**Question 1**. Do taller people have bigger brains? – find the correlation, and the p-value for the correlation, between Height and brain size (MRI\_Count). Give an interpretation of this correlation coefficient, and report on significance.

> cor.test(MRI\_Count,Height)

 Pearson's product-moment correlation

data: MRI\_Count and Height

t = 4.366, df = 36, p-value = 0.0001023

alternative hypothesis: true correlation is not equal to 0

95 percent confidence interval:

 0.3309423 0.7643000

sample estimates:

 cor

0.5883772

r Height, Brain size = 0.588

95% CI for r (0.33, 0.76)

p=0.0001

There is a strong, positive association between height & brain size.

**Question 2**. Do taller people have higher IQ? – find the correlation, and the p-value for the correlation, between Height and Full Scale IQ. Give an interpretation of this correlation coefficient, and report on significance.

> cor.test(FSIQ,Height)

 Pearson's product-moment correlation

data: FSIQ and Height

t = -0.7157, df = 36, p-value = 0.4788

alternative hypothesis: true correlation is not equal to 0

95 percent confidence interval:

 -0.4221462 0.2091554

sample estimates:

 cor

-0.1184478

r Height, Full scale IQ = -0.118

95% CI for r (-0.42, 0.21)

p=0.479

There is a weak and non-significant negative association between height & full scale IQ.

**Question 3**. Our primary interest is in the association between brain size and Full Scale IQ. Get a scatter plot showing the association between Full Scale IQ (the dependent variable, plotted on the Y axis) and brain size (the independent variable, plotted on the X axis). Perform a regression predicting Full Scale IQ from brain size (MRI\_count).

> plot(MRI\_Count,FSIQ)



> reg.out<-lm(FSIQ~MRI\_Count)

> summary(reg.out)

Call:

lm(formula = FSIQ ~ MRI\_Count)

Residuals:

 Min 1Q Median 3Q Max

-35.100 -20.600 3.392 20.670 34.167

Coefficients:

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

(Intercept) 14.238 46.903 0.304 0.7632

MRI\_Count 10.953 5.157 2.124 0.0406 \*

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Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 22.76 on 36 degrees of freedom

Multiple R-squared: 0.1114, Adjusted R-squared: 0.08668

F-statistic: 4.512 on 1 and 36 DF, p-value: 0.0406

**Question 3a**. Report and interpret the R2 from this regression.

The R2 is 0.114, indicating that 11% of the variability in FSIQ can be attributed to differences in brain size. The p-value was 0.04.

**Question 3b**. Based on the regression for FSIQ. Is there a significant association between brain size and FSIQ?

Yes. The p-value was 0.04.

**Question 3c**. Report the regression equation for FSIQ and brain size. Calculate the predicted IQ for a subject with MRI\_count of 8.0 (a relatively small brain in this sample).

FSIQ8= 14.24+10.95(MRI\_Count)

FSIQ8= 14.24 + 10.95(8)= 101.84

**Question 3d.** Calculate the predicted IQ for a subject with MRI\_count of 10.0 (a relatively large brain in this sample).

FSIQ10= 14.24+10.95(MRI\_Count)

FSIQ10= 14.24 + 10.95(10)= 123.74