muskingum EDA

2025-07-02

```r
library("readr")
library("dplyr")
library("ggplot2")
library("readr")
library("stringr")
library("glue")
```

```r
g <- params$category
singular_game <- readr::read_csv(glue("Desktop/SURA project code/extended_cmu_data/extended_cmu_data_",
```

```
## New names:
## Rows: 22 Columns: 22
## -- Column specification
## -------------------------------------------------------------------------------- Delimiter: "," cl
## (1): LINEUP (NAMES) dbl (20): ...1, NUMBER OF GUARDS, OPPONENT POSSESSIONS, CMU POSSESSIONS, OPPONENT
## CMU PTS, SCORE ... time (1): LINEUP MINUTES
## i Use `spec()` to retrieve the full column specification for this data. i Specify the column types o
## `show_col_types = FALSE` to quiet this message.
## * `` -> `...1`
```

```r
# if negatives in any columns (specifically had problem in possession column)
for (colName in colnames(singular_game)){
  singular_game[[colName]][singular_game[[colName]] < 0] <- 0
}
```

```r
singular_game$`LINEUP MINUTES` <- sapply(singular_game$`LINEUP MINUTES`, function(t){
  parts <- as.integer(strsplit(as.character(t),":")[[1]])
  parts[1]*60 + parts[2]
})
```

```r
singular_game <- singular_game %>% rename('LINEUP SECONDS' = `LINEUP MINUTES`) %>% mutate(LINEUP_SORTED
  if (is.na(l)) return(NA)
  paste(sort(strsplit(l, ", ")[[1]]), collapse = " ")
}))
```

```r
game <- singular_game %>% group_by(`LINEUP_SORTED`) %>% summarise(
    `NUMBER OF GUARDS` = mean(`NUMBER OF GUARDS`),
    `OPPONENT POSSESSIONS` = sum(`OPPONENT POSSESSIONS`, na.rm = TRUE),
    `CMU POSSESSIONS` = sum(`CMU POSSESSIONS`, na.rm = TRUE),
    `LINEUP SECONDS` = sum(`LINEUP SECONDS`, na.rm = TRUE),
    `OPPONENT PTS` = sum(`OPPONENT PTS`, na.rm = TRUE),
    `CMU PTS` = sum(`CMU PTS`, na.rm = TRUE),
    `CMU 3PA` = sum(`CMU 3PA`, na.rm = TRUE),
    `CMU FGA` = sum(`CMU FGA`, na.rm = TRUE),
    `CMU FTA` = sum(`CMU FTA`, na.rm = TRUE),
    `CMU REBOUNDS` = sum(`CMU REBOUNDS`, na.rm = TRUE),
    `TOTAL REBOUNDS` = sum(`TOTAL REBOUNDS`, na.rm = TRUE),
```

```
      `SCORE DIFFERENTIAL WHEN ENTER` = paste(`SCORE DIFFERENTIAL WHEN ENTER`, collapse = ", "),
      `QUARTER` = paste(`QUARTER`, collapse = ", ")
  ) %>%mutate(`PACE` = 40 * ((`CMU POSSESSIONS` + `OPPONENT POSSESSIONS`) / (2 * `LINEUP SECONDS`/60)),
      `OFFENSIVE RATING` = 100 * (`CMU PTS` / `CMU POSSESSIONS`),
      `DEFENSIVE RATING` = 100 * (`OPPONENT PTS` / `OPPONENT POSSESSIONS`),
      `NET RATING` = `OFFENSIVE RATING` - `DEFENSIVE RATING`,
      `3PA/FGA` = `CMU 3PA` / `CMU FGA`,
      `TRUE SHOOTING %` = 100 * (`CMU PTS` / ( 2 * (`CMU FGA` + (0.44* `CMU FTA`)))),
      `TRB%`= 100 * (`CMU REBOUNDS` / `TOTAL REBOUNDS`))
```

```
# see where to score differential cut off time -> SHOULD DO THIS AFTER OR BEFORE CUT SCRAP MINUTES?
ggplot(singular_game, aes(x = `SCORE DIFFERENTIAL WHEN ENTER`)) + stat_ecdf() + geom_vline(xintercept =
```


Score Differential
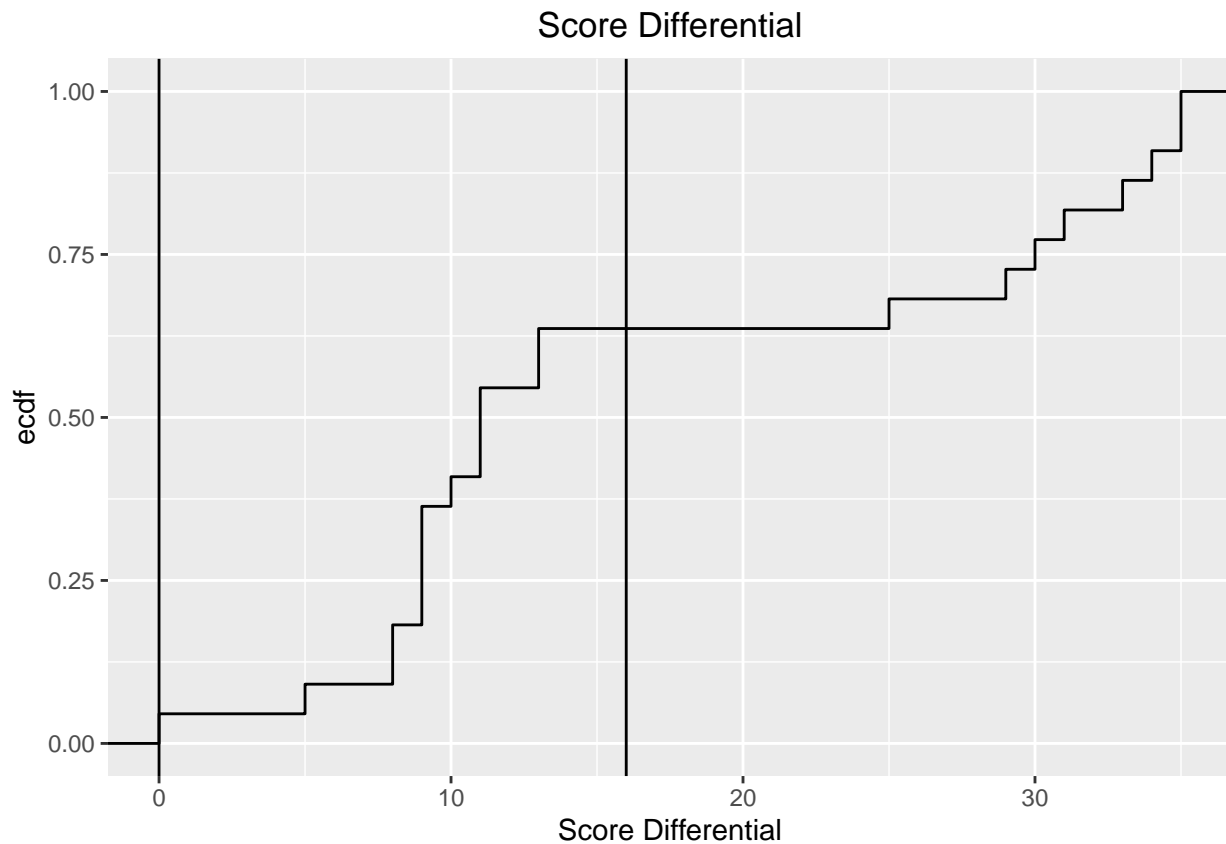
```
quantile(singular_game$`SCORE DIFFERENTIAL WHEN ENTER`,probs=c(0.1,0.9))
```

```
##  10%  90%
##  8.0 33.9
```
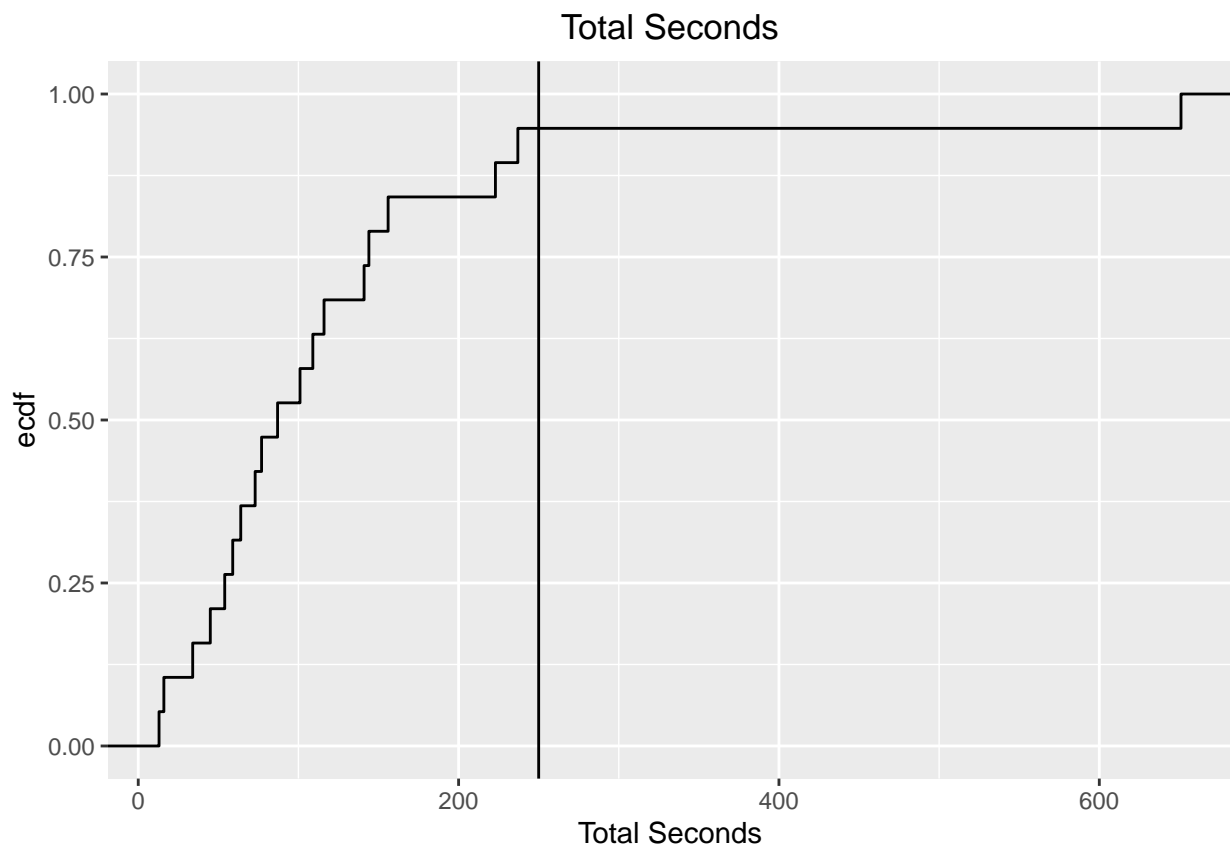
```
#game <- subset(game, !((`SCORE DIFFERENTIAL WHEN ENTER` <= 0 | `SCORE DIFFERENTIAL WHEN ENTER` >= 16)
```

```
# see where to cut time -> SHOULD DO THIS AFTER OR BEFORE CUT SCRAP MINUTES?
ggplot(game, aes(x = `LINEUP SECONDS`)) + stat_ecdf() + geom_vline(xintercept = 250) + labs(title = "To
```

Total Seconds


```r
quantile(game$`LINEUP SECONDS`,probs=c(0.9))
```

```
##    90%
## 225.8
```
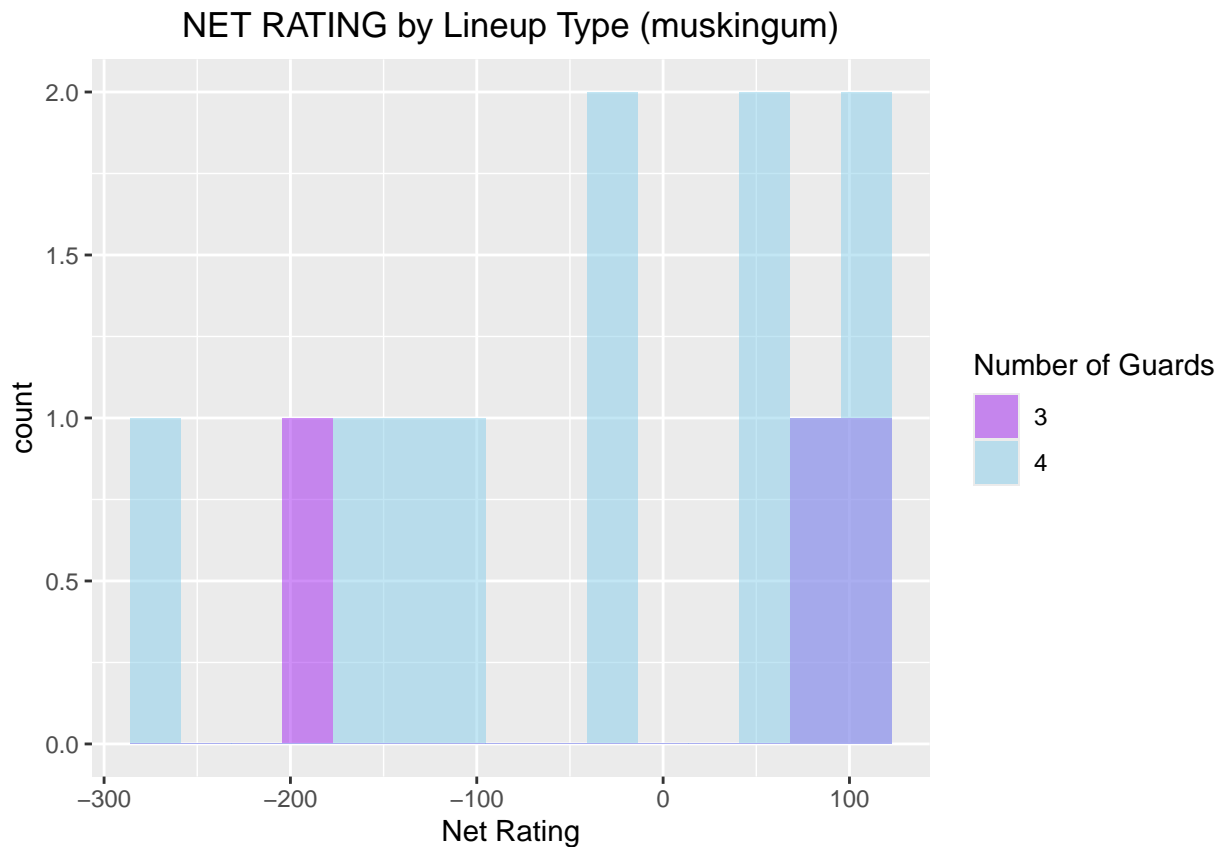
```r
#game <- subset(game, `LINEUP SECONDS` >= 250)

#pdf(file = glue("Desktop/SURA project code/sing_game_EDA/{g}_plot.pdf"), width = 6, height = 5)

t_f <- c("3", "4")

ggplot(data = subset(game, subset = `NUMBER OF GUARDS` %in% t_f), aes(x = `NET RATING`, fill = factor(`
```

```
## Warning: Removed 2 rows containing non-finite outside the scale range (`stat_bin()`).
```

NET RATING by Lineup Type (muskingum)


```
tapply(game$`NET RATING`[game$`NUMBER OF GUARDS` %in% t_f], game$`NUMBER OF GUARDS`[game$`NUMBER OF GUAR
```

```
## $`3`
##       Min.    1st Qu.    Median       Mean   3rd Qu.       Max.
## -200.0000  -54.1667   91.6667    0.5556  100.8333  110.0000
##
## $`4`
##      Min. 1st Qu.  Median     Mean 3rd Qu.     Max.     NA's
## -266.67 -112.50  -16.67  -25.48   75.00  114.77        2
```

```
wilcox.test(`NET RATING` ~ `NUMBER OF GUARDS`, data = subset(game, `NUMBER OF GUARDS` %in% t_f), exact =
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  NET RATING by NUMBER OF GUARDS
## W = 20, p-value = 0.6404
## alternative hypothesis: true location shift is not equal to 0
```

```
ggplot(data = subset(game, subset = `NUMBER OF GUARDS` %in% t_f), aes(x = `TRB%`, fill = factor(`NUMBER
```

```
## Warning: Removed 1 row containing non-finite outside the scale range (`stat_bin()`).
```

TRB% by Lineup Type (muskingum)
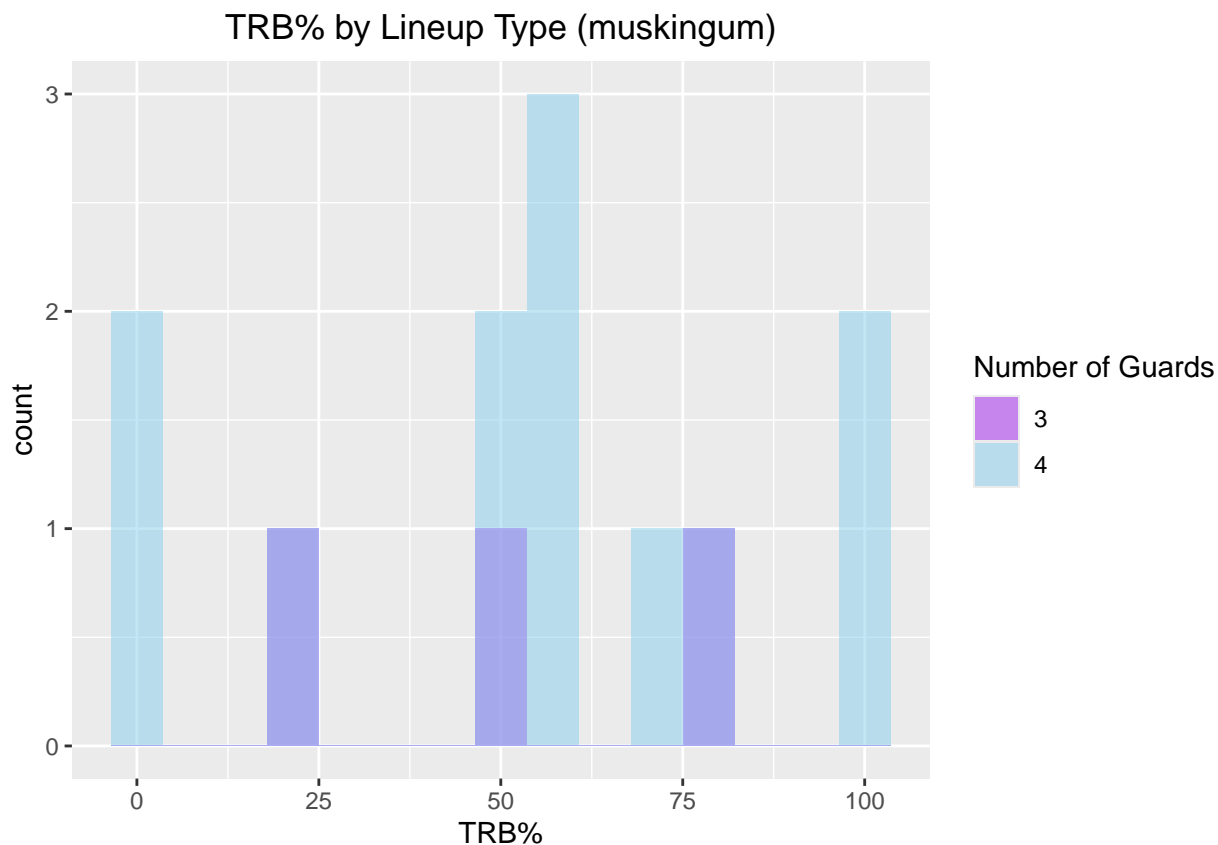

```
tapply(game$`TRB%`[game$`NUMBER OF GUARDS` %in% t_f], game$`NUMBER OF GUARDS`[game$`NUMBER OF GUARDS` %
```
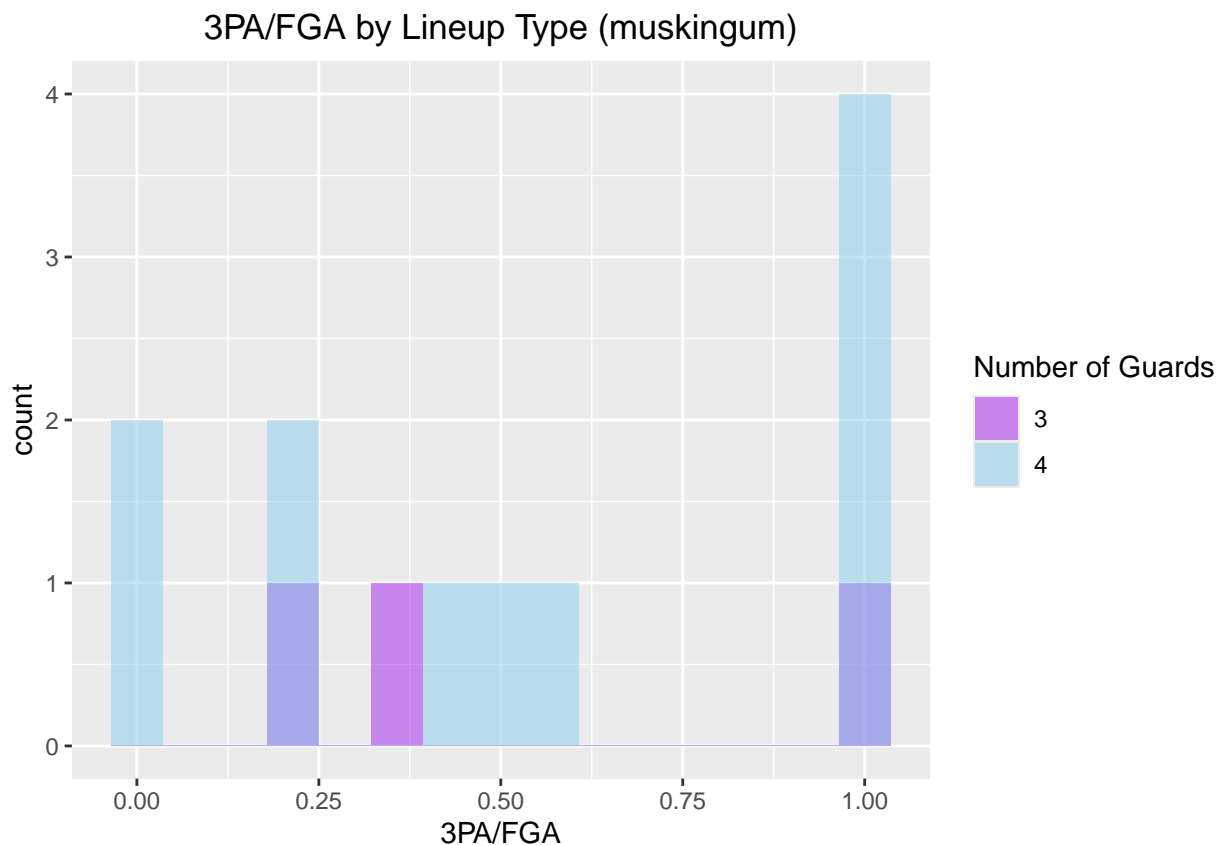
```
## $`3`
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##      20      35      50      50      65      80
##
## $`4`
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.    NA's
##    0.00   42.50   58.57   54.16   74.55  100.00       1
```

```
wilcox.test(`TRB%` ~ `NUMBER OF GUARDS`, data = subset(game, `NUMBER OF GUARDS` %in% t_f), exact = FALS
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  TRB% by NUMBER OF GUARDS
## W = 16, p-value = 0.8272
## alternative hypothesis: true location shift is not equal to 0
```

```
ggplot(data = subset(game, subset = `NUMBER OF GUARDS` %in% t_f), aes(x = `3PA/FGA`, fill = factor(`NUM
```

```
## Warning: Removed 2 rows containing non-finite outside the scale range (`stat_bin()`).
```

3PA/FGA by Lineup Type (muskingum)


```r
tapply(game$`3PA/FGA`[game$`NUMBER OF GUARDS` %in% t_f], game$`NUMBER OF GUARDS`[game$`NUMBER OF GUARDS`
```

```
## $`3`
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##  0.2500  0.2917  0.3333  0.5278  0.6667  1.0000
##
## $`4`
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.    NA's
##  0.0000  0.2321  0.5000  0.5422  1.0000  1.0000       2
```
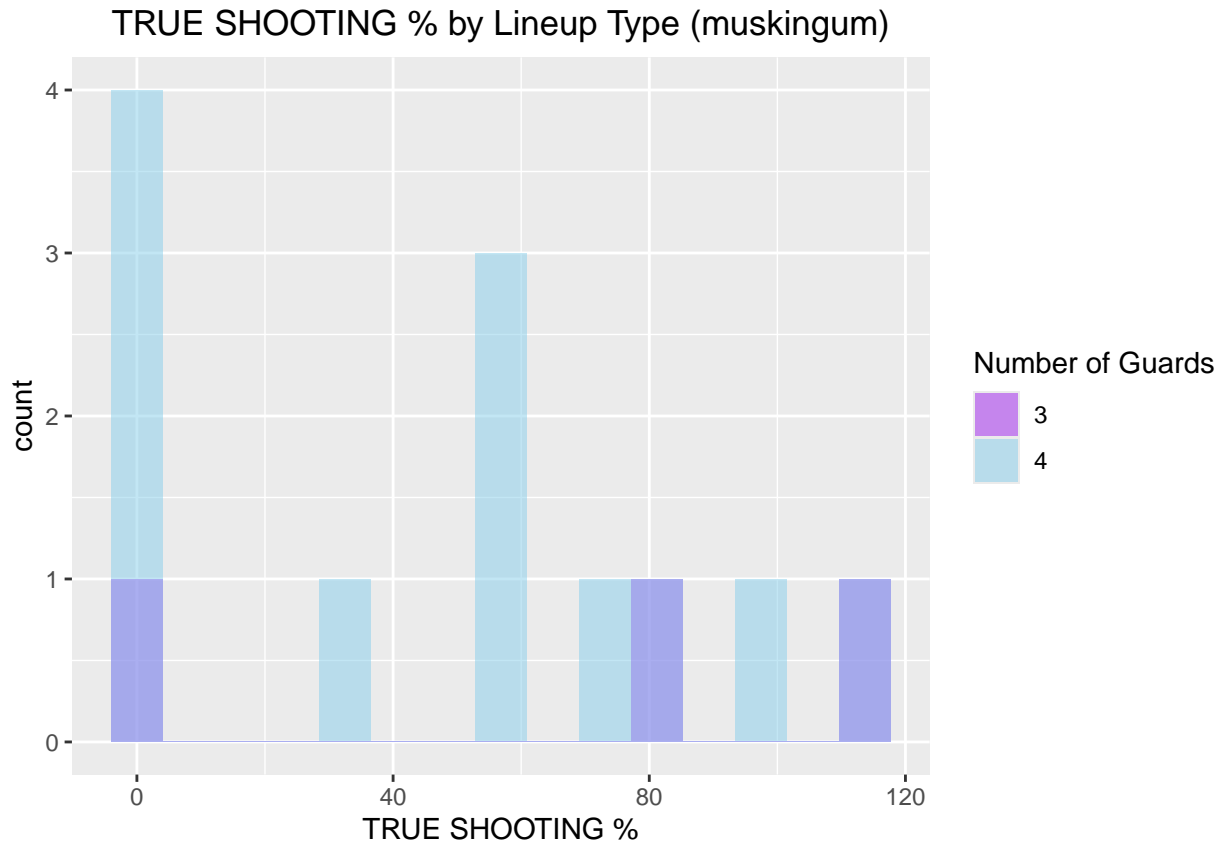
```r
wilcox.test(`3PA/FGA` ~ `NUMBER OF GUARDS`, data = subset(game, `NUMBER OF GUARDS` %in% t_f), exact = F
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  3PA/FGA by NUMBER OF GUARDS
## W = 16.5, p-value = 1
## alternative hypothesis: true location shift is not equal to 0
```

```r
ggplot(data = subset(game, subset = `NUMBER OF GUARDS` %in% t_f), aes(x = `TRUE SHOOTING %`, fill = fact
```

```
## Warning: Removed 1 row containing non-finite outside the scale range (`stat_bin()`).
```

TRUE SHOOTING % by Lineup Type (muskingum)


```
tapply(game$`TRUE SHOOTING %`[game$`NUMBER OF GUARDS` %in% t_f], game$`NUMBER OF GUARDS`[game$`NUMBER OF
```

```
## $`3`
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##    0.00   38.66   77.32   63.27   94.91  112.50
##
## $`4`
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.    NA's
##    0.00    0.00   53.19   47.34   77.86  113.64       1
```

```
wilcox.test(`TRUE SHOOTING %` ~ `NUMBER OF GUARDS`, data = subset(game, `NUMBER OF GUARDS` %in% t_f), ex
```
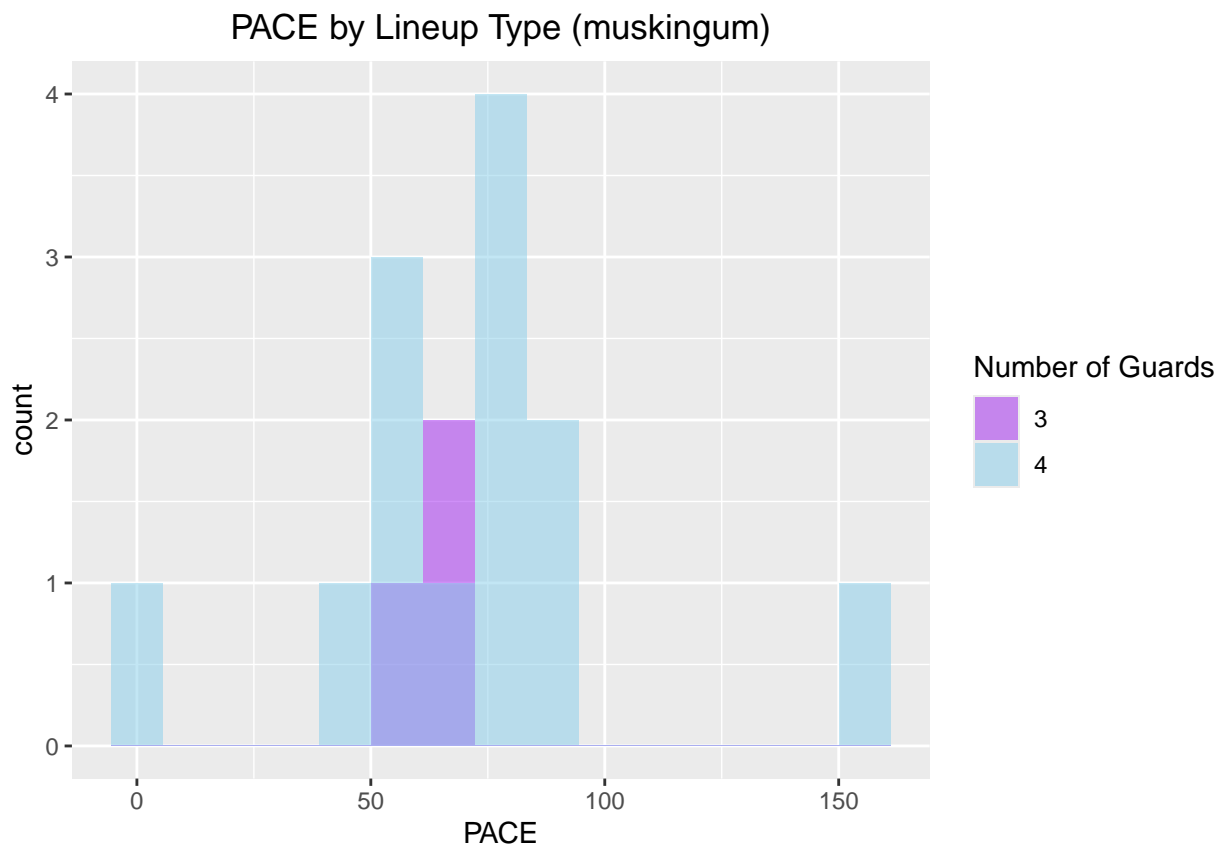
```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  TRUE SHOOTING % by NUMBER OF GUARDS
## W = 22, p-value = 0.6066
## alternative hypothesis: true location shift is not equal to 0
```

```
ggplot(data = subset(game, subset = `NUMBER OF GUARDS` %in% t_f), aes(x = `PACE`, fill = factor(`NUMBER
```

PACE by Lineup Type (muskingum)


```
tapply(game$`PACE`[game$`NUMBER OF GUARDS` %in% t_f], game$`NUMBER OF GUARDS`[game$`NUMBER OF GUARDS` %
```

```
## $`3`
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##   59.57   64.40   69.23   66.46   69.91   70.59
##
## $`4`
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##    0.00   59.19   75.00   72.42   82.76  155.56
```
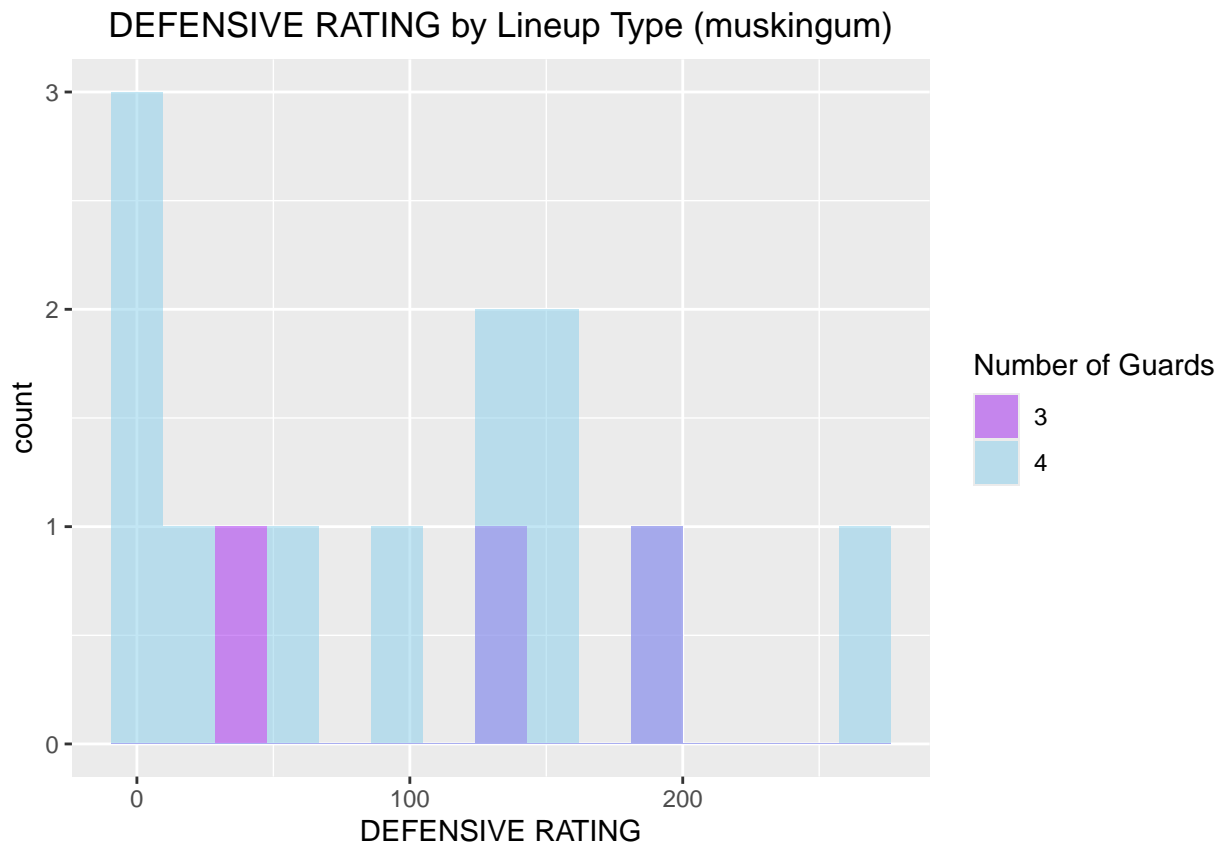
```
wilcox.test(`PACE` ~ `NUMBER OF GUARDS`, data = subset(game, `NUMBER OF GUARDS` %in% t_f), exact = FALSE
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  PACE by NUMBER OF GUARDS
## W = 16, p-value = 0.6865
## alternative hypothesis: true location shift is not equal to 0
```

```
ggplot(data = subset(game, subset = `NUMBER OF GUARDS` %in% t_f), aes(x = `DEFENSIVE RATING`, fill = fac
```

```
## Warning: Removed 1 row containing non-finite outside the scale range (`stat_bin()`).
```

DEFENSIVE RATING by Lineup Type (muskingum)


```
tapply(game$`DEFENSIVE RATING`[game$`NUMBER OF GUARDS` %in% t_f], game$`NUMBER OF GUARDS`[game$`NUMBER (
```

```
## $`3`
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##   40.00   86.67  133.33  124.44  166.67  200.00
##
## $`4`
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.    NA's
##    0.00   17.05  112.50   99.81  150.00  266.67       1
```
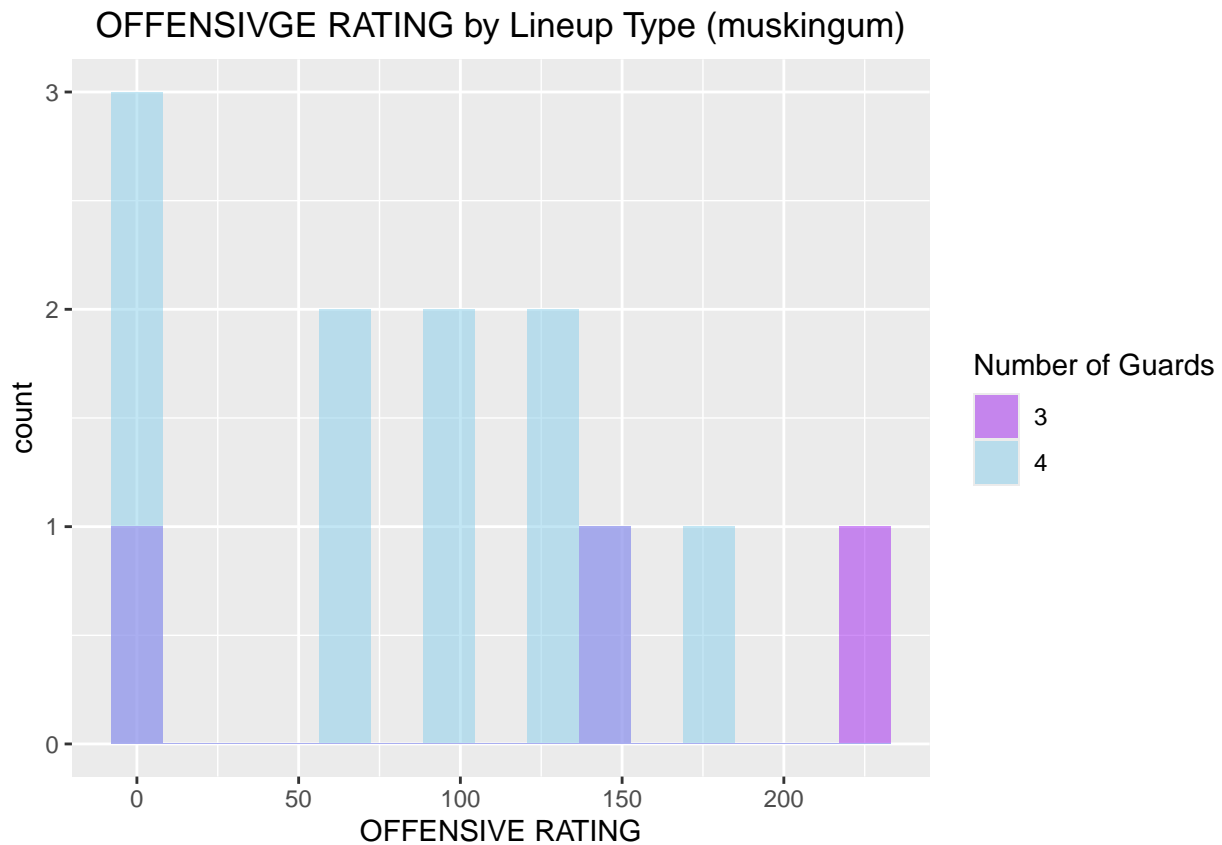
```
wilcox.test(`DEFENSIVE RATING` ~ `NUMBER OF GUARDS`, data = subset(game, `NUMBER OF GUARDS` %in% t_f),
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  DEFENSIVE RATING by NUMBER OF GUARDS
## W = 22, p-value = 0.6112
## alternative hypothesis: true location shift is not equal to 0
```

```
ggplot(data = subset(game, subset = `NUMBER OF GUARDS` %in% t_f), aes(x = `OFFENSIVE RATING`, fill = fac
```

```
## Warning: Removed 2 rows containing non-finite outside the scale range (`stat_bin()`).
```

OFFENSIVGE RATING by Lineup Type (muskingum)


```
tapply(game$`OFFENSIVE RATING`[game$`NUMBER OF GUARDS` %in% t_f], game$`NUMBER
```

```
## $`3`
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##     0.0    75.0   150.0   125.0   187.5   225.0
##
## $`4`
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.    NA's
##    0.00   33.33  100.00   83.41  133.33  180.00       2
```

```
wilcox.test(`OFFENSIVE RATING` ~ `NUMBER OF GUARDS`, data = subset(game, `NUMBER OF GUARDS` %in% t_f),
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  OFFENSIVE RATING by NUMBER OF GUARDS
## W = 22.5, p-value = 0.3849
## alternative hypothesis: true location shift is not equal to 0
```

```
#dev.off()
```