

age_structure.R

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```
# Age_structure.R
# Tests of independence - age structure data

# Load necessary libraries
library(ggplot2)
library(gmodels)

# Read in data set
agedata <- read.table(header=T,colClasses=c("factor","factor","numeric"),text="
pop age obsfreq
1 0 36
1 1 22
1 2 18
1 3 13
1 4 11
2 0 48
2 1 24
2 2 14
2 3 10
2 4 4
3 0 60
3 1 21
3 2 12
3 3 5
3 4 2
")

# Print data
agedata
```

```
##      pop age obsfreq
## 1      1  0      36
## 2      1  1      22
## 3      1  2      18
## 4      1  3      13
## 5      1  4      11
## 6      2  0      48
## 7      2  1      24
## 8      2  2      14
## 9      2  3      10
## 10     2  4       4
## 11     3  0      60
## 12     3  1      21
## 13     3  2      12
## 14     3  3       5
## 15     3  4       2
```

```
# Convert tabulated data to raw form for CrossTable
pop <- rep(agedata[, "pop"], agedata$obsfreq)
age <- rep(agedata[, "age"], agedata$obsfreq)

# Tests of independence
CrossTable(age, pop, expected=TRUE)
```

```
##
##
##      Cell Contents
## |-----|
## |              N |
## |      Expected N |
## | Chi-square contribution |
## |      N / Row Total |
## |      N / Col Total |
## |      N / Table Total |
## |-----|
##
##
## Total Observations in Table:  300
##
##
##      age | pop
##      ---|---|
##      1   | 2   | 3   | Row Total |
##      ---|---|---|---|
##      0   | 36  | 48  | 60  | 144 |
##      | 48.000 | 48.000 | 48.000 | |
##      | 3.000 | 0.000 | 3.000 | |
##      | 0.250 | 0.333 | 0.417 | 0.480 |
##      | 0.360 | 0.480 | 0.600 | |
##      | 0.120 | 0.160 | 0.200 | |
##      ---|---|---|---|
##      1   | 22  | 24  | 21  | 67 |
##      | 22.333 | 22.333 | 22.333 | |
##      | 0.005 | 0.124 | 0.080 | |
##      | 0.328 | 0.358 | 0.313 | 0.223 |
##      | 0.220 | 0.240 | 0.210 | |
##      | 0.073 | 0.080 | 0.070 | |
##      ---|---|---|---|
##      2   | 18  | 14  | 12  | 44 |
##      | 14.667 | 14.667 | 14.667 | |
##      | 0.758 | 0.030 | 0.485 | |
##      | 0.409 | 0.318 | 0.273 | 0.147 |
##      | 0.180 | 0.140 | 0.120 | |
##      | 0.060 | 0.047 | 0.040 | |
##      ---|---|---|---|
##      3   | 13  | 10  | 5   | 28 |
##      | 9.333 | 9.333 | 9.333 | |
##      | 1.440 | 0.048 | 2.012 | |
##      | 0.464 | 0.357 | 0.179 | 0.093 |
##      | 0.130 | 0.100 | 0.050 | |
##      | 0.043 | 0.033 | 0.017 | |
##      ---|---|---|---|
```

```
##           4 |           11 |           4 |           2 |           17 |
##           |           5.667 |           5.667 |           5.667 |           |
##           |           5.020 |           0.490 |           2.373 |           |
##           |           0.647 |           0.235 |           0.118 |           0.057 |
##           |           0.110 |           0.040 |           0.020 |           |
##           |           0.037 |           0.013 |           0.007 |           |
## -----|-----|-----|-----|-----|
## Column Total |           100 |           100 |           100 |           300 |
##           |           0.333 |           0.333 |           0.333 |           |
## -----|-----|-----|-----|-----|
##
##
## Statistics for All Table Factors
##
##
## Pearson's Chi-squared test
## -----
## Chi^2 = 18.86404      d.f. = 8      p = 0.01560394
##
##
##
```

```
# Generate bar chart showing proportions
ggplot(agedata,aes(pop,fill=age))+
geom_bar(position="fill",aes(weight=obsfreq))+
scale_fill_grey(start=0,end=1)
```

