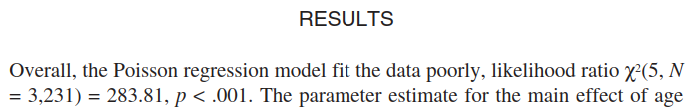
**ATC example (ATC-inclass.R)**

* Broach and Schroeder (*The International Journal of Aviation Psychology*, 2006)
  + Goodness of fit test – P. 370





* + - This is the residual deviance statistic from ModelAssessment-GOFinfluence-5.docx
      * What are the null and alternative hypotheses?
      * D = -2log(Λ) has an approximate  distribution under the null hypothesis
    - Test is “valid under the assumption that the number of unique sets of explanatory variable combinations in the data is fixed as the sample size increases.” Is this true here?
    - Authors state a value of 283.81. One can show it is 238.81.
    - Authors state the model does not fit well. Should they use it to draw conclusions about age?
  + What is their model?
    - Not stated in the paper!
    - After trying some models and finding a Federal Aviation Administration document by the same authors, here’s the R equivalent of what they did:

> set1 <- read.csv("ATC.csv")

> head(set1)

experience age errors population

1 1 1 44 3587

2 1 2 4 110

3 2 1 488 7574

4 2 2 10 191

5 3 1 1112 15758

6 3 2 20 280

> mod.fit <- glm(formula = errors ~ factor(experience) + age, data = set1, family = poisson(link = log))

> summary(mod.fit)

Call:

glm(formula = errors ~ factor(experience) + age, family = poisson(link = log),

data = set1)

Deviance Residuals:

1 2 3 4 5 6

-0.3829 1.7767 0.2108 -1.2877 0.4000 -2.4888

7 8 9 10 11 12

0.8800 -6.6744 0.4433 -3.1294 -3.8639 12.5385

Coefficients:

Estimate Std. Error z value Pr(>|z|)

(Intercept) 7.3382 0.1798 40.815 <2e-16

factor(experience)2 2.3394 0.1511 15.479 <2e-16

factor(experience)3 3.1605 0.1474 21.447 <2e-16

factor(experience)4 3.0455 0.1477 20.615 <2e-16

factor(experience)5 1.9723 0.1541 12.803 <2e-16

factor(experience)6 1.4221 0.1608 8.844 <2e-16

age -3.4968 0.1041 -33.578 <2e-16

(Dispersion parameter for poisson family taken to be 1)

Null deviance: 5796.51 on 11 degrees of freedom

Residual deviance: 238.81 on 5 degrees of freedom

AIC: 321.92

Number of Fisher Scoring iterations: 6

What is incorrect?

* + What is the correct Poisson rate regression model with experience as a nominal categorical variable and age?
  + Estimate and state the previous model
  + Goodness-of-fit
  + Residuals
  + Influence
  + glmInflDiag()