

Lecture 18 HW

Ellen Chancey

November 23, 2018

Question 6.16

Refer to table 2.6. Use CMH stat to test independence of death penalty verdict and victim's race, controlling for defendant's race. Conduct another test of this hypothesis and compare the results.

Read in Data

```
deathpenalty <- read.csv("deathpenalty.csv")
print(deathpenalty)
```

```
##   victim defendant  dp count
## 1  white      white yes    53
## 2  white      white no   414
## 3  white      black yes    11
## 4  white      black no    37
## 5  black      white yes     0
## 6  black      white no    16
## 7  black      black yes     4
## 8  black      black no   139
```

Convert data to a table to put in the CMH function

```
table <- xtabs(count ~ defendant + dp + victim, data = deathpenalty)
ftable(table) # display a flattened table, outcome will be a row
```

```
##               victim black white
## defendant dp
## black      no           139    37
##            yes            4    11
## white      no           16   414
##            yes            0    53
```

Calculate CMH stat

```
mantelhaen.test(table)
```

```
##
## Mantel-Haenszel chi-squared test with continuity correction
##
## data:  table
## Mantel-Haenszel X-squared = 4.779, df = 1, p-value = 0.02881
## alternative hypothesis: true common odds ratio is not equal to 1
```

```
## 95 percent confidence interval:
##  0.1991173 0.8519141
## sample estimates:
## common odds ratio
##          0.4118627
```

Do some other hypothesis test Woolf Test for homogeneity of OR across strata

```
require(vcd)

## Loading required package: vcd
## Loading required package: grid

woolf_test(table)

##
## Woolf-test on Homogeneity of Odds Ratios (no 3-Way assoc.)
##
## data:  table
## X-squared = 0.26585, df = 1, p-value = 0.6061
```

Review the results

The CMH test found significance, while the Woolf test did not. This indicates that the CMH is the appropriate test to use in this instance.

Reference Material

http://rcompanion.org/handbook/H_06.html

```
sessionInfo()

## R version 3.4.1 (2017-06-30)
## Platform: x86_64-w64-mingw32/x64 (64-bit)
## Running under: Windows 10 x64 (build 16299)
##
## Matrix products: default
##
## locale:
## [1] LC_COLLATE=English_United States.1252
## [2] LC_CTYPE=English_United States.1252
## [3] LC_MONETARY=English_United States.1252
## [4] LC_NUMERIC=C
## [5] LC_TIME=English_United States.1252
##
## attached base packages:
## [1] grid      stats      graphics  grDevices  utils      datasets  methods
## [8] base
##
## other attached packages:
## [1] vcd_1.4-3
##
```

```
## loaded via a namespace (and not attached):
## [1] Rcpp_0.12.13      lattice_0.20-35   zoo_1.8-0         lmtest_0.9-35
## [5] digest_0.6.12     rprojroot_1.2     MASS_7.3-47       backports_1.1.0
## [9] magrittr_1.5       evaluate_0.10.1   stringi_1.1.5     rmarkdown_1.6
## [13] tools_3.4.1        stringr_1.2.0     yaml_2.1.14       compiler_3.4.1
## [17] colorspace_1.3-2  htmltools_0.3.6   knitr_1.16
```