Salary MLR 2nd Draft

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Contents


```
#install.packages(c("pacman","tidyverse","randomForest","parallel","rpart","readr","janitor","car","MAS
# library(tidyverse)
# library(randomForest)
# library(parallel)
# library(rpart)
# library(readr)
# library(janitor)
# library(car)
# library(MASS)
# library(Hmisc)
# library(rstatix)
# library(forcats)
# library(GGally)
# library(performance)
# library(caret)
# library(lmtest)
```

```
# library(corrplot)
# library(PerformanceAnalytics)
# library(plotly)
# library(mlbench)
pacman::p_load(tidymodels,randomForest,parallel,rpart,readr,janitor,car,MASS,Hmisc,rstatix,GGally,perfo
step <- stats::step
```

Intro

blahblahblah Hi

Question - How do the various stats from the ESPN website explain the salaries of NBA players?

Where data is from

Variables explained

Data Exploration

```
# Load dataset

players <- read_csv("players.csv")
```

```
## Rows: 558 Columns: 12
## -- Column specification --------------------------------------------------------
## Delimiter: ","
## chr (5): Name, Position, Team, Height, College
## dbl (7): Age, Height_i, Weight, Salary, Points, Rebounds, Assists
##
## i Use `spec()` to retrieve the full column specification for this data.
## i Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

```
active_p <- read_csv("active_players_2.csv")
```

```
## Rows: 558 Columns: 9
## -- Column specification --------------------------------------------------------
## Delimiter: ","
## chr (5): Name, Team, Position, Height, College
## dbl (4): Age, Height_i, Weight, Salary
##
## i Use `spec()` to retrieve the full column specification for this data.
## i Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

```
# Structure/Dimensions of the data.frame
str(active_p)
```

```
## spec_tbl_df [558 x 9] (S3: spec_tbl_df/tbl_df/tbl/data.frame)
##  $ Name    : chr [1:558] "Juhann Begarin" "Jaylen Brown" "Kris Dunn" "Carsen Edwards" ...
##  $ Team    : chr [1:558] "Boston Celtics" "Boston Celtics" "Boston Celtics" "Boston Celtics" ...
##  $ Position: chr [1:558] "SG" "SG" "PG" "PG" ...
##  $ Age     : num [1:558] 19 24 27 23 25 23 35 29 26 21 ...
##  $ Height  : chr [1:558] "6' 5\"" "6' 6\"" "6' 3\"" "5' 11\"" ...
##  $ Height_i: num [1:558] 6.5 6.6 6.3 5.11 7.5 6.9 6.9 6.1 7.2 6.4 ...
##  $ Weight  : num [1:558] 185 223 205 200 311 240 240 250 250 216 ...
##  $ College : chr [1:558] "nan" "California" "Providence" "Purdue" ...
##  $ Salary  : num [1:558] NaN 26758928 5005350 1782621 NaN ...
```

```
##  - attr(*, "spec")=
##   .. cols(
##   ..   Name = col_character(),
##   ..   Team = col_character(),
##   ..   Position = col_character(),
##   ..   Age = col_double(),
##   ..   Height = col_character(),
##   ..   Height_i = col_double(),
##   ..   Weight = col_double(),
##   ..   College = col_character(),
##   ..   Salary = col_double()
##   .. )
##  - attr(*, "problems")=<externalptr>
```

```
# Number of columns containing `NA` or `NaN`
colSums(is.na(active_p))
```

```
##     Name     Team Position      Age   Height Height_i   Weight  College
##        0        0        0        0        0        0        0        0
##   Salary
##      113
```

Data Cleaning

```
#identifying the rows with NAs
rownames(active_p)[apply(active_p, 2, anyNA)]
```

```
##  [1] "9"   "18"  "27"  "36"  "45"  "54"  "63"  "72"  "81"  "90"  "99"  "108"
## [13] "117" "126" "135" "144" "153" "162" "171" "180" "189" "198" "207" "216"
## [25] "225" "234" "243" "252" "261" "270" "279" "288" "297" "306" "315" "324"
## [37] "333" "342" "351" "360" "369" "378" "387" "396" "405" "414" "423" "432"
## [49] "441" "450" "459" "468" "477" "486" "495" "504" "513" "522" "531" "540"
## [61] "549" "558"
```

```
#removing all `Salary` observations with NAs
ap_cl <- active_p[!(is.na(active_p$Salary)), ]
```

```
# Checking for leftover `NA` after cleaning
rownames(active_p)[apply(ap_cl, 2, anyNA)]
```

```
## character(0)
```

```
# Transforming Team,Position,College into factors
ap_cl_f <- transform (
  ap_cl,
  fTeam = as.factor(Team),
  fPosition = as.factor(Position),
  fCollege = as.factor(College)
)
```

```
# Rename `fCollege` factor level "nan" as "None"
# levels(ap_cl_f$fCollege)[levels(ap_cl_f$fCollege)=="nan"] <- "None"
#levels(ap_cl_f$fCollege)
```

```
str(ap_cl_f)
```

```
## 'data.frame':    445 obs. of  12 variables:
```

```
##  $ Name     : chr  "Jaylen Brown" "Kris Dunn" "Carsen Edwards" "Bruno Fernando" ...
##  $ Team     : chr  "Boston Celtics" "Boston Celtics" "Boston Celtics" "Boston Celtics" ...
##  $ Position : chr  "SG" "PG" "PG" "F" ...
##  $ Age      : num  24 27 23 23 35 29 21 21 26 23 ...
##  $ Height   : chr  "6' 6\"" "6' 3\"" "5' 11\"" "6' 9\"" ...
##  $ Height_i : num  6.6 6.3 5.11 6.9 6.9 6.1 6.4 6.5 6.8 6.1 ...
##  $ Weight   : num  223 205 200 240 240 250 216 215 245 195 ...
##  $ College  : chr  "California" "Providence" "Purdue" "Maryland" ...
##  $ Salary   : num  26758928 5005350 1782621 1782621 27000000 ...
##  $ fTeam    : Factor w/ 30 levels "Atlanta Hawks",..: 2 2 2 2 2 2 2 2 2 2 ...
##  $ fPosition: Factor w/ 7 levels "C","F","G","PF",..: 7 5 5 2 1 1 7 6 4 5 ...
##  $ fCollege : Factor w/ 119 levels "Alabama","Arizona",..: 15 79 80 50 26 41 36 104 25 75 ...
```

```
# Start with `ap_cl_f` data.frame, reclassify as tibble

ap_tibble <- as_tibble(ap_cl_f)
class(ap_tibble)
```

```
## [1] "tbl_df"     "tbl"        "data.frame"
```

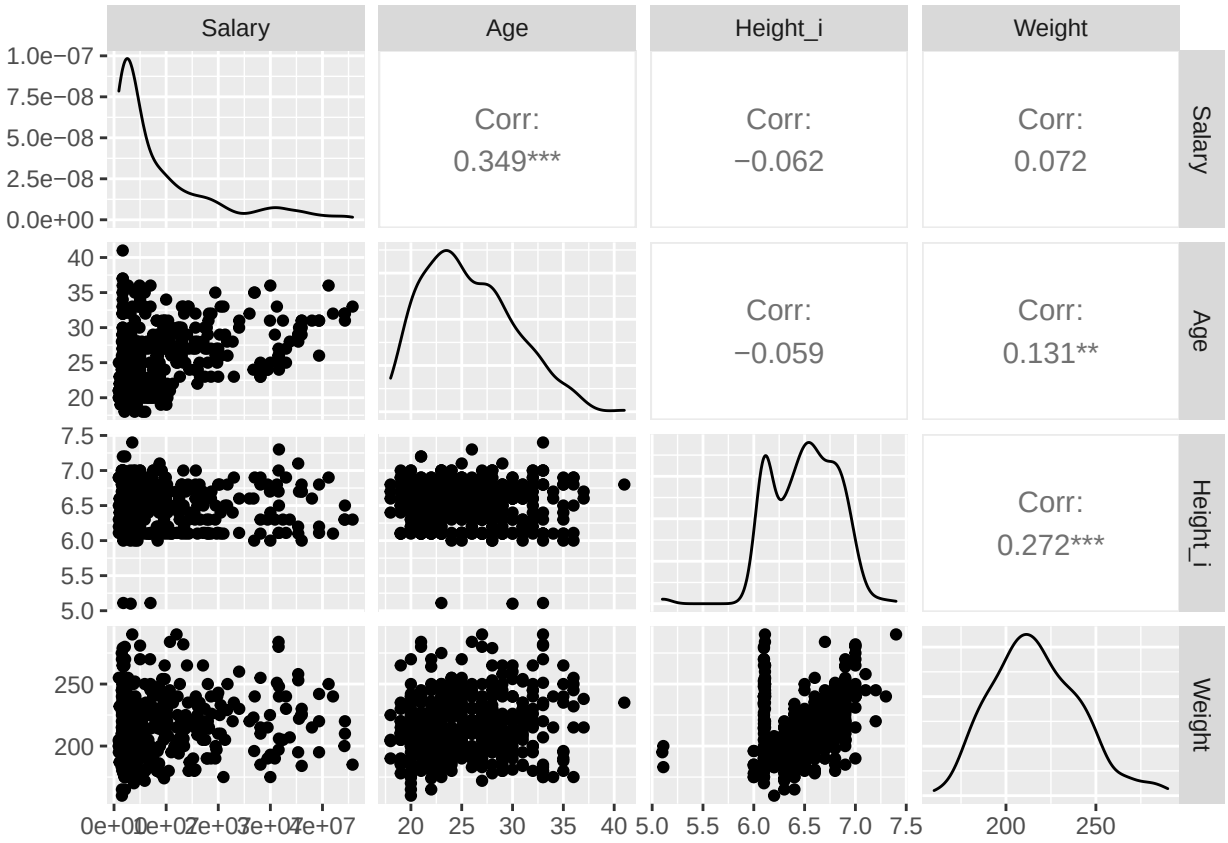
```
str(ap_tibble)
```

```
## tibble [445 x 12] (S3: tbl_df/tbl/data.frame)
##  $ Name     : chr [1:445] "Jaylen Brown" "Kris Dunn" "Carsen Edwards" "Bruno Fernando" ...
##  $ Team     : chr [1:445] "Boston Celtics" "Boston Celtics" "Boston Celtics" "Boston Celtics" ...
##  $ Position : chr [1:445] "SG" "PG" "PG" "F" ...
##  $ Age      : num [1:445] 24 27 23 23 35 29 21 21 26 23 ...
##  $ Height   : chr [1:445] "6' 6\"" "6' 3\"" "5' 11\"" "6' 9\"" ...
##  $ Height_i : num [1:445] 6.6 6.3 5.11 6.9 6.9 6.1 6.4 6.5 6.8 6.1 ...
##  $ Weight   : num [1:445] 223 205 200 240 240 250 216 215 245 195 ...
##  $ College  : chr [1:445] "California" "Providence" "Purdue" "Maryland" ...
##  $ Salary   : num [1:445] 26758928 5005350 1782621 1782621 27000000 ...
##  $ fTeam    : Factor w/ 30 levels "Atlanta Hawks",..: 2 2 2 2 2 2 2 2 2 2 ...
##  $ fPosition: Factor w/ 7 levels "C","F","G","PF",..: 7 5 5 2 1 1 7 6 4 5 ...
##  $ fCollege : Factor w/ 119 levels "Alabama","Arizona",..: 15 79 80 50 26 41 36 104 25 75 ...
```

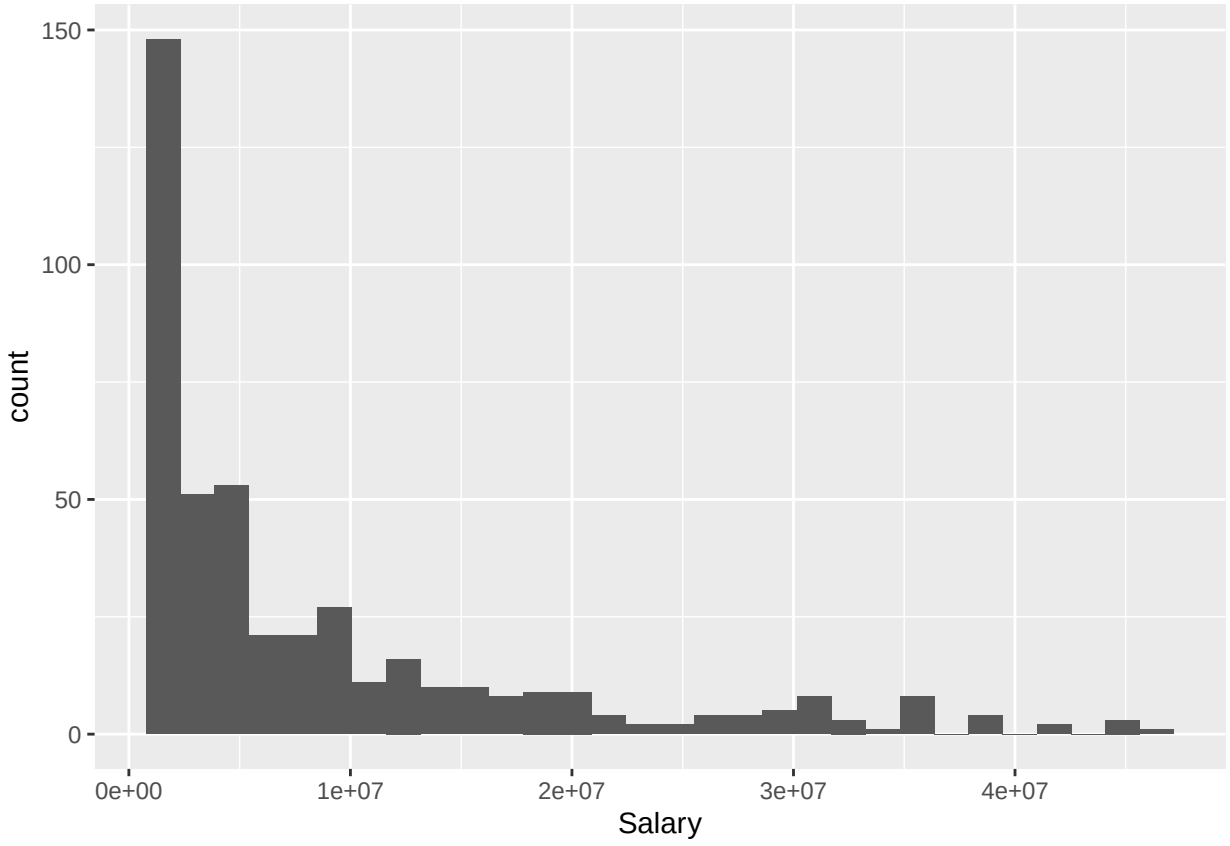
Model Building

Initial Graphs

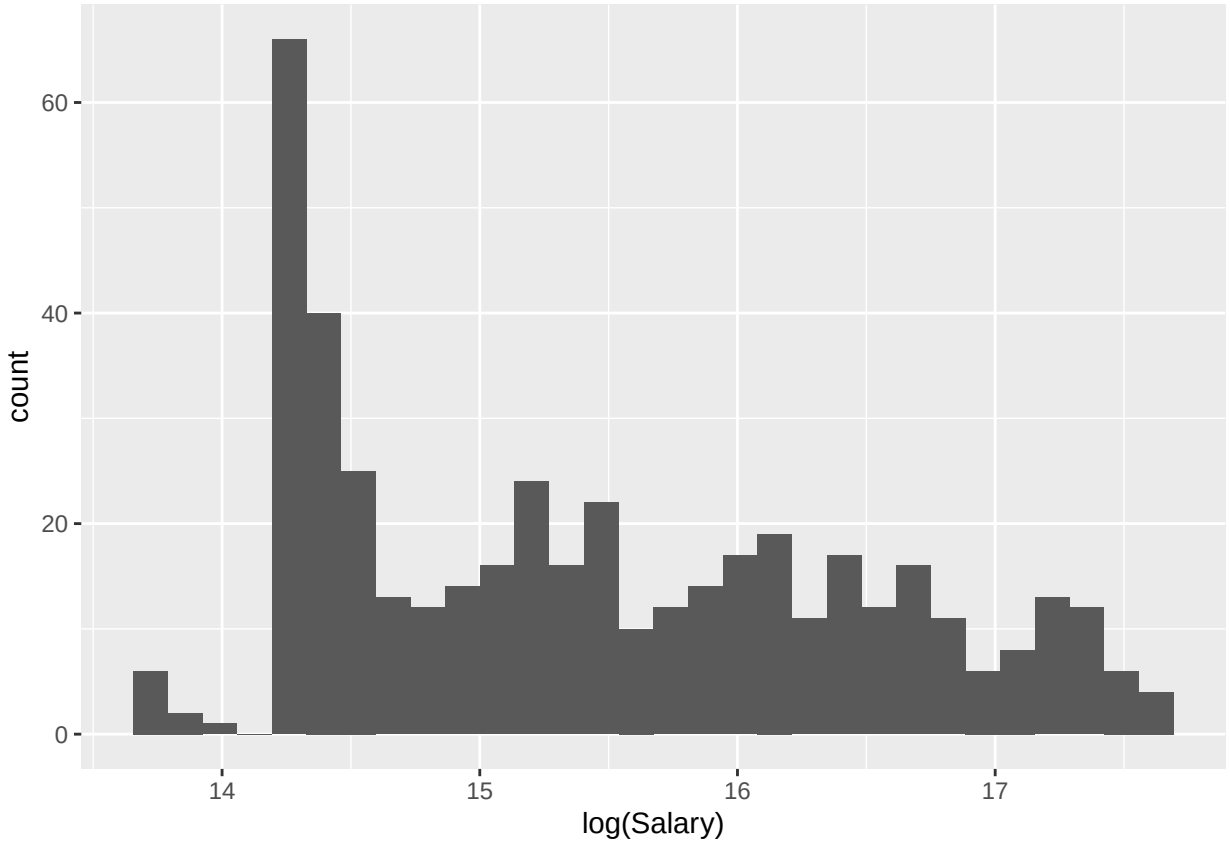
```
# The diagonal consists of the densities of the three variables and the upper panels consist of the cor

ggpairs(ap_tibble, columns = c(9,4,6,7), cardinality_threshold = NULL)
```




```
ggplot(ap_tibble, aes(Salary)) +
  geom_histogram(bins = 30)
```




```
ggplot(ap_tibble, aes(log(Salary))) +
  geom_histogram(bins = 30)
```



Full(Initial) Model

```
summary(lm1 <- lm(Salary ~ fTeam+fPosition+fCollege+Age+Height_i+Weight, data=ap_tibble))
```

```
##
## Call:
## lm(formula = Salary ~ fTeam + fPosition + fCollege + Age + Height_i +
##     Weight, data = ap_tibble)
##
## Residuals:
##       Min        1Q    Median        3Q       Max
## -18232129  -4355864         0   2782057  27394419
##
## Coefficients:
##                                 Estimate Std. Error t value Pr(>|t|)
## (Intercept)                   -43409716   16626942  -2.611 0.009506 **
## fTeamBoston Celtics            -2139600    3999655  -0.535 0.593100
## fTeamBrooklyn Nets              1376171    3812791   0.361 0.718412
## fTeamCharlotte Hornets         -2482487    3742196  -0.663 0.507620
## fTeamChicago Bulls              1451456    4130193   0.351 0.725526
## fTeamCleveland Cavaliers        2396367    4078738   0.588 0.557310
## fTeamDallas Mavericks          -2179304    3816160  -0.571 0.568396
## fTeamDenver Nuggets              618798    3904190   0.158 0.874177
## fTeamDetroit Pistons           -3902716    3911500  -0.998 0.319236
## fTeamGolden State Warriors     -1024287    3989880  -0.257 0.797577
## fTeamHouston Rockets           -2388664    3848381  -0.621 0.535292
```

```
## fTeamIndiana Pacers                -391881    3957015  -0.099 0.921180
## fTeamLos Angeles Clippers         -1764702    4039118  -0.437 0.662509
## fTeamLos Angeles Lakers           -3269636    4131496  -0.791 0.429366
## fTeamMemphis Grizzlies            -2112003    3994901  -0.529 0.597438
## fTeamMiami Heat                   -3585954    4065171  -0.882 0.378449
## fTeamMilwaukee Bucks                965708    4021669   0.240 0.810403
## fTeamMinnesota Timberwolves        4551282    4220656   1.078 0.281786
## fTeamNew Orleans Pelicans          -647960    3745909  -0.173 0.862790
## fTeamNew York Knicks              -1878918    3824003  -0.491 0.623554
## fTeamOklahoma City Thunder        -2754850    3934686  -0.700 0.484402
## fTeamOrlando Magic                -1166824    3960187  -0.295 0.768482
## fTeamPhiladelphia Sixers            605822    3977677   0.152 0.879053
## fTeamPhoenix Suns                   917437    4004371   0.229 0.818947
## fTeamPortland Trail Blazers       -5390573    4402004  -1.225 0.221737
## fTeamSacremento Kings              1570102    4017930   0.391 0.696253
## fTeamSan Antonio Spurs             -473258    3895515  -0.121 0.903389
## fTeamToronto Raptors              -1433236    4269557  -0.336 0.737351
## fTeamUtah Jazz                     1116045    4098972   0.272 0.785606
## fTeamWashington Wizards           -1153886    3721264  -0.310 0.756725
## fPositionF                         1204828    4375387   0.275 0.783233
## fPositionG                        10656218    5190359   2.053 0.040968 *
## fPositionPF                        2889966    1929730   1.498 0.135332
## fPositionPG                       11138355    2996036   3.718 0.000242 ***
## fPositionSF                        6497102    2150070   3.022 0.002738 **
## fPositionSG                        7196111    2549099   2.823 0.005089 **
## fCollegeArizona                     660692    5617835   0.118 0.906462
## fCollegeArizona State              9982902    7299120   1.368 0.172477
## fCollegeArkansas                    469247    6682154   0.070 0.944064
## fCollegeAuburn                     1571889    7223599   0.218 0.827891
## fCollegeBaylor                    -2481774    6392019  -0.388 0.698109
## fCollegeBelmont                   -4855131   10707722  -0.453 0.650585
## fCollegeBoise State               -3368144   10882863  -0.309 0.757172
## fCollegeBoston College            -2494383   10912629  -0.229 0.819359
## fCollegeBowling Green              4292252   10993543   0.390 0.696504
## fCollegeBucknell                   -955784   11010106  -0.087 0.930883
## fCollegeButler                     5918936    8385665   0.706 0.480858
## fCollegeBYU                       -7249423   10885559  -0.666 0.505965
## fCollegeCal Poly                  -2510893   10854196  -0.231 0.817223
## fCollegeCalifornia                20654255   10910430   1.893 0.059350 .
## fCollegeCharleston                -7563826   10944739  -0.691 0.490064
## fCollegeCleveland State           -3436899   10754028  -0.320 0.749509
## fCollegeColorado                   3697341    7210164   0.513 0.608487
## fCollegeConnecticut                2729879    6316981   0.432 0.665956
## fCollegeCreighton                   117698    8236695   0.014 0.988609
## fCollegeDavidson                  33917971   10894796   3.113 0.002037 **
## fCollegeDayton                     4072786   10799793   0.377 0.706364
## fCollegeDePaul                    -3115672    8308080  -0.375 0.707924
## fCollegeDrexel                    -6131316   10875214  -0.564 0.573337
## fCollegeDuke                       3327920    4889327   0.681 0.496640
## fCollegeFlorida                    7222763    6360647   1.136 0.257094
## fCollegeFlorida State              2056866    5638667   0.365 0.715544
## fCollegeFresno State              28832960   10936707   2.636 0.008835 **
## fCollegeGeorge Washington         -4562823   10945256  -0.417 0.677079
## fCollegeGeorgetown                -4952188    7222440  -0.686 0.493475
```

```
## fCollegeGeorgia                    1704338    7265198   0.235 0.814694
## fCollegeGeorgia Tech               -162680    7296193  -0.022 0.982227
## fCollegeGonzaga                    3856775    5893987   0.654 0.513404
## fCollegeHouston                   -4382913    8216914  -0.533 0.594167
## fCollegeIllinois                  -2109111    8695076  -0.243 0.808516
## fCollegeIndiana                    2041078    5902780   0.346 0.729759
## fCollegeIowa State                -1846631    6292715  -0.293 0.769385
## fCollegeIUPUI                    -11029514   11901368  -0.927 0.354836
## fCollegeKansas                     6022649    5599807   1.076 0.283047
## fCollegeKansas State              -3378939    7184555  -0.470 0.638492
## fCollegeKentucky                   7582646    4841408   1.566 0.118398
## fCollegeLehigh                    29182543   11042973   2.643 0.008676 **
## fCollegeLiberty                   -3208200   10817453  -0.297 0.767004
## fCollegeLouisiana-Lafayette       -9654690   10882355  -0.887 0.375718
## fCollegeLouisville                 5632489    6343176   0.888 0.375303
## fCollegeLoyola (MD)                3748003   10921836   0.343 0.731724
## fCollegeLSU                         356961    6584833   0.054 0.956806
## fCollegeMarquette                  6687787    7321909   0.913 0.361799
## fCollegeMarshall                 -11070017   10986738  -1.008 0.314502
## fCollegeMaryland                  -1916231    6356430  -0.301 0.763279
## fCollegeMemphis                    5812091    6643567   0.875 0.382387
## fCollegeMiami (FL)                 -811418    8207611  -0.099 0.921317
## fCollegeMichigan                   3993331    5748518   0.695 0.487821
## fCollegeMichigan State             7610990    6394741   1.190 0.234950
## fCollegeMinnesota                  2246389   10908141   0.206 0.836986
## fCollegeMississippi State         -7276374   10965548  -0.664 0.507498
## fCollegeMissouri                   -688399    7200677  -0.096 0.923903
## fCollegeMissouri State            -2738954   10820839  -0.253 0.800357
## fCollegeMurray State               1990539    8321722   0.239 0.811122
## fCollegenan                        3285715    4643254   0.708 0.479746
## fCollegeNebraska                  -1116174    8350171  -0.134 0.893756
## fCollegeNevada                    -5189084    8364267  -0.620 0.535494
## fCollegeNew Mexico                -2333981   11045614  -0.211 0.832800
## fCollegeNew Mexico JC              5006924   11080370   0.452 0.651700
## fCollegeNew Mexico State          19434510   11053679   1.758 0.079777 .
## fCollegeNorth Carolina             -949428    5521054  -0.172 0.863586
## fCollegeNorth Carolina State       3651398   10887643   0.335 0.737590
## fCollegeNotre Dame                -4567492   10892999  -0.419 0.675306
## fCollegeOhio                      -3366614   10864360  -0.310 0.756879
## fCollegeOhio State                 6567510    7284072   0.902 0.368009
## fCollegeOklahoma                    540170    7256431   0.074 0.940712
## fCollegeOklahoma State             4055621    8379129   0.484 0.628743
## fCollegeOld Dominion              -3988140   10922934  -0.365 0.715293
## fCollegeOle Miss                  -2925069   10901041  -0.268 0.788638
## fCollegeOregon                     755727    6247375   0.121 0.903801
## fCollegeOregon State              -4591241   10728739  -0.428 0.669016
## fCollegePenn State                -4050789   11386818  -0.356 0.722293
## fCollegePittsburgh                10090316   11007453   0.917 0.360077
## fCollegeProvidence                -4574929   10858708  -0.421 0.673840
## fCollegePurdue                    -4613061   11090707  -0.416 0.677764
## fCollegeRadford                  -12134400   10912877  -1.112 0.267094
## fCollegeSaint Joseph's            -1392672    8514159  -0.164 0.870183
## fCollegeSaint Mary's              -6101377    8244976  -0.740 0.459896
## fCollegeSalt Lake CC UT           -8037516   10865039  -0.740 0.460048
```

```
## fCollegeSan Diego State              9244590    7253561   1.274 0.203517
## fCollegeSMU                         -4825688    7272754  -0.664 0.507522
## fCollegeSouth Carolina              -4588005   10681331  -0.430 0.667855
## fCollegeSt. John's                  -6903125   10934001  -0.631 0.528316
## fCollegeStanford                      781509    6103557   0.128 0.898206
## fCollegeSyracuse                    -1627849    6331447  -0.257 0.797281
## fCollegeTCU                         -2381903    8336740  -0.286 0.775304
## fCollegeTennessee                    6904659    6421508   1.075 0.283167
## fCollegeTennessee State             12472584   11084456   1.125 0.261428
## fCollegeTexas                        7193501    5372870   1.339 0.181673
## fCollegeTexas A&M                    6348154    6736758   0.942 0.346821
## fCollegeTexas Tech                    156150    8670496   0.018 0.985644
## fCollegeUC Santa Barbara            -4543256   10815854  -0.420 0.674758
## fCollegeUCLA                         8760281    5414101   1.618 0.106747
## fCollegeUNLV                         6960075    7410230   0.939 0.348388
## fCollegeUSC                          3612676    5610377   0.644 0.520135
## fCollegeUSC Upstate                 -5806804   10900473  -0.533 0.594644
## fCollegeUtah                         4123587    7198620   0.573 0.567207
## fCollegeUtah State                  -2882745   10855217  -0.266 0.790766
## fCollegeVanderbilt                  -1368396    6621199  -0.207 0.836414
## fCollegeVillanova                    -148498    5520203  -0.027 0.978558
## fCollegeVirginia                      522108    5781111   0.090 0.928102
## fCollegeVirginia Commonwealth        -561324   10687760  -0.053 0.958151
## fCollegeVirginia Tech               -1338244   10510698  -0.127 0.898774
## fCollegeWake Forest                  4051041    6318899   0.641 0.521968
## fCollegeWashington                   2105986    5699779   0.369 0.712037
## fCollegeWashington State            15483585    8425597   1.838 0.067139 .
## fCollegeWeber State                31799371   11072060   2.872 0.004381 **
## fCollegeWest Virginia              -5678638    8274292  -0.686 0.493077
## fCollegeWestern Texas Coll. (J.C.) -6332252   10759470  -0.589 0.556639
## fCollegeWichita State                6661369    8415955   0.792 0.429294
## fCollegeWisconsin                   -4235075    8582977  -0.493 0.622087
## fCollegeWyoming                      1513570    8402762   0.180 0.857179
## fCollegeXavier                      -5456878    8094128  -0.674 0.500739
## fCollegeYale                        -5344975   10870850  -0.492 0.623320
## Age                                   632383     129540   4.882 1.74e-06 ***
## Height_i                               -1394    1908175  -0.001 0.999418
## Weight                                131345      38186   3.440 0.000669 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 9385000 on 288 degrees of freedom
## Multiple R-squared:  0.4155, Adjusted R-squared:  0.09891
## F-statistic: 1.312 on 156 and 288 DF,  p-value: 0.02448
```

```
shapiro.test(resid(lm1))
```

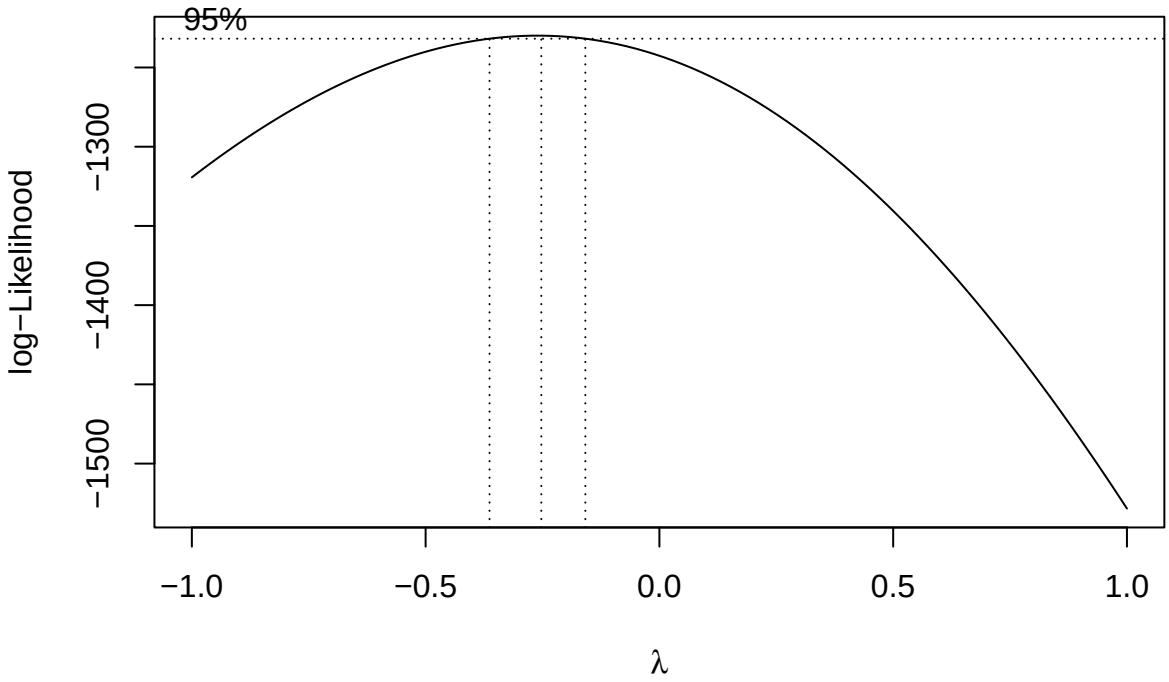
```
##
##  Shapiro-Wilk normality test
##
## data:  resid(lm1)
## W = 0.9352, p-value = 5.455e-13
```

```
bptest(lm1)
```

```
##
##  studentized Breusch-Pagan test
##
## data:  lm1
## BP = 181.76, df = 156, p-value = 0.07744
```

Box Cox

```
boxcox(lm1,lambda=seq(-1, 1, by=0.05))
```




```
BoxCoxTrans(ap_tibble$Salary)
```

```
## Box-Cox Transformation
##
## 445 data points used to estimate Lambda
##
## Input data summary:
##     Min.  1st Qu.   Median     Mean  3rd Qu.     Max.
##   925258  1802057  4447896  8813696 12000000 45780966
##
## Largest/Smallest: 49.5
## Sample Skewness: 1.75
##
## Estimated Lambda: -0.2
```

```
## With fudge factor, Lambda = 0 will be used for transformations
```

log(Full Model)

```
summary(lm_l1 <- lm(log(Salary) ~ fTeam+fPosition+fCollege+Age+Height_i+Weight, data=ap_tibble))
```

```
##
## Call:
## lm(formula = log(Salary) ~ fTeam + fPosition + fCollege + Age +
##     Height_i + Weight, data = ap_tibble)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -1.9390 -0.5096  0.0000  0.5006  2.0837
##
## Coefficients:
##                                  Estimate Std. Error t value Pr(>|t|)
## (Intercept)                     1.019e+01  1.704e+00   5.981 6.57e-09 ***
## fTeamBoston Celtics            -3.519e-01  4.098e-01  -0.859 0.391211
## fTeamBrooklyn Nets             -3.157e-01  3.907e-01  -0.808 0.419695
## fTeamCharlotte Hornets         -2.616e-01  3.834e-01  -0.682 0.495661
## fTeamChicago Bulls              5.956e-02  4.232e-01   0.141 0.888167
## fTeamCleveland Cavaliers        3.029e-01  4.179e-01   0.725 0.469158
## fTeamDallas Mavericks          -2.849e-01  3.910e-01  -0.729 0.466886
## fTeamDenver Nuggets            -1.534e-01  4.000e-01  -0.384 0.701595
## fTeamDetroit Pistons           -4.307e-01  4.008e-01  -1.075 0.283378
## fTeamGolden State Warriors     -3.802e-01  4.088e-01  -0.930 0.353184
## fTeamHouston Rockets           -4.673e-01  3.943e-01  -1.185 0.236914
## fTeamIndiana Pacers             2.479e-05  4.054e-01   0.000 0.999951
## fTeamLos Angeles Clippers      -2.494e-01  4.138e-01  -0.603 0.547291
## fTeamLos Angeles Lakers        -9.898e-01  4.233e-01  -2.338 0.020058 *
## fTeamMemphis Grizzlies         -1.615e-01  4.093e-01  -0.395 0.693389
## fTeamMiami Heat                -7.197e-01  4.165e-01  -1.728 0.085068 .
## fTeamMilwaukee Bucks           -4.504e-01  4.121e-01  -1.093 0.275300
## fTeamMinnesota Timberwolves     3.236e-01  4.325e-01   0.748 0.454928
## fTeamNew Orleans Pelicans      -1.511e-01  3.838e-01  -0.394 0.694192
## fTeamNew York Knicks           -3.476e-01  3.918e-01  -0.887 0.375776
## fTeamOklahoma City Thunder     -3.002e-01  4.031e-01  -0.745 0.457064
## fTeamOrlando Magic             -3.362e-02  4.058e-01  -0.083 0.934023
## fTeamPhiladelphia Sixers       -2.516e-01  4.076e-01  -0.617 0.537461
## fTeamPhoenix Suns               4.483e-02  4.103e-01   0.109 0.913068
## fTeamPortland Trail Blazers    -7.391e-01  4.510e-01  -1.639 0.102380
## fTeamSacremento Kings          -1.278e-02  4.117e-01  -0.031 0.975255
## fTeamSan Antonio Spurs         -1.354e-01  3.991e-01  -0.339 0.734708
## fTeamToronto Raptors           -2.856e-01  4.375e-01  -0.653 0.514437
## fTeamUtah Jazz                 -1.014e-01  4.200e-01  -0.241 0.809467
## fTeamWashington Wizards        -2.724e-01  3.813e-01  -0.714 0.475550
## fPositionF                     -1.160e-01  4.483e-01  -0.259 0.796030
## fPositionG                      1.439e+00  5.318e-01   2.705 0.007235 **
## fPositionPF                     2.784e-01  1.977e-01   1.408 0.160200
## fPositionPG                     1.122e+00  3.070e-01   3.655 0.000306 ***
## fPositionSF                     6.935e-01  2.203e-01   3.148 0.001816 **
## fPositionSG                     8.278e-01  2.612e-01   3.169 0.001692 **
## fCollegeArizona                -5.687e-03  5.756e-01  -0.010 0.992124
```

```
## fCollegeArizona State              2.313e-01  7.479e-01   0.309 0.757384
## fCollegeArkansas                  -1.152e-01  6.847e-01  -0.168 0.866477
## fCollegeAuburn                    -1.507e-01  7.401e-01  -0.204 0.838788
## fCollegeBaylor                    -3.934e-01  6.549e-01  -0.601 0.548492
## fCollegeBelmont                   -1.104e+00  1.097e+00  -1.006 0.315289
## fCollegeBoise State               -3.856e-01  1.115e+00  -0.346 0.729723
## fCollegeBoston College             2.154e-03  1.118e+00   0.002 0.998464
## fCollegeBowling Green              8.366e-01  1.126e+00   0.743 0.458233
## fCollegeBucknell                  -2.955e-01  1.128e+00  -0.262 0.793568
## fCollegeButler                    -1.978e-01  8.592e-01  -0.230 0.818121
## fCollegeBYU                       -1.074e+00  1.115e+00  -0.963 0.336431
## fCollegeCal Poly                  -7.272e-02  1.112e+00  -0.065 0.947907
## fCollegeCalifornia                 1.678e+00  1.118e+00   1.501 0.134481
## fCollegeCharleston                -1.227e+00  1.121e+00  -1.095 0.274615
## fCollegeCleveland State           -3.873e-01  1.102e+00  -0.352 0.725461
## fCollegeColorado                   5.909e-01  7.388e-01   0.800 0.424476
## fCollegeConnecticut                3.018e-02  6.472e-01   0.047 0.962846
## fCollegeCreighton                 -1.533e-01  8.439e-01  -0.182 0.855972
## fCollegeDavidson                   1.766e+00  1.116e+00   1.582 0.114654
## fCollegeDayton                     6.805e-01  1.107e+00   0.615 0.539034
## fCollegeDePaul                    -7.680e-01  8.512e-01  -0.902 0.367714
## fCollegeDrexel                    -1.065e+00  1.114e+00  -0.956 0.339791
## fCollegeDuke                       2.588e-01  5.010e-01   0.517 0.605780
## fCollegeFlorida                    3.140e-01  6.517e-01   0.482 0.630327
## fCollegeFlorida State              8.523e-02  5.777e-01   0.148 0.882829
## fCollegeFresno State               1.469e+00  1.121e+00   1.311 0.190801
## fCollegeGeorge Washington         -1.022e+00  1.121e+00  -0.911 0.363084
## fCollegeGeorgetown                -7.592e-01  7.400e-01  -1.026 0.305807
## fCollegeGeorgia                    3.399e-01  7.444e-01   0.457 0.648330
## fCollegeGeorgia Tech               1.457e-01  7.476e-01   0.195 0.845559
## fCollegeGonzaga                    4.516e-01  6.039e-01   0.748 0.455193
## fCollegeHouston                   -1.001e+00  8.419e-01  -1.189 0.235234
## fCollegeIllinois                  -6.296e-01  8.909e-01  -0.707 0.480322
## fCollegeIndiana                    7.484e-02  6.048e-01   0.124 0.901609
## fCollegeIowa State                 6.467e-02  6.448e-01   0.100 0.920171
## fCollegeIUPUI                     -1.109e+00  1.219e+00  -0.909 0.364023
## fCollegeKansas                     3.708e-01  5.738e-01   0.646 0.518624
## fCollegeKansas State              -1.062e+00  7.361e-01  -1.443 0.150095
## fCollegeKentucky                   4.924e-01  4.961e-01   0.993 0.321723
## fCollegeLehigh                     2.263e+00  1.131e+00   2.000 0.046470 *
## fCollegeLiberty                   -1.035e+00  1.108e+00  -0.934 0.351132
## fCollegeLouisiana-Lafayette       -1.647e+00  1.115e+00  -1.477 0.140777
## fCollegeLouisville                 4.744e-01  6.499e-01   0.730 0.465988
## fCollegeLoyola (MD)               -1.505e-01  1.119e+00  -0.134 0.893140
## fCollegeLSU                       -2.511e-01  6.747e-01  -0.372 0.710035
## fCollegeMarquette                  3.169e-01  7.502e-01   0.422 0.673011
## fCollegeMarshall                  -1.677e+00  1.126e+00  -1.490 0.137322
## fCollegeMaryland                  -2.306e-01  6.513e-01  -0.354 0.723507
## fCollegeMemphis                    8.919e-01  6.807e-01   1.310 0.191148
## fCollegeMiami (FL)                 1.562e-01  8.410e-01   0.186 0.852744
## fCollegeMichigan                   1.357e-01  5.890e-01   0.230 0.817940
## fCollegeMichigan State             6.134e-01  6.552e-01   0.936 0.349983
## fCollegeMinnesota                 -5.505e-01  1.118e+00  -0.493 0.622692
## fCollegeMississippi State         -1.327e+00  1.124e+00  -1.181 0.238645
```

```
## fCollegeMissouri                -2.656e-02  7.378e-01  -0.036 0.971306
## fCollegeMissouri State          -4.607e-01  1.109e+00  -0.416 0.678059
## fCollegeMurray State             4.170e-01  8.526e-01   0.489 0.625176
## fCollegenan                      2.281e-01  4.757e-01   0.479 0.631961
## fCollegeNebraska                -9.216e-01  8.556e-01  -1.077 0.282321
## fCollegeNevada                  -8.471e-01  8.570e-01  -0.988 0.323790
## fCollegeNew Mexico              -8.228e-01  1.132e+00  -0.727 0.467787
## fCollegeNew Mexico JC            8.206e-01  1.135e+00   0.723 0.470359
## fCollegeNew Mexico State         1.207e+00  1.133e+00   1.066 0.287349
## fCollegeNorth Carolina          -1.272e-01  5.657e-01  -0.225 0.822241
## fCollegeNorth Carolina State     4.695e-01  1.116e+00   0.421 0.674188
## fCollegeNotre Dame               4.433e-02  1.116e+00   0.040 0.968344
## fCollegeOhio                    -1.321e+00  1.113e+00  -1.187 0.236257
## fCollegeOhio State               2.907e-01  7.463e-01   0.390 0.697179
## fCollegeOklahoma                -1.639e-02  7.435e-01  -0.022 0.982432
## fCollegeOklahoma State           7.368e-01  8.585e-01   0.858 0.391469
## fCollegeOld Dominion            -5.627e-01  1.119e+00  -0.503 0.615503
## fCollegeOle Miss                -2.728e-01  1.117e+00  -0.244 0.807203
## fCollegeOregon                  -2.058e-02  6.401e-01  -0.032 0.974379
## fCollegeOregon State            -9.986e-01  1.099e+00  -0.908 0.364412
## fCollegePenn State              -9.945e-01  1.167e+00  -0.852 0.394691
## fCollegePittsburgh               1.013e+00  1.128e+00   0.899 0.369657
## fCollegeProvidence              -2.831e-01  1.113e+00  -0.254 0.799349
## fCollegePurdue                  -9.438e-01  1.136e+00  -0.831 0.406907
## fCollegeRadford                 -1.869e+00  1.118e+00  -1.671 0.095753 .
## fCollegeSaint Joseph's          -5.300e-01  8.724e-01  -0.608 0.543962
## fCollegeSaint Mary's            -9.261e-01  8.448e-01  -1.096 0.273894
## fCollegeSalt Lake CC UT         -1.128e+00  1.113e+00  -1.014 0.311647
## fCollegeSan Diego State          2.396e-01  7.432e-01   0.322 0.747425
## fCollegeSMU                     -7.416e-01  7.452e-01  -0.995 0.320461
## fCollegeSouth Carolina          -9.239e-01  1.094e+00  -0.844 0.399259
## fCollegeSt. John's              -6.082e-01  1.120e+00  -0.543 0.587648
## fCollegeStanford                 4.214e-02  6.254e-01   0.067 0.946317
## fCollegeSyracuse                -5.396e-01  6.487e-01  -0.832 0.406254
## fCollegeTCU                     -8.616e-01  8.542e-01  -1.009 0.313972
## fCollegeTennessee                4.604e-01  6.580e-01   0.700 0.484637
## fCollegeTennessee State          1.619e+00  1.136e+00   1.426 0.154963
## fCollegeTexas                    6.648e-01  5.505e-01   1.208 0.228190
## fCollegeTexas A&M                5.730e-01  6.903e-01   0.830 0.407123
## fCollegeTexas Tech              -4.151e-01  8.884e-01  -0.467 0.640655
## fCollegeUC Santa Barbara        -7.964e-01  1.108e+00  -0.719 0.472957
## fCollegeUCLA                     6.803e-01  5.547e-01   1.226 0.221071
## fCollegeUNLV                     1.039e+00  7.593e-01   1.369 0.172176
## fCollegeUSC                      2.117e-01  5.748e-01   0.368 0.712893
## fCollegeUSC Upstate             -6.704e-01  1.117e+00  -0.600 0.548787
## fCollegeUtah                     6.648e-01  7.376e-01   0.901 0.368130
## fCollegeUtah State              -1.221e+00  1.112e+00  -1.098 0.273143
## fCollegeVanderbilt              -3.627e-01  6.784e-01  -0.535 0.593354
## fCollegeVillanova               -1.298e-01  5.656e-01  -0.229 0.818650
## fCollegeVirginia                -1.059e-01  5.923e-01  -0.179 0.858169
## fCollegeVirginia Commonwealth   -2.968e-01  1.095e+00  -0.271 0.786539
## fCollegeVirginia Tech           -3.159e-01  1.077e+00  -0.293 0.769470
## fCollegeWake Forest              1.980e-01  6.474e-01   0.306 0.760007
## fCollegeWashington               1.117e-01  5.840e-01   0.191 0.848389
```

```
## fCollegeWashington State            6.777e-01  8.633e-01   0.785 0.433087
## fCollegeWeber State                 1.994e+00  1.134e+00   1.758 0.079800 .
## fCollegeWest Virginia              -8.985e-01  8.478e-01  -1.060 0.290096
## fCollegeWestern Texas Coll. (J.C.) -1.320e+00  1.102e+00  -1.197 0.232158
## fCollegeWichita State               5.866e-01  8.623e-01   0.680 0.496855
## fCollegeWisconsin                  -9.329e-01  8.794e-01  -1.061 0.289640
## fCollegeWyoming                     8.380e-02  8.610e-01   0.097 0.922531
## fCollegeXavier                     -1.139e+00  8.293e-01  -1.373 0.170670
## fCollegeYale                       -1.058e+00  1.114e+00  -0.950 0.342838
## Age                                 7.574e-02  1.327e-02   5.706 2.87e-08 ***
## Height_i                            2.641e-03  1.955e-01   0.014 0.989234
## Weight                              1.312e-02  3.913e-03   3.352 0.000909 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.9616 on 288 degrees of freedom
## Multiple R-squared:  0.4318, Adjusted R-squared:  0.1241
## F-statistic: 1.403 on 156 and 288 DF,  p-value: 0.007015
```

```
shapiro.test(resid(lm_l1))
```

```
##
##  Shapiro-Wilk normality test
##
## data:  resid(lm_l1)
## W = 0.99129, p-value = 0.01014
```

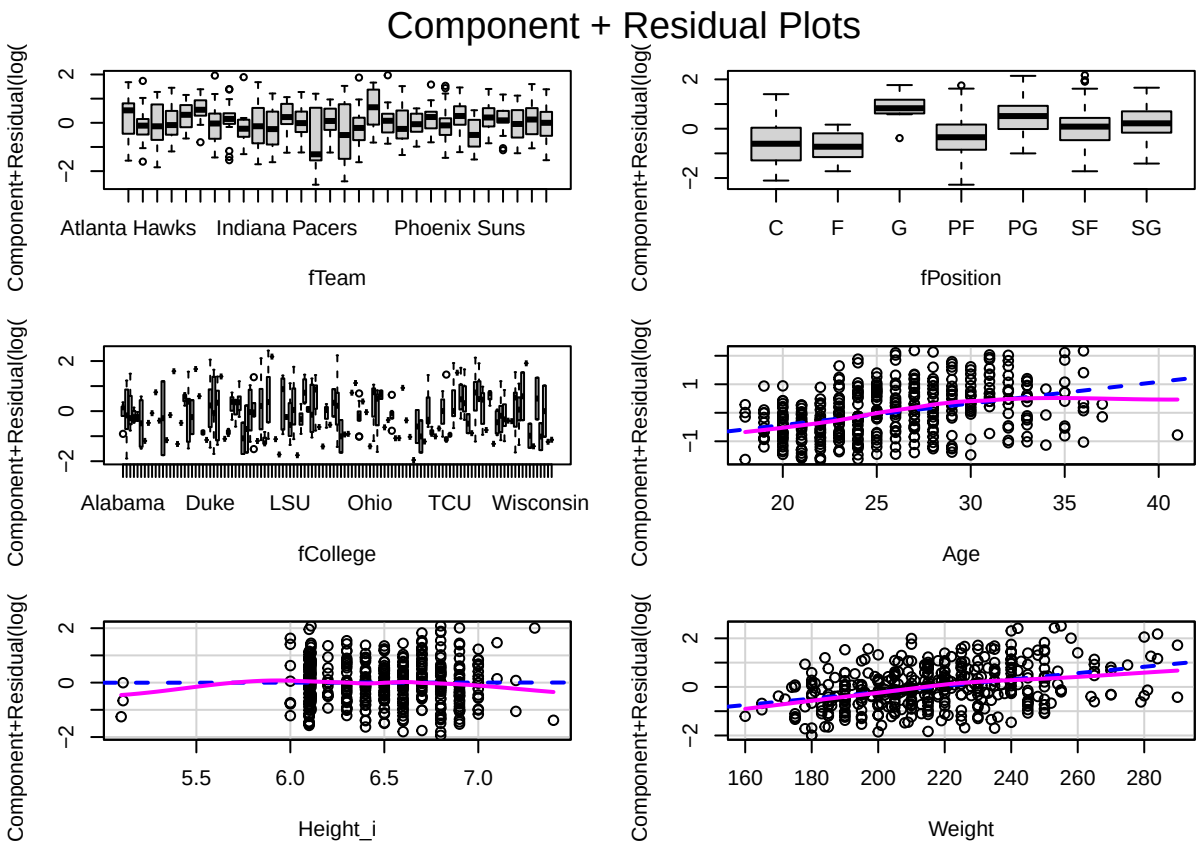
```
bptest(lm_l1)
```

```
##
##  studentized Breusch-Pagan test
##
## data:  lm_l1
## BP = 183.73, df = 156, p-value = 0.06393
```

Check for Polynomial Terms

`Age`, `Height_i`, and `Weight` appear to be misspecified.

```
crPlots(lm_l1)
```




```
summary(lm(log(Salary) ~ fTeam+fPosition+fCollege+poly(Age,4)+poly(Height_i,4)+poly(Weight,4),data=ap_t
```

```
##
## Call:
## lm(formula = log(Salary) ~ fTeam + fPosition + fCollege + poly(Age,
##     4) + poly(Height_i, 4) + poly(Weight, 4), data = ap_tibble)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -2.1055 -0.4707  0.0000  0.4990  2.0111
##
## Coefficients:
##                                 Estimate Std. Error t value Pr(>|t|)
## (Intercept)                    14.985920   0.575932  26.020  < 2e-16 ***
## fTeamBoston Celtics            -0.334561   0.402752  -0.831  0.40686
## fTeamBrooklyn Nets             -0.344470   0.382860  -0.900  0.36904
## fTeamCharlotte Hornets         -0.227947   0.375239  -0.607  0.54403
## fTeamChicago Bulls              0.164216   0.419351   0.392  0.69566
## fTeamCleveland Cavaliers        0.317370   0.409392   0.775  0.43886
## fTeamDallas Mavericks          -0.441224   0.404041  -1.092  0.27576
## fTeamDenver Nuggets            -0.074952   0.398188  -0.188  0.85083
## fTeamDetroit Pistons           -0.440057   0.392050  -1.122  0.26264
## fTeamGolden State Warriors     -0.365824   0.404455  -0.904  0.36652
## fTeamHouston Rockets           -0.367501   0.391924  -0.938  0.34922
## fTeamIndiana Pacers            -0.060367   0.398610  -0.151  0.87974
## fTeamLos Angeles Clippers      -0.352413   0.404887  -0.870  0.38483
```

```
## fTeamLos Angeles Lakers           -0.493325   0.430868  -1.145  0.25321
## fTeamMemphis Grizzlies            -0.153873   0.401888  -0.383  0.70210
## fTeamMiami Heat                   -0.414699   0.416831  -0.995  0.32065
## fTeamMilwaukee Bucks              -0.509732   0.403707  -1.263  0.20778
## fTeamMinnesota Timberwolves        0.361136   0.426151   0.847  0.39748
## fTeamNew Orleans Pelicans         -0.080034   0.378133  -0.212  0.83253
## fTeamNew York Knicks              -0.308336   0.384307  -0.802  0.42305
## fTeamOklahoma City Thunder        -0.250290   0.397859  -0.629  0.52980
## fTeamOrlando Magic                -0.019495   0.397165  -0.049  0.96089
## fTeamPhiladelphia Sixers          -0.291701   0.399637  -0.730  0.46605
## fTeamPhoenix Suns                  0.130230   0.402241   0.324  0.74636
## fTeamPortland Trail Blazers       -0.773598   0.448069  -1.727  0.08536 .
## fTeamSacremento Kings             -0.053402   0.403021  -0.133  0.89468
## fTeamSan Antonio Spurs            -0.099365   0.391240  -0.254  0.79970
## fTeamToronto Raptors              -0.139428   0.428791  -0.325  0.74530
## fTeamUtah Jazz                    -0.004998   0.410122  -0.012  0.99029
## fTeamWashington Wizards           -0.426259   0.374864  -1.137  0.25647
## fPositionF                        -0.016114   0.462802  -0.035  0.97225
## fPositionG                         1.172310   0.549417   2.134  0.03374 *
## fPositionPF                        0.206036   0.220796   0.933  0.35155
## fPositionPG                        1.119123   0.326097   3.432  0.00069 ***
## fPositionSF                        0.587899   0.268459   2.190  0.02936 *
## fPositionSG                        0.718515   0.313339   2.293  0.02259 *
## fCollegeArizona                    0.138030   0.566882   0.243  0.80780
## fCollegeArizona State              0.272155   0.736500   0.370  0.71202
## fCollegeArkansas                   0.074214   0.678607   0.109  0.91299
## fCollegeAuburn                    -0.074932   0.727253  -0.103  0.91801
## fCollegeBaylor                    -0.445013   0.650396  -0.684  0.49441
## fCollegeBelmont                   -0.935953   1.078433  -0.868  0.38620
## fCollegeBoise State               -0.467907   1.095396  -0.427  0.66959
## fCollegeBoston College            -0.170705   1.095452  -0.156  0.87628
## fCollegeBowling Green              0.582543   1.103884   0.528  0.59811
## fCollegeBucknell                  -0.614516   1.108070  -0.555  0.57962
## fCollegeButler                    -0.260556   0.843245  -0.309  0.75756
## fCollegeBYU                       -1.074582   1.092553  -0.984  0.32619
## fCollegeCal Poly                  -0.354920   1.094001  -0.324  0.74586
## fCollegeCalifornia                 1.743080   1.094629   1.592  0.11243
## fCollegeCharleston                -1.065971   1.116993  -0.954  0.34075
## fCollegeCleveland State           -0.646943   1.080032  -0.599  0.54966
## fCollegeColorado                   0.432665   0.730340   0.592  0.55405
## fCollegeConnecticut                0.216811   0.636699   0.341  0.73372
## fCollegeCreighton                 -0.338287   0.831430  -0.407  0.68441
## fCollegeDavidson                   1.954142   1.097462   1.781  0.07607 .
## fCollegeDayton                     0.647599   1.089139   0.595  0.55259
## fCollegeDePaul                    -0.847799   0.840091  -1.009  0.31376
## fCollegeDrexel                    -1.245004   1.091721  -1.140  0.25510
## fCollegeDuke                       0.348743   0.497794   0.701  0.48415
## fCollegeFlorida                    0.906625   0.669079   1.355  0.17650
## fCollegeFlorida State              0.167943   0.571200   0.294  0.76896
## fCollegeFresno State               1.393814   1.095295   1.273  0.20424
## fCollegeGeorge Washington         -1.357230   1.104749  -1.229  0.22028
## fCollegeGeorgetown                -0.623726   0.733069  -0.851  0.39559
## fCollegeGeorgia                    0.417385   0.732731   0.570  0.56939
## fCollegeGeorgia Tech               0.225802   0.733623   0.308  0.75847
```

```
## fCollegeGonzaga                  0.570543   0.597377   0.955  0.34036
## fCollegeHouston                 -0.960217   0.826208  -1.162  0.24615
## fCollegeIllinois                -0.701977   0.874430  -0.803  0.42278
## fCollegeIndiana                 -0.015826   0.595313  -0.027  0.97881
## fCollegeIowa State              -0.045290   0.636530  -0.071  0.94333
## fCollegeIUPUI                   -0.147250   1.215065  -0.121  0.90363
## fCollegeKansas                   0.388449   0.569704   0.682  0.49590
## fCollegeKansas State            -1.121567   0.726275  -1.544  0.12366
## fCollegeKentucky                 0.469333   0.494106   0.950  0.34300
## fCollegeLehigh                   2.229404   1.109371   2.010  0.04544 *
## fCollegeLiberty                 -0.768699   1.089769  -0.705  0.48116
## fCollegeLouisiana-Lafayette     -1.895728   1.098738  -1.725  0.08557 .
## fCollegeLouisville               0.434428   0.639555   0.679  0.49753
## fCollegeLoyola (MD)             -0.148011   1.097054  -0.135  0.89278
## fCollegeLSU                      0.024178   0.665433   0.036  0.97104
## fCollegeMarquette                0.072079   0.739242   0.098  0.92240
## fCollegeMarshall                -1.554231   1.104012  -1.408  0.16030
## fCollegeMaryland                -0.256971   0.641576  -0.401  0.68907
## fCollegeMemphis                  0.813369   0.665848   1.222  0.22291
## fCollegeMiami (FL)               0.298641   0.836539   0.357  0.72136
## fCollegeMichigan                 0.126565   0.582470   0.217  0.82814
## fCollegeMichigan State           0.688578   0.648394   1.062  0.28917
## fCollegeMinnesota               -0.366206   1.099163  -0.333  0.73926
## fCollegeMississippi State       -0.983556   1.101422  -0.893  0.37263
## fCollegeMissouri                -0.079400   0.726255  -0.109  0.91302
## fCollegeMissouri State          -0.495009   1.103204  -0.449  0.65400
## fCollegeMurray State             0.433122   0.838196   0.517  0.60575
## fCollegenan                      0.291259   0.467052   0.624  0.53339
## fCollegeNebraska                -0.984789   0.853372  -1.154  0.24949
## fCollegeNevada                  -0.688467   0.843178  -0.817  0.41490
## fCollegeNew Mexico              -0.989357   1.107513  -0.893  0.37246
## fCollegeNew Mexico JC            0.421950   1.127670   0.374  0.70856
## fCollegeNew Mexico State         0.755132   1.118196   0.675  0.50004
## fCollegeNorth Carolina          -0.058423   0.557450  -0.105  0.91661
## fCollegeNorth Carolina State     0.276396   1.091863   0.253  0.80035
## fCollegeNotre Dame              -0.057292   1.091000  -0.053  0.95816
## fCollegeOhio                    -0.942755   1.105306  -0.853  0.39443
## fCollegeOhio State               0.278541   0.736414   0.378  0.70554
## fCollegeOklahoma                 0.052091   0.729940   0.071  0.94316
## fCollegeOklahoma State           0.563505   0.845068   0.667  0.50544
## fCollegeOld Dominion            -0.957466   1.109709  -0.863  0.38898
## fCollegeOle Miss                -0.090820   1.097902  -0.083  0.93413
## fCollegeOregon                   0.030303   0.635824   0.048  0.96202
## fCollegeOregon State            -0.880901   1.085792  -0.811  0.41789
## fCollegePenn State              -1.095124   1.142585  -0.958  0.33866
## fCollegePittsburgh               1.057459   1.108243   0.954  0.34082
## fCollegeProvidence              -0.542255   1.096725  -0.494  0.62139
## fCollegePurdue                   0.242111   1.304969   0.186  0.85295
## fCollegeRadford                 -2.228174   1.099710  -2.026  0.04370 *
## fCollegeSaint Joseph's          -0.628563   0.864200  -0.727  0.46763
## fCollegeSaint Mary's            -0.808418   0.829104  -0.975  0.33038
## fCollegeSalt Lake CC UT         -1.347884   1.095649  -1.230  0.21965
## fCollegeSan Diego State          0.212956   0.733059   0.291  0.77165
## fCollegeSMU                     -0.630106   0.741398  -0.850  0.39612
```

```
## fCollegeSouth Carolina             -0.889834   1.075320  -0.828  0.40866
## fCollegeSt. John's                 -0.784208   1.094238  -0.717  0.47418
## fCollegeStanford                    0.181613   0.625109   0.291  0.77163
## fCollegeSyracuse                   -0.412793   0.644589  -0.640  0.52244
## fCollegeTCU                        -0.849912   0.844415  -1.007  0.31504
## fCollegeTennessee                   0.495235   0.650833   0.761  0.44734
## fCollegeTennessee State             1.429864   1.115301   1.282  0.20089
## fCollegeTexas                       0.833757   0.548537   1.520  0.12965
## fCollegeTexas A&M                   0.468629   0.678238   0.691  0.49017
## fCollegeTexas Tech                 -0.009494   0.875559  -0.011  0.99136
## fCollegeUC Santa Barbara           -1.167094   1.096715  -1.064  0.28817
## fCollegeUCLA                        0.655328   0.548624   1.194  0.23330
## fCollegeUNLV                        0.762040   0.757625   1.006  0.31537
## fCollegeUSC                         0.265507   0.566300   0.469  0.63955
## fCollegeUSC Upstate                -0.815112   1.090387  -0.748  0.45536
## fCollegeUtah                        0.619594   0.728772   0.850  0.39595
## fCollegeUtah State                 -1.195397   1.091589  -1.095  0.27442
## fCollegeVanderbilt                 -0.243635   0.667884  -0.365  0.71555
## fCollegeVillanova                  -0.092257   0.561105  -0.164  0.86952
## fCollegeVirginia                   -0.111260   0.588360  -0.189  0.85015
## fCollegeVirginia Commonwealth      -0.167486   1.134433  -0.148  0.88273
## fCollegeVirginia Tech              -0.202923   1.058351  -0.192  0.84809
## fCollegeWake Forest                 0.390108   0.639770   0.610  0.54252
## fCollegeWashington                  0.262641   0.577936   0.454  0.64986
## fCollegeWashington State            0.772123   0.848757   0.910  0.36376
## fCollegeWeber State                 1.848409   1.113438   1.660  0.09802 .
## fCollegeWest Virginia              -0.955060   0.836227  -1.142  0.25439
## fCollegeWestern Texas Coll. (J.C.) -1.255040   1.086845  -1.155  0.24918
## fCollegeWichita State               0.498073   0.851107   0.585  0.55888
## fCollegeWisconsin                  -1.381830   0.869141  -1.590  0.11299
## fCollegeWyoming                     0.210203   0.850663   0.247  0.80501
## fCollegeXavier                     -1.087908   0.821073  -1.325  0.18626
## fCollegeYale                       -1.038398   1.098861  -0.945  0.34549
## poly(Age, 4)1                       6.903962   1.207197   5.719 2.76e-08 ***
## poly(Age, 4)2                      -3.977404   1.232603  -3.227  0.00140 **
## poly(Age, 4)3                      -2.905055   1.140129  -2.548  0.01137 *
## poly(Age, 4)4                       1.101345   1.122062   0.982  0.32718
## poly(Height_i, 4)1                  0.502565   1.307691   0.384  0.70104
## poly(Height_i, 4)2                 -1.150971   1.312028  -0.877  0.38111
## poly(Height_i, 4)3                  1.647264   1.348978   1.221  0.22307
## poly(Height_i, 4)4                 -1.142729   1.316481  -0.868  0.38613
## poly(Weight, 4)1                    5.813612   2.068403   2.811  0.00529 **
## poly(Weight, 4)2                   -1.929609   1.358915  -1.420  0.15673
## poly(Weight, 4)3                    0.568692   1.229359   0.463  0.64402
## poly(Weight, 4)4                    1.229289   1.273031   0.966  0.33506
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.9364 on 279 degrees of freedom
## Multiple R-squared:  0.4781, Adjusted R-squared:  0.1694
## F-statistic: 1.549 on 165 and 279 DF,  p-value: 0.0006718
```

```
summary(lm(log(Salary) ~ fTeam+fPosition+fCollege+poly(Age,3)+Height_i+poly(Weight,3),data=ap_tibble))
```

```
##
```

```
## Call:
## lm(formula = log(Salary) ~ fTeam + fPosition + fCollege + poly(Age,
##     3) + Height_i + poly(Weight, 3), data = ap_tibble)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -2.0785 -0.4995  0.0000  0.4827  2.0443
##
## Coefficients:
##                                  Estimate Std. Error t value Pr(>|t|)
## (Intercept)                     14.809809   1.379704  10.734  < 2e-16 ***
## fTeamBoston Celtics             -0.380075   0.401408  -0.947 0.344519
## fTeamBrooklyn Nets              -0.338640   0.381470  -0.888 0.375440
## fTeamCharlotte Hornets          -0.239260   0.374656  -0.639 0.523591
## fTeamChicago Bulls               0.091227   0.413576   0.221 0.825578
## fTeamCleveland Cavaliers         0.297135   0.408867   0.727 0.467992
## fTeamDallas Mavericks           -0.401035   0.382828  -1.048 0.295733
## fTeamDenver Nuggets             -0.172278   0.392286  -0.439 0.660876
## fTeamDetroit Pistons            -0.454556   0.391639  -1.161 0.246759
## fTeamGolden State Warriors      -0.358161   0.401645  -0.892 0.373290
## fTeamHouston Rockets            -0.456953   0.386464  -1.182 0.238038
## fTeamIndiana Pacers             -0.049226   0.396136  -0.124 0.901194
## fTeamLos Angeles Clippers       -0.321362   0.404253  -0.795 0.427305
## fTeamLos Angeles Lakers         -0.556980   0.426272  -1.307 0.192395
## fTeamMemphis Grizzlies          -0.161855   0.401145  -0.403 0.686898
## fTeamMiami Heat                 -0.417330   0.414954  -1.006 0.315403
## fTeamMilwaukee Bucks            -0.515829   0.403643  -1.278 0.202316
## fTeamMinnesota Timberwolves      0.319350   0.424177   0.753 0.452152
## fTeamNew Orleans Pelicans       -0.091599   0.378058  -0.242 0.808731
## fTeamNew York Knicks            -0.318799   0.384333  -0.829 0.407526
## fTeamOklahoma City Thunder      -0.302577   0.395000  -0.766 0.444301
## fTeamOrlando Magic              -0.017101   0.396780  -0.043 0.965652
## fTeamPhiladelphia Sixers        -0.243457   0.398563  -0.611 0.541796
## fTeamPhoenix Suns                0.123298   0.402197   0.307 0.759402
## fTeamPortland Trail Blazers     -0.721240   0.445653  -1.618 0.106688
## fTeamSacremento Kings           -0.042519   0.402859  -0.106 0.916019
## fTeamSan Antonio Spurs          -0.134026   0.389351  -0.344 0.730929
## fTeamToronto Raptors            -0.157084   0.427361  -0.368 0.713470
## fTeamUtah Jazz                  -0.038817   0.409661  -0.095 0.924577
## fTeamWashington Wizards         -0.398454   0.374618  -1.064 0.288401
## fPositionF                      -0.072886   0.446555  -0.163 0.870463
## fPositionG                       1.142549   0.532720   2.145 0.032821 *
## fPositionPF                      0.229397   0.202821   1.131 0.258995
## fPositionPG                      1.067762   0.310955   3.434 0.000684 ***
## fPositionSF                      0.560643   0.232773   2.409 0.016654 *
## fPositionSG                      0.662209   0.275680   2.402 0.016944 *
## fCollegeArizona                  0.048479   0.564166   0.086 0.931583
## fCollegeArizona State            0.235090   0.732744   0.321 0.748571
## fCollegeArkansas                 0.048476   0.671485   0.072 0.942500
## fCollegeAuburn                  -0.172819   0.723245  -0.239 0.811317
## fCollegeBaylor                  -0.535648   0.648242  -0.826 0.409322
## fCollegeBelmont                 -1.102969   1.075426  -1.026 0.305947
## fCollegeBoise State             -0.587426   1.093080  -0.537 0.591409
## fCollegeBoston College          -0.201135   1.094308  -0.184 0.854300
```

```
## fCollegeBowling Green              0.613315   1.102651   0.556 0.578499
## fCollegeBucknell                  -0.551000   1.106200  -0.498 0.618798
## fCollegeButler                    -0.322330   0.841456  -0.383 0.701961
## fCollegeBYU                       -1.146697   1.092112  -1.050 0.294619
## fCollegeCal Poly                  -0.320299   1.091478  -0.293 0.769389
## fCollegeCalifornia                 1.691214   1.094441   1.545 0.123393
## fCollegeCharleston                -1.313540   1.102998  -1.191 0.234694
## fCollegeCleveland State           -0.586924   1.079110  -0.544 0.586940
## fCollegeColorado                   0.367249   0.726750   0.505 0.613718
## fCollegeConnecticut                0.117286   0.633378   0.185 0.853224
## fCollegeCreighton                 -0.318330   0.831106  -0.383 0.701992
## fCollegeDavidson                   1.767803   1.087929   1.625 0.105288
## fCollegeDayton                     0.546640   1.086996   0.503 0.615431
## fCollegeDePaul                    -0.963035   0.836664  -1.151 0.250683
## fCollegeDrexel                    -1.302987   1.091680  -1.194 0.233646
## fCollegeDuke                       0.247446   0.494743   0.500 0.617356
## fCollegeFlorida                    0.920876   0.662750   1.389 0.165776
## fCollegeFlorida State              0.062826   0.568786   0.110 0.912125
## fCollegeFresno State               1.363924   1.092893   1.248 0.213061
## fCollegeGeorge Washington         -1.335242   1.103843  -1.210 0.227427
## fCollegeGeorgetown                -0.754233   0.725753  -1.039 0.299576
## fCollegeGeorgia                    0.332616   0.729419   0.456 0.648737
## fCollegeGeorgia Tech               0.097783   0.730507   0.134 0.893611
## fCollegeGonzaga                    0.452207   0.593709   0.762 0.446893
## fCollegeHouston                   -1.064758   0.823884  -1.292 0.197282
## fCollegeIllinois                  -0.779280   0.873768  -0.892 0.373222
## fCollegeIndiana                   -0.048893   0.594230  -0.082 0.934482
## fCollegeIowa State                -0.119682   0.632356  -0.189 0.850021
## fCollegeIUPUI                     -0.422738   1.200655  -0.352 0.725032
## fCollegeKansas                     0.299327   0.566429   0.528 0.597602
## fCollegeKansas State              -1.217563   0.725172  -1.679 0.094252 .
## fCollegeKentucky                   0.376378   0.491530   0.766 0.444474
## fCollegeLehigh                     2.092190   1.104259   1.895 0.059154 .
## fCollegeLiberty                   -0.942454   1.086735  -0.867 0.386546
## fCollegeLouisiana-Lafayette       -1.973812   1.094078  -1.804 0.072277 .
## fCollegeLouisville                 0.394656   0.639186   0.617 0.537442
## fCollegeLoyola (MD)               -0.170647   1.095403  -0.156 0.876314
## fCollegeLSU                       -0.124094   0.660496  -0.188 0.851105
## fCollegeMarquette                 -0.031006   0.736089  -0.042 0.966431
## fCollegeMarshall                  -1.729902   1.097641  -1.576 0.116135
## fCollegeMaryland                  -0.334012   0.639315  -0.522 0.601762
## fCollegeMemphis                    0.749364   0.664371   1.128 0.260301
## fCollegeMiami (FL)                 0.146896   0.831634   0.177 0.859920
## fCollegeMichigan                   0.032993   0.579865   0.057 0.954667
## fCollegeMichigan State             0.549882   0.642540   0.856 0.392833
## fCollegeMinnesota                 -0.544810   1.091016  -0.499 0.617912
## fCollegeMississippi State         -1.180407   1.096155  -1.077 0.282456
## fCollegeMissouri                  -0.107526   0.723091  -0.149 0.881893
## fCollegeMissouri State            -0.648893   1.099361  -0.590 0.555495
## fCollegeMurray State               0.397596   0.836999   0.475 0.635134
## fCollegenan                        0.217208   0.465589   0.467 0.641199
## fCollegeNebraska                  -1.064285   0.848824  -1.254 0.210933
## fCollegeNevada                    -0.870334   0.837797  -1.039 0.299764
## fCollegeNew Mexico                -1.105855   1.106286  -1.000 0.318350
```

```
## fCollegeNew Mexico JC               0.358664   1.126138   0.318 0.750347
## fCollegeNew Mexico State            0.818091   1.116631   0.733 0.464381
## fCollegeNorth Carolina             -0.180289   0.553736  -0.326 0.744977
## fCollegeNorth Carolina State        0.270826   1.090356   0.248 0.804017
## fCollegeNotre Dame                 -0.105588   1.090641  -0.097 0.922943
## fCollegeOhio                       -1.211489   1.091325  -1.110 0.267891
## fCollegeOhio State                  0.247559   0.733719   0.337 0.736062
## fCollegeOklahoma                   -0.043336   0.727780  -0.060 0.952560
## fCollegeOklahoma State              0.597181   0.842500   0.709 0.479017
## fCollegeOld Dominion               -1.087634   1.103461  -0.986 0.325141
## fCollegeOle Miss                   -0.258574   1.094292  -0.236 0.813376
## fCollegeOregon                     -0.046748   0.631698  -0.074 0.941060
## fCollegeOregon State               -1.024640   1.081630  -0.947 0.344286
## fCollegePenn State                 -1.183250   1.139295  -1.039 0.299883
## fCollegePittsburgh                  0.948480   1.100845   0.862 0.389639
## fCollegeProvidence                 -0.536660   1.093568  -0.491 0.623988
## fCollegePurdue                     -0.933888   1.117782  -0.835 0.404148
## fCollegeRadford                    -2.218833   1.098870  -2.019 0.044406 *
## fCollegeSaint Joseph's             -0.722193   0.862646  -0.837 0.403193
## fCollegeSaint Mary's               -0.881696   0.826474  -1.067 0.286961
## fCollegeSalt Lake CC UT            -1.431114   1.092770  -1.310 0.191383
## fCollegeSan Diego State             0.146699   0.732404   0.200 0.841391
## fCollegeSMU                        -0.796936   0.734277  -1.085 0.278694
## fCollegeSouth Carolina             -0.938457   1.072226  -0.875 0.382182
## fCollegeSt. John's                 -0.821901   1.094226  -0.751 0.453199
## fCollegeStanford                    0.185369   0.615315   0.301 0.763438
## fCollegeSyracuse                   -0.536655   0.641629  -0.836 0.403636
## fCollegeTCU                        -0.938488   0.841386  -1.115 0.265619
## fCollegeTennessee                   0.394081   0.642700   0.613 0.540259
## fCollegeTennessee State             1.257801   1.112527   1.131 0.259186
## fCollegeTexas                       0.629596   0.540110   1.166 0.244721
## fCollegeTexas A&M                   0.427801   0.677872   0.631 0.528487
## fCollegeTexas Tech                 -0.215530   0.868119  -0.248 0.804103
## fCollegeUC Santa Barbara           -1.271273   1.093240  -1.163 0.245867
## fCollegeUCLA                        0.569353   0.546706   1.041 0.298565
## fCollegeUNLV                        0.772476   0.756118   1.022 0.307823
## fCollegeUSC                         0.180765   0.562985   0.321 0.748384
## fCollegeUSC Upstate                -0.864956   1.089805  -0.794 0.428045
## fCollegeUtah                        0.575333   0.725706   0.793 0.428561
## fCollegeUtah State                 -1.298610   1.088945  -1.193 0.234045
## fCollegeVanderbilt                 -0.335306   0.664792  -0.504 0.614387
## fCollegeVillanova                  -0.192626   0.558173  -0.345 0.730274
## fCollegeVirginia                   -0.201038   0.586470  -0.343 0.732007
## fCollegeVirginia Commonwealth       0.081879   1.102800   0.074 0.940867
## fCollegeVirginia Tech              -0.360218   1.055788  -0.341 0.733217
## fCollegeWake Forest                 0.333666   0.633397   0.527 0.598752
## fCollegeWashington                  0.105590   0.572313   0.184 0.853755
## fCollegeWashington State            0.612052   0.843702   0.725 0.468782
## fCollegeWeber State                 1.737909   1.109867   1.566 0.118492
## fCollegeWest Virginia              -0.986491   0.835061  -1.181 0.238456
## fCollegeWestern Texas Coll. (J.C.) -1.324479   1.083579  -1.222 0.222600
## fCollegeWichita State               0.433860   0.848903   0.511 0.609690
## fCollegeWisconsin                  -1.358455   0.865976  -1.569 0.117832
## fCollegeWyoming                     0.003562   0.844217   0.004 0.996637
```

```
## fCollegeXavier                     -1.230794   0.817607  -1.505 0.133342
## fCollegeYale                       -1.151266   1.097508  -1.049 0.295078
## poly(Age, 3)1                       6.687217   1.201732   5.565 6.07e-08 ***
## poly(Age, 3)2                      -3.885756   1.228970  -3.162 0.001738 **
## poly(Age, 3)3                      -2.789428   1.137655  -2.452 0.014812 *
## Height_i                            0.046791   0.192589   0.243 0.808214
## poly(Weight, 3)1                    5.896807   2.058519   2.865 0.004487 **
## poly(Weight, 3)2                   -1.794283   1.321939  -1.357 0.175760
## poly(Weight, 3)3                    0.516757   1.192484   0.433 0.665093
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.9369 on 284 degrees of freedom
## Multiple R-squared:  0.4681, Adjusted R-squared:  0.1685
## F-statistic: 1.562 on 160 and 284 DF,  p-value: 0.0005652
```

```
summary(lm(log(Salary) ~ fTeam+fPosition+fCollege+poly(Age,3)+Height_i+Weight,data=ap_tibble))
```

```
##
## Call:
## lm(formula = log(Salary) ~ fTeam + fPosition + fCollege + poly(Age,
##     3) + Height_i + Weight, data = ap_tibble)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -2.0695 -0.4836  0.0000  0.4824  2.0273
##
## Coefficients:
##                                  Estimate Std. Error t value Pr(>|t|)
## (Intercept)                     12.043683   1.618465   7.441 1.17e-12 ***
## fTeamBoston Celtics             -0.374141   0.401161  -0.933 0.351789
## fTeamBrooklyn Nets              -0.340770   0.381275  -0.894 0.372199
## fTeamCharlotte Hornets          -0.233372   0.373607  -0.625 0.532702
## fTeamChicago Bulls               0.087408   0.412825   0.212 0.832467
## fTeamCleveland Cavaliers         0.313679   0.408627   0.768 0.443334
## fTeamDallas Mavericks           -0.400137   0.382434  -1.046 0.296310
## fTeamDenver Nuggets             -0.160452   0.390948  -0.410 0.681806
## fTeamDetroit Pistons            -0.419976   0.390679  -1.075 0.283286
## fTeamGolden State Warriors      -0.315033   0.398640  -0.790 0.430025
## fTeamHouston Rockets            -0.425153   0.385569  -1.103 0.271099
## fTeamIndiana Pacers             -0.054030   0.395798  -0.137 0.891514
## fTeamLos Angeles Clippers       -0.283448   0.403258  -0.703 0.482693
## fTeamLos Angeles Lakers         -0.558302   0.426090  -1.310 0.191149
## fTeamMemphis Grizzlies          -0.143422   0.400772  -0.358 0.720708
## fTeamMiami Heat                 -0.389433   0.414397  -0.940 0.348135
## fTeamMilwaukee Bucks            -0.500471   0.402448  -1.244 0.214677
## fTeamMinnesota Timberwolves      0.320329   0.421986   0.759 0.448419
## fTeamNew Orleans Pelicans       -0.114140   0.375081  -0.304 0.761115
## fTeamNew York Knicks            -0.270026   0.382483  -0.706 0.480774
## fTeamOklahoma City Thunder      -0.344376   0.393016  -0.876 0.381635
## fTeamOrlando Magic              -0.002917   0.395950  -0.007 0.994127
## fTeamPhiladelphia Sixers        -0.256713   0.397496  -0.646 0.518909
## fTeamPhoenix Suns                0.134262   0.401398   0.334 0.738259
## fTeamPortland Trail Blazers     -0.746262   0.439902  -1.696 0.090893 .
## fTeamSacremento Kings           -0.030373   0.402664  -0.075 0.939925
```

```
## fTeamSan Antonio Spurs            -0.116766   0.388850  -0.300 0.764178
## fTeamToronto Raptors              -0.166230   0.427117  -0.389 0.697424
## fTeamUtah Jazz                    -0.055919   0.409409  -0.137 0.891455
## fTeamWashington Wizards           -0.359851   0.372541  -0.966 0.334892
## fPositionF                         0.026966   0.438897   0.061 0.951052
## fPositionG                         1.201822   0.521891   2.303 0.022007 *
## fPositionPF                        0.313371   0.193428   1.620 0.106314
## fPositionPG                        1.080926   0.299544   3.609 0.000363 ***
## fPositionSF                        0.669712   0.214689   3.119 0.001997 **
## fPositionSG                        0.745132   0.255238   2.919 0.003786 **
## fCollegeArizona                    0.085742   0.563429   0.152 0.879153
## fCollegeArizona State              0.325108   0.729729   0.446 0.656282
## fCollegeArkansas                  -0.008287   0.667780  -0.012 0.990107
## fCollegeAuburn                    -0.115713   0.721079  -0.160 0.872623
## fCollegeBaylor                    -0.471312   0.645839  -0.730 0.466130
## fCollegeBelmont                   -1.090632   1.073431  -1.016 0.310476
## fCollegeBoise State               -0.544291   1.091196  -0.499 0.618302
## fCollegeBoston College            -0.078651   1.089848  -0.072 0.942520
## fCollegeBowling Green              0.731551   1.099119   0.666 0.506216
## fCollegeBucknell                  -0.398495   1.100104  -0.362 0.717444
## fCollegeButler                    -0.268787   0.839275  -0.320 0.749004
## fCollegeBYU                       -1.080330   1.090871  -0.990 0.322846
## fCollegeCal Poly                  -0.294131   1.090829  -0.270 0.787632
## fCollegeCalifornia                 1.762453   1.093011   1.612 0.107961
## fCollegeCharleston                -1.337265   1.102472  -1.213 0.226142
## fCollegeCleveland State           -0.527030   1.077495  -0.489 0.625128
## fCollegeColorado                   0.432306   0.725008   0.596 0.551462
## fCollegeConnecticut                0.053908   0.631152   0.085 0.931993
## fCollegeCreighton                 -0.277264   0.830394  -0.334 0.738704
## fCollegeDavidson                   1.750097   1.087678   1.609 0.108715
## fCollegeDayton                     0.574159   1.085014   0.529 0.597097
## fCollegeDePaul                    -0.901192   0.834788  -1.080 0.281254
## fCollegeDrexel                    -1.263824   1.091128  -1.158 0.247719
## fCollegeDuke                       0.260423   0.493076   0.528 0.597798
## fCollegeFlorida                    0.980413   0.661083   1.483 0.139165
## fCollegeFlorida State              0.100377   0.567921   0.177 0.859834
## fCollegeFresno State               1.408751   1.092144   1.290 0.198129
## fCollegeGeorge Washington         -1.274873   1.100918  -1.158 0.247826
## fCollegeGeorgetown                -0.802373   0.723236  -1.109 0.268180
## fCollegeGeorgia                    0.394645   0.727542   0.542 0.587941
## fCollegeGeorgia Tech               0.122449   0.730174   0.168 0.866939
## fCollegeGonzaga                    0.471640   0.593426   0.795 0.427404
## fCollegeHouston                   -1.017824   0.822399  -1.238 0.216869
## fCollegeIllinois                  -0.740160   0.872024  -0.849 0.396712
## fCollegeIndiana                   -0.005835   0.593214  -0.010 0.992159
## fCollegeIowa State                -0.094649   0.631855  -0.150 0.881032
## fCollegeIUPUI                     -0.419290   1.200436  -0.349 0.727135
## fCollegeKansas                     0.287996   0.563945   0.511 0.609968
## fCollegeKansas State              -1.193704   0.723151  -1.651 0.099898 .
## fCollegeKentucky                   0.411688   0.490453   0.839 0.401944
## fCollegeLehigh                     2.108315   1.103957   1.910 0.057162 .
## fCollegeLiberty                   -0.911002   1.086100  -0.839 0.402292
## fCollegeLouisiana-Lafayette       -1.888017   1.091309  -1.730 0.084700 .
## fCollegeLouisville                 0.440683   0.638201   0.691 0.490435
```

```
## fCollegeLoyola (MD)              -0.087411   1.090567  -0.080 0.936172
## fCollegeLSU                      -0.074724   0.659185  -0.113 0.909826
## fCollegeMarquette                -0.014981   0.735882  -0.020 0.983772
## fCollegeMarshall                 -1.768418   1.097019  -1.612 0.108060
## fCollegeMaryland                 -0.308302   0.638628  -0.483 0.629638
## fCollegeMemphis                   0.765476   0.664057   1.153 0.249985
## fCollegeMiami (FL)                0.194588   0.828388   0.235 0.814455
## fCollegeMichigan                  0.070056   0.578836   0.121 0.903753
## fCollegeMichigan State            0.586704   0.641745   0.914 0.361364
## fCollegeMinnesota                -0.463466   1.089123  -0.426 0.670763
## fCollegeMississippi State        -1.174394   1.095252  -1.072 0.284507
## fCollegeMissouri                 -0.048929   0.721458  -0.068 0.945976
## fCollegeMissouri State           -0.567238   1.093369  -0.519 0.604302
## fCollegeMurray State              0.315173   0.834678   0.378 0.706009
## fCollegenan                       0.231327   0.465192   0.497 0.619379
## fCollegeNebraska                 -0.901567   0.839858  -1.073 0.283963
## fCollegeNevada                   -0.898709   0.836135  -1.075 0.283353
## fCollegeNew Mexico               -1.022391   1.104434  -0.926 0.355375
## fCollegeNew Mexico JC             0.410371   1.115735   0.368 0.713292
## fCollegeNew Mexico State          0.947580   1.111711   0.852 0.394726
## fCollegeNorth Carolina           -0.127039   0.552020  -0.230 0.818152
## fCollegeNorth Carolina State      0.326403   1.089318   0.300 0.764670
## fCollegeNotre Dame               -0.040278   1.089423  -0.037 0.970533
## fCollegeOhio                     -1.214985   1.089890  -1.115 0.265882
## fCollegeOhio State                0.247982   0.733578   0.338 0.735578
## fCollegeOklahoma                 -0.044424   0.727575  -0.061 0.951356
## fCollegeOklahoma State            0.735074   0.836376   0.879 0.380204
## fCollegeOld Dominion             -1.077595   1.097835  -0.982 0.327144
## fCollegeOle Miss                 -0.211418   1.092271  -0.194 0.846659
## fCollegeOregon                    0.018247   0.628634   0.029 0.976864
## fCollegeOregon State             -1.060304   1.080628  -0.981 0.327327
## fCollegePenn State               -1.158480   1.138953  -1.017 0.309944
## fCollegePittsburgh                0.883148   1.099561   0.803 0.422537
## fCollegeProvidence               -0.398284   1.086973  -0.366 0.714325
## fCollegePurdue                   -0.787739   1.109700  -0.710 0.478365
## fCollegeRadford                  -2.072153   1.093241  -1.895 0.059045 .
## fCollegeSaint Joseph's           -0.644945   0.859084  -0.751 0.453429
## fCollegeSaint Mary's             -0.894140   0.826235  -1.082 0.280082
## fCollegeSalt Lake CC UT          -1.376906   1.091550  -1.261 0.208184
## fCollegeSan Diego State           0.135275   0.731456   0.185 0.853408
## fCollegeSMU                      -0.750477   0.733385  -1.023 0.307028
## fCollegeSouth Carolina           -0.880228   1.071066  -0.822 0.411862
## fCollegeSt. John's               -0.781249   1.093349  -0.715 0.475472
## fCollegeStanford                  0.072780   0.609349   0.119 0.905011
## fCollegeSyracuse                 -0.484707   0.638895  -0.759 0.448678
## fCollegeTCU                      -0.855784   0.838656  -1.020 0.308390
## fCollegeTennessee                 0.442793   0.640969   0.691 0.490240
## fCollegeTennessee State           1.361532   1.108954   1.228 0.220546
## fCollegeTexas                     0.698902   0.537613   1.300 0.194644
## fCollegeTexas A&M                 0.457468   0.677298   0.675 0.499948
## fCollegeTexas Tech               -0.206779   0.866866  -0.239 0.811636
## fCollegeUC Santa Barbara         -1.173666   1.088908  -1.078 0.282014
## fCollegeUCLA                      0.630161   0.544640   1.157 0.248228
## fCollegeUNLV                      0.885205   0.749335   1.181 0.238457
```

```
## fCollegeUSC                          0.241331   0.560813   0.430 0.667284
## fCollegeUSC Upstate                 -0.805572   1.088740  -0.740 0.459961
## fCollegeUtah                         0.577608   0.725571   0.796 0.426650
## fCollegeUtah State                  -1.243961   1.087253  -1.144 0.253526
## fCollegeVanderbilt                  -0.295474   0.663197  -0.446 0.656274
## fCollegeVillanova                   -0.139847   0.556525  -0.251 0.801774
## fCollegeVirginia                    -0.135298   0.584445  -0.231 0.817094
## fCollegeVirginia Commonwealth       -0.216397   1.066977  -0.203 0.839425
## fCollegeVirginia Tech               -0.266175   1.053418  -0.253 0.800699
## fCollegeWake Forest                  0.320538   0.633125   0.506 0.613051
## fCollegeWashington                   0.116028   0.571790   0.203 0.839341
## fCollegeWashington State             0.675958   0.842035   0.803 0.422776
## fCollegeWeber State                  1.868116   1.105667   1.690 0.092197 .
## fCollegeWest Virginia               -0.876868   0.829673  -1.057 0.291457
## fCollegeWestern Texas Coll. (J.C.) -1.266890   1.081735  -1.171 0.242507
## fCollegeWichita State                0.449096   0.846889   0.530 0.596323
## fCollegeWisconsin                   -1.327434   0.865514  -1.534 0.126210
## fCollegeWyoming                     -0.006288   0.843848  -0.007 0.994060
## fCollegeXavier                      -1.138664   0.814496  -1.398 0.163197
## fCollegeYale                        -1.059210   1.094291  -0.968 0.333891
## poly(Age, 3)1                        6.632580   1.200878   5.523 7.49e-08 ***
## poly(Age, 3)2                       -4.034700   1.223344  -3.298 0.001097 **
## poly(Age, 3)3                       -2.816061   1.135647  -2.480 0.013725 *
## Height_i                             0.067048   0.191933   0.349 0.727098
## Weight                               0.011685   0.003831   3.050 0.002500 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.9368 on 286 degrees of freedom
## Multiple R-squared:  0.4646, Adjusted R-squared:  0.1688
## F-statistic: 1.571 on 158 and 286 DF,  p-value: 0.0005046
```

The end result is that only `Age` has been misspecified, and has been re-specified as `poly(Age,3)`.

```
# Resulting Full model with polynomial terms
summary(lm_log1 <- lm(log(Salary) ~ fTeam+fPosition+fCollege+poly(Age,3)+Height_i+Weight, data=ap_tibble
```

```
##
## Call:
## lm(formula = log(Salary) ~ fTeam + fPosition + fCollege + poly(Age,
##     3) + Height_i + Weight, data = ap_tibble)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -2.0695 -0.4836  0.0000  0.4824  2.0273
##
## Coefficients:
##                                  Estimate Std. Error t value Pr(>|t|)
## (Intercept)                     12.043683   1.618465   7.441 1.17e-12 ***
## fTeamBoston Celtics             -0.374141   0.401161  -0.933 0.351789
## fTeamBrooklyn Nets              -0.340770   0.381275  -0.894 0.372199
## fTeamCharlotte Hornets          -0.233372   0.373607  -0.625 0.532702
## fTeamChicago Bulls               0.087408   0.412825   0.212 0.832467
## fTeamCleveland Cavaliers         0.313679   0.408627   0.768 0.443334
## fTeamDallas Mavericks           -0.400137   0.382434  -1.046 0.296310
```

```
## fTeamDenver Nuggets              -0.160452   0.390948  -0.410 0.681806
## fTeamDetroit Pistons             -0.419976   0.390679  -1.075 0.283286
## fTeamGolden State Warriors       -0.315033   0.398640  -0.790 0.430025
## fTeamHouston Rockets             -0.425153   0.385569  -1.103 0.271099
## fTeamIndiana Pacers              -0.054030   0.395798  -0.137 0.891514
## fTeamLos Angeles Clippers        -0.283448   0.403258  -0.703 0.482693
## fTeamLos Angeles Lakers          -0.558302   0.426090  -1.310 0.191149
## fTeamMemphis Grizzlies           -0.143422   0.400772  -0.358 0.720708
## fTeamMiami Heat                  -0.389433   0.414397  -0.940 0.348135
## fTeamMilwaukee Bucks             -0.500471   0.402448  -1.244 0.214677
## fTeamMinnesota Timberwolves       0.320329   0.421986   0.759 0.448419
## fTeamNew Orleans Pelicans        -0.114140   0.375081  -0.304 0.761115
## fTeamNew York Knicks             -0.270026   0.382483  -0.706 0.480774
## fTeamOklahoma City Thunder       -0.344376   0.393016  -0.876 0.381635
## fTeamOrlando Magic               -0.002917   0.395950  -0.007 0.994127
## fTeamPhiladelphia Sixers         -0.256713   0.397496  -0.646 0.518909
## fTeamPhoenix Suns                 0.134262   0.401398   0.334 0.738259
## fTeamPortland Trail Blazers      -0.746262   0.439902  -1.696 0.090893 .
## fTeamSacremento Kings            -0.030373   0.402664  -0.075 0.939925
## fTeamSan Antonio Spurs           -0.116766   0.388850  -0.300 0.764178
## fTeamToronto Raptors             -0.166230   0.427117  -0.389 0.697424
## fTeamUtah Jazz                   -0.055919   0.409409  -0.137 0.891455
## fTeamWashington Wizards          -0.359851   0.372541  -0.966 0.334892
## fPositionF                        0.026966   0.438897   0.061 0.951052
## fPositionG                        1.201822   0.521891   2.303 0.022007 *
## fPositionPF                       0.313371   0.193428   1.620 0.106314
## fPositionPG                       1.080926   0.299544   3.609 0.000363 ***
## fPositionSF                       0.669712   0.214689   3.119 0.001997 **
## fPositionSG                       0.745132   0.255238   2.919 0.003786 **
## fCollegeArizona                   0.085742   0.563429   0.152 0.879153
## fCollegeArizona State             0.325108   0.729729   0.446 0.656282
## fCollegeArkansas                 -0.008287   0.667780  -0.012 0.990107
## fCollegeAuburn                   -0.115713   0.721079  -0.160 0.872623
## fCollegeBaylor                   -0.471312   0.645839  -0.730 0.466130
## fCollegeBelmont                  -1.090632   1.073431  -1.016 0.310476
## fCollegeBoise State              -0.544291   1.091196  -0.499 0.618302
## fCollegeBoston College           -0.078651   1.089848  -0.072 0.942520
## fCollegeBowling Green             0.731551   1.099119   0.666 0.506216
## fCollegeBucknell                 -0.398495   1.100104  -0.362 0.717444
## fCollegeButler                   -0.268787   0.839275  -0.320 0.749004
## fCollegeBYU                      -1.080330   1.090871  -0.990 0.322846
## fCollegeCal Poly                 -0.294131   1.090829  -0.270 0.787632
## fCollegeCalifornia                1.762453   1.093011   1.612 0.107961
## fCollegeCharleston               -1.337265   1.102472  -1.213 0.226142
## fCollegeCleveland State          -0.527030   1.077495  -0.489 0.625128
## fCollegeColorado                  0.432306   0.725008   0.596 0.551462
## fCollegeConnecticut               0.053908   0.631152   0.085 0.931993
## fCollegeCreighton                -0.277264   0.830394  -0.334 0.738704
## fCollegeDavidson                  1.750097   1.087678   1.609 0.108715
## fCollegeDayton                    0.574159   1.085014   0.529 0.597097
## fCollegeDePaul                   -0.901192   0.834788  -1.080 0.281254
## fCollegeDrexel                   -1.263824   1.091128  -1.158 0.247719
## fCollegeDuke                      0.260423   0.493076   0.528 0.597798
## fCollegeFlorida                   0.980413   0.661083   1.483 0.139165
```

```
## fCollegeFlorida State              0.100377   0.567921   0.177 0.859834
## fCollegeFresno State               1.408751   1.092144   1.290 0.198129
## fCollegeGeorge Washington         -1.274873   1.100918  -1.158 0.247826
## fCollegeGeorgetown                -0.802373   0.723236  -1.109 0.268180
## fCollegeGeorgia                    0.394645   0.727542   0.542 0.587941
## fCollegeGeorgia Tech               0.122449   0.730174   0.168 0.866939
## fCollegeGonzaga                    0.471640   0.593426   0.795 0.427404
## fCollegeHouston                   -1.017824   0.822399  -1.238 0.216869
## fCollegeIllinois                  -0.740160   0.872024  -0.849 0.396712
## fCollegeIndiana                   -0.005835   0.593214  -0.010 0.992159
## fCollegeIowa State                -0.094649   0.631855  -0.150 0.881032
## fCollegeIUPUI                     -0.419290   1.200436  -0.349 0.727135
## fCollegeKansas                     0.287996   0.563945   0.511 0.609968
## fCollegeKansas State              -1.193704   0.723151  -1.651 0.099898 .
## fCollegeKentucky                   0.411688   0.490453   0.839 0.401944
## fCollegeLehigh                     2.108315   1.103957   1.910 0.057162 .
## fCollegeLiberty                   -0.911002   1.086100  -0.839 0.402292
## fCollegeLouisiana-Lafayette       -1.888017   1.091309  -1.730 0.084700 .
## fCollegeLouisville                 0.440683   0.638201   0.691 0.490435
## fCollegeLoyola (MD)               -0.087411   1.090567  -0.080 0.936172
## fCollegeLSU                       -0.074724   0.659185  -0.113 0.909826
## fCollegeMarquette                 -0.014981   0.735882  -0.020 0.983772
## fCollegeMarshall                  -1.768418   1.097019  -1.612 0.108060
## fCollegeMaryland                  -0.308302   0.638628  -0.483 0.629638
## fCollegeMemphis                    0.765476   0.664057   1.153 0.249985
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## fCollegeMichigan                   0.070056   0.578836   0.121 0.903753
## fCollegeMichigan State             0.586704   0.641745   0.914 0.361364
## fCollegeMinnesota                 -0.463466   1.089123  -0.426 0.670763
## fCollegeMississippi State         -1.174394   1.095252  -1.072 0.284507
## fCollegeMissouri                  -0.048929   0.721458  -0.068 0.945976
## fCollegeMissouri State            -0.567238   1.093369  -0.519 0.604302
## fCollegeMurray State               0.315173   0.834678   0.378 0.706009
## fCollegenan                        0.231327   0.465192   0.497 0.619379
## fCollegeNebraska                  -0.901567   0.839858  -1.073 0.283963
## fCollegeNevada                    -0.898709   0.836135  -1.075 0.283353
## fCollegeNew Mexico                -1.022391   1.104434  -0.926 0.355375
## fCollegeNew Mexico JC              0.410371   1.115735   0.368 0.713292
## fCollegeNew Mexico State           0.947580   1.111711   0.852 0.394726
## fCollegeNorth Carolina            -0.127039   0.552020  -0.230 0.818152
## fCollegeNorth Carolina State       0.326403   1.089318   0.300 0.764670
## fCollegeNotre Dame                -0.040278   1.089423  -0.037 0.970533
## fCollegeOhio                      -1.214985   1.089890  -1.115 0.265882
## fCollegeOhio State                 0.247982   0.733578   0.338 0.735578
## fCollegeOklahoma                  -0.044424   0.727575  -0.061 0.951356
## fCollegeOklahoma State             0.735074   0.836376   0.879 0.380204
## fCollegeOld Dominion              -1.077595   1.097835  -0.982 0.327144
## fCollegeOle Miss                  -0.211418   1.092271  -0.194 0.846659
## fCollegeOregon                     0.018247   0.628634   0.029 0.976864
## fCollegeOregon State              -1.060304   1.080628  -0.981 0.327327
## fCollegePenn State                -1.158480   1.138953  -1.017 0.309944
## fCollegePittsburgh                 0.883148   1.099561   0.803 0.422537
## fCollegeProvidence                -0.398284   1.086973  -0.366 0.714325
## fCollegePurdue                    -0.787739   1.109700  -0.710 0.478365
```
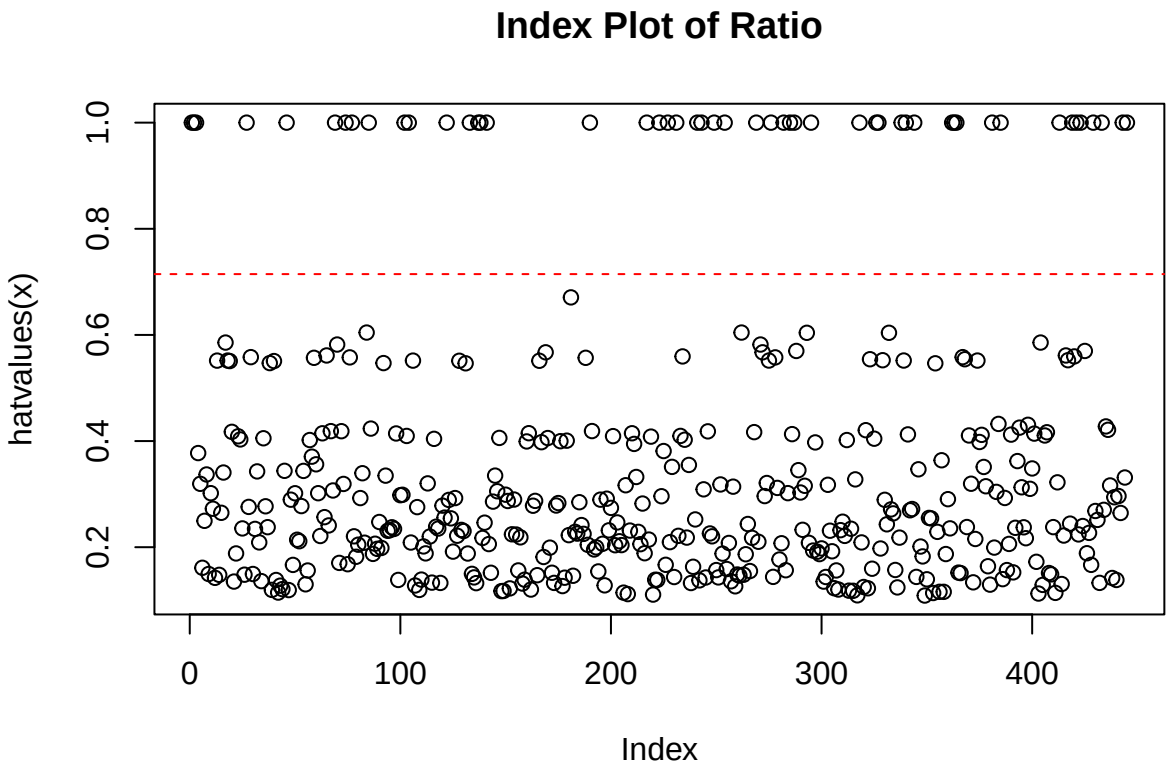

```
## fCollegeRadford                    -2.072153   1.093241  -1.895 0.059045 .
## fCollegeSaint Joseph's             -0.644945   0.859084  -0.751 0.453429
## fCollegeSaint Mary's               -0.894140   0.826235  -1.082 0.280082
## fCollegeSalt Lake CC UT            -1.376906   1.091550  -1.261 0.208184
## fCollegeSan Diego State             0.135275   0.731456   0.185 0.853408
## fCollegeSMU                        -0.750477   0.733385  -1.023 0.307028
## fCollegeSouth Carolina             -0.880228   1.071066  -0.822 0.411862
## fCollegeSt. John's                 -0.781249   1.093349  -0.715 0.475472
## fCollegeStanford                    0.072780   0.609349   0.119 0.905011
## fCollegeSyracuse                   -0.484707   0.638895  -0.759 0.448678
## fCollegeTCU                        -0.855784   0.838656  -1.020 0.308390
## fCollegeTennessee                   0.442793   0.640969   0.691 0.490240
## fCollegeTennessee State             1.361532   1.108954   1.228 0.220546
## fCollegeTexas                       0.698902   0.537613   1.300 0.194644
## fCollegeTexas A&M                   0.457468   0.677298   0.675 0.499948
## fCollegeTexas Tech                 -0.206779   0.866866  -0.239 0.811636
## fCollegeUC Santa Barbara           -1.173666   1.088908  -1.078 0.282014
## fCollegeUCLA                        0.630161   0.544640   1.157 0.248228
## fCollegeUNLV                        0.885205   0.749335   1.181 0.238457
## fCollegeUSC                         0.241331   0.560813   0.430 0.667284
## fCollegeUSC Upstate                -0.805572   1.088740  -0.740 0.459961
## fCollegeUtah                        0.577608   0.725571   0.796 0.426650
## fCollegeUtah State                 -1.243961   1.087253  -1.144 0.253526
## fCollegeVanderbilt                 -0.295474   0.663197  -0.446 0.656274
## fCollegeVillanova                  -0.139847   0.556525  -0.251 0.801774
## fCollegeVirginia                   -0.135298   0.584445  -0.231 0.817094
## fCollegeVirginia Commonwealth      -0.216397   1.066977  -0.203 0.839425
## fCollegeVirginia Tech              -0.266175   1.053418  -0.253 0.800699
## fCollegeWake Forest                 0.320538   0.633125   0.506 0.613051
## fCollegeWashington                  0.116028   0.571790   0.203 0.839341
## fCollegeWashington State            0.675958   0.842035   0.803 0.422776
## fCollegeWeber State                 1.868116   1.105667   1.690 0.092197 .
## fCollegeWest Virginia              -0.876868   0.829673  -1.057 0.291457
## fCollegeWestern Texas Coll. (J.C.) -1.266890   1.081735  -1.171 0.242507
## fCollegeWichita State               0.449096   0.846889   0.530 0.596323
## fCollegeWisconsin                  -1.327434   0.865514  -1.534 0.126210
## fCollegeWyoming                    -0.006288   0.843848  -0.007 0.994060
## fCollegeXavier                     -1.138664   0.814496  -1.398 0.163197
## fCollegeYale                       -1.059210   1.094291  -0.968 0.333891
## poly(Age, 3)1                       6.632580   1.200878   5.523 7.49e-08 ***
## poly(Age, 3)2                      -4.034700   1.223344  -3.298 0.001097 **
## poly(Age, 3)3                      -2.816061   1.135647  -2.480 0.013725 *
## Height_i                            0.067048   0.191933   0.349 0.727098
## Weight                              0.011685   0.003831   3.050 0.002500 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.9368 on 286 degrees of freedom
## Multiple R-squared:  0.4646, Adjusted R-squared:  0.1688
## F-statistic: 1.571 on 158 and 286 DF,  p-value: 0.0005046
```

Check for Outliers and High Leverage

```
outlierTest(lm_log1)
```

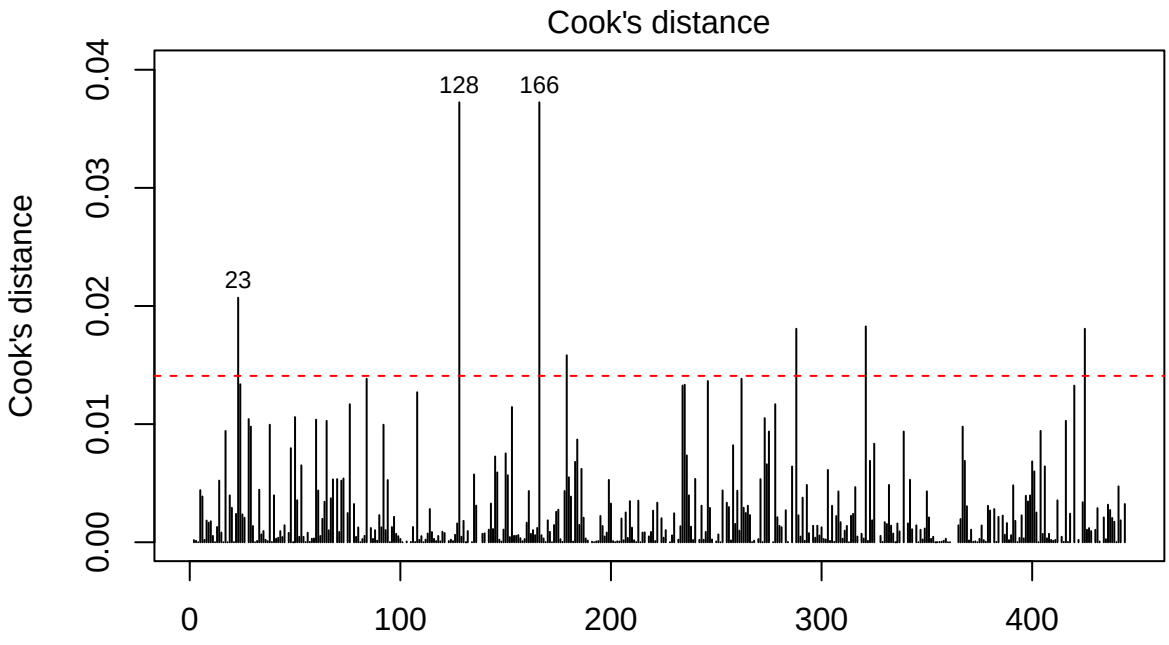
```
## No Studentized residuals with Bonferroni p < 0.05
## Largest |rstudent|:
##      rstudent unadjusted p-value Bonferroni p
## 153 -2.532025           0.011878           NA
```

```
highleverage <- function(x) {
  p <- length(coefficients(x))
  n <- length(fitted(x))
  ratio <- p/n
  plot(hatvalues(x), main="Index Plot of Ratio")
  abline(h=c(2,3)*ratio, col="red", lty=2)
  identify(1:n, hatvalues(x), names(hatvalues(x)))
}
highleverage(lm_log1)
```



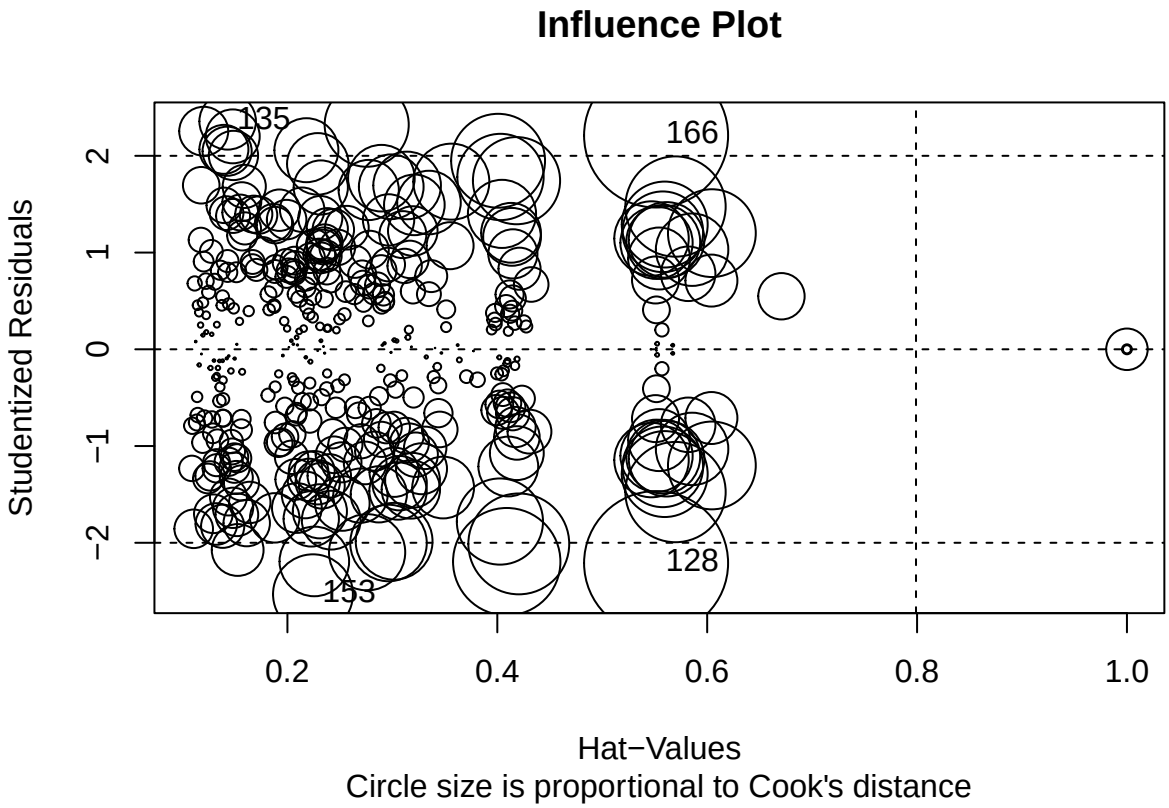

```
## integer(0)
```

```
cutoff <- 4/(nrow(ap_tibble)-length(lm_log1$coefficients)-2)
plot(lm_log1, which=4,cook.levels=cutoff)
abline(h=cutoff, lty=2, col="red")
```




```
#avPlots(lm_log1, ask=FALSE, id="identify")
```

```
influencePlot(lm_log1,main="Influence Plot", sub="Circle size is proportional to Cook's distance")
```




```
##       StudRes       Hat       CookD
## 1         NaN 1.0000000         NaN
## 27        NaN 1.0000000         NaN
## 128 -2.210127 0.5513065 0.037241025
## 135  2.356405 0.1430491 0.005738168
## 153 -2.532025 0.2243390 0.011445416
## 166  2.210127 0.5513065 0.037241025
```

```
# Removal of outliers and high leverage points
ap_tibble <- ap_tibble[-which(abs(rstandard(lm_log1)) > 2 | hatvalues(lm_log1) > .8),]
```

```
# Resulting Full model with polynomial terms
summary(lm_log1 <- lm(log(Salary) ~ fTeam+fPosition+fCollege+poly(Age,3)+Height_i+Weight, data=ap_tibble
```

```
##
## Call:
## lm(formula = log(Salary) ~ fTeam + fPosition + fCollege + poly(Age,
##     3) + Height_i + Weight, data = ap_tibble)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.54459 -0.51808  0.04767  0.53071  1.68621
##
## Coefficients:
##                             Estimate Std. Error t value Pr(>|t|)
## (Intercept)                11.176566   1.478385   7.560 6.20e-13 ***
## fTeamBoston Celtics        -0.666996   0.379028  -1.760  0.07957 .
```

```
## fTeamBrooklyn Nets          -0.112821   0.371574  -0.304  0.76164
## fTeamCharlotte Hornets      -0.422631   0.346836  -1.219  0.22408
## fTeamChicago Bulls          -0.032415   0.379767  -0.085  0.93204
## fTeamCleveland Cavaliers     0.184051   0.378134   0.487  0.62684
## fTeamDallas Mavericks       -0.676003   0.361298  -1.871  0.06241 .
## fTeamDenver Nuggets         -0.150769   0.376696  -0.400  0.68929
## fTeamDetroit Pistons        -0.707260   0.366086  -1.932  0.05440 .
## fTeamGolden State Warriors  -0.630222   0.377559  -1.669  0.09623 .
## fTeamHouston Rockets        -0.389134   0.361197  -1.077  0.28228
## fTeamIndiana Pacers          0.006626   0.371861   0.018  0.98580
## fTeamLos Angeles Clippers   -0.368187   0.371016  -0.992  0.32190
## fTeamLos Angeles Lakers     -0.734320   0.391916  -1.874  0.06205 .
## fTeamMemphis Grizzlies      -0.239948   0.367922  -0.652  0.51484
## fTeamMiami Heat             -0.593949   0.401383  -1.480  0.14010
## fTeamMilwaukee Bucks        -0.859189   0.380993  -2.255  0.02492 *
## fTeamMinnesota Timberwolves  0.205606   0.390395   0.527  0.59886
## fTeamNew Orleans Pelicans   -0.287294   0.353297  -0.813  0.41683
## fTeamNew York Knicks        -0.328152   0.353043  -0.929  0.35346
## fTeamOklahoma City Thunder  -0.329881   0.361725  -0.912  0.36259
## fTeamOrlando Magic          -0.079574   0.364920  -0.218  0.82755
## fTeamPhiladelphia Sixers    -0.394274   0.366067  -1.077  0.28241
## fTeamPhoenix Suns           -0.051844   0.371394  -0.140  0.88909
## fTeamPortland Trail Blazers -0.840615   0.403580  -2.083  0.03820 *
## fTeamSacremento Kings       -0.194403   0.368692  -0.527  0.59843
## fTeamSan Antonio Spurs      -0.192984   0.357218  -0.540  0.58947
## fTeamToronto Raptors        -0.257975   0.391634  -0.659  0.51064
## fTeamUtah Jazz              -0.238036   0.378530  -0.629  0.52998
## fTeamWashington Wizards     -0.393659   0.344054  -1.144  0.25356
## fPositionF                   0.209748   0.396838   0.529  0.59755
## fPositionG                   1.558195   0.475481   3.277  0.00119 **
## fPositionPF                  0.494921   0.178330   2.775  0.00590 **
## fPositionPG                  1.322079   0.272614   4.850 2.08e-06 ***
## fPositionSF                  0.796633   0.196827   4.047 6.76e-05 ***
## fPositionSG                  1.044913   0.234221   4.461 1.19e-05 ***
## fCollegeArizona              0.333534   0.522761   0.638  0.52399
## fCollegeArizona State        0.005412   0.660466   0.008  0.99347
## fCollegeArkansas             0.038909   0.602360   0.065  0.94854
## fCollegeAuburn              -0.120204   0.650812  -0.185  0.85360
## fCollegeBaylor              -0.458239   0.582867  -0.786  0.43245
## fCollegeColorado             0.317168   0.653775   0.485  0.62797
## fCollegeConnecticut         -0.032320   0.569415  -0.057  0.95478
## fCollegeCreighton           -0.410028   0.750324  -0.546  0.58519
## fCollegeDePaul              -0.830836   0.754781  -1.101  0.27197
## fCollegeDuke                 0.121583   0.456327   0.266  0.79010
## fCollegeFlorida              0.984553   0.597255   1.648  0.10041
## fCollegeFlorida State        0.055708   0.512785   0.109  0.91357
## fCollegeGeorgetown          -0.784002   0.654506  -1.198  0.23202
## fCollegeGeorgia              0.228709   0.657203   0.348  0.72811
## fCollegeGeorgia Tech         0.012984   0.658691   0.020  0.98429
## fCollegeGonzaga              0.380625   0.536399   0.710  0.47856
## fCollegeHouston             -1.116005   0.741242  -1.506  0.13333
## fCollegeIllinois            -0.754912   0.786211  -0.960  0.33781
## fCollegeIndiana             -0.044044   0.536379  -0.082  0.93462
## fCollegeIowa State          -0.098305   0.569619  -0.173  0.86311
```

```
## fCollegeKansas               0.295139   0.534993   0.552  0.58163
## fCollegeKansas State        -1.094658   0.652747  -1.677  0.09469 .
## fCollegeKentucky             0.367513   0.443621   0.828  0.40815
## fCollegeLouisville           0.474713   0.577341   0.822  0.41166
## fCollegeLSU                 -0.212121   0.595242  -0.356  0.72185
## fCollegeMarquette            0.054968   0.666599   0.082  0.93434
## fCollegeMaryland            -0.251837   0.576499  -0.437  0.66258
## fCollegeMemphis              0.787839   0.598976   1.315  0.18951
## fCollegeMiami (FL)           0.052450   0.748164   0.070  0.94416
## fCollegeMichigan             0.139480   0.523425   0.266  0.79007
## fCollegeMichigan State       0.589567   0.579750   1.017  0.31009
## fCollegeMissouri            -0.086459   0.650271  -0.133  0.89432
## fCollegeMurray State         0.451106   0.752318   0.600  0.54926
## fCollegenan                  0.108606   0.420320   0.258  0.79630
## fCollegeNebraska            -0.896261   0.757187  -1.184  0.23758
## fCollegeNevada              -0.834505   0.754448  -1.106  0.26965
## fCollegeNorth Carolina      -0.128921   0.498518  -0.259  0.79613
## fCollegeOhio State           1.027605   0.757730   1.356  0.17617
## fCollegeOklahoma             0.688057   0.751384   0.916  0.36063
## fCollegeOklahoma State       0.801994   0.756127   1.061  0.28979
## fCollegeOregon               0.071534   0.567477   0.126  0.89978
## fCollegeSaint Joseph's      -0.869055   0.775850  -1.120  0.26365
## fCollegeSaint Mary's        -1.078439   0.746257  -1.445  0.14957
## fCollegeSan Diego State      0.208059   0.659996   0.315  0.75282
## fCollegeSMU                 -0.625120   0.663826  -0.942  0.34719
## fCollegeStanford             0.139721   0.551532   0.253  0.80020
## fCollegeSyracuse            -0.963871   0.608311  -1.585  0.11424
## fCollegeTCU                 -0.918175   0.756234  -1.214  0.22575
## fCollegeTennessee            0.443801   0.579597   0.766  0.44451
## fCollegeTexas                0.661003   0.485641   1.361  0.17461
## fCollegeTexas A&M            0.565391   0.613098   0.922  0.35725
## fCollegeTexas Tech          -0.241241   0.782438  -0.308  0.75807
## fCollegeUCLA                 0.685358   0.491877   1.393  0.16465
## fCollegeUNLV                 0.973960   0.676912   1.439  0.15135
## fCollegeUSC                  0.201738   0.506831   0.398  0.69091
## fCollegeUtah                 0.543188   0.655381   0.829  0.40794
## fCollegeVanderbilt          -0.125363   0.599564  -0.209  0.83453
## fCollegeVillanova           -0.079131   0.502487  -0.157  0.87499
## fCollegeVirginia            -0.243369   0.528336  -0.461  0.64543
## fCollegeWake Forest          0.699046   0.602448   1.160  0.24693
## fCollegeWashington           0.128365   0.515805   0.249  0.80365
## fCollegeWashington State     0.650565   0.759358   0.857  0.39235
## fCollegeWest Virginia       -1.073430   0.749489  -1.432  0.15323
## fCollegeWichita State        0.467479   0.763279   0.612  0.54074
## fCollegeWisconsin           -1.354259   0.780148  -1.736  0.08371 .
## fCollegeWyoming             -0.040901   0.760641  -0.054  0.95716
## fCollegeXavier              -1.132261   0.734533  -1.541  0.12437
## poly(Age, 3)1                6.656392   1.040846   6.395 6.96e-10 ***
## poly(Age, 3)2               -3.310328   1.069847  -3.094  0.00218 **
## poly(Age, 3)3               -3.248946   1.005019  -3.233  0.00138 **
## Height_i                     0.045917   0.177391   0.259  0.79595
## Weight                       0.015974   0.003529   4.526 8.98e-06 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
##
## Residual standard error: 0.8431 on 272 degrees of freedom
## Multiple R-squared:  0.4847, Adjusted R-squared:  0.282
## F-statistic: 2.391 on 107 and 272 DF,  p-value: 6.099e-09
```

```
shapiro.test(resid(lm_log1))
```

```
##
##  Shapiro-Wilk normality test
##
## data:  resid(lm_log1)
## W = 0.98788, p-value = 0.002966
```

```
bptest(lm_log1)
```

```
##
##  studentized Breusch-Pagan test
##
## data:  lm_log1
## BP = 149.86, df = 107, p-value = 0.003972
```

Reduced Model

```
# Removal of `fTeam` due to no significance
summary(lm_log2 <- lm(log(Salary) ~ fPosition+fCollege+poly(Age,3)+Height_i+Weight,data=ap_tibble))
```

```
##
## Call:
## lm(formula = log(Salary) ~ fPosition + fCollege + poly(Age, 3) +
##     Height_i + Weight, data = ap_tibble)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.71930 -0.54951  0.03869  0.54214  1.84730
##
## Coefficients:
##                            Estimate Std. Error t value Pr(>|t|)
## (Intercept)              11.482065   1.374447   8.354 2.45e-15 ***
## fPositionF                0.049314   0.371767   0.133 0.894561
## fPositionG                1.576201   0.448887   3.511 0.000514 ***
## fPositionPF               0.462322   0.175106   2.640 0.008717 **
## fPositionPG               1.268930   0.255871   4.959 1.18e-06 ***
## fPositionSF               0.775423   0.191895   4.041 6.77e-05 ***
## fPositionSG               0.970125   0.222456   4.361 1.78e-05 ***
## fCollegeArizona           0.307252   0.502728   0.611 0.541548
## fCollegeArizona State    -0.094135   0.624377  -0.151 0.880262
## fCollegeArkansas         -0.116076   0.570549  -0.203 0.838924
## fCollegeAuburn           -0.096642   0.623074  -0.155 0.876842
## fCollegeBaylor           -0.470646   0.541497  -0.869 0.385454
## fCollegeColorado          0.172094   0.628092   0.274 0.784277
## fCollegeConnecticut      -0.129466   0.540814  -0.239 0.810966
## fCollegeCreighton        -0.556658   0.716399  -0.777 0.437755
## fCollegeDePaul           -1.188798   0.715085  -1.662 0.097462 .
## fCollegeDuke             -0.082598   0.430233  -0.192 0.847884
## fCollegeFlorida           0.680801   0.561112   1.213 0.225964
## fCollegeFlorida State     0.087464   0.489318   0.179 0.858256
```

```
## fCollegeGeorgetown       -1.060010   0.626640  -1.692 0.091761 .
## fCollegeGeorgia           0.260432   0.622045   0.419 0.675756
## fCollegeGeorgia Tech      0.077114   0.625003   0.123 0.901888
## fCollegeGonzaga           0.227369   0.506883   0.449 0.654070
## fCollegeHouston          -1.026737   0.716928  -1.432 0.153143
## fCollegeIllinois         -1.041212   0.738212  -1.410 0.159439
## fCollegeIndiana          -0.405973   0.504240  -0.805 0.421386
## fCollegeIowa State       -0.240909   0.542915  -0.444 0.657554
## fCollegeKansas           -0.032123   0.508813  -0.063 0.949702
## fCollegeKansas State     -1.269791   0.625028  -2.032 0.043075 *
## fCollegeKentucky          0.099765   0.418688   0.238 0.811826
## fCollegeLouisville        0.222972   0.544766   0.409 0.682612
## fCollegeLSU              -0.187140   0.572629  -0.327 0.744040
## fCollegeMarquette        -0.205205   0.628194  -0.327 0.744153
## fCollegeMaryland         -0.235430   0.544882  -0.432 0.665996
## fCollegeMemphis           0.630553   0.575511   1.096 0.274112
## fCollegeMiami (FL)        0.016873   0.714600   0.024 0.981178
## fCollegeMichigan         -0.156540   0.488024  -0.321 0.748612
## fCollegeMichigan State    0.405437   0.541665   0.749 0.454742
## fCollegeMissouri         -0.177116   0.623332  -0.284 0.776496
## fCollegeMurray State      0.409329   0.715012   0.572 0.567425
## fCollegenan              -0.084224   0.397961  -0.212 0.832531
## fCollegeNebraska         -1.061431   0.715475  -1.484 0.138979
## fCollegeNevada           -0.906048   0.715907  -1.266 0.206637
## fCollegeNorth Carolina   -0.296921   0.467500  -0.635 0.525829
## fCollegeOhio State        1.164464   0.714858   1.629 0.104371
## fCollegeOklahoma          0.726393   0.712335   1.020 0.308672
## fCollegeOklahoma State    0.276906   0.721546   0.384 0.701421
## fCollegeOregon           -0.026658   0.541004  -0.049 0.960732
## fCollegeSaint Joseph's   -0.894070   0.734043  -1.218 0.224175
## fCollegeSaint Mary's     -1.089883   0.714604  -1.525 0.128270
## fCollegeSan Diego State  -0.016822   0.621989  -0.027 0.978441
## fCollegeSMU              -1.139399   0.627498  -1.816 0.070399 .
## fCollegeStanford         -0.208386   0.517438  -0.403 0.687435
## fCollegeSyracuse         -1.052837   0.575063  -1.831 0.068116 .
## fCollegeTCU              -1.073883   0.715740  -1.500 0.134564
## fCollegeTennessee         0.108821   0.536550   0.203 0.839416
## fCollegeTexas             0.494747   0.463915   1.066 0.287070
## fCollegeTexas A&M         0.212340   0.575755   0.369 0.712533
## fCollegeTexas Tech       -0.351496   0.737188  -0.477 0.633846
## fCollegeUCLA              0.392200   0.462619   0.848 0.397233
## fCollegeUNLV              0.841837   0.630733   1.335 0.182984
## fCollegeUSC               0.190139   0.478025   0.398 0.691090
## fCollegeUtah              0.474458   0.626101   0.758 0.449165
## fCollegeVanderbilt       -0.367068   0.571949  -0.642 0.521502
## fCollegeVillanova        -0.341601   0.479328  -0.713 0.476604
## fCollegeVirginia         -0.377353   0.503672  -0.749 0.454320
## fCollegeWake Forest       0.723260   0.575192   1.257 0.209574
## fCollegeWashington        0.143073   0.484783   0.295 0.768100
## fCollegeWashington State  0.107434   0.715901   0.150 0.880811
## fCollegeWest Virginia    -1.173340   0.714547  -1.642 0.101619
## fCollegeWichita State     0.446309   0.720242   0.620 0.535947
## fCollegeWisconsin        -1.289870   0.738383  -1.747 0.081677 .
## fCollegeWyoming          -0.406487   0.716697  -0.567 0.571023
```

```
## fCollegeXavier           -1.159174   0.714507  -1.622 0.105777
## poly(Age, 3)1             6.081960   0.946296   6.427 5.08e-10 ***
## poly(Age, 3)2            -3.897324   0.961161  -4.055 6.40e-05 ***
## poly(Age, 3)3            -3.169827   0.945966  -3.351 0.000908 ***
## Height_i                  0.003167   0.169273   0.019 0.985083
## Weight                    0.015342   0.003317   4.625 5.57e-06 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.8441 on 301 degrees of freedom
## Multiple R-squared:  0.4285, Adjusted R-squared:  0.2804
## F-statistic: 2.894 on 78 and 301 DF,  p-value: 4.186e-11
```

```
summary(lm_log3 <- lm(log(Salary) ~ fPosition+fCollege+poly(Age,3)+Weight,data=ap_tibble))
```

```
##
## Call:
## lm(formula = log(Salary) ~ fPosition + fCollege + poly(Age, 3) +
##     Weight, data = ap_tibble)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -1.7203 -0.5497  0.0389  0.5415  1.8460
##
## Coefficients:
##                          Estimate Std. Error t value Pr(>|t|)
## (Intercept)             11.501478   0.900061  12.779  < 2e-16 ***
## fPositionF               0.049832   0.370119   0.135 0.892987
## fPositionG               1.576384   0.448037   3.518 0.000501 ***
## fPositionPF              0.462472   0.174632   2.648 0.008516 **
## fPositionPG              1.268186   0.252340   5.026 8.61e-07 ***
## fPositionSF              0.775834   0.190316   4.077 5.85e-05 ***
## fPositionSG              0.970155   0.222082   4.368 1.72e-05 ***
## fCollegeArizona          0.307293   0.501890   0.612 0.540819
## fCollegeArizona State   -0.094673   0.622682  -0.152 0.879257
## fCollegeArkansas        -0.116684   0.568680  -0.205 0.837567
## fCollegeAuburn          -0.097513   0.620307  -0.157 0.875192
## fCollegeBaylor          -0.470694   0.540594  -0.871 0.384610
## fCollegeColorado         0.172743   0.626092   0.276 0.782808
## fCollegeConnecticut     -0.129785   0.539651  -0.240 0.810108
## fCollegeCreighton       -0.556820   0.715160  -0.779 0.436828
## fCollegeDePaul          -1.188444   0.713651  -1.665 0.096889 .
## fCollegeDuke            -0.082866   0.429281  -0.193 0.847061
## fCollegeFlorida          0.681117   0.559929   1.216 0.224770
## fCollegeFlorida State    0.087453   0.488507   0.179 0.858042
## fCollegeGeorgetown      -1.059136   0.623861  -1.698 0.090592 .
## fCollegeGeorgia          0.259591   0.619390   0.419 0.675436
## fCollegeGeorgia Tech     0.077478   0.623665   0.124 0.901216
## fCollegeGonzaga          0.226827   0.505216   0.449 0.653775
## fCollegeHouston         -1.026801   0.715733  -1.435 0.152432
## fCollegeIllinois        -1.041772   0.736383  -1.415 0.158182
## fCollegeIndiana         -0.406619   0.502225  -0.810 0.418787
## fCollegeIowa State      -0.240973   0.542005  -0.445 0.656931
## fCollegeKansas          -0.032127   0.507970  -0.063 0.949613
## fCollegeKansas State    -1.269480   0.623772  -2.035 0.042707 *
```

```
## fCollegeKentucky          0.099610   0.417912   0.238 0.811770
## fCollegeLouisville        0.222414   0.543049   0.410 0.682415
## fCollegeLSU              -0.187342   0.571579  -0.328 0.743318
## fCollegeMarquette        -0.205036   0.627089  -0.327 0.743921
## fCollegeMaryland         -0.235097   0.543689  -0.432 0.665752
## fCollegeMemphis           0.630920   0.574223   1.099 0.272758
## fCollegeMiami (FL)        0.016330   0.712829   0.023 0.981738
## fCollegeMichigan         -0.156667   0.487169  -0.322 0.747989
## fCollegeMichigan State    0.405144   0.540542   0.750 0.454131
## fCollegeMissouri         -0.178078   0.620178  -0.287 0.774202
## fCollegeMurray State      0.409296   0.713825   0.573 0.566812
## fCollegenan              -0.084347   0.397248  -0.212 0.831994
## fCollegeNebraska         -1.060132   0.710917  -1.491 0.136948
## fCollegeNevada           -0.905531   0.714189  -1.268 0.205805
## fCollegeNorth Carolina   -0.297200   0.466489  -0.637 0.524542
## fCollegeOhio State        1.164653   0.713602   1.632 0.103706
## fCollegeOklahoma          0.726020   0.710875   1.021 0.307928
## fCollegeOklahoma State    0.277449   0.719768   0.385 0.700161
## fCollegeOregon           -0.026306   0.539781  -0.049 0.961163
## fCollegeSaint Joseph's   -0.894097   0.732825  -1.220 0.223391
## fCollegeSaint Mary's     -1.090717   0.712033  -1.532 0.126610
## fCollegeSan Diego State  -0.016492   0.620708  -0.027 0.978821
## fCollegeSMU              -1.139498   0.626436  -1.819 0.069899 .
## fCollegeStanford         -0.208031   0.516232  -0.403 0.687249
## fCollegeSyracuse         -1.052595   0.573966  -1.834 0.067653 .
## fCollegeTCU              -1.073949   0.714546  -1.503 0.133889
## fCollegeTennessee         0.108928   0.535631   0.203 0.838988
## fCollegeTexas             0.494061   0.461697   1.070 0.285430
## fCollegeTexas A&M         0.212578   0.574662   0.370 0.711702
## fCollegeTexas Tech       -0.351882   0.735677  -0.478 0.632775
## fCollegeUCLA              0.392686   0.461123   0.852 0.395118
## fCollegeUNLV              0.841710   0.629652   1.337 0.182298
## fCollegeUSC               0.190411   0.477012   0.399 0.690047
## fCollegeUtah              0.474579   0.625030   0.759 0.448271
## fCollegeVanderbilt       -0.367775   0.569754  -0.645 0.519094
## fCollegeVillanova        -0.341730   0.478485  -0.714 0.475660
## fCollegeVirginia         -0.376811   0.502006  -0.751 0.453472
## fCollegeWake Forest       0.723433   0.574165   1.260 0.208651
## fCollegeWashington        0.143360   0.483738   0.296 0.767160
## fCollegeWashington State  0.107708   0.714566   0.151 0.880288
## fCollegeWest Virginia    -1.173778   0.712981  -1.646 0.100743
## fCollegeWichita State     0.445640   0.718162   0.621 0.535378
## fCollegeWisconsin        -1.288758   0.734771  -1.754 0.080452 .
## fCollegeWyoming          -0.405917   0.714863  -0.568 0.570576
## fCollegeXavier           -1.158847   0.713111  -1.625 0.105193
## poly(Age, 3)1             6.079228   0.933409   6.513 3.07e-10 ***
## poly(Age, 3)2            -3.895270   0.953286  -4.086 5.63e-05 ***
## poly(Age, 3)3            -3.169915   0.944388  -3.357 0.000890 ***
## Weight                    0.015348   0.003298   4.654 4.87e-06 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.8427 on 302 degrees of freedom
## Multiple R-squared:  0.4285, Adjusted R-squared:  0.2828
```

```
## F-statistic: 2.941 on 77 and 302 DF,  p-value: 2.412e-11
```

```
summary(lm_log4 <- lm(log(Salary) ~ fPosition+poly(Age,3)+Weight,data=ap_tibble))
```

```
##
## Call:
## lm(formula = log(Salary) ~ fPosition + poly(Age, 3) + Weight,
##     data = ap_tibble)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.83473 -0.65342  0.03578  0.61875  1.96734
##
## Coefficients:
##                Estimate Std. Error t value Pr(>|t|)
## (Intercept)   12.406721   0.782369  15.858  < 2e-16 ***
## fPositionF    -0.318547   0.337164  -0.945 0.345388
## fPositionG     1.098637   0.413133   2.659 0.008172 **
## fPositionPF    0.361549   0.163128   2.216 0.027277 *
## fPositionPG    1.023472   0.232988   4.393 1.46e-05 ***
## fPositionSF    0.474506   0.179534   2.643 0.008568 **
## fPositionSG    0.692310   0.204574   3.384 0.000791 ***
## poly(Age, 3)1  6.685044   0.887958   7.529 3.97e-13 ***
## poly(Age, 3)2 -3.140491   0.884334  -3.551 0.000433 ***
## poly(Age, 3)3 -3.284844   0.879152  -3.736 0.000216 ***
## Weight         0.011765   0.003102   3.792 0.000174 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.873 on 369 degrees of freedom
## Multiple R-squared:  0.2506, Adjusted R-squared:  0.2302
## F-statistic: 12.34 on 10 and 369 DF,  p-value: < 2.2e-16
```

```
anova(lm_log4,lm_log3,lm_log2,lm_log1)
```

```
## Analysis of Variance Table
##
## Model 1: log(Salary) ~ fPosition + poly(Age, 3) + Weight
## Model 2: log(Salary) ~ fPosition + fCollege + poly(Age, 3) + Weight
## Model 3: log(Salary) ~ fPosition + fCollege + poly(Age, 3) + Height_i +
##     Weight
## Model 4: log(Salary) ~ fTeam + fPosition + fCollege + poly(Age, 3) + Height_i +
##     Weight
##   Res.Df    RSS Df Sum of Sq      F  Pr(>F)
## 1    369 281.22
## 2    302 214.45 67    66.776 1.4021 0.03242 *
## 3    301 214.45  1     0.000 0.0004 0.98507
## 4    272 193.35 29    21.096 1.0233 0.43723
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

Stepwise Model Selection

```
summary(lm_step <- step(lm_logsm <- lm(log(Salary) ~ fTeam+fPosition+fCollege+poly(Age,3)+Height_i+Weigh
```

```
## Start:  AIC=-40.75
## log(Salary) ~ fTeam + fPosition + fCollege + poly(Age, 3) + Height_i +
##     Weight
##
##                Df Sum of Sq    RSS     AIC
## - fCollege     67    65.279 258.63 -64.212
## - fTeam        29    21.096 214.45 -59.399
## - Height_i      1     0.048 193.40 -42.656
## <none>                      193.35 -40.750
## - fPosition     6    19.812 213.16 -15.681
## - Weight        1    14.564 207.92 -15.153
## - poly(Age, 3)  3    47.877 241.23  37.319
##
## Step:  AIC=-64.21
## log(Salary) ~ fTeam + fPosition + poly(Age, 3) + Height_i + Weight
##
##                Df Sum of Sq    RSS     AIC
## - fTeam        29    22.453 281.08 -90.577
## - Height_i      1     0.035 258.67 -66.161
## <none>                      258.63 -64.212
## - fPosition     6    20.274 278.90 -47.534
## - Weight        1    13.447 272.08 -46.951
## - poly(Age, 3)  3    62.661 321.29  12.229
##
## Step:  AIC=-90.58
## log(Salary) ~ fPosition + poly(Age, 3) + Height_i + Weight
##
##                Df Sum of Sq    RSS     AIC
## - Height_i      1     0.140 281.22 -92.387
## <none>                      281.08 -90.577
## - fPosition     6    18.670 299.75 -78.140
## - Weight        1    11.092 292.18 -77.869
## - poly(Age, 3)  3    61.477 342.56 -21.414
##
## Step:  AIC=-92.39
## log(Salary) ~ fPosition + poly(Age, 3) + Weight
##
##                Df Sum of Sq    RSS     AIC
## <none>                      281.22 -92.387
## - Weight        1    10.961 292.19 -79.858
## - fPosition     6    20.201 301.43 -78.026
## - poly(Age, 3)  3    63.351 344.58 -21.186
##
## Call:
## lm(formula = log(Salary) ~ fPosition + poly(Age, 3) + Weight,
##     data = ap_tibble)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.83473 -0.65342  0.03578  0.61875  1.96734
##
## Coefficients:
##                Estimate Std. Error t value Pr(>|t|)
```

```
## (Intercept)   12.406721   0.782369  15.858  < 2e-16 ***
## fPositionF    -0.318547   0.337164  -0.945 0.345388
## fPositionG     1.098637   0.413133   2.659 0.008172 **
## fPositionPF    0.361549   0.163128   2.216 0.027277 *
## fPositionPG    1.023472   0.232988   4.393 1.46e-05 ***
## fPositionSF    0.474506   0.179534   2.643 0.008568 **
## fPositionSG    0.692310   0.204574   3.384 0.000791 ***
## poly(Age, 3)1  6.685044   0.887958   7.529 3.97e-13 ***
## poly(Age, 3)2 -3.140491   0.884334  -3.551 0.000433 ***
## poly(Age, 3)3 -3.284844   0.879152  -3.736 0.000216 ***
## Weight         0.011765   0.003102   3.792 0.000174 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.873 on 369 degrees of freedom
## Multiple R-squared:  0.2506, Adjusted R-squared:  0.2302
## F-statistic: 12.34 on 10 and 369 DF,  p-value: < 2.2e-16
```

```
shapiro.test(resid(lm_log3))
```

```
##
##  Shapiro-Wilk normality test
##
## data:  resid(lm_log3)
## W = 0.9908, p-value = 0.01796
```

```
bptest(lm_log3)
```

```
##
##  studentized Breusch-Pagan test
##
## data:  lm_log3
## BP = 96.864, df = 77, p-value = 0.0626
```

```
shapiro.test(resid(lm_step))
```

```
##
##  Shapiro-Wilk normality test
##
## data:  resid(lm_step)
## W = 0.98555, p-value = 0.0007663
```

```
bptest(lm_step)
```

```
##
##  studentized Breusch-Pagan test
##
## data:  lm_step
## BP = 35.338, df = 10, p-value = 0.0001093
```

Logistic Regression

```
# Calculate quantiles of Salary for good cutoff point
quantile(ap_tibble$Salary, probs = seq(0,1,1/20))
```

Recoding for Logistic Regression

```
##       0%       5%      10%      15%      20%      25%      30%      35%
##   925258  1517981  1669178  1701593  1782621  2006780  2318872  2937822
##      40%      45%      50%      55%      60%      65%      70%      75%
##  3479760  4000000  4672995  5479487  6952016  8401762  9720900 11711496
##      80%      85%      90%      95%     100%
## 14038000 17363572 20533929 31582951 44310840
```

```
# Used 65% as cutoff
ap_tibble <- ap_tibble %>% mutate(Salary.Dummy = if_else(Salary >= 8401762, 1, 0))

# Transforming Team,Position,College into factors
ap_tibble <- transform (
  ap_tibble,
  nTeam = as.numeric(fTeam),
  nPosition = as.numeric(fPosition),
  nCollege = as.numeric(fCollege),
  fSalary.Dummy = as.factor(Salary.Dummy)
)
```

```
#cross validation
set.seed(999)
n <-nrow(ap_tibble)
n
```

Model Selection (glm)

```
## [1] 380
```

```
floor(0.7*n)
```

```
## [1] 266
```

```
train <- sample(1:n, 311)

tn <- ap_tibble[train,]
test <- ap_tibble[-train,]
```

```
set.seed(999)
summary(glmFit_full <- train(fSalary.Dummy ~ nTeam+nPosition+nCollege+poly(Age,3)+Height_i+Weight, data=
```

```
##
## Call:
## NULL
##
## Deviance Residuals:
##     Min       1Q   Median       3Q      Max
## -1.8589  -0.8005  -0.4584   0.8844   2.5539
##
## Coefficients:
##                   Estimate Std. Error z value Pr(>|z|)
## (Intercept)      -1.072629   2.713558  -0.395  0.69263
## nTeam             0.019530   0.014313   1.364  0.17243
## nPosition         0.244457   0.083045   2.944  0.00324 **
## nCollege          0.001570   0.004031   0.390  0.69689
## `poly(Age, 3)1`  15.169035   2.941159   5.158 2.50e-07 ***
## `poly(Age, 3)2` -13.523898   2.952984  -4.580 4.66e-06 ***
```

```
## `poly(Age, 3)3`  -9.788944   3.693551  -2.650  0.00804 **
## Height_i         -0.990023   0.427320  -2.317  0.02051 *
## Weight            0.023574   0.007172   3.287  0.00101 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 492.06  on 379  degrees of freedom
## Residual deviance: 391.65  on 371  degrees of freedom
## AIC: 409.65
##
## Number of Fisher Scoring iterations: 5
```

```
confusionMatrix(glmFit_full)
```

```
## Bootstrapped (25 reps) Confusion Matrix
##
## (entries are percentual average cell counts across resamples)
##
##           Reference
## Prediction    0    1
##          0 52.0 15.7
##          1 13.0 19.2
##
##  Accuracy (average) : 0.713
```

```
set.seed(999)
summary(glmFit_reduced <- train(fSalary.Dummy ~ nTeam+nPosition+nCollege+poly(Age,3)+Height_i+Weight, da
```

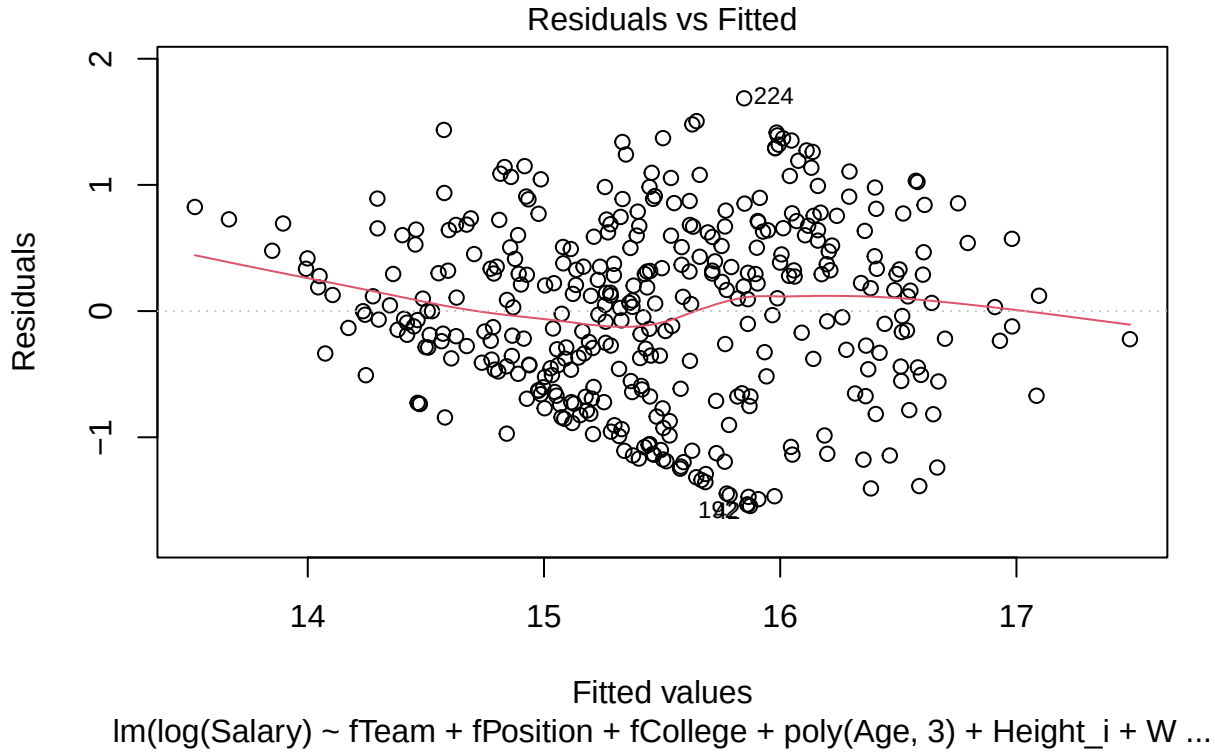
```
##
## Call:
## NULL
##
## Deviance Residuals:
##     Min       1Q   Median       3Q      Max
## -1.8941  -0.7807  -0.4548   0.8874   2.4994
##
## Coefficients:
##                   Estimate Std. Error z value Pr(>|z|)
## (Intercept)      -0.910312   2.699504  -0.337 0.735955
## nPosition         0.240541   0.082358   2.921 0.003493 **
## `poly(Age, 3)1`  15.213163   2.916835   5.216 1.83e-07 ***
## `poly(Age, 3)2` -13.594206   2.944578  -4.617 3.90e-06 ***
## `poly(Age, 3)3`  -9.410427   3.679292  -2.558 0.010538 *
## Height_i         -0.948495   0.423789  -2.238 0.025213 *
## Weight            0.023519   0.007113   3.307 0.000945 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 492.06  on 379  degrees of freedom
## Residual deviance: 393.65  on 373  degrees of freedom
## AIC: 407.65
```

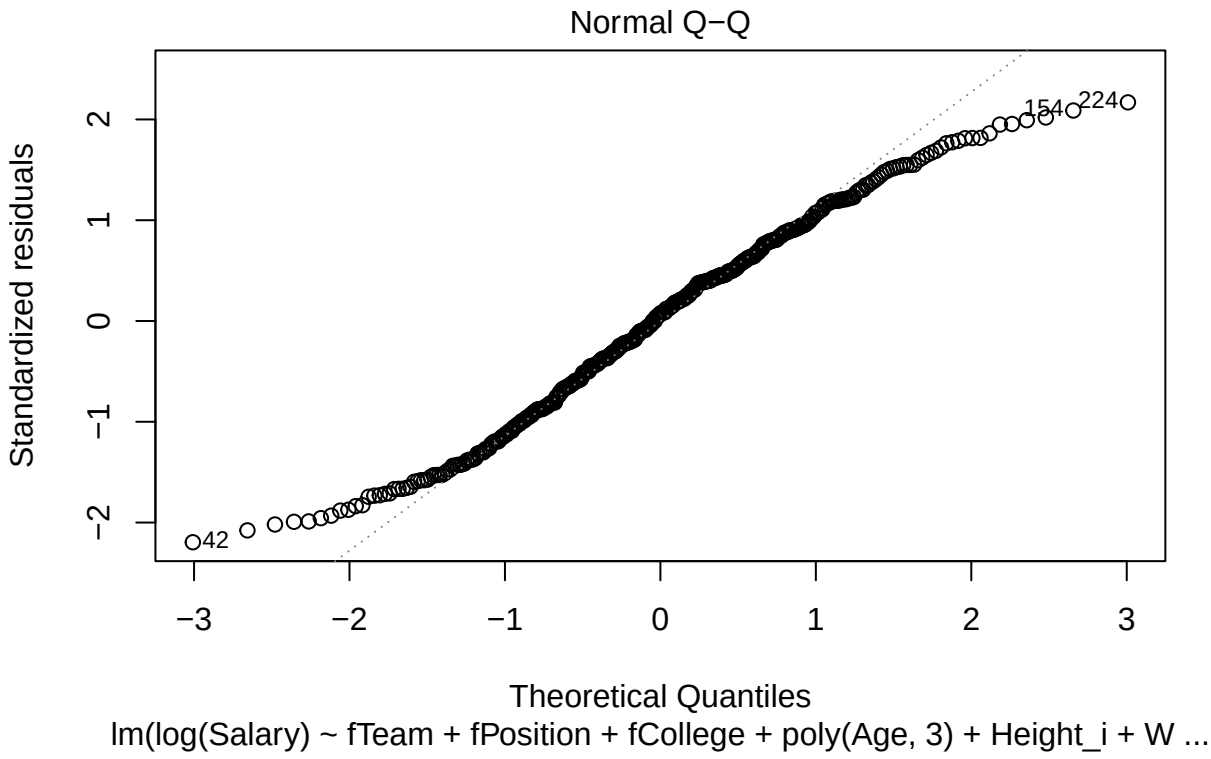
```
##
## Number of Fisher Scoring iterations: 5
```

```
confusionMatrix(glmFit_reduced)
```

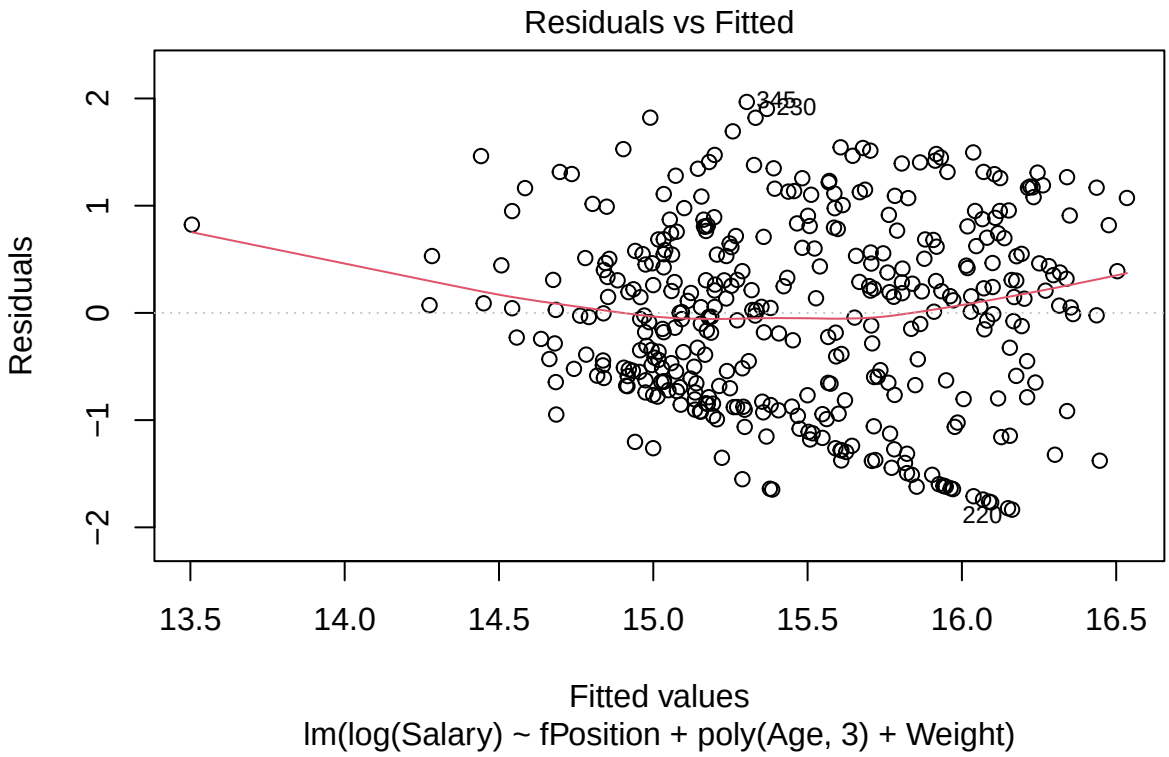
```
## Bootstrapped (25 reps) Confusion Matrix
##
## (entries are percentual average cell counts across resamples)
##
##           Reference
## Prediction    0    1
##          0 52.2 15.6
##          1 12.9 19.3
##
##  Accuracy (average) : 0.715
```

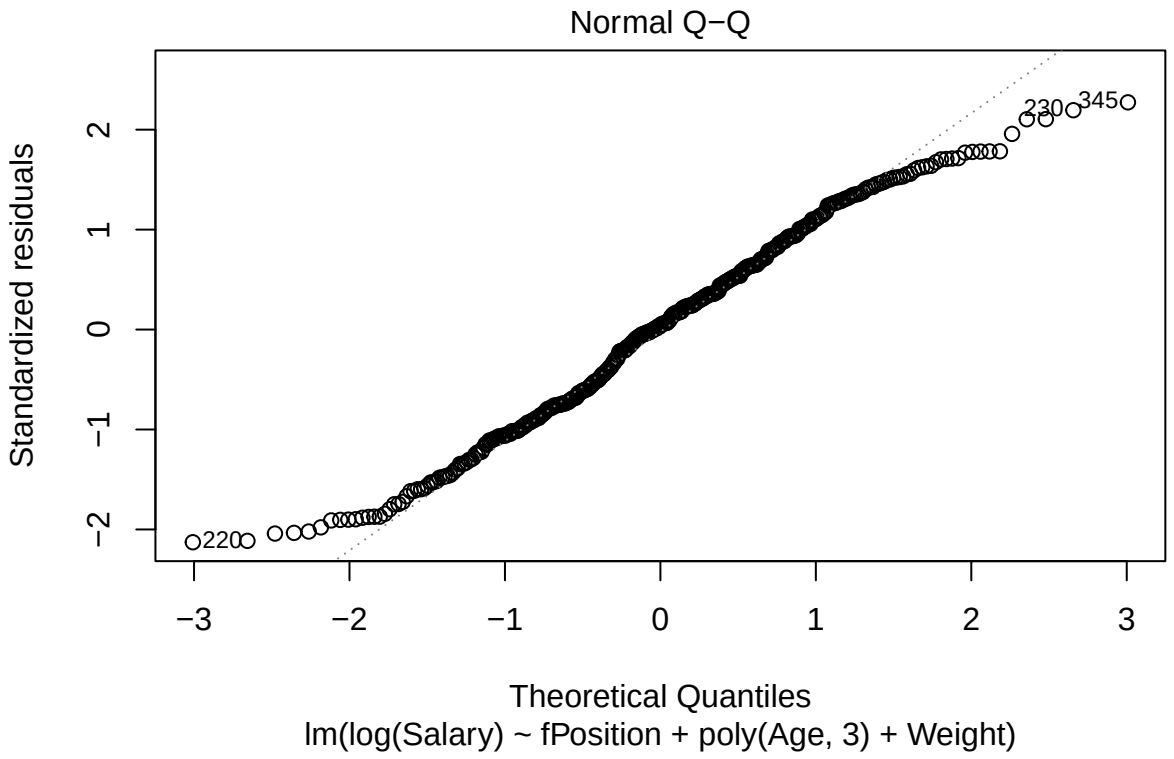
```
#comparing the plots
# Rename variables

plot(lm_log1, 1:2)
```



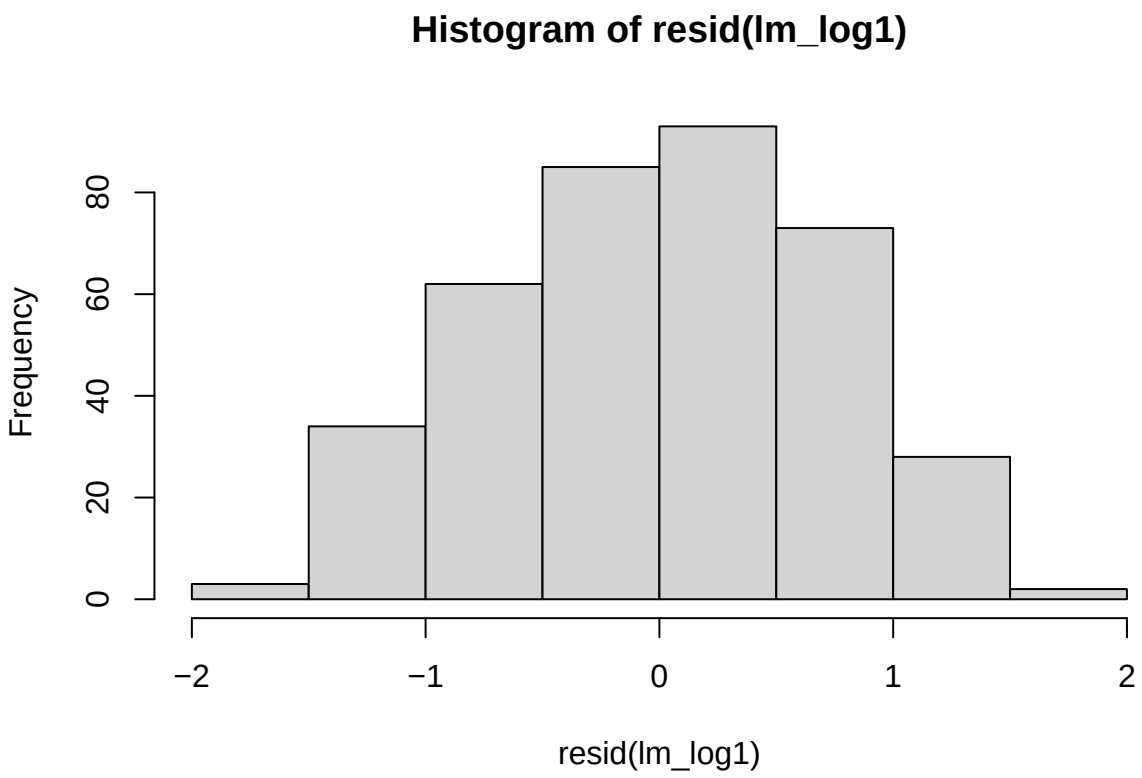



```
plot(lm_log4, 1:2)
```

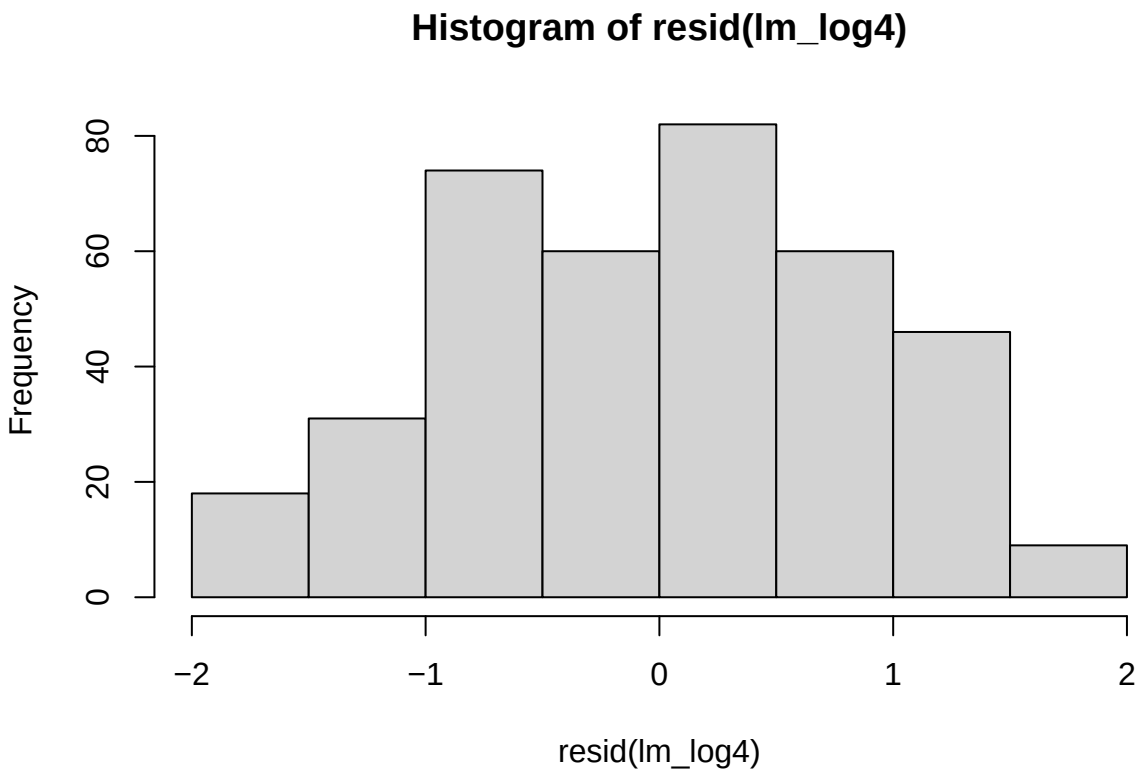

Residuals vs Fitted
Residuals
Fitted values
lm(log(Salary) ~ fPosition + poly(Age, 3) + Weight)
345
230
220
2
1
0
−1
−2
13.5
14.0
14.5
15.0
15.5
16.0
16.5



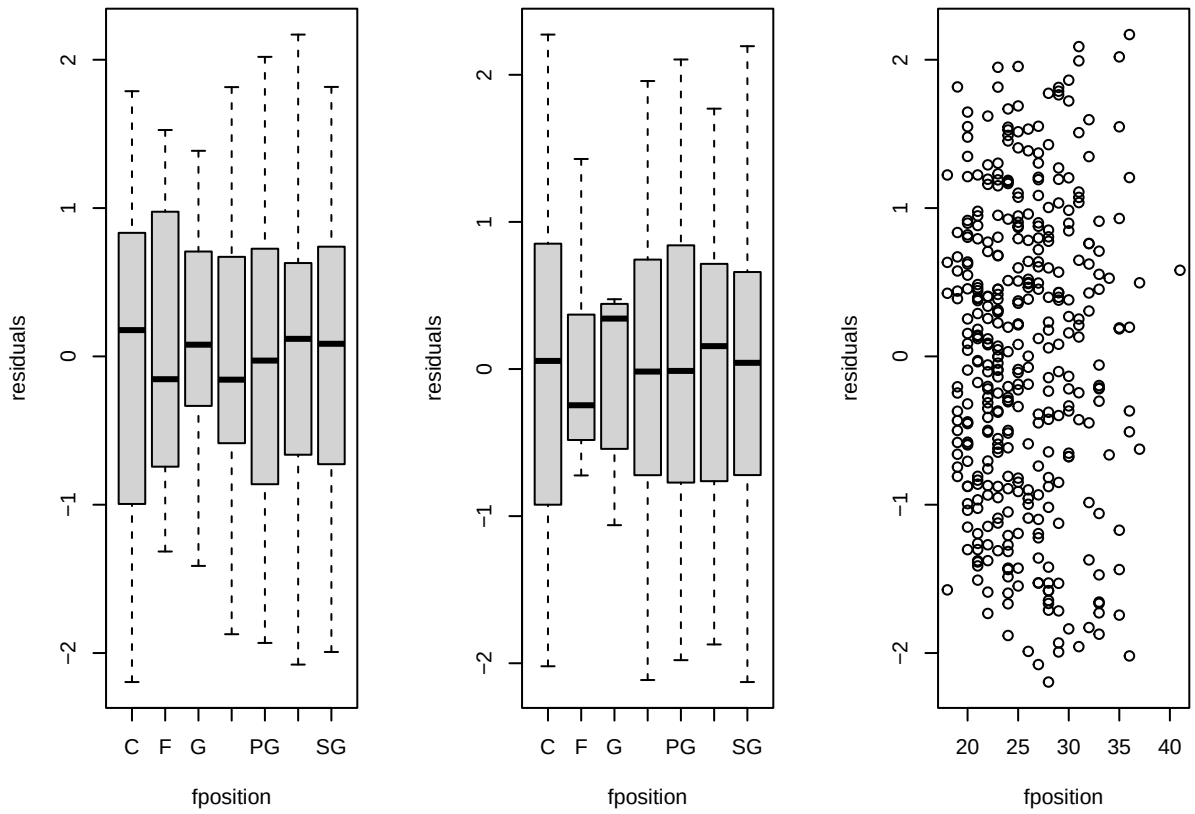

```
hist(resid(lm_log1))
```



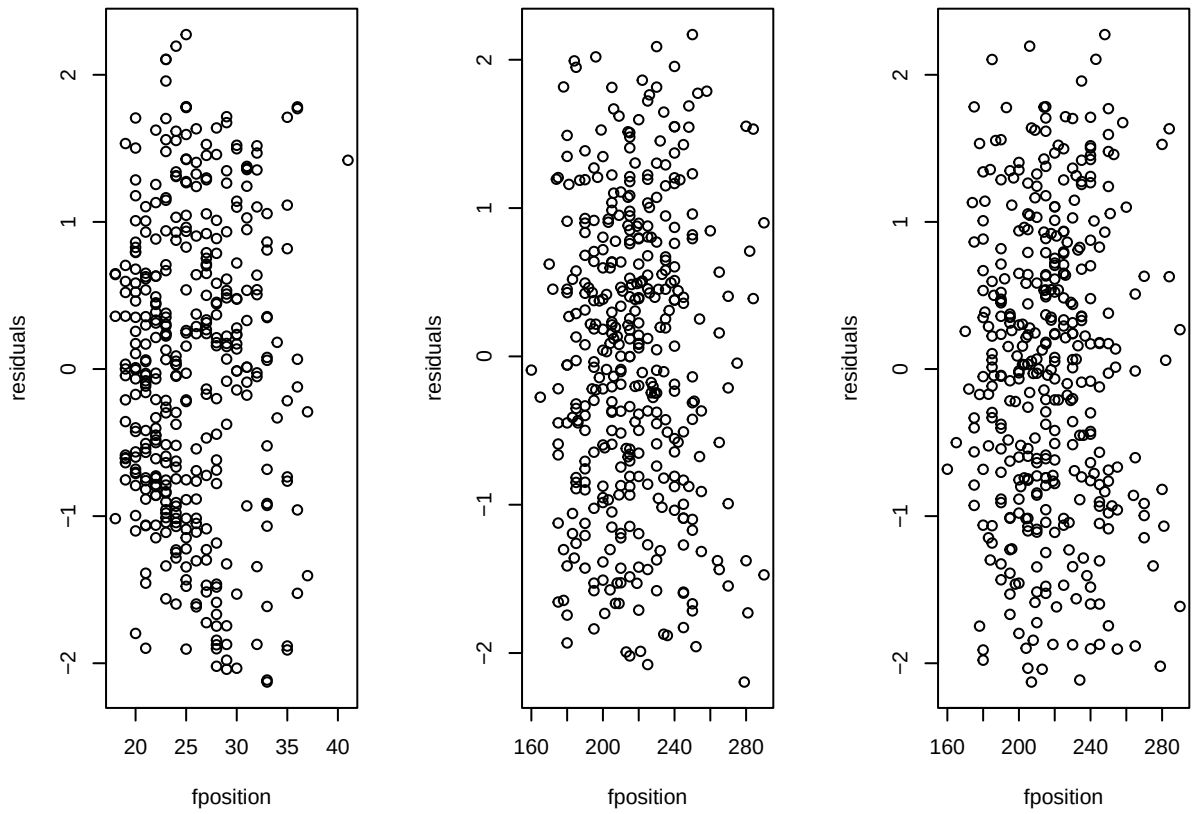

```
hist(resid(lm_log4))
```



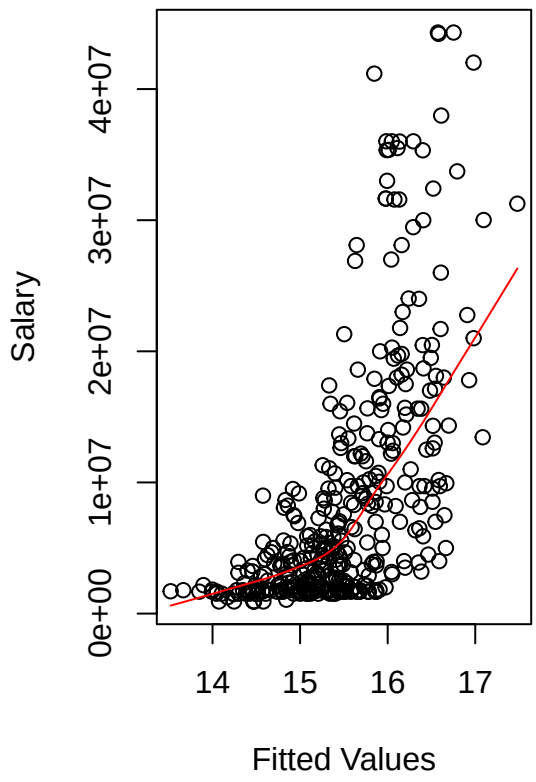

```
par(mfrow=c(1,3), mar=c(4.5, 4.5, 2, 2))

plot(ap_tibble$fPosition, rstandard(lm_log1), xlab ="fposition", ylab = "residuals")
plot(ap_tibble$fPosition, rstandard(lm_log4), xlab ="fposition", ylab = "residuals")

plot(ap_tibble$Age, rstandard(lm_log1), xlab ="fposition", ylab = "residuals")
```

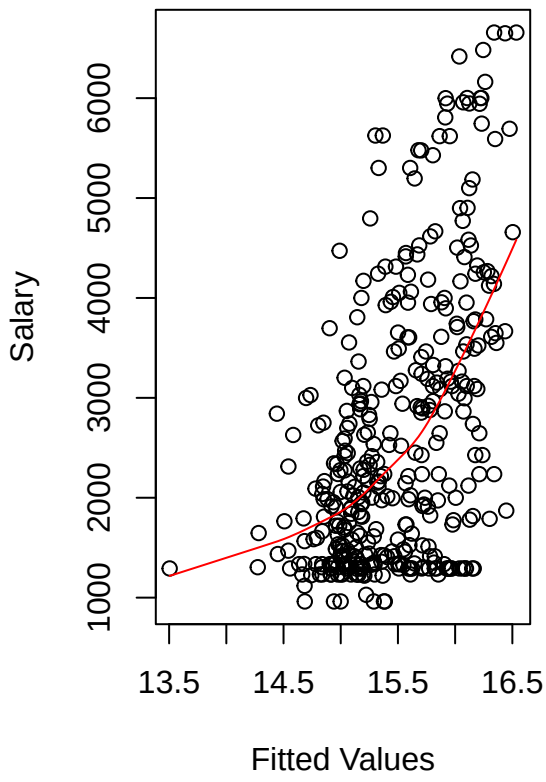



```
plot(ap_tibble$Age, rstandard(lm_log4), xlab ="fposition", ylab = "residuals")

plot(ap_tibble$Weight, rstandard(lm_log1), xlab ="fposition", ylab = "residuals")
plot(ap_tibble$Weight, rstandard(lm_log4), xlab ="fposition", ylab = "residuals")
```

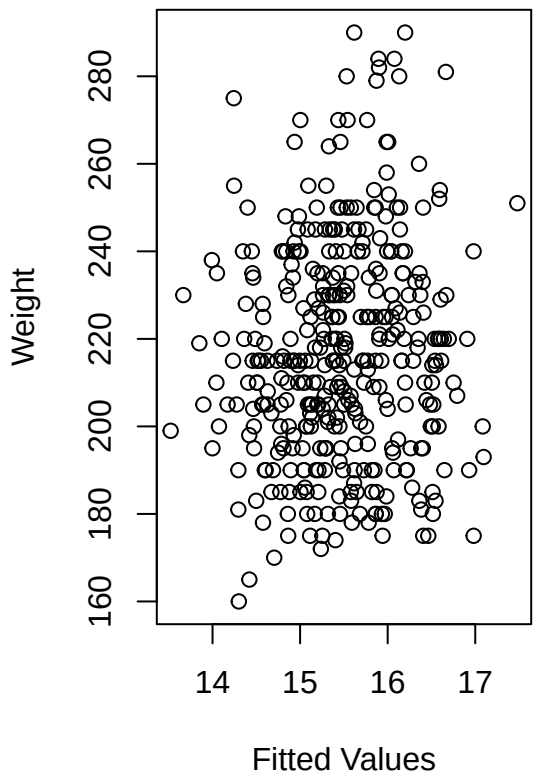


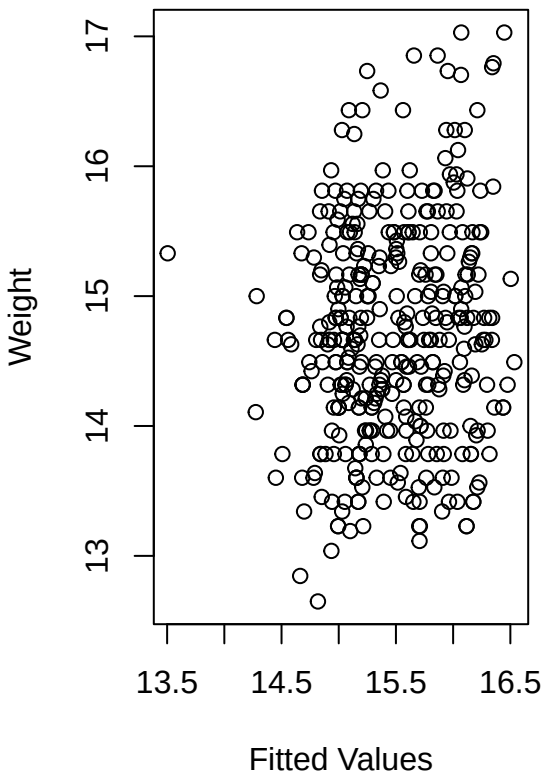

```
#normality check
par(mfrow=c(1,2), mar=c(4.5, 4.5, 2, 2))
plot(predict(lm_log1), ap_tibble$Salary,
       xlab = "Fitted Values", ylab = "Salary")
abline()
lines(lowess(predict(lm_log1), ap_tibble$Salary), col='red')

plot(predict(lm_log4), sqrt(ap_tibble$Salary),
       xlab = "Fitted Values", ylab = "Salary")
lines(lowess(predict(lm_log4), sqrt(ap_tibble$Salary)), col='red')
```



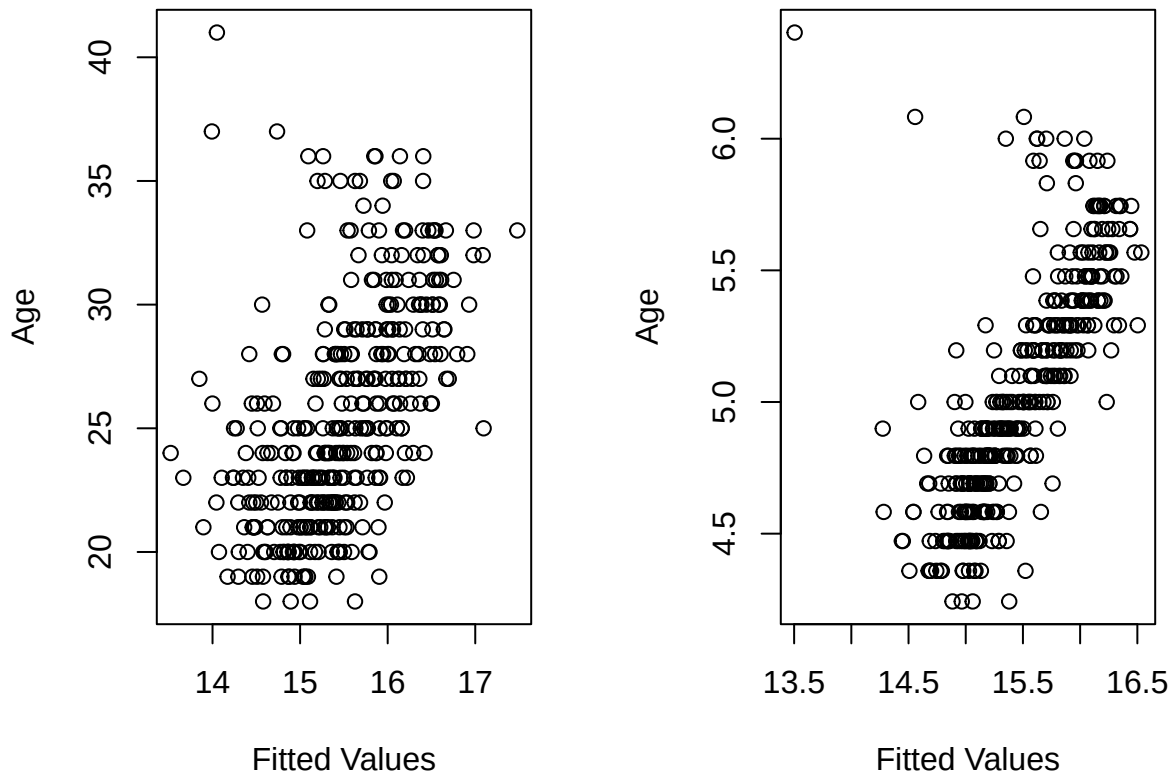



```
plot(predict(lm_log1), ap_tibble$Weight,
     xlab = "Fitted Values", ylab = "Weight")

plot(predict(lm_log4), sqrt(ap_tibble$Weight),
     xlab = "Fitted Values", ylab = "Weight")
```






```
plot(predict(lm_log1), ap_tibble$Age,
     xlab = "Fitted Values", ylab = "Age")

plot(predict(lm_log4), sqrt(ap_tibble$Age),
     xlab = "Fitted Values", ylab = "Age")
```



Model Checking

Comparing Models

`lm_log3` has smaller `R2` than `lm_log1` but has larger `adj.R2` than `lm_log1`.

```
performance::compare_performance(lm_log1,lm_log2,lm_log3,lm_step, rank = TRUE)
```

```
## # Comparison of Model Performance Indices
##
## Name    | Model |    R2 | R2 (adj.) |  RMSE | Sigma | AIC weights | BIC weights | Performance-Score
## ------------------------------------------------------------------------------------------------------
## lm_log1 |    lm | 0.485 |     0.282 | 0.713 | 0.843 |     < 0.001 |     < 0.001 |            66.18%
## lm_log3 |    lm | 0.429 |     0.283 | 0.751 | 0.843 |     < 0.001 |     < 0.001 |            58.37%
## lm_log2 |    lm | 0.429 |     0.280 | 0.751 | 0.844 |     < 0.001 |     < 0.001 |            56.84%
## lm_step |    lm | 0.251 |     0.230 | 0.860 | 0.873 |       1.000 |        1.00 |            33.33%
```

VIF

```
round(vif(lm_step),2)
```

```
##              GVIF Df GVIF^(1/(2*Df))
## fPosition    3.05  6            1.10
## poly(Age, 3) 1.08  3            1.01
## Weight       2.97  1            1.72
```

```
round(vif(lm_log3),2)
```

```
##                GVIF Df GVIF^(1/(2*Df))
## fPosition     11.18  6            1.22
## fCollege      7.65 67            1.02
## poly(Age, 3)  1.97  3            1.12
## Weight        3.60  1            1.90
```

ROC/AUC

```
set.seed(999)

train <- sample(1:n, 311)

glm_train1 <- glm(fSalary.Dummy ~ nTeam+nPosition+nCollege+poly(Age,3)+Height_i+Weight, data=ap_tibble,

summary(glm_train1)
```

```
##
## Call:
## glm(formula = fSalary.Dummy ~ nTeam + nPosition + nCollege +
##     poly(Age, 3) + Height_i + Weight, family = binomial, data = ap_tibble,
##     subset = train)
##
## Deviance Residuals:
##     Min       1Q   Median       3Q      Max
## -1.7338  -0.8494  -0.4766   0.9310   2.5544
##
## Coefficients:
##                 Estimate Std. Error z value Pr(>|z|)
## (Intercept)    9.135e-01  2.959e+00   0.309   0.7576
## nTeam          2.405e-02  1.564e-02   1.538   0.1241
## nPosition      2.073e-01  8.892e-02   2.331   0.0197 *
## nCollege       2.751e-04  4.475e-03   0.061   0.9510
## poly(Age, 3)1  1.488e+01  3.122e+00   4.766 1.88e-06 ***
## poly(Age, 3)2 -1.263e+01  3.082e+00  -4.099 4.14e-05 ***
## poly(Age, 3)3 -8.020e+00  3.937e+00  -2.037   0.0417 *
## Height_i      -1.018e+00  4.650e-01  -2.188   0.0287 *
## Weight         1.627e-02  7.701e-03   2.113   0.0346 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 402.9  on 310  degrees of freedom
## Residual deviance: 330.1  on 302  degrees of freedom
## AIC: 348.1
##
## Number of Fisher Scoring iterations: 5
```

```
ap_test <- ap_tibble[-train,]
head(ap_test)
```

```
##                   Name            Team Position Age Height Height_i Weight
```

```
## 1       Bruno Fernando  Boston Celtics        F  23  6' 9"      6.9    240
## 12 Robert Williams III  Boston Celtics        C  23  6' 8"      6.8    237
## 15        Jevon Carter   Brooklyn Nets       PG  25  6' 1"      6.1    200
## 20          Joe Harris   Brooklyn Nets       SF  30  6' 6"      6.6    220
## 25      Cameron Thomas   Brooklyn Nets       SG  19  6' 4"      6.4    210
## 30          Taj Gibson New York Knicks        C  36  6' 9"      6.9    232
##          College   Salary           fTeam fPosition      fCollege Salary.Dummy
## 1       Maryland  1782621  Boston Celtics         F      Maryland            0
## 12     Texas A&M  3661976  Boston Celtics         C     Texas A&M            0
## 15 West Virginia  3650000   Brooklyn Nets        PG West Virginia            0
## 20      Virginia 17357143   Brooklyn Nets        SF      Virginia            1
## 25           LSU  2036280   Brooklyn Nets        SG           LSU            0
## 30           USC  4910000 New York Knicks         C           USC            0
##    nTeam nPosition nCollege fSalary.Dummy
## 1      2         2       50             0
## 12     2         1       95             0
## 15     3         5      113             0
## 20     3         6      106             1
## 25     3         7       47             0
## 30    20         1      100             0
```

```
probs_test <- predict(glm_train1, newdata = ap_test,
                      type = "response")

head(probs_test)
```

```
##          1         12         15         20         25         30
## 0.09311594 0.08179884 0.32281506 0.64232452 0.10225082 0.12519537
```

```
length(probs_test)
```

```
## [1] 69
```

```
preds_test <- rep(0,12)
preds_test[probs_test > 0.5] <- 1

length(probs_test)
```

```
## [1] 69
```

```
length(preds_test)
```

```
## [1] 69
```

```
head(probs_test)
```

```
##          1         12         15         20         25         30
## 0.09311594 0.08179884 0.32281506 0.64232452 0.10225082 0.12519537
```

```
head(preds_test)
```

```
## [1] 0 0 0 1 0 0
```

```
tb1<- table(prediction = preds_test, actual = ap_test$fSalary.Dummy)
addmargins(tb1)
```

```
##           actual
## prediction  0  1 Sum
##        0   10  1  11
```

```
##        1    5 18  23
##        Sum 15 19  34
```

```
#Accuracy
(tb1[1,1] + tb1[2,2]) / 36
```

```
## [1] 0.7777778
```

```
#Sensitivity
tb1[2,2] / 19
```

```
## [1] 0.9473684
```

```
#Specificity
tb1[1,1] / 17
```

```
## [1] 0.5882353
```

```
library(pROC)
```

```
## Warning: package 'pROC' was built under R version 4.1.3
```

```
## Type 'citation("pROC")' for a citation.
```

```
##
## Attaching package: 'pROC'
```

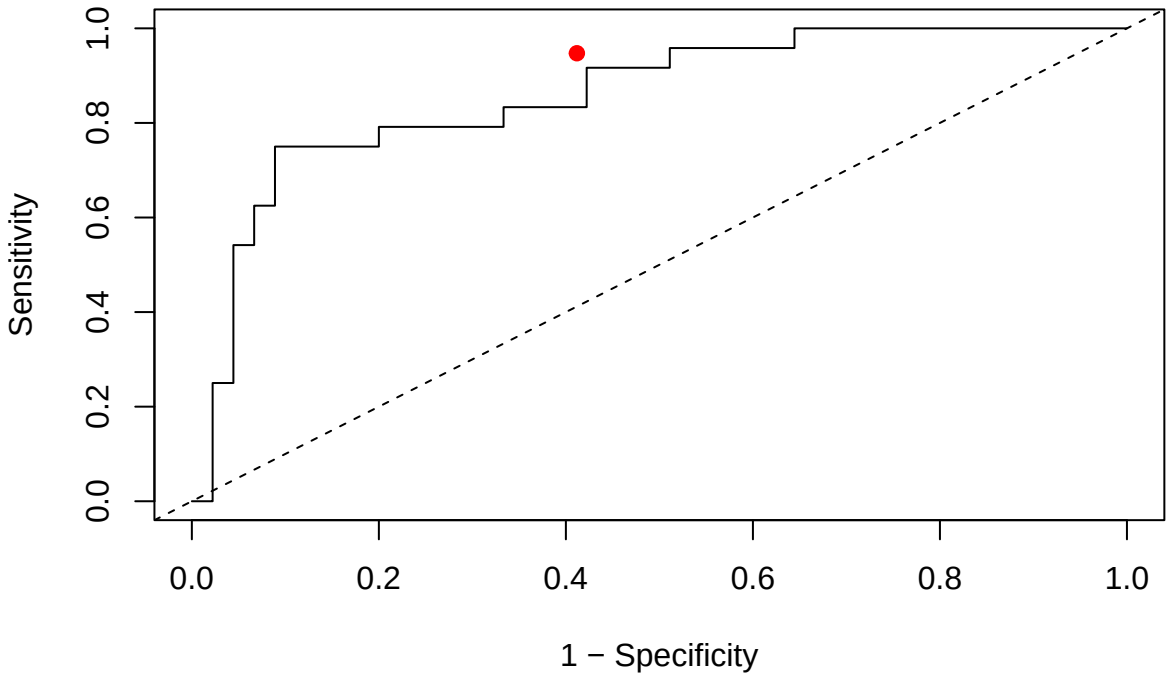
```
## The following objects are masked from 'package:stats':
##
##     cov, smooth, var
```

```
roc_full <- roc(ap_test$fSalary.Dummy, probs_test)
```

```
## Setting levels: control = 0, case = 1
```

```
## Setting direction: controls < cases
```

```
plot(1 - roc_full$specificities, roc_full$sensitivities, type="l",
       xlab = "1 - Specificity", ylab = "Sensitivity")
# plot red point corresponding to 0.5 threshold:
points(x = 1-(tb1[1,1] / 17), y = tb1[2,2] / 19, col="red", pch=19)
abline(0, 1, lty=2)
```




```
set.seed(999)

glm_train2 <- glm(fSalary.Dummy ~ nPosition+poly(Age,3)+Height_i+Weight, data=ap_tibble, subset = train

summary(glm_train2)
```

```
##
## Call:
## glm(formula = fSalary.Dummy ~ nPosition + poly(Age, 3) + Height_i +
##     Weight, family = binomial, data = ap_tibble, subset = train)
##
## Deviance Residuals:
##     Min       1Q   Median       3Q      Max
## -1.7505  -0.8342  -0.4885   0.9424   2.4826
##
## Coefficients:
##                 Estimate Std. Error z value Pr(>|z|)
## (Intercept)     1.079950   2.941566   0.367   0.7135
## nPosition       0.203221   0.088244   2.303   0.0213 *
## poly(Age, 3)1  14.733017   3.088543   4.770 1.84e-06 ***
## poly(Age, 3)2 -12.627900   3.062515  -4.123 3.73e-05 ***
## poly(Age, 3)3  -7.797480   3.924839  -1.987   0.0470 *
## Height_i       -0.988818   0.459384  -2.152   0.0314 *
## Weight          0.016588   0.007613   2.179   0.0293 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 402.90  on 310  degrees of freedom
## Residual deviance: 332.49  on 304  degrees of freedom
## AIC: 346.49
##
## Number of Fisher Scoring iterations: 5
```

```
ap_test <- ap_tibble[-train,]
head(ap_test)
```

```
##                   Name            Team Position Age Height Height_i Weight
## 1       Bruno Fernando  Boston Celtics        F  23  6' 9"      6.9    240
## 12 Robert Williams III  Boston Celtics        C  23  6' 8"      6.8    237
## 15        Jevon Carter   Brooklyn Nets       PG  25  6' 1"      6.1    200
## 20          Joe Harris   Brooklyn Nets       SF  30  6' 6"      6.6    220
## 25      Cameron Thomas   Brooklyn Nets       SG  19  6' 4"      6.4    210
## 30          Taj Gibson New York Knicks        C  36  6' 9"      6.9    232
##          College   Salary           fTeam fPosition      fCollege Salary.Dummy
## 1       Maryland  1782621  Boston Celtics         F      Maryland            0
## 12     Texas A&M  3661976  Boston Celtics         C     Texas A&M            0
## 15 West Virginia  3650000   Brooklyn Nets        PG West Virginia            0
## 20      Virginia 17357143   Brooklyn Nets        SF      Virginia            1
## 25           LSU  2036280   Brooklyn Nets        SG           LSU            0
## 30           USC  4910000 New York Knicks         C           USC            0
##    nTeam nPosition nCollege fSalary.Dummy
## 1      2         2       50             0
## 12     2         1       95             0
## 15     3         5      113             0
## 20     3         6      106             1
## 25     3         7       47             0
## 30    20         1      100             0
```

```
probs_test <- predict(glm_train2, newdata = ap_test,
                      type = "response")

head(probs_test)
```

```
##         1        12        15        20        25        30
## 0.1310472 0.1144739 0.3891356 0.7042890 0.1328949 0.1167010
```

```
length(probs_test)
```

```
## [1] 69
```

```
preds_test <- rep(0,12)
preds_test[probs_test > 0.5] <- 1

length(probs_test)
```

```
## [1] 69
```

```
length(preds_test)
```

```
## [1] 69
```

```
head(probs_test)
```

```
##         1        12        15        20        25        30
## 0.1310472 0.1144739 0.3891356 0.7042890 0.1328949 0.1167010
```

```
head(preds_test)
```

```
## [1] 0 0 0 1 0 0
```

```
tb2<- table(prediction = preds_test, actual = ap_test$fSalary.Dummy)
addmargins(tb2)
```

```
##           actual
## prediction  0  1 Sum
##        0   10  1  11
##        1    7 18  25
##        Sum 17 19  36
```

```
#Accuracy
(tb2[1,1] + tb2[2,2]) / 36
```

```
## [1] 0.7777778
```

```
#Sensitivity
tb2[2,2] / 19
```

```
## [1] 0.9473684
```

```
#Specificity
tb2[1,1] / 17
```

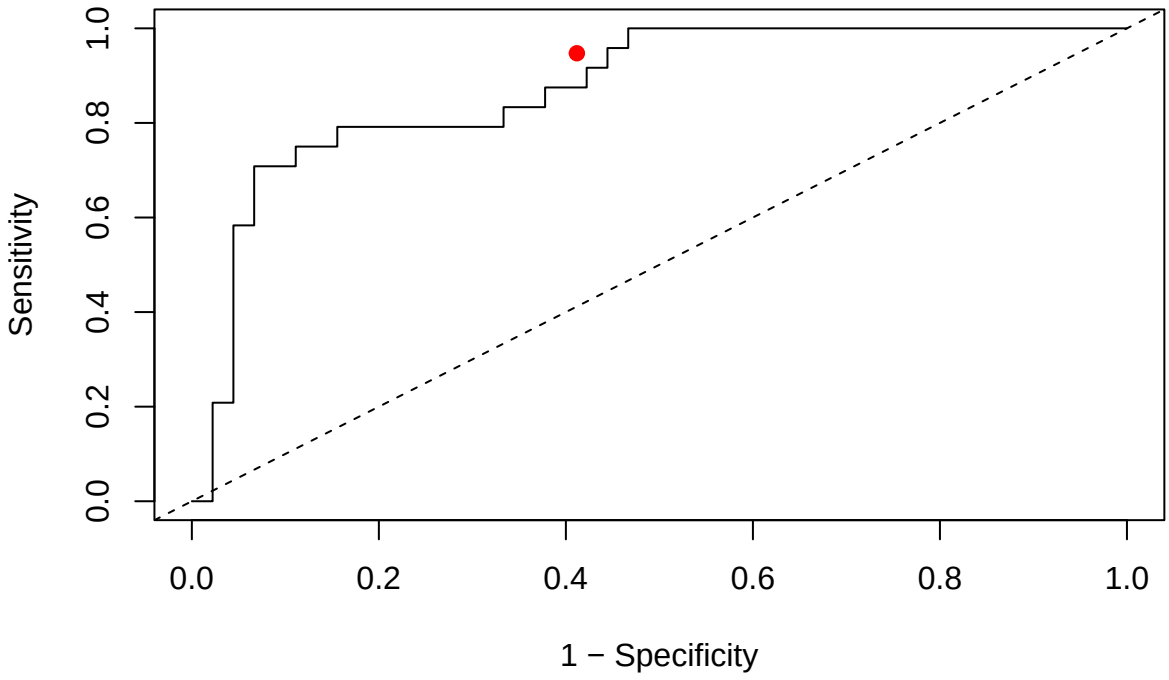
```
## [1] 0.5882353
```

```
library(pROC)
roc_reduced <- roc(ap_test$fSalary.Dummy, probs_test)
```

```
## Setting levels: control = 0, case = 1
```

```
## Setting direction: controls < cases
```

```
plot(1 - roc_reduced$specificities, roc_reduced$sensitivities, type="l",
       xlab = "1 - Specificity", ylab = "Sensitivity")
# plot red point corresponding to 0.5 threshold:
points(x = 1-(tb2[1,1] / 17), y = tb2[2,2] / 19, col="red", pch=19)
abline(0, 1, lty=2)
```




```
auc(roc_full)
```

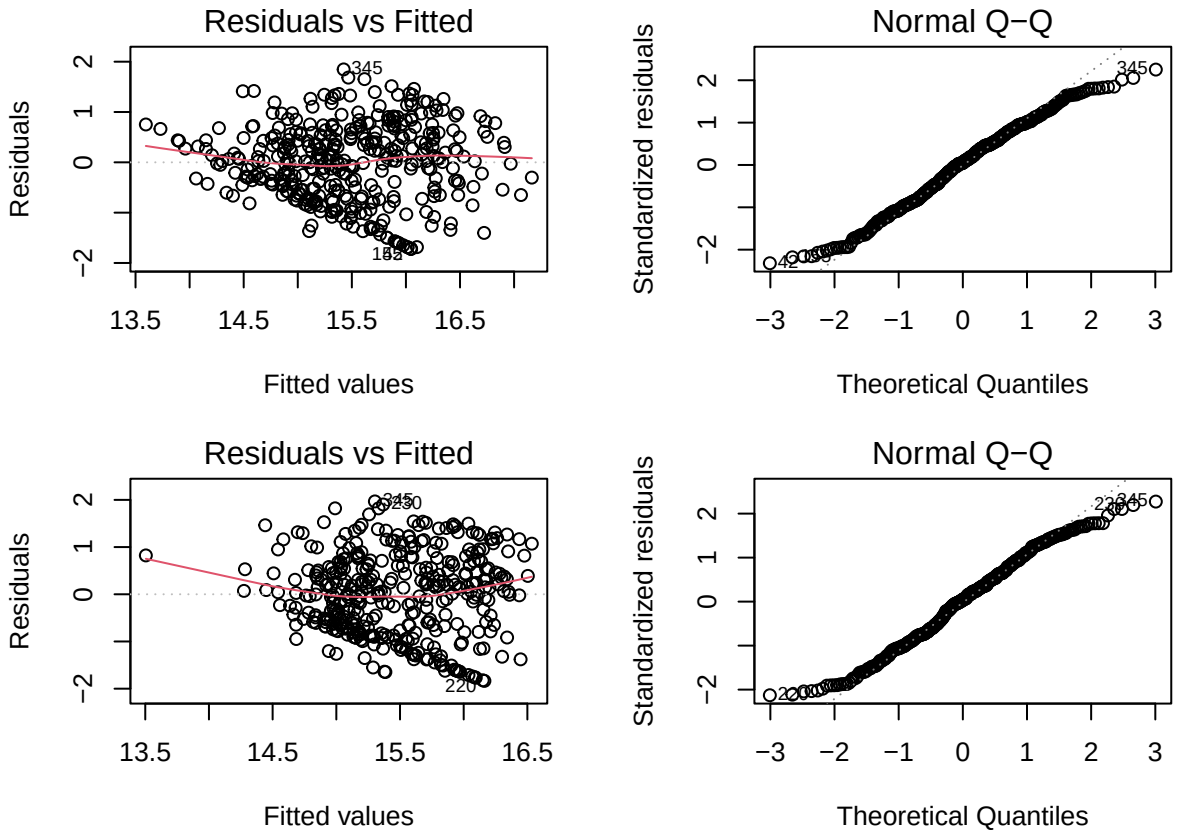
```
## Area under the curve: 0.8593
```

```
auc(roc_reduced)
```

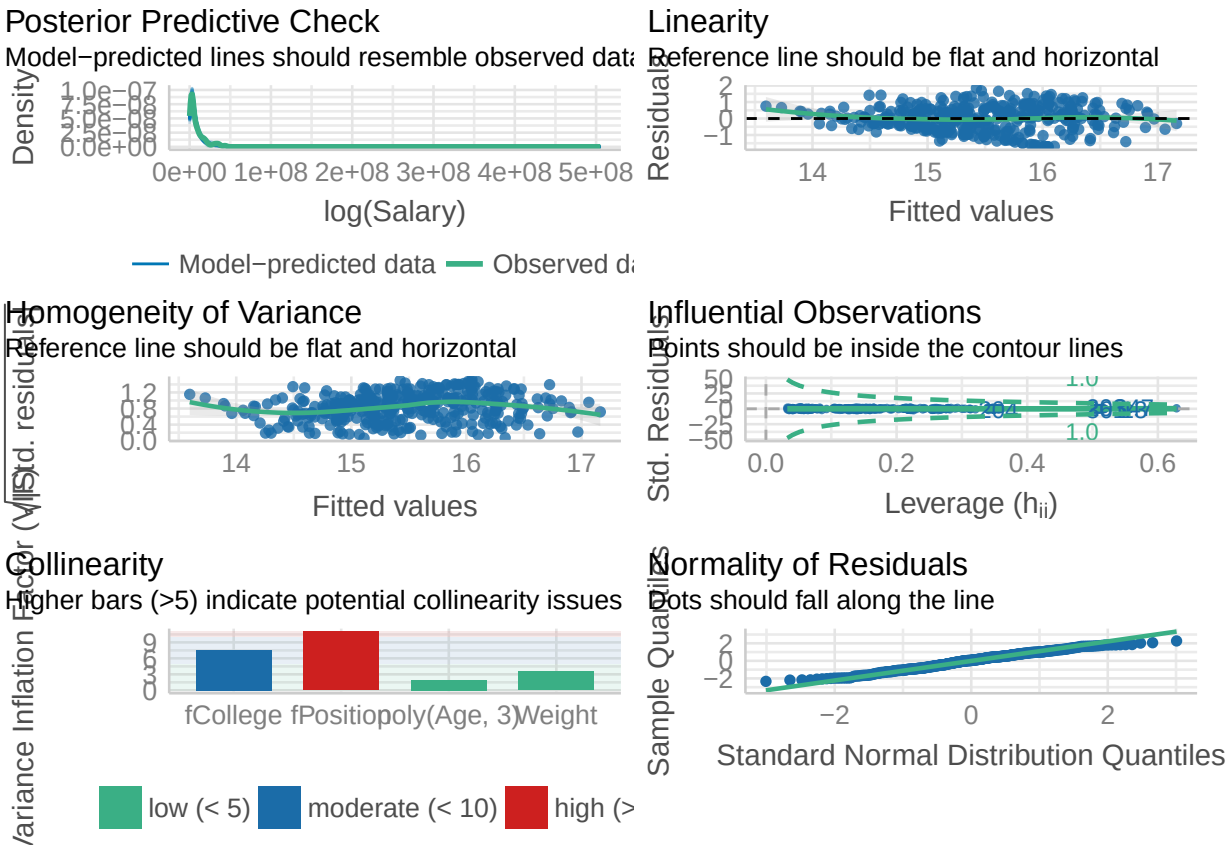
```
## Area under the curve: 0.8741
```

Plots

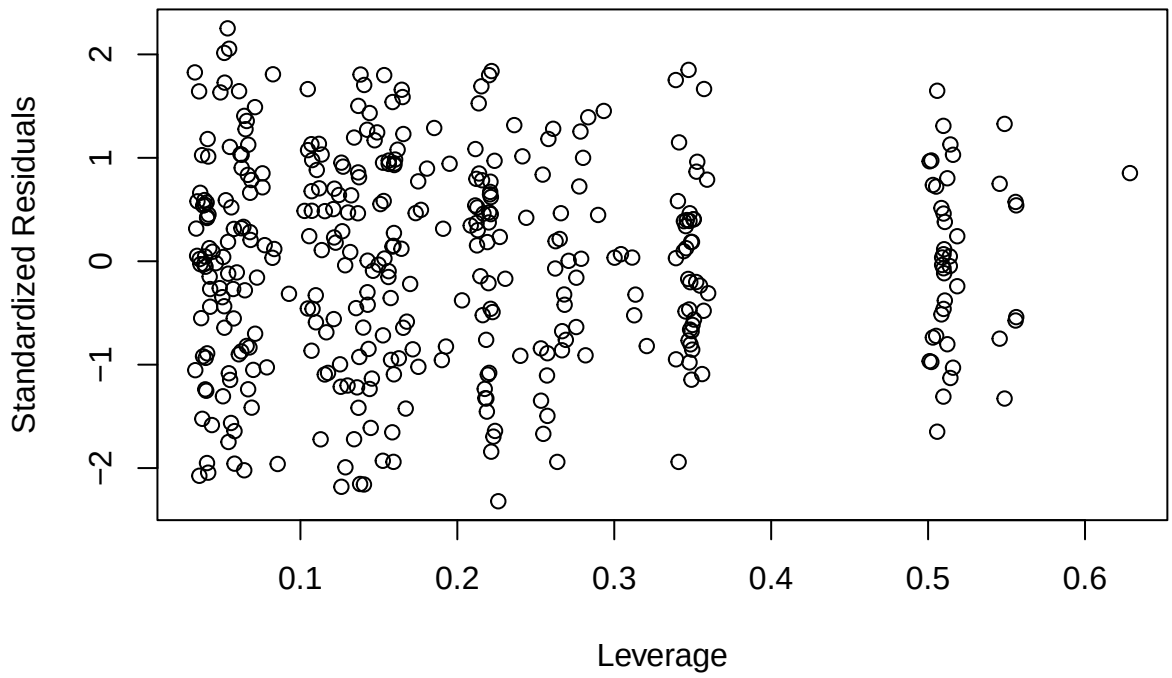
```
par(mfrow=c(2,2), mar=c(4.5, 4.5, 2, 2))
plot(lm_log3, 1:2)
plot(lm_step, 1:2)
```



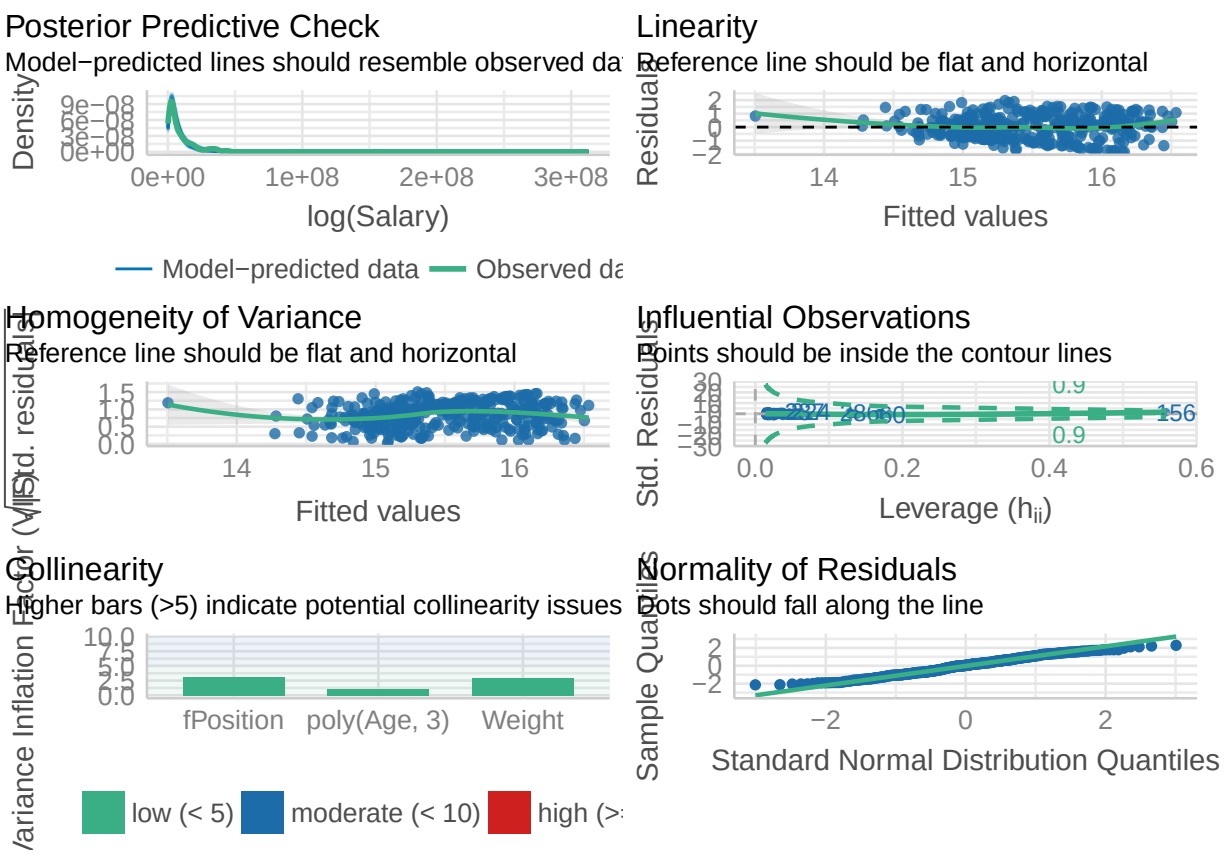

```
performance::check_model(lm_log3)
```




```
plot(hatvalues(lm_log3), rstandard(lm_log3),xlab='Leverage', ylab='Standardized Residuals')
```




```
performance::check_model(lm_step)
```



Final Model - Change

Backwards Elimination Reduced Model:

$$\widehat{log(Salary)} = 11.50148 + fPosition \pm fCollege + 6.07923Age - 3.89527Age^2 - 3.16991Age^3 + 0.01535Weight$$

Step() Reduced Model:

$$\widehat{log(Salary)} = 12.40672 \pm fPosition + 6.68504Age - 3.14049Age^2 - 3.28484Age^3 + 0.01176Weight$$

Loigistic Regression Model:

$$fSalary.Dummy = 1.07995 + 0.20322nPosition + 14.73302Age - 12.62790Age^2 - 7.79748Age^3 - 0.98882Height_i + 0.01659Weigh$$

Prediction

```
# James Harden SG 32 6.5 220 "Arizona State" 44310840

newdata <- data.frame(fPosition='SG', Age=32, Weight = 220, fCollege='Arizona State')
cat("lm_log3 prediction = $", exp(predict(lm_log3, newdata, type='response')), "\n")
```

```
## lm_log3 prediction = $ 12575341
```

```
newdata <- data.frame(fPosition='SG', Age=32, Weight = 220, fCollege='Arizona State')
cat("lm_step prediction = $", exp(predict(lm_step, newdata, type='response')), "\n")
```

```
## lm_step prediction = $ 12493430
```

```
cat("Actual Salary = $ 44310840")
```

```
## Actual Salary = $ 44310840
```

```
# Miles McBride Age = 20, Weight = 200, fPosition = PG fCollege = West Virginia, Salary = 925258
newdata <- data.frame(fPosition='PG', Age=20, Weight = 200, fCollege = 'West Virginia')
cat("lm_log3 prediction = $", exp(predict(lm_log3, newdata, type='response')), "\n")
```

```
## lm_log3 prediction = $ 1419429
```

```
newdata <- data.frame(fPosition='PG', Age=20, Weight = 200, fCollege = 'West Virginia')
cat("lm_step prediction = $",exp(predict(lm_step, newdata, type='response')), "\n")
```

```
## lm_step prediction = $ 4363351
```

```
cat("Actual Salary = $ 925258")
```

```
## Actual Salary = $ 925258
```

Conclusion

Given that the estimated/predicted salaries are way way off, and that the adjusted R^2 of the `lm_step_trans` is only *blahblahblah*, there are obviously other predictors responsible for the majority of variance in the salaries of NBA players, most likely factors such as points scored, assists, rebounds, etc.

It was never expected that non-skill factors would be responsible for explaining the majority of Salary variance.

https://www.r-bloggers.com/2021/07/easystats-quickly-investigate-model-performance/ https://stackoverflow.com/questions/44578920/r-how-to-reload-function-or-change-package-priority https://towardsdatascience.com/how-to-detect-unusual-observations-on-your-regression-model-with-r-de0eaa38bc5b#:~:text=You%20can%20compute%20the%20high,considers%20as%20high%2Dleverage%20points.

```
str(ap_tibble)
```

```
## 'data.frame':    380 obs. of  17 variables:
##  $ Name         : chr  "Bruno Fernando" "Al Horford" "Enes Kanter" "Romeo Langford" ...
##  $ Team         : chr  "Boston Celtics" "Boston Celtics" "Boston Celtics" "Boston Celtics" ...
##  $ Position     : chr  "F" "C" "C" "SG" ...
##  $ Age          : num  23 35 29 21 21 26 23 27 27 27 ...
##  $ Height       : chr  "6' 9\"" "6' 9\"" "6' 10\"" "6' 4\"" ...
##  $ Height_i     : num  6.9 6.9 6.1 6.4 6.5 6.8 6.1 6.5 6.3 6.3 ...
##  $ Weight       : num  240 240 250 216 215 245 195 200 172 220 ...
##  $ College      : chr  "Maryland" "Florida" "Kentucky" "Indiana" ...
##  $ Salary       : num  1782621 27000000 1669178 3804360 3631200 ...
##  $ fTeam        : Factor w/ 30 levels "Atlanta Hawks",..: 2 2 2 2 2 2 2 2 2 2 ...
##  $ fPosition    : Factor w/ 7 levels "C","F","G","PF",..: 2 1 1 7 6 4 5 7 5 5 ...
##  $ fCollege     : Factor w/ 119 levels "Alabama","Arizona",..: 50 26 41 36 104 25 75 92 60 72 ...
##  $ Salary.Dummy : num  0 1 0 0 0 0 0 1 0 1 ...
##  $ nTeam        : num  2 2 2 2 2 2 2 2 2 2 ...
##  $ nPosition    : num  2 1 1 7 6 4 5 7 5 5 ...
##  $ nCollege     : num  50 26 41 36 104 25 75 92 60 72 ...
##  $ fSalary.Dummy: Factor w/ 2 levels "0","1": 1 2 1 1 1 1 1 2 1 2 ...
```

```
#influencePlot(lm_log3,main="Influence Plot", sub="Circle size is proportional to Cook's distance")
```