

# DATA 621 - ELMR exercise 7.6

Document Author

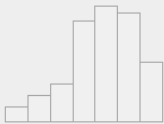
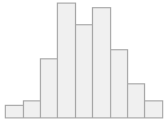

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// 6. One hundred twenty-five fruitflies were divided randomly into five groups of 25 each. The response was the longevity of the fruitfly in days. One group was kept solitary, while another was kept individually with a virgin female each day. Another group was given eight virgin females per day. As an additional control the fourth and fifth groups were kept with one or eight pregnant females per day. Pregnant fruitflies will not mate. The thorax length of each male was measured as this was known to affect longevity. The data is presented in fruitfly.

Show how a gamma GLM may be used to model the lifetimes as a function of the predictors. Interpret your chosen model.

Holding other factors constant, an increase of a hundredth of an unit in thorax size results in a longevity increase of about 1.5 days.

## | Fruitfly dataset

No	Variable	Stats / Values	Freqs (% of Valid)	Graph	Valid	Missing
1	thorax [numeric]	Mean (sd) : 0.8 (0.1) min ≤ med ≤ max: 0.6 ≤ 0.8 ≤ 0.9 IQR (CV) : 0.1 (0.1)	14 distinct values		124 (100.0%)	0 (0.0%)
2	longevity [integer]	Mean (sd) : 57.6 (17.5) min ≤ med ≤ max: 16 ≤ 58 ≤ 97 IQR (CV) : 24 (0.3)	45 distinct values		124 (100.0%)	0 (0.0%)
3	activity [factor]	1. isolated 2. one 3. low 4. many 5. high	25 ( 20.2% ) 25 ( 20.2% ) 25 ( 20.2% ) 24 ( 19.4% ) 25 ( 20.2% )		124 (100.0%)	0 (0.0%)

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```
##
## Call:
## glm(formula = longevity ~ thorax, family = Gamma(link = "identity"),
##      data = fruitfly)
##
## Deviance Residuals:
##      Min       1Q   Median       3Q      Max
## -0.6564  -0.1968   0.0280   0.1507   0.5172
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)   -64.28      10.95  -5.867 3.89e-08 ***
## thorax         148.25      13.89  10.670 < 2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for Gamma family taken to be 0.06095532)
##
##      Null deviance: 13.2803  on 123  degrees of freedom
## Residual deviance:  7.9916  on 122  degrees of freedom
## AIC: 1011.3
##
## Number of Fisher Scoring iterations: 4
```

