

# Introduction to R

## *Answers to Session 6 exercises*

Statistical Consulting Center

15 November, 2016

1. Plot the mean nerdy score for each gender (with  $\pm 1.96 \times \text{SE}$  bars), as shown in Figure 1.

```
g.m <- with(sports.df, tapply(nerdy.sc, gender, mean, na.rm = T))
g.sd <- with(sports.df, tapply(nerdy.sc, gender, sd, na.rm = T))
g.n <- with(sports.df, tapply(nerdy.sc, gender, function(x)sum(!is.na(x))))
g.stder <- g.sd/sqrt(g.n)
g.upper <- g.m + 1.96*g.stder
g.lower <- g.m - 1.96*g.stder
plot(g.m, xlim = c(0, 3), ylim = range(c(g.upper, g.lower)), xlab = "Gender",
     ylab = "Mean nerdy score", axes = F)
arrows(1:2, g.upper, 1:2, g.lower, length = 0.1, code = 3, angle = 90)
axis(2)
axis(1, at=1:2, labels = names(g.m))
box()
```

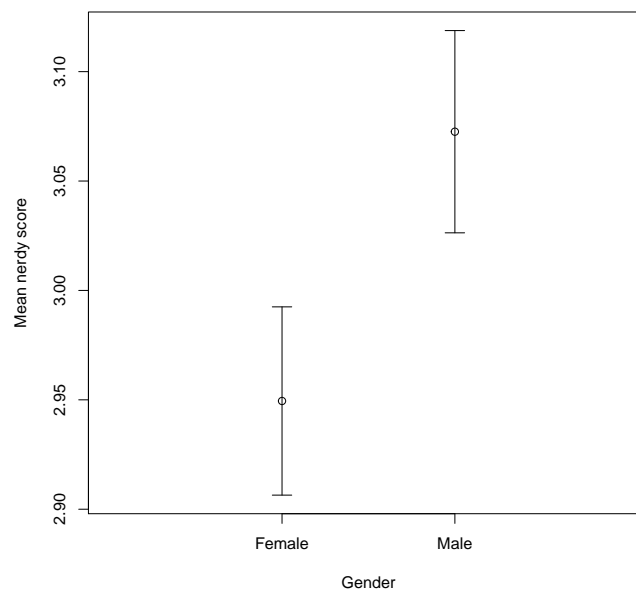


Figure 1: First plot with standard error bars

2. Now reproduce Figure 2. The graph should have:

- for Males: **blue** solid circles (representing the mean) and  $\pm 1.96 \times \text{SE}$  bars (representing the lower and upper 95% confidence limits).
- for Females: **red** solid circles (representing the mean) and  $\pm 1.96 \times \text{SE}$  bars (representing the lower and upper 95% confidence limits).

```
ga.m <- with(sports.df, tapply(nerdy.sc, list(gender, age.group), mean, na.rm = TRUE))
ga.sd <- with(sports.df, tapply(nerdy.sc, list(gender, age.group), sd, na.rm = TRUE))
ga.n <- with(sports.df, tapply(nerdy.sc, list(gender, age.group),
                                function(x) sum(!is.na(x)))))
ga.stder <- ga.sd/sqrt(ga.n)
ga.upper <- ga.m + 1.96*ga.stder
ga.lower <- ga.m - 1.96*ga.stder
plot(c(1, 3, 5), ga.m[1, ], xlim = c(0, 6.5), ylim = range(c(ga.upper, ga.lower)),
     xlab = "Age Group", ylab = "Mean nerdy score", axes = F, col = 2, pch = 19)
arrows(c(1, 3, 5), ga.upper[1, ], c(1, 3, 5), ga.lower[1, ],
       length = 0.1, code = 3, angle = 90, col = 2)
points(c(1.5, 3.5, 5.5), ga.m[2, ], col = 4, pch = 19)
arrows(c(1.5, 3.5, 5.5), ga.upper[2, ], c(1.5, 3.5, 5.5), ga.lower[2, ],
       length = 0.1, code = 3, angle = 90, col = 4)
axis(2)
axis(1, at=c(1.25, 3.25, 5.25), labels = colnames(ga.m))
box()
legend("topright", pch = 19, lty = 1, col = c(2, 4),
       legend = row.names(ga.m), bty = "n")
```

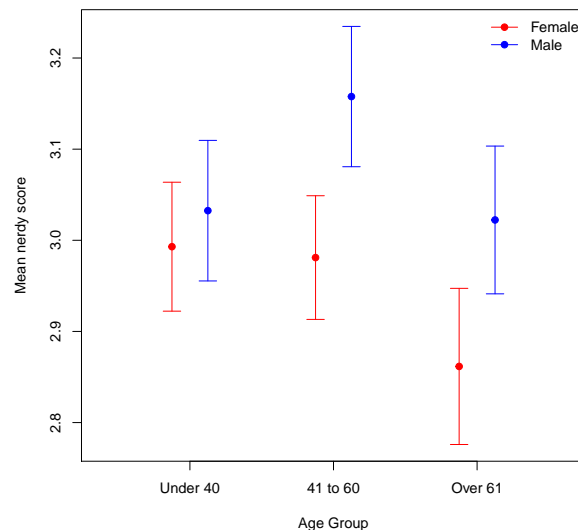


Figure 2: Second plot with standard error bars