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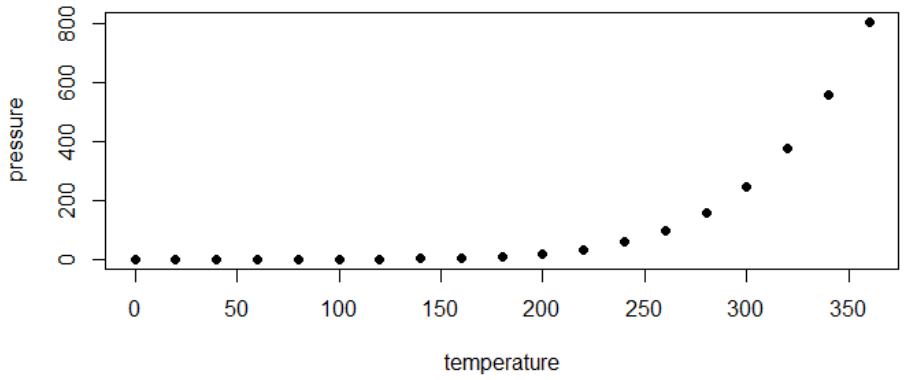
EPPS 6356 Data Visualization (Fall 2021)

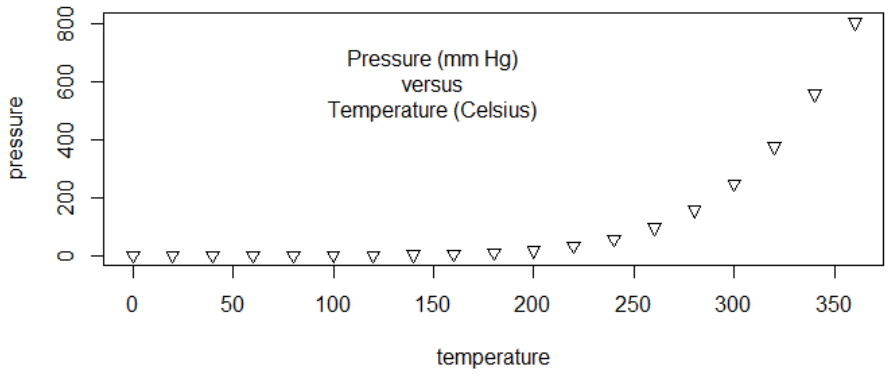
Murrell Assignment

September 2021

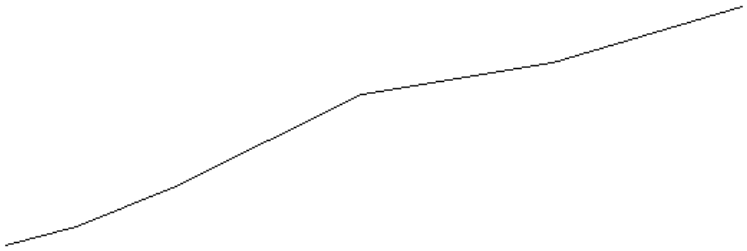
```
> ### Paul Murrell's R examples (selected)
> ## Start plotting from basics
> plot(pressure, pch=16)  # Can you change pch?
```



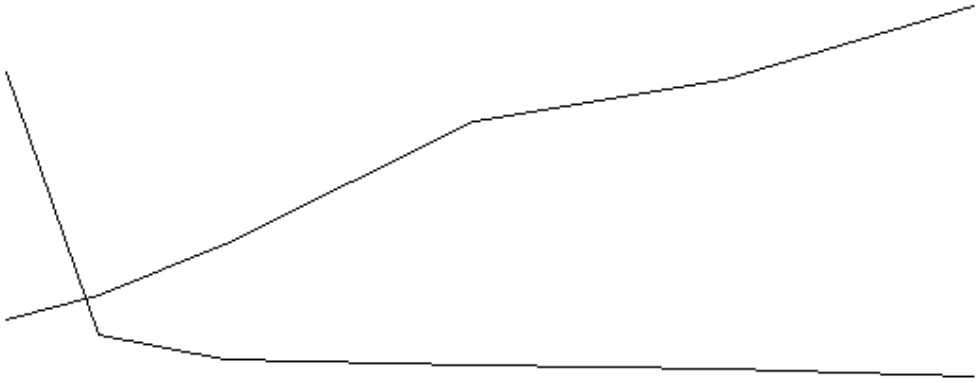

```
plot(pressure, pch=25)  # Can you change pch?
> text(150, 600,
+ "Pressure (mm Hg)\nversus\nTemperature (Celsius)")
```



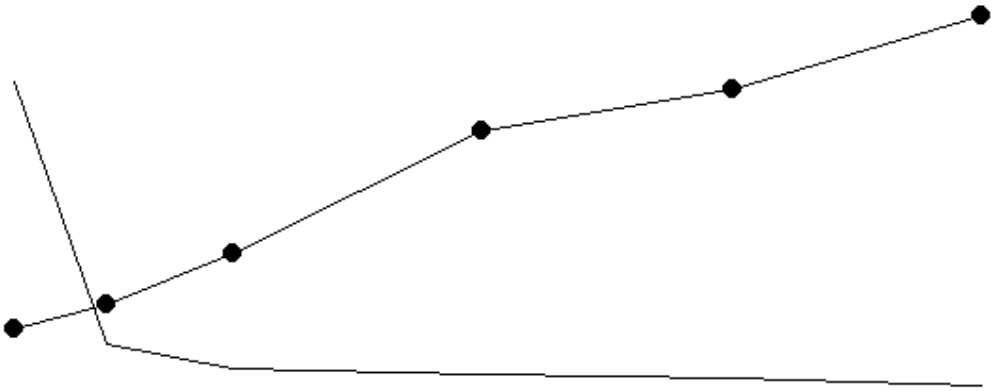
```
# Setting the parameter (3 rows by 2 cols)
> par(mfrow=c(3, 2))
> # Scatterplot
> # Note the incremental additions
> x <- c(0.5, 2, 4, 8, 12, 16)
> y1 <- c(1, 1.3, 1.9, 3.4, 3.9, 4.8)
> y2 <- c(4, .8, .5, .45, .4, .3)
> # Setting label orientation, margins c(bottom, left, top, right) & text size
> par(las=1, mar=c(4, 4, 2, 4), cex=.7)
> plot.new()
> plot.window(range(x), c(0, 6))
> lines(x, y1)
```



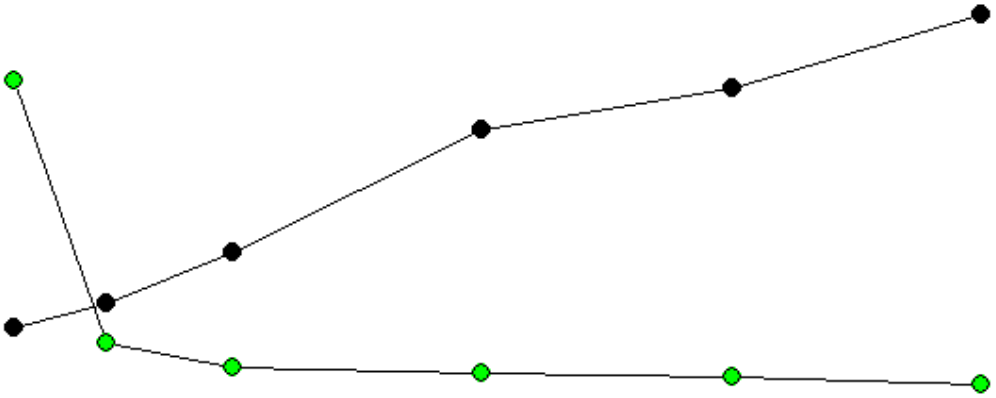
```
plot.new()
> plot.window(range(x), c(0, 6))
> lines(x, y1)
> lines(x, y2)
```



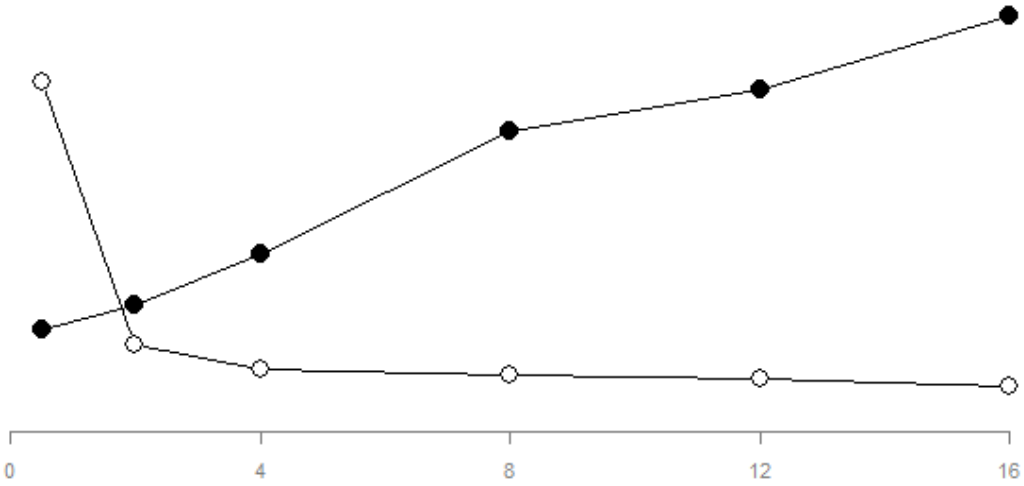
```
points(x, y1, pch=16, cex=2) # Try different cex value?
```



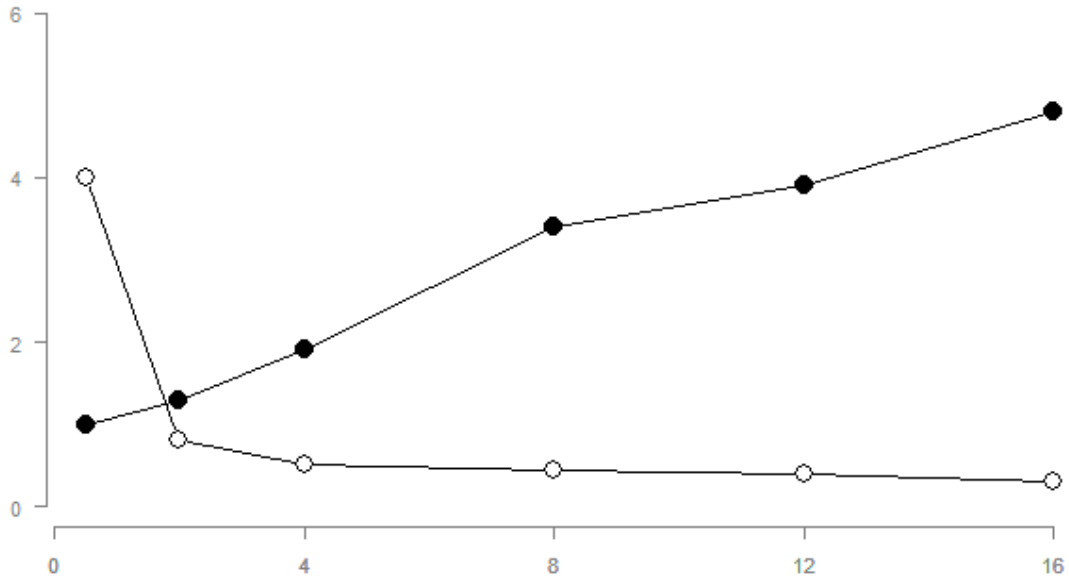
points(x, y2, pch=21, bg="green", cex=2) # Different background color



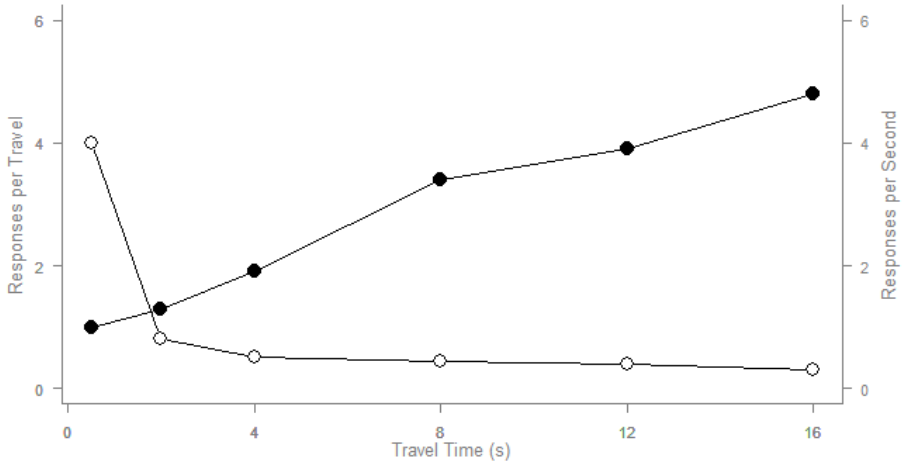
par(col="gray50", fg="gray50", col.axis="gray50")
> par(col="yellow50", fg="pink50", col.axis="gray50")
> par(col="gray50", fg="gray50", col.axis="gray50")
> axis(1, at=seq(0, 16, 4))



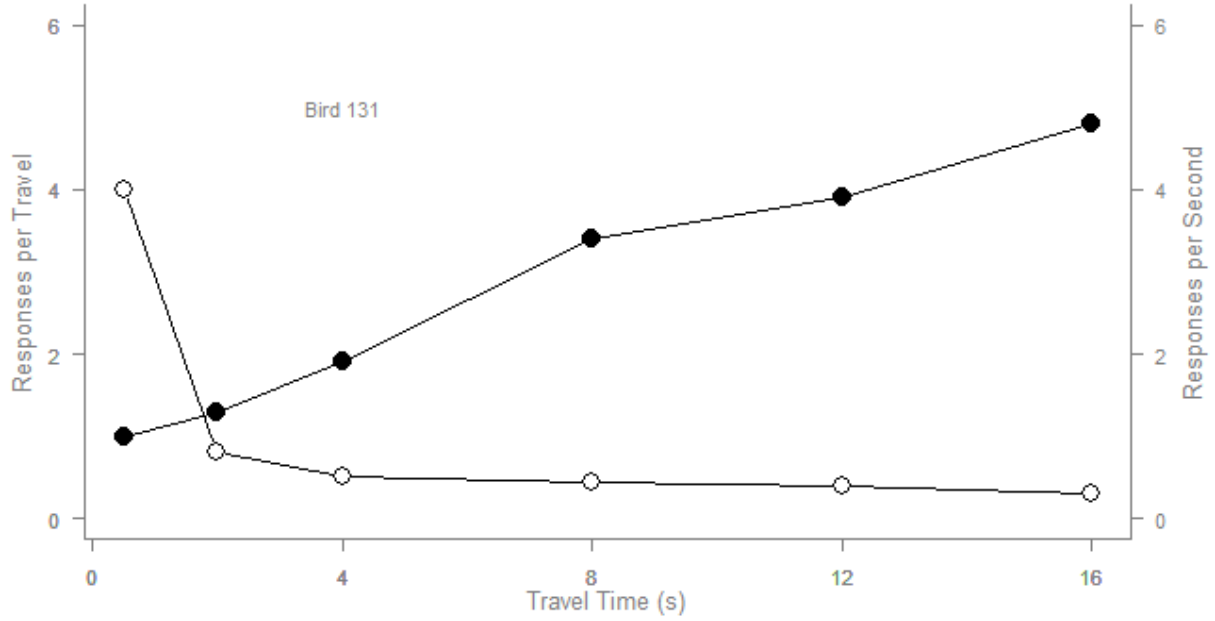
```
par(col="gray50", fg="gray50", col.axis="gray50")
> axis(1, at=seq(0, 16, 4))
> axis(2, at=seq(0, 6, 2))
```



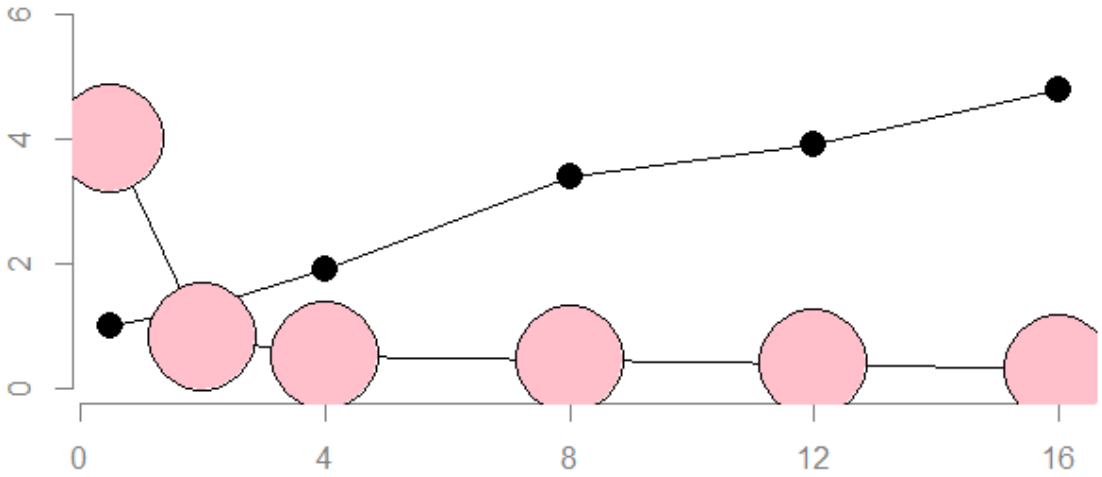

```
axis(1, at=seq(0, 16, 4))
> axis(2, at=seq(0, 6, 2))
> axis(4, at=seq(0, 6, 2))
> box(bty="u")
> mtext("Travel Time (s)", side=1, line=2, cex=0.8)
> mtext("Responses per Travel", side=2, line=2, las=0, cex=0.8)
> mtext("Responses per Second", side=4, line=2, las=0, cex=0.8)
>
```



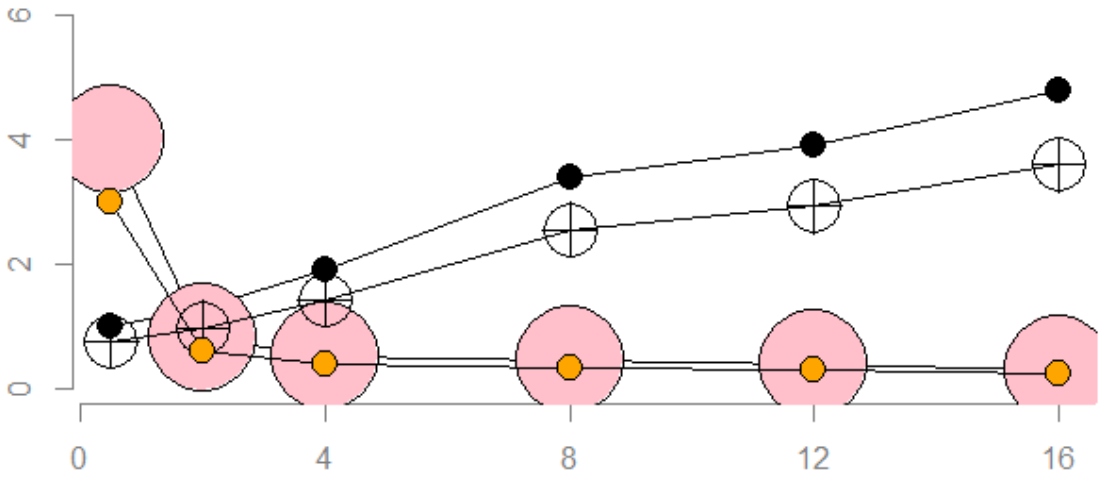
par(mar=c(5.1, 4.1, 4.1, 2.1), col="black", fg="black", col.axis="black")



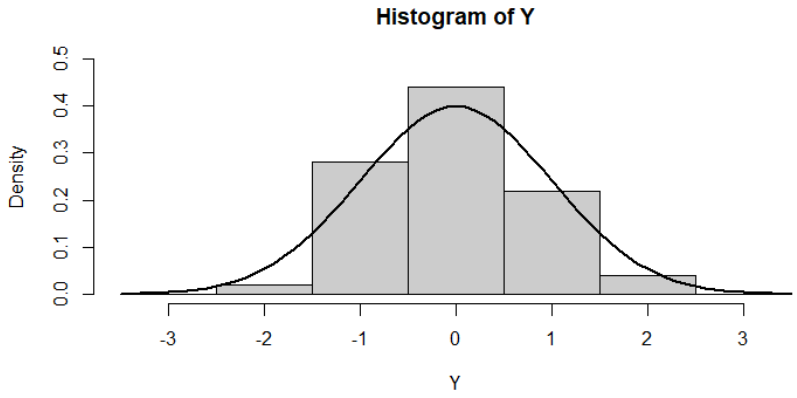
lines(x, y1)
> lines(x, y2)
> points(x, y1, pch=16, cex=2) # Try different cex value?
> points(x, y2, pch=21, bg="pink", cex=8) # Different background color


0
2
4
6
0
4
8
12
16

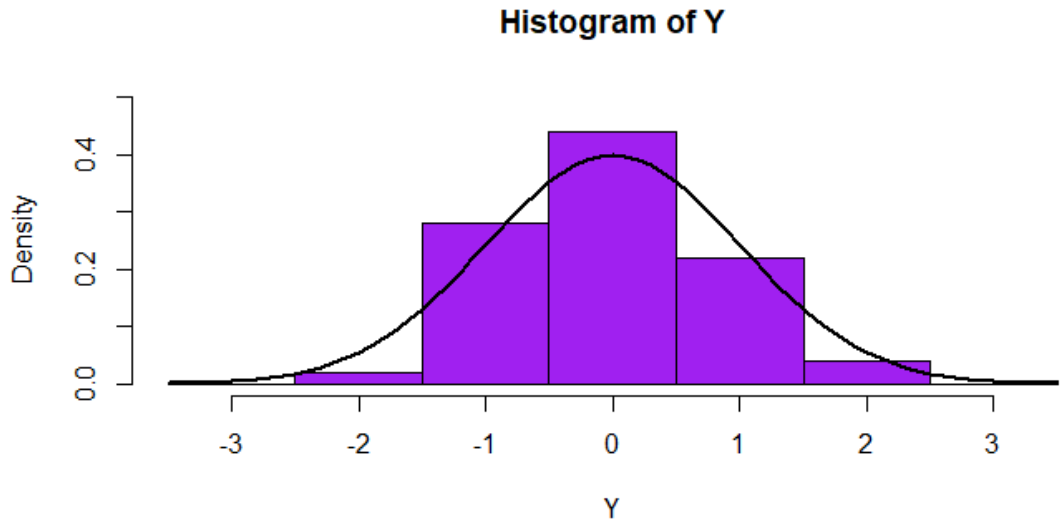
plot.window(range(x), c(0, 8))
> lines(x, y1)
> lines(x, y2)
> points(x, y1, pch=10, cex=4) # Try different cex value?
> points(x, y2, pch=21, bg="orange", cex=2) # Different background color



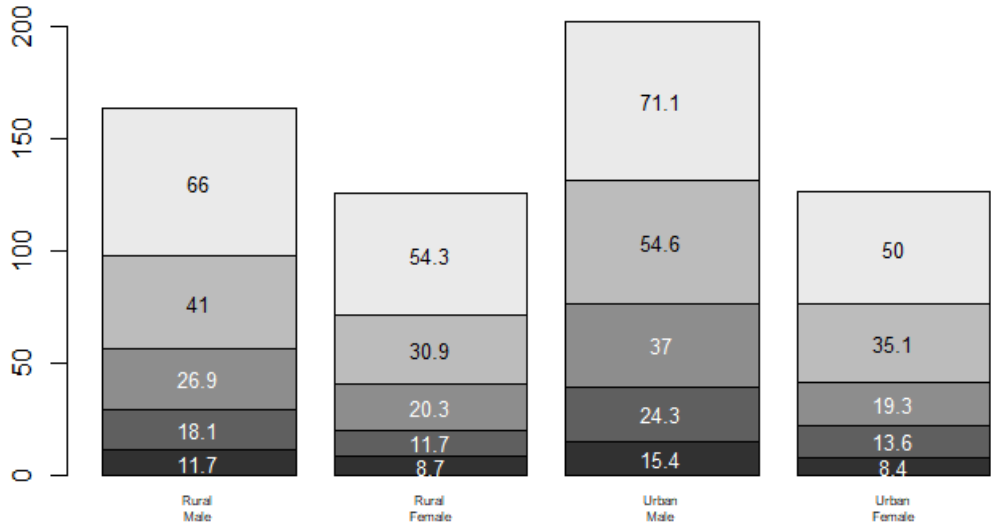
```
# Histogram
> # Random data
> Y <- rnorm(50)
> # Make sure no Y exceed [-3.5, 3.5]
> Y[Y < -3.5 | Y > 3.5] <- NA # Selection
> x <- seq(-3.5, 3.5, .1)
> dn <- dnorm(x)
> par(mar=c(4.5, 4.1, 3.1, 0))
> hist(Y, breaks=seq(-3.5, 3.5), ylim=c(0, 0.5),
+ col="gray80", freq=FALSE)
> lines(x, dnorm(x), lwd=2)
> par(mar=c(5.1, 4.1, 4.1, 2.1))
>
```



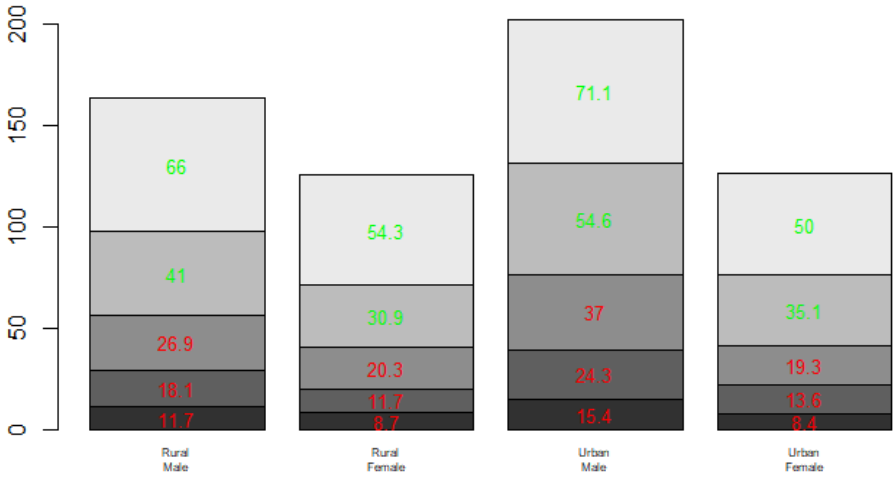

```
 hist(Y, breaks=seq(-3.5, 3.5), ylim=c(0, 0.5),
+      col="purple", freq=FALSE)
> lines(x, dnorm(x), lwd=2)
```



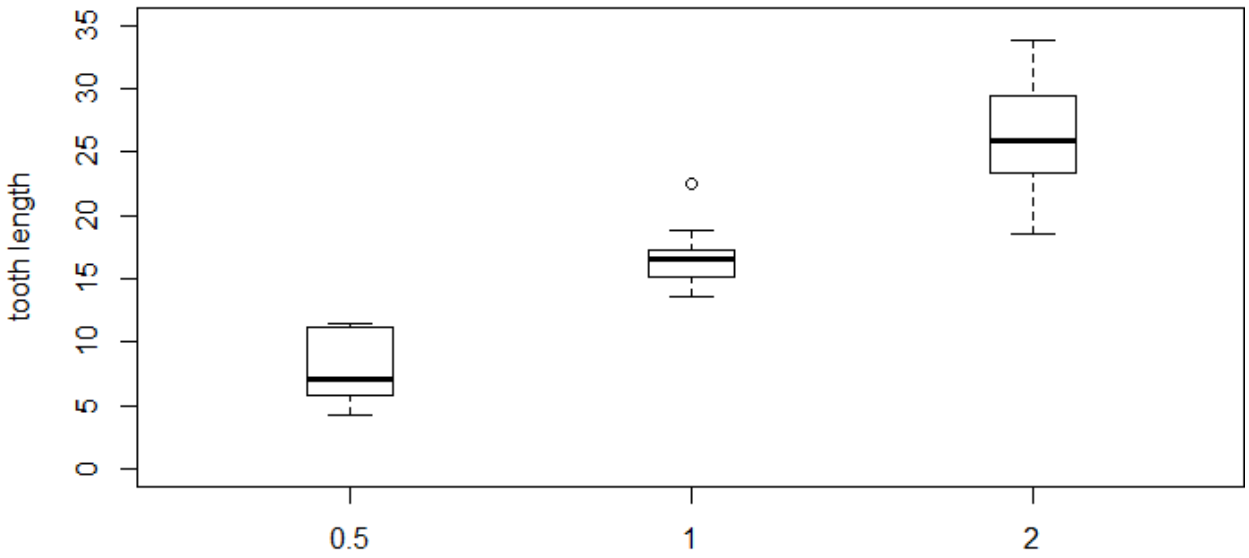
```
plot.new()
> # Barplot
> par(mar=c(2, 3.1, 2, 2.1))
> midpts <- barplot(VADeaths,
+ col=gray(0.1 + seq(1, 9, 2)/11),
+ names=rep("", 4))
> mtext(sub(" ", "\n", colnames(VADeaths)),
+ at=midpts, side=1, line=0.5, cex=0.5)
> text(rep(midpts, each=5), apply(VADeaths, 2, cumsum) - VADeaths/2,
+ VADeaths,
+ col=rep(c("white", "black"), times=3:2),
+ cex=0.8)
> par(mar=c(5.1, 4.1, 4.1, 2.1))
```



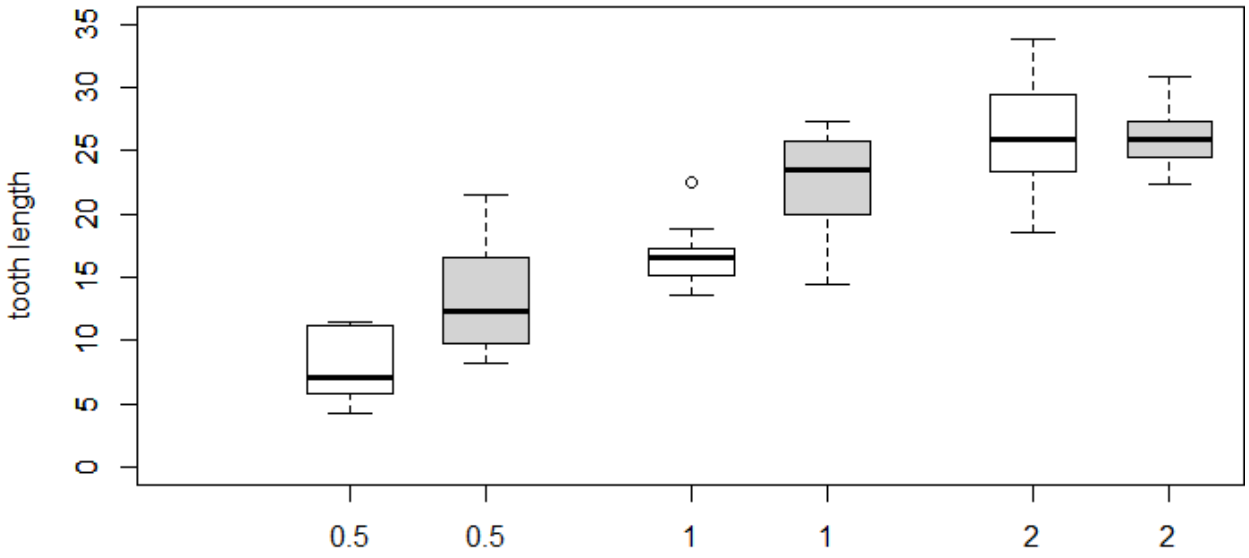
```
#
> plot.new()
> # Barplot
> par(mar=c(2, 3.1, 2, 2.1))
> midpts <- barplot(VADeaths,
+ col=gray(0.1 + seq(1, 9, 2)/11),
+ names=rep("", 4))
> mtext(sub(" ", "\n", colnames(VADeaths)),
+ at=midpts, side=1, line=0.5, cex=0.5)
> text(rep(midpts, each=5), apply(VADeaths, 2, cumsum) - VADeaths/2,
+ VADeaths,
+ col=rep(c("red", "green"), times=3:2),
+ cex=0.8)
> par(mar=c(5.1, 4.1, 4.1, 2.1))
```



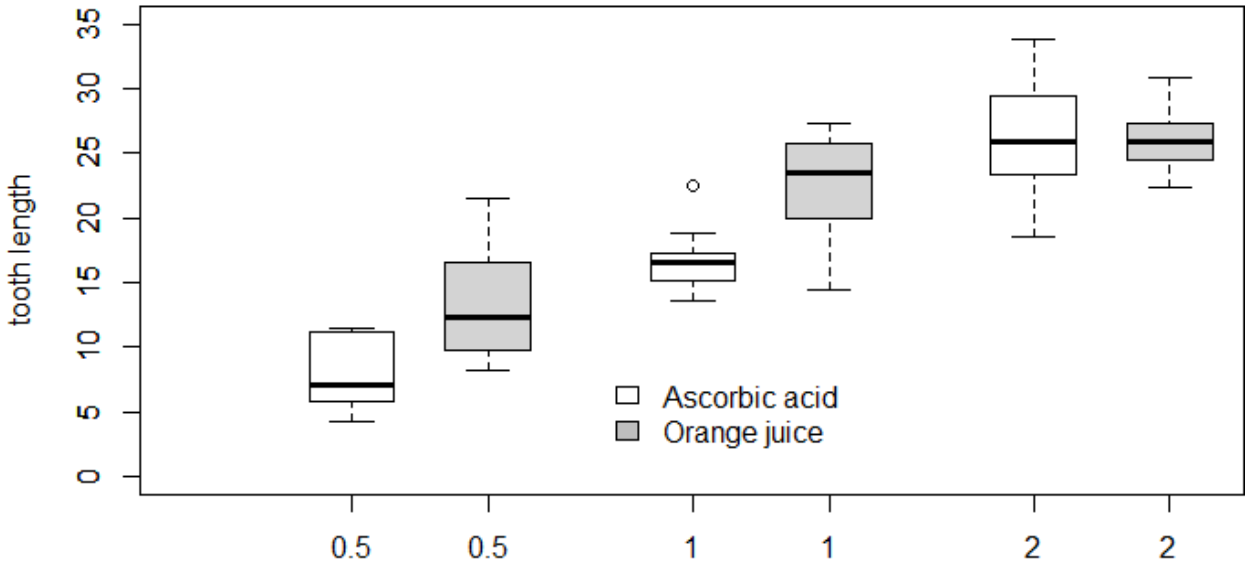
```
plot.new()
> # Boxplot
> par(mar=c(3, 4.1, 2, 0))
> boxplot(len ~ dose, data = ToothGrowth,
+ boxwex = 0.25, at = 1:3 - 0.2,
+ subset= supp == "VC", col="white",
+ xlab="",
+ ylab="tooth length", ylim=c(0,35))
```



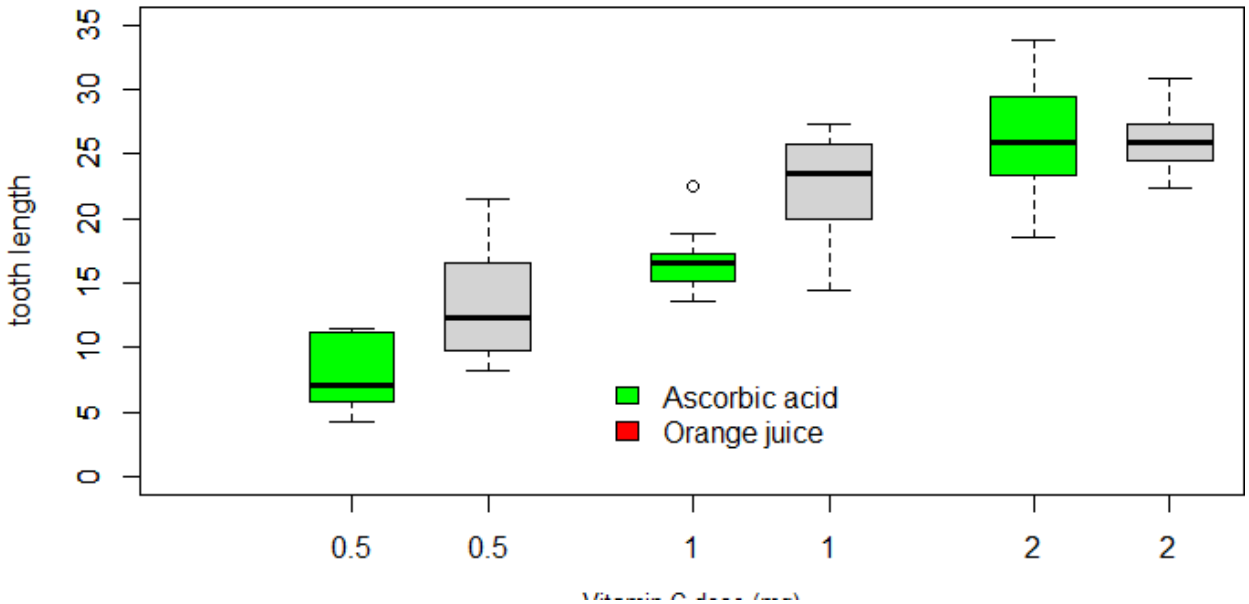
```
plot.new()
> # Boxplot
> par(mar=c(3, 4.1, 2, 0))
> boxplot(len ~ dose, data = ToothGrowth,
+ boxwex = 0.25, at = 1:3 - 0.2,
+ subset= supp == "VC", col="white",
+ xlab="",
+ ylab="tooth length", ylim=c(0,35))
> boxplot(len ~ dose, data = ToothGrowth, add = TRUE,
+ boxwex = 0.25, at = 1:3 + 0.2,
+
+ subset= supp == "OJ")
```



```
subset= supp == "OJ")
> legend(1.5, 9, c("Ascorbic acid", "Orange juice"),
+ fill = c("white", "gray"),
+ bty="n")
```

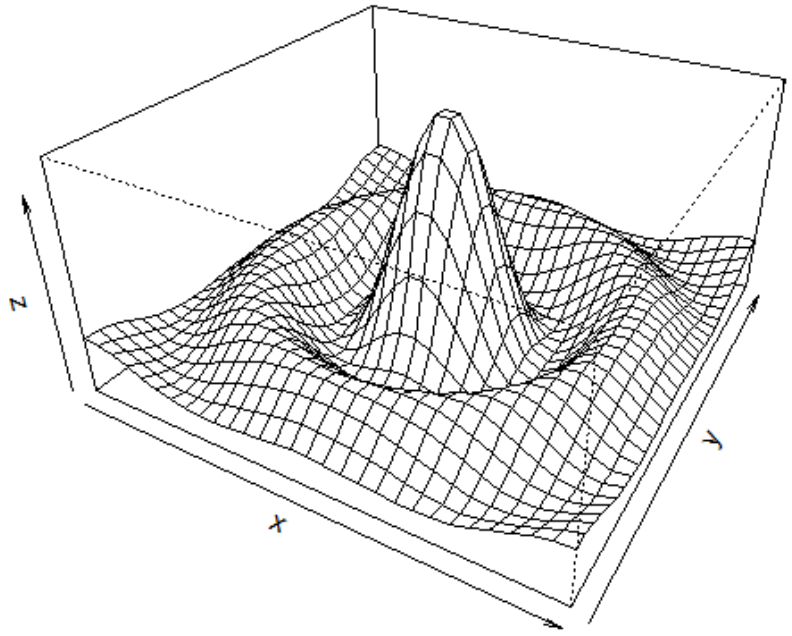


```
plot.new()
> # Boxplot
> par(mar=c(3, 4.1, 2, 0))
> par(mar=c(3, 4.1, 2, 0))
> boxplot(len ~ dose, data = ToothGrowth,
+ boxwex = 0.25, at = 1:3 - 0.2,
+ subset= supp == "VC", col="green",
+ xlab="",
+ ylab="tooth length", ylim=c(0,35))
> mtext("Vitamin C dose (mg)", side=1, line=2.5, cex=0.8)
> boxplot(len ~ dose, data = ToothGrowth, add = TRUE,
+ boxwex = 0.25, at = 1:3 + 0.2,
+ subset= supp == "OJ")
> legend(1.5, 9, c("Ascorbic acid", "Orange juice"),
+ fill = c("green", "red"),
+ bty="n")
> par(mar=c(5.1, 4.1, 4.1, 2.1))
```

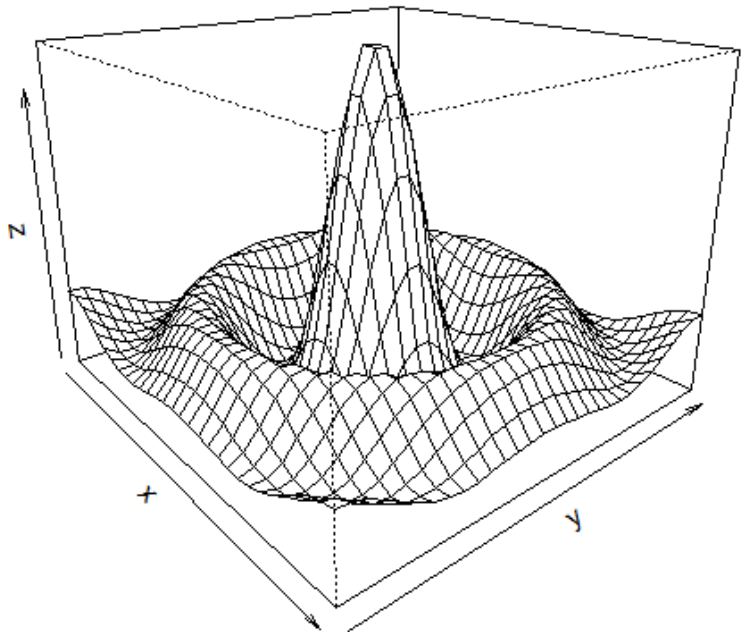


Persp

```
> x <- seq(-10, 10, length= 30)
> y <- x
> f <- function(x,y) { r <- sqrt(x^2+y^2); 10 * sin(r)/r }
> z <- outer(x, y, f)
> z[is.na(z)] <- 1
> # 0.5 to include z axis label
> par(mar=c(0, 0.5, 0, 0), lwd=0.5)
> persp(x, y, z, theta = 30, phi = 30,
+ expand = 0.5)
```



```
# 0.5 to include z axis label
> par(mar=c(0, 0.5, 0, 0), lwd=0.5)
> persp(x, y, z, theta = 50, phi = 20,
+ expand = 0.75)
> par(mar=c(5.1, 4.1, 4.1, 2.1), lwd=1)
>
```



```
# Piechart
> par(mar=c(0, 2, 1, 2), xpd=FALSE, cex=0.5)
> pie.sales <- c(0.12, 0.3, 0.26, 0.16, 0.04, 0.12)
> names(pie.sales) <- c("Blueberry", "Cherry",
+                       "Apple", "Boston Cream", "Other", "Vanilla")
> pie(pie.sales, col = gray(seq(0.3,1.0,length=6)))
```