02441 Applied Statistics and Statistical Software

Exercise 4B - Diet

A manufacturer was considering marketing crackers high in a certain kind of edible fiber as a dieting aid. Dieters would consume some crackers before a meal, filling their stomachs so that they would feel less hungry and eat less. A laboratory studied whether people would in fact eat less in this way. Female subjects ate crackers with different types of fiber (bran fiber, gum fiber, both, and a control cracker) and were then allowed to eat as much as they wished from a prepared menu. The amount of food they consumed and their weight were monitored, along with any side effects they reported. Unfortunately, some subjects developed uncomfortable bloating and gastric upset from some of the fiber crackers.

Variable name	Description
Cracker	Type of fiber in the cracker
Diet	One of four diets (type of cracker)
Subject	An identification for each of the 12 subjects
Digested	Digested calories. Difference between caloric intake and calories passed through system
Bloat	Degree of bloating and flatulence reported by the subjects

1. Analyze the relationship between the four types of cracker and the four levels of severity of bloating as reported by the subjects.

Load Data

```r
crack <- read.table("diet.txt", header = TRUE)
crack <- table(crack$Cracker, crack$Bloat)
```

Perform Chi-Square test

```r
chi1 <- chisq.test(crack)
```

```
## Warning in chisq.test(crack): Chi-squared approximation may be incorrect
```

```r
chi1$expected
```

```
##
##           high  low  med none
##    bran    1.75 3.75 2.25 4.25
##    combo   1.75 3.75 2.25 4.25
##    control 1.75 3.75 2.25 4.25
##    gum     1.75 3.75 2.25 4.25
```

The reason for the warning is that the count in many cells is less than five. Use Fisher's Exact test instead.

Fisher's exact test calculates the probability of any particular outcome that is at least as extreme as the observed. A p-value can be computed summing up all these (at least as extreme) possible outcomes. For further information read on page 105 in Michael Crawleys, "Statistics: An Introduction using R".

```
fisher.test(crack)
```

```
## 
##  Fisher's Exact Test for Count Data
## 
## data:  crack
## p-value = 0.06636
## alternative hypothesis: two.sided
```

The is no significant interaction between bloating and Cracker type.