How does GPA, MCAT, and Number of Applications Affect Admissions into Medical School?

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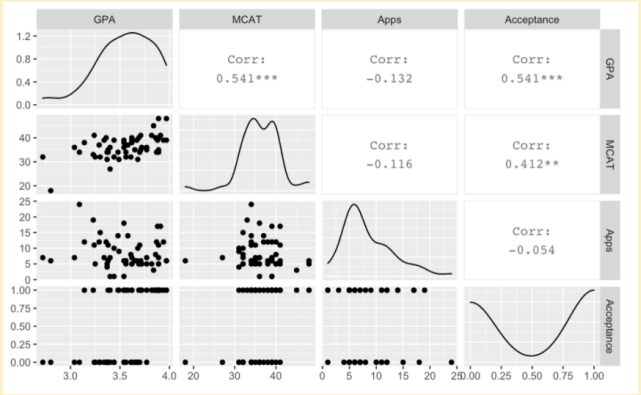
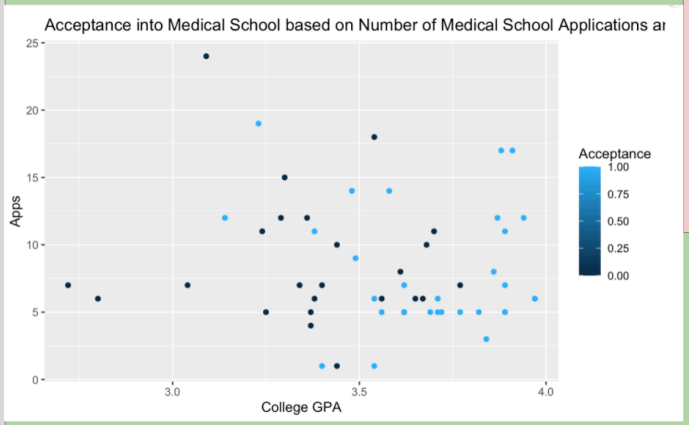
ggpairs



- ggpairs creates a matrix of all the used variables
- MCAT & GPA, and Acceptance & GPA are correlated
- Applications & GPA, Applications & MCAT, and Applications & Applications are not correlated

Graph for Acceptance



- Scatterplot of number of applications vs. GPA
- Shows whether or not student was accepted
- Higher GPA has a clear correlation with being accepted

Data Source:

- Dataset with 55 observations for 11 variables
- Variables used:
  - GPA: College grade point average
  - MCAT: Score on the MCAT exam (Medical College Admission Test)
  - Apps: Number of medical schools applied to

Linear Regression

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Call:
glm(formula = Acceptance ~ GPA + MCAT + Apps, family = "binomial",
    data = MedGPA)

Deviance Residuals:
    Min       1Q   Median       3Q      Max
-1.6949  -0.8309   0.2900   0.7926   1.8238

Coefficients:
             Estimate Std. Error z value Pr(>|z|)
(Intercept) -23.68942    7.02387  -3.373 0.000744 ***
GPA           4.86062    1.69441   2.869 0.004123 **
MCAT          0.17287    0.10537   1.641 0.100867
Apps          0.04379    0.07617   0.575 0.565412
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

(Dispersion parameter for binomial family taken to be 1)

    Null deviance: 75.791  on 54  degrees of freedom
Residual deviance: 53.682  on 51  degrees of freedom
AIC: 61.682

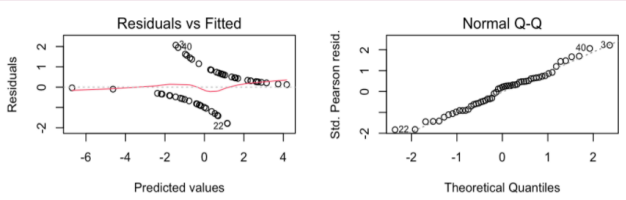
Number of Fisher Scoring iterations: 5
```

- GPA has a p-value < 0.05, significant
- MCAT and Apps have a p-value > 0.05
- Therefore, we throw out MCAT and Apps
- Less than 1% chance alternative hypothesis is correct

H_0=GPA, MCAT, and Apps have no significant impact on whether or not students are accepted or denied admission into medical school.

H_a=GPA, MCAT, and Apps do have a significant impact on whether or not students are accepted or denied admission into medical school.

Normal Distribution & Equal VairanceCheck



- The Residual vs. Fitted plot shows equal variance
- The qqplot shows that the model has fairly normal distribution

ANOVA Test

```
           Df Sum Sq Mean Sq F value   Pr(>F)
GPA         1  3.984   3.984  21.689 2.33e-05 ***
MCAT        1  0.274   0.274   1.489    0.228
Apps        1  0.009   0.009   0.049    0.826
Residuals  51  9.369   0.184
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
```

- Analysis of variance, has 3 variables
- Significant: GPA & Acceptance
- 1 out of 3 variables are statistically significant
- Alternative hypothesis= rejected
- Null hypothesis= accepted

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