

Procedure for extracting tones from Praat to txt file, normalizing in R, exporting to Excel

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Note: Screenshots of this procedure are given on pages 84-94 of the PDF titled “NWAVAP sociotonetics workshop”

1. Install R. It's a free download: www.r-project.org

2. Paste the following code into R and press Enter.

```
tone.normal.smt <- function (x, y) {
  sac <- smooth.and.chop(x)
  z <- c()
  zz <- c()
  #Calculate the person's mean T3 in semitones
  smtn.mean <- 12*(log(y/100)) / log(2)
  temp.mean <- rep(smtn.mean, 390)
  zz <- sac$pitch
  #Convert tone track to semitones
  smtn <- 12*(log((zz)/100)) / log(2)
  #subtract the person's mean T3 in semitones from the semitone version of the tone track
  z$pitch <- smtn - temp.mean
  z$time <- sac$time
  return(z)
}
smooth.and.chop <- function(x) {
  leng <- length(smooth(x)$pitch)
  y <- smooth(x)
  z <- y[151:(leng-60)]
  z$pitch <- y$pitch[151:(leng-60)]
  z$time <- y$time[151:(leng-60)]
  return (z)
}
smooth <- function(x) {
  i <- length(x$pitch)
  #The index i counts from the number of raw data points, i.e., length(x$pitch),
  #down to zero.
  n <- 600

  #Initialize the new tone track table
  newx <- c()
```

```

newx$time <- c()
newx$pitch <- c()
newx$pitch[600] <- x$pitch[length(x$pitch)]
#Calculate the time interval between each of the raw points
# (This will be 0.01 sec in the current type of data being used)
raw.interval <- (max(x$time)-min(x$time))/(length(x$time)-1)
#Calculate the time interval between each of the 600 new points
time.interval <- (max(x$time)-min(x$time))/600
#Initialize the time marker
current.time <- 0
#Now build the new tone track, piece by piece
while (n > 0) {
#First calculate local slope (slope between closest two raw data points)
if (i==0) {i <- 1}
local.slope <- diff(x$pitch)[i-1] / raw.interval
if (i==1) {local.slope <- diff(x$pitch)[1] / raw.interval}
newx$time[n] <- n-1
#Then assign the appropriate pitch to the given time point
newx$pitch[n] <- x$pitch[i] - local.slope*(current.time)
#Check to see if it's time to move on to the next i yet
if (current.time > (raw.interval-time.interval)) {
i = i - 1
current.time = 0
}
current.time <- current.time + time.interval
n = n-1
}
return(newx)
}

```

3. Install Praat (free download)

<http://www.fon.hum.uva.nl/praat/>

4. Select a token. Then use Praat to show the pitch listing, and save the pitch listing as a .txt file on your computer.

In the txt file, change “Time_s” to “time” and change “Fo_Hz” to “pitch”.

In R, enter the following command (this will import your data to R):
datafile <- read.table(file.choose(),header=T)(This makes a user-friendly interface for getting data into R)

By the way, if you have a comma-delimited file (such as an Excel file save in CSV format), then use: `datafile <- read.table(file.choose(),header=T,sep=",")`

Now name the file in R: `mytoken <- datafile`

5. You're now ready to normalize the token in R. Use the following command. Note that you'll want to replace "180" with the mean F0 for your speaker (in hertz). In this example, the speaker had a mean F0 of 180 Hz.

```
mytoken.normalized <- tone.normal.smt(mytoken, 180)
```

The above R command runs the function *tone.normal.smt*, which normalizes the data. Note: The input to *tone.normal.smt* is the raw txt file being normalized plus the speaker's mean midpoint (in Hz). The output of *tone.normal.smt* is a file with two columns (time and pitch) which is normalized for pitch, converted to semitones, and trimmed to avoid edge effects (i.e., the output begins at 25% of the original syllable duration and ends at 90% of the original syllable duration; Stanford 2008:420-21).

6. Now export the normalized data from R to Excel. Note that the file name and address will depend on where you want the file to be located on your own computer. An example address is given here.

Type the following command in R, using an appropriate file address on your computer:

For Mac:

```
write.table(mytoken.normalized, file = "/Users/jamesstanford/Jim's stuff/NWAV Asia-Pacific/NWAVAP sociotonetics workshop/test.csv", sep=",", row.names=F)
```

For PC:

```
write.table(mytoken.normalized, file="C:\\Users\\Owner\\Desktop\\trip files NZ-India 2011\\NWAV Asia-Pacific\\NWAVAP sociotonetics workshop\\testing.csv",sep=",",row.names=F)
```

Note:

`sep=","` makes it a comma-delimited file

`row.names=F` keeps the csv file from including an extra column with only index numbers

Finished! You now can open this csv file in Excel and use it for regular analysis in Excel or whatever statistical package you prefer.

Appendix: Other useful procedures

--Importing a txt file into Excel: In Mac Excel 2008, Data, Get external Data, Import, then choose "fixed width"

--Transferring from Praat directly to Excel: Show pitch listing, copy the data, paste into Excel, then highlight one column, Data-Text to Columns-Fixed width.