4VCcueweights

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When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:

```r
rm(list = ls())

library(dplyr)
```

```
##
## Attaching package: 'dplyr'

## The following objects are masked from 'package:stats':
##
##     filter, lag

## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

```r
library(reshape2)
library(plyr)
```

```
## -------------------------------------------------------------------------

## You have loaded plyr after dplyr - this is likely to cause problems.
## If you need functions from both plyr and dplyr, please load plyr first, then dplyr:
## library(plyr); library(dplyr)

## -------------------------------------------------------------------------

##
## Attaching package: 'plyr'

## The following objects are masked from 'package:dplyr':
##
##     arrange, count, desc, failwith, id, mutate, rename, summarise,
##     summarize
```

```r
library(ggplot2)
library(gplots)
```

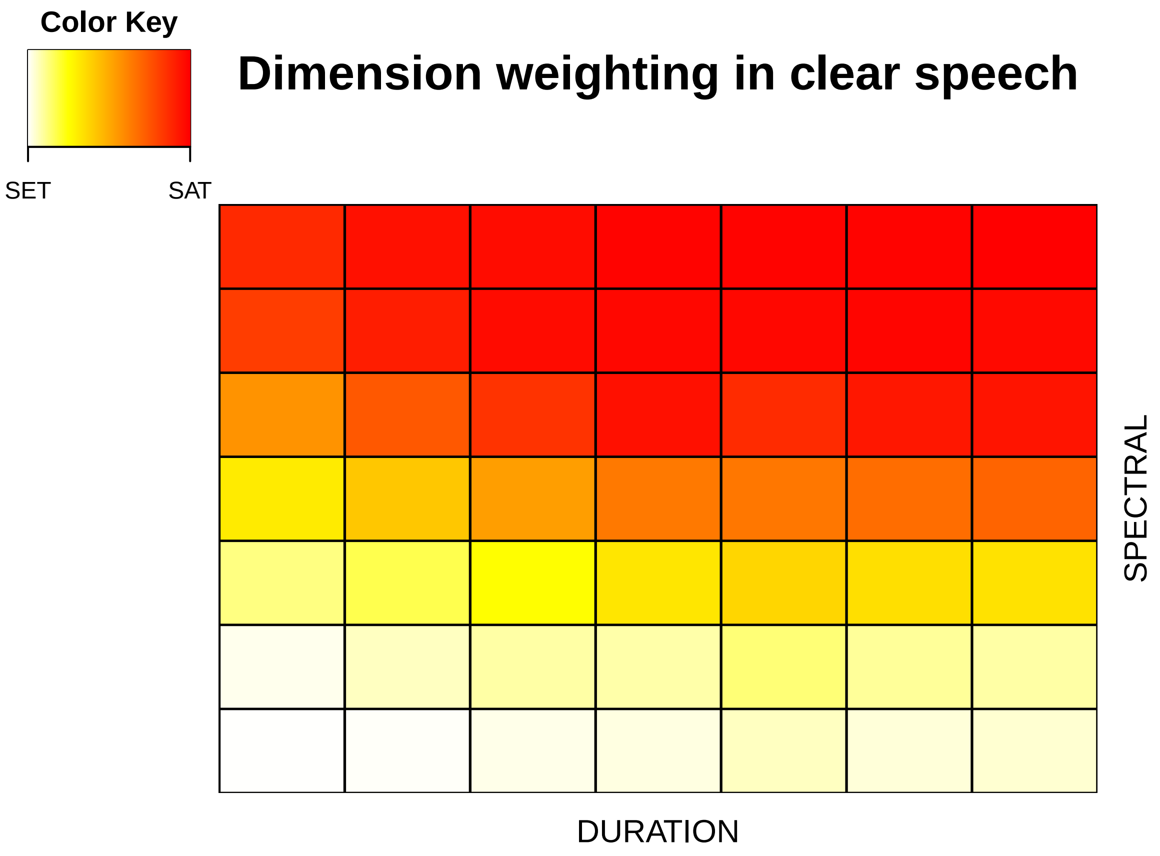
```
##
## Attaching package: 'gplots'

## The following object is masked from 'package:stats':
##
##     lowess
```

```
################set your working directory########################
setwd("/Users/charleswu/Google Drive/HoltLab/VocodingProj/4ChannelCueWeights") #mac
##setwd("C:/Users/charl/Google Drive/HoltLab/VocodingProj/4ChannelCueWeights") #PC

######################################
#####Five general steps in this code#############
####1. read in the data#########
####2. select and sort the variables that you re interested in
####3.construct the matrices for plotting. Note these mat
###rices are not cue weights, but only proportion of responses for visualization
####4.construct the matrices for individual cue weights and plot them
####5.calculate overall cue weights
######################################
###########step 1###################
ddd <- read.csv("Data_final.csv") ###read in the data in the folder
ddd$Subject <- as.factor(ddd$Subject)
ddd$Block <- as.factor(ddd$Block)
ddd$duration <- as.factor(ddd$duration)
ddd$spec <- as.factor(ddd$spec) ###set these factors to categorical because it's generally good for plot

#####step 2##########
d_select <- select(ddd, Subject, Block, response=ImageDisplay2.RESP, StimType, StimCategory, StimSubType
d_order <- d_select[order(d_select$Subject), ]
summary(as.factor(d_order$Subject))
```

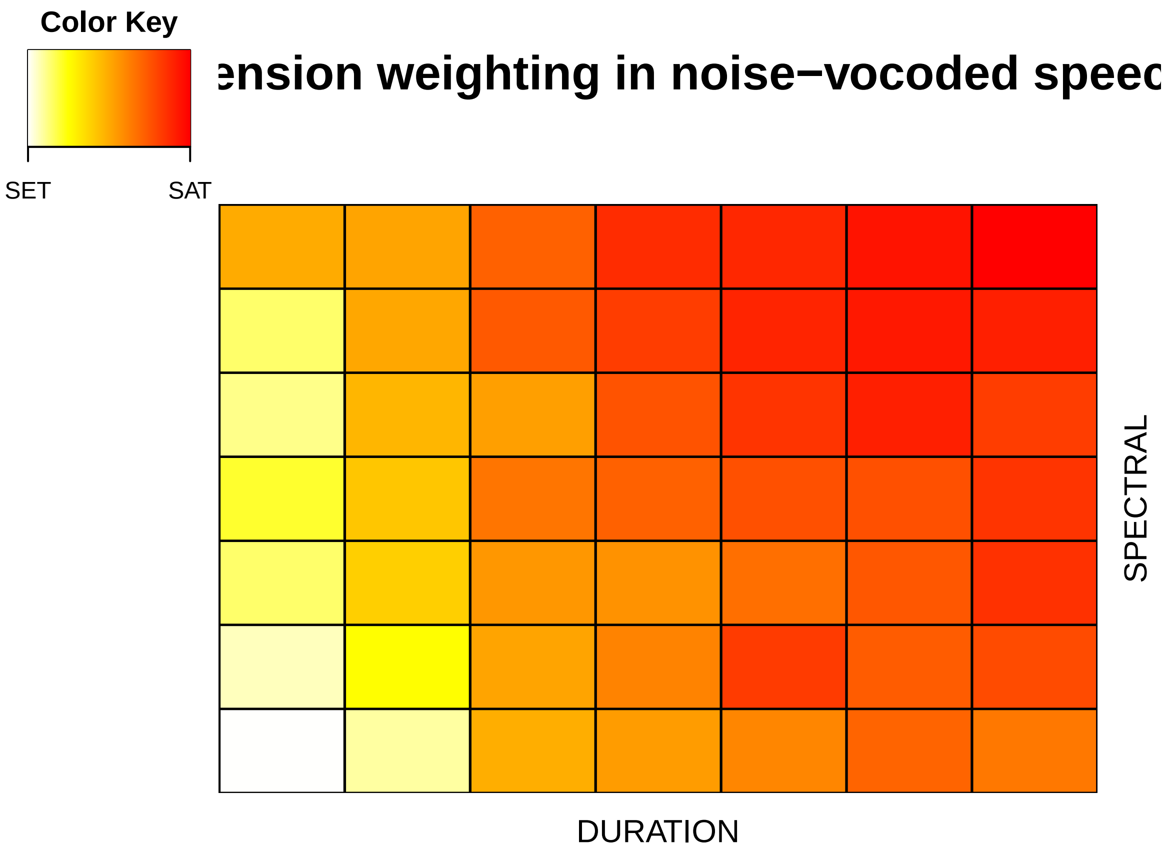
```
##   1   2   3   4   5   6   7   8   9  10  11  12  13  14  16  17  18  19
## 784 784 784 784 784 784 784 784 784 784 784 784 784 784 784 784 784 784
##  20  21  22  23  24
## 784 784 784 784 784
```

```
clear <- ddply(subset(d_order, StimCategory == "Clear"), ~Subject + Block + duration + spec, summarise,

noise <- ddply(subset(d_order, StimCategory == "FourChannel"), ~Subject + Block + duration + spec, summa

########step 3##########
clearMatrix <- NULL#####use an empty matrix and fill it in
#plot the heatmap for the clear first
for (durValue in 1:7) {

  clearMatrixRow <- c(mean(subset(clear, spec==1 & duration==durValue)$perSAT),
                      mean(subset(clear, spec==2 & duration==durValue)$perSAT),
                      mean(subset(clear, spec==3 & duration==durValue)$perSAT),
                      mean(subset(clear, spec==4 & duration==durValue)$perSAT),
                      mean(subset(clear, spec==5 & duration==durValue)$perSAT),
                      mean(subset(clear, spec==6 & duration==durValue)$perSAT),
                      mean(subset(clear, spec==7 & duration==durValue)$perSAT))

  clearMatrix <- rbind(clearMatrix, clearMatrixRow)
}

colnames(clearMatrix) <- c("spec1","spec2","spec3","spec4","spec5","spec6","spec7")
rownames(clearMatrix) <- c("dur1","dur2","dur3","dur4","dur5","dur6","dur7")
```

```
clearMatrix <- t(clearMatrix)#this is different from the noisematrix below because it's filled by dur, s


##draw the heatmap in Ran's way
##will have to make the matrix again to accomodate for the heatmap function

clearMatrix <- NULL

for (specValue in 7:1) {

  meanMatrixRow <- c( mean(subset(clear, duration==1 & spec==specValue)$perSAT) ,
                      mean(subset(clear, duration==2 & spec==specValue)$perSAT),
                      mean(subset(clear, duration==3 & spec==specValue)$perSAT),
                      mean(subset(clear, duration==4 & spec==specValue)$perSAT),
                      mean(subset(clear, duration==5 & spec==specValue)$perSAT),
                      mean(subset(clear, duration==6 & spec==specValue)$perSAT),
                      mean(subset(clear, duration==7 & spec==specValue)$perSAT))

  clearMatrix <- rbind(clearMatrix, meanMatrixRow)

}

heatmap.2(clearMatrix, dendrogram="none", Rowv=FALSE, Colv=FALSE, col=rev(heat.colors(256)), keysize=1.3
          key.xtickfun = function() {
            breaks = pretty(parent.frame()$breaks)
            breaks = breaks[c(1,length(breaks))]
            list(at = parent.frame()$scale01(breaks),
                 labels = c("SET", "SAT"))
          })
```



```
###do the same thing for data in the noise-vocoded condition
noiseMatrix <- NULL

for (specValue in 7:1) {

  meanMatrixRow <- c( mean(subset(noise, duration==1 & spec==specValue)$perSAT) ,
                      mean(subset(noise, duration==2 & spec==specValue)$perSAT),
                      mean(subset(noise, duration==3 & spec==specValue)$perSAT),
                      mean(subset(noise, duration==4 & spec==specValue)$perSAT),
                      mean(subset(noise, duration==5 & spec==specValue)$perSAT),
                      mean(subset(noise, duration==6 & spec==specValue)$perSAT),
                      mean(subset(noise, duration==7 & spec==specValue)$perSAT))

  noiseMatrix <- rbind(noiseMatrix, meanMatrixRow)

}

heatmap.2(noiseMatrix, dendrogram="none", Rowv=FALSE, Colv=FALSE, col=rev(heat.colors(256)), keysize=1.3
          key.xtickfun = function() {
            breaks = pretty(parent.frame()$breaks)
            breaks = breaks[c(1,length(breaks))]
            list(at = parent.frame()$scale01(breaks),
                 labels = c("SET", "SAT"))
          })
```

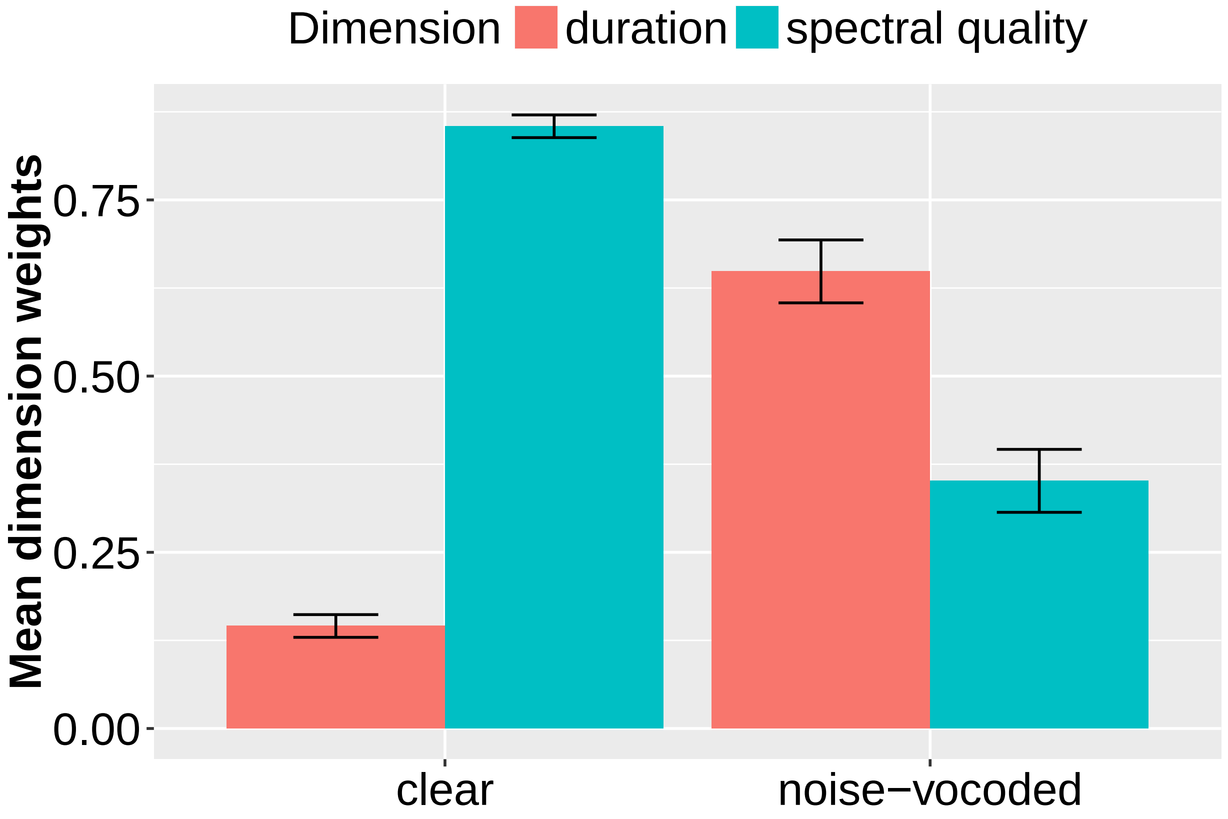


```
########step 4#########
###IMPORTANT: When you do this analysis, make sure that the variables are not factors and they have to
###for the cue weights, calculate individual cue weights first
###and then take the average to represent the overal cue weights

##here I will just re-read the data for simplicity reasons, even though this might not be the smartest
rm(list = ls())
ddd <- read.csv("Data_final.csv")
d_select <- select(ddd, Subject, Block, response=ImageDisplay2.RESP, StimType, StimCategory, StimSubTyp
d_order <- d_select[order(d_select$Subject), ]
summary(as.factor(d_order$Subject))
```

```
##   1   2   3   4   5   6   7   8   9  10  11  12  13  14  16  17  18  19
## 784 784 784 784 784 784 784 784 784 784 784 784 784 784 784 784 784 784
##  20  21  22  23  24
## 784 784 784 784 784
```

```
clear <- ddply(subset(d_order, StimCategory == "Clear"), ~Subject + Block + duration + spec, summarise,

noise <- ddply(subset(d_order, StimCategory == "FourChannel"), ~Subject + Block + duration + spec, summa

clearCWMatrix = NULL
for (subid in 1:24){
  if (subid == 15) ##have to skip 15 for now because we don't have the data, only specific to my study
    next
  dur <- subset(clear, Subject == subid)
```

```r
  cw <- lm(perSAT~duration + spec, dur)
  sum <- abs(round ( as.numeric (cw$coefficients[2]), digits = 3)) + abs( round ( as.numeric (cw$coeffi
  iddur <-  abs(round ( as.numeric (cw$coefficients[2]), digits = 3))/sum
  idspec <- abs(round ( as.numeric (cw$coefficients[3]), digits = 3))/sum
  clearCWMatrix <- rbind(clearCWMatrix, c(Subject = subid, iddur, idspec))
}
clearCWMatrix <- data.frame (clearCWMatrix)
colnames(clearCWMatrix) <- c("Subject","cleardurweights", "clearspecweights") ###label the column names

noiseCWMatrix = NULL
for (subid in 1:24){
  if (subid == 15)
    next
  dur <- subset(noise, Subject == subid)
  cw <- lm(perSAT~duration + spec, dur)
  sum <- abs(round ( as.numeric (cw$coefficients[2]), digits = 3)) + abs(round ( as.numeric (cw$coeffic
  iddur <- abs(round ( as.numeric (cw$coefficients[2]), digits = 3))/sum
  idspec <-abs(round ( as.numeric (cw$coefficients[3]), digits = 3))/sum
  noiseCWMatrix <- rbind(noiseCWMatrix, c(Subject = subid, iddur, idspec))
}
noiseCWMatrix <- data.frame (noiseCWMatrix)
colnames(noiseCWMatrix) <- c("Subject","noisedurweights", "noisespecweights") ###label the column names

##plot histogram for the average cue weights with the error bars indicating standard error
cwmat <- melt(join(clearCWMatrix, noiseCWMatrix, by = "Subject"), id.vars = "Subject") #melt the cue we
cwmat[, 4] <- rep(c("clear", "noise-vocoded"), c(length(clearCWMatrix$Subject)*2, length(clearCWMatrix$S
cwmat[, 5] <- rep(c("duration", "spectral quality"), c(length(clearCWMatrix$Subject), length(clearCWMatr
colnames(cwmat) <- c("Subject", "whole", "value", "condition", "Dimension")
sum <- ddply(cwmat, ~condition + Dimension, summarise, mean = mean(value), sd = sd(value), n = length(Su

a = 17
ggplot(sum, aes(x = condition, y = mean, fill = Dimension)) +
  geom_bar(stat = "identity", position = position_dodge()) +
  geom_errorbar(aes(ymin = mean-se, ymax = mean + se), pos = position_dodge(0.9), width = 0.35) +
  labs(x = NULL, y = "Mean dimension weights") +
  theme(legend.text=element_text(size=a), legend.title=element_text(size = a), axis.title=element_text(
```



```
########step 5#############
noise <- ddply (subset(d_order, StimCategory == "FourChannel"), ~Subject + duration + spec, summarise,
noiselm <- lm(perSAT ~ duration + spec, noise)
noise_corr_DurPre = round( as.numeric(noiselm$coefficients[2]) , digits=3)
noise_corr_SpecPre = round( as.numeric(noiselm$coefficients[3]) , digits=3)
noise_SUM_Pre = noise_corr_DurPre + noise_corr_SpecPre
noise_corr_DurPre_NORM = round( noise_corr_DurPre / noise_SUM_Pre , digits=3)
noise_corr_SpecPre_NORM = round( noise_corr_SpecPre / noise_SUM_Pre , digits=3)

clearlm <- lm(perSAT ~ duration + spec, clear)
clear_corr_DurPre = round( as.numeric(clearlm$coefficients[2]) , digits=3)
clear_corr_SpecPre = round( as.numeric(clearlm$coefficients[3]) , digits=3)
clear_SUM_Pre = clear_corr_DurPre + clear_corr_SpecPre
clear_corr_DurPre_NORM = round( clear_corr_DurPre / clear_SUM_Pre , digits=3)
clear_corr_SpecPre_NORM = round( clear_corr_SpecPre / clear_SUM_Pre , digits=3)
summary(cars)
```

```
##      speed           dist       
##  Min.   : 4.0   Min.   :  2.00  
##  1st Qu.:12.0   1st Qu.: 26.00  
##  Median :15.0   Median : 36.00  
##  Mean   :15.4   Mean   : 42.98  
##  3rd Qu.:19.0   3rd Qu.: 56.00  
##  Max.   :25.0   Max.   :120.00  
```