logi [1:56] NA TRUE TRUE NA FALSE FALSE ...
##   ..$ 7       : logi [1:56] FALSE FALSE NA NA TRUE TRUE ...
##   ..$ 8       : logi [1:56] TRUE FALSE NA NA FALSE TRUE ...
##   ..$ 9       : logi [1:56] FALSE FALSE NA NA NA NA ...
##   ..$ 10      : logi [1:56] NA TRUE NA NA FALSE FALSE ...
##   ..$ 11      : logi [1:56] FALSE FALSE NA NA TRUE FALSE ...
##   ..$ 12      : logi [1:56] TRUE TRUE NA NA TRUE TRUE ...
##   ..$ 13      : logi [1:56] TRUE NA NA NA FALSE FALSE ...
##   ..$ 14      : logi [1:56] FALSE NA NA NA TRUE FALSE ...
##   ..$ 15      : logi [1:56] FALSE FALSE NA FALSE TRUE FALSE ...
##   ..$ 16      : logi [1:56] TRUE FALSE NA NA FALSE TRUE ...
##   ..$ 17      : logi [1:56] TRUE TRUE NA NA NA TRUE ...
##  $ PassingCompletions        :Classes 'tbl_df', 'tbl' and 'data.frame': 56 obs. of  18 variables:
##   ..$ PlayerID: num [1:56] 611 732 2428 2593 3807 ...
##   ..$ 1       : num [1:56] NA 21 27 28 24 16 NA NA 26 NA ...
##   ..$ 2       : num [1:56] 25 19 19 33 23 30 NA 22 16 NA ...
##   ..$ 3       : num [1:56] NA 24 29 28 22 25 NA 35 18 NA ...
##   ..$ 4       : num [1:56] 31 24 33 18 18 32 NA 30 NA NA ...
##   ..$ 5       : num [1:56] 19 NA 28 19 NA 30 NA 21 23 NA ...
##   ..$ 6       : num [1:56] NA 24 18 NA 17 20 NA 11 31 NA ...
##   ..$ 7       : num [1:56] 27 23 NA NA 14 21 NA 19 17 13 ...
##   ..$ 8       : num [1:56] 10 18 NA NA 17 32 NA NA 26 NA ...
##   ..$ 9       : num [1:56] 34 24 NA NA NA NA 15 20 14 NA ...
##   ..$ 10      : num [1:56] NA 22 NA NA 19 25 24 28 23 NA ...
##   ..$ 11      : num [1:56] 22 19 NA NA 30 30 NA 19 NA 17 ...
##   ..$ 12      : num [1:56] 20 26 NA NA 33 18 NA NA 19 23 ...
##   ..$ 13      : num [1:56] 23 NA NA NA 24 21 NA NA 26 NA ...
##   ..$ 14      : num [1:56] 20 NA NA NA 44 24 NA 31 NA NA ...
##   ..$ 15      : num [1:56] 26 17 NA 26 22 22 NA 37 NA NA ...
##   ..$ 16      : num [1:56] 29 22 NA NA 20 21 20 NA NA NA ...
##   ..$ 17      : num [1:56] 25 28 NA NA NA 18 15 NA NA NA ...
##  $ PassingAttempts           :Classes 'tbl_df', 'tbl' and 'data.frame': 56 obs. of  18 variables:
##   ..$ PlayerID: num [1:56] 611 732 2428 2593 3807 ...
##   ..$ 1       : num [1:56] NA 30 48 42 36 36 NA NA 39 NA ...
##   ..$ 2       : num [1:56] 34 28 36 50 35 39 NA 32 24 NA ...
##   ..$ 3       : num [1:56] NA 35 48 42 39 35 NA 47 23 NA ...
```

```
##   ..$ 4       : num [1:56] 49 42 51 26 30 45 NA 49 NA NA ...
##   ..$ 5       : num [1:56] 26 NA 44 29 NA 40 NA 36 30 NA ...
##   ..$ 6       : num [1:56] NA 35 22 NA 25 38 NA 19 47 NA ...
##   ..$ 7       : num [1:56] 39 33 NA NA 24 29 NA 39 27 21 ...
##   ..$ 8       : num [1:56] 15 29 NA NA 31 47 NA NA 33 NA ...
##   ..$ 9       : num [1:56] 52 38 NA NA NA NA 30 36 20 NA ...
##   ..$ 10      : num [1:56] NA 29 NA NA 31 34 47 37 39 NA ...
##   ..$ 11      : num [1:56] 28 27 NA NA 45 37 NA 35 NA 28 ...
##   ..$ 12      : num [1:56] 32 35 NA NA 45 28 NA NA 36 34 ...
##   ..$ 13      : num [1:56] 36 NA NA NA 40 30 NA NA 36 NA ...
##   ..$ 14      : num [1:56] 35 NA NA NA 66 43 NA 46 NA NA ...
##   ..$ 15      : num [1:56] 42 31 NA 45 30 35 NA 57 NA NA ...
##   ..$ 16      : num [1:56] 38 36 NA NA 29 28 34 NA NA NA ...
##   ..$ 17      : num [1:56] 47 45 NA NA NA 37 34 NA NA NA ...
##  $ PassingCompletionPercentage:Classes 'tbl_df', 'tbl' and 'data.frame': 56 obs. of  18 variables:
##   ..$ PlayerID: num [1:56] 611 732 2428 2593 3807 ...
##   ..$ 1       : num [1:56] NA 70 56.2 66.7 66.7 44.4 NA NA 66.7 NA ...
##   ..$ 2       : num [1:56] 73.5 67.9 52.8 66 65.7 76.9 NA 68.8 66.7 NA ...
##   ..$ 3       : num [1:56] NA 68.6 60.4 66.7 56.4 71.4 NA 74.5 78.3 NA ...
##   ..$ 4       : num [1:56] 63.3 57.1 64.7 69.2 60 71.1 NA 61.2 NA NA ...
##   ..$ 5       : num [1:56] 73.1 NA 63.6 65.5 NA 75 NA 58.3 76.7 NA ...
##   ..$ 6       : num [1:56] NA 68.6 81.8 NA 68 52.6 NA 57.9 66 NA ...
##   ..$ 7       : num [1:56] 69.2 69.7 NA NA 58.3 72.4 NA 48.7 63 61.9 ...
##   ..$ 8       : num [1:56] 66.7 62.1 NA NA 54.8 68.1 NA NA 78.8 NA ...
##   ..$ 9       : num [1:56] 65.4 63.2 NA NA NA NA 50 55.6 70 NA ...
##   ..$ 10      : num [1:56] NA 75.9 NA NA 61.3 73.5 51.1 75.7 59 NA ...
##   ..$ 11      : num [1:56] 78.6 70.4 NA NA 66.7 81.1 NA 54.3 NA 60.7 ...
##   ..$ 12      : num [1:56] 62.5 74.3 NA NA 73.3 64.3 NA NA 52.8 67.6 ...
##   ..$ 13      : num [1:56] 63.9 NA NA NA 60 70 NA NA 72.2 NA ...
##   ..$ 14      : num [1:56] 57.1 NA NA NA 66.7 55.8 NA 67.4 NA NA ...
##   ..$ 15      : num [1:56] 61.9 54.8 NA 57.8 73.3 62.9 NA 64.9 NA NA ...
##   ..$ 16      : num [1:56] 76.3 61.1 NA NA 69 75 58.8 NA NA NA ...
##   ..$ 17      : num [1:56] 53.2 62.2 NA NA NA 48.6 44.1 NA NA NA ...
##  $ PassingYards               :Classes 'tbl_df', 'tbl' and 'data.frame': 56 obs. of  18 variables:
##   ..$ PlayerID: num [1:56] 611 732 2428 2593 3807 ...
##   ..$ 1       : num [1:56] NA 321 268 311 263 267 NA NA 187 NA ...
##   ..$ 2       : num [1:56] 217 252 332 343 243 447 NA 239 166 NA ...
##   ..$ 3       : num [1:56] NA 294 325 313 235 378 NA 366 249 NA ...
##   ..$ 4       : num [1:56] 235 242 357 179 216 307 NA 288 NA NA ...
##   ..$ 5       : num [1:56] 222 NA 291 221 NA 303 NA 225 194 NA ...
##   ..$ 6       : num [1:56] NA 248 283 NA 252 257 NA 128 354 NA ...
##   ..$ 7       : num [1:56] 186 233 NA NA 224 249 NA 134 209 188 ...
##   ..$ 8       : num [1:56] 101 254 NA NA 317 333 NA NA 257 NA ...
##   ..$ 9       : num [1:56] 261 313 NA NA NA NA 201 220 140 NA ...
##   ..$ 10      : num [1:56] NA 215 NA NA 236 266 273 273 262 NA ...
##   ..$ 11      : num [1:56] 183 195 NA NA 299 340 NA 205 NA 282 ...
##   ..$ 12      : num [1:56] 141 317 NA NA 351 227 NA NA 307 215 ...
##   ..$ 13      : num [1:56] 269 NA NA NA 290 258 NA NA 331 NA ...
##   ..$ 14      : num [1:56] 269 NA NA NA 506 233 NA 228 NA NA ...
##   ..$ 15      : num [1:56] 288 212 NA 290 281 298 NA 434 NA NA ...
##   ..$ 16      : num [1:56] 237 288 NA NA 226 224 209 NA NA NA ...
##   ..$ 17      : num [1:56] 203 317 NA NA NA 190 145 NA NA NA ...
##  $ PassingYardsPerAttempt     :Classes 'tbl_df', 'tbl' and 'data.frame': 56 obs. of  18 variables:
##   ..$ PlayerID: num [1:56] 611 732 2428 2593 3807 ...
```

```
##   ..$ 1       : num [1:56] NA 10.7 5.6 7.4 7.3 7.4 NA NA 4.8 NA ...
##   ..$ 2       : num [1:56] 6.4 9 9.2 6.9 6.9 11.5 NA 7.5 6.9 NA ...
##   ..$ 3       : num [1:56] NA 8.4 6.8 7.5 6 10.8 NA 7.8 10.8 NA ...
##   ..$ 4       : num [1:56] 4.8 5.8 7 6.9 7.2 6.8 NA 5.9 NA NA ...
##   ..$ 5       : num [1:56] 8.5 NA 6.6 7.6 NA 7.6 NA 6.2 6.5 NA ...
##   ..$ 6       : num [1:56] NA 7.1 12.9 NA 10.1 6.8 NA 6.7 7.5 NA ...
##   ..$ 7       : num [1:56] 4.8 7.1 NA NA 9.3 8.6 NA 3.4 7.7 9 ...
##   ..$ 8       : num [1:56] 6.7 8.8 NA NA 10.2 7.1 NA NA 7.8 NA ...
##   ..$ 9       : num [1:56] 5 8.2 NA NA NA NA 6.7 6.1 7 NA ...
##   ..$ 10      : num [1:56] NA 7.4 NA NA 7.6 7.8 5.8 7.4 6.7 NA ...
##   ..$ 11      : num [1:56] 6.5 7.2 NA NA 6.6 9.2 NA 5.9 NA 10.1 ...
##   ..$ 12      : num [1:56] 4.4 9.1 NA NA 7.8 8.1 NA NA 8.5 6.3 ...
##   ..$ 13      : num [1:56] 7.5 NA NA NA 7.2 8.6 NA NA 9.2 NA ...
##   ..$ 14      : num [1:56] 7.7 NA NA NA 7.7 5.4 NA 5 NA NA ...
##   ..$ 15      : num [1:56] 6.9 6.8 NA 6.4 9.4 8.5 NA 7.6 NA NA ...
##   ..$ 16      : num [1:56] 6.2 8 NA NA 7.8 8 6.1 NA NA NA ...
##   ..$ 17      : num [1:56] 4.3 7 NA NA NA 5.1 4.3 NA NA NA ...
##  $ PassingTouchdowns          :Classes 'tbl_df', 'tbl' and 'data.frame': 56 obs. of  18 variables:
##   ..$ PlayerID: num [1:56] 611 732 2428 2593 3807 ...
##   ..$ 1       : num [1:56] NA 1 1 1 2 0 NA NA 0 NA ...
##   ..$ 2       : num [1:56] 2 1 1 2 2 3 NA 1 2 NA ...
##   ..$ 3       : num [1:56] NA 2 2 3 1 5 NA 3 1 NA ...
##   ..$ 4       : num [1:56] 1 1 1 4 1 2 NA 2 NA NA ...
##   ..$ 5       : num [1:56] 0 NA 1 3 NA 1 NA 2 2 NA ...
##   ..$ 6       : num [1:56] NA 1 3 NA 1 2 NA 1 2 NA ...
##   ..$ 7       : num [1:56] 1 1 NA NA 2 2 NA 1 3 2 ...
##   ..$ 8       : num [1:56] 1 2 NA NA 1 1 NA NA 2 NA ...
##   ..$ 9       : num [1:56] 2 2 NA NA NA NA 2 2 1 NA ...
##   ..$ 10      : num [1:56] NA 2 NA NA 2 3 1 2 1 NA ...
##   ..$ 11      : num [1:56] 1 2 NA NA 4 3 NA 0 NA 1 ...
##   ..$ 12      : num [1:56] 0 1 NA NA 4 4 NA NA 3 1 ...
##   ..$ 13      : num [1:56] 2 NA NA NA 2 0 NA NA 1 NA ...
##   ..$ 14      : num [1:56] 2 NA NA NA 2 1 NA 1 NA NA ...
##   ..$ 15      : num [1:56] 1 1 NA 3 2 1 NA 3 NA NA ...
##   ..$ 16      : num [1:56] 2 1 NA NA 2 2 2 NA NA NA ...
##   ..$ 17      : num [1:56] 2 1 NA NA NA 2 1 NA NA NA ...
##  $ PassingInterceptions       :Classes 'tbl_df', 'tbl' and 'data.frame': 56 obs. of  18 variables:
##   ..$ PlayerID: num [1:56] 611 732 2428 2593 3807 ...
##   ..$ 1       : num [1:56] NA 0 3 1 1 0 NA NA 2 NA ...
##   ..$ 2       : num [1:56] 1 0 1 1 0 0 NA 1 0 NA ...
##   ..$ 3       : num [1:56] NA 3 0 1 0 0 NA 2 0 NA ...
##   ..$ 4       : num [1:56] 2 2 1 0 1 0 NA 0 NA NA ...
##   ..$ 5       : num [1:56] 0 NA 0 0 NA 1 NA 1 1 NA ...
##   ..$ 6       : num [1:56] NA 1 1 NA 1 1 NA 0 2 NA ...
##   ..$ 7       : num [1:56] 0 0 NA NA 0 0 NA 0 1 1 ...
##   ..$ 8       : num [1:56] 0 0 NA NA 1 0 NA NA 0 NA ...
##   ..$ 9       : num [1:56] 2 1 NA NA NA NA 1 1 0 NA ...
##   ..$ 10      : num [1:56] NA 1 NA NA 1 0 0 0 1 NA ...
##   ..$ 11      : num [1:56] 1 0 NA NA 0 0 NA 0 NA 0 ...
##   ..$ 12      : num [1:56] 0 0 NA NA 2 1 NA NA 0 2 ...
##   ..$ 13      : num [1:56] 0 NA NA NA 1 1 NA NA 0 NA ...
##   ..$ 14      : num [1:56] 1 NA NA NA 0 2 NA 2 NA NA ...
##   ..$ 15      : num [1:56] 0 0 NA 3 1 1 NA 1 NA NA ...
##   ..$ 16      : num [1:56] 0 1 NA NA 0 1 2 NA NA NA ...
```

```
##   ..$ 17      : num [1:56] 1 0 NA NA NA 0 1 NA NA NA ...
##  $ PassingRating              :Classes 'tbl_df', 'tbl' and 'data.frame': 56 obs. of  18 variables:
##   ..$ PlayerID: num [1:56] 611 732 2428 2593 3807 ...
##   ..$ 1       : num [1:56] NA 116.1 53.1 86.5 95 ...
##   ..$ 2       : num [1:56] 97.3 108 82.2 90.7 104.8 ...
##   ..$ 3       : num [1:56] NA 77.6 94.5 102.6 82.8 ...
##   ..$ 4       : num [1:56] 64.6 61.8 83.5 128 79.3 ...
##   ..$ 5       : num [1:56] 98.6 NA 90.2 122.9 NA ...
##   ..$ 6       : num [1:56] NA 86.4 139.4 NA 97.4 ...
##   ..$ 7       : num [1:56] 88.2 99.7 NA NA 117.4 ...
##   ..$ 8       : num [1:56] 107.9 113.3 NA NA 87.7 ...
##   ..$ 9       : num [1:56] 74.3 95.6 NA NA NA ...
##   ..$ 10      : num [1:56] NA 104.8 NA NA 92.9 ...
##   ..$ 11      : num [1:56] 90.9 115.5 NA NA 115 ...
##   ..$ 12      : num [1:56] 72.5 111.2 NA NA 106.8 ...
##   ..$ 13      : num [1:56] 105 NA NA NA 88.5 ...
##   ..$ 14      : num [1:56] 88.9 NA NA NA 99.7 ...
##   ..$ 15      : num [1:56] 90.2 87 NA 71.5 110.6 ...
##   ..$ 16      : num [1:56] 109 84 NA NA 115 ...
##   ..$ 17      : num [1:56] 69.7 90.7 NA NA NA ...
##  $ RushingAttempts            :Classes 'tbl_df', 'tbl' and 'data.frame': 56 obs. of  18 variables:
##   ..$ PlayerID: num [1:56] 611 732 2428 2593 3807 ...
##   ..$ 1       : num [1:56] NA 3 1 7 3 2 NA NA 2 NA ...
##   ..$ 2       : num [1:56] 1 1 3 2 2 2 NA 0 4 NA ...
##   ..$ 3       : num [1:56] NA 1 3 4 1 1 NA 0 4 NA ...
##   ..$ 4       : num [1:56] 0 1 2 1 1 1 NA 3 NA NA ...
##   ..$ 5       : num [1:56] 3 NA 0 4 NA 2 NA 0 3 NA ...
##   ..$ 6       : num [1:56] NA 0 5 NA 2 1 NA 1 3 NA ...
##   ..$ 7       : num [1:56] 1 3 NA NA 3 5 NA 0 3 0 ...
##   ..$ 8       : num [1:56] 1 6 NA NA 3 1 NA NA 1 NA ...
##   ..$ 9       : num [1:56] 1 1 NA NA NA NA 4 0 5 NA ...
##   ..$ 10      : num [1:56] NA 0 NA NA 2 1 1 0 0 NA ...
##   ..$ 11      : num [1:56] 2 3 NA NA 1 0 NA 2 NA 1 ...
##   ..$ 12      : num [1:56] 6 1 NA NA 3 5 NA NA 2 2 ...
##   ..$ 13      : num [1:56] 1 NA NA NA 1 0 NA NA 7 NA ...
##   ..$ 14      : num [1:56] 0 NA NA NA 1 0 NA 0 NA NA ...
##   ..$ 15      : num [1:56] 4 3 NA 6 3 2 NA 0 NA NA ...
##   ..$ 16      : num [1:56] 4 2 NA NA 1 2 2 NA NA NA ...
##   ..$ 17      : num [1:56] 0 3 NA NA NA 0 1 NA NA NA ...
##  $ RushingYards               :Classes 'tbl_df', 'tbl' and 'data.frame': 56 obs. of  18 variables:
##   ..$ PlayerID: num [1:56] 611 732 2428 2593 3807 ...
##   ..$ 1       : num [1:56] NA 11 2 21 -8 0 NA NA 0 NA ...
##   ..$ 2       : num [1:56] -1 8 6 8 -2 9 NA 0 31 NA ...
##   ..$ 3       : num [1:56] NA -1 7 23 6 6 NA 0 7 NA ...
##   ..$ 4       : num [1:56] 0 8 1 -1 -1 2 NA 22 NA NA ...
##   ..$ 5       : num [1:56] -4 NA 0 32 NA 5 NA 0 -3 NA ...
##   ..$ 6       : num [1:56] NA 0 -4 NA -2 -1 NA 0 21 NA ...
##   ..$ 7       : num [1:56] 0 37 NA NA -3 5 NA 0 1 0 ...
##   ..$ 8       : num [1:56] 9 17 NA NA -2 2 NA NA 0 NA ...
##   ..$ 9       : num [1:56] 7 -1 NA NA NA NA 2 0 13 NA ...
##   ..$ 10      : num [1:56] NA 0 NA NA 5 0 1 0 0 NA ...
##   ..$ 11      : num [1:56] -1 12 NA NA 10 0 NA 5 NA 0 ...
##   ..$ 12      : num [1:56] 42 1 NA NA 25 -4 NA NA 28 9 ...
##   ..$ 13      : num [1:56] -1 NA NA NA 4 0 NA NA 19 NA ...
```

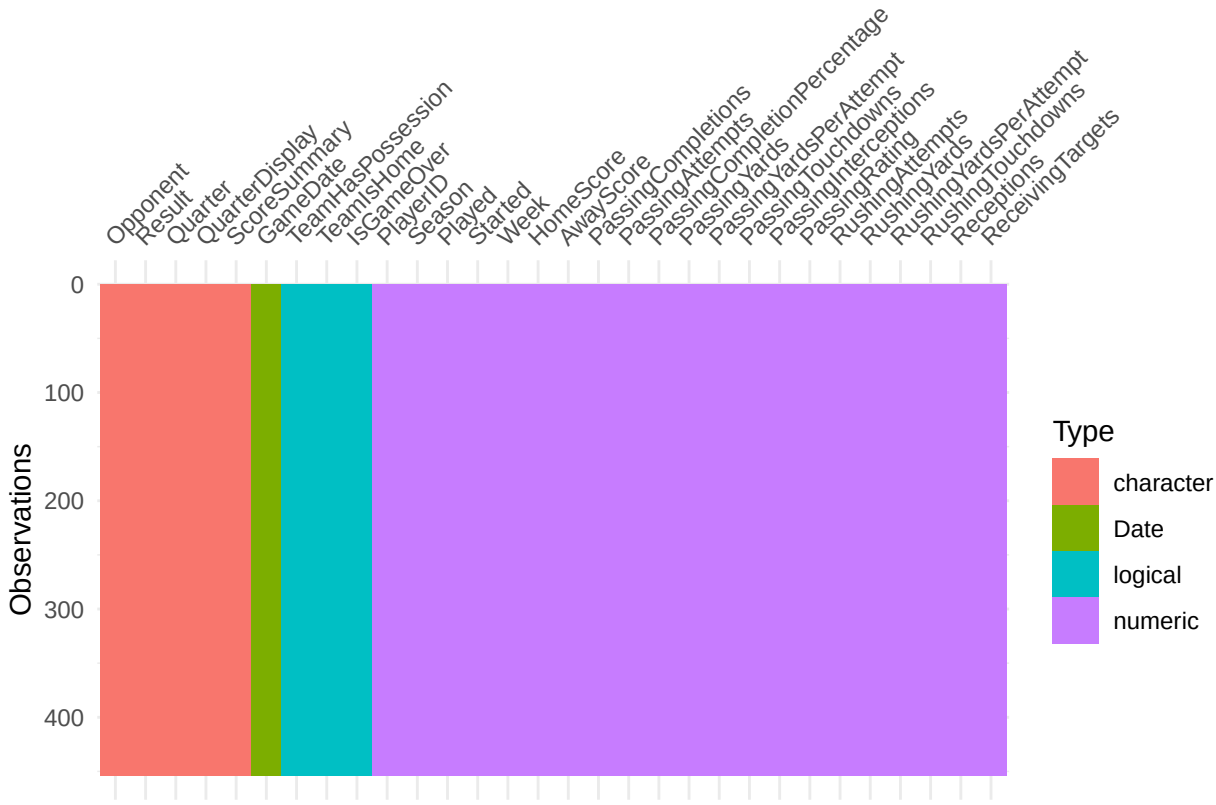
```
##   ..$ 14      : num [1:56] 0 NA NA NA 5 0 NA 0 NA NA ...
##   ..$ 15      : num [1:56] 3 29 NA 43 10 -2 NA 0 NA NA ...
##   ..$ 16      : num [1:56] -2 7 NA NA -1 6 1 NA NA NA ...
##   ..$ 17      : num [1:56] 0 14 NA NA NA 0 -1 NA NA NA ...
##  $ RushingYardsPerAttempt     :Classes 'tbl_df', 'tbl' and 'data.frame': 56 obs. of  18 variables:
##   ..$ PlayerID: num [1:56] 611 732 2428 2593 3807 ...
##   ..$ 1       : num [1:56] NA 3.7 2 3 -2.7 0 NA NA 0 NA ...
##   ..$ 2       : num [1:56] -1 8 2 4 -1 4.5 NA 0 7.8 NA ...
##   ..$ 3       : num [1:56] NA -1 2.3 5.8 6 6 NA 0 1.8 NA ...
##   ..$ 4       : num [1:56] 0 8 0.5 -1 -1 2 NA 7.3 NA NA ...
##   ..$ 5       : num [1:56] -1.3 NA 0 8 NA 2.5 NA 0 -1 NA ...
##   ..$ 6       : num [1:56] NA 0 -0.8 NA -1 -1 NA 0 7 NA ...
##   ..$ 7       : num [1:56] 0 12.3 NA NA -1 1 NA 0 0.3 0 ...
##   ..$ 8       : num [1:56] 9 2.8 NA NA -0.7 2 NA NA 0 NA ...
##   ..$ 9       : num [1:56] 7 -1 NA NA NA NA 0.5 0 2.6 NA ...
##   ..$ 10      : num [1:56] NA 0 NA NA 2.5 0 1 0 0 NA ...
##   ..$ 11      : num [1:56] -0.5 4 NA NA 10 0 NA 2.5 NA 0 ...
##   ..$ 12      : num [1:56] 7 1 NA NA 8.3 -0.8 NA NA 14 4.5 ...
##   ..$ 13      : num [1:56] -1 NA NA NA 4 0 NA NA 2.7 NA ...
##   ..$ 14      : num [1:56] 0 NA NA NA 5 0 NA 0 NA NA ...
##   ..$ 15      : num [1:56] 0.8 9.7 NA 7.2 3.3 -1 NA 0 NA NA ...
##   ..$ 16      : num [1:56] -0.5 3.5 NA NA -1 3 0.5 NA NA NA ...
##   ..$ 17      : num [1:56] 0 4.7 NA NA NA 0 -1 NA NA NA ...
##  $ RushingTouchdowns          :Classes 'tbl_df', 'tbl' and 'data.frame': 56 obs. of  18 variables:
##   ..$ PlayerID: num [1:56] 611 732 2428 2593 3807 ...
##   ..$ 1       : num [1:56] NA 0 0 0 0 0 NA NA 1 NA ...
##   ..$ 2       : num [1:56] 0 0 0 0 0 0 NA 0 0 NA ...
##   ..$ 3       : num [1:56] NA 0 0 0 0 0 NA 0 0 NA ...
##   ..$ 4       : num [1:56] 0 0 0 0 0 0 NA 1 NA NA ...
##   ..$ 5       : num [1:56] 0 NA 0 0 NA 0 NA 0 0 NA ...
##   ..$ 6       : num [1:56] NA 0 0 NA 0 0 NA 0 0 NA ...
##   ..$ 7       : num [1:56] 0 0 NA NA 0 0 NA 0 1 0 ...
##   ..$ 8       : num [1:56] 0 0 NA NA 0 0 NA NA 0 NA ...
##   ..$ 9       : num [1:56] 0 0 NA NA NA NA 0 0 1 NA ...
##   ..$ 10      : num [1:56] NA 0 NA NA 0 0 0 0 0 NA ...
##   ..$ 11      : num [1:56] 0 0 NA NA 0 0 NA 0 NA 0 ...
##   ..$ 12      : num [1:56] 0 0 NA NA 0 0 NA NA 0 0 ...
##   ..$ 13      : num [1:56] 0 NA NA NA 0 0 NA NA 2 NA ...
##   ..$ 14      : num [1:56] 0 NA NA NA 0 0 NA 0 NA NA ...
##   ..$ 15      : num [1:56] 1 0 NA 0 0 0 NA 0 NA NA ...
##   ..$ 16      : num [1:56] 0 0 NA NA 0 0 0 NA NA NA ...
##   ..$ 17      : num [1:56] 0 0 NA NA NA 0 0 NA NA NA ...
##  $ FumblesLost                :Classes 'tbl_df', 'tbl' and 'data.frame': 56 obs. of  18 variables:
##   ..$ PlayerID: num [1:56] 611 732 2428 2593 3807 ...
##   ..$ 1       : num [1:56] NA 0 0 0 0 0 NA NA 0 NA ...
##   ..$ 2       : num [1:56] 0 0 0 1 0 0 NA 0 1 NA ...
##   ..$ 3       : num [1:56] NA 0 0 0 1 1 NA 0 0 NA ...
##   ..$ 4       : num [1:56] 0 1 0 0 0 0 NA 0 NA NA ...
##   ..$ 5       : num [1:56] 0 NA 0 0 NA 1 NA 1 0 NA ...
##   ..$ 6       : num [1:56] NA 0 0 NA 0 0 NA 0 0 NA ...
##   ..$ 7       : num [1:56] 0 0 NA NA 0 0 NA 1 0 0 ...
##   ..$ 8       : num [1:56] 0 2 NA NA 0 0 NA NA 0 NA ...
##   ..$ 9       : num [1:56] 0 0 NA NA NA NA 0 1 0 NA ...
##   ..$ 10      : num [1:56] NA 0 NA NA 0 0 0 1 0 NA ...
```

```
##   ..$ 11      : num [1:56] 0 0 NA NA 0 0 NA 0 NA 0 ...
##   ..$ 12      : num [1:56] 0 0 NA NA 0 1 NA NA 1 0 ...
##   ..$ 13      : num [1:56] 0 NA NA NA 0 0 NA NA 0 NA ...
##   ..$ 14      : num [1:56] 0 NA NA NA 0 0 NA 0 NA NA ...
##   ..$ 15      : num [1:56] 0 0 NA 0 0 0 NA 0 NA NA ...
##   ..$ 16      : num [1:56] 0 0 NA NA 0 0 0 NA NA NA ...
##   ..$ 17      : num [1:56] 0 0 NA NA NA 0 0 NA NA NA ...
##  $ FantasyPoints             :Classes 'tbl_df', 'tbl' and 'data.frame': 56 obs. of  18 variables:
##   ..$ PlayerID: num [1:56] 611 732 2428 2593 3807 ...
##   ..$ 1       : num [1:56] NA 17.94 8.92 16.54 15.72 ...
##   ..$ 2       : num [1:56] 14.6 14.9 15.9 18.5 17.5 ...
##   ..$ 3       : num [1:56] NA 13.7 21.7 24.8 12 ...
##   ..$ 4       : num [1:56] 9.4 8.48 16.38 23.06 10.54 ...
##   ..$ 5       : num [1:56] 8.48 NA 15.64 24.04 NA ...
##   ..$ 6       : num [1:56] NA 11.9 20.9 NA 11.9 ...
##   ..$ 7       : num [1:56] 11.4 17 NA NA 16.7 ...
##   ..$ 8       : num [1:56] 8.94 15.86 NA NA 14.48 ...
##   ..$ 9       : num [1:56] 15.1 18.4 NA NA NA ...
##   ..$ 10      : num [1:56] NA 14.6 NA NA 17.9 ...
##   ..$ 11      : num [1:56] 9.22 17 NA NA 28.96 ...
##   ..$ 12      : num [1:56] 9.84 16.78 NA NA 30.54 ...
##   ..$ 13      : num [1:56] 18.7 NA NA NA 18 ...
##   ..$ 14      : num [1:56] 16.8 NA NA NA 28.7 ...
##   ..$ 15      : num [1:56] 21.8 15.4 NA 21.9 18.2 ...
##   ..$ 16      : num [1:56] 17.3 14.2 NA NA 16.9 ...
##   ..$ 17      : num [1:56] 14.1 18.1 NA NA NA ...
##  $ Team                      :Classes 'tbl_df', 'tbl' and 'data.frame': 56 obs. of  18 variables:
##   ..$ PlayerID: num [1:56] 611 732 2428 2593 3807 ...
##   ..$ 1       : chr [1:56] NA "ATL" "ARI" "GB" ...
##   ..$ 2       : chr [1:56] "BAL" "ATL" "ARI" "GB" ...
##   ..$ 3       : chr [1:56] NA "ATL" "ARI" "GB" ...
##   ..$ 4       : chr [1:56] "BAL" "ATL" "ARI" "GB" ...
##   ..$ 5       : chr [1:56] "BAL" NA "ARI" "GB" ...
##   ..$ 6       : chr [1:56] NA "ATL" "ARI" NA ...
##   ..$ 7       : chr [1:56] "BAL" "ATL" NA NA ...
##   ..$ 8       : chr [1:56] "BAL" "ATL" NA NA ...
##   ..$ 9       : chr [1:56] "BAL" "ATL" NA NA ...
##   ..$ 10      : chr [1:56] NA "ATL" NA NA ...
##   ..$ 11      : chr [1:56] "BAL" "ATL" NA NA ...
##   ..$ 12      : chr [1:56] "BAL" "ATL" NA NA ...
##   ..$ 13      : chr [1:56] "BAL" NA NA NA ...
##   ..$ 14      : chr [1:56] "BAL" NA NA NA ...
##   ..$ 15      : chr [1:56] "BAL" "ATL" NA "GB" ...
##   ..$ 16      : chr [1:56] "BAL" "ATL" NA NA ...
##   ..$ 17      : chr [1:56] "BAL" "ATL" NA NA ...
```

1.3: Missing Data

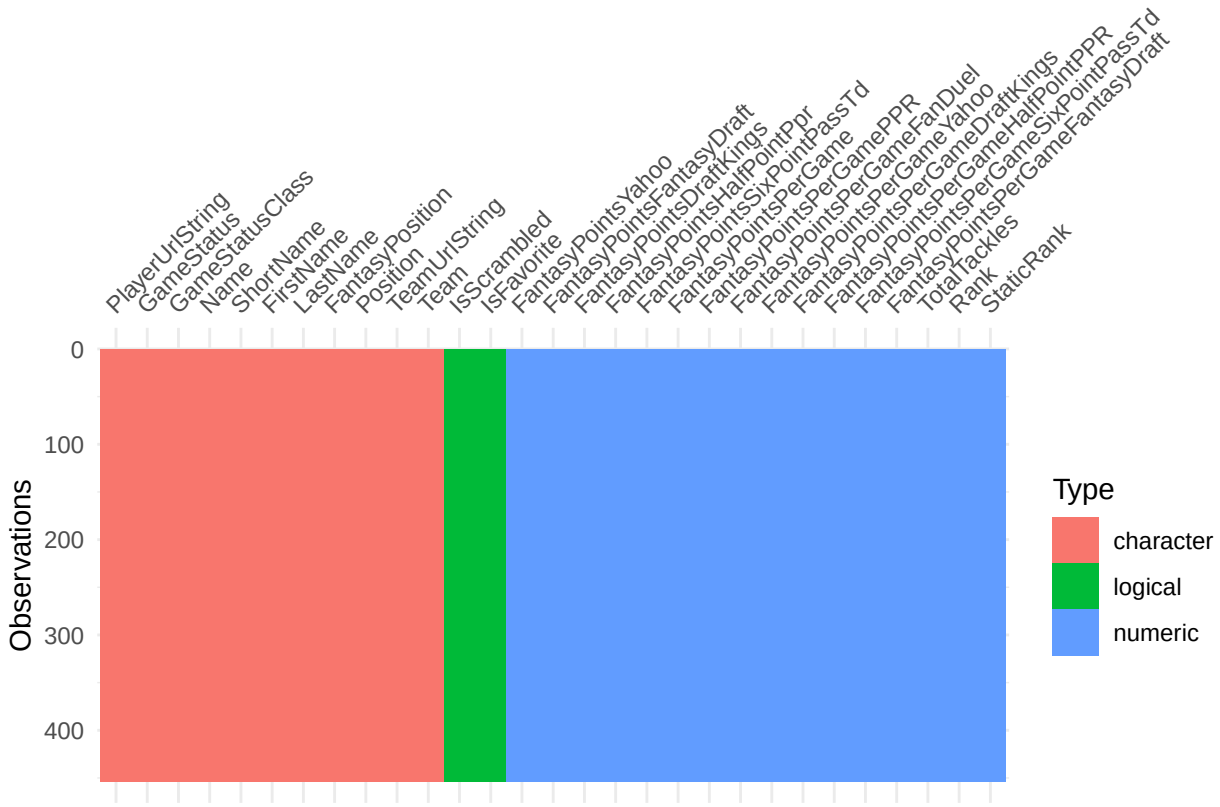
1.3.1 Quarterbacks (Old Data QBdata dataset)

```
vis_dat(QBdata[1:30])
```



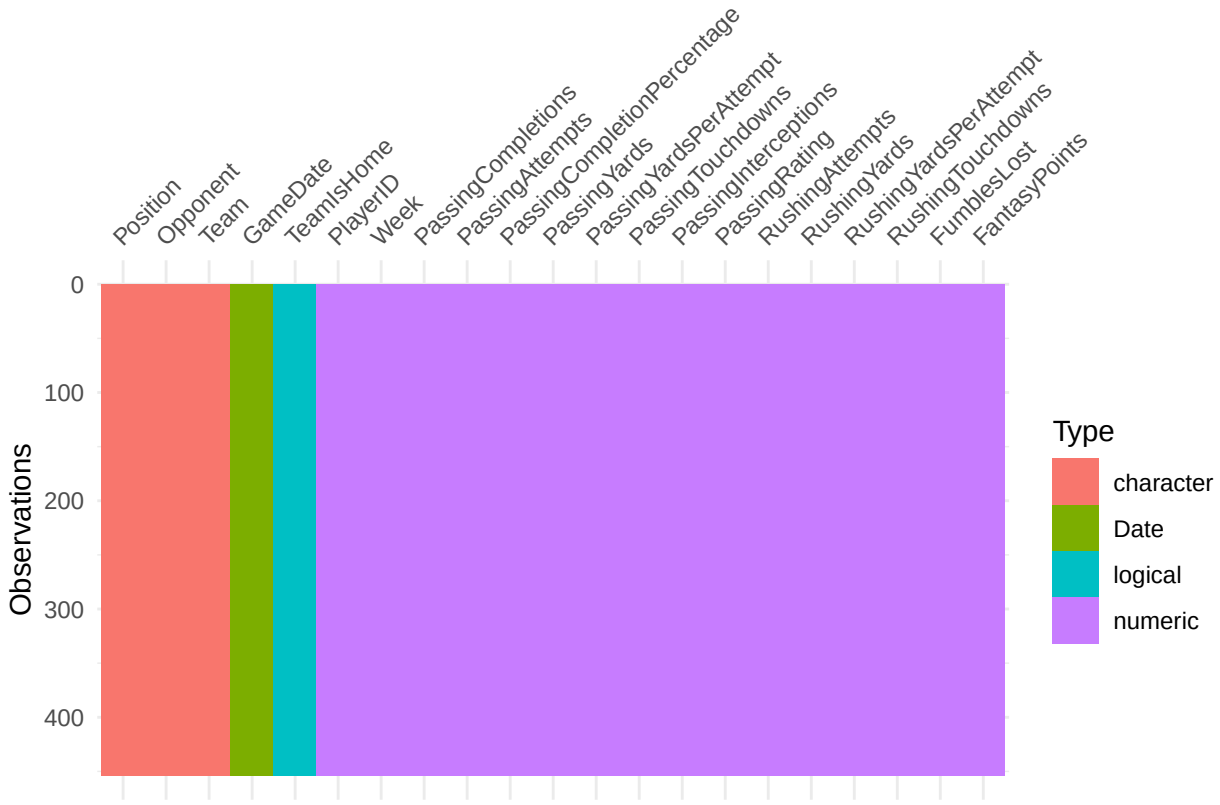

```
vis_dat(QBdata[31:60])
```

```
vis_dat(QBdata[61:89])
```



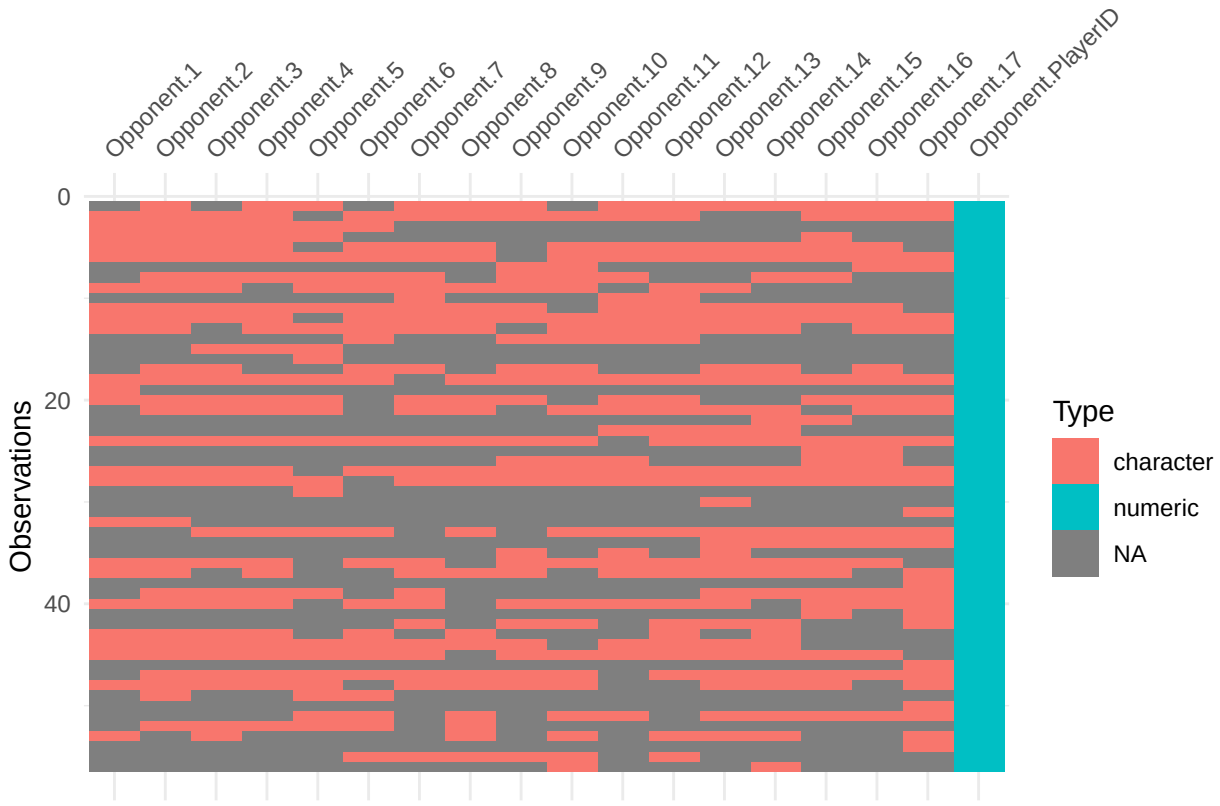
1.3.2 QBCrossSectional dataset (New dataset)

```
vis_dat(QBCrossSectional)
```

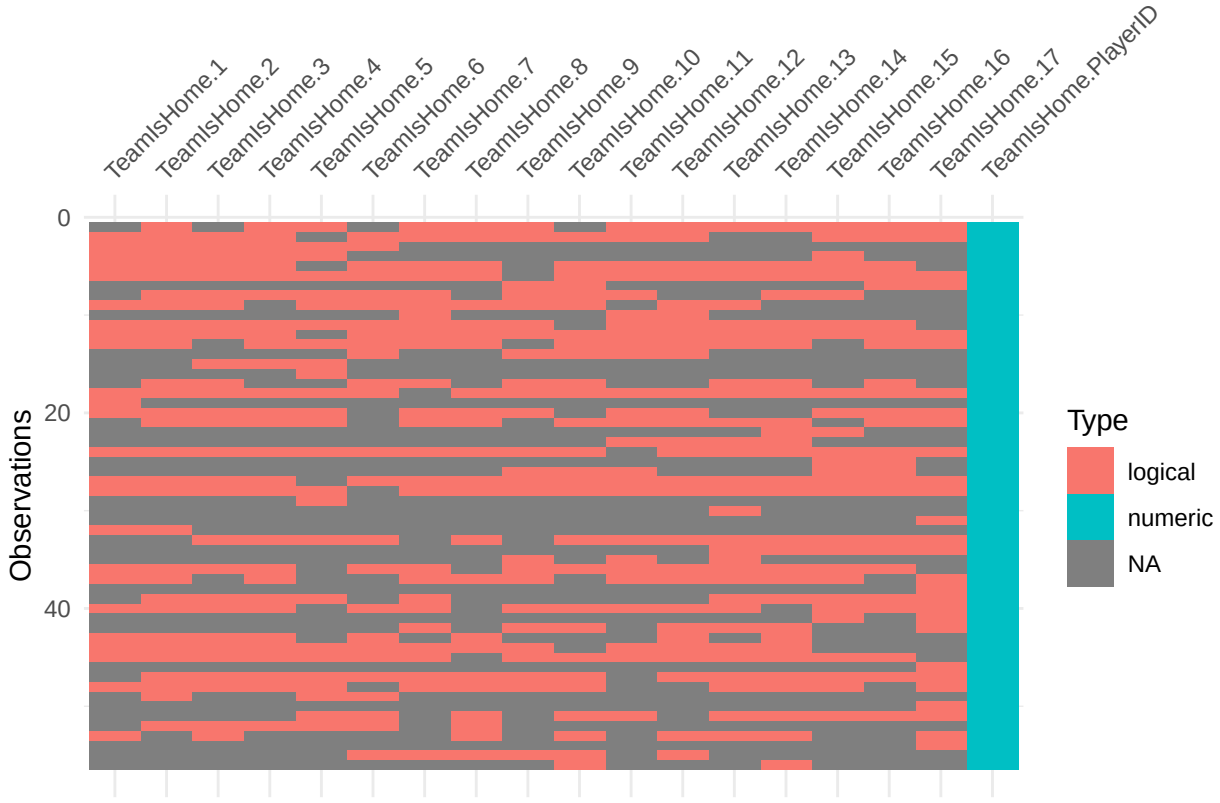


1.3.3 QBPanels dataset (New dataset)

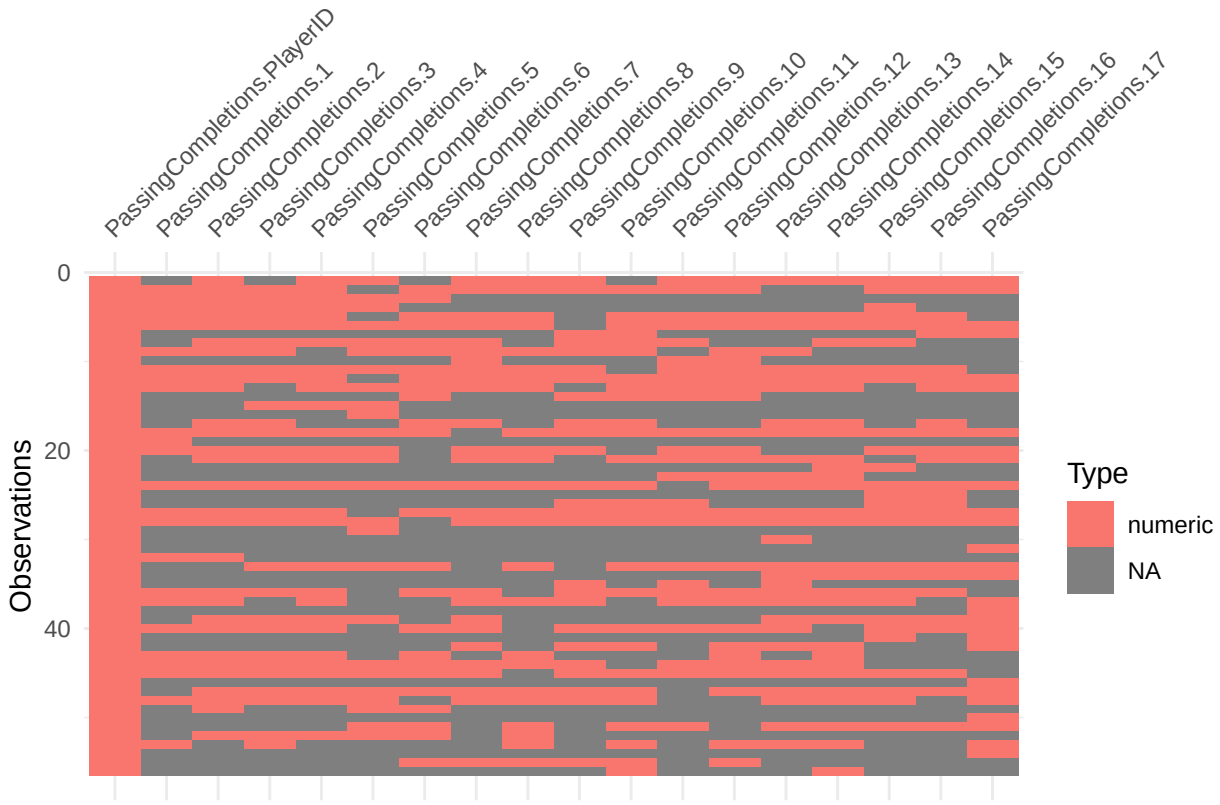
```
vis_dat(as.data.frame(QBPanels[1]))
```



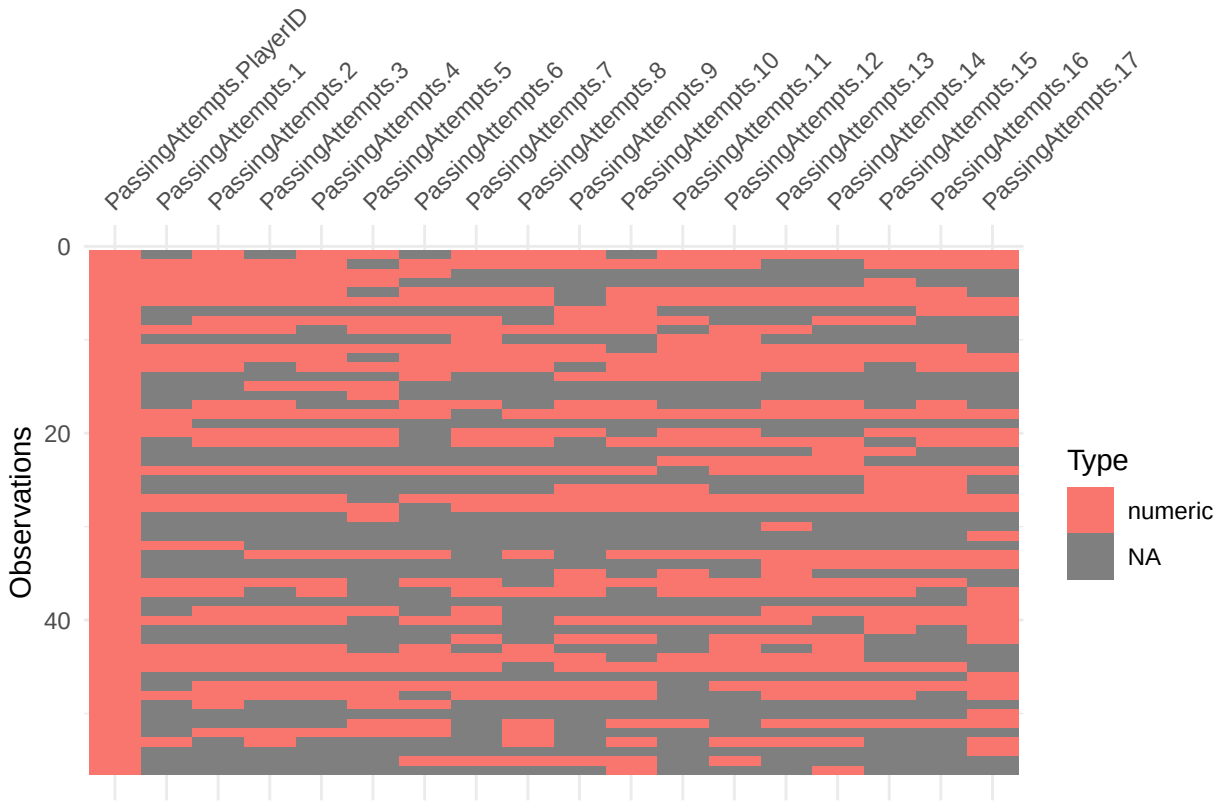

```
vis_dat(as.data.frame(QBPanels[2]))
```



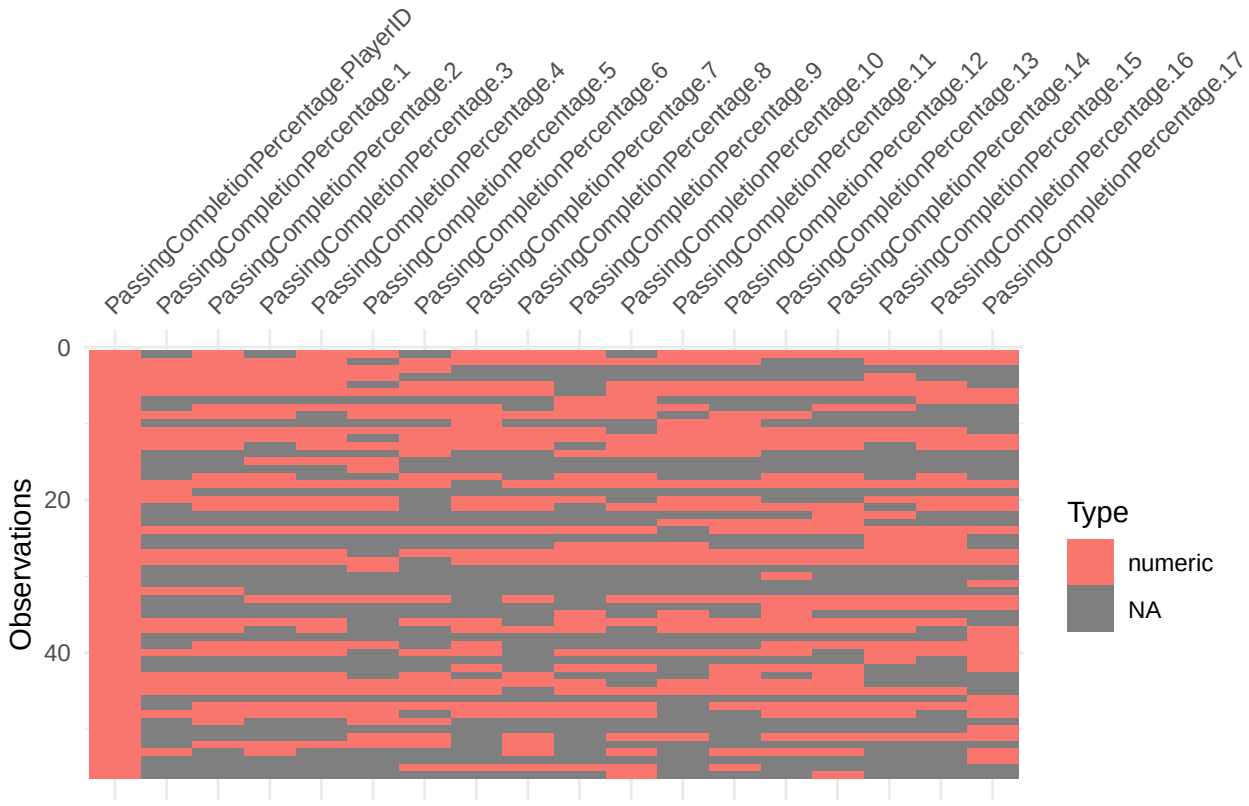
```
vis_dat(as.data.frame(QBPanels[3]))
```



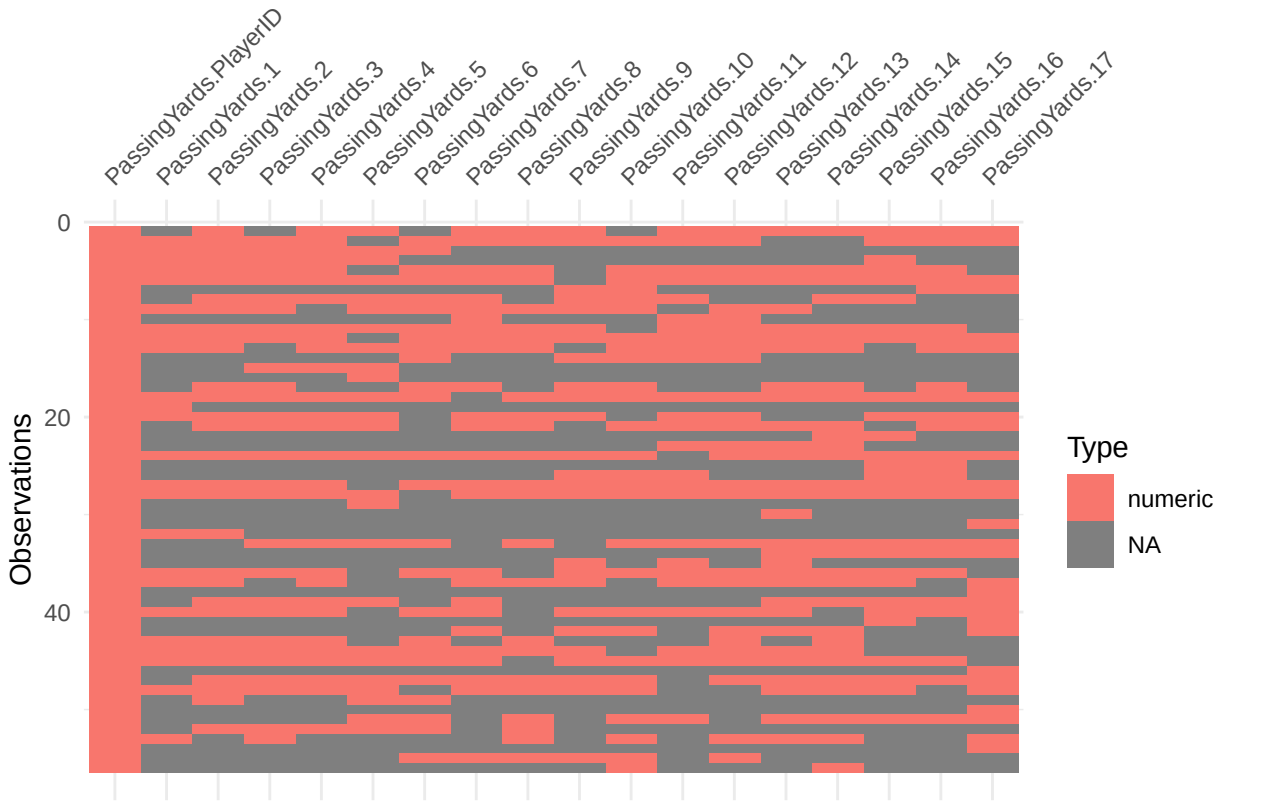

```
vis_dat(as.data.frame(QBPanels[4]))
```



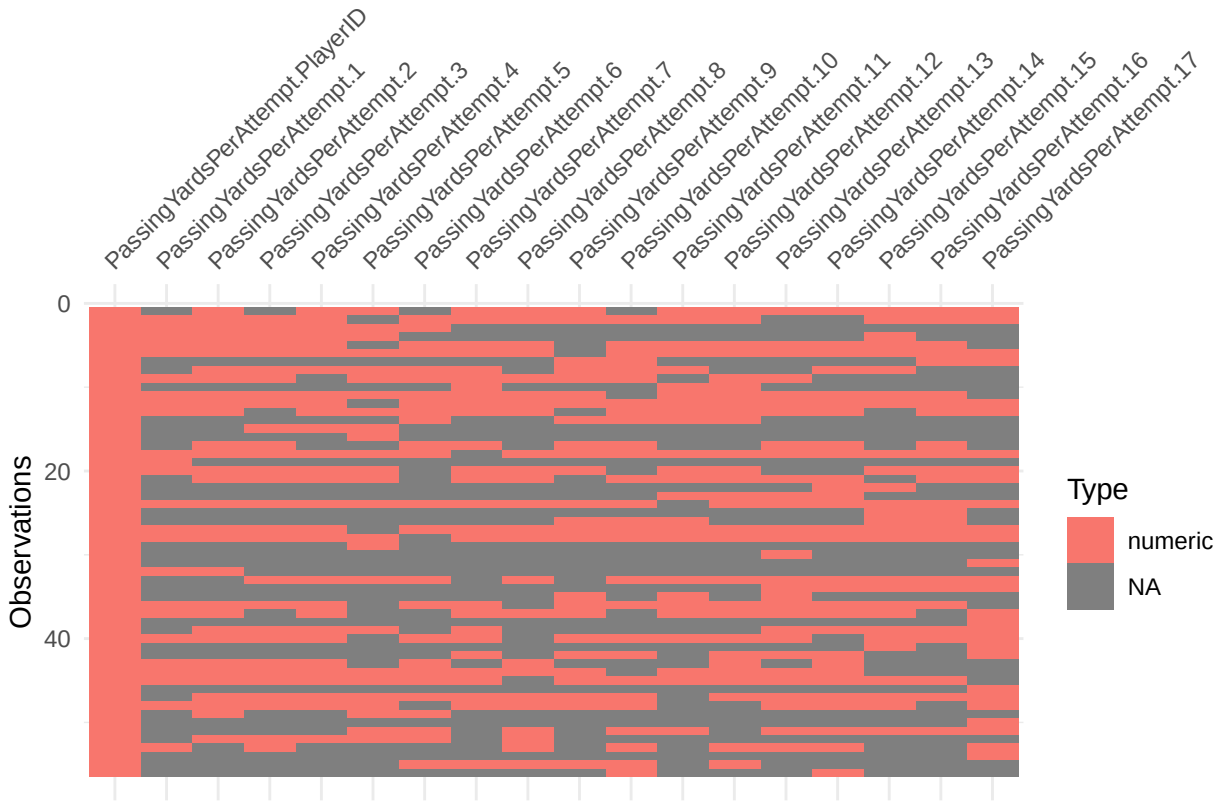

```
vis_dat(as.data.frame(QBPanels[5]))
```



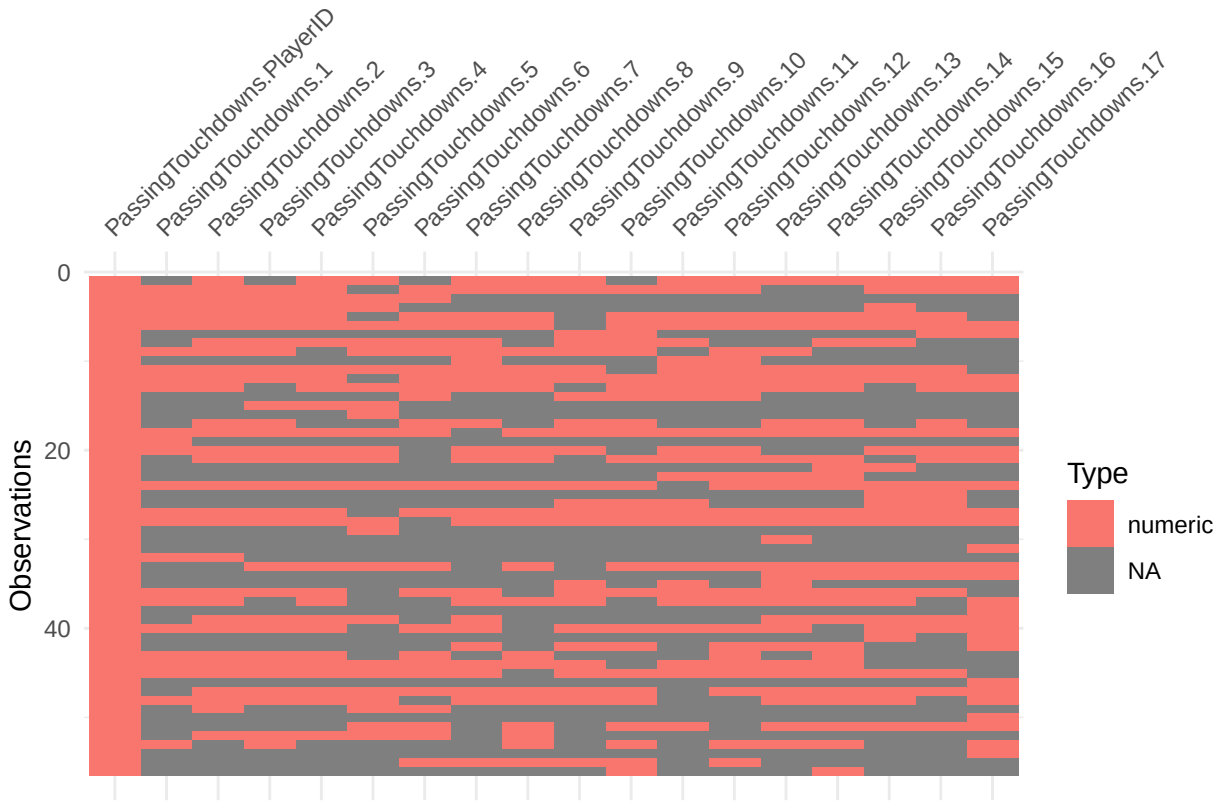
```
vis_dat(as.data.frame(QBPanels[6]))
```



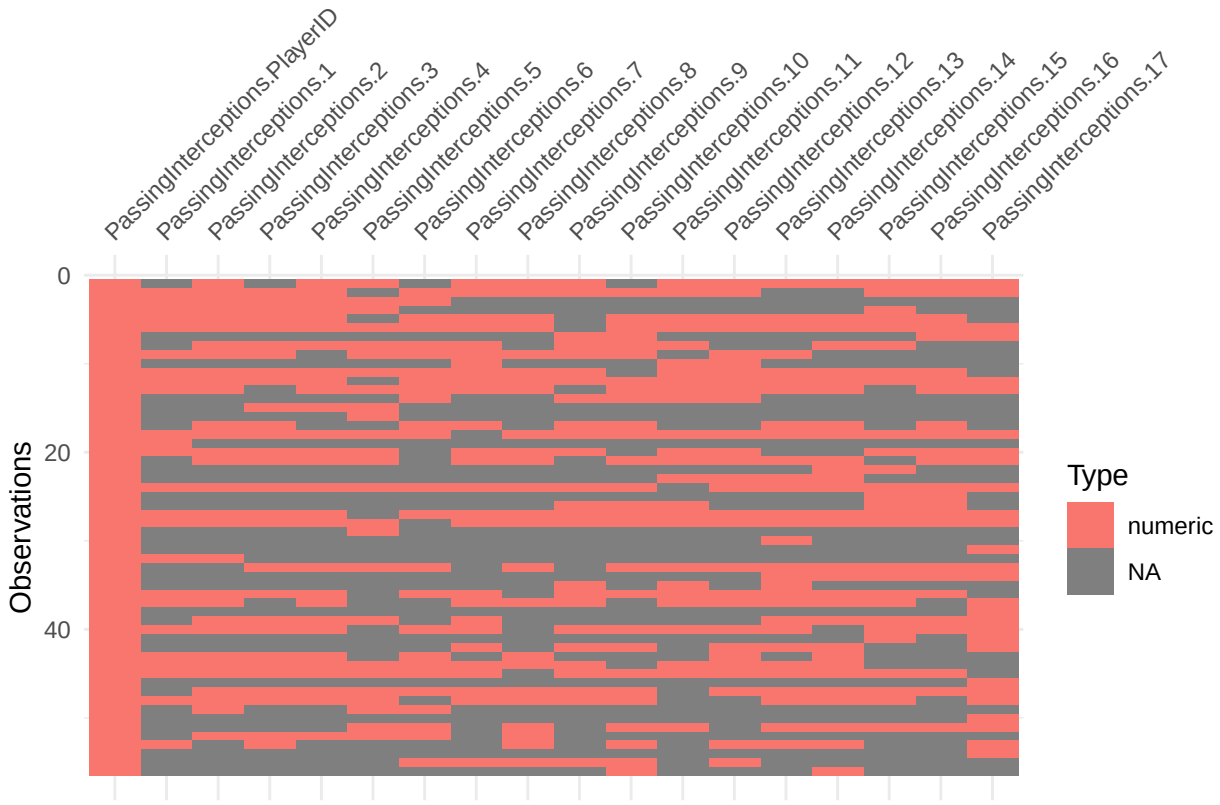

```
vis_dat(as.data.frame(QBPanels[7]))
```



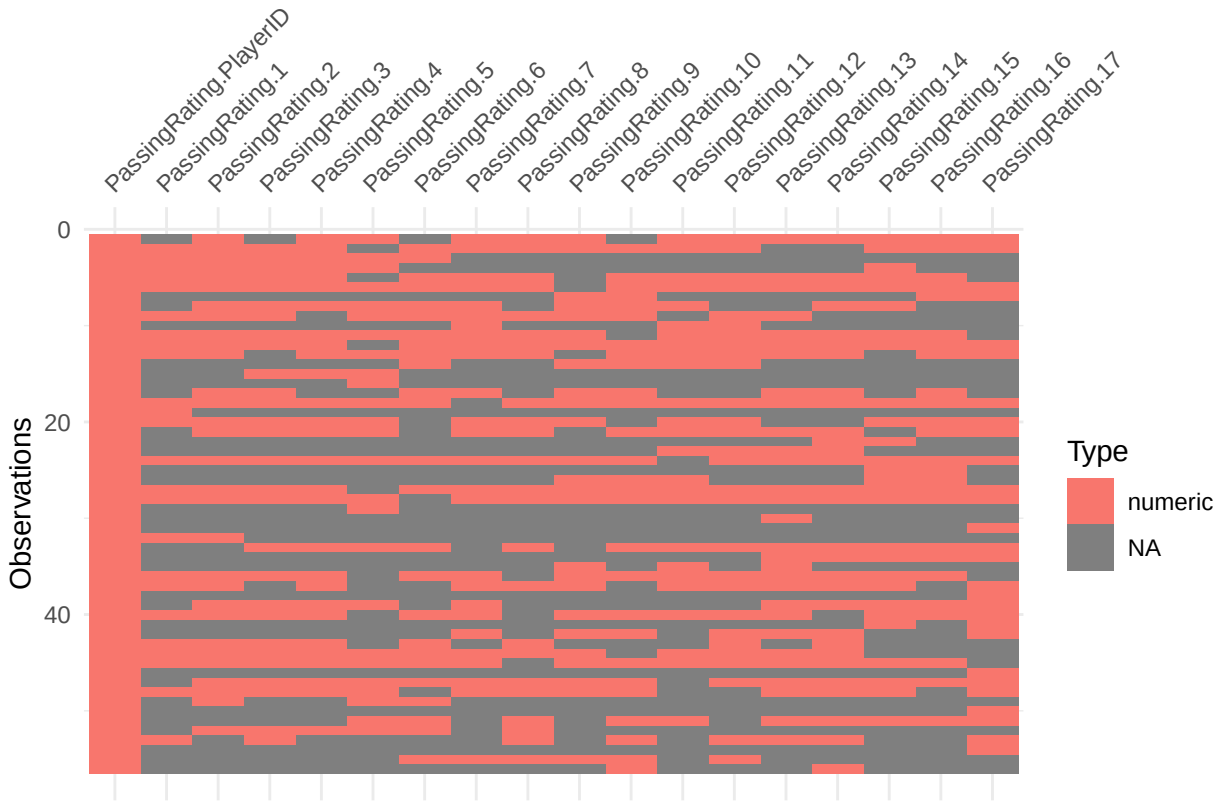

```
vis_dat(as.data.frame(QBPanels[8]))
```



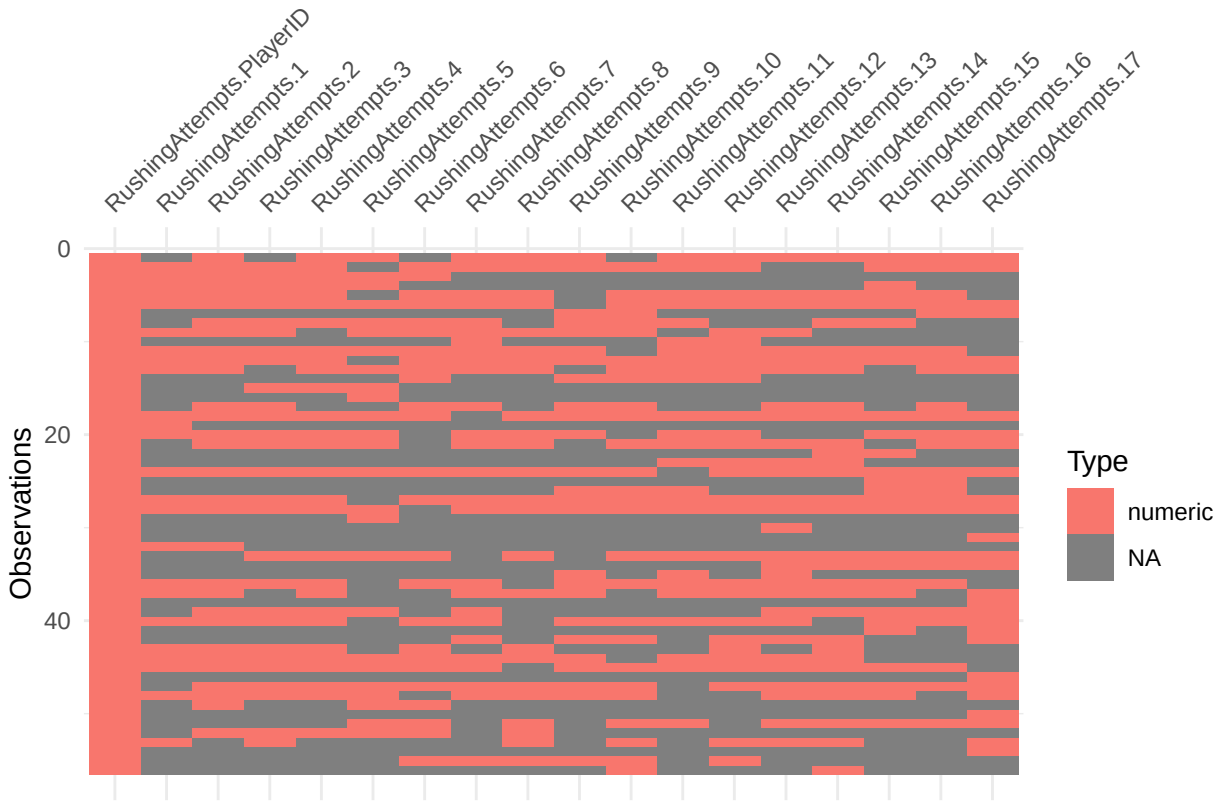
```
vis_dat(as.data.frame(QBPanels[9]))
```



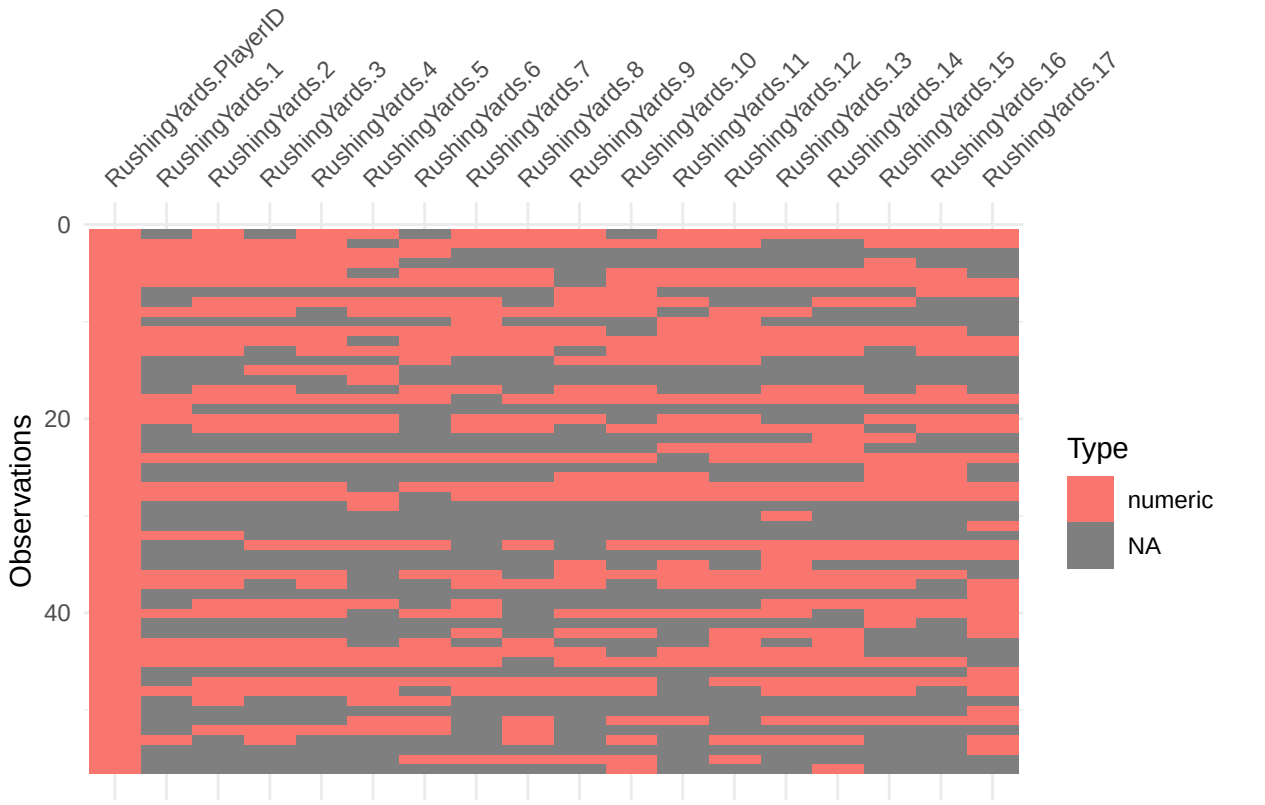

```
vis_dat(as.data.frame(QBPanels[10]))
```



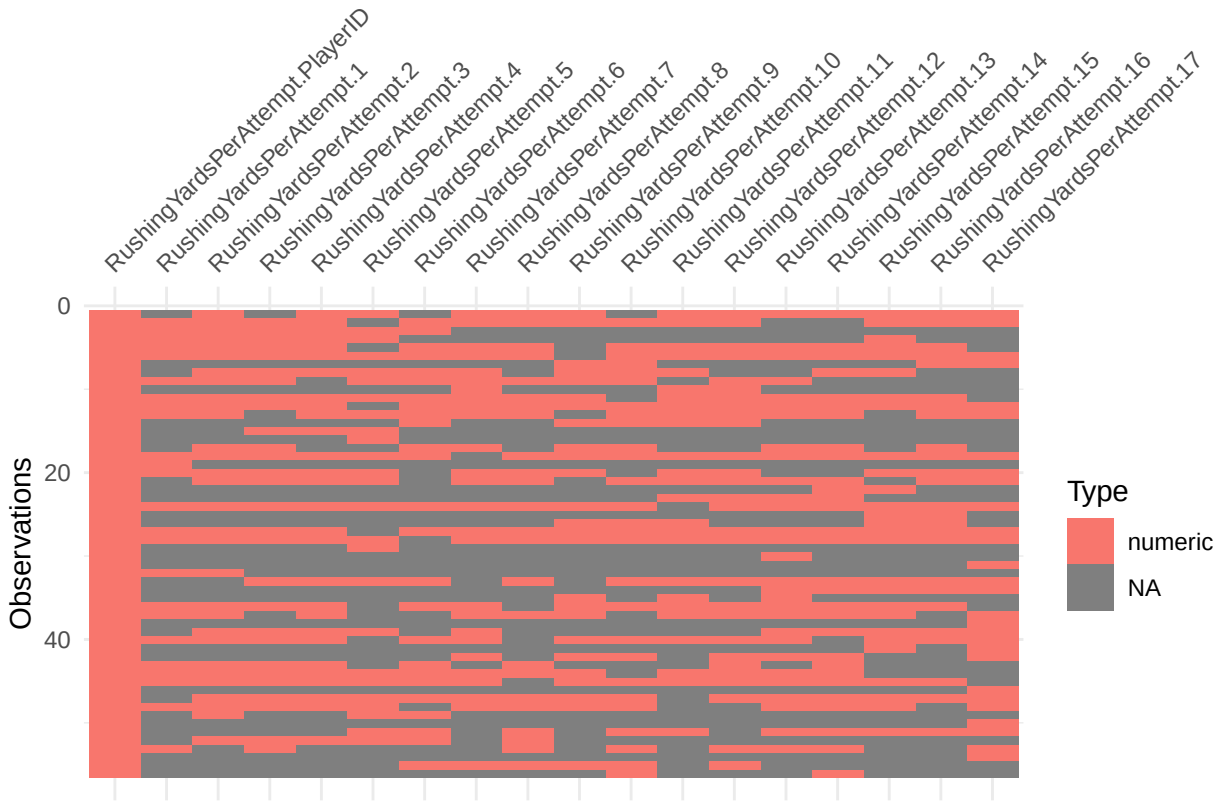

```
vis_dat(as.data.frame(QBPanels[11]))
```



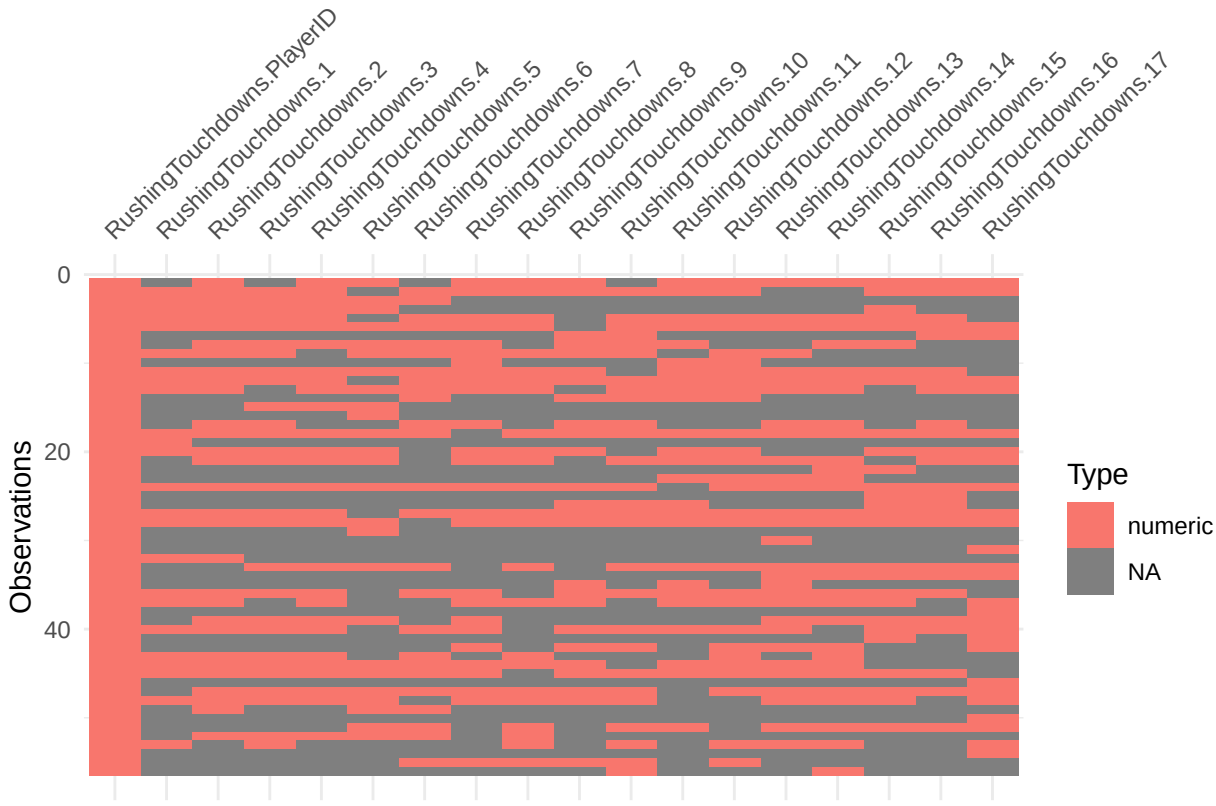
```
vis_dat(as.data.frame(QBPanels[12]))
```



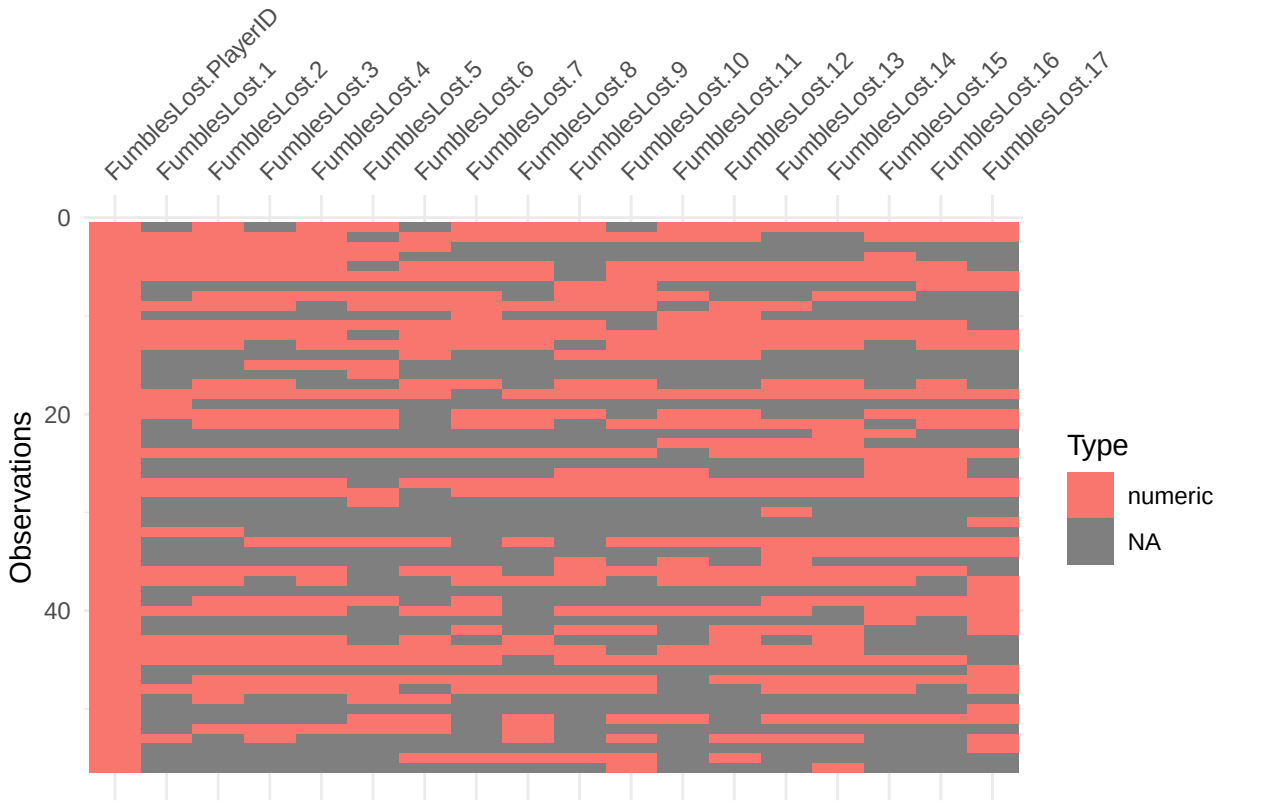

```
vis_dat(as.data.frame(QBPanels[13]))
```



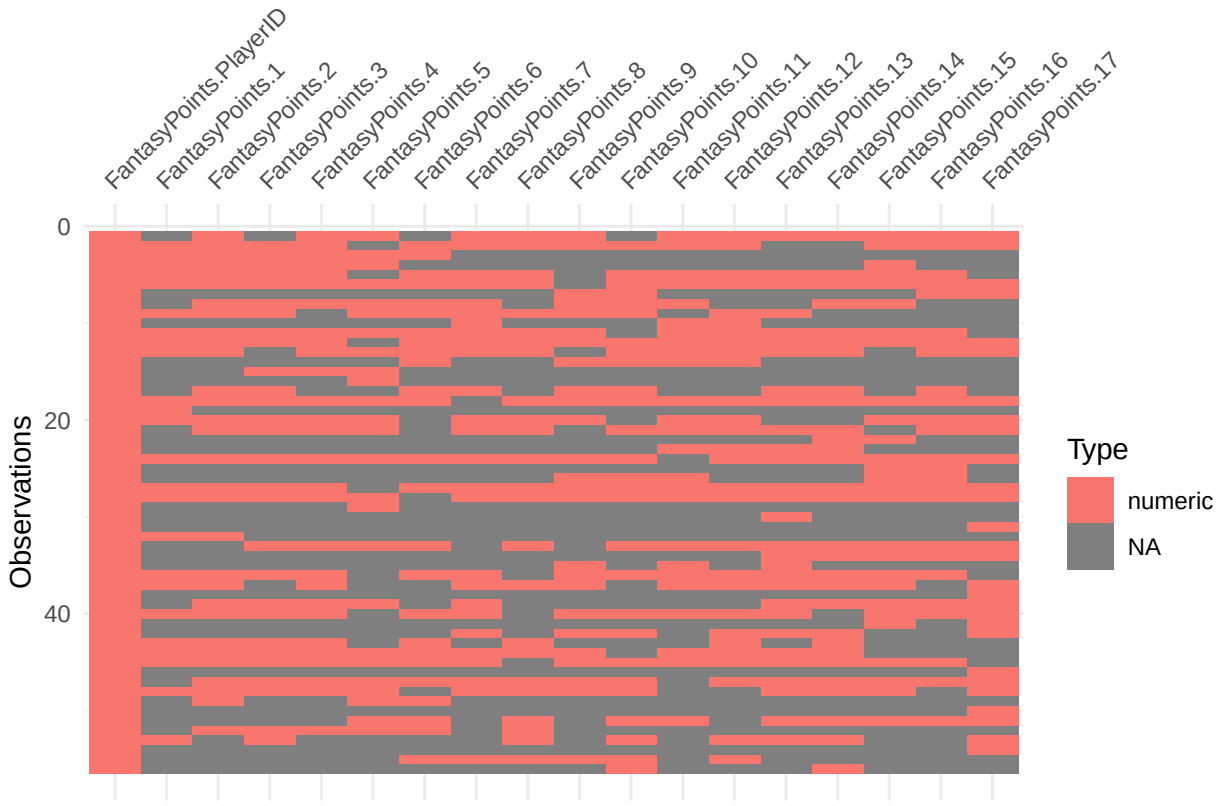

```
vis_dat(as.data.frame(QBPanels[14]))
```



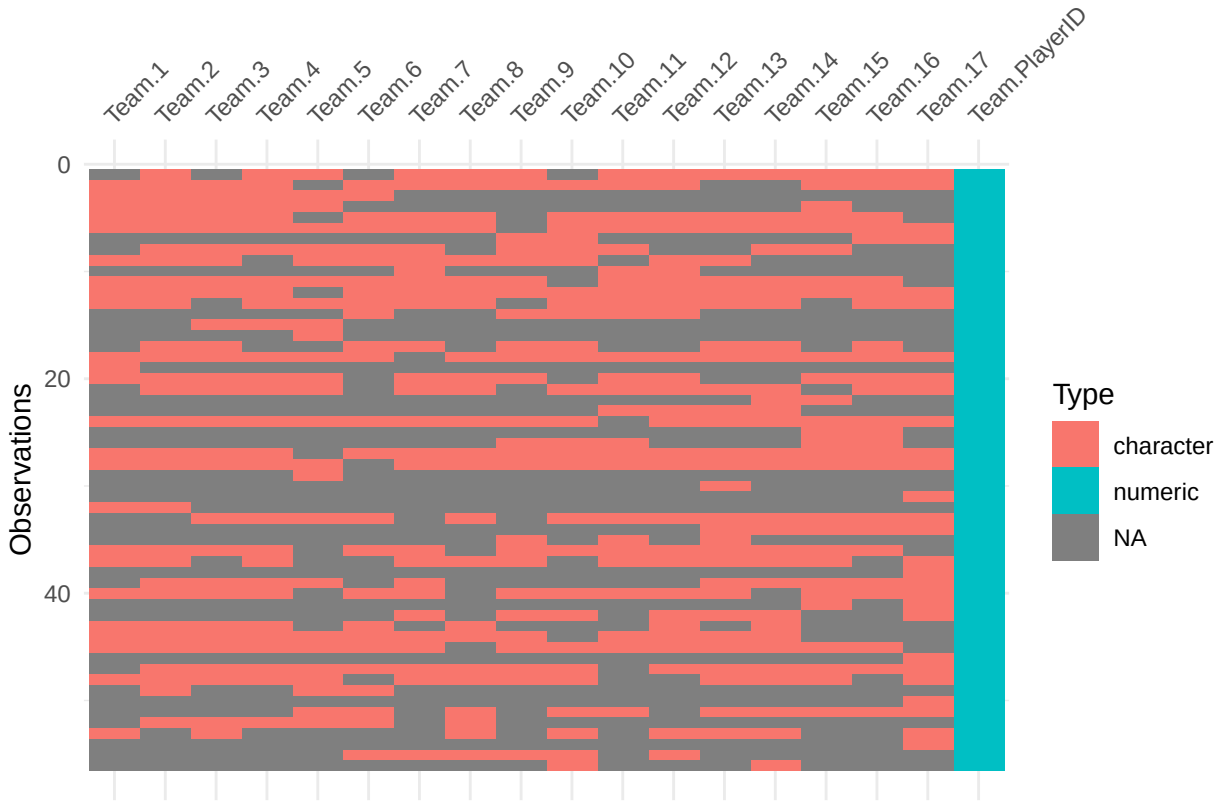
```
vis_dat(as.data.frame(QBPanels[15]))
```




```
vis_dat(as.data.frame(QBPanels[16]))
```



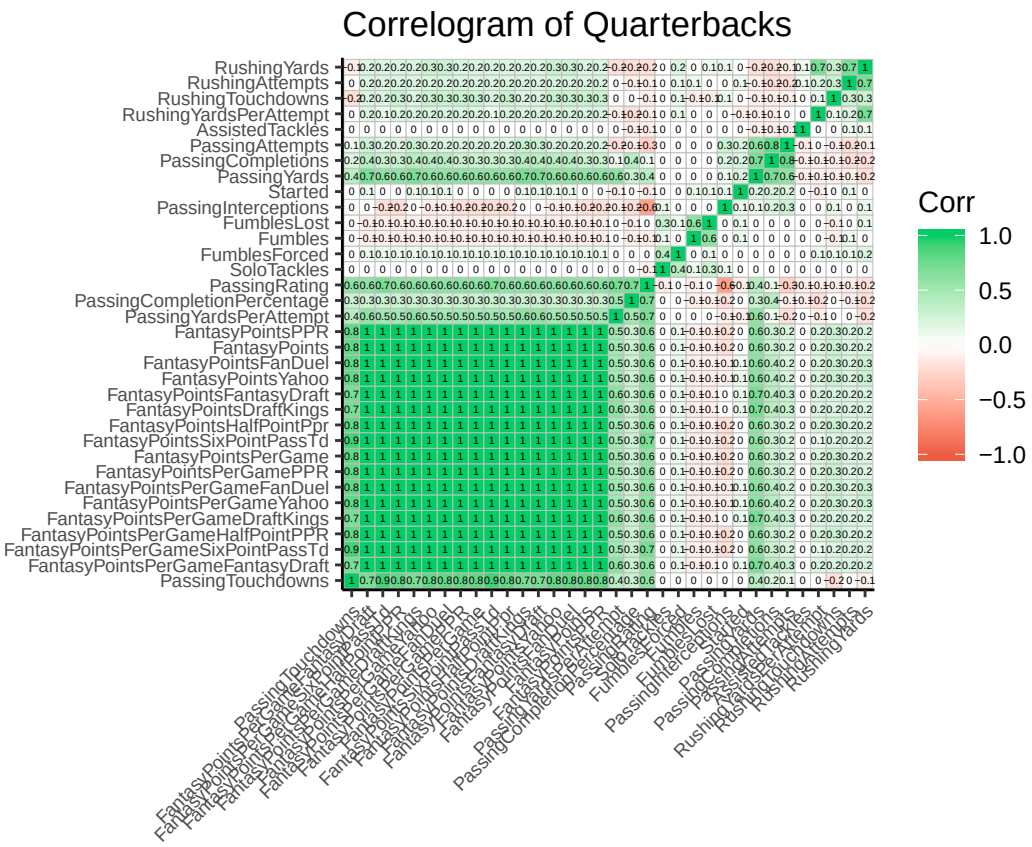

```
vis_dat(as.data.frame(QBPanels[17]))
```



1.4: Corrrelogram

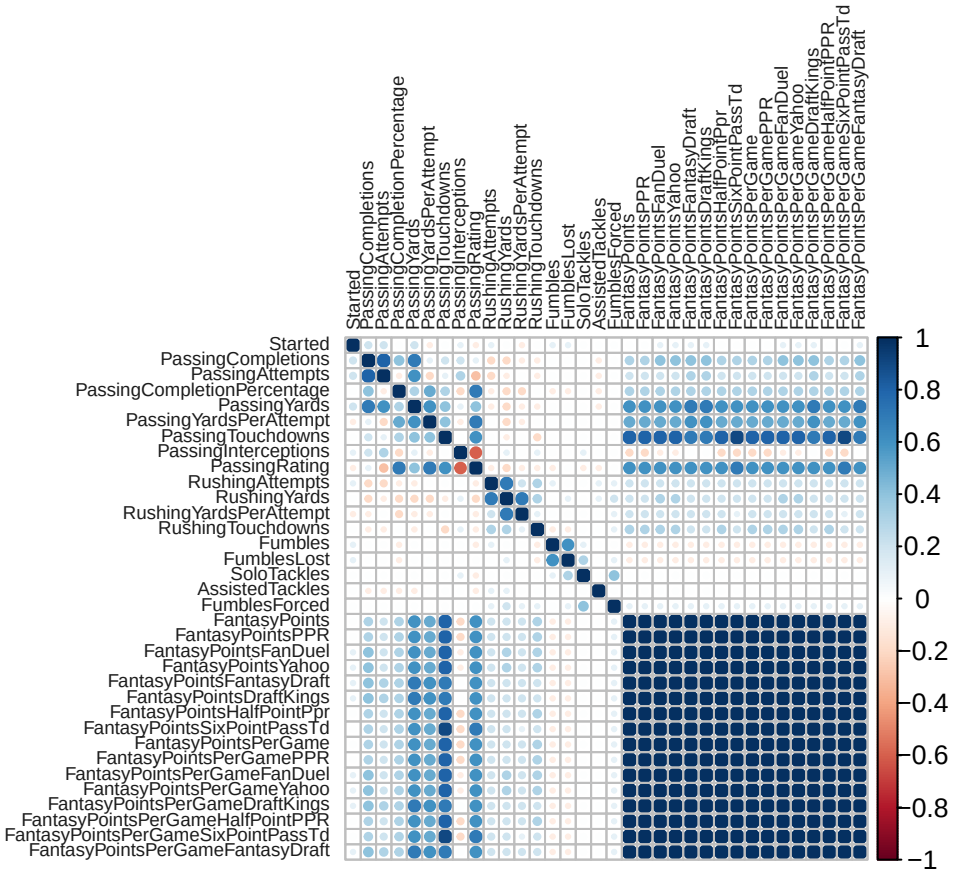
1.4.1 Corrrelogram Style1 QBData (Old dataset)

```
QBdata_num <- QBdata[-c(1:3,5:16,29:36,39:52,55:56,74:89)]
corr <- round(cor(QBdata_num), 1)

ggcorrplot(corr, hc.order = TRUE,
           type = "full",
           lab = TRUE,
           lab_size = 1.5,
           method="square",
           colors = c("tomato2", "white", "springgreen3"),
           title="Correlogram of Quarterbacks", tl.cex = 7,pch=2,pch.col =3,show.diag = T,
           ggtheme=theme_classic)
```



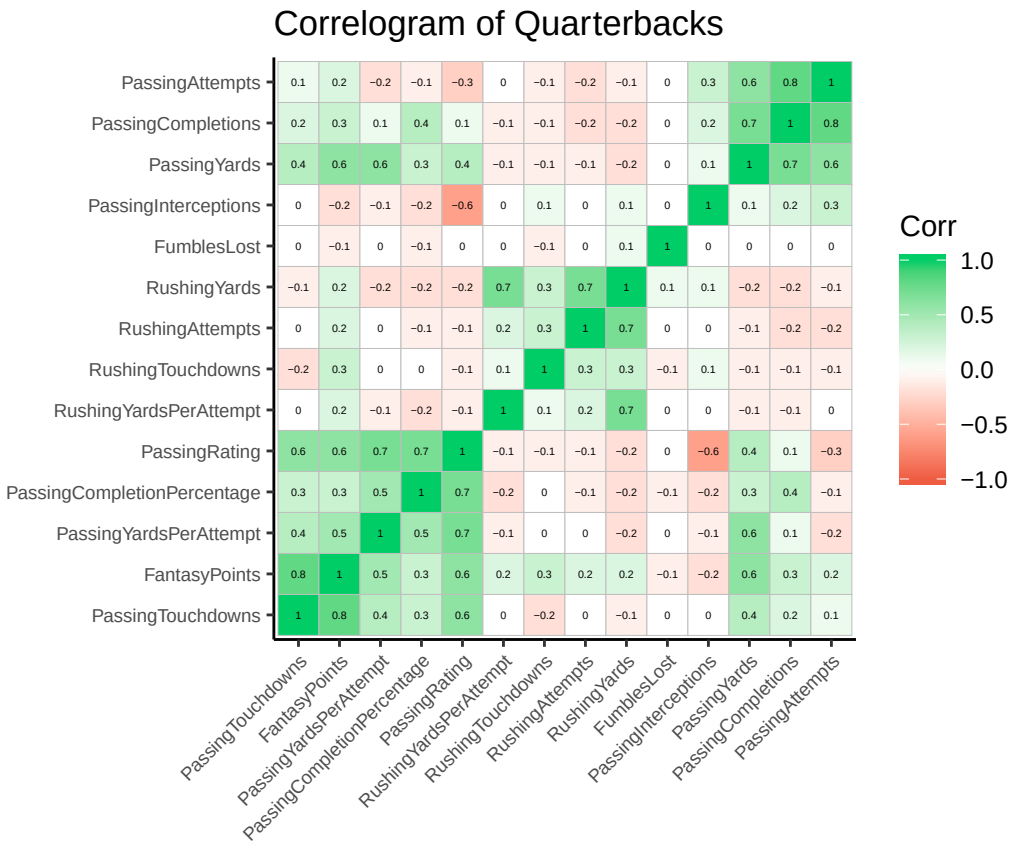
1.4.2 Corrrelogram Style2 QBData (Old dataset)

```
corrplot(corr, method="circle",tl.cex = 0.55,tl.col = "#1C1C1C")
```



1.4.3 Corrrelogram of Crosssectional data (New dataset)

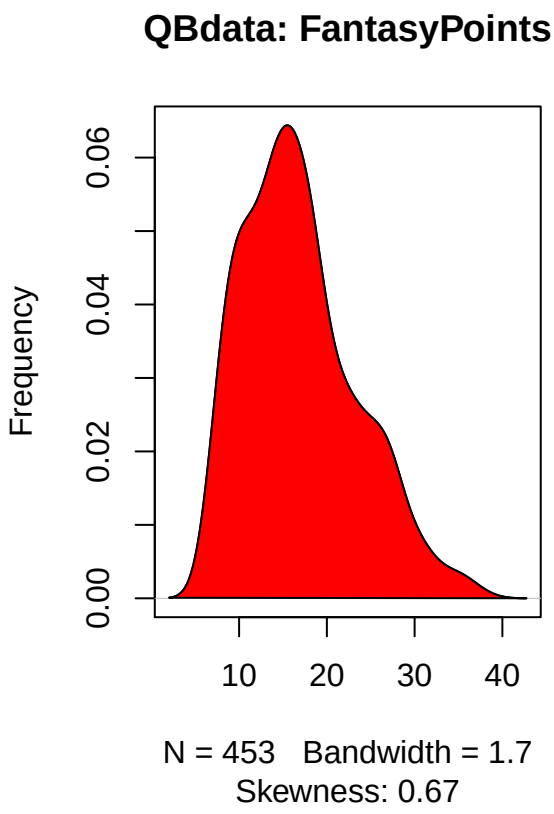
```
QBX_ds <- QBCrossSectional[-c(1:6,21)]
corr <- round(cor(QBX_ds), 1)
ggcorrplot(corr, hc.order = TRUE,
           type = "full",
           lab = TRUE,
           lab_size = 1.5,
           method="square",
           colors = c("tomato2", "white", "springgreen3"),
           title="Correlogram of Quarterbacks", tl.cex = 7,pch=2,pch.col =3,show.diag = T,
           ggtheme=theme_classic)
```



1.5: Distributions

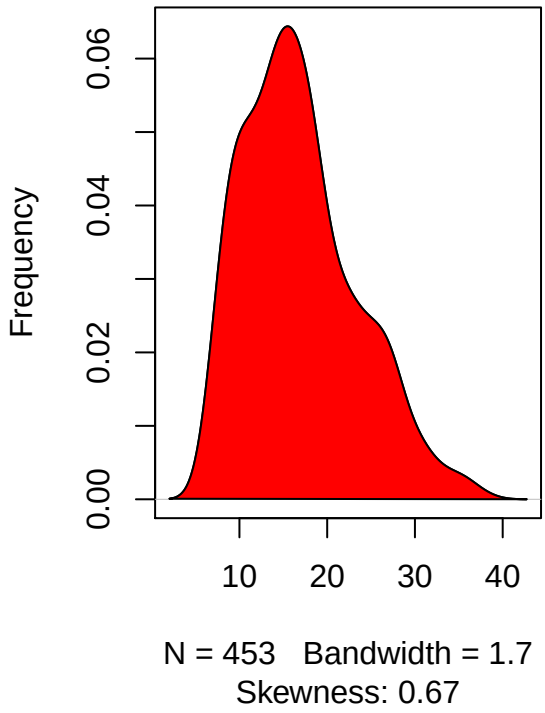
1.5.1 Density plot for Fantasypoints is approxmiately Normal (Old QBData)

```
library(e1071)
par(mfrow=c(1, 2))  # divide graph area in 2 columns
target <- QBdata$FantasyPoints
plot(density(target), main="QBdata: FantasyPoints", ylab="Frequency", sub=paste("Skewness:", round(e107
polygon(density(target), col="red",asp=1.2 )
```



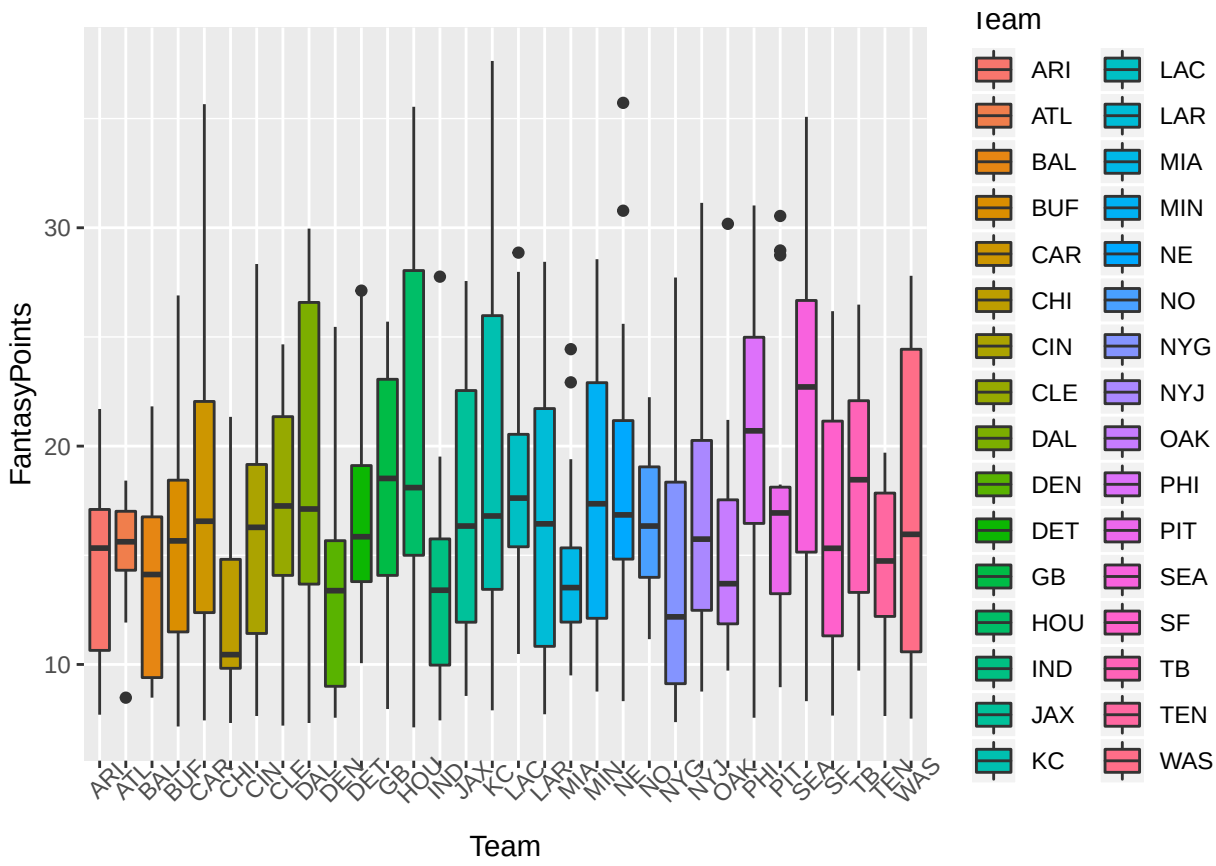
1.5.2 Density plot for Fantasypoints is approxmiately Normal (New QBCrossSectional)

```
par(mfrow=c(1, 2))  # divide graph area in 2 columns
target <- QBCrossSectional$FantasyPoints
plot(density(target), main="CrossSectional Dataset: FantasyPoints", ylab="Frequency", sub=paste("Skewnes
polygon(density(target), col="red")
```

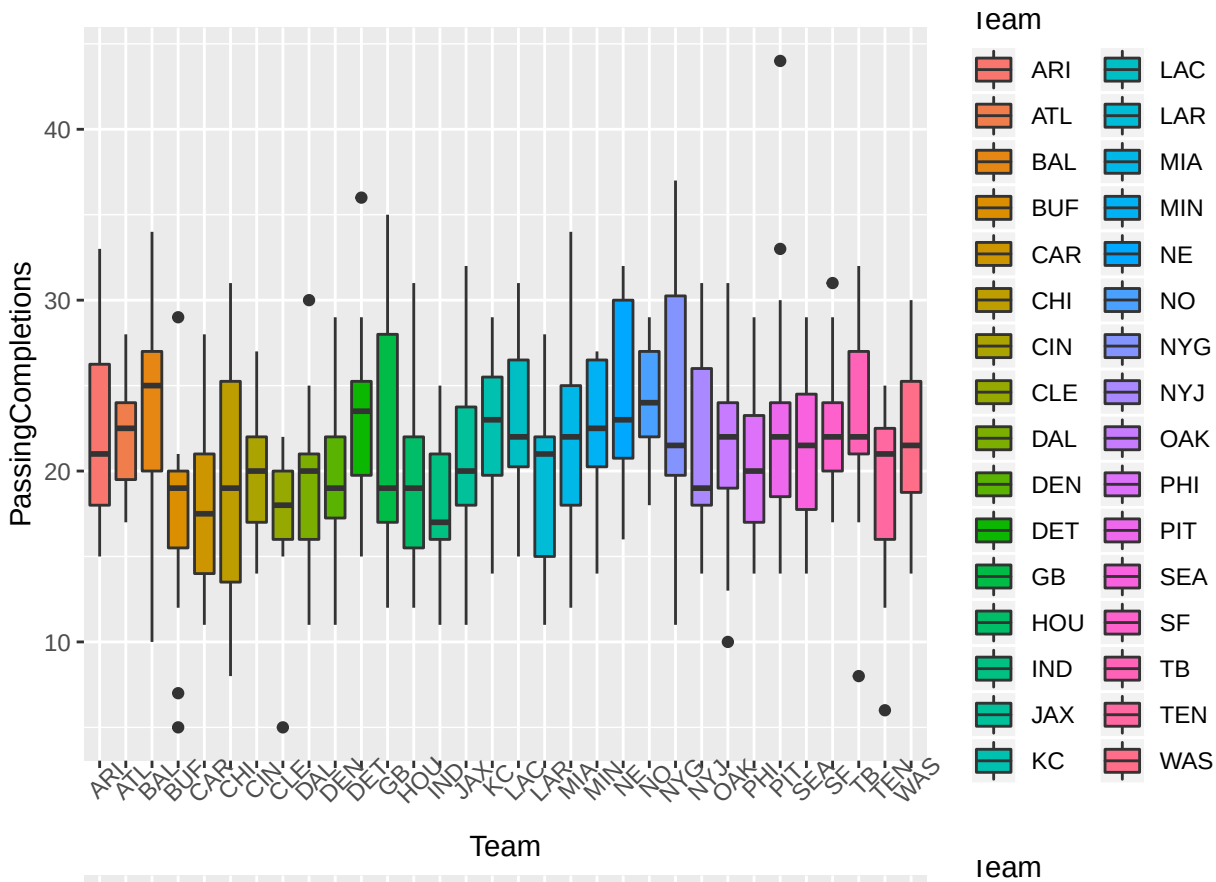


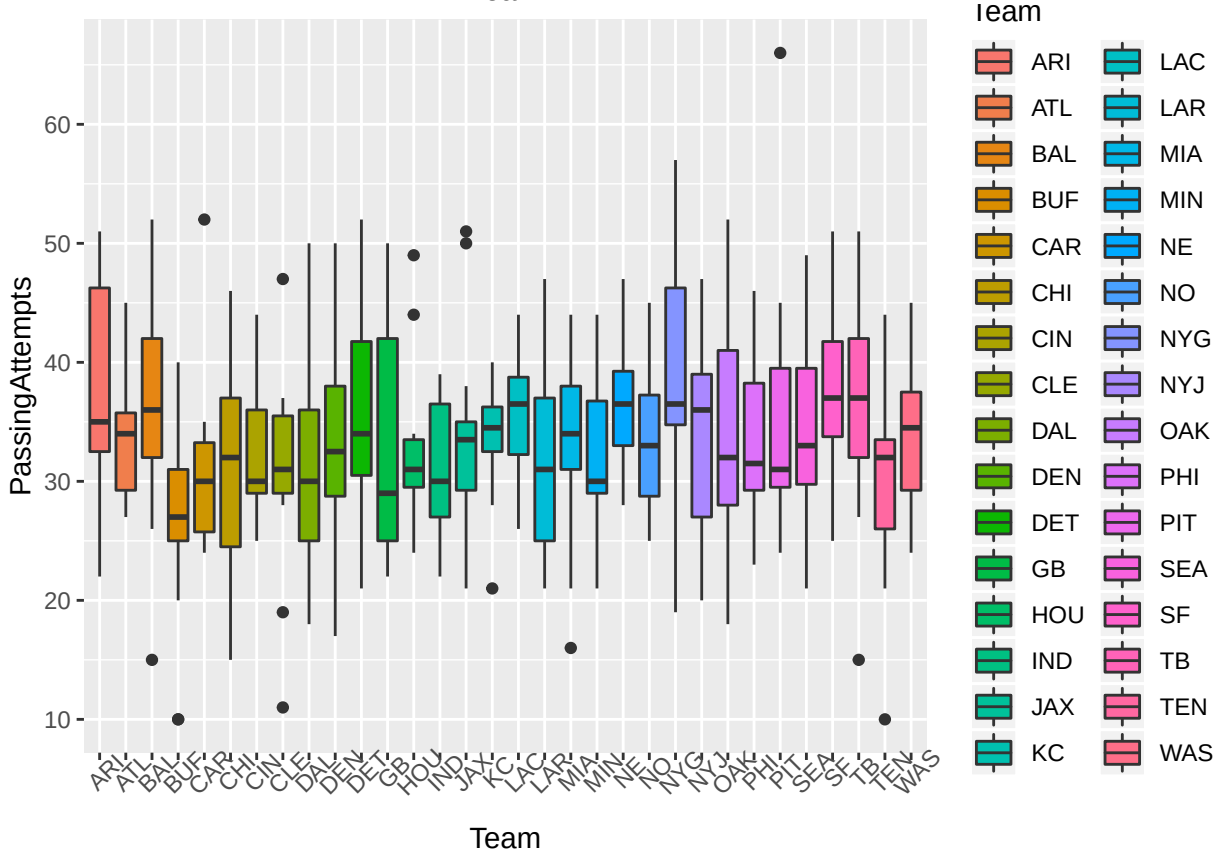
1.5.3 Boxplots - Target and Individual Predictor Bevavior for per Team

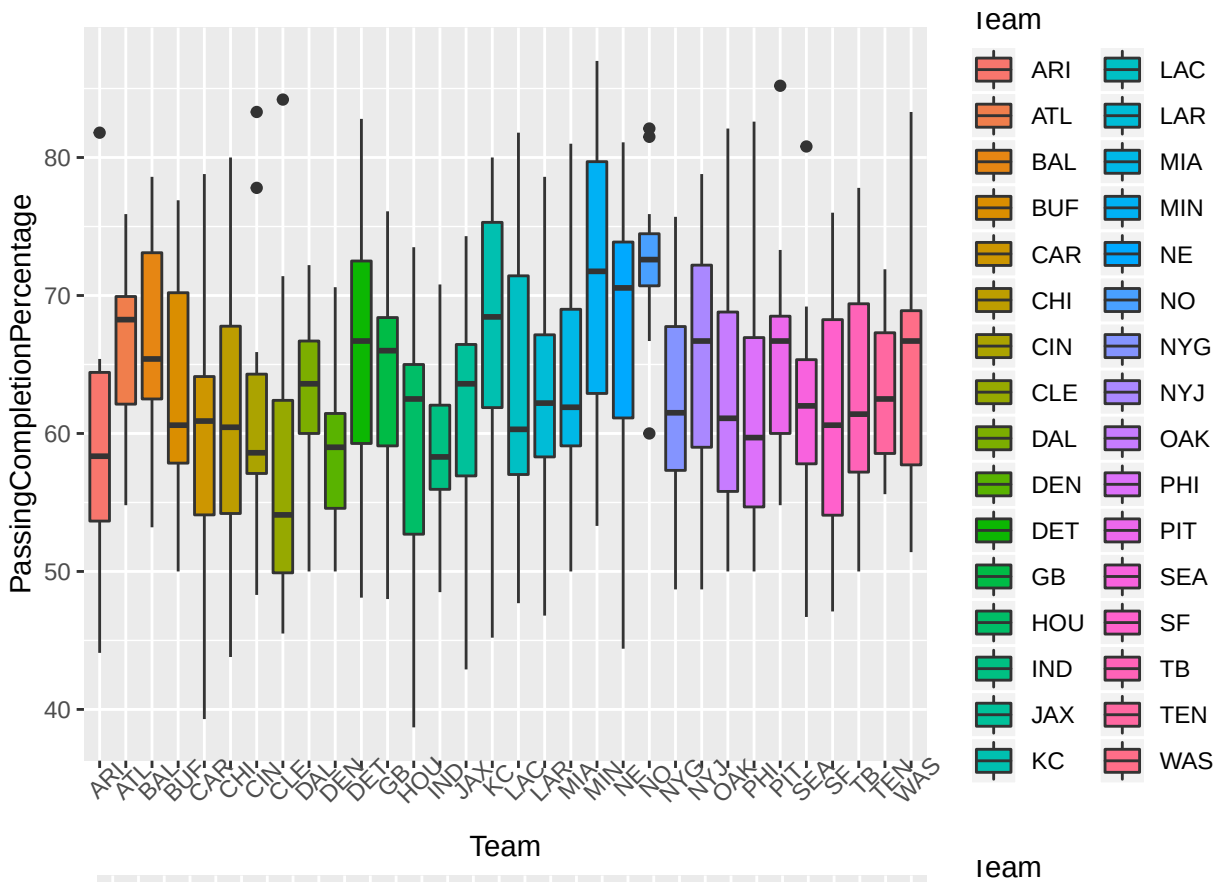
```
QBCrossSectional %>% ggplot(aes(y=FantasyPoints,x=Team,fill=Team))+
                      geom_boxplot()+
                      xlab("Team")+ylab("FantasyPoints")+
                      theme(axis.text.x = element_text(angle=45))
```

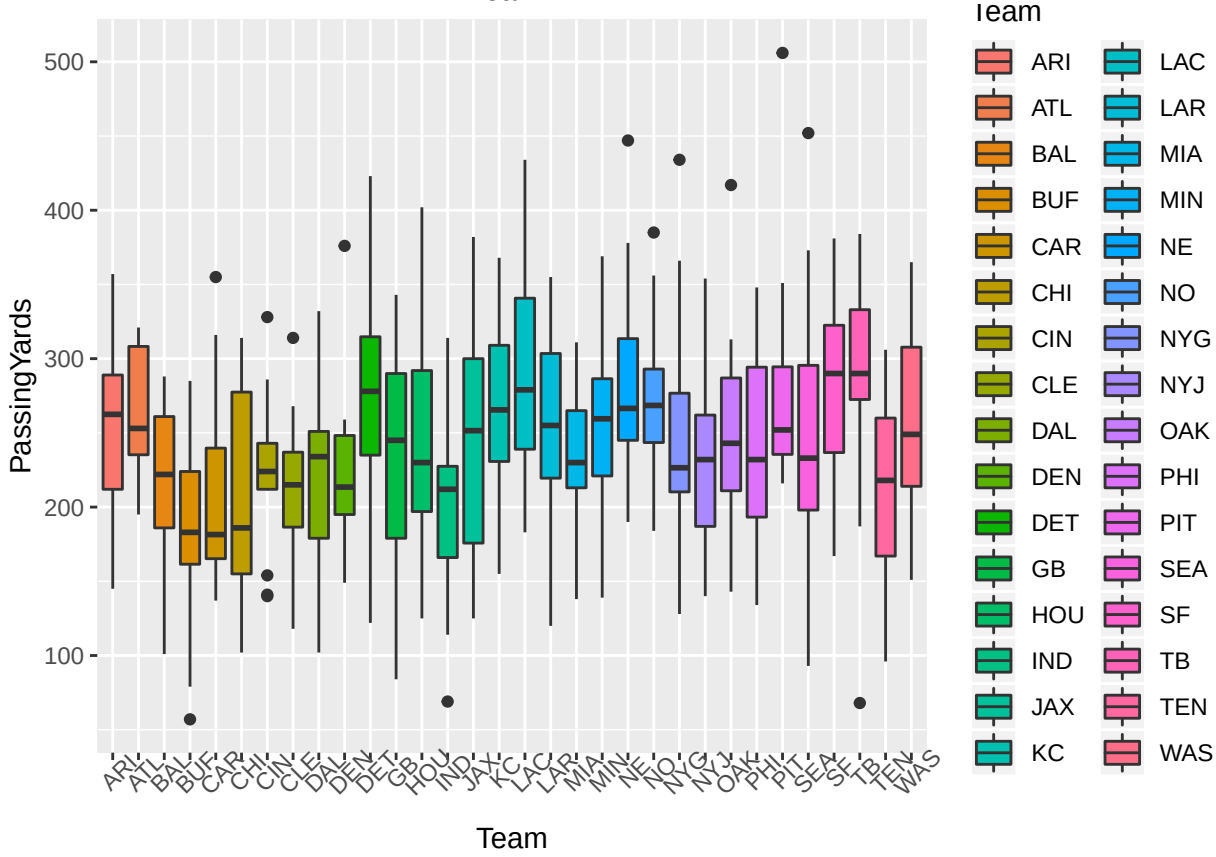


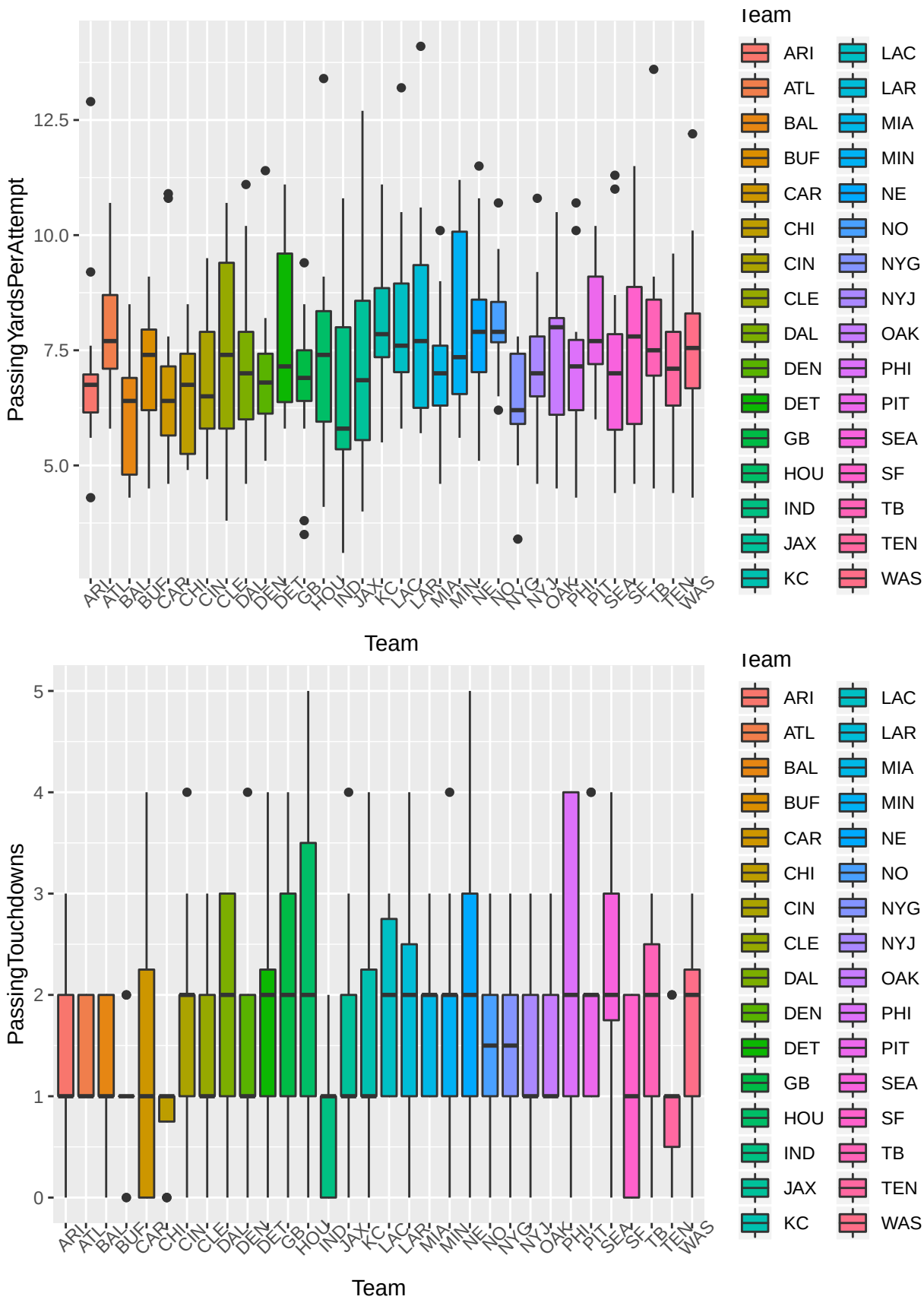

```
for (i in 7:19) {
  ggplotp <-  QBCrossSectional %>% ggplot(aes_string(y=names(QBCrossSectional[i]),x="Team",fill="Team"))
                          geom_boxplot()+
                          xlab("Team")+ylab(names(QBCrossSectional[i]))+
                          theme(axis.text.x = element_text(angle=45))
  print(ggplotp)
}
```

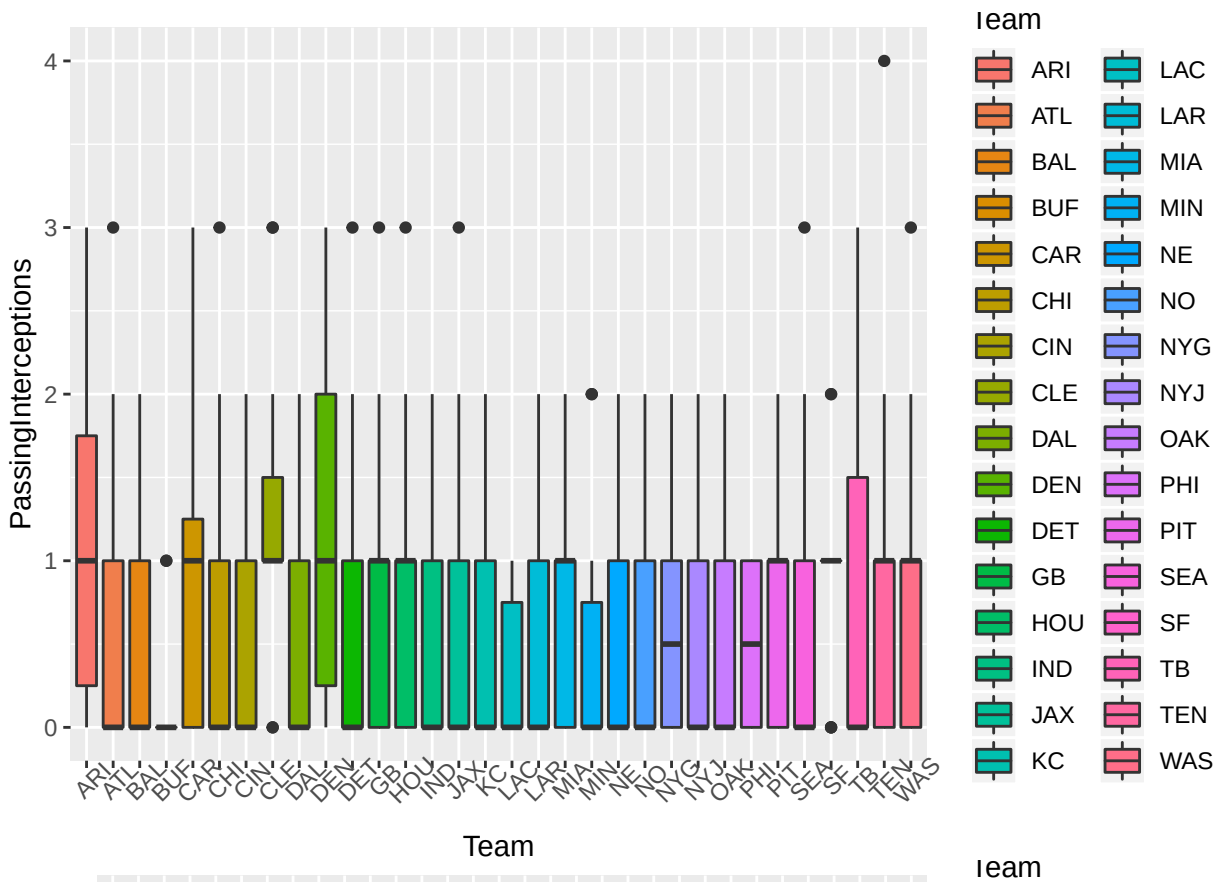

PassingCompletions
40
30
20
10
ARI ATL BAL BUF CAR CHI CIN CLE DAL DEN DET GB HOU IND JAX KC LAC LAR MIA MIN NE NO NYG NYJ OAK PHI PIT SEA SF TB TEN WAS
Team
Team
ARI
ATL
BAL
BUF
CAR
CHI
CIN
CLE
DAL
DEN
DET
GB
HOU
IND
JAX
KC
LAC
LAR
MIA
MIN
NE
NO
NYG
NYJ
OAK
PHI
PIT
SEA
SF
TB
TEN
WAS

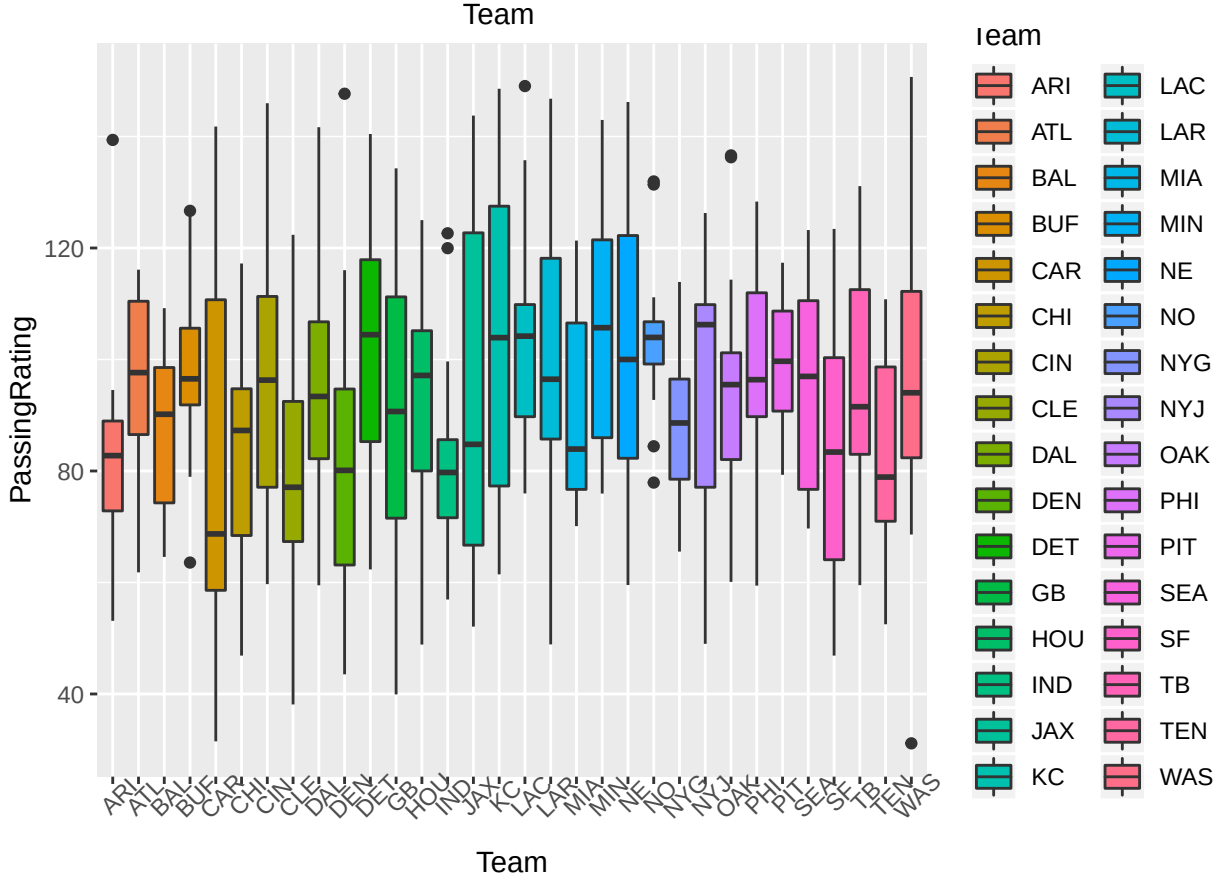

PassingAttempts
60
50
40
30
20
10
ARI ATL BAL BUF CAR CHI CIN CLE DAL DEN DET GB HOU IND JAX KC LAC LAR MIA MIN NE NO NYG NYJ OAK PHI PIT SEA SF TB TEN WAS
Team
Team
ARI
ATL
BAL
BUF
CAR
CHI
CIN
CLE
DAL
DEN
DET
GB
HOU
IND
JAX
KC
LAC
LAR
MIA
MIN
NE
NO
NYG
NYJ
OAK
PHI
PIT
SEA
SF
TB
TEN
WAS

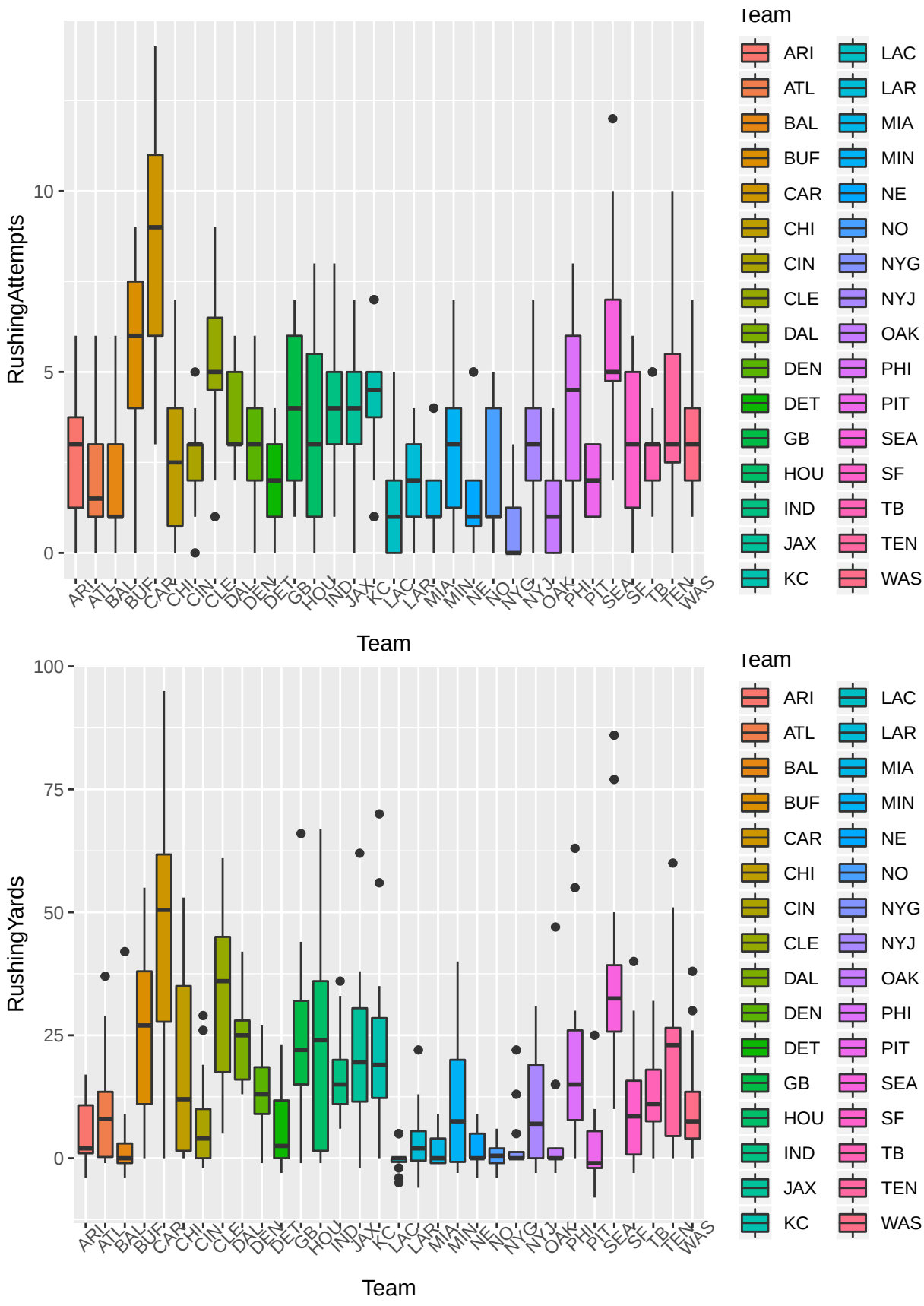

PassingCompletionPercentage
80
70
60
50
40
ARI ATL BAL BUF CAR CHI CIN CLE DAL DEN DET GB HOU IND JAX KC LAC LAR MIA MIN NE NO NYG NYJ OAK PHI PIT SEA SF TB TEN WAS
Team
Team
ARI ATL BAL BUF CAR CHI CIN CLE DAL DEN DET GB HOU IND JAX KC LAC LAR MIA MIN NE NO NYG NYJ OAK PHI PIT SEA SF TB TEN WAS

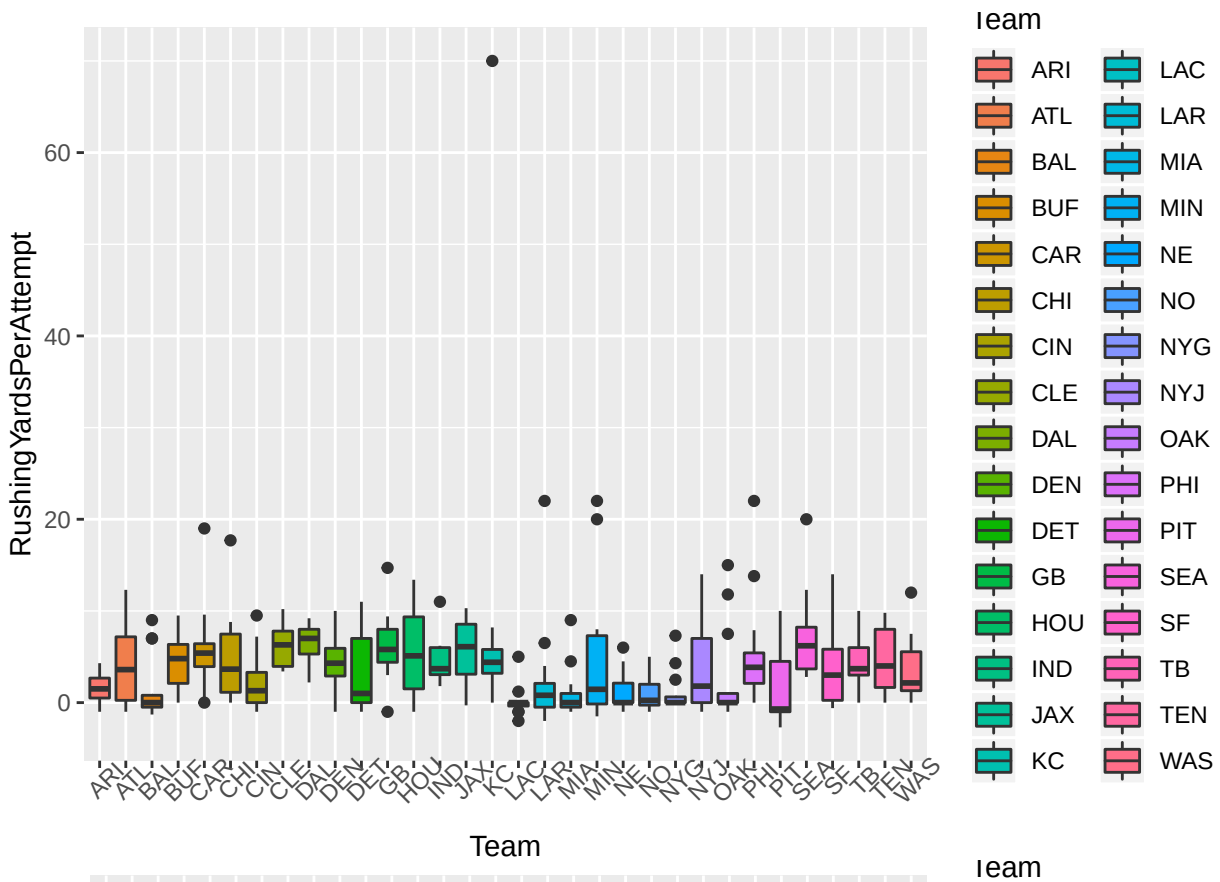

PassingYards
500
400
300
200
100
ARI ATL BAL BUF CAR CHI CIN CLE DAL DEN DET GB HOU IND JAX KC LAC LAR MIA MIN NE NO NYG NYJ OAK PHI PIT SEA SF TB TEN WAS
Team
Team
ARI ATL BAL BUF CAR CHI CIN CLE DAL DEN DET GB HOU IND JAX KC LAC LAR MIA MIN NE NO NYG NYJ OAK PHI PIT SEA SF TB TEN WAS

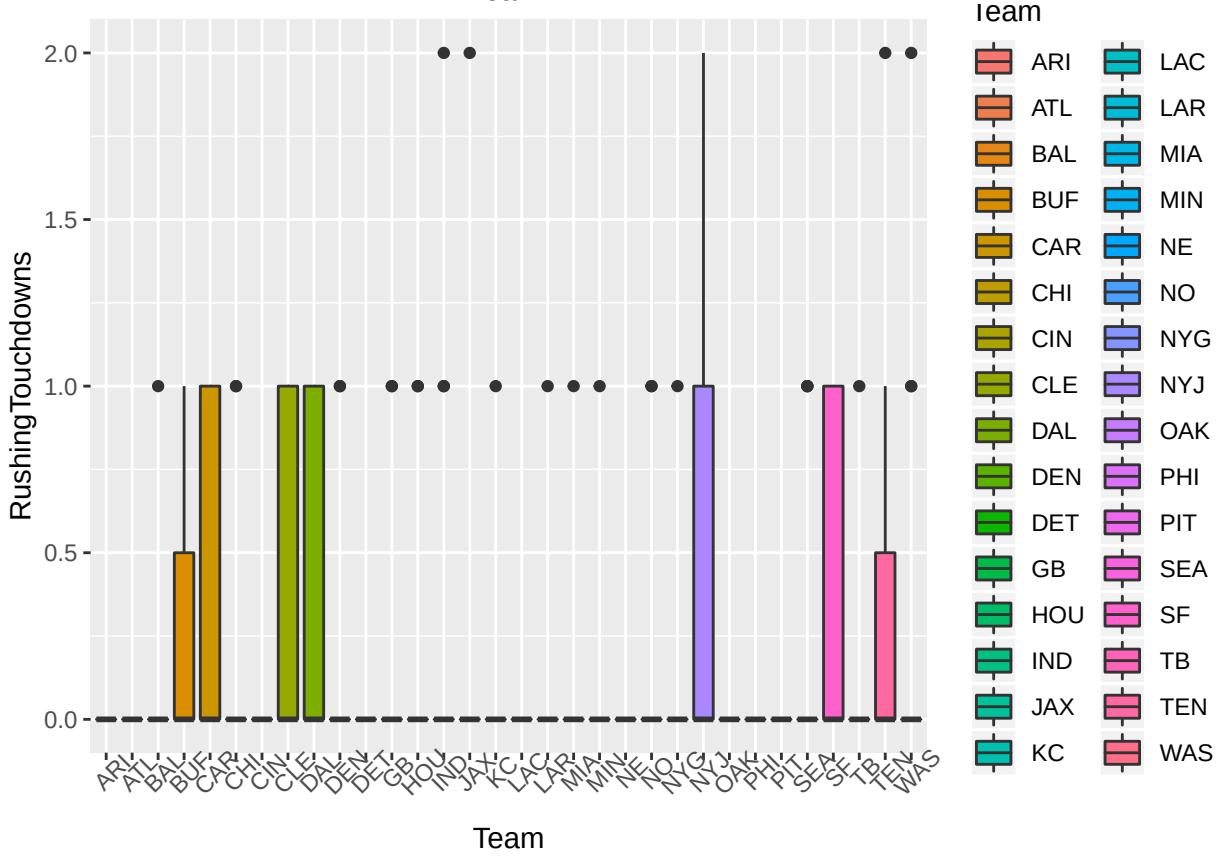

PassingYardsPerAttempt
12.5
10.0
7.5
5.0
ARI ATL BAL BUF CAR CHI CIN CLE DAL DEN DET GB HOU IND JAX KC LAC LAR MIA MIN NE NO NYG NYJ OAK PHI PIT SEA SF TB TEN WAS
Team
Team
ARI ATL BAL BUF CAR CHI CIN CLE DAL DEN DET GB HOU IND JAX KC LAC LAR MIA MIN NE NO NYG NYJ OAK PHI PIT SEA SF TB TEN WAS
PassingTouchdowns
5
4
3
2
1
0
ARI ATL BAL BUF CAR CHI CIN CLE DAL DEN DET GB HOU IND JAX KC LAC LAR MIA MIN NE NO NYG NYJ OAK PHI PIT SEA SF TB TEN WAS
Team
Team
ARI ATL BAL BUF CAR CHI CIN CLE DAL DEN DET GB HOU IND JAX KC LAC LAR MIA MIN NE NO NYG NYJ OAK PHI PIT SEA SF TB TEN WAS

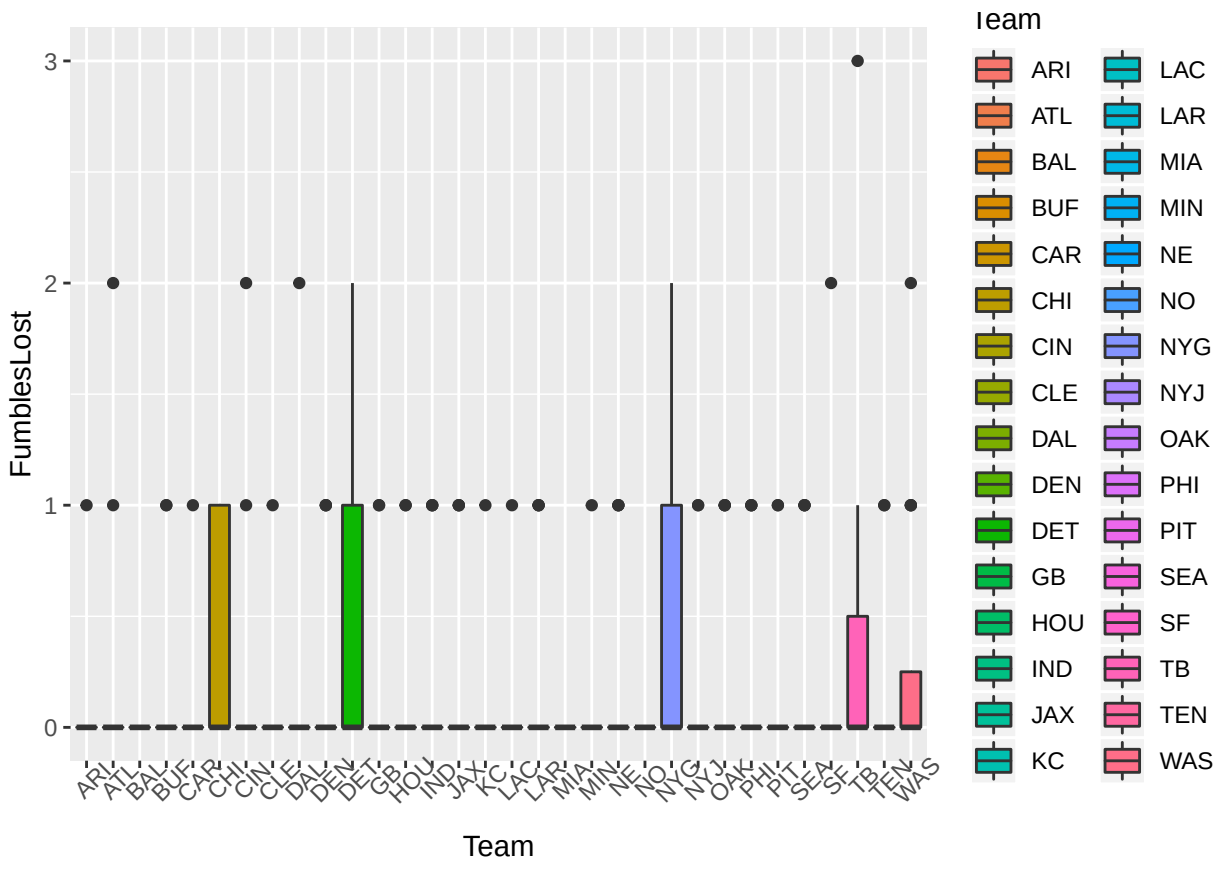

PassingInterceptions
4
3
2
1
0
ARI ATL BAL BUF CAR CHI CIN CLE DAL DEN DET GB HOU IND JAX KC LAC LAR MIA MIN NE NO NYG NYJ OAK PHI PIT SEA SF TB TEN WAS
Team
Team
ARI
ATL
BAL
BUF
CAR
CHI
CIN
CLE
DAL
DEN
DET
GB
HOU
IND
JAX
KC
LAC
LAR
MIA
MIN
NE
NO
NYG
NYJ
OAK
PHI
PIT
SEA
SF
TB
TEN
WAS


PassingRating
120
80
40
ARI ATL BAL BUF CAR CHI CIN CLE DAL DEN DET GB HOU IND JAX KC LAC LAR MIA MIN NE NO NYG NYJ OAK PHI PIT SEA SF TB TEN WAS
Team
Team
ARI
ATL
BAL
BUF
CAR
CHI
CIN
CLE
DAL
DEN
DET
GB
HOU
IND
JAX
KC
LAC
LAR
MIA
MIN
NE
NO
NYG
NYJ
OAK
PHI
PIT
SEA
SF
TB
TEN
WAS


RushingAttempts
10
5
0
ARI ATL BAL BUF CAR CHI CIN CLE DAL DEN DET GB HOU IND JAX KC LAC LAR MIA MIN NE NO NYG NYJ OAK PHI PIT SEA SF TB TEN WAS
Team
Team
ARI
ATL
BAL
BUF
CAR
CHI
CIN
CLE
DAL
DEN
DET
GB
HOU
IND
JAX
KC
LAC
LAR
MIA
MIN
NE
NO
NYG
NYJ
OAK
PHI
PIT
SEA
SF
TB
TEN
WAS
RushingYards
100
75
50
25
0
ARI ATL BAL BUF CAR CHI CIN CLE DAL DEN DET GB HOU IND JAX KC LAC LAR MIA MIN NE NO NYG NYJ OAK PHI PIT SEA SF TB TEN WAS
Team
Team
ARI
ATL
BAL
BUF
CAR
CHI
CIN
CLE
DAL
DEN
DET
GB
HOU
IND
JAX
KC
LAC
LAR
MIA
MIN
NE
NO
NYG
NYJ
OAK
PHI
PIT
SEA
SF
TB
TEN
WAS


RushingYardsPerAttempt
60
40
20
0
ARI ATL BAL BUF CAR CHI CIN CLE DAL DEN DET GB HOU IND JAX KC LAC LAR MIA MIN NE NO NYG NYJ OAK PHI PIT SEA SF TB TEN WAS
Team
Team
ARI ATL BAL BUF CAR CHI CIN CLE DAL DEN DET GB HOU IND JAX KC LAC LAR MIA MIN NE NO NYG NYJ OAK PHI PIT SEA SF TB TEN WAS
LAC LAR MIA MIN NE NO NYG NYJ OAK PHI PIT SEA SF TB TEN WAS


RushingTouchdowns
2.0
1.5
1.0
0.5
0.0
ARI ATL BAL BUF CAR CHI CIN CLE DAL DEN DET GB HOU IND JAX KC LAC LAR MIA MIN NE NO NYG NYJ OAK PHI PIT SEA SF TB TEN WAS
Team
Team
ARI ATL BAL BUF CAR CHI CIN CLE DAL DEN DET GB HOU IND JAX KC LAC LAR MIA MIN NE NO NYG NYJ OAK PHI PIT SEA SF TB TEN WAS
LAC LAR MIA MIN NE NO NYG NYJ OAK PHI PIT SEA SF TB TEN WAS



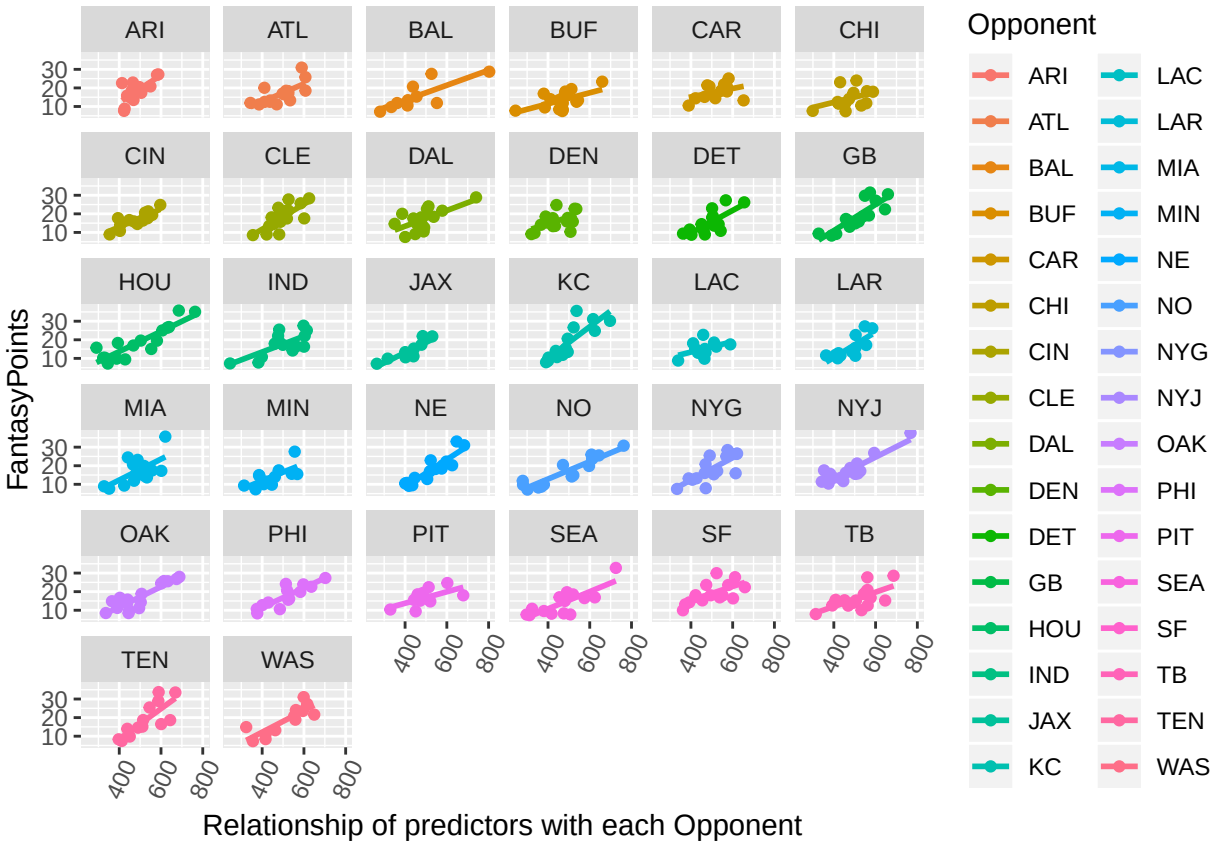
1.6: Relationships

1.6.1 Relationship between FanatasyPoints with all predictors and taking Opponent into consideration

```
attach(QBCrossSectional)
```

```
## The following object is masked from package:ggplot2:
##
##     Position
```

```
QBCrossSectional %>% ggplot(aes(y=FantasyPoints,x=PassingCompletions+PassingAttempts+
                                                  PassingCompletionPercentage+
                                                  PassingYards+PassingYardsPerAttempt+
                                                  PassingTouchdowns+PassingInterceptions+
                                                  PassingRating+RushingAttempts+RushingYards+
                                                  RushingYardsPerAttempt+RushingTouchdowns+FumblesLost,
                                                  color=Opponent))+
                        xlab("Relationship of predictors with each Opponent")+
                        geom_point()+
                        geom_smooth(method="lm",se=F)+
                        theme(axis.text.x = element_text(angle=65, vjust=0.6))+facet_wrap(~Opponent)
```



1.6.2 Relationship between FanatasyPoints with all predictors and taking Home turf into consideration

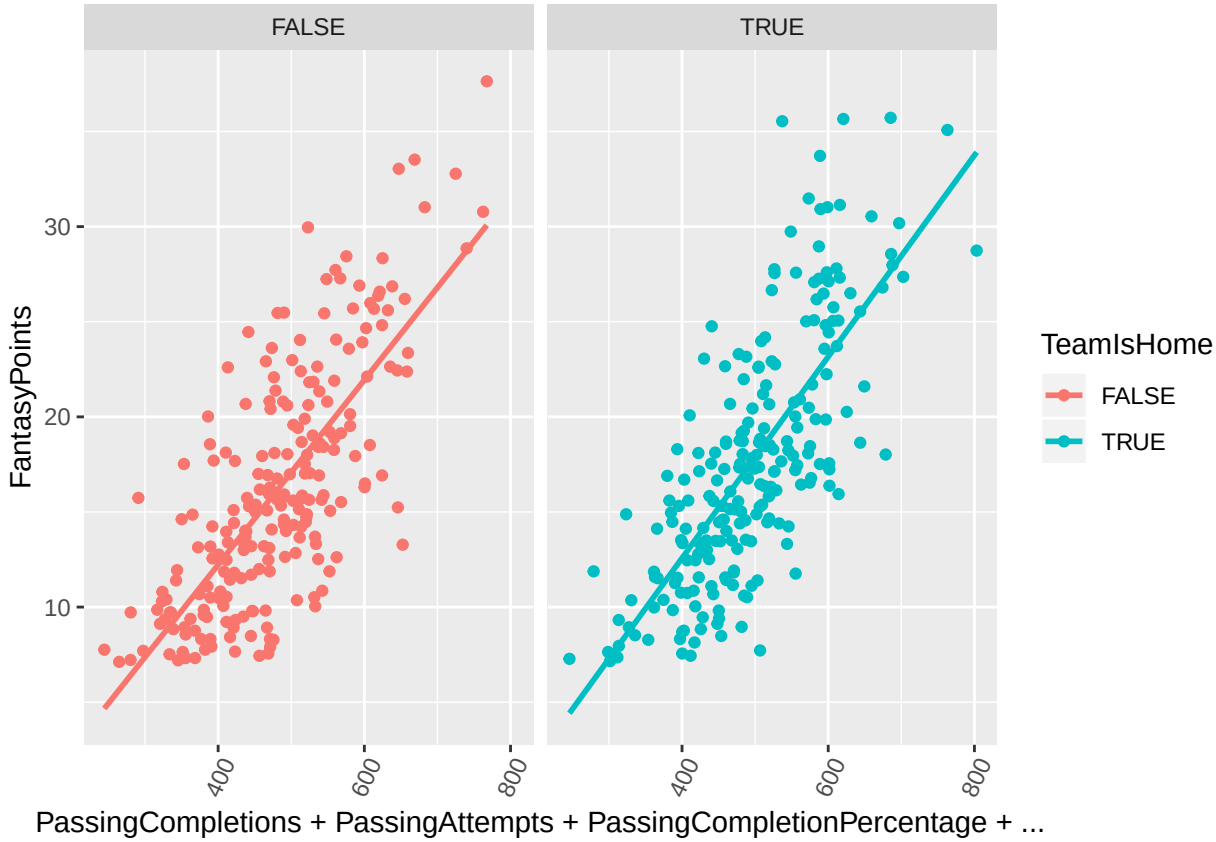
```
attach(QBCrossSectional)
```

```
## The following objects are masked from QBCrossSectional (pos = 3):
##
##     FantasyPoints, FumblesLost, GameDate, Opponent,
##     PassingAttempts, PassingCompletionPercentage,
##     PassingCompletions, PassingInterceptions, PassingRating,
##     PassingTouchdowns, PassingYards, PassingYardsPerAttempt,
##     PlayerID, Position, RushingAttempts, RushingTouchdowns,
##     RushingYards, RushingYardsPerAttempt, Team, TeamIsHome, Week
```

```
## The following object is masked from package:ggplot2:
##
##     Position
```

```
QBCrossSectional %>% ggplot(aes(y=FantasyPoints,x=PassingCompletions+PassingAttempts+
                                                  PassingCompletionPercentage+
                                                  PassingYards+PassingYardsPerAttempt+
                                                  PassingTouchdowns+PassingInterceptions+
                                                  PassingRating+RushingAttempts+RushingYards+
                                                  RushingYardsPerAttempt+RushingTouchdowns+FumblesLost,
                                                  color=TeamIsHome))+
                    geom_point()+
                    geom_smooth(method="lm",se=F)+
```

```
                theme(axis.text.x = element_text(angle=65, vjust=0.6))+facet_wrap(~TeamIsHome)
```

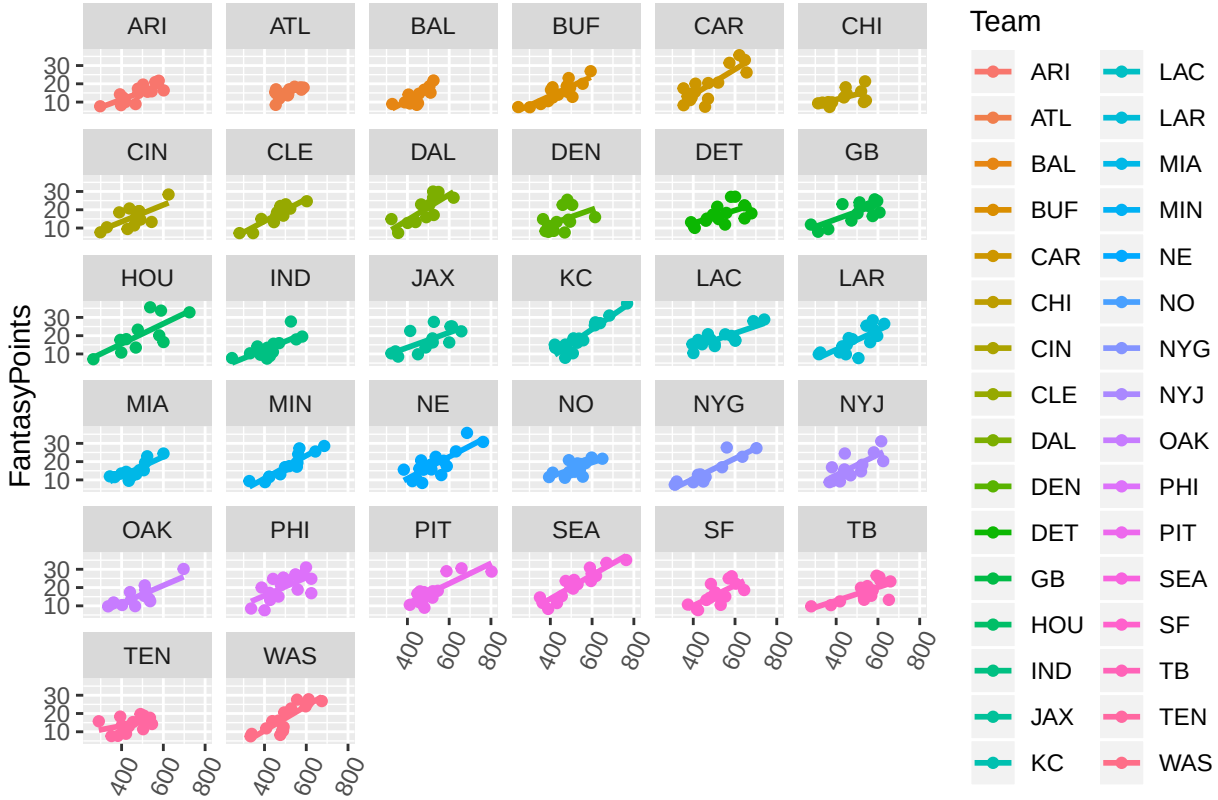


1.6.3 Relationship between FanatasyPoints with all predictors per team

```
attach(QBCrossSectional)
```

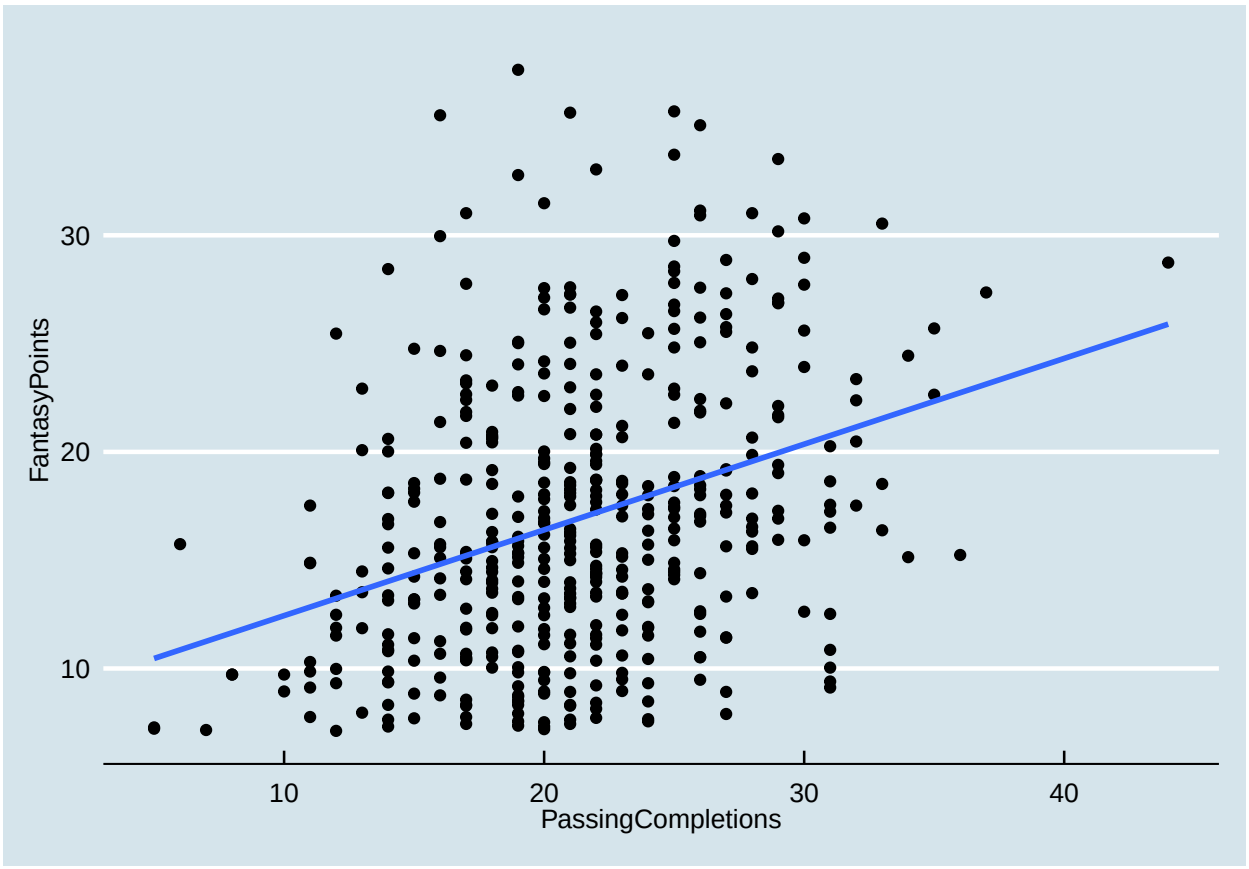
```
## The following objects are masked from QBCrossSectional (pos = 3):
##
##     FantasyPoints, FumblesLost, GameDate, Opponent,
##     PassingAttempts, PassingCompletionPercentage,
##     PassingCompletions, PassingInterceptions, PassingRating,
##     PassingTouchdowns, PassingYards, PassingYardsPerAttempt,
##     PlayerID, Position, RushingAttempts, RushingTouchdowns,
##     RushingYards, RushingYardsPerAttempt, Team, TeamIsHome, Week

## The following objects are masked from QBCrossSectional (pos = 4):
##
##     FantasyPoints, FumblesLost, GameDate, Opponent,
##     PassingAttempts, PassingCompletionPercentage,
##     PassingCompletions, PassingInterceptions, PassingRating,
##     PassingTouchdowns, PassingYards, PassingYardsPerAttempt,
##     PlayerID, Position, RushingAttempts, RushingTouchdowns,
##     RushingYards, RushingYardsPerAttempt, Team, TeamIsHome, Week

## The following object is masked from package:ggplot2:
##
##     Position
```

```
QBCrossSectional %>% ggplot(aes(y=FantasyPoints,x=PassingCompletions+PassingAttempts+
                                                  PassingCompletionPercentage+
                                                  PassingYards+PassingYardsPerAttempt+
                                                  PassingTouchdowns+PassingInterceptions+
                                                  PassingRating+RushingAttempts+
                                                  RushingYards+RushingYardsPerAttempt+
                                                  RushingTouchdowns+FumblesLost,color=Team)) +
                    geom_point()+
                    geom_smooth(method="lm",se=F)+
                    theme(axis.text.x = element_text(angle=65, vjust=0.6))+facet_wrap(~Team)
```

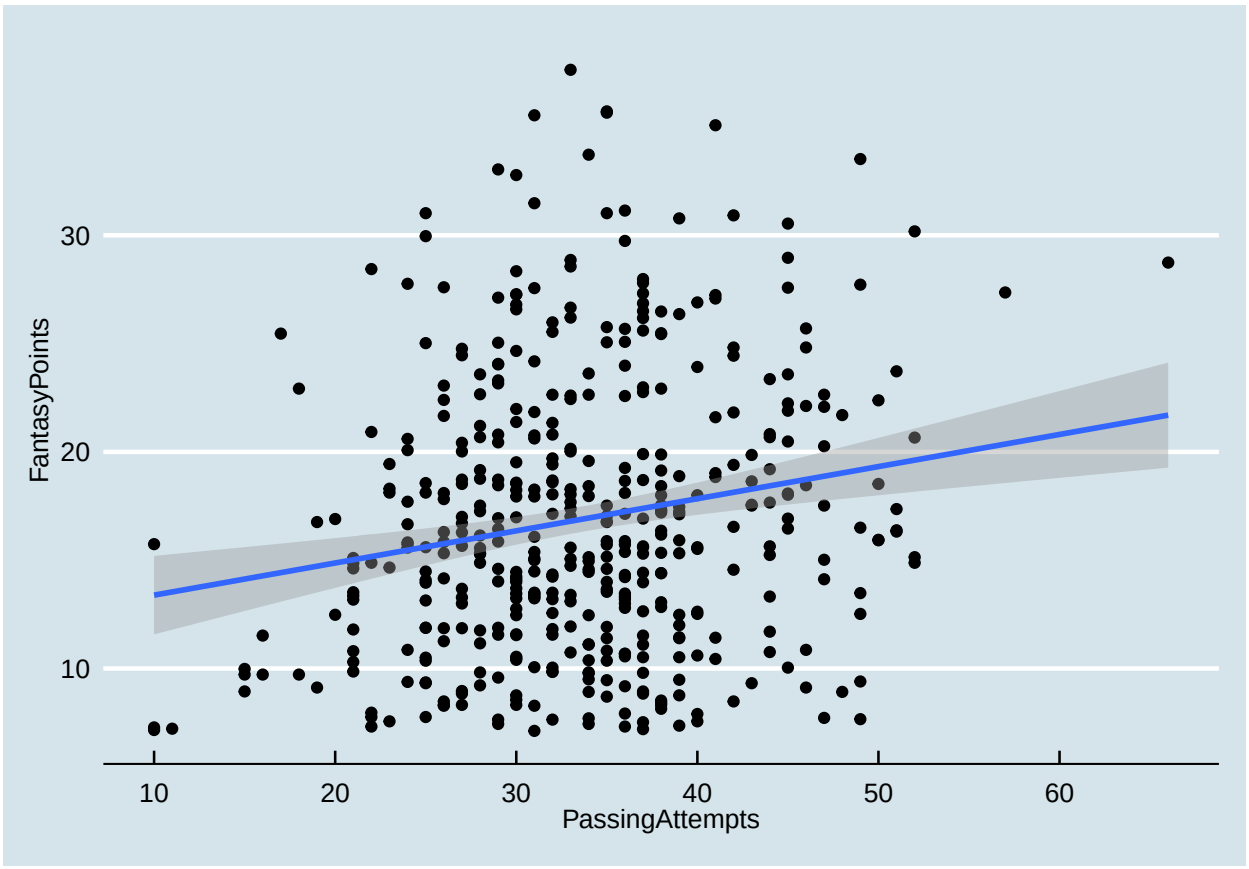


1.6.4 Relationship between FantasyPoints and Individual predictors

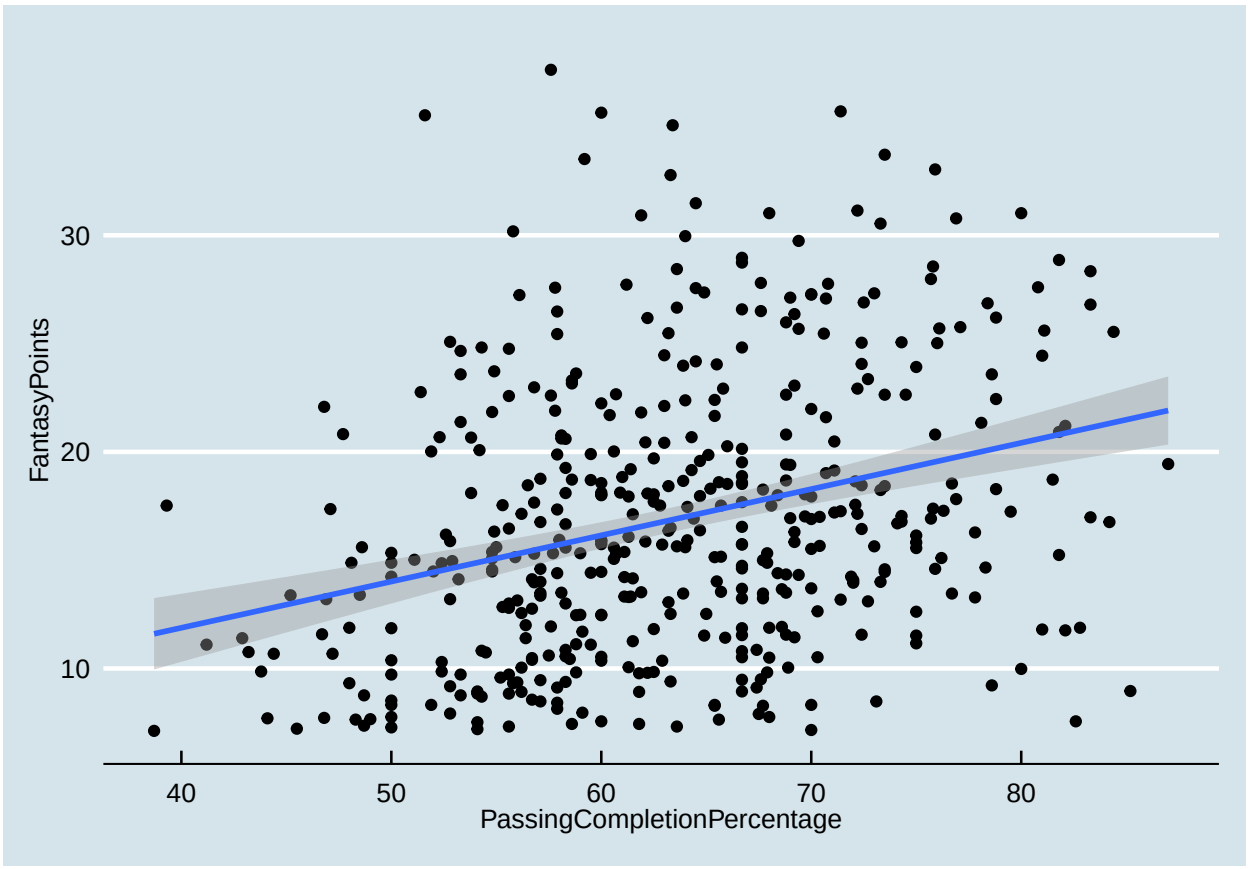
```
QBCrossSectional %>% ggplot(aes(y=FantasyPoints,x=PassingCompletions)) +
  geom_point()+geom_smooth(method="lm",se=F)+
  theme(axis.text.x = element_text(angle=65, vjust=0.6))+theme_economist()
```



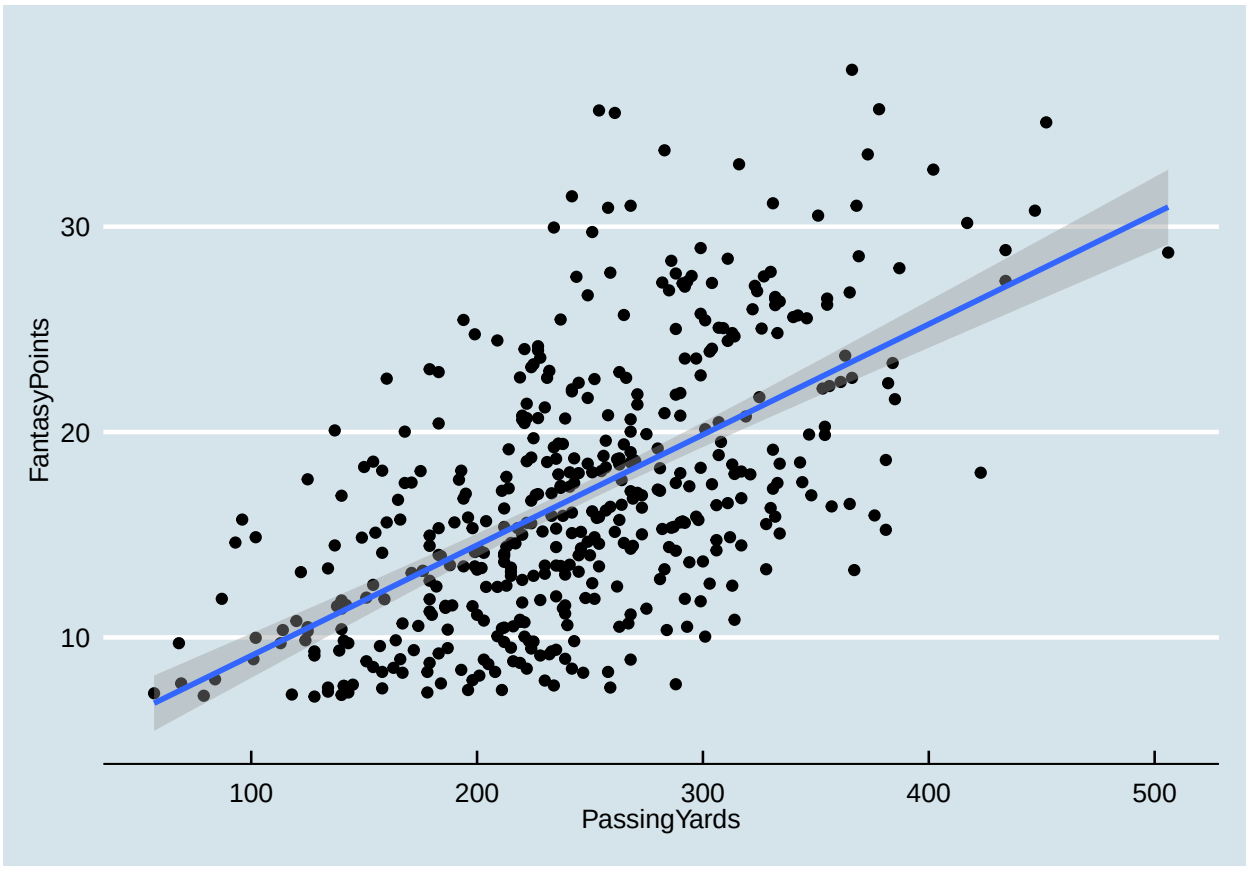

```
QBCrossSectional %>% ggplot(aes(y=FantasyPoints,x=PassingAttempts)) +
  geom_point()+geom_smooth(method="lm")+
  theme(axis.text.x = element_text(angle=65, vjust=0.6))+theme_economist()
```



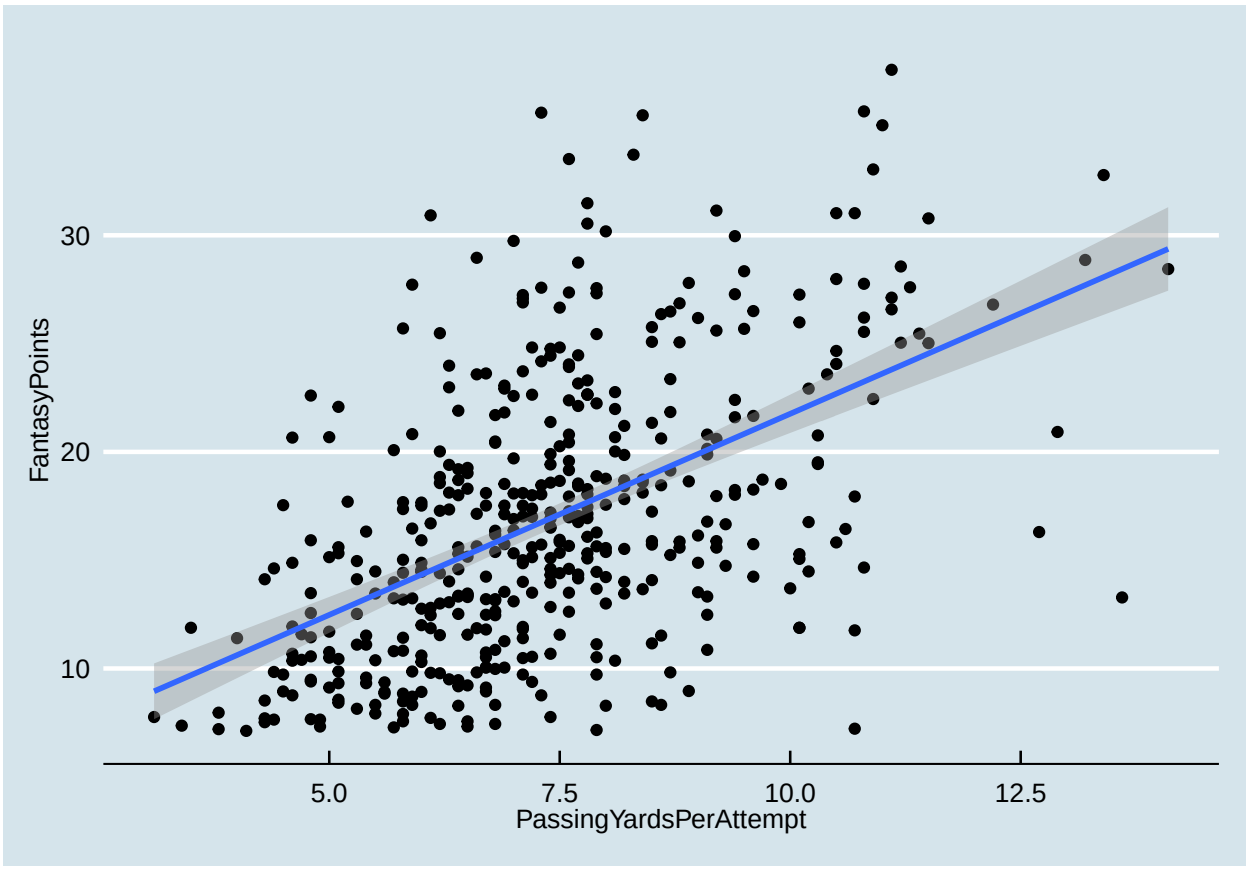

```
QBCrossSectional %>% ggplot(aes(y=FantasyPoints,x=PassingCompletionPercentage)) +
  geom_point()+geom_smooth(method="lm")+
  theme(axis.text.x = element_text(angle=65, vjust=0.6))+theme_economist()
```



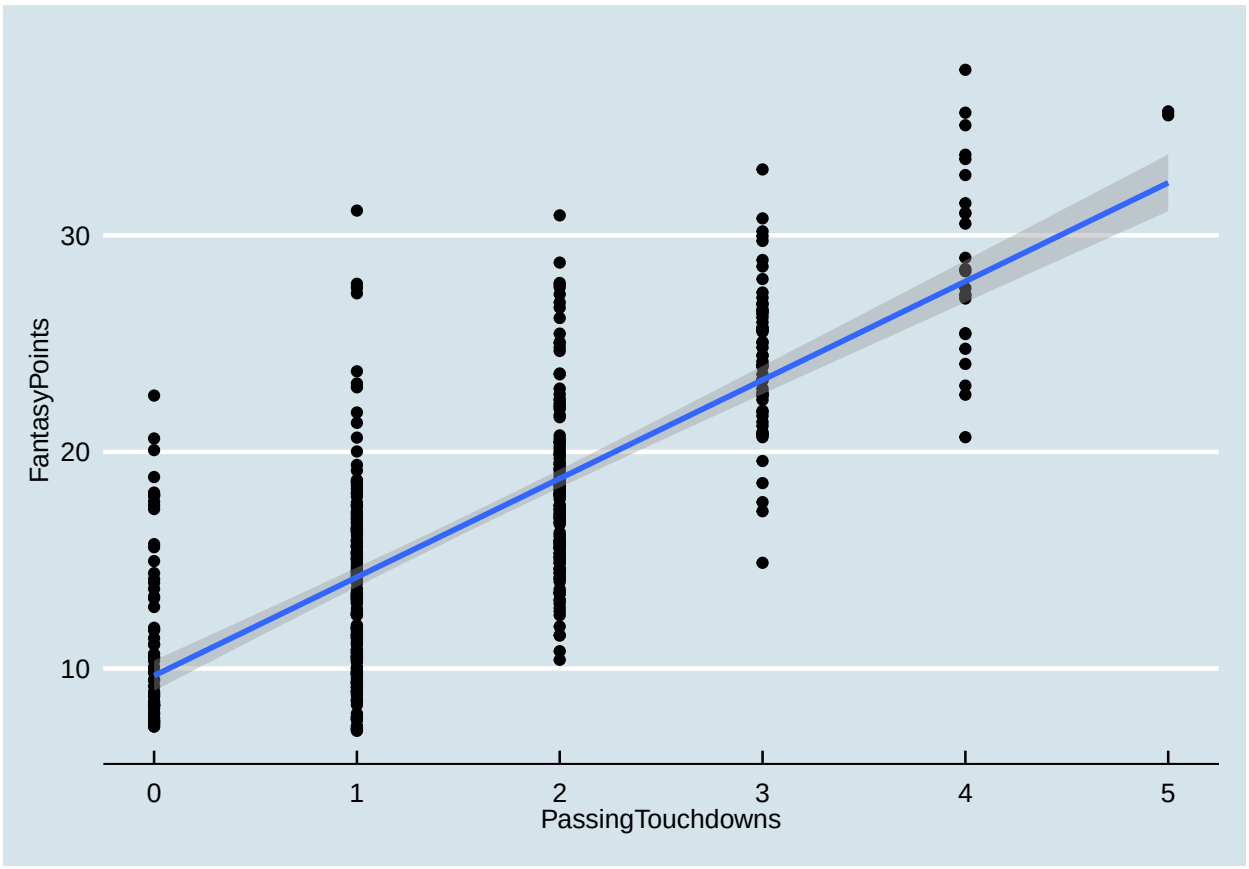

```
QBCrossSectional %>% ggplot(aes(y=FantasyPoints,x=PassingYards)) +
  geom_point()+geom_smooth(method="lm")+
  theme(axis.text.x = element_text(angle=65, vjust=0.6))+theme_economist()
```



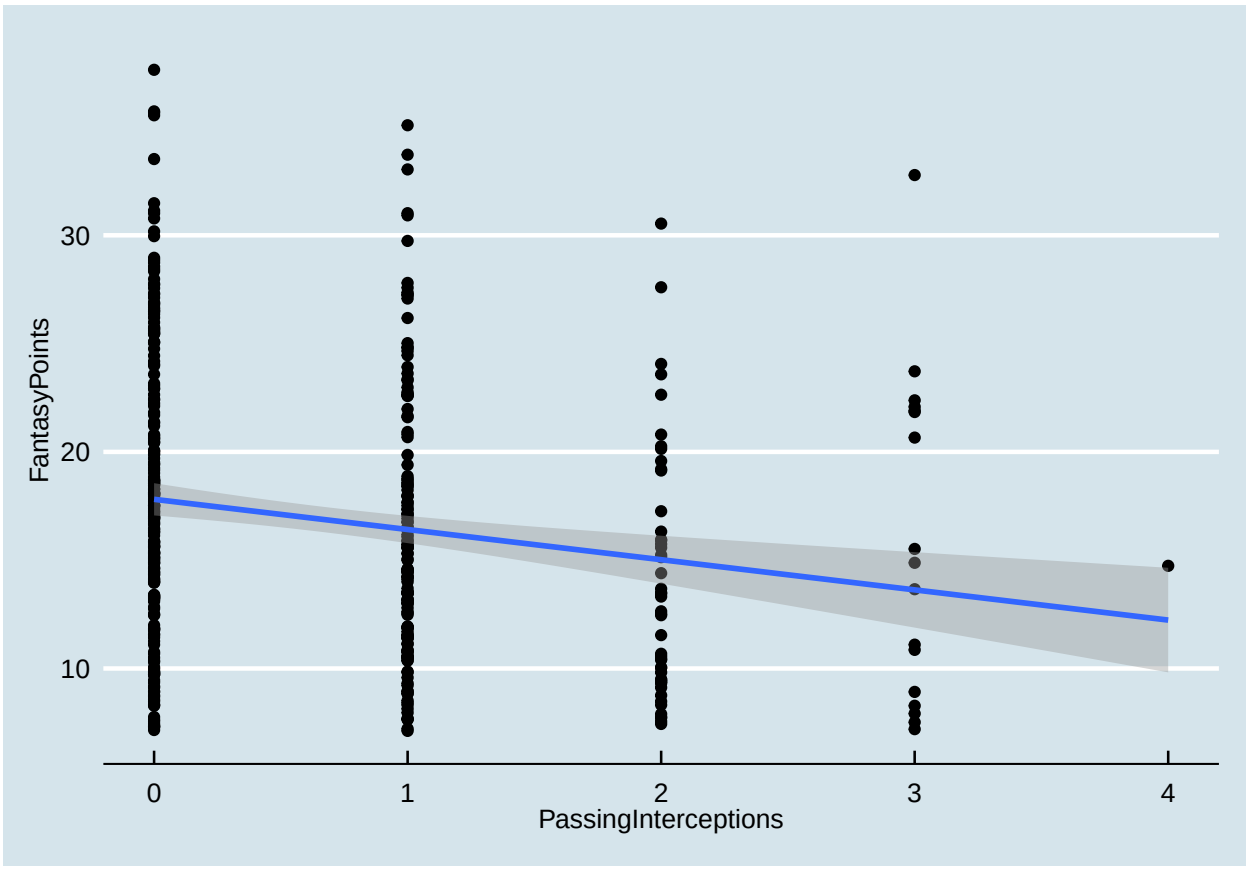

```
QBCrossSectional %>% ggplot(aes(y=FantasyPoints,x=PassingYardsPerAttempt)) +
  geom_point()+geom_smooth(method="lm")+
  theme(axis.text.x = element_text(angle=65, vjust=0.6))+theme_economist()
```



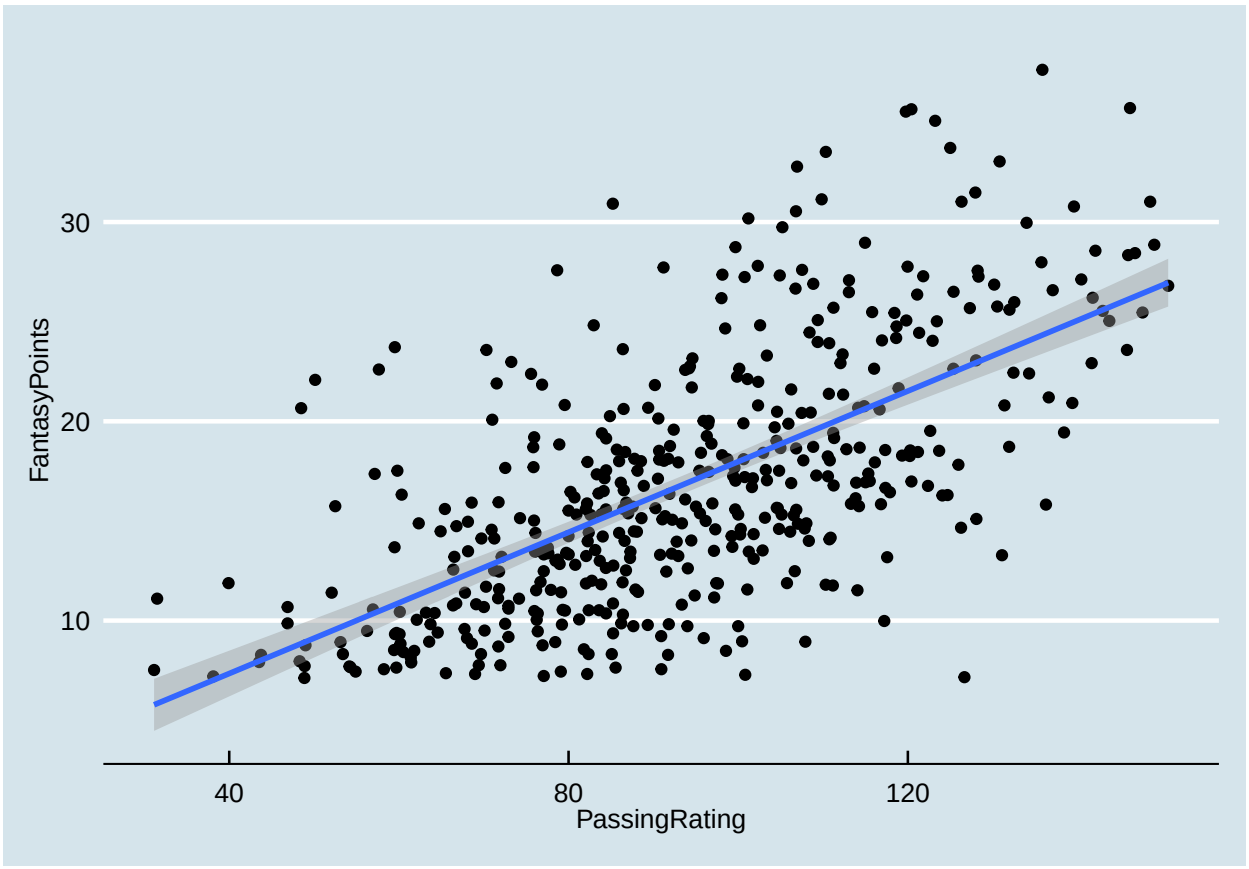

```
QBCrossSectional %>% ggplot(aes(y=FantasyPoints,x=PassingTouchdowns)) +
  geom_point()+geom_smooth(method="lm")+
  theme(axis.text.x = element_text(angle=65, vjust=0.6))+theme_economist()
```



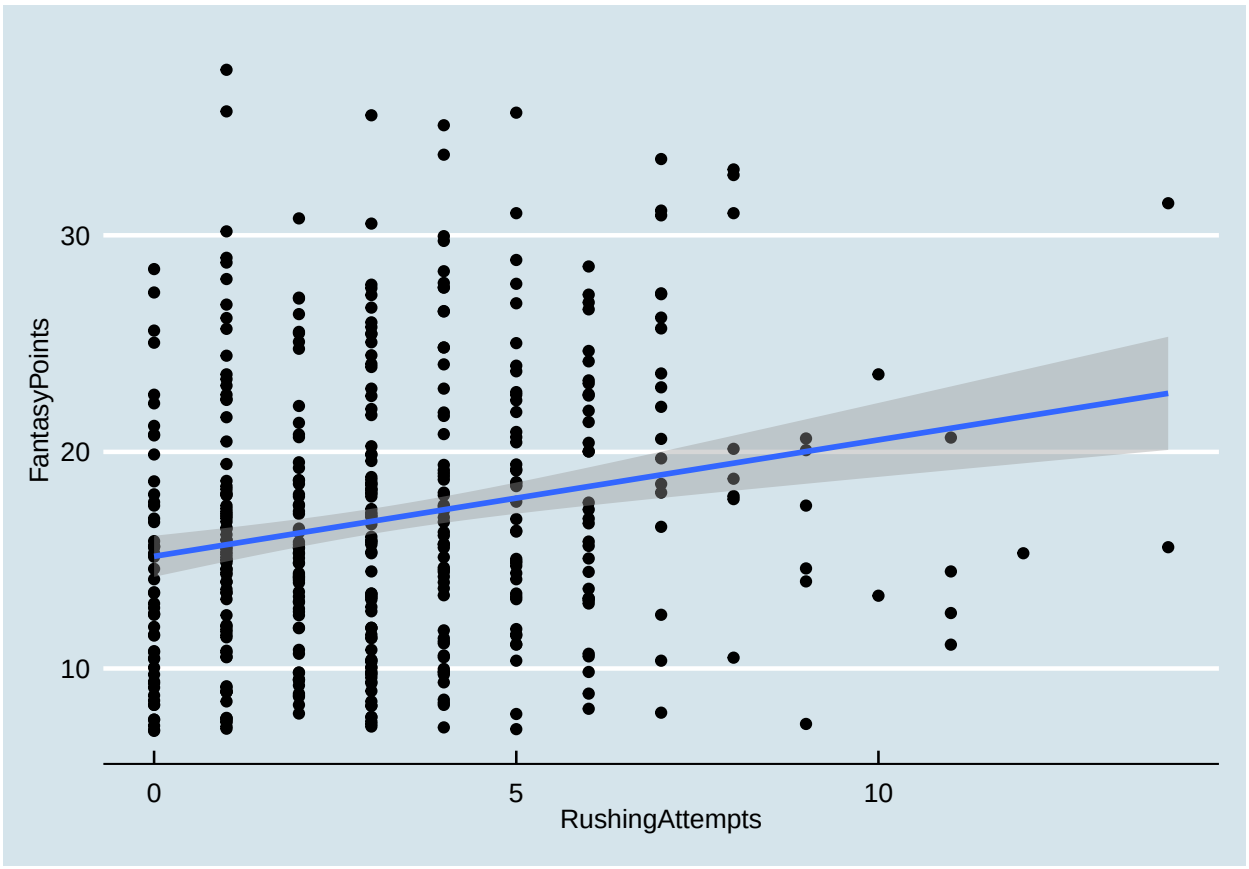

```
QBCrossSectional %>% ggplot(aes(y=FantasyPoints,x=PassingInterceptions)) +
  geom_point()+geom_smooth(method="lm")+
  theme(axis.text.x = element_text(angle=65, vjust=0.6))+theme_economist()
```



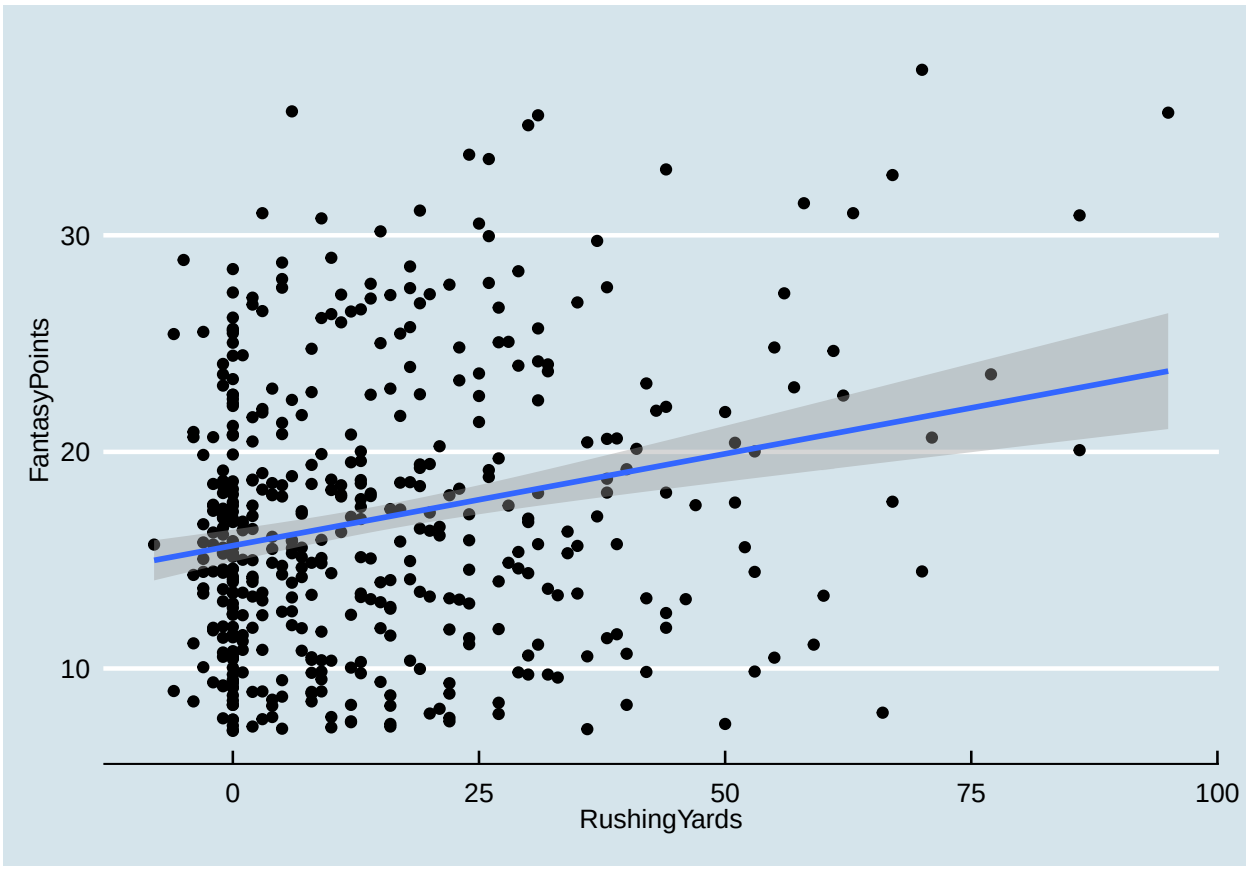

```
QBCrossSectional %>% ggplot(aes(y=FantasyPoints,x=PassingRating)) +
  geom_point()+geom_smooth(method="lm")+
  theme(axis.text.x = element_text(angle=65, vjust=0.6))+theme_economist()
```



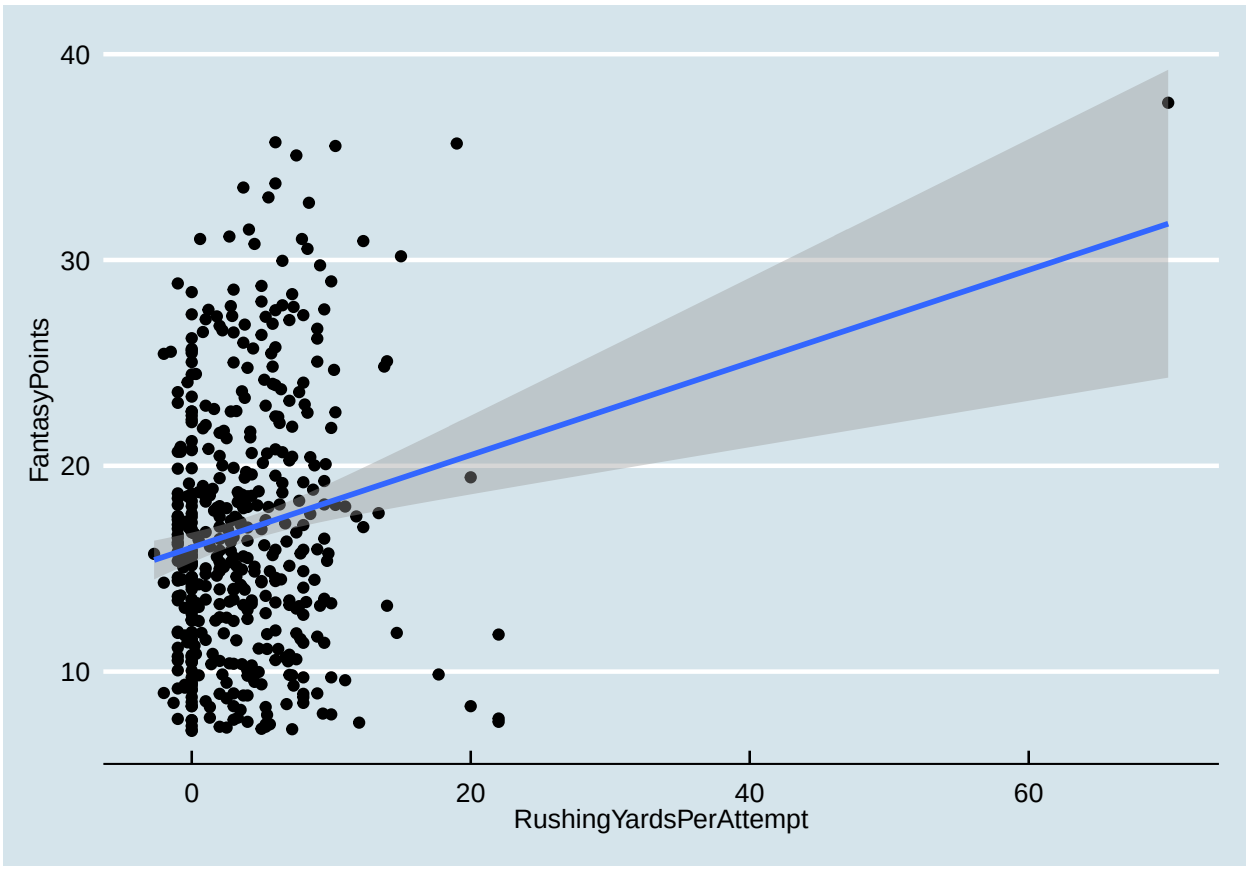

```
QBCrossSectional %>% ggplot(aes(y=FantasyPoints,x=RushingAttempts)) +
  geom_point()+geom_smooth(method="lm")+
  theme(axis.text.x = element_text(angle=65, vjust=0.6))+theme_economist()
```



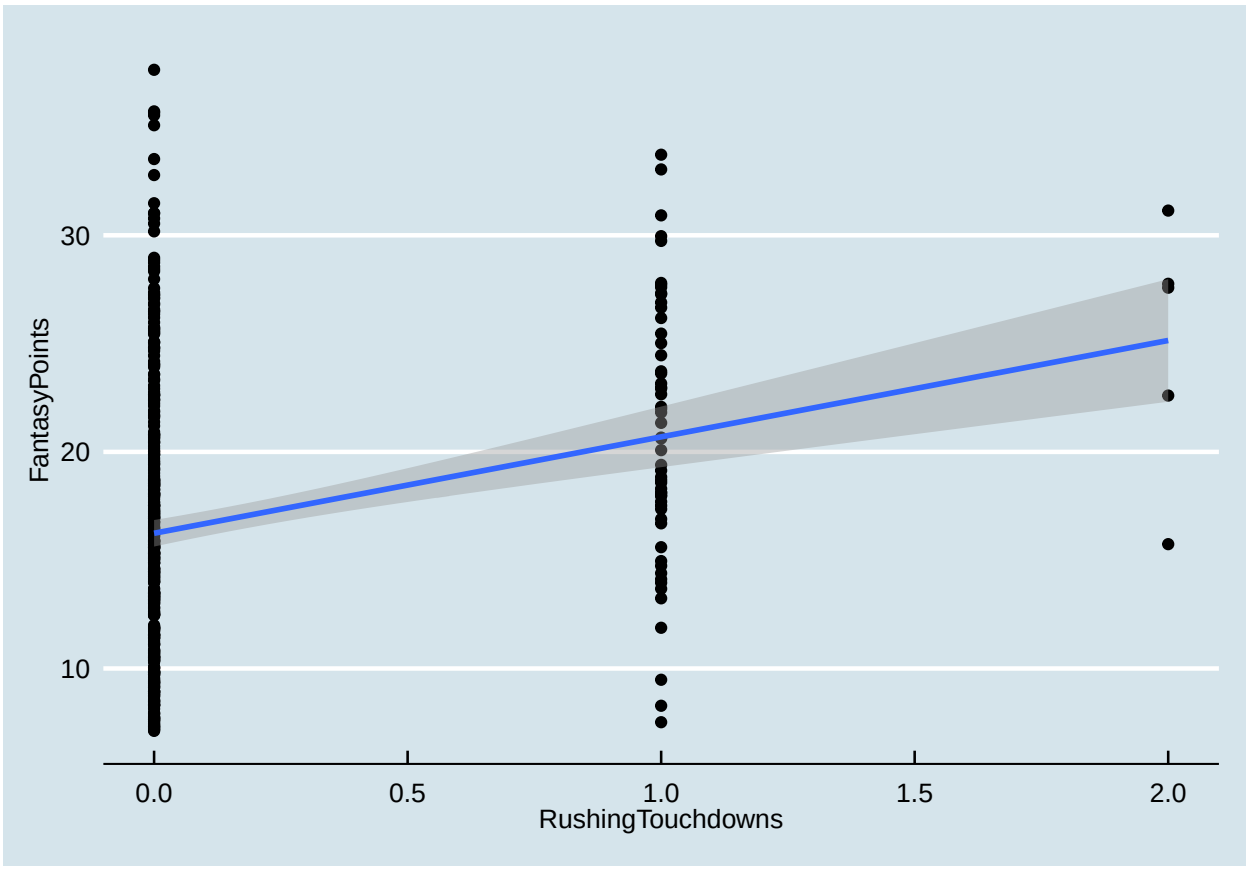

```
QBCrossSectional %>% ggplot(aes(y=FantasyPoints,x=RushingYards)) +
  geom_point()+geom_smooth(method="lm")+
  theme(axis.text.x = element_text(angle=65, vjust=0.6))+theme_economist()
```



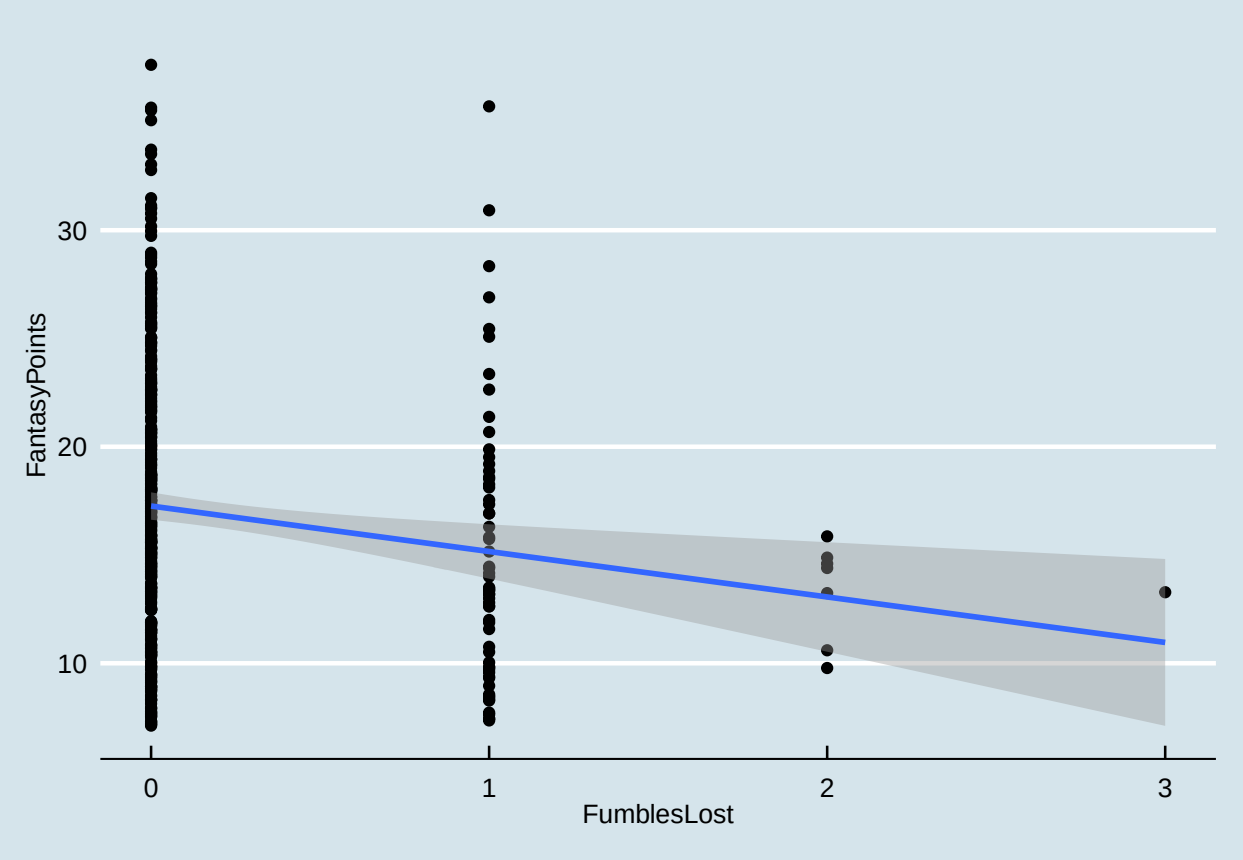

```
QBCrossSectional %>% ggplot(aes(y=FantasyPoints,x=RushingYardsPerAttempt)) +
  geom_point()+geom_smooth(method="lm")+
  theme(axis.text.x = element_text(angle=65, vjust=0.6))+theme_economist()
```




```
QBCrossSectional %>% ggplot(aes(y=FantasyPoints,x=RushingTouchdowns)) +
  geom_point()+geom_smooth(method="lm")+
  theme(axis.text.x = element_text(angle=65, vjust=0.6))+theme_economist()
```




```
QBCrossSectional %>% ggplot(aes(y=FantasyPoints,x=FumblesLost)) +
  geom_point()+geom_smooth(method="lm")+
  theme(axis.text.x = element_text(angle=65, vjust=0.6))+theme_economist()
```


30
20
10
FantasyPoints
0
1
2
3
FumblesLost