

Find_Best_Number_Players

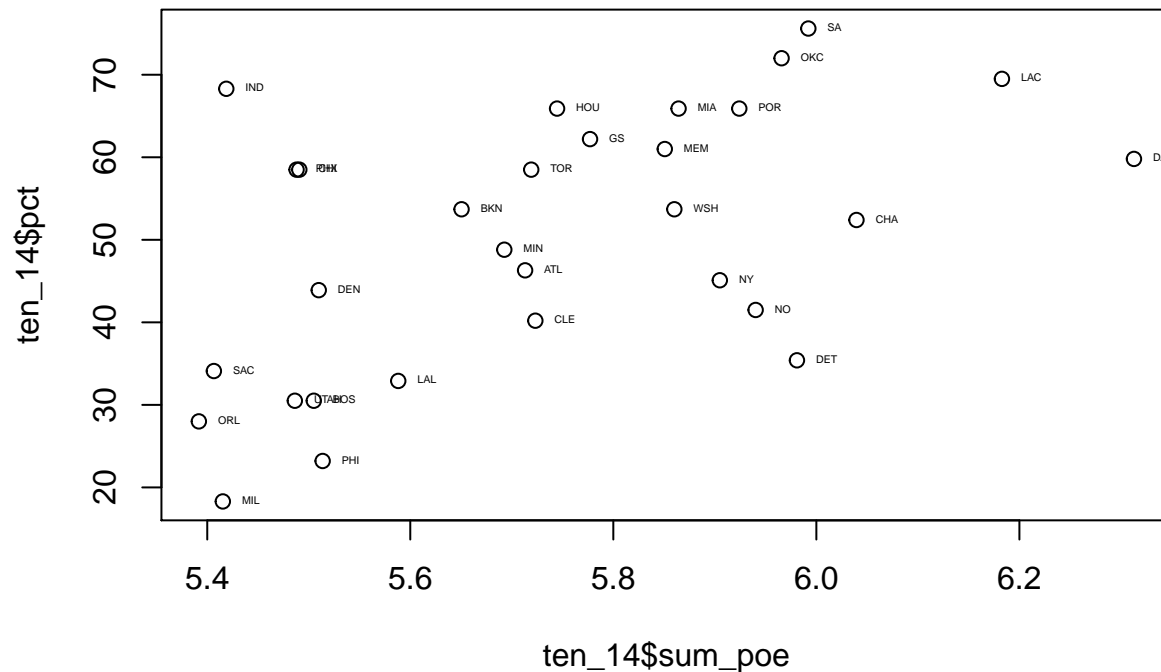
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November 9, 2018

The goal of this session is to find how many players' efficiency combined would be the best correlation between PE_Combined and pct.

```
ten <- read.csv('/home/chenjie/Desktop/Math564Project/POE/10_poe.csv')
nine <- read.csv('/home/chenjie/Desktop/Math564Project/POE/9_poe.csv')
eight <- read.csv('/home/chenjie/Desktop/Math564Project/POE/8_poe.csv')
seven <- read.csv('/home/chenjie/Desktop/Math564Project/POE/7_poe.csv')
six <- read.csv('/home/chenjie/Desktop/Math564Project/POE/6_poe.csv')
five <- read.csv('/home/chenjie/Desktop/Math564Project/POE/5_poe.csv')
four <- read.csv('/home/chenjie/Desktop/Math564Project/POE/4_poe.csv')
three <- read.csv('/home/chenjie/Desktop/Math564Project/POE/3_poe.csv')
two <- read.csv('/home/chenjie/Desktop/Math564Project/POE/2_poe.csv')
one <- read.csv('/home/chenjie/Desktop/Math564Project/POE/1_poe.csv')
```

```
ten$pct <- ten$pct*100
ten_14 <- ten[ten$season == 2014,]
plot(ten_14$sum_poe, ten_14$pct) + text(ten_14$pct ~ ten_14$sum_poe, labels=ten_14$team, data=ten_14, cex=0.5)
```



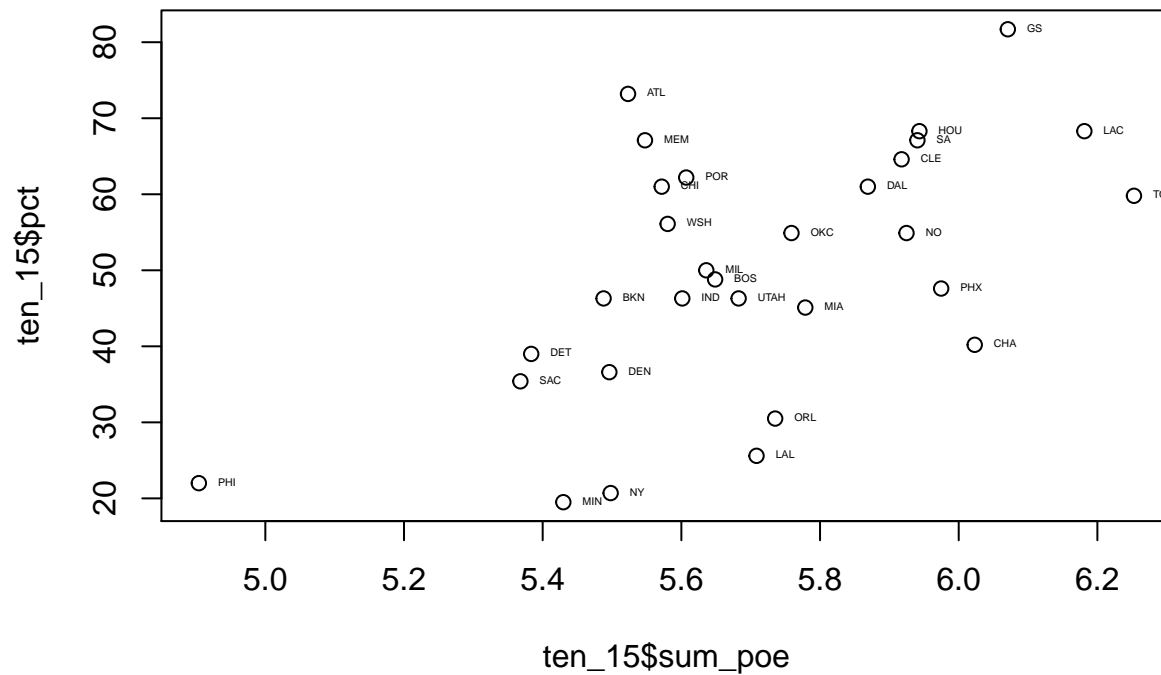
```
## integer(0)
ten_md_14 <- lm(ten_14$pct ~ ten_14$sum_poe)
summary(ten_md_14)
```

```
##
## Call:
## lm(formula = ten_14$pct ~ ten_14$sum_poe)
```

```
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -23.0001 -10.5974  -0.1634  10.4317  29.1020
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -145.91      58.76  -2.483   0.0193 *
## ten_14$sum_poe    34.16     10.24   3.337   0.0024 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 13.56 on 28 degrees of freedom
## Multiple R-squared:  0.2846, Adjusted R-squared:  0.259
## F-statistic: 11.14 on 1 and 28 DF,  p-value: 0.0024
```

```
ten_15 <- ten[ten$season == 2015,]
```

```
plot(ten_15$sum_poe,ten_15$pct)+text(ten_15$pct ~ ten_15$sum_poe, labels=ten_15$team,data=ten_15, cex=0
```



```
## integer(0)
```

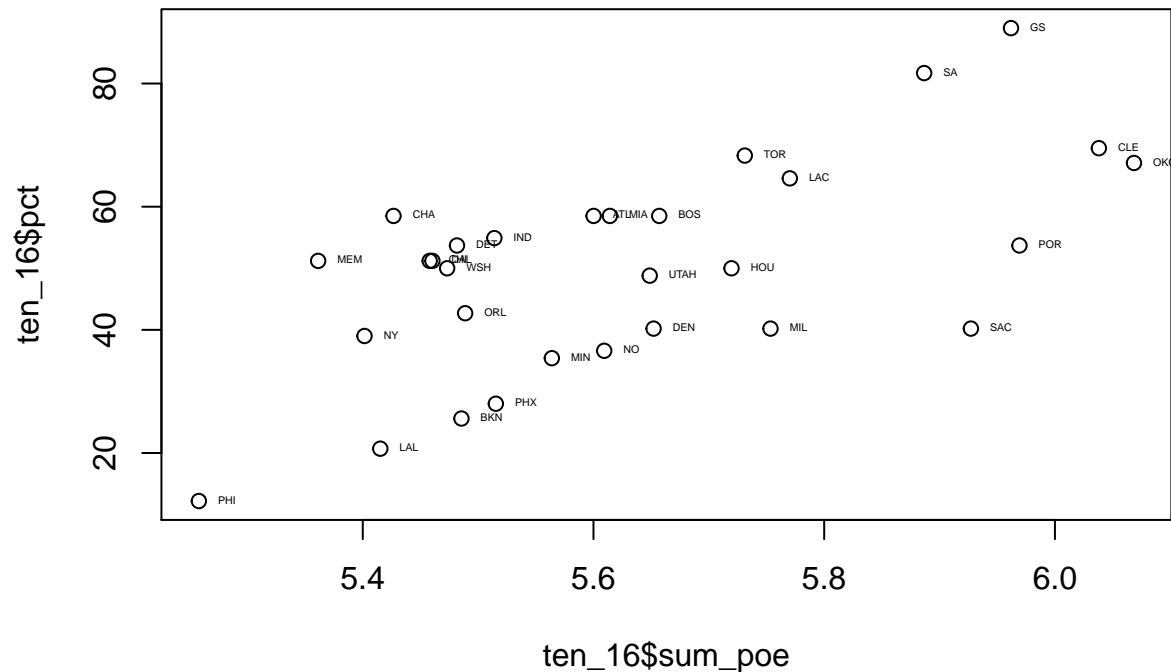
```
ten_md_15 <- lm(ten_15$pct ~ ten_15$sum_poe)
summary(ten_md_15)
```

```
##
## Call:
## lm(formula = ten_15$pct ~ ten_15$sum_poe)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -24.6320  -7.2465   0.0684   8.7796  29.0790
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
##
```

```
## (Intercept)    -138.013      52.445   -2.632   0.01367 *
## ten_15$sum_poe  32.977       9.188    3.589   0.00125 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 13.82 on 28 degrees of freedom
## Multiple R-squared:  0.3151, Adjusted R-squared:  0.2906
## F-statistic: 12.88 on 1 and 28 DF,  p-value: 0.001249
```

```
ten_16 <- ten[ten$season == 2016,]
```

```
plot(ten_16$sum_poe,ten_16$pct)+text(ten_16$pct ~ ten_16$sum_poe, labels=ten_16$team,data=ten_16, cex=0
```



```
## integer(0)
```

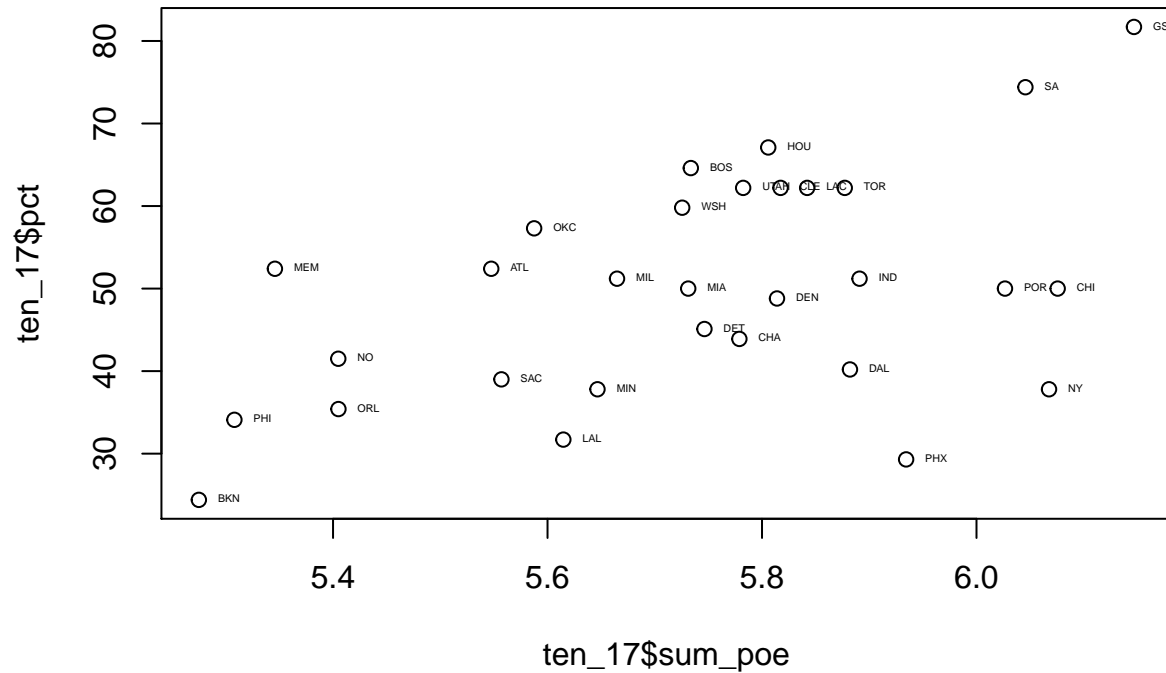
```
ten_md_16 <- lm(ten_16$pct ~ ten_16$sum_poe)
summary(ten_md_16)
```

```
##
## Call:
## lm(formula = ten_16$pct ~ ten_16$sum_poe)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -24.3382 -12.1013  -0.0601   9.9100  22.7575
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -226.00      66.40  -3.404 0.002022 **
## ten_16$sum_poe   49.02     11.78   4.160 0.000273 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 13.55 on 28 degrees of freedom
## Multiple R-squared:  0.3819, Adjusted R-squared:  0.3599
```

```
## F-statistic: 17.3 on 1 and 28 DF, p-value: 0.0002735
```

```
ten_17 <- ten[ten$season == 2017,]
```

```
plot(ten_17$sum_poe,ten_17$pct)+text(ten_17$pct ~ ten_17$sum_poe, labels=ten_17$team,data=ten_17, cex=0
```



```
## integer(0)
```

```
ten_md_17 <- lm(ten_17$pct ~ ten_17$sum_poe)
```

```
summary(ten_md_17)
```

```
##
```

```
## Call:
```

```
## lm(formula = ten_17$pct ~ ten_17$sum_poe)
```

```
##
```

```
## Residuals:
```

```
##      Min       1Q   Median       3Q      Max
```

```
## -26.334  -8.020  -1.529   10.049   20.027
```

```
##
```

```
## Coefficients:
```

```
##              Estimate Std. Error t value Pr(>|t|)
```

```
## (Intercept)  -113.033     55.035  -2.054  0.04943 *
```

```
## ten_17$sum_poe   28.422      9.587   2.965  0.00613 **
```

```
## ---
```

```
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

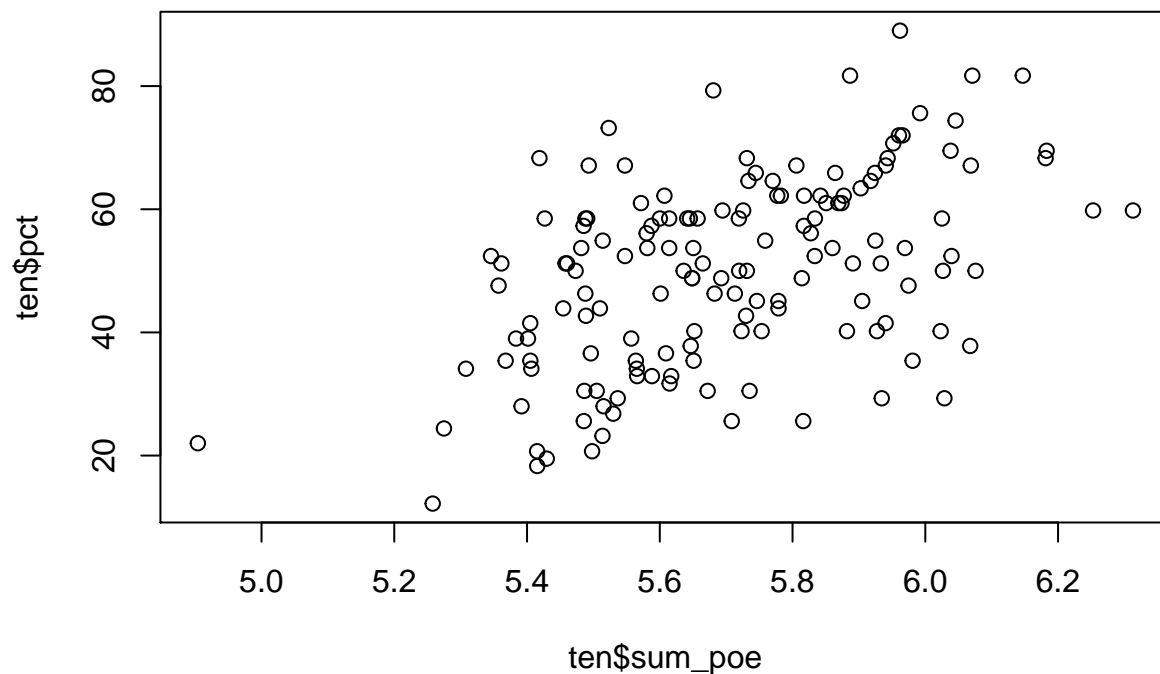
```
##
```

```
## Residual standard error: 12.11 on 28 degrees of freedom
```

```
## Multiple R-squared:  0.2389, Adjusted R-squared:  0.2117
```

```
## F-statistic: 8.789 on 1 and 28 DF, p-value: 0.006129
```

```
plot(ten$sum_poe,ten$pct)
```

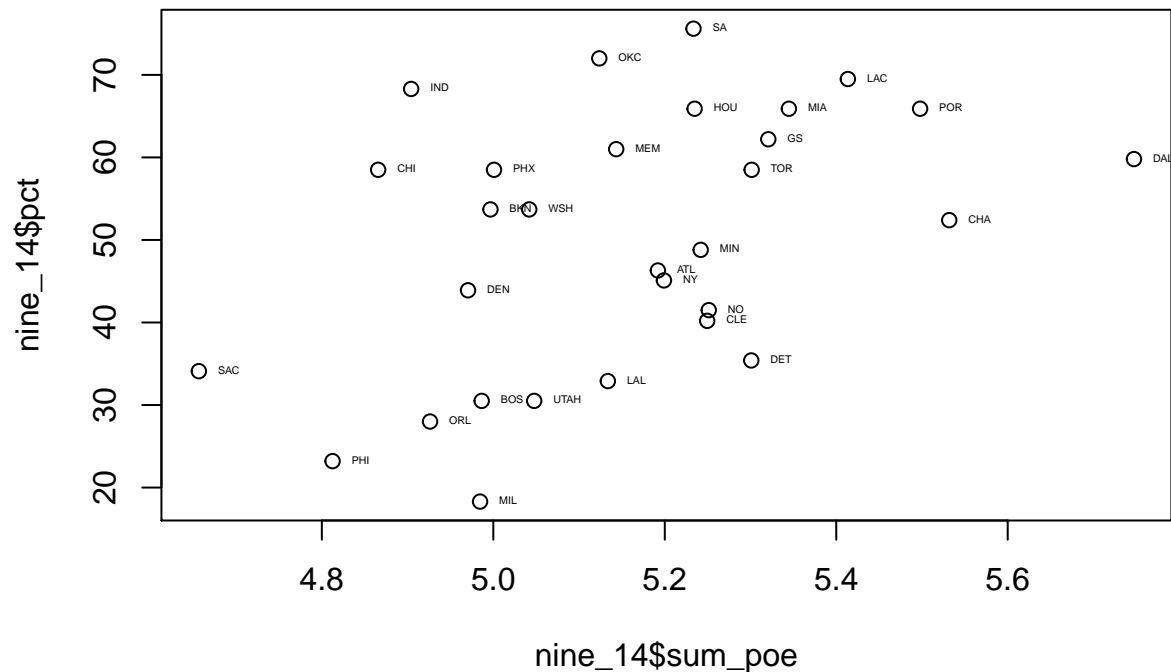


```
ten_md <- lm(ten$pct ~ ten$sum_poe)
summary(ten_md)
```

```
##
## Call:
## lm(formula = ten$pct ~ ten$sum_poe)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -31.3981 -10.4419   0.5731  10.0537  30.4960
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  -137.120     26.797  -5.117 9.49e-07 ***
## ten$sum_poe   32.812       4.695   6.989 8.81e-11 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 13.37 on 148 degrees of freedom
## Multiple R-squared:  0.2481, Adjusted R-squared:  0.243
## F-statistic: 48.84 on 1 and 148 DF, p-value: 8.812e-11
```

Nine Players:

```
nine$pct <- nine$pct*100
nine_14 <- nine[nine$season == 2014,]
plot(nine_14$sum_poe,nine_14$pct)+text(nine_14$pct ~ nine_14$sum_poe, labels=nine_14$team,data=nine_14,
```



```
## integer(0)
```

```
nine_md_14 <- lm(nine_14$pct ~ nine_14$sum_poe)
summary(nine_md_14)
```

```
##
```

```
## Call:
```

```
## lm(formula = nine_14$pct ~ nine_14$sum_poe)
```

```
##
```

```
## Residuals:
```

```
##      Min       1Q   Median       3Q      Max
## -26.5879 -12.3210  -0.7581  11.0652  25.8228
```

```
##
```

```
## Coefficients:
```

```
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -104.60     59.54  -1.757   0.0899 .
## nine_14$sum_poe    29.99     11.54   2.599   0.0147 *
```

```
## ---
```

```
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
##
```

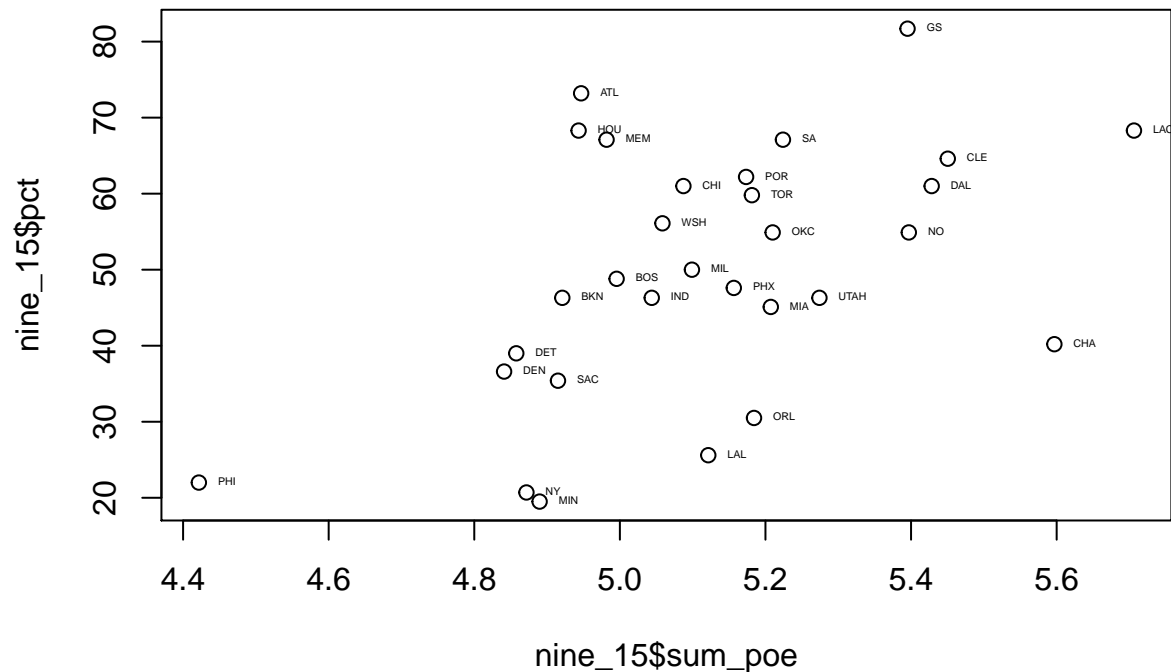
```
## Residual standard error: 14.39 on 28 degrees of freedom
```

```
## Multiple R-squared:  0.1944, Adjusted R-squared:  0.1656
```

```
## F-statistic: 6.755 on 1 and 28 DF,  p-value: 0.01475
```

```
nine_15 <- nine[nine$season == 2015,]
```

```
plot(nine_15$sum_poe,nine_15$pct)+text(nine_15$pct ~ nine_15$sum_poe, labels=nine_15$team,data=nine_15,
```



```
## integer(0)
```

```
nine_md_15 <- lm(nine_15$pct ~ nine_15$sum_poe)
summary(nine_md_15)
```

```
##
```

```
## Call:
```

```
## lm(formula = nine_15$pct ~ nine_15$sum_poe)
```

```
##
```

```
## Residuals:
```

```
##      Min       1Q   Median       3Q      Max
## -24.6017  -7.3182   0.3683   7.9555  28.5422
```

```
##
```

```
## Coefficients:
```

```
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -108.63     53.87  -2.017  0.05342 .
## nine_15$sum_poe   30.99     10.51   2.948  0.00638 **
```

```
## ---
```

```
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
##
```

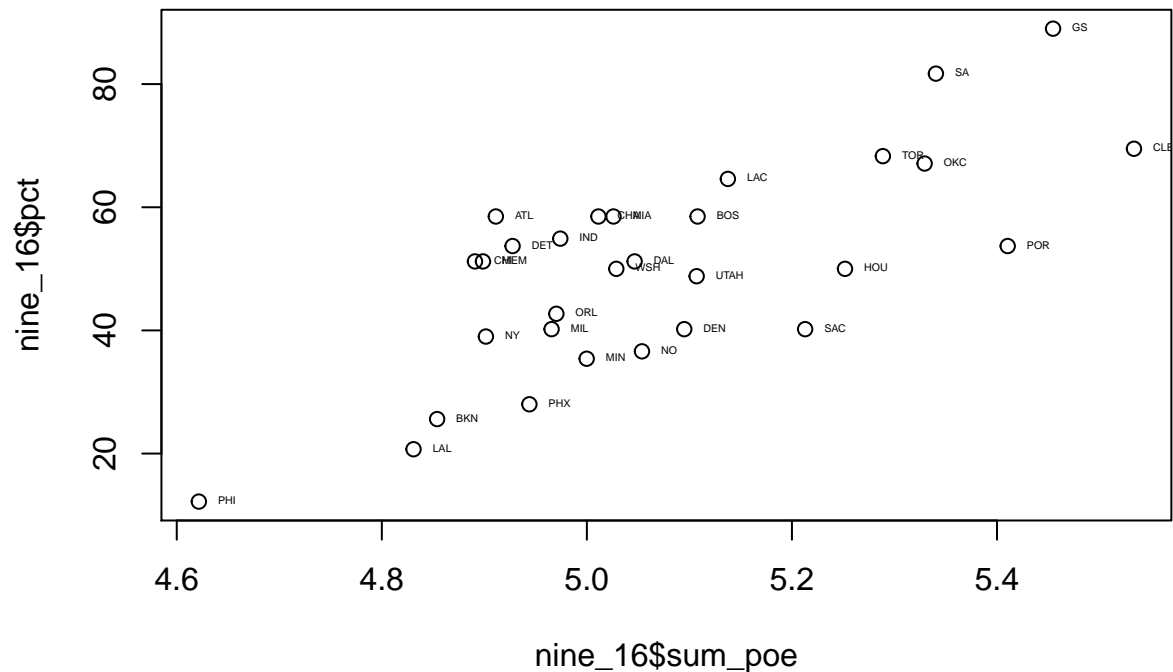
```
## Residual standard error: 14.59 on 28 degrees of freedom
```

```
## Multiple R-squared:  0.2369, Adjusted R-squared:  0.2097
```

```
## F-statistic: 8.693 on 1 and 28 DF,  p-value: 0.00638
```

```
nine_16 <- nine[nine$season == 2016,]
```

```
plot(nine_16$sum_poe,nine_16$pct)+text(nine_16$pct ~ nine_16$sum_poe, labels=nine_16$team,data=nine_16,
```



```
## integer(0)
```

```
nine_md_16 <- lm(nine_16$pct ~ nine_16$sum_poe)
summary(nine_md_16)
```

```
##
```

```
## Call:
```

```
## lm(formula = nine_16$pct ~ nine_16$sum_poe)
```

```
##
```

```
## Residuals:
```

```
##      Min       1Q   Median       3Q      Max
## -18.4799 -10.8693  0.3306  11.1501  18.2782
```

```
##
```

```
## Coefficients:
```

```
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -260.29     52.79   -4.931 3.35e-05 ***
## nine_16$sum_poe    61.19     10.40    5.883 2.51e-06 ***
```

```
## ---
```

```
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
##
```

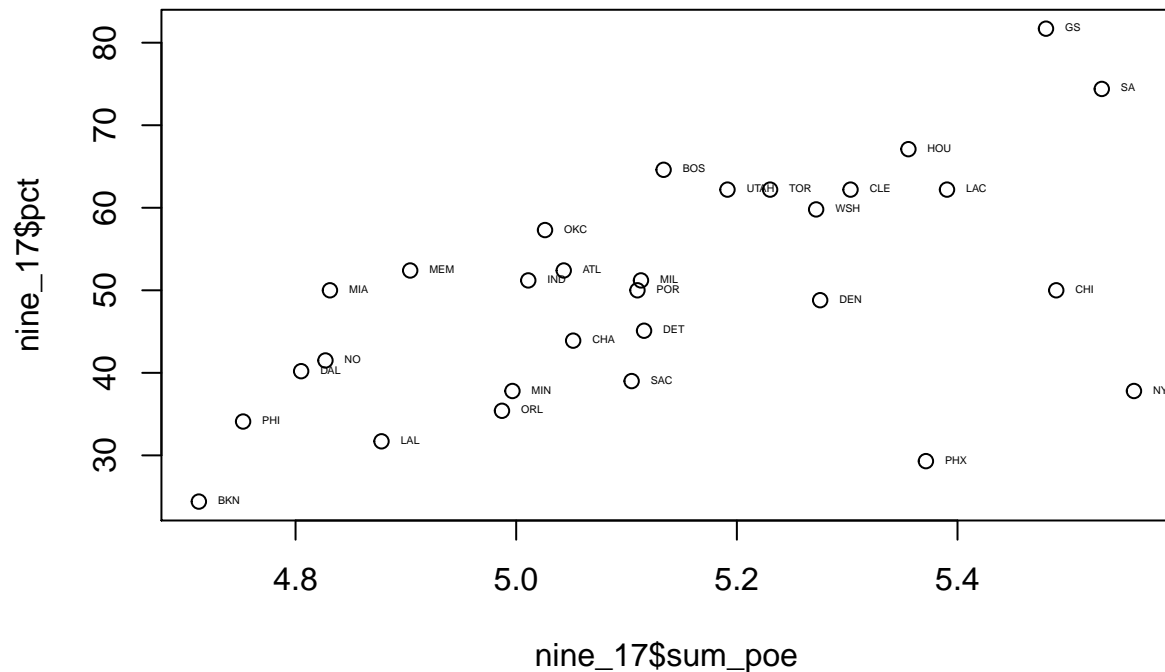
```
## Residual standard error: 11.52 on 28 degrees of freedom
```

```
## Multiple R-squared:  0.5528, Adjusted R-squared:  0.5368
```

```
## F-statistic: 34.61 on 1 and 28 DF,  p-value: 2.51e-06
```

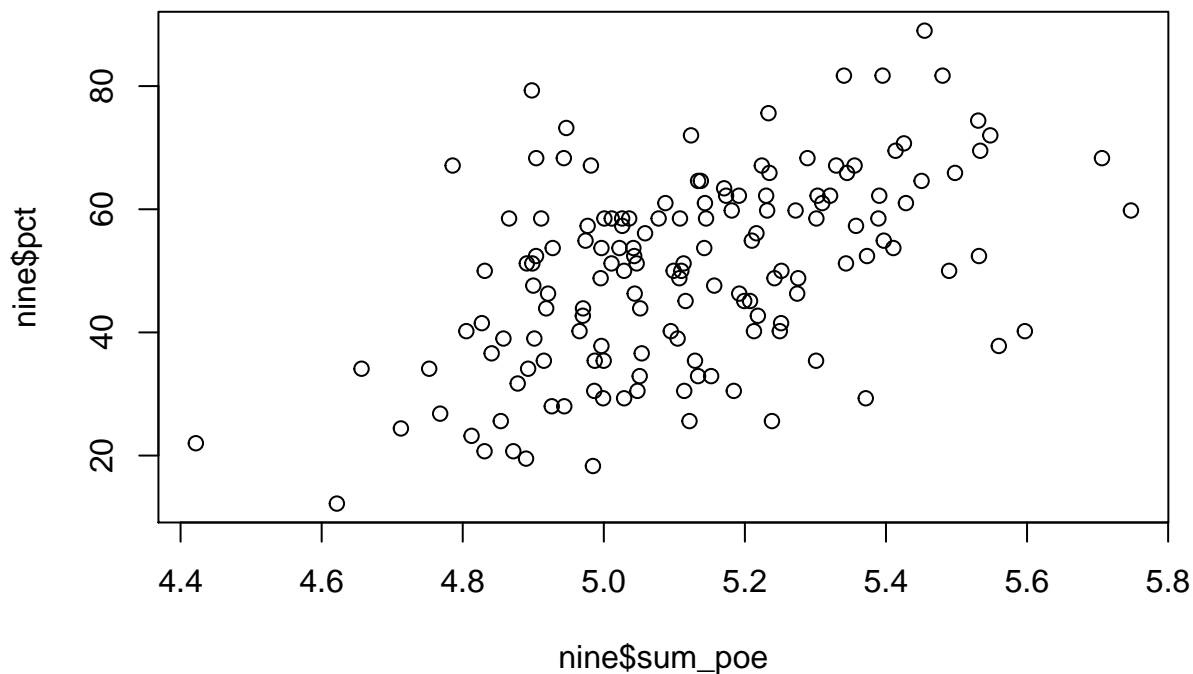
```
nine_17 <- nine[nine$season == 2017,]
```

```
plot(nine_17$sum_poe,nine_17$pct)+text(nine_17$pct ~ nine_17$sum_poe, labels=nine_17$team,data=nine_17,
```

```
## integer(0)
nine_md_17 <- lm(nine_17$pct ~ nine_17$sum_poe)
summary(nine_md_17)

##
## Call:
## lm(formula = nine_17$pct ~ nine_17$sum_poe)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -28.466  -7.461   1.417   9.369  20.453
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -114.01     45.90  -2.484  0.01924 *
## nine_17$sum_poe    31.98      8.94   3.577  0.00129 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 11.5 on 28 degrees of freedom
## Multiple R-squared:  0.3137, Adjusted R-squared:  0.2892
## F-statistic: 12.8 on 1 and 28 DF, p-value: 0.001289
plot(nine$sum_poe,nine$pct)
```

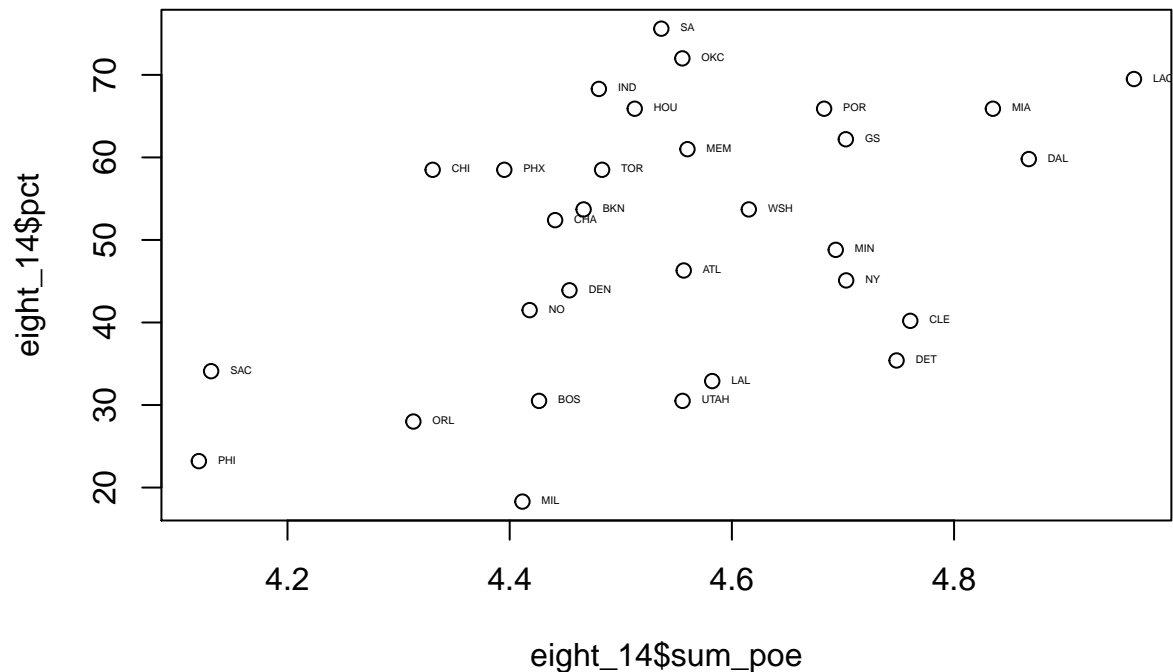


```
nine_md_10 <- lm(nine$pct ~ nine$sum_poe)
summary(nine_md_10)
```

```
##
## Call:
## lm(formula = nine$pct ~ nine$sum_poe)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -29.312 -10.008   0.935   9.682  36.939
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  -125.784     24.795  -5.073 1.16e-06 ***
## nine$sum_poe   34.329      4.838   7.096 4.94e-11 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 13.32 on 148 degrees of freedom
## Multiple R-squared:  0.2539, Adjusted R-squared:  0.2488
## F-statistic: 50.36 on 1 and 148 DF, p-value: 4.944e-11
```

Eight players:

```
eight$pct <- eight$pct*100
eight_14 <- eight[eight$season == 2014,]
plot(eight_14$sum_poe,eight_14$pct)+text(eight_14$pct ~ eight_14$sum_poe, labels=eight_14$team,data=eight_14)
```



```
## integer(0)
```

```
eight_md_14 <- lm(eight_14$pct ~ eight_14$sum_poe)
summary(eight_md_14)
```

```
##
```

```
## Call:
```

```
## lm(formula = eight_14$pct ~ eight_14$sum_poe)
```

```
##
```

```
## Residuals:
```

```
##      Min       1Q   Median       3Q      Max
## -27.052 -11.543  -0.105   10.566   25.839
```

```
##
```

```
## Coefficients:
```

```
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -110.22     62.45  -1.765   0.0885 .
## eight_14$sum_poe    35.27     13.73   2.568   0.0159 *
```

```
## ---
```

```
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
##
```

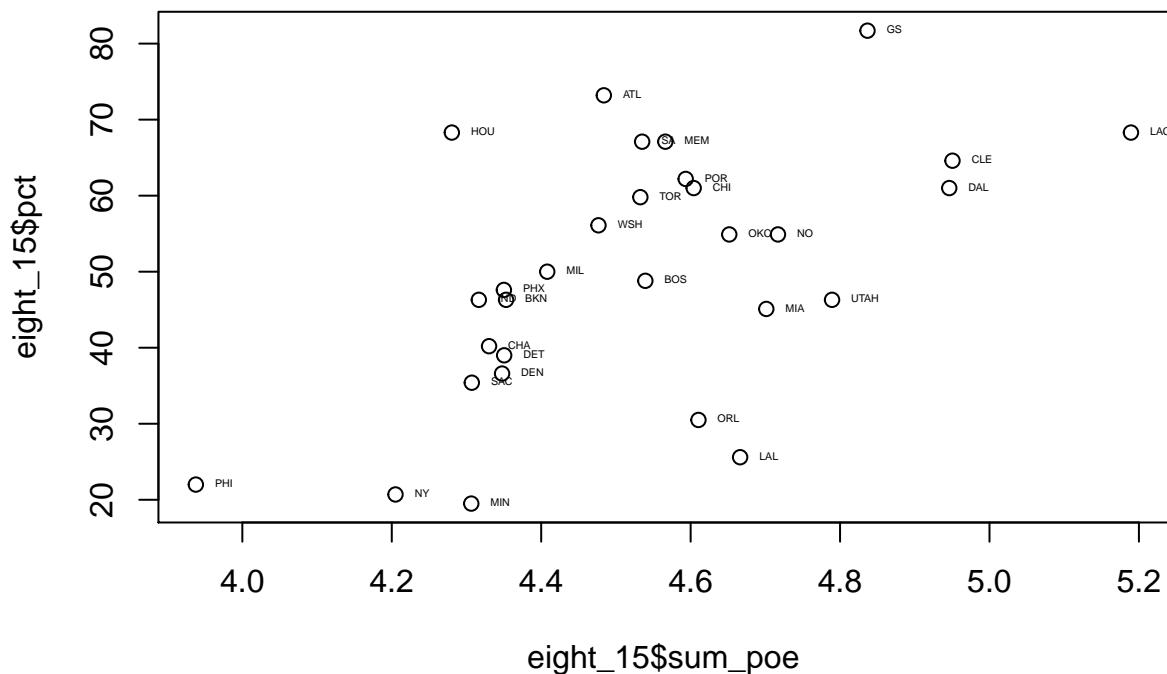
```
## Residual standard error: 14.43 on 28 degrees of freedom
```

```
## Multiple R-squared:  0.1906, Adjusted R-squared:  0.1617
```

```
## F-statistic: 6.594 on 1 and 28 DF, p-value: 0.01586
```

```
eight_15 <- eight[eight$season == 2015,]
```

```
plot(eight_15$sum_poe, eight_15$pct) + text(eight_15$pct ~ eight_15$sum_poe, labels=eight_15$team, data=eight_15)
```



```
## integer(0)
```

```
eight_md_15 <- lm(eight_15$pct ~ eight_15$sum_poe)
summary(eight_md_15)
```

```
##
```

```
## Call:
```

```
## lm(formula = eight_15$pct ~ eight_15$sum_poe)
```

```
##
```

```
## Residuals:
```

```
##      Min       1Q   Median       3Q      Max
## -29.2727  -6.8746  -0.9712   8.2485  27.1580
```

```
##
```

```
## Coefficients:
```

```
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -111.16     45.50  -2.443  0.02111 *
## eight_15$sum_poe  35.58     10.03   3.548  0.00139 **
```

```
## ---
```

```
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
##
```

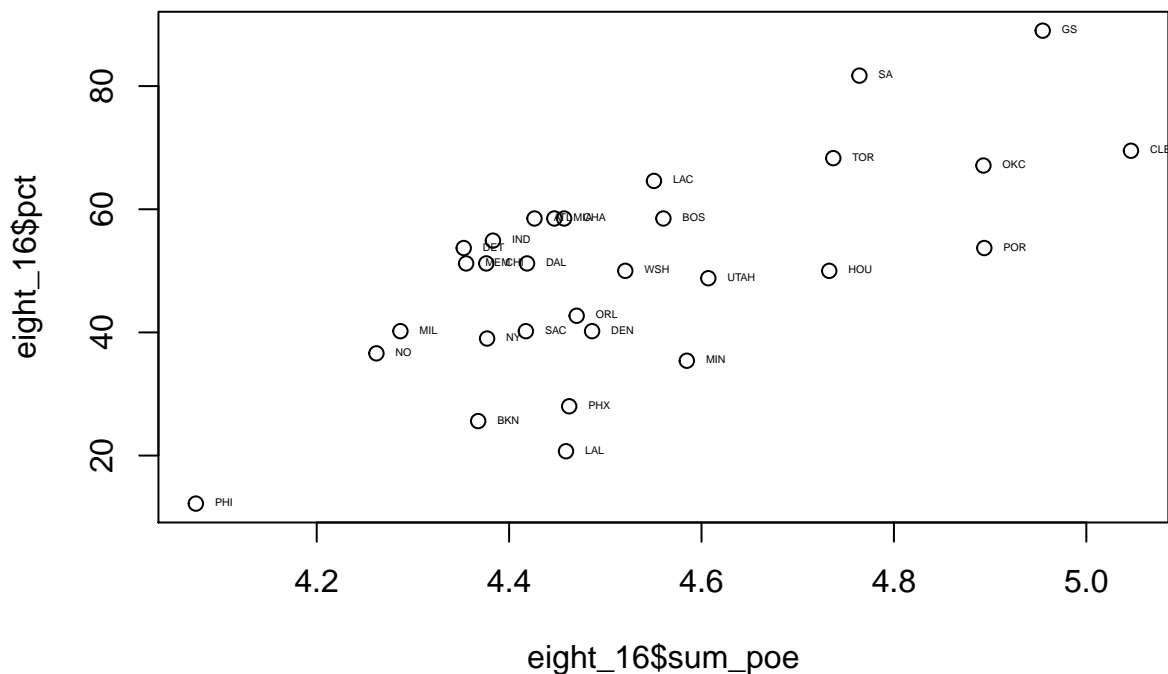
```
## Residual standard error: 13.87 on 28 degrees of freedom
```

```
## Multiple R-squared:  0.3101, Adjusted R-squared:  0.2855
```

```
## F-statistic: 12.59 on 1 and 28 DF, p-value: 0.001392
```

```
eight_16 <- eight[eight$season == 2016,]
```

```
plot(eight_16$sum_poe, eight_16$pct) + text(eight_16$pct ~ eight_16$sum_poe, labels=eight_16$team, data=eight_16)
```



```
## integer(0)
```

```
eight_md_16 <- lm(eight_16$pct ~ eight_16$sum_poe)
summary(eight_md_16)
```

```
##
```

```
## Call:
```

```
## lm(formula = eight_16$pct ~ eight_16$sum_poe)
```

```
##
```

```
## Residuals:
```

```
##      Min       1Q   Median       3Q      Max
## -25.8331  -8.1192   0.3643  11.5977  18.9631
```

```
##
```

```
## Coefficients:
```

```
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -190.37     47.21  -4.032 0.000386 ***
## eight_16$sum_poe   53.13     10.42   5.097 2.13e-05 ***
```

```
## ---
```

```
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
##
```

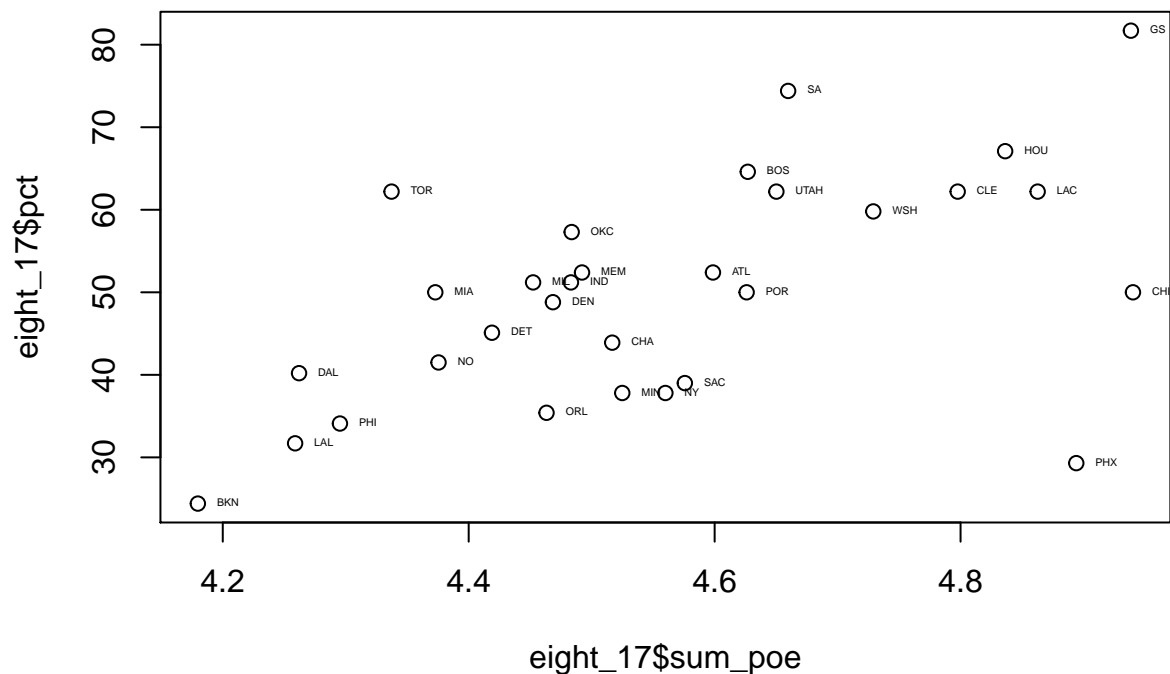
```
## Residual standard error: 12.41 on 28 degrees of freedom
```

```
## Multiple R-squared:  0.4813, Adjusted R-squared:  0.4627
```

```
## F-statistic: 25.98 on 1 and 28 DF, p-value: 2.129e-05
```

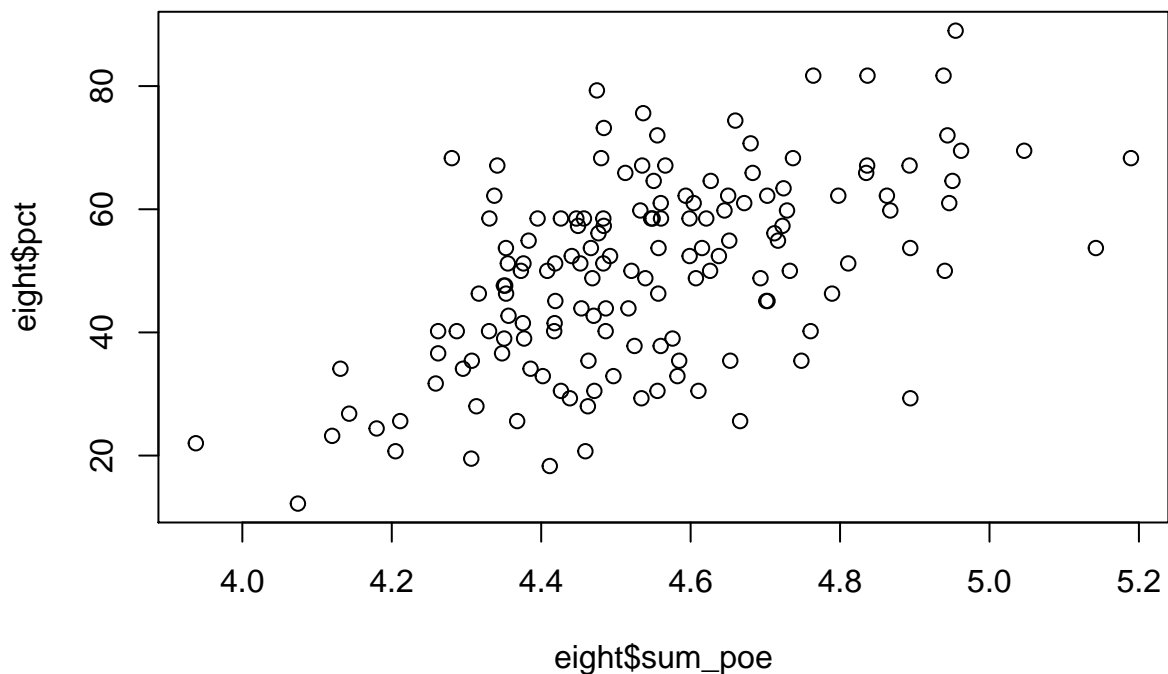
```
eight_17 <- eight[eight$season == 2017,]
```

```
plot(eight_17$sum_poe, eight_17$pct) + text(eight_17$pct ~ eight_17$sum_poe, labels=eight_17$team, data=eight_17)
```



```
## integer(0)
eight_md_17 <- lm(eight_17$pct ~ eight_17$sum_poe)
summary(eight_md_17)

##
## Call:
## lm(formula = eight_17$pct ~ eight_17$sum_poe)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -32.931  -7.271   0.983   6.214  20.648
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -114.89     46.96  -2.447  0.02094 *
## eight_17$sum_poe    36.19     10.30   3.515  0.00152 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 11.57 on 28 degrees of freedom
## Multiple R-squared:  0.3062, Adjusted R-squared:  0.2814
## F-statistic: 12.36 on 1 and 28 DF,  p-value: 0.001515
plot(eight$sum_poe,eight$pct)
```

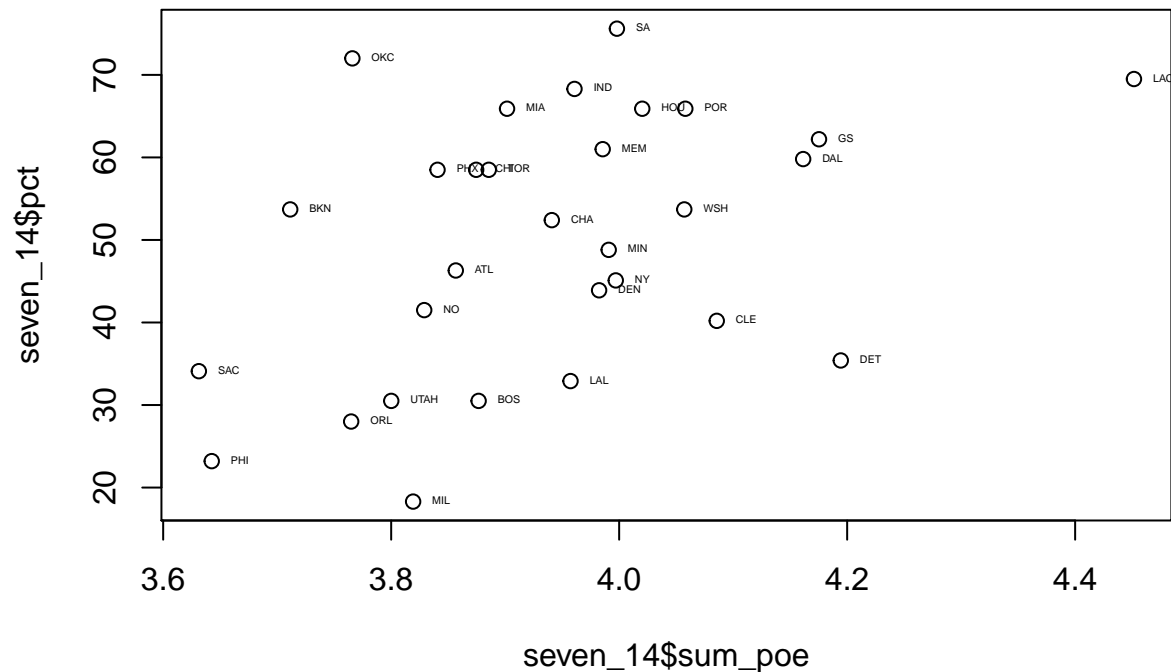


```
eight_md_10 <- lm(eight$pct ~ eight$sum_poe)
summary(eight_md_10)
```

```
##
## Call:
## lm(formula = eight$pct ~ eight$sum_poe)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -34.489  -8.897   0.214   8.295  31.958
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  -128.079     22.207  -5.767 4.54e-08 ***
## eight$sum_poe   39.204       4.884   8.028 2.83e-13 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 12.87 on 148 degrees of freedom
## Multiple R-squared:  0.3034, Adjusted R-squared:  0.2986
## F-statistic: 64.45 on 1 and 148 DF, p-value: 2.83e-13
```

Seven players:

```
seven$pct <- seven$pct*100
seven_14 <- seven[seven$season == 2014,]
plot(seven_14$sum_poe,seven_14$pct)+text(seven_14$pct ~ seven_14$sum_poe, labels=seven_14$team,data=seven_14)
```



```
## integer(0)
```

```
seven_md_14 <- lm(seven_14$pct ~ seven_14$sum_poe)
summary(seven_md_14)
```

```
##
```

```
## Call:
```

```
## lm(formula = seven_14$pct ~ seven_14$sum_poe)
```

```
##
```

```
## Residuals:
```

```
##      Min       1Q   Median       3Q      Max
## -27.0386 -12.5040  -0.3156  11.2938  28.7098
```

```
##
```

```
## Coefficients:
```

```
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -101.51      61.33  -1.655   0.1091
## seven_14$sum_poe   38.45      15.55   2.473   0.0197 *
```

```
## ---
```

```
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
##
```

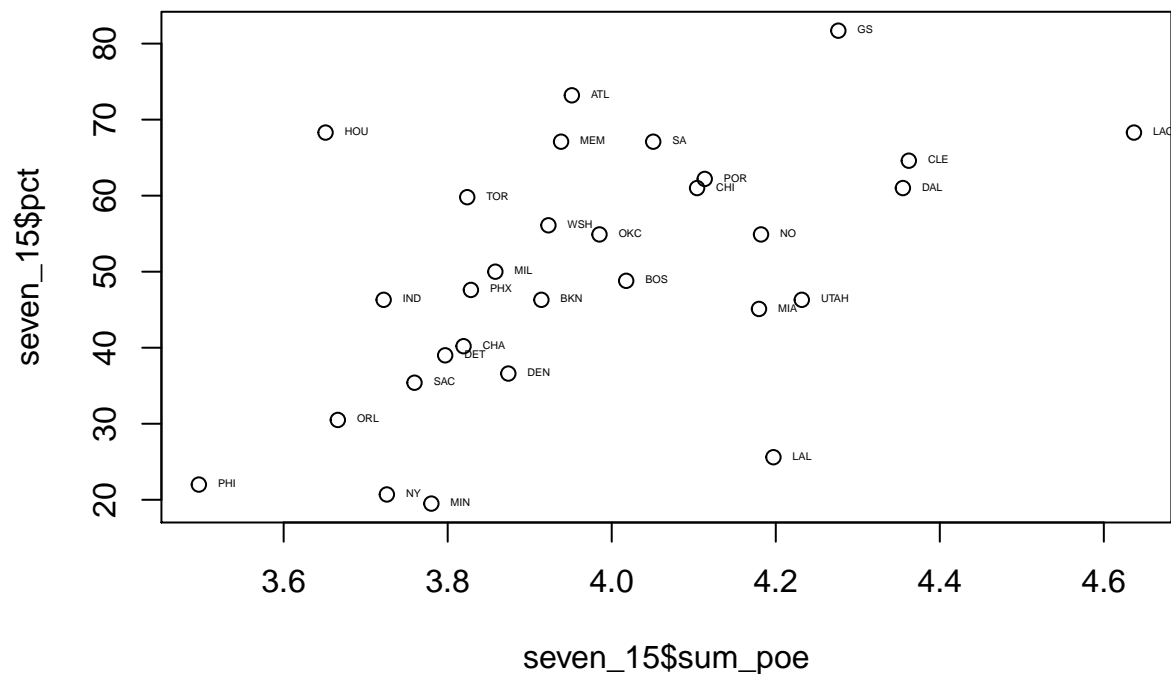
```
## Residual standard error: 14.53 on 28 degrees of freedom
```

```
## Multiple R-squared:  0.1792, Adjusted R-squared:  0.1499
```

```
## F-statistic: 6.115 on 1 and 28 DF,  p-value: 0.01974
```

```
seven_15 <- seven[seven$season == 2015,]
```

```
plot(seven_15$sum_poe,seven_15$pct)+text(seven_15$pct ~ seven_15$sum_poe, labels=seven_15$team,data=seven_15)
```

```
## integer(0)
```

```
seven_md_15 <- lm(seven_15$pct ~ seven_15$sum_poe)
summary(seven_md_15)
```

```
##
```

```
## Call:
```

```
## lm(formula = seven_15$pct ~ seven_15$sum_poe)
```

```
##
```

```
## Residuals:
```

```
##      Min       1Q   Median       3Q      Max
## -32.024  -8.560  -1.839   7.216  29.325
```

```
##
```

```
## Coefficients:
```

```
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -85.71     41.78  -2.051  0.04968 *
## seven_15$sum_poe  34.15     10.49   3.255  0.00296 **
```

```
## ---
```

```
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
##
```

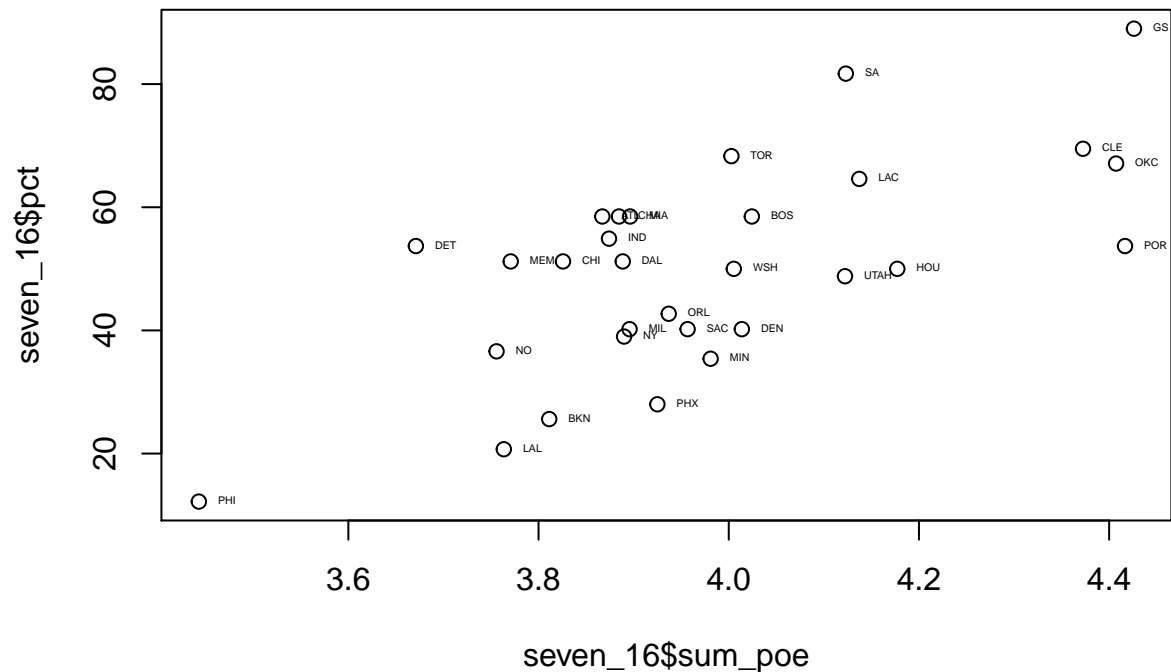
```
## Residual standard error: 14.23 on 28 degrees of freedom
```

```
## Multiple R-squared:  0.2745, Adjusted R-squared:  0.2486
```

```
## F-statistic: 10.59 on 1 and 28 DF,  p-value: 0.002965
```

```
seven_16 <- seven[seven$season == 2016,]
```

```
plot(seven_16$sum_poe,seven_16$pct)+text(seven_16$pct ~ seven_16$sum_poe, labels=seven_16$team,data=seven_16)
```



```
## integer(0)
```

```
seven_md_16 <- lm(seven_16$pct ~ seven_16$sum_poe)
summary(seven_md_16)
```

```
##
```

```
## Call:
```

```
## lm(formula = seven_16$pct ~ seven_16$sum_poe)
```

```
##
```

```
## Residuals:
```

```
##      Min       1Q   Median       3Q      Max
## -19.473  -9.740  -1.963   11.045   24.359
```

```
##
```

```
## Coefficients:
```

```
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -147.98     42.14  -3.512  0.00153 **
## seven_16$sum_poe    49.80     10.58   4.706  6.2e-05 ***
```

```
## ---
```

```
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
##
```

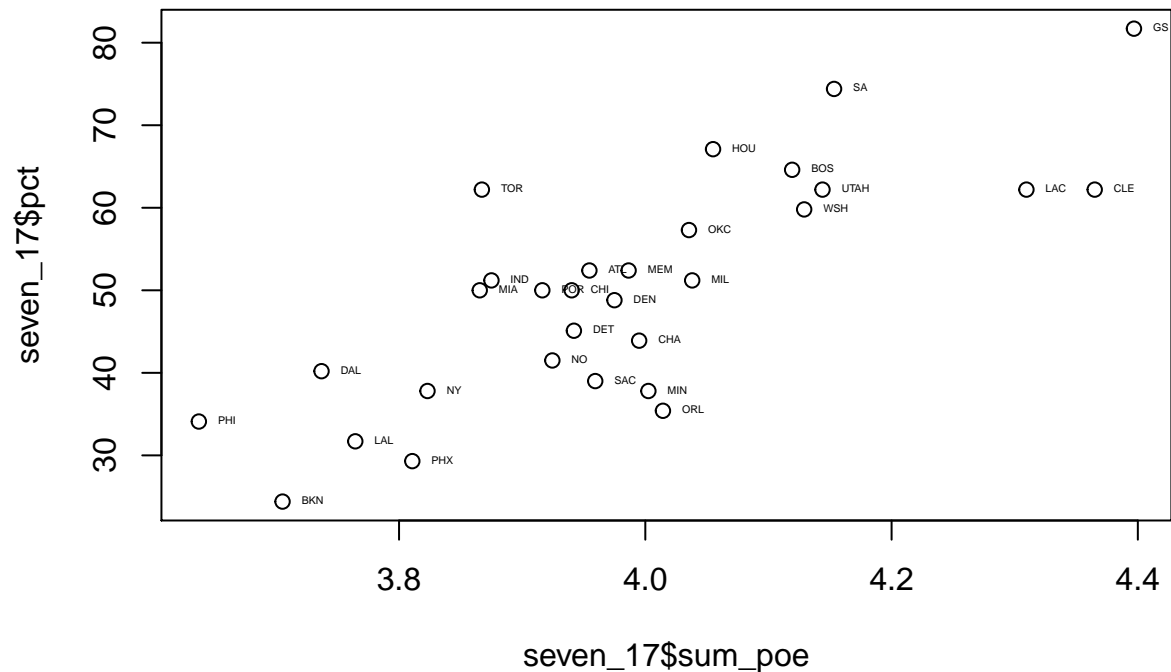
```
## Residual standard error: 12.88 on 28 degrees of freedom
```

```
## Multiple R-squared:  0.4416, Adjusted R-squared:  0.4217
```

```
## F-statistic: 22.14 on 1 and 28 DF,  p-value: 6.199e-05
```

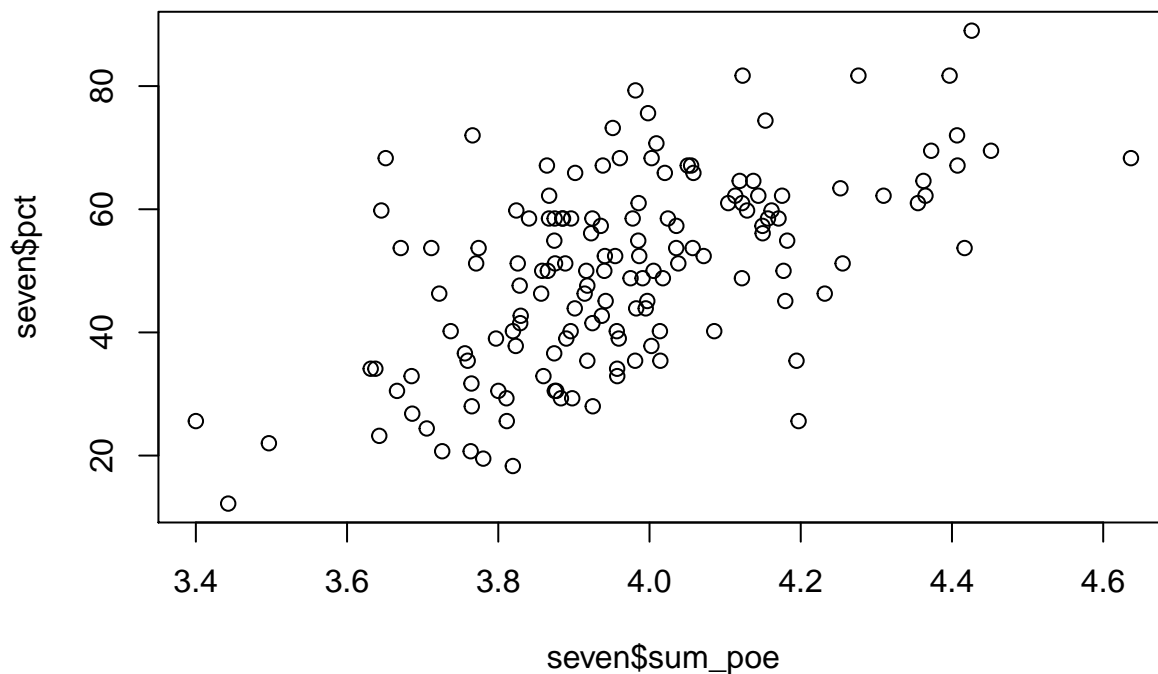
```
seven_17 <- seven[seven$season == 2017,]
```

```
plot(seven_17$sum_poe,seven_17$pct)+text(seven_17$pct ~ seven_17$sum_poe, labels=seven_17$team,data=seven_17)
```



```
## integer(0)
seven_md_17 <- lm(seven_17$pct ~ seven_17$sum_poe)
summary(seven_md_17)

##
## Call:
## lm(formula = seven_17$pct ~ seven_17$sum_poe)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -16.557  -6.527   1.560   4.705  18.996
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)   -186.987     35.205  -5.311 1.18e-05 ***
## seven_17$sum_poe    59.523      8.834   6.738 2.57e-07 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 8.577 on 28 degrees of freedom
## Multiple R-squared:  0.6185, Adjusted R-squared:  0.6049
## F-statistic: 45.4 on 1 and 28 DF,  p-value: 2.573e-07
plot(seven$sum_poe,seven$pct)
```

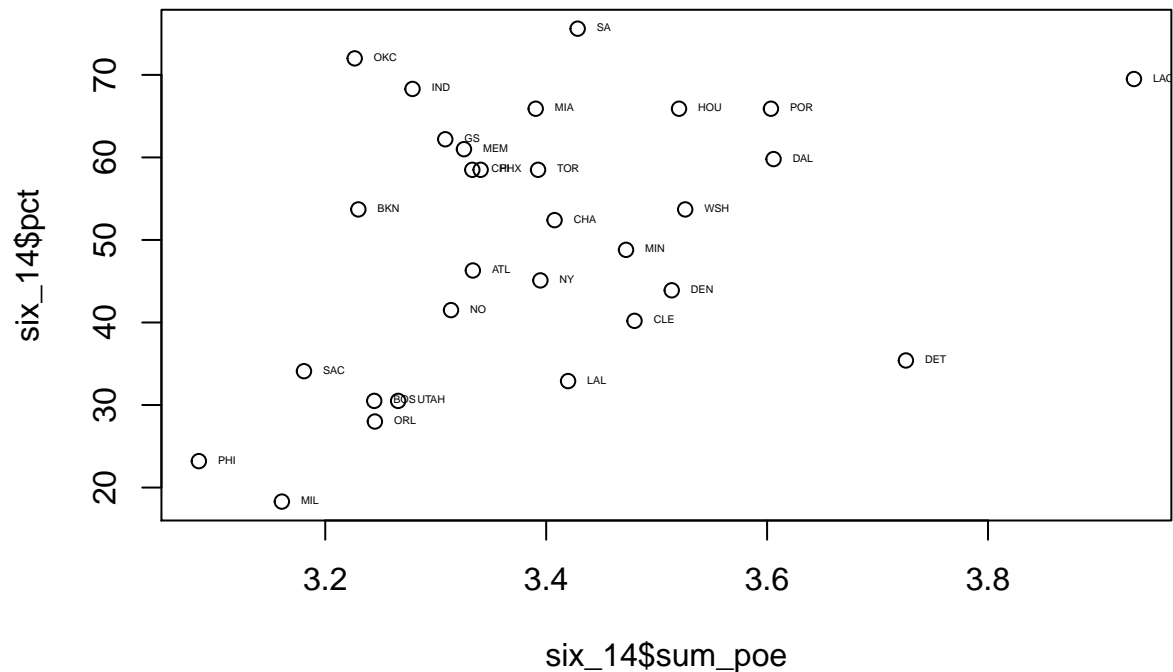


```
seven_md_10 <- lm(seven$pct ~ seven$sum_poe)
summary(seven_md_10)
```

```
##
## Call:
## lm(formula = seven$pct ~ seven$sum_poe)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -34.437  -8.878  -1.037   7.969  31.935
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  -121.912     19.622  -6.213 5.00e-09 ***
## seven$sum_poe   43.351       4.941   8.773 3.85e-15 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 12.5 on 148 degrees of freedom
## Multiple R-squared:  0.3421, Adjusted R-squared:  0.3377
## F-statistic: 76.97 on 1 and 148 DF, p-value: 3.854e-15
```

Six players:

```
six$pct <- six$pct*100
six_14 <- six[six$season == 2014,]
plot(six_14$sum_poe,six_14$pct)+text(six_14$pct ~ six_14$sum_poe, labels=six_14$team,data=six_14, cex=0
```



```
## integer(0)
```

```
six_md_14 <- lm(six_14$pct ~ six_14$sum_poe)
summary(six_md_14)
```

```
##
```

```
## Call:
```

```
## lm(formula = six_14$pct ~ six_14$sum_poe)
```

```
##
```

```
## Residuals:
```

```
##      Min       1Q   Median       3Q      Max
## -26.4241 -12.3548  -0.3416  10.4148  27.7256
```

```
##
```

```
## Coefficients:
```

```
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -69.20     52.62  -1.315   0.1991
## six_14$sum_poe   35.17     15.50   2.269   0.0312 *
```

```
## ---
```

```
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
##
```

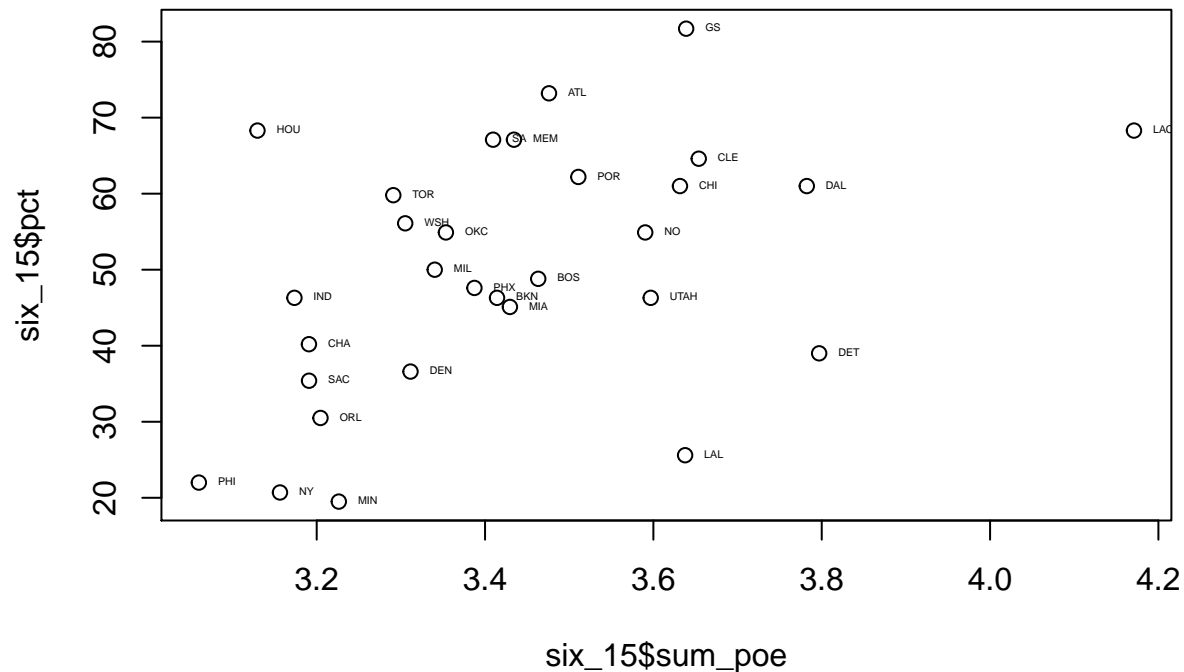
```
## Residual standard error: 14.74 on 28 degrees of freedom
```

```
## Multiple R-squared:  0.1553, Adjusted R-squared:  0.1251
```

```
## F-statistic: 5.147 on 1 and 28 DF,  p-value: 0.0312
```

```
six_15 <- six[six$season == 2015,]
```

```
plot(six_15$sum_poe,six_15$pct)+text(six_15$pct ~ six_15$sum_poe, labels=six_15$team,data=six_15, cex=0
```



```
## integer(0)
```

```
six_md_15 <- lm(six_15$pct ~ six_15$sum_poe)
summary(six_md_15)
```

```
##
```

```
## Call:
```

```
## lm(formula = six_15$pct ~ six_15$sum_poe)
```

```
##
```

```
## Residuals:
```

```
##      Min       1Q   Median       3Q      Max
## -30.7254  -8.3770  -0.5019   9.2738  27.5840
```

```
##
```

```
## Coefficients:
```

```
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -55.44      39.46  -1.405   0.1710
## six_15$sum_poe   30.72      11.47   2.679   0.0122 *
```

```
## ---
```

```
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
##
```

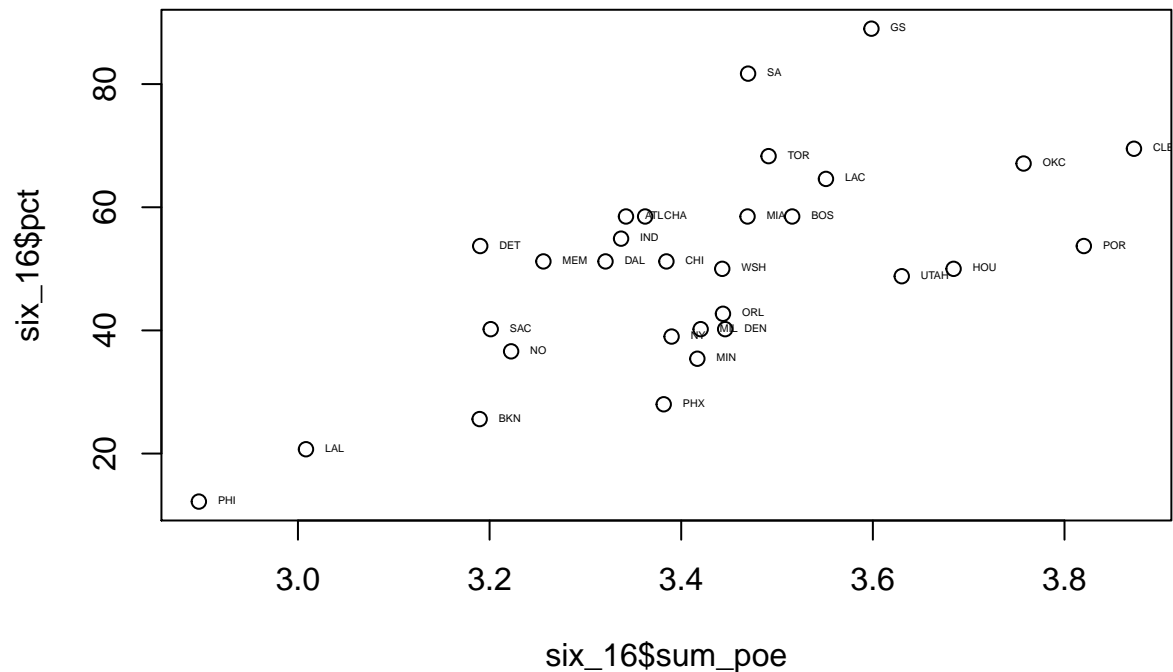
```
## Residual standard error: 14.9 on 28 degrees of freedom
```

```
## Multiple R-squared:  0.204, Adjusted R-squared:  0.1756
```

```
## F-statistic: 7.175 on 1 and 28 DF,  p-value: 0.01223
```

```
six_16 <- six[six$season == 2016,]
```

```
plot(six_16$sum_poe,six_16$pct)+text(six_16$pct ~ six_16$sum_poe, labels=six_16$team,data=six_16, cex=0
```



```
## integer(0)
```

```
six_md_16 <- lm(six_16$pct ~ six_16$sum_poe)
summary(six_md_16)
```

```
##
```

```
## Call:
```

```
## lm(formula = six_16$pct ~ six_16$sum_poe)
```

```
##
```

```
## Residuals:
```

```
##      Min       1Q   Median       3Q      Max
## -20.1870 -10.9243  -0.7694   8.6818  29.7596
```

```
##
```

```
## Coefficients:
```

```
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -124.25     38.48   -3.229  0.00316 **
## six_16$sum_poe    50.99     11.24    4.537 9.82e-05 ***
```

```
## ---
```

```
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
##
```

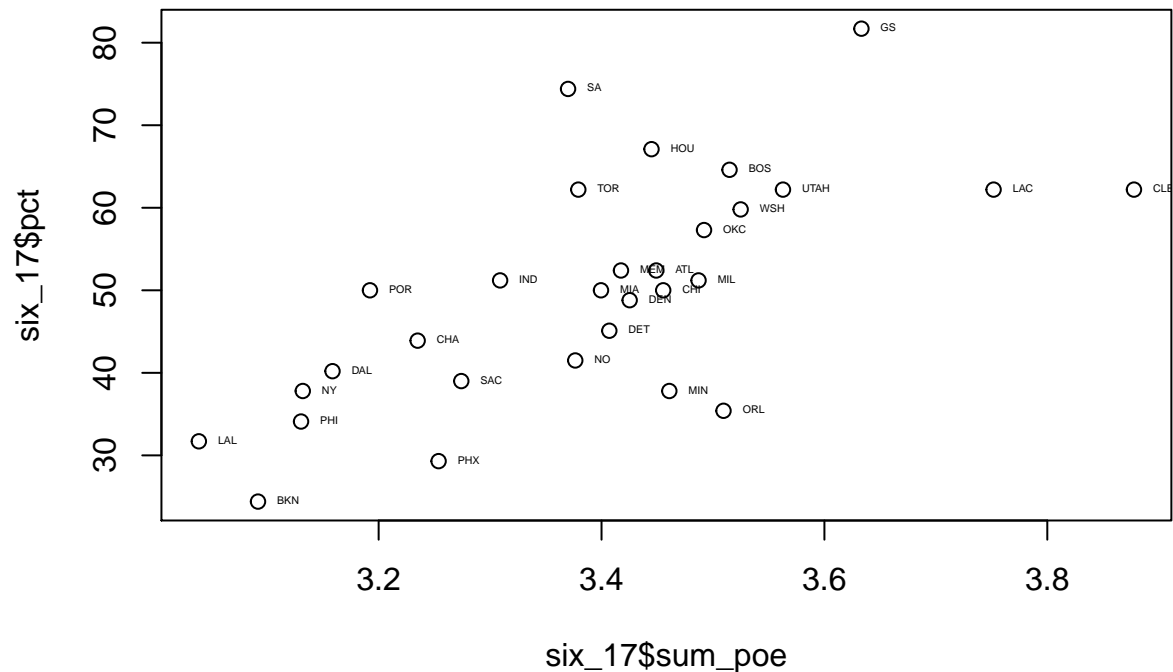
```
## Residual standard error: 13.08 on 28 degrees of freedom
```

```
## Multiple R-squared:  0.4237, Adjusted R-squared:  0.4031
```

```
## F-statistic: 20.59 on 1 and 28 DF,  p-value: 9.815e-05
```

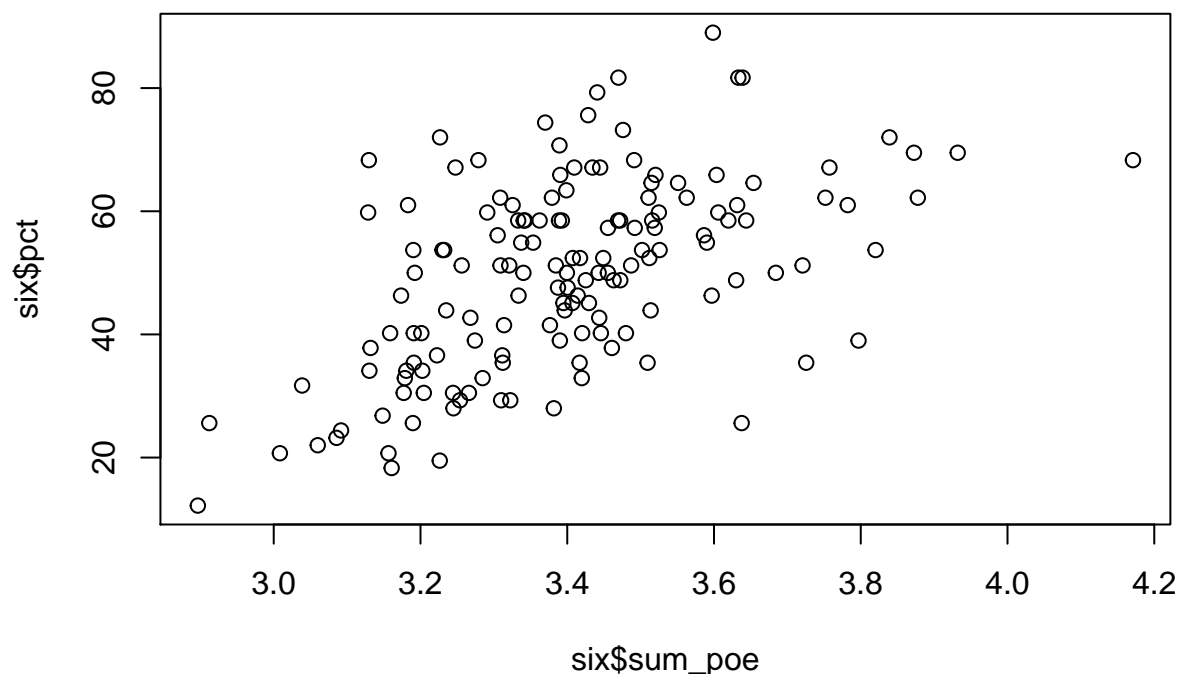
```
six_17 <- six[six$season == 2017,]
```

```
plot(six_17$sum_poe,six_17$pct)+text(six_17$pct ~ six_17$sum_poe, labels=six_17$team,data=six_17, cex=0
```



```
## integer(0)
six_md_17 <- lm(six_17$pct ~ six_17$sum_poe)
summary(six_md_17)

##
## Call:
## lm(formula = six_17$pct ~ six_17$sum_poe)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -20.2928  -5.2820  -0.3699   3.7841  25.4610
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -114.21      34.07  -3.352  0.00231 **
## six_17$sum_poe    48.41      10.03   4.826  4.46e-05 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 10.26 on 28 degrees of freedom
## Multiple R-squared:  0.4541, Adjusted R-squared:  0.4346
## F-statistic: 23.29 on 1 and 28 DF,  p-value: 4.458e-05
plot(six$sum_poe,six$pct)
```

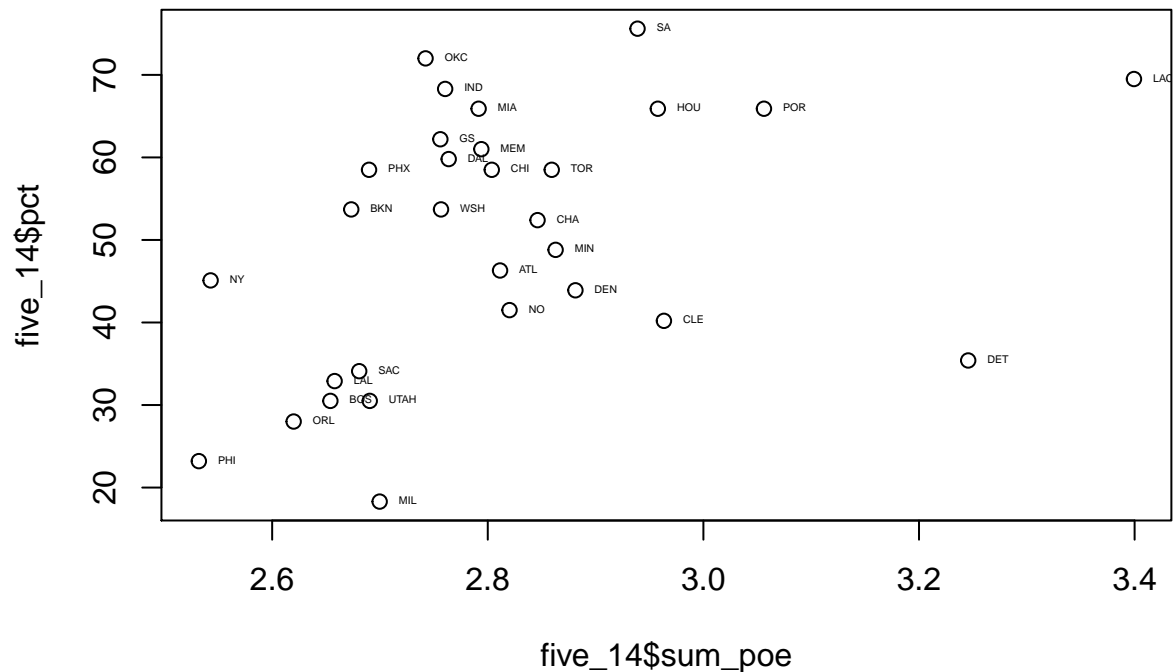



```
six_md_10 <- lm(six$pct ~ six$sum_poe)
summary(six_md_10)
```

```
##
## Call:
## lm(formula = six$pct ~ six$sum_poe)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -33.990 -10.476  -1.351   8.497  30.996
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  -87.619     17.815  -4.918 2.30e-06 ***
## six$sum_poe   40.468       5.229   7.739 1.45e-12 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 13.01 on 148 degrees of freedom
## Multiple R-squared:  0.2881, Adjusted R-squared:  0.2833
## F-statistic: 59.88 on 1 and 148 DF, p-value: 1.445e-12
```

Five players:

```
five$pct <- five$pct*100
five_14 <- five[five$season == 2014,]
plot(five_14$sum_poe,five_14$pct)+text(five_14$pct ~ five_14$sum_poe, labels=five_14$team,data=five_14,
```



```
## integer(0)
```

```
five_md_14 <- lm(five_14$pct ~ five_14$sum_poe)
summary(five_md_14)
```

```
##
```

```
## Call:
```

```
## lm(formula = five_14$pct ~ five_14$sum_poe)
```

```
##
```

```
## Residuals:
```

```
##      Min       1Q   Median       3Q      Max
## -29.457 -11.885   2.615  11.191  24.243
```

```
##
```

```
## Coefficients:
```

```
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -45.40     41.46  -1.095   0.2829
## five_14$sum_poe  33.97     14.73   2.306   0.0287 *
```

```
## ---
```

```
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
##
```

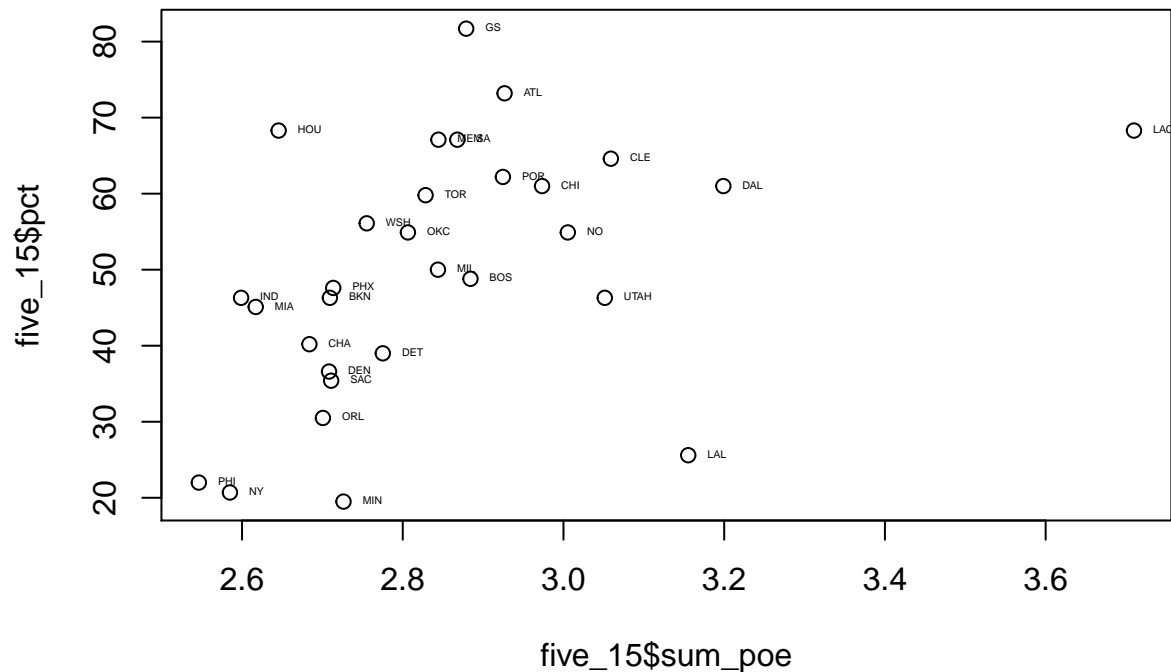
```
## Residual standard error: 14.7 on 28 degrees of freedom
```

```
## Multiple R-squared:  0.1596, Adjusted R-squared:  0.1296
```

```
## F-statistic: 5.317 on 1 and 28 DF,  p-value: 0.02874
```

```
five_15 <- five[five$season == 2015,]
```

```
plot(five_15$sum_poe,five_15$pct)+text(five_15$pct ~ five_15$sum_poe, labels=five_15$team,data=five_15,
```



```
## integer(0)
```

```
five_md_15 <- lm(five_15$pct ~ five_15$sum_poe)
summary(five_md_15)
```

```
##
```

```
## Call:
```

```
## lm(formula = five_15$pct ~ five_15$sum_poe)
```

```
##
```

```
## Residuals:
```

```
##      Min       1Q   Median       3Q      Max
## -33.751  -9.069   0.414   8.729  30.750
```

```
##
```

```
## Coefficients:
```

```
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -36.58      34.32  -1.066   0.2956
## five_15$sum_poe  30.40      12.01   2.531   0.0173 *
```

```
## ---
```

```
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
##
```

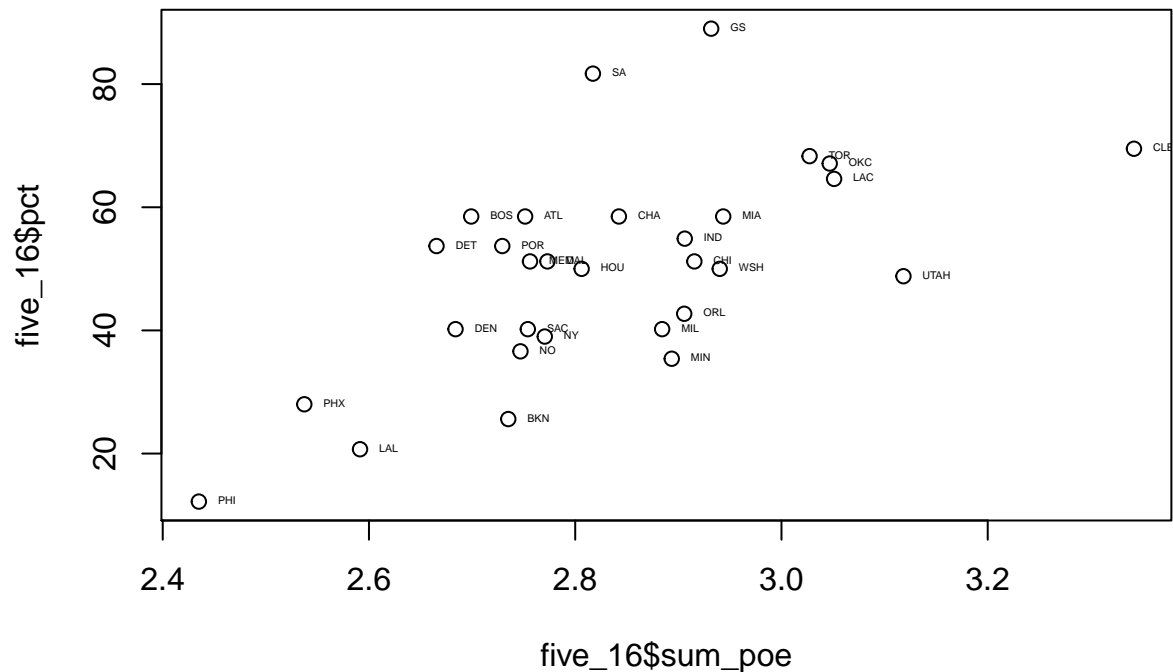
```
## Residual standard error: 15.07 on 28 degrees of freedom
```

```
## Multiple R-squared:  0.1862, Adjusted R-squared:  0.1571
```

```
## F-statistic: 6.405 on 1 and 28 DF,  p-value: 0.01728
```

```
five_16 <- five[five$season == 2016,]
```

```
plot(five_16$sum_poe,five_16$pct)+text(five_16$pct ~ five_16$sum_poe, labels=five_16$team,data=five_16,
```



```
## integer(0)
```

```
five_md_16 <- lm(five_16$pct ~ five_16$sum_poe)
summary(five_md_16)
```

```
##
```

```
## Call:
```

```
## lm(formula = five_16$pct ~ five_16$sum_poe)
```

```
##
```

```
## Residuals:
```

```
##      Min       1Q   Median       3Q      Max
## -18.738  -9.405  -0.239   6.781  33.344
```

```
##
```

```
## Coefficients:
```

```
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -112.96      39.39  -2.868  0.007766 **
## five_16$sum_poe   57.51      13.87   4.145  0.000284 ***
```

```
## ---
```

```
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
##
```

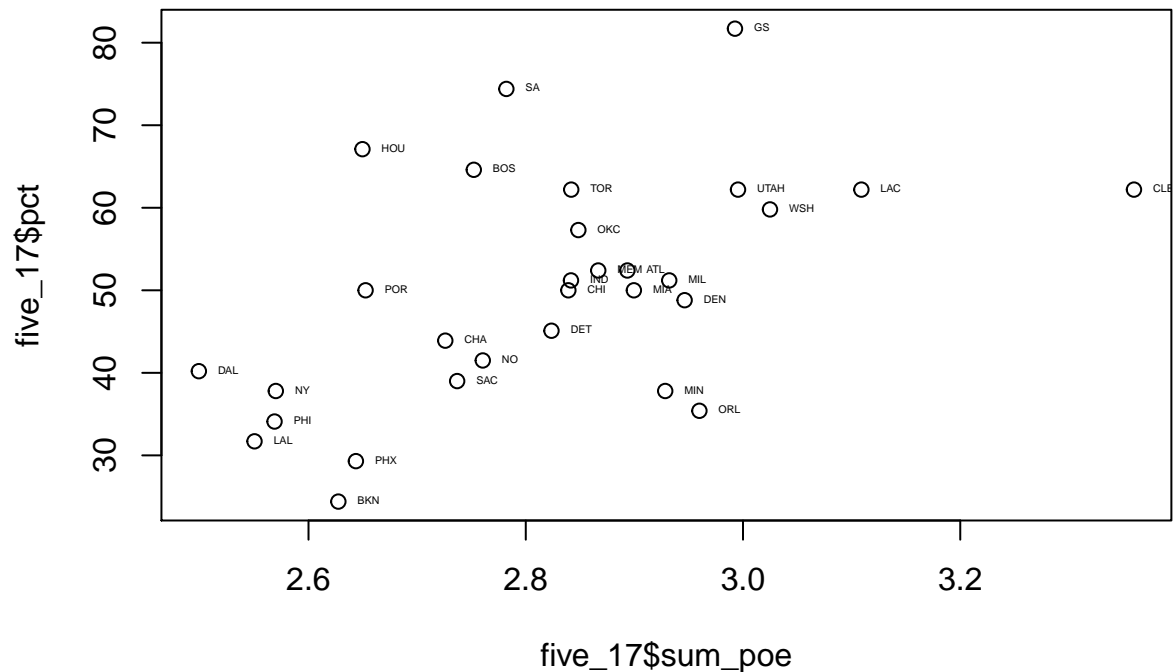
```
## Residual standard error: 13.57 on 28 degrees of freedom
```

```
## Multiple R-squared:  0.3803, Adjusted R-squared:  0.3582
```

```
## F-statistic: 17.18 on 1 and 28 DF,  p-value: 0.0002843
```

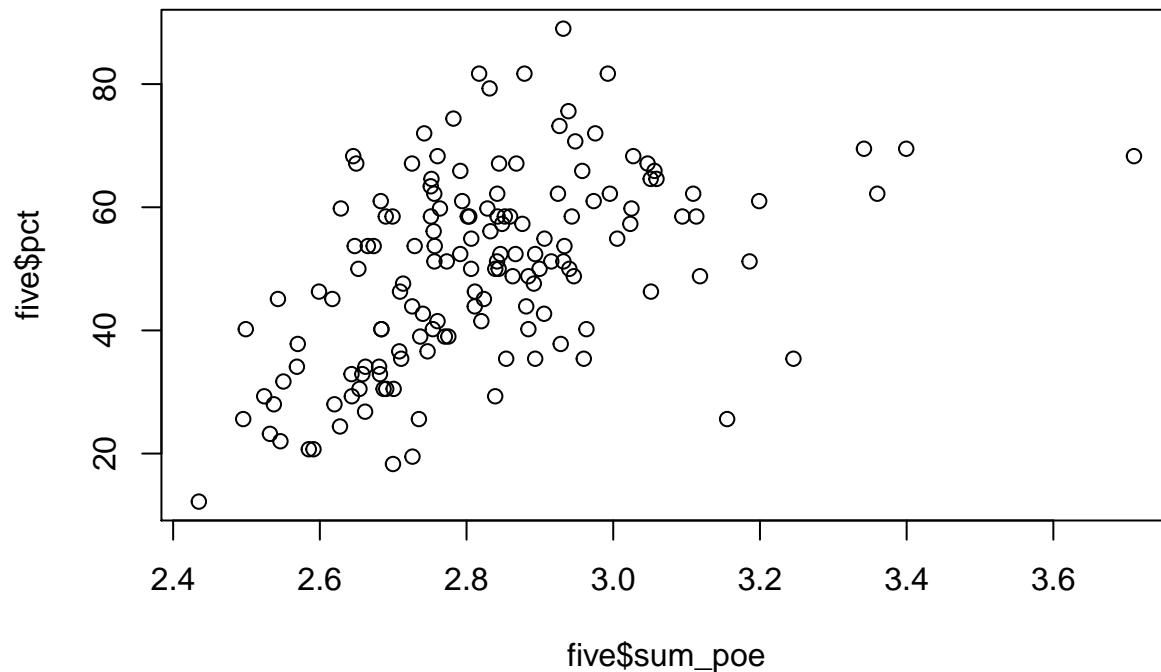
```
five_17 <- five[five$season == 2017,]
```

```
plot(five_17$sum_poe,five_17$pct)+text(five_17$pct ~ five_17$sum_poe, labels=five_17$team,data=five_17,
```



```
## integer(0)
five_md_17 <- lm(five_17$pct ~ five_17$sum_poe)
summary(five_md_17)

##
## Call:
## lm(formula = five_17$pct ~ five_17$sum_poe)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -19.855  -6.335  -1.605   4.792  25.862
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -56.60      33.54  -1.688  0.10259
## five_17$sum_poe  37.79      11.87   3.185  0.00354 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 11.9 on 28 degrees of freedom
## Multiple R-squared:  0.266, Adjusted R-squared:  0.2397
## F-statistic: 10.14 on 1 and 28 DF, p-value: 0.003536
plot(five$sum_poe,five$pct)
```

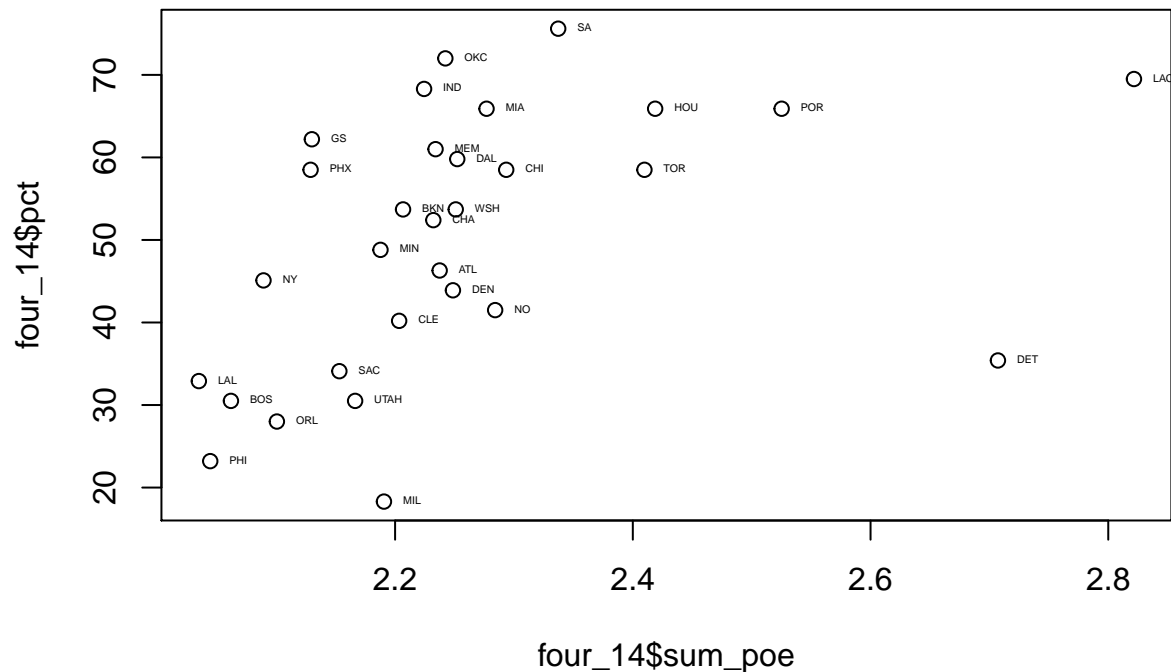


```
five_md_10 <- lm(five$pct ~ five$sum_poe)
summary(five_md_10)
```

```
##
## Call:
## lm(formula = five$pct ~ five$sum_poe)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -37.355  -9.953  -0.609   8.665  34.764
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)   -60.199     16.471  -3.655 0.000357 ***
## five$sum_poe   39.031      5.821   6.705 3.96e-10 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 13.5 on 148 degrees of freedom
## Multiple R-squared:  0.233, Adjusted R-squared:  0.2278
## F-statistic: 44.96 on 1 and 148 DF, p-value: 3.963e-10
```

four players:

```
four$pct <- four$pct*100
four_14 <- four[four$season == 2014,]
plot(four_14$sum_poe,four_14$pct)+text(four_14$pct ~ four_14$sum_poe, labels=four_14$team,data=four_14,
```



```
## integer(0)
```

```
four_md_14 <- lm(four_14$pct ~ four_14$sum_poe)
summary(four_md_14)
```

```
##
```

```
## Call:
```

```
## lm(formula = four_14$pct ~ four_14$sum_poe)
```

```
##
```

```
## Residuals:
```

```
##      Min       1Q   Median       3Q      Max
## -31.870  -9.326   2.063   9.888  22.541
```

```
##
```

```
## Coefficients:
```

```
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -36.44     34.42  -1.059   0.2988
## four_14$sum_poe  38.31     15.21   2.519   0.0178 *
```

```
## ---
```

```
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
##
```

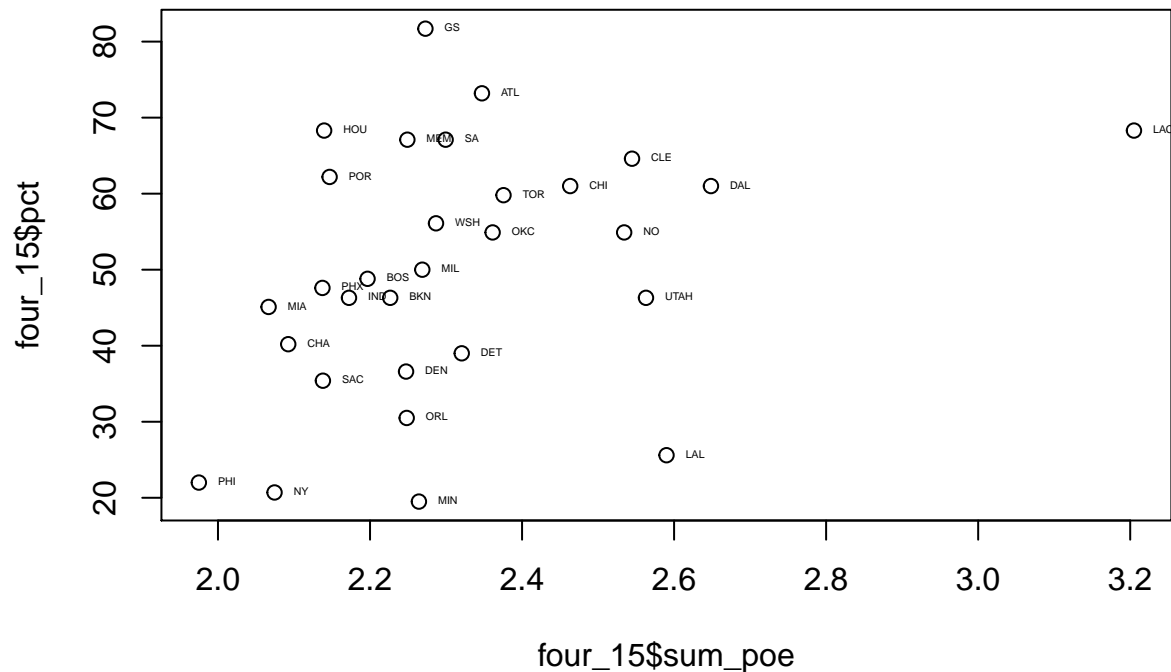
```
## Residual standard error: 14.48 on 28 degrees of freedom
```

```
## Multiple R-squared:  0.1847, Adjusted R-squared:  0.1556
```

```
## F-statistic: 6.344 on 1 and 28 DF,  p-value: 0.01777
```

```
four_15 <- four[four$season == 2015,]
```

```
plot(four_15$sum_poe,four_15$pct)+text(four_15$pct ~ four_15$sum_poe, labels=four_15$team,data=four_15,
```



```
## integer(0)
```

```
four_md_15 <- lm(four_15$pct ~ four_15$sum_poe)
summary(four_md_15)
```

```
##
```

```
## Call:
```

```
## lm(formula = four_15$pct ~ four_15$sum_poe)
```

```
##
```

```
## Residuals:
```

```
##      Min       1Q   Median       3Q      Max
## -31.017 -10.171   1.097   8.116  32.716
```

```
##
```

```
## Coefficients:
```

```
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -5.713     28.450  -0.201   0.842
## four_15$sum_poe 24.066     12.226   1.968   0.059 .
```

```
## ---
```

```
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
##
```

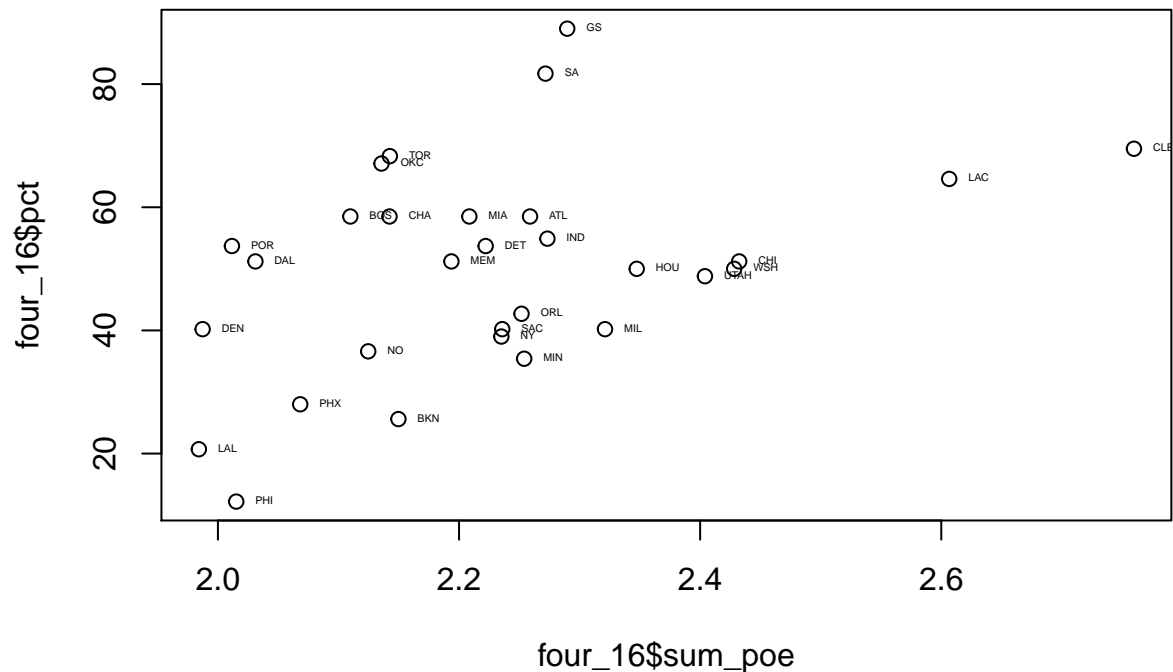
```
## Residual standard error: 15.66 on 28 degrees of freedom
```

```
## Multiple R-squared:  0.1216, Adjusted R-squared:  0.09018
```

```
## F-statistic: 3.874 on 1 and 28 DF,  p-value: 0.059
```

```
four_16 <- four[four$season == 2016,]
```

```
plot(four_16$sum_poe,four_16$pct)+text(four_16$pct ~ four_16$sum_poe, labels=four_16$team,data=four_16,
```

```
## integer(0)
```

```
four_md_16 <- lm(four_16$pct ~ four_16$sum_poe)
summary(four_md_16)
```

```
##
```

```
## Call:
```

```
## lm(formula = four_16$pct ~ four_16$sum_poe)
```

```
##
```

```
## Residuals:
```

```
##      Min       1Q   Median       3Q      Max
## -29.021  -9.798  -1.455   9.368  36.566
```

```
##
```

```
## Coefficients:
```

```
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -41.08      36.75  -1.118   0.2731
## four_16$sum_poe  40.84      16.43   2.486   0.0192 *
```

```
## ---
```

```
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
##
```

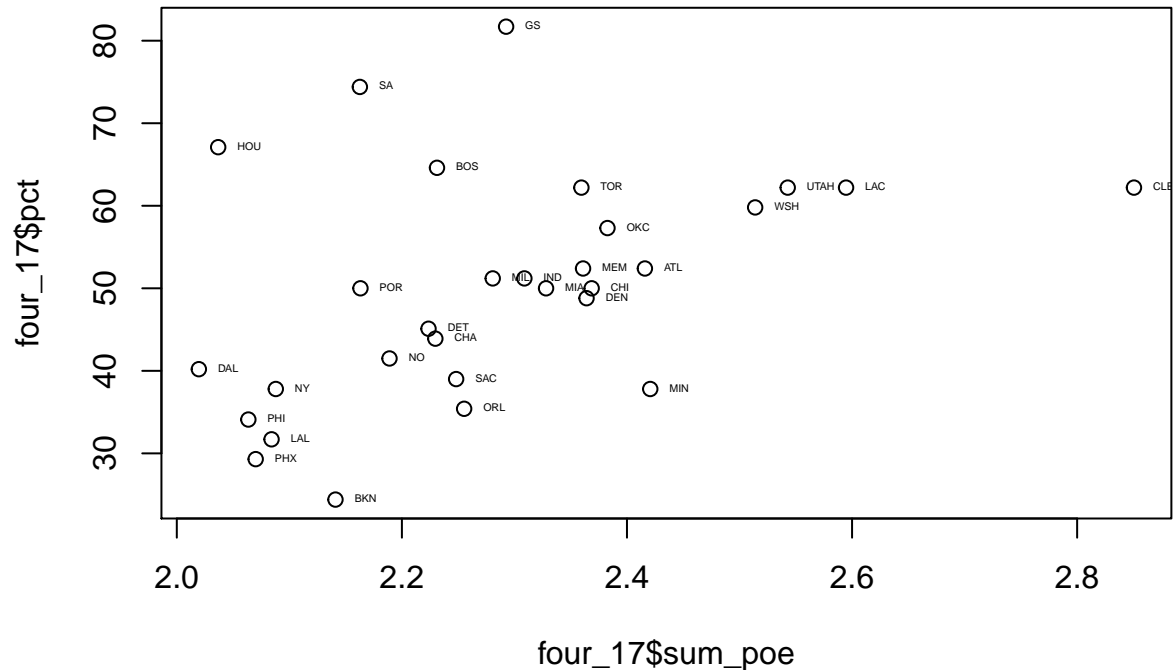
```
## Residual standard error: 15.6 on 28 degrees of freedom
```

```
## Multiple R-squared:  0.1808, Adjusted R-squared:  0.1515
```

```
## F-statistic: 6.179 on 1 and 28 DF,  p-value: 0.01916
```

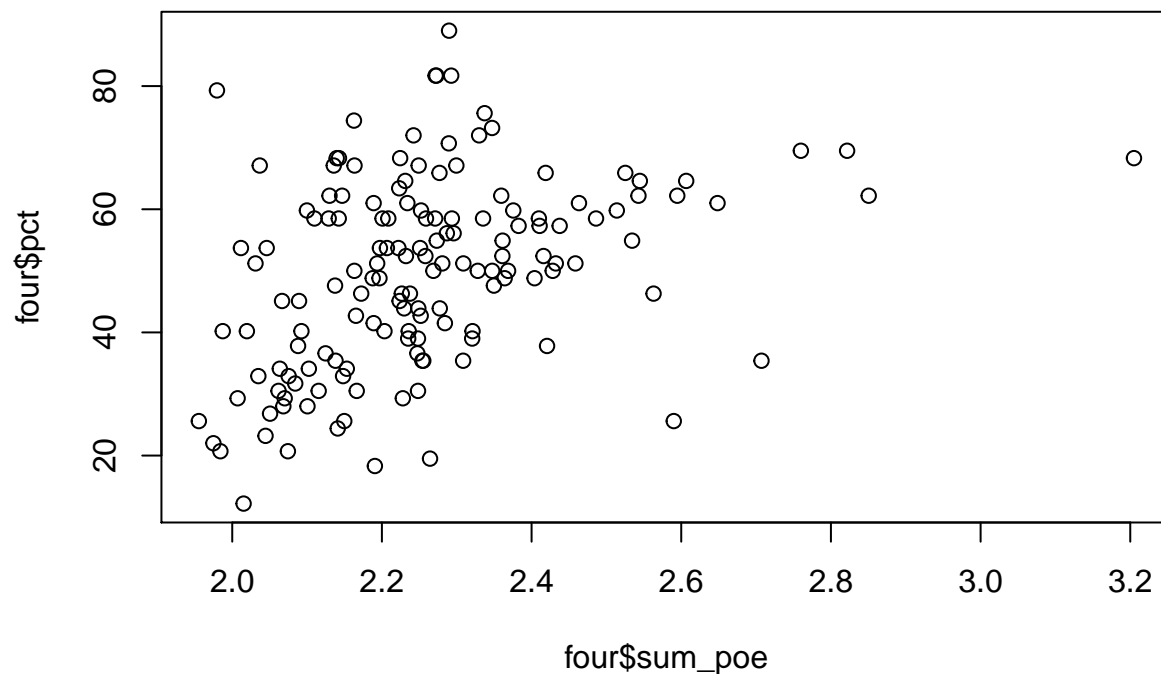
```
four_17 <- four[four$season == 2017,]
```

```
plot(four_17$sum_poe,four_17$pct)+text(four_17$pct ~ four_17$sum_poe, labels=four_17$team,data=four_17,
```



```
## integer(0)
four_md_17 <- lm(four_17$pct ~ four_17$sum_poe)
summary(four_md_17)

##
## Call:
## lm(formula = four_17$pct ~ four_17$sum_poe)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -20.974  -5.850  -1.520   3.582  31.505
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -22.70     28.98  -0.783   0.4402
## four_17$sum_poe  31.79     12.64   2.516   0.0179 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 12.54 on 28 degrees of freedom
## Multiple R-squared:  0.1844, Adjusted R-squared:  0.1553
## F-statistic:  6.33 on 1 and 28 DF,  p-value: 0.01789
plot(four$sum_poe,four$pct)
```

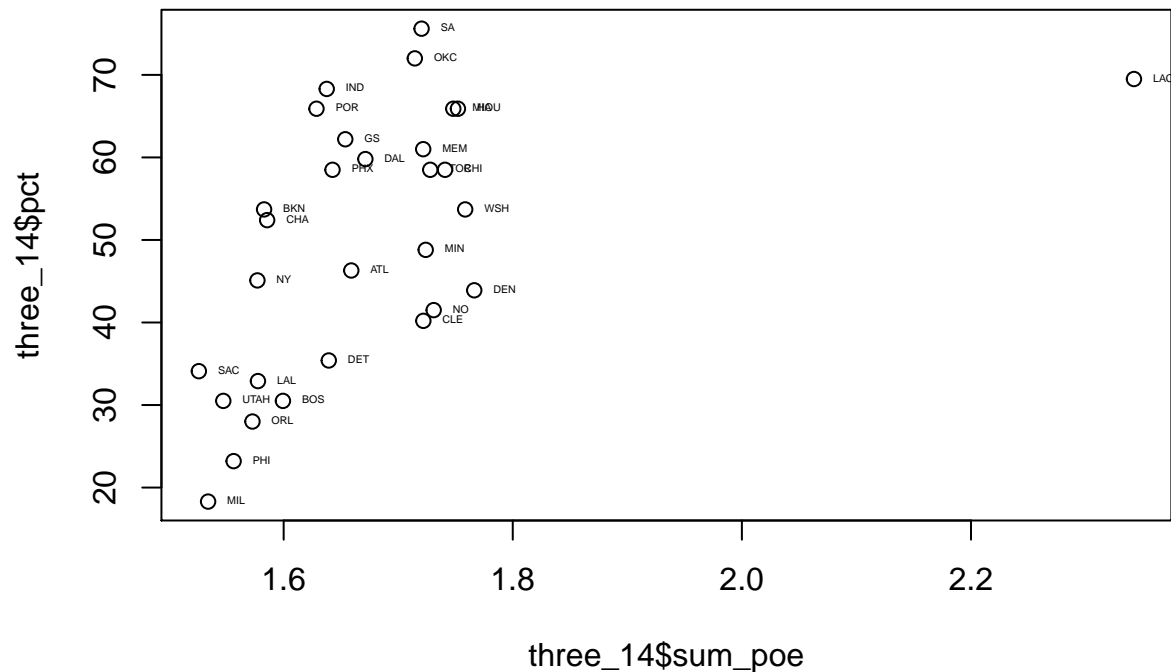


```
four_md_10 <- lm(four$pct ~ four$sum_poe)
summary(four_md_10)
```

```
##
## Call:
## lm(formula = four$pct ~ four$sum_poe)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -34.753 -10.506   0.116   8.521  38.135
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  -21.060     14.144  -1.489   0.139
## four$sum_poe   31.433      6.236   5.041 1.33e-06 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 14.24 on 148 degrees of freedom
## Multiple R-squared:  0.1465, Adjusted R-squared:  0.1408
## F-statistic: 25.41 on 1 and 148 DF, p-value: 1.335e-06
```

three players:

```
three$pct <- three$pct*100
three_14 <- three[three$season == 2014,]
plot(three_14$sum_poe,three_14$pct)+text(three_14$pct ~ three_14$sum_poe, labels=three_14$team,data=thr
```



```
## integer(0)
```

```
three_md_14 <- lm(three_14$pct ~ three_14$sum_poe)
summary(three_md_14)
```

```
##
```

```
## Call:
```

```
## lm(formula = three_14$pct ~ three_14$sum_poe)
```

```
##
```

```
## Residuals:
```

```
##      Min       1Q   Median       3Q      Max
## -23.7791 -12.0189  -0.0047  10.4040  23.3130
```

```
##
```

```
## Coefficients:
```

```
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -41.96     29.45  -1.425  0.16534
## three_14$sum_poe  54.78     17.48   3.134  0.00403 **
```

```
## ---
```

```
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
##
```

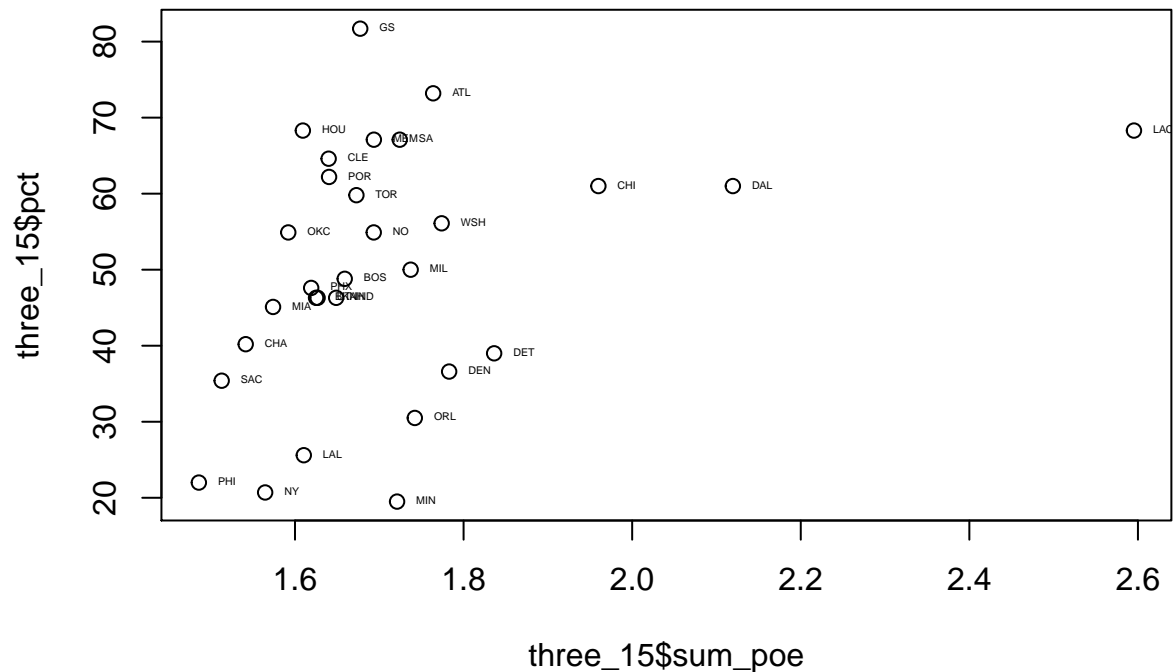
```
## Residual standard error: 13.8 on 28 degrees of freedom
```

```
## Multiple R-squared:  0.2596, Adjusted R-squared:  0.2332
```

```
## F-statistic:  9.82 on 1 and 28 DF,  p-value: 0.004025
```

```
three_15 <- three[three$season == 2015,]
```

```
plot(three_15$sum_poe,three_15$pct)+text(three_15$pct ~ three_15$sum_poe, labels=three_15$team,data=thr
```



```
## integer(0)
```

```
three_md_15 <- lm(three_15$pct ~ three_15$sum_poe)
summary(three_md_15)
```

```
##
```

```
## Call:
```

```
## lm(formula = three_15$pct ~ three_15$sum_poe)
```

```
##
```

```
## Residuals:
```

```
##      Min       1Q   Median       3Q      Max
## -30.678  -8.279  -0.401   10.288   32.730
```

```
##
```

```
## Coefficients:
```

```
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)      2.647     23.898   0.111  0.9126
## three_15$sum_poe  27.616     13.837   1.996  0.0558 .
```

```
## ---
```

```
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
##
```

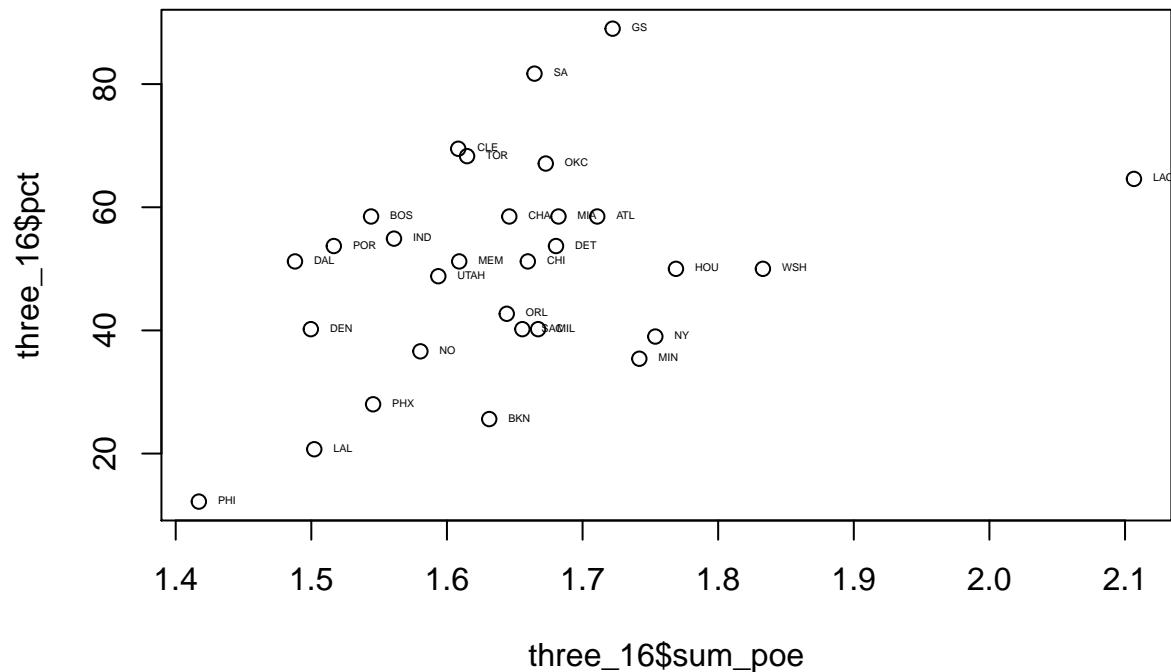
```
## Residual standard error: 15.63 on 28 degrees of freedom
```

```
## Multiple R-squared:  0.1245, Adjusted R-squared:  0.09328
```

```
## F-statistic: 3.984 on 1 and 28 DF,  p-value: 0.05576
```

```
three_16 <- three[three$season == 2016,]
```

```
plot(three_16$sum_poe,three_16$pct)+text(three_16$pct ~ three_16$sum_poe, labels=three_16$team,data=thr
```



```
## integer(0)
```

```
three_md_16 <- lm(three_16$pct ~ three_16$sum_poe)
summary(three_md_16)
```

```
##
```

```
## Call:
```

```
## lm(formula = three_16$pct ~ three_16$sum_poe)
```

```
##
```

```
## Residuals:
```

```
##      Min       1Q   Median       3Q      Max
## -26.547 -10.332   0.872   9.004  35.139
```

```
##
```

```
## Coefficients:
```

```
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -31.45     38.36  -0.820   0.4193
## three_16$sum_poe  49.53     23.27   2.129   0.0422 *
```

```
## ---
```

```
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
##
```

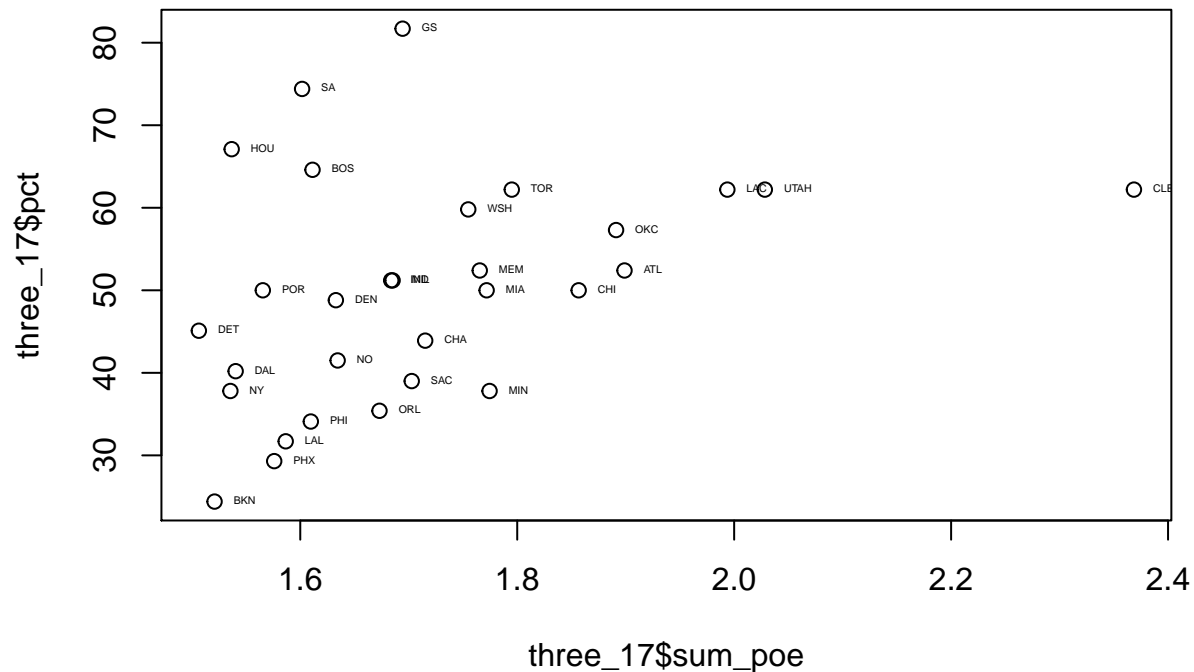
```
## Residual standard error: 15.99 on 28 degrees of freedom
```

```
## Multiple R-squared:  0.1393, Adjusted R-squared:  0.1086
```

```
## F-statistic: 4.533 on 1 and 28 DF,  p-value: 0.04218
```

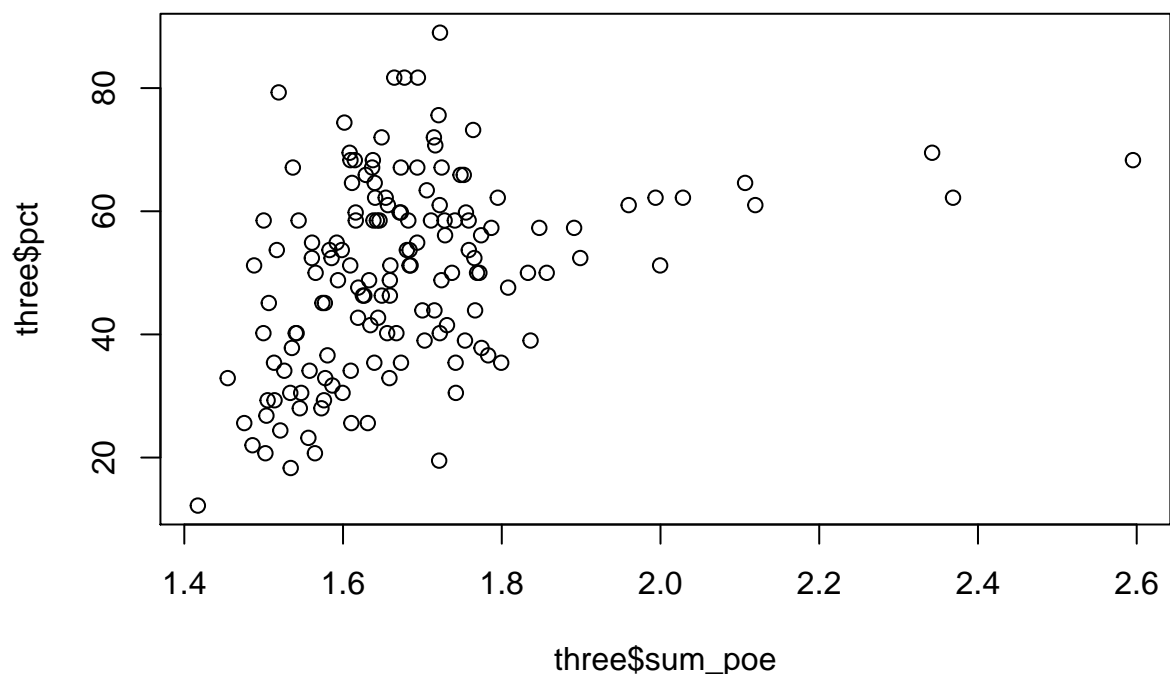
```
three_17 <- three[three$season == 2017,]
```

```
plot(three_17$sum_poe,three_17$pct)+text(three_17$pct ~ three_17$sum_poe, labels=three_17$team,data=thr
```



```
## integer(0)
three_md_17 <- lm(three_17$pct ~ three_17$sum_poe)
summary(three_md_17)

##
## Call:
## lm(formula = three_17$pct ~ three_17$sum_poe)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -20.066  -6.852  -0.252   4.065  32.344
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)      1.566      22.258   0.070  0.9444
## three_17$sum_poe 28.206      12.891   2.188  0.0372 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 12.83 on 28 degrees of freedom
## Multiple R-squared:  0.146, Adjusted R-squared:  0.1155
## F-statistic: 4.787 on 1 and 28 DF,  p-value: 0.03718
plot(three$sum_poe,three$pct)
```

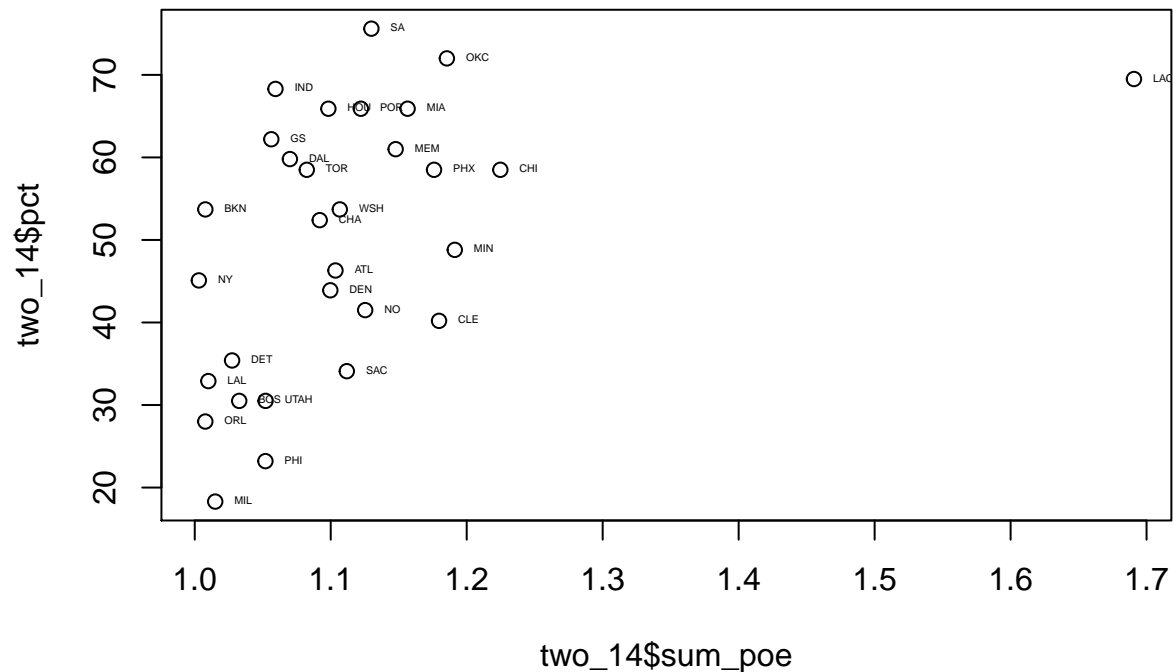


```
three_md_10 <- lm(three$pct ~ three$sum_poe)
summary(three_md_10)
```

```
##
## Call:
## lm(formula = three$pct ~ three$sum_poe)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -31.935 -11.082  -0.276   9.647  37.528
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -8.535     12.119  -0.704   0.482
## three$sum_poe   34.844       7.181   4.853 3.06e-06 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 14.32 on 148 degrees of freedom
## Multiple R-squared:  0.1373, Adjusted R-squared:  0.1314
## F-statistic: 23.55 on 1 and 148 DF, p-value: 3.06e-06
```

two players:

```
two$pct <- two$pct*100
two_14 <- two[two$season == 2014,]
plot(two_14$sum_poe,two_14$pct)+text(two_14$pct ~ two_14$sum_poe, labels=two_14$team,data=two_14, cex=0
```

```
## integer(0)
```

```
two_md_14 <- lm(two_14$pct ~ two_14$sum_poe)
summary(two_md_14)
```

```
##
```

```
## Call:
```

```
## lm(formula = two_14$pct ~ two_14$sum_poe)
```

```
##
```

```
## Residuals:
```

```
##      Min       1Q   Median       3Q      Max
## -26.147 -12.513   1.799  11.767  24.697
```

```
##
```

```
## Coefficients:
```

```
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -12.62     23.83  -0.529   0.6006
## two_14$sum_poe   56.22     21.26   2.644   0.0133 *
```

```
## ---
```

```
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
##
```

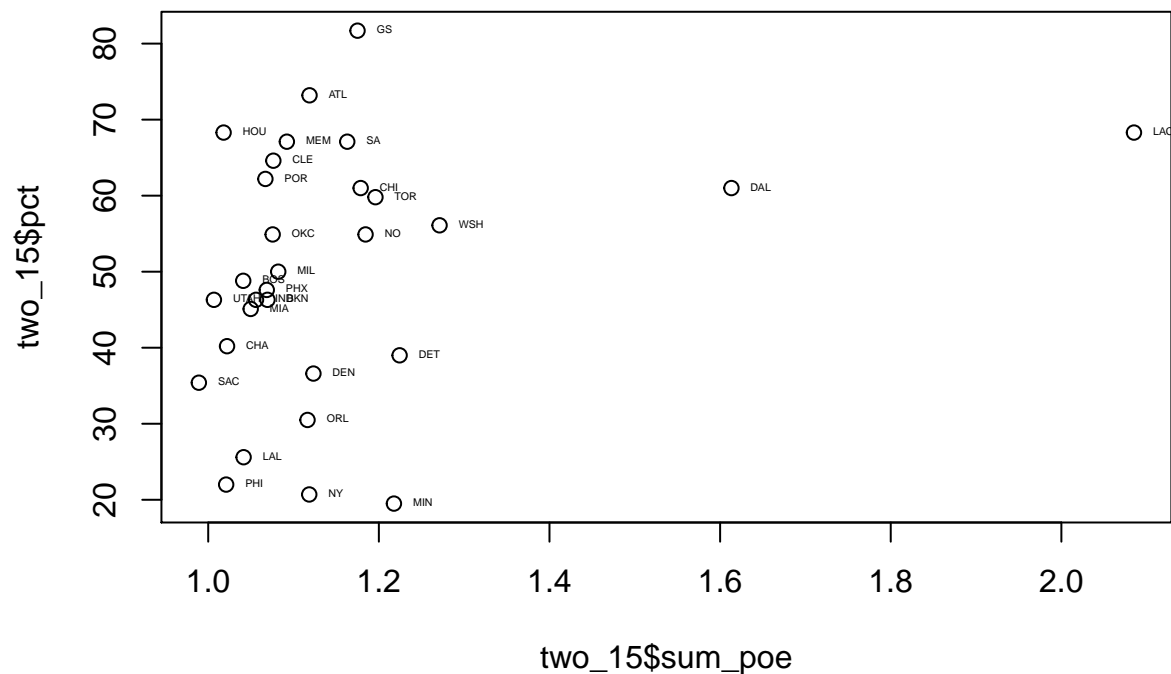
```
## Residual standard error: 14.34 on 28 degrees of freedom
```

```
## Multiple R-squared:  0.1998, Adjusted R-squared:  0.1712
```

```
## F-statistic: 6.991 on 1 and 28 DF,  p-value: 0.01327
```

```
two_15 <- two[two$season == 2015,]
```

```
plot(two_15$sum_poe,two_15$pct)+text(two_15$pct ~ two_15$sum_poe, labels=two_15$team,data=two_15, cex=0
```



```
## integer(0)
```

```
two_md_15 <- lm(two_15$pct ~ two_15$sum_poe)
summary(two_md_15)
```

```
##
```

```
## Call:
```

```
## lm(formula = two_15$pct ~ two_15$sum_poe)
```

```
##
```

```
## Residuals:
```

```
##      Min       1Q   Median       3Q      Max
## -31.977  -9.925   0.098  10.001  31.181
```

```
##
```

```
## Coefficients:
```

```
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)      24.12      16.41   1.470   0.153
## two_15$sum_poe    22.47      14.02   1.603   0.120
```

```
##
```

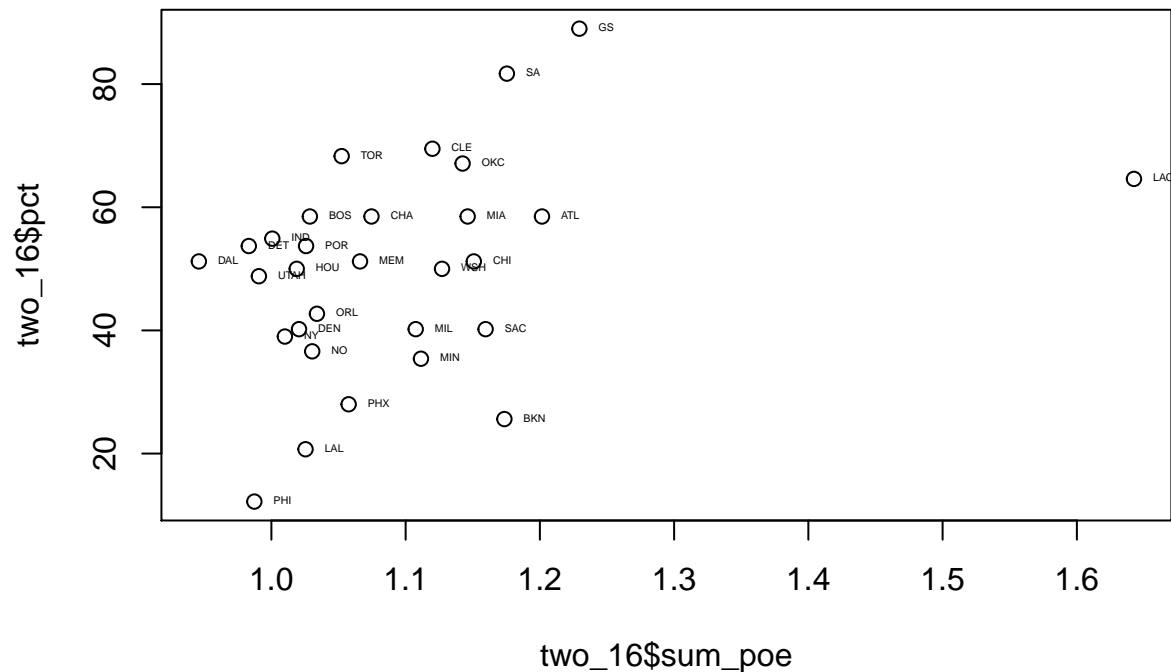
```
## Residual standard error: 15.99 on 28 degrees of freedom
```

```
## Multiple R-squared:  0.08406,    Adjusted R-squared:  0.05135
```

```
## F-statistic: 2.57 on 1 and 28 DF,  p-value: 0.1202
```

```
two_16 <- two[two$season == 2016,]
```

```
plot(two_16$sum_poe,two_16$pct)+text(two_16$pct ~ two_16$sum_poe, labels=two_16$team,data=two_16, cex=0
```



```
## integer(0)
```

```
two_md_16 <- lm(two_16$pct ~ two_16$sum_poe)
summary(two_md_16)
```

##

```
## Call:
```

```
## lm(formula = two_16$pct ~ two_16$sum_poe)
```

##

```
## Residuals:
```

##	Min	1Q	Median	3Q	Max
##	-32.563	-10.378	2.953	9.399	32.447

##

```
## Coefficients:
```

##	Estimate	Std. Error	t value	Pr(> t)
## (Intercept)	-3.318	25.861	-0.128	0.8988
## two_16\$sum_poe	48.699	23.473	2.075	0.0473 *

```
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

##

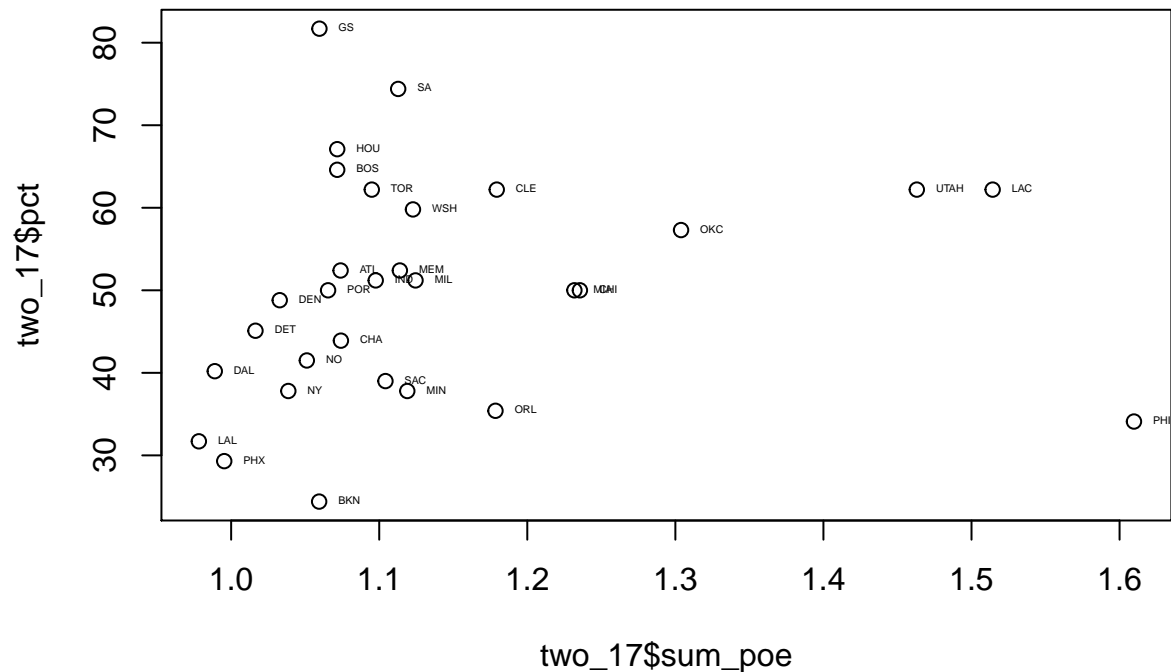
```
## Residual standard error: 16.04 on 28 degrees of freedom
```

```
## Multiple R-squared:  0.1332, Adjusted R-squared:  0.1023
```

```
## F-statistic: 4.304 on 1 and 28 DF,  p-value: 0.04732
```

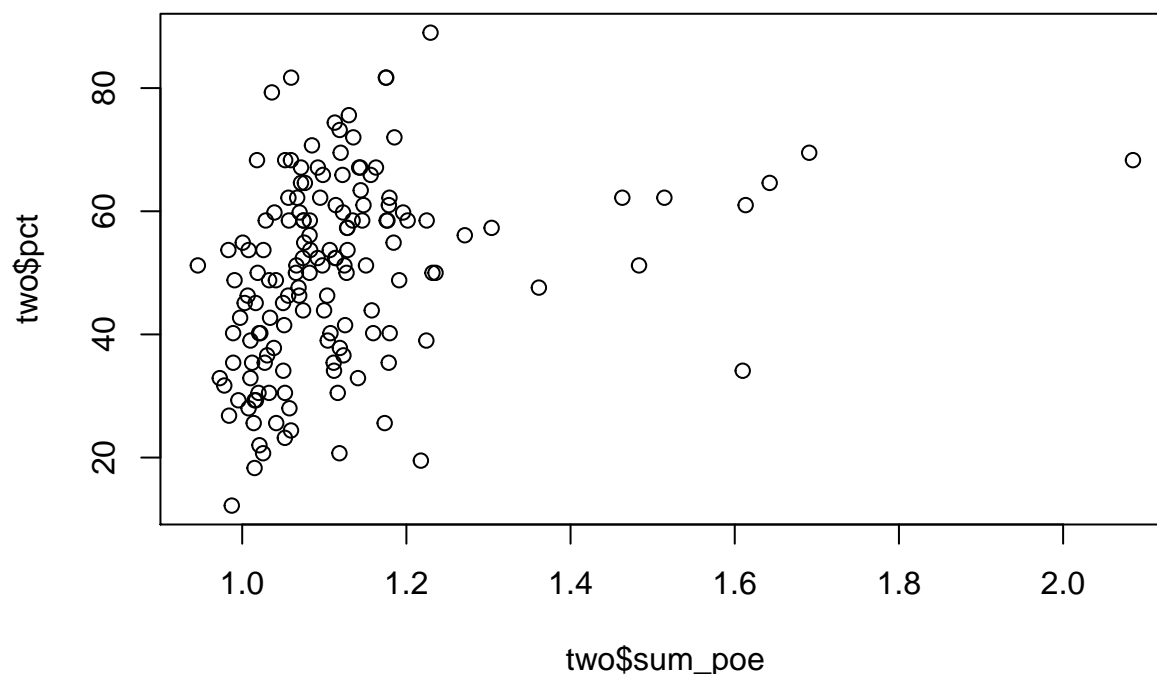
```
two_17 <- two[two$season == 2017,]
```

```
plot(two_17$sum_poe,two_17$pct)+text(two_17$pct ~ two_17$sum_poe, labels=two_17$team,data=two_17, cex=0
```



```
## integer(0)
two_md_17 <- lm(two_17$pct ~ two_17$sum_poe)
summary(two_md_17)

##
## Call:
## lm(formula = two_17$pct ~ two_17$sum_poe)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -24.519  -9.834   0.619   7.673  32.778
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)      34.65      19.25   1.800  0.0827 .
## two_17$sum_poe    13.47      16.75   0.804  0.4283
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 13.73 on 28 degrees of freedom
## Multiple R-squared:  0.02255,    Adjusted R-squared:  -0.01235
## F-statistic: 0.6461 on 1 and 28 DF,  p-value: 0.4283
plot(two$sum_poe,two$pct)
```

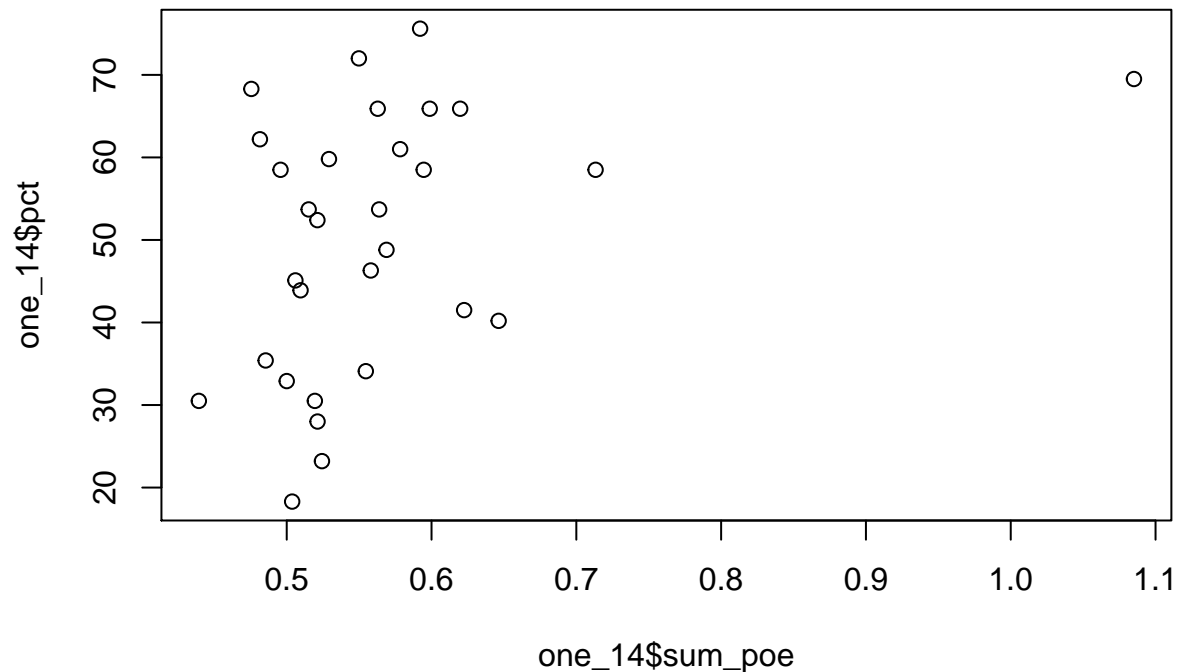


```
two_md_10 <- lm(two$pct ~ two$sum_poe)
summary(two_md_10)
```

```
##
## Call:
## lm(formula = two$pct ~ two$sum_poe)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -33.744 -10.914   1.342   9.850  35.669
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)   15.820     9.172   1.725 0.086648 .
## two$sum_poe   30.511     8.117   3.759 0.000245 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 14.73 on 148 degrees of freedom
## Multiple R-squared:  0.08715,    Adjusted R-squared:  0.08098
## F-statistic: 14.13 on 1 and 148 DF,  p-value: 0.000245
```

one players:

```
one$pct <- one$pct*100
one_14 <- one[one$season == 2014,]
plot(one_14$sum_poe,one_14$pct)+text(ten_14$pct ~ ten_14$sum_poe, labels=ten_14$team,data=ten_14, cex=0
```



```
## integer(0)
```

```
one_md_14 <- lm(one_14$pct ~ one_14$sum_poe)
summary(one_md_14)
```

```
##
```

```
## Call:
```

```
## lm(formula = one_14$pct ~ one_14$sum_poe)
```

```
##
```

```
## Residuals:
```

```
##      Min       1Q   Median       3Q      Max
## -28.6721 -12.7919  -0.1711  11.8366  24.2219
```

```
##
```

```
## Coefficients:
```

```
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)      21.85       14.03   1.557  0.1306
## one_14$sum_poe    49.87       24.37   2.046  0.0502 .
```

```
## ---
```

```
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
##
```

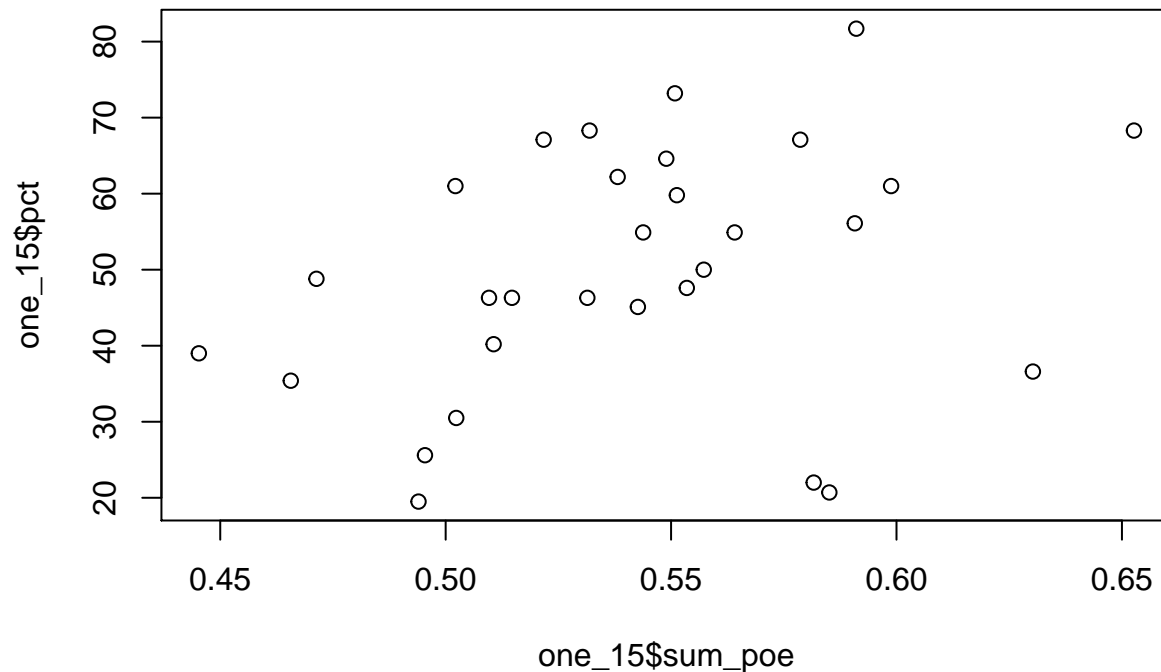
```
## Residual standard error: 14.96 on 28 degrees of freedom
```

```
## Multiple R-squared:  0.1301, Adjusted R-squared:  0.09902
```

```
## F-statistic: 4.187 on 1 and 28 DF,  p-value: 0.05023
```

```
one_15 <- one[one$season == 2015,]
```

```
plot(one_15$sum_poe,one_15$pct)+text(ten_15$pct ~ ten_15$sum_poe, labels=ten_15$team,data=ten_15, cex=0
```



```
## integer(0)
```

```
one_md_15 <- lm(one_15$pct ~ one_15$sum_poe)
summary(one_md_15)
```

```
##
```

```
## Call:
```

```
## lm(formula = one_15$pct ~ one_15$sum_poe)
```

```
##
```

```
## Residuals:
```

```
##      Min       1Q   Median       3Q      Max
## -34.117  -5.839   0.270  11.643  26.218
```

```
##
```

```
## Coefficients:
```

```
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -10.30      33.71  -0.306   0.7621
## one_15$sum_poe  111.30      61.99   1.795   0.0834 .
```

```
## ---
```

```
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
##
```

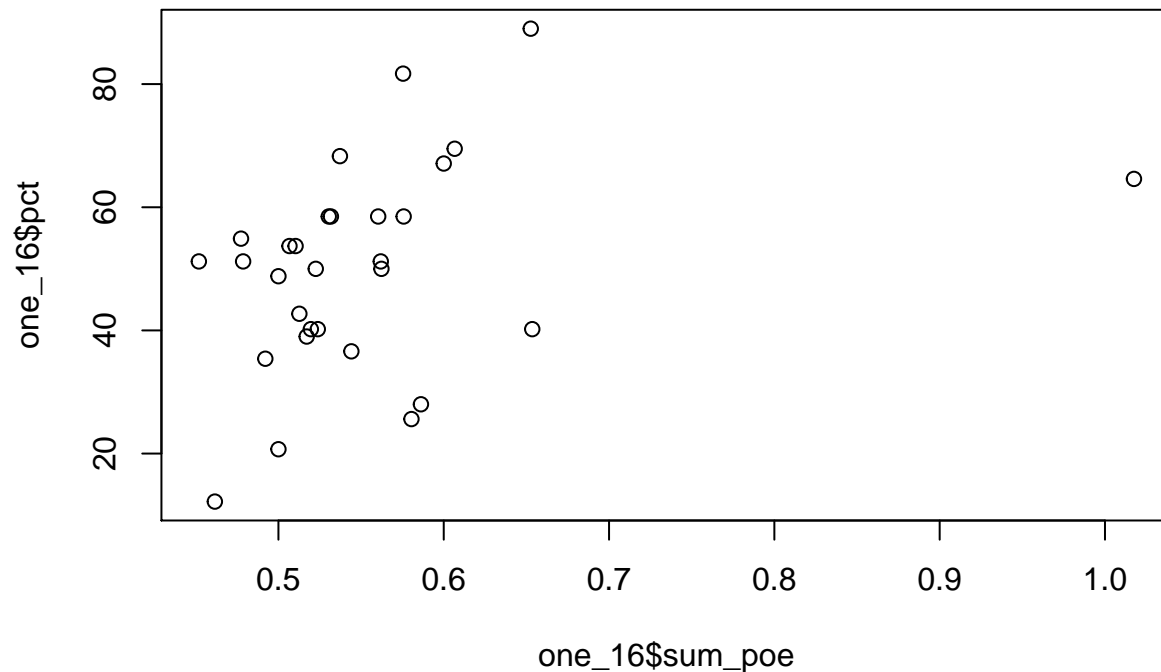
```
## Residual standard error: 15.82 on 28 degrees of freedom
```

```
## Multiple R-squared:  0.1032, Adjusted R-squared:  0.07122
```

```
## F-statistic: 3.224 on 1 and 28 DF,  p-value: 0.08338
```

```
one_16 <- one[one$season == 2016,]
```

```
plot(one_16$sum_poe,one_16$pct)+text(ten_16$pct ~ ten_16$sum_poe, labels=ten_16$team,data=ten_16, cex=0
```



```
## integer(0)
```

```
one_md_16 <- lm(one_16$pct ~ one_16$sum_poe)
summary(one_md_16)
```

```
##
```

```
## Call:
```

```
## lm(formula = one_16$pct ~ one_16$sum_poe)
```

```
##
```

```
## Residuals:
```

```
##      Min       1Q   Median       3Q      Max
## -32.412 -10.428   1.926   9.084  33.394
```

```
##
```

```
## Coefficients:
```

```
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)      18.06      16.83   1.073  0.2925
## one_16$sum_poe    57.53      29.86   1.927  0.0642 .
```

```
## ---
```

```
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
##
```

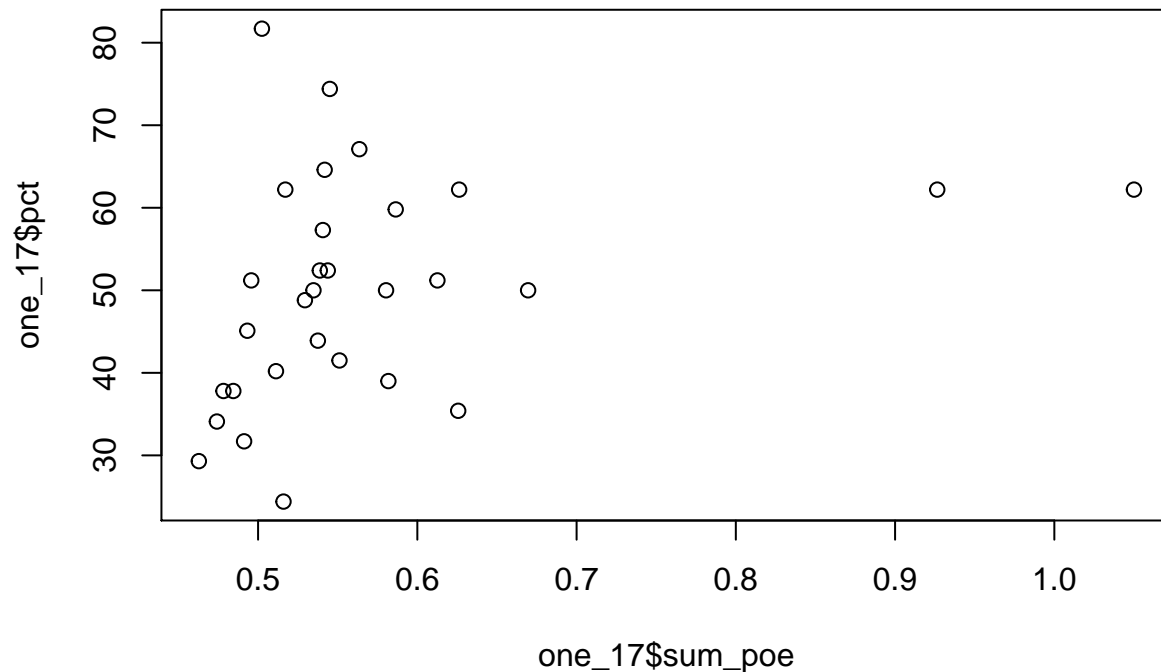
```
## Residual standard error: 16.19 on 28 degrees of freedom
```

```
## Multiple R-squared:  0.1171, Adjusted R-squared:  0.08556
```

```
## F-statistic: 3.713 on 1 and 28 DF,  p-value: 0.06418
```

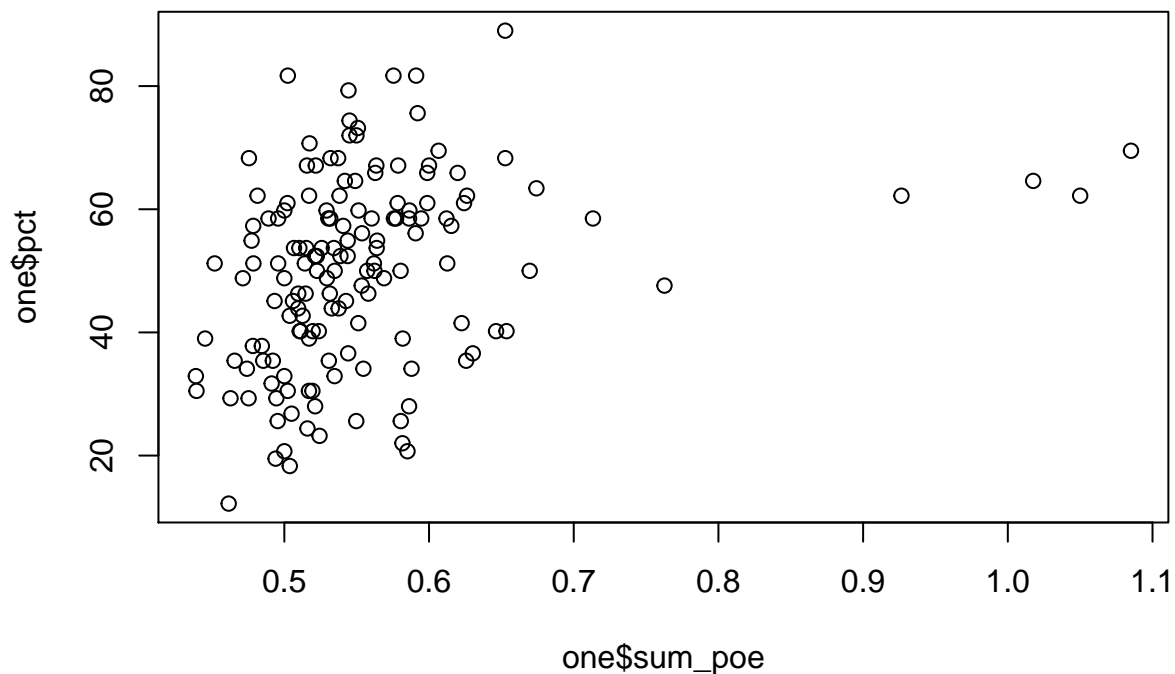
```
one_17 <- one[one$season == 2017,]
```

```
plot(one_17$sum_poe,one_17$pct)+text(ten_17$pct ~ ten_17$sum_poe, labels=ten_17$team,data=ten_17, cex=0
```

```
## integer(0)
one_md_17 <- lm(one_17$pct ~ one_17$sum_poe)
summary(one_md_17)

##
## Call:
## lm(formula = one_17$pct ~ one_17$sum_poe)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -23.682  -8.672  -0.331   7.219  34.094
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)      29.94      11.41   2.624  0.0139 *
## one_17$sum_poe    35.16      19.56   1.798  0.0830 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 13.15 on 28 degrees of freedom
## Multiple R-squared:  0.1035, Adjusted R-squared:  0.07147
## F-statistic: 3.232 on 1 and 28 DF,  p-value: 0.083
plot(one$sum_poe,one$pct)
```



```
one_md_10 <- lm(one$pct ~ one$sum_poe)
summary(one_md_10)
```

```
##
## Call:
## lm(formula = one$pct ~ one$sum_poe)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -33.145 -11.424   0.953   9.725  34.329
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)   22.476     7.183   3.129 0.002113 **
## one$sum_poe   49.551    12.750   3.886 0.000153 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 14.68 on 148 degrees of freedom
## Multiple R-squared:  0.0926, Adjusted R-squared:  0.08646
## F-statistic: 15.1 on 1 and 148 DF, p-value: 0.0001532
```