Barcharts

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## Factor Variables

R calls categorical or qualitative variables, factor variables. When reading CSV files, R makes character variables into factor variables by default. However, when a factor variable has been coded with numbers, R assumes that the variable is quantitative. The ***HTWT*** data shows how this can be a problem.

htwt = read.csv("http://facweb1.redlands.edu/fac/jim\_bentley/Data/FYS04/HtWt.csv")  
 summary(htwt)

## Height Weight Group   
## Min. :51.0 Min. : 82.0 Min. :1.00   
## 1st Qu.:56.0 1st Qu.:108.2 1st Qu.:1.00   
## Median :59.5 Median :123.5 Median :2.00   
## Mean :62.1 Mean :139.6 Mean :1.55   
## 3rd Qu.:68.0 3rd Qu.:166.8 3rd Qu.:2.00   
## Max. :79.0 Max. :228.0 Max. :2.00

Note that the variable ***Group*** has been treated as numeric. It turns out that this variable actually represents the sex of the individual and that males were coded as 1 and females as 2. We convert the numeric variable to a factor variable.

is.numeric(htwt$Group)

## [1] TRUE

is.factor(htwt$Group)

## [1] FALSE

table(htwt$Group)

##   
## 1 2   
## 9 11

htwt$Group = factor(htwt$Group, labels=c("Male","Female"))  
 is.numeric(htwt$Group)

## [1] FALSE

is.factor(htwt$Group)

## [1] TRUE

summary(htwt$Group)

## Male Female   
## 9 11

table(htwt$Group)

##   
## Male Female   
## 9 11

R uses factor variables to keep track of ordinal data. The ***ordered*** argument should be set to ***TRUE***. We will use data on phone service satisfaction to show how this works.

phone = c(rep("Poor",840),rep("Fair",1649),rep("Good",4787),rep("Excellent",3208))  
 # At this point phone is a list of strings and not a factor  
 is.factor(phone)

## [1] FALSE

# Use the function factor to convert the variable  
 phone.u = factor(phone)  
 is.factor(phone.u)

## [1] TRUE

table(phone.u)

## phone.u  
## Excellent Fair Good Poor   
## 3208 1649 4787 840

# Note that the output is alphabetical and not properly ordered  
 # Recreate phone as an ordered factor variable  
 phone.o = factor(phone, levels = c("Poor","Fair","Good","Excellent"), ordered=TRUE)  
 table(phone.o)

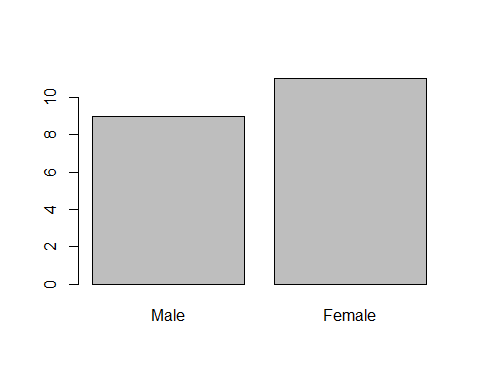
## phone.o  
## Poor Fair Good Excellent   
## 840 1649 4787 3208

# The values in the table are now ordered

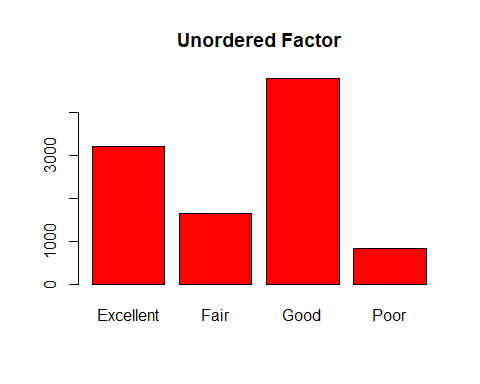
## Barcharts

We now create plots to go with the tables.

# Use base graphics  
 barplot(table(htwt$Group))



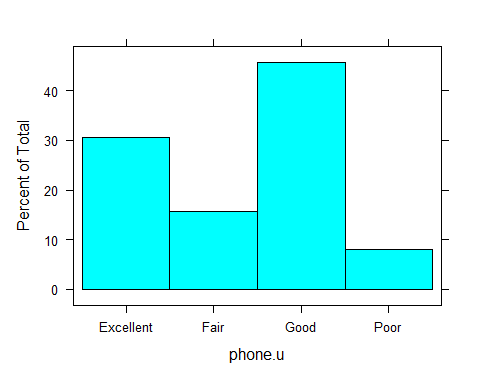
barplot(table(phone.u), main="Unordered Factor", col="red")



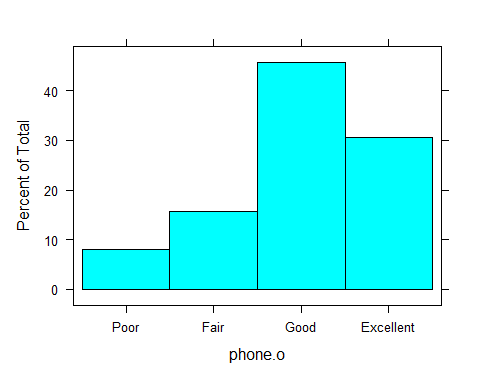
barplot(table(phone.o), main="Ordered Factor", col="lightblue")  
 # Use lattice plots  
 p\_load(lattice)



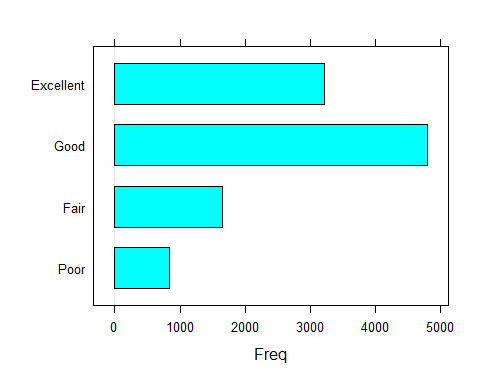
histogram(~phone.u)



histogram(~phone.o)

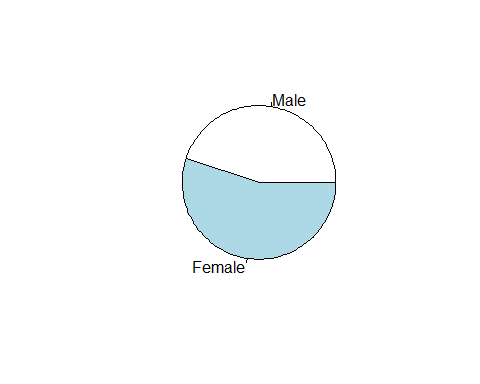


barchart(phone.o)

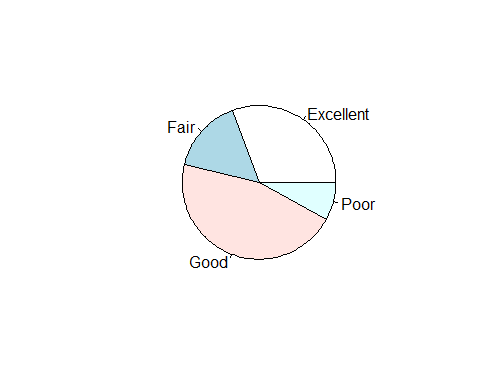


For those who just will not get rid of those stupid pie charts, R will make them. Why anyone would want to is a mystery.

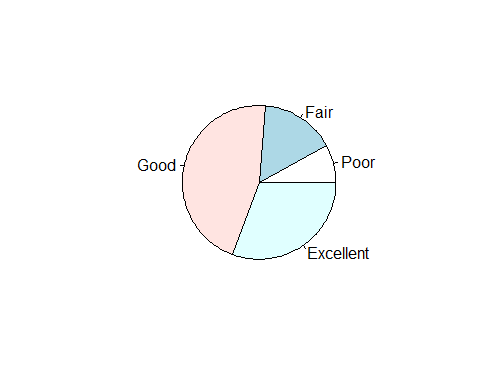
# Use base graphics  
 pie(table(htwt$Group))



pie(table(phone.u))



pie(table(phone.o))



# Can't use lattice since it won't make pie charts