三軍總醫院北投分院統計及實驗設計課程之一

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使用方法:

1. 使用gmail帳號登入
2. 按"執行階段" -->"全部執行" 以執行全部內容, 若要個別執行可點選每格程式左方箭頭或按 Control + Enter 鍵執行。

```
!git  clone  https://github.com/YuehMintTai/RPython.git
```

```
Cloning into 'RPython'...
remote: Enumerating objects: 41, done.
remote: Counting objects: 100% (41/41), done.
remote: Compressing objects: 100% (39/39), done.
remote: Total 41 (delta 10), reused 0 (delta 0), pack-reused 0
Unpacking objects: 100% (41/41), done.
```

```
!pip  install  rpy2
```

```
Requirement already satisfied: rpy2 in /usr/local/lib/python3.7/dist-packages (3.4.5)
Requirement already satisfied: pytz in /usr/local/lib/python3.7/dist-packages (from rpy2) (20
Requirement already satisfied: cffi>=1.10.0 in /usr/local/lib/python3.7/dist-packages (from r
Requirement already satisfied: jinja2 in /usr/local/lib/python3.7/dist-packages (from rpy2) (
Requirement already satisfied: tzlocal in /usr/local/lib/python3.7/dist-packages (from rpy2)
Requirement already satisfied: pycparser in /usr/local/lib/python3.7/dist-packages (from cffi
Requirement already satisfied: MarkupSafe>=0.23 in /usr/local/lib/python3.7/dist-packages (fr
```

```
%load_ext  rpy2.ipython
```

```
%%R
myData  <-  read.csv('RPython/samples.csv')
head(myData)
myData[1,]
```

```
  SID 性別      年齡 入伍前職業 教育程度 婚姻狀況 皆無過去病史01 早產兒01
1 137     1 21.33308       學生         4         1              0         0
  頭部曾受傷01 發展遲緩01 注意力不足過動症01 癲癇01 癲癇服藥治療 癲癇服藥期間
1            1          0                 0       0            0             0
  軍種 軍階 役別 入伍至今_年 聽過自殺課程_次 求助心輔_次 求助精神科_次
1   11    1    2         0.3                0          1              1
  使用1995_次 使用24h專線_次 特殊狀況 父母婚姻狀態 自殺意念_bsrs6 B型肝炎01
1           0              0         4           1              0         0
  C型肝炎01 氣喘史01 過敏史01 心臟病史01 高血壓01 醣尿病01 甲狀腺01 類風濕01
1         0        0        1          0        0        0        0        0
```

```
  重大意外01 自殺意念01 透露父母 透露手足 透露好友 透露同儕 透露長官 透露心輔
1          1          0        0        0        1        0        0        0
  透露醫師 拒告父母 拒告手足 拒告好友 拒告同儕 拒告長官 拒告心輔 拒告醫師
1        0        1        0        0        0        1        0        0
  BSRS總分 BSRSR總分 過動症總分 Inattention Impulsivity opposition depression
1        1         1         23          21           2          9         13
  anxiety burdensome belonging 家庭滿意度apgar 網路成癮症01 網路成癮分數YDQ
1      53         23        19              10            0                2
  existeness meaning control seeking death suicidea 睡眠困擾_bsrs1
1         18      18      11      18    15        0              0
  睡眠困擾_bsrsr1 睡眠困擾_bdi16 易怒_bsrs3 易怒_bsrsr3 depress impuls Internet
1               0              0          0          0      13      2        2
  ADHD
1   23
```

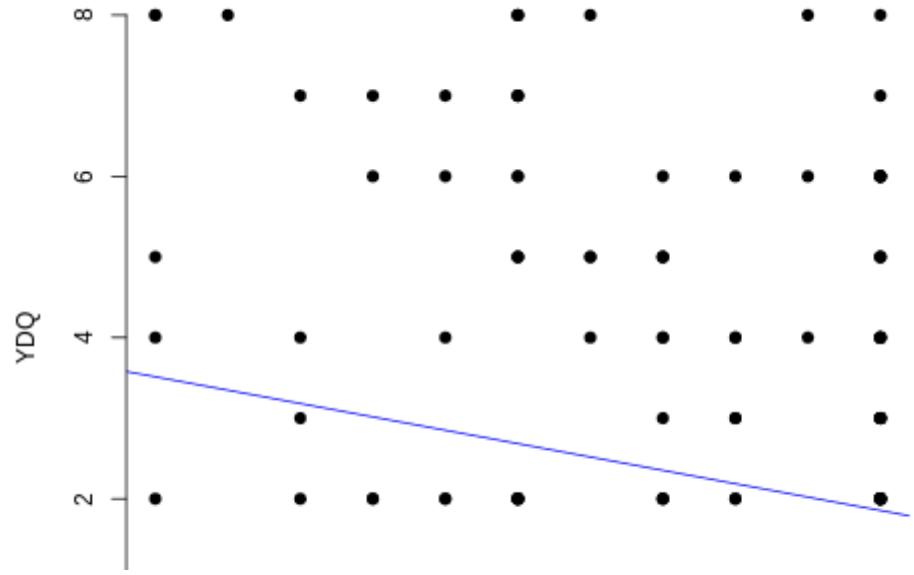
###檢視統計模型: 家庭滿意度apgar --> 網路成癮分數YDQ

```
%%R
formula='網路成癮分數YDQ~家庭滿意度apgar'
model1  <-glm(formula,  myData,  family='gaussian')
summary(model1)
```

```
Call:
glm(formula = formula, family = "gaussian", data = myData)

Deviance Residuals:
    Min       1Q   Median       3Q      Max
-3.5125  -1.8546  -0.8546   1.8138   6.1454

Coefficients:
                Estimate Std. Error t value Pr(>|t|)
(Intercept)      3.51255    0.45740   7.679 8.82e-13 ***
家庭滿意度apgar -0.16580    0.05836  -2.841    0.005 **
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

(Dispersion parameter for gaussian family taken to be 5.856059)

    Null deviance: 1136.5  on 187  degrees of freedom
Residual deviance: 1089.2  on 186  degrees of freedom
AIC: 869.8

Number of Fisher Scoring iterations: 2
```

##繪製Acatter plot和 linear regression line

```
%%R
plot(myData$家庭滿意度apgar,  myData$網路成癮分數YDQ,  xlab='APGAR',  ylab='YDQ',  pch=19,  frame=F
abline(glm(網路成癮分數YDQ~家庭滿意度apgar,  data=myData),col='blue')
```




```
%%R
fit1 <- lm(BSRS總分 ~ 年齡 + 家庭滿意度apgar, data=myData)
summary(fit1)
```

```
Call:
lm(formula = BSRS總分 ~ 年齡 + 家庭滿意度apgar, data = myData)

Residuals:
    Min      1Q  Median      3Q     Max
-7.8611 -3.2879 -0.7738  3.0258 11.1353

Coefficients:
               Estimate Std. Error t value Pr(>|t|)
(Intercept)      4.8612     1.8070   2.690  0.00779 **
年齡             0.1993     0.0710   2.807  0.00554 **
家庭滿意度apgar  -0.4825     0.1021  -4.727  4.5e-06 ***
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 4.184 on 185 degrees of freedom
Multiple R-squared:  0.159,     Adjusted R-squared:  0.1499
F-statistic: 17.48 on 2 and 185 DF,  p-value: 1.112e-07
```

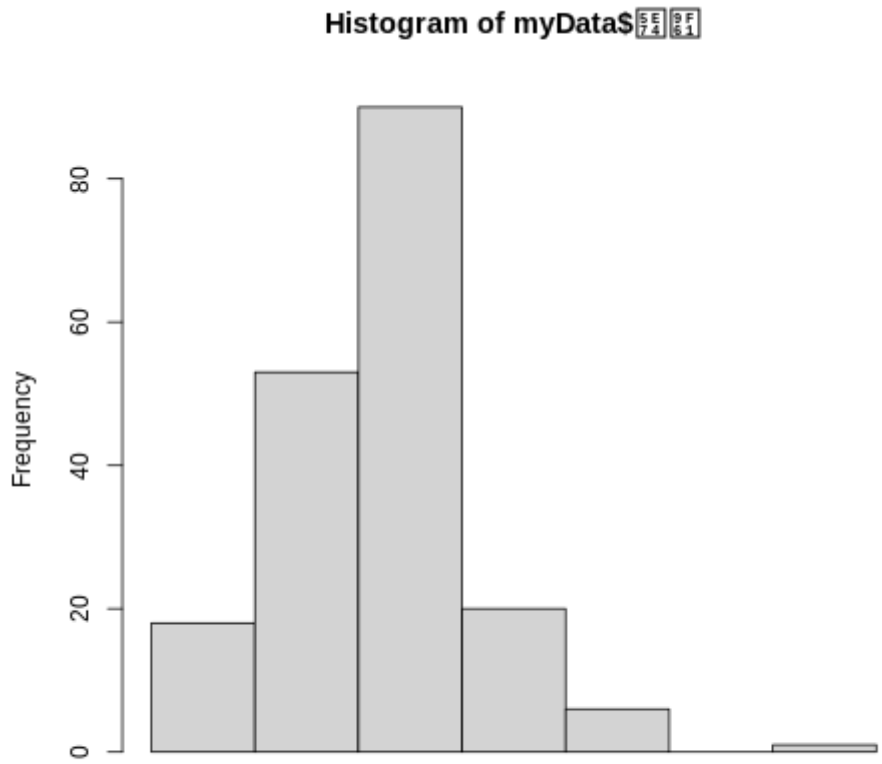
```
import pandas as pd
df=pd.read_csv('RPython/samples.csv')
df.head()
```

	SID	性別	年齡	入伍前職業	教育程度	婚姻狀況	皆無過去病史01	早產兒01	頭部曾受傷01	發展遲緩01	注意力不足過動症01	癲癇01	癲癇服藥治療	癲癇服藥期間	軍種	軍階	役別	入伍至今_年
0	137	1	21.333082	學生	4	1	0.0	0.0	1.0	0	0.0	0.0	0	0.0	11	1	2	0.3000
1	78	2	15.000000		4	1	1.0	0.0	0.0	0	0.0	0.0	0	0.0	8	2	4	3.0412

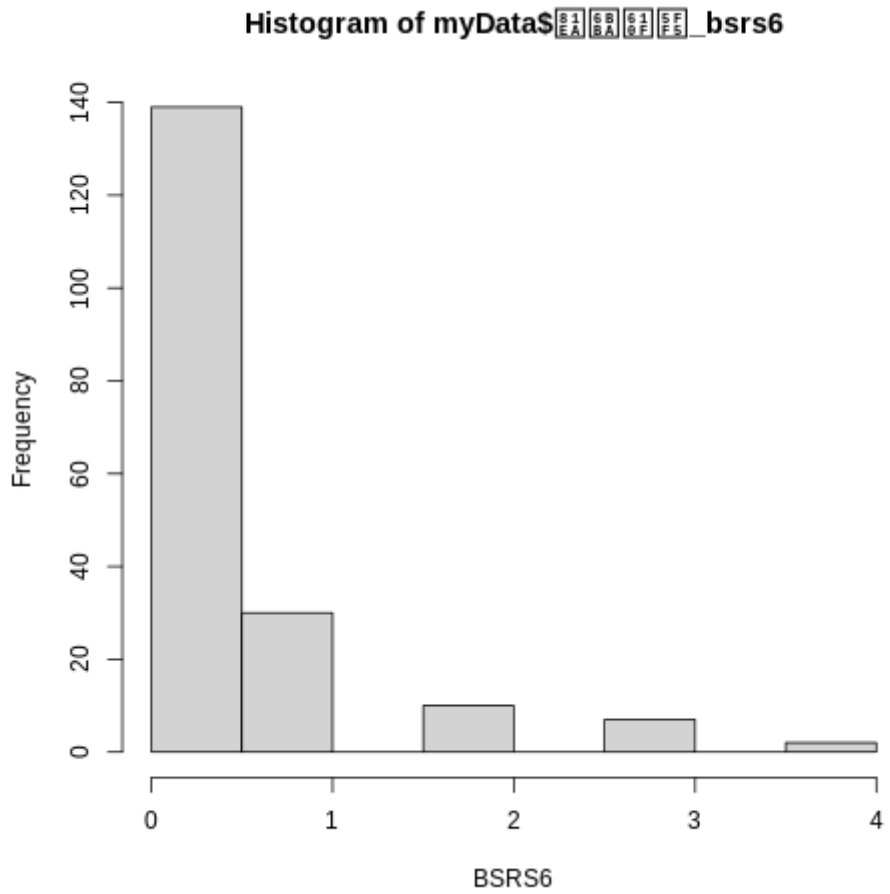
```
%load_ext  rpy2.ipython
```

3	82	1	15.000000	學	4	1	1.0	0.0	0.0	0	0.0	0.0	0	0.0	8	2	4	1.5000

```
%%R
myData  <-  read.csv('RPython/samples.csv')
hist(myData$年齡,  xlab='age')
hist(myData$性別,  xlab='sex')
hist(myData$網路成癮分數YDQ,  xlab='YDQ')
hist(myData$家庭滿意度apgar,  xlab='APGAR')
```




```
%%R
myData  <-  read.csv('RPython/samples.csv')
hist(myData$自殺意念_bsrs6,  xlab='BSRS6')
hist(myData$軍階,  xlab='Ranks')
hist(myData$軍種,  xlab='Military')
hist(myData$教育程度,  xlab='Education')
```




```
import  statsmodels.api  as  sm
import  statsmodels.formula.api  as  smf
formula='網路成癮分數YDQ~家庭滿意度apgar'
model=smf.glm(formula,  df).fit()
print(model.summary())
```

```
                 Generalized Linear Model Regression Results
==============================================================================
Dep. Variable:              網路成癮分數YDQ   No. Observations:                  188
Model:                            GLM   Df Residuals:                      186
Model Family:                Gaussian   Df Model:                            1
Link Function:               identity   Scale:                          5.8561
Method:                          IRLS   Log-Likelihood:                -431.90
Date:                Fri, 25 Jun 2021   Deviance:                       1089.2
Time:                        07:17:03   Pearson chi2:                 1.09e+03
No. Iterations:                     3
Covariance Type:            nonrobust
==============================================================================
                 coef    std err          z      P>|z|      [0.025      0.975]
------------------------------------------------------------------------------
Intercept      3.5125      0.457      7.679      0.000       2.616       4.409
家庭滿意度apgar    -0.1658      0.058     -2.841      0.005      -0.280      -0.051
==============================================================================
```

```
import  statsmodels.api  as  sm

glm1=sm.GLM(df.年齡,[df.家庭滿意度apgar,  df.BSRS總分],  fammmily=sm.families.Gamma())
result=glm1.fit()
```

```
result.summary()
```

```
/usr/local/lib/python3.7/dist-packages/statsmodels/tools/_testing.py:19: FutureWarnir
  import pandas.util.testing as tm
---------------------------------------------------------------------------
ValueError                                Traceback (most recent call last)
<ipython-input-4-599d363e6e9a> in <module>()
      1 import statsmodels.api as sm
      2
----> 3 glm1=sm.GLM(df.年齡,[df.家庭滿意度apgar, df.BSRS總分], fammmily=sm.families.Ga
      4 result=glm1.fit()
      5 result.summary()

                                  7 frames
/usr/local/lib/python3.7/dist-packages/statsmodels/base/data.py in _check_integrity(s
    405         if self.exog is not None:
    406             if len(self.exog) != len(self.endog):
--> 407                 raise ValueError("endog and exog matrices are different sizes
    408
    409     def wrap_output(self, obj, how='columns', names=None):

ValueError: endog and exog matrices are different sizes
```

SEARCH STACK OVERFLOW