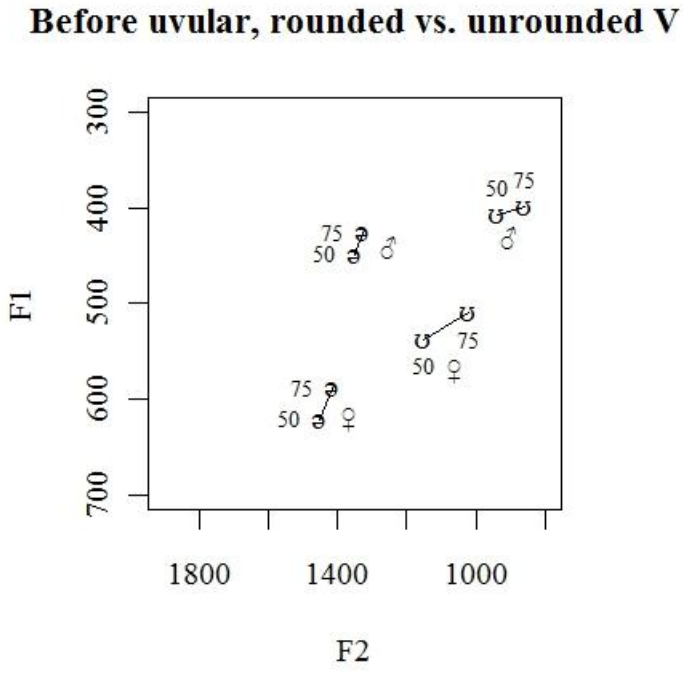
R code and resulting plots for various versions of a graph of vowel quality for two vowels at two measurement points, two groups of speakers

Sharon Hargus, 10/30/2010

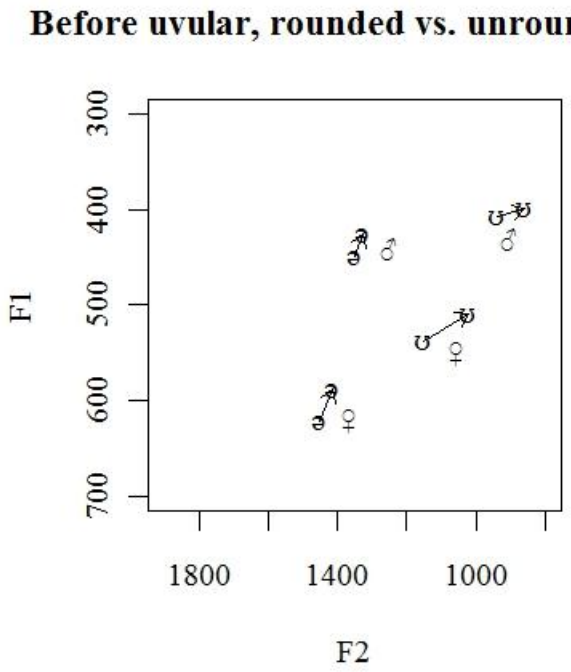
```
#don't forget to set your user directory; mine is:
setwd("c:/users/sharon")
#I like to check that it's set correctly
getwd()

#first graph I created for Lab Phon paper:  Before uvular, rounded vs. unrounded vowel
#set up plotting space
windows(w=4,h=4,pointsize=12)
#oma:  A vector of the form c(bottom, left, top, right) giving the size of the outer margins in
    lines of text.
#A character specifying the type of plot region to be used; "s" generates a square plotting
    region and "m" generates the maximal plotting region.
par(family="serif",pty="s",oma=rep(0,4))
#read in tab-delimited data files
menrd=data.frame(read.table("men_rd.txt",header=TRUE,sep="\t"))
womenrd=data.frame(read.table("women_rd.txt",header=TRUE,sep="\t"))
menunrd=data.frame(read.table("men_unrd.txt",header=TRUE,sep="\t"))
womenunrd=data.frame(read.table("women_unrd.txt",header=TRUE,sep="\t"))
#plot first line
plot(menrd$F2,menrd$F1,xlim=c(1900,800),ylim=c(700,300),xlab="F2",ylab="F1",type="l",main
    ="Before uvular, rounded vs. unrounded V")
#Doesn't like:  sub=""\u028A"=before rounded vowel;"\u0259"=before unrounded vowel"
#add other lines to graph
points(menunrd$F2,menunrd$F1,type="l")
points(womenunrd$F2,womenunrd$F1,type="l")
points(womenrd$F2,womenrd$F1,type="l")
#plot upsilon
text(menrd$F2,menrd$F1,"\u028A")
text(womenrd$F2,womenrd$F1,"\u028A")
#plot schwa
text(menunrd$F2,menunrd$F1,"\u0259")
text(womenunrd$F2,womenunrd$F1,"\u0259")
#plot contents of column position (50%, 75%)
#clockwise starting at 6 o'clock (pos=1, pos=2, pos=3, pos=4)
#supercedes adj = c(0,0)
#cex=#(character size)
text(menrd$F2,menrd$F1,menrd$position,pos=3,cex=.75)
text(menunrd$F2,menunrd$F1,menunrd$position,pos=2,cex=.75)
text(womenrd$F2,womenrd$F1,womenrd$position,pos=1,cex=.75)
text(womenunrd$F2,womenunrd$F1,womenunrd$position,pos=2,cex=.75)
```

```
#plot female (unicode 2640) and male (unicode 2642) symbols
text(1365,620,"\u2640",cex=.75)
text(1060,570,"\u2640",cex=.75)
text(1250,440,"\u2642",cex=.75)
text(900,430,"\u2642",cex=.75)
#resulting graph:  uvu_rd_unrd_pos.jpg; looks cluttered
```



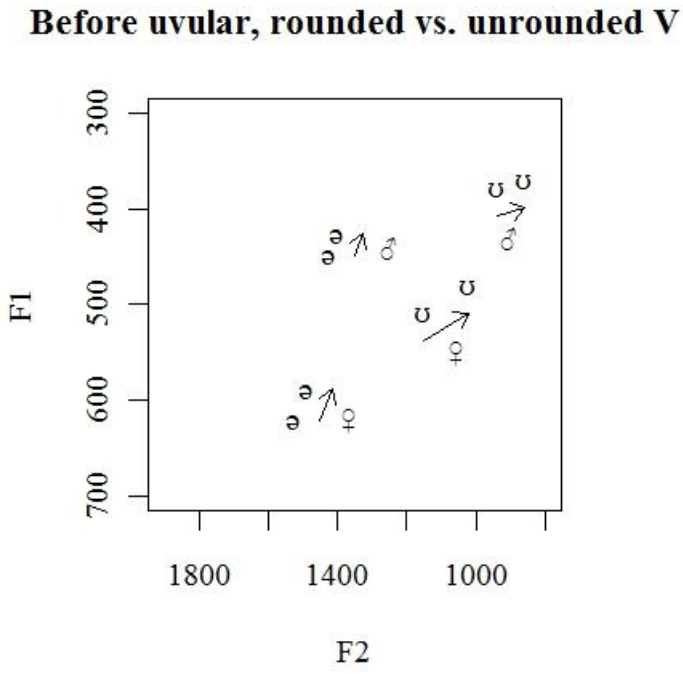

```
#following up on Richard's suggestion; use arrows in plot
windows(w=4,h=4,pointsize=12)
par(family="serif",pty="s",oma=rep(0,4))
menrd=data.frame(read.table("men_rd.txt",header=TRUE,sep="\t"))
womenrd=data.frame(read.table("women_rd.txt",header=TRUE,sep="\t"))
menunrd=data.frame(read.table("men_unrd.txt",header=TRUE,sep="\t"))
womenunrd=data.frame(read.table("women_unrd.txt",header=TRUE,sep="\t"))
#set axes and title but plot nothing (type="n")
plot(menrd$F2,menrd$F1,xlim=c(1900,800),ylim=c(700,300),xlab="F2",ylab="F1",type="n",mai
    n="Before uvular, rounded vs. unrounded V")
#doesn't work:  arrows(menrd$F2,menrd$F1,length=.08,angle=35,code=2); x and y therefore
    entered in arrows function
#optional arrows parameters, don't really improve the look of this plot
#lty (line type) = [dotted, dashed, etc.]
#ljoin (line join) =0 (round), 1 (mitre), 2 (bevel); this has no effect that I can see
#lend (line end) =0 (round), 1 (butt), 2 (square); also no effect that I can see
```

```
arrows(939,407,862,399,length=.07,angle=35,code=2)
arrows(1350,448,1329,426,length=.07,angle=35,code=2)
arrows(1151,537,1023,509,length=.07,angle=35,code=2)
arrows(1450,621,1415,589,length=.07,angle=35,code=2)
#plots upsilon
text(menrd$F2,menrd$F1,"\u028A")
text(womenrd$F2,womenrd$F1,"\u028A")
#plots schwa
text(menunrd$F2,menunrd$F1,"\u0259")
text(womenunrd$F2,womenunrd$F1,"\u0259")
#plots male and female symbols; at 75% of default size
text(1365,620,"\u2640",cex=.75)
text(1055,550,"\u2640",cex=.75)
text(1250,440,"\u2642",cex=.75)
text(900,430,"\u2642",cex=.75)
#resulting graph:  uvu_rd_unrd_arrows_vowels_at_endpoints.jpg; looks very cluttered
```



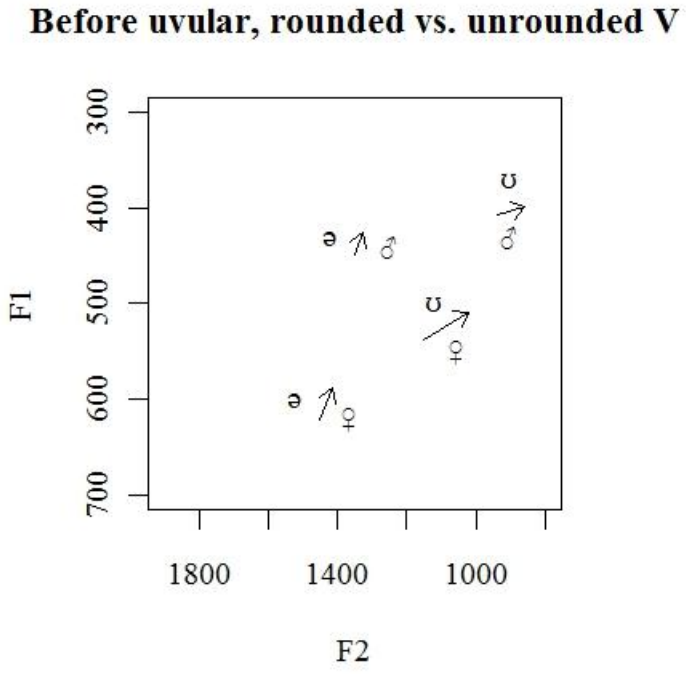

```
#next attempt:  plot vowels beside lines, not at arrow endpoints
windows(w=4,h=4,pointsize=12)
par(family="serif",pty="s",oma=rep(0,4))
menrd=data.frame(read.table("men_rd.txt",header=TRUE,sep="\t"))
womenrd=data.frame(read.table("women_rd.txt",header=TRUE,sep="\t"))
menunrd=data.frame(read.table("men_unrd.txt",header=TRUE,sep="\t"))
```

```
womenunrd=data.frame(read.table("women_unrd.txt",header=TRUE,sep="\t"))
plot(menrd$F2,menrd$F1,xlim=c(1900,800),ylim=c(700,300),xlab="F2",ylab="F1",type="n",mai
    n="Before uvular, rounded vs. unrounded V")
arrows(939,407,862,399,length=.08,angle=35,code=2)
arrows(1350,448,1329,426,length=.08,angle=35,code=2)
arrows(1151,537,1023,509,length=.08,angle=35,code=2)
arrows(1450,621,1415,589,length=.08,angle=35,code=2)
#plots upsilon
text(menrd$F2,menrd$F1,"\u028A",pos=3)
text(womenrd$F2,womenrd$F1,"\u028A",pos=3)
#plots schwa
text(menunrd$F2,menunrd$F1,"\u0259",pos=2)
text(womenunrd$F2,womenunrd$F1,"\u0259",pos=2)
#plots male and female symbols
text(1365,620,"\u2640",cex=.75)
text(1055,550,"\u2640",cex=.75)
text(1250,440,"\u2642",cex=.75)
text(900,430,"\u2642",cex=.75)
#resulting graph:  uvu_rd_unrd_arrows_vowels_beside_endpoints.jpg; still looks cluttered
```

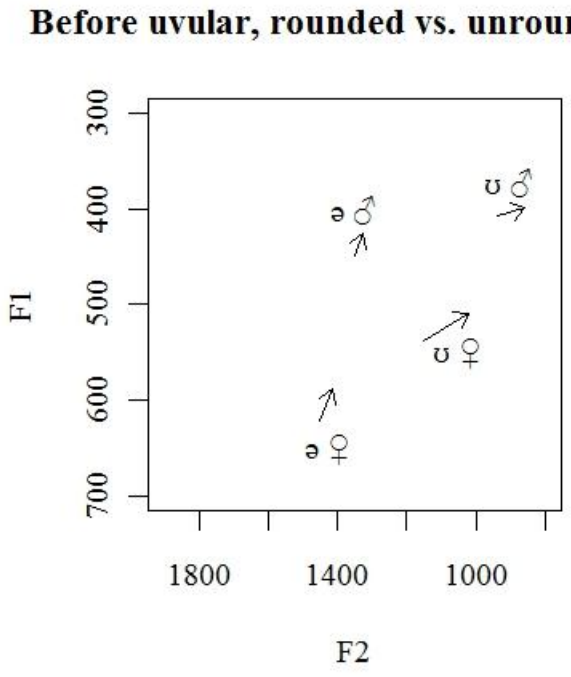



```
#trying single offset vowels beside arrows
windows(w=4,h=4,pointsize=12)
par(family="serif",pty="s",oma=rep(0,4))
```

```
#reading in first data file to get x,y for plot function (although there any two numbers would
    work); nothing is actually plotted
menrd=data.frame(read.table("men_rd.txt",header=TRUE,sep="\t"))
#now no longer makes sense to read in other data files; all numbers typed directly in functions
plot(menrd$F2,menrd$F1,xlim=c(1900,800),ylim=c(700,300),xlab="F2",ylab="F1",type="n",mai
    n="Before uvular, rounded vs. unrounded V")
#plots vowels at endpoints of arrows
arrows(939,407,862,399,length=.08,angle=35,code=2)
arrows(1350,448,1329,426,length=.08,angle=35,code=2)
arrows(1151,537,1023,509,length=.08,angle=35,code=2)
arrows(1450,621,1415,589,length=.08,angle=35,code=2)
#plots upsilon
text(900,370,"\u028A")
text(1120,500,"\u028A")
#plots schwa
text(1420,430,"\u0259")
text(1520,600,"\u0259")
#plots male and female symbols
text(1365,620,"\u2640",cex=.75)
text(1055,550,"\u2640",cex=.75)
text(1250,440,"\u2642",cex=.75)
text(900,430,"\u2642",cex=.75)
#resulting graph:  uvu_rd_unrd_arrows_bothsides.jpg; still looks harder to read than necessary
```

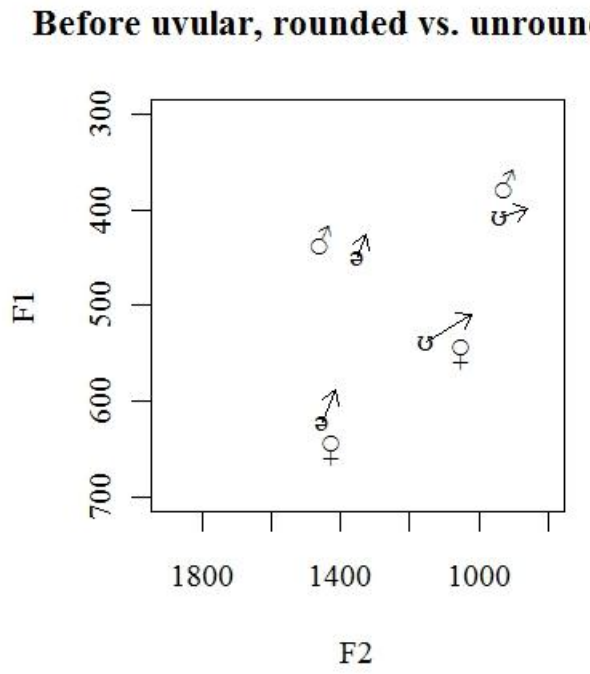


```
#trying single offset vowels grouped with male/female symbols
windows(w=4,h=4,pointsize=12)
par(family="serif",pty="s",oma=rep(0,4))
menrd=data.frame(read.table("men_rd.txt",header=TRUE,sep="\t"))
plot(menrd$F2,menrd$F1,xlim=c(1900,800),ylim=c(700,300),xlab="F2",ylab="F1",type="n",mai
    n="Before uvular, rounded vs. unrounded V")
arrows(939,407,862,399,length=.08,angle=35,code=2)
arrows(1350,448,1329,426,length=.08,angle=35,code=2)
arrows(1151,537,1023,509,length=.08,angle=35,code=2)
arrows(1450,621,1415,589,length=.08,angle=35,code=2)
#plots upsilon-male
text(900,370,"\u028A \u2642")
#plots upsilon-female
text(1050,550,"\u028A \u2640")
#plots schwa-male
text(1350,400,"\u0259 \u2642")
#plots schwa-female
text(1425,650,"\u0259 \u2640")
#resulting graph:  uvu_rd_unrd_arrows_together.jpg; better but male and female symbols look
    bigger than plotted vowels; Richard's suggestion:  plot vowels at arrow tails (only)
```



#arrows, single vowels plotted at arrow tail

```
windows(w=4,h=4,pointsize=12)
par(family="serif",pty="s",oma=rep(0,4))
menrd=data.frame(read.table("men_rd.txt",header=TRUE,sep="\t"))
plot(menrd$F2,menrd$F1,xlim=c(1900,800),ylim=c(700,300),xlab="F2",ylab="F1",type="n",mai
    n="Before uvular, rounded vs. unrounded V")
arrows(939,407,862,399,length=.08,angle=35,code=2)
arrows(1350,448,1329,426,length=.08,angle=35,code=2)
arrows(1151,537,1023,509,length=.08,angle=35,code=2)
arrows(1450,621,1415,589,length=.08,angle=35,code=2)
#plots upsilon (males)
text(939,407,"\u028A")
#plots upsilon (females)
text(1151,537,"\u028A")
#plots schwa (males)
text(1350,448,"\u0259")
#plots schwa (females)
text(1450,621,"\u0259")
#plots male (upsilon)
text(920,370,"\u2642")
#plots female (upsilon)
text(1050,550,"\u2640")
#plots male (schwa)
text(1450,430,"\u2642")
#plots female (schwa)
text(1425,650,"\u2640")
#resulting graph:  uvu_rd_unrd_arrows_vowels_at_tails.jpg; looking better, now can arrows be
    improved upon?
```




```
#arrows drawn with IDPmisc package; first must download (Packages, Install packages...); then
    must load package on starting R(?) (Packages, Load packages)
windows(w=4,h=4,pointsize=12)
par(family="serif",pty="s",oma=rep(0,4))
menrd=data.frame(read.table("men_rd.txt",header=TRUE,sep="\t"))
plot(menrd$F2,menrd$F1,xlim=c(1900,800),ylim=c(700,300),xlab="F2",ylab="F1",type="n",mai
    n="Before uvular, rounded vs. unrounded V")
#note capitalization of function name
Arrows(939,407,862,399,size=.25,width=9)
Arrows(1350,448,1329,426,size=.25,width=9)
Arrows(1151,537,1023,509,size=.25,width=9)
Arrows(1450,621,1415,589,size=.25,width=9)
##plots upsilon (males)
text(939,407,"\u028A")
##plots upsilon (females)
text(1151,537,"\u028A")
##plots schwa (males)
text(1350,448,"\u0259")
##plots schwa (females)
text(1450,621,"\u0259")
##plots male (upsilon)
text(920,370,"\u2642")
##plots female (upsilon)
```

```
text(1050,550,"\u2640")
##plots male (schwa)
text(1450,430,"\u2642")
##plots female (schwa)
text(1425,650,"\u2640")
#resulting plot:  uvu_rd_unrd_arrows_vowels_at_tails_better_arrows.jpg
```