

# AUDL GS08 & GAV1: Auditory Perception: Laboratory session

## Energetic & informational masking for speech-in-noise perception

### Introduction

Many factors are important in determining the extent to which background sounds interfere with the perception of a particular target talker. In this laboratory session, you will be performing a speech-in-noise task with a wide variety of maskers, consisting both of plain 'noisy' sounds, as well as other speech.

### Materials

You will use software that adaptively measures the *Speech Reception Threshold* (SRT), which is the *signal-to-noise ratio* (SNR) that allows a certain level of performance (here 50%) on a closed-set speech identification task. Better performance is indicated by *lower* numbers, because lower numbers mean more noise and less speech can be tolerated.

On every trial, you will hear a sentence of the type 'Show the dog where the [colour] [digit] is' where 6 colours and 8 digits are possible (e.g., *Show the dog where the red 6 is*). You will then click on one of 48 response boxes. The SNR will be adjusted on the basis of your performance. Feedback will be given in the form of a smiley or sad face. The target signals are always the same, spoken by an adult female, but there are 5 different masking conditions. In 3 of those conditions, the masking talkers will be saying a similar sentence (e.g., *Show the pig where the blue 2 is*). You try to ignore the other talker(s). The target talker will always say *Show the dog ...* Here are the 5 conditions:

masker	condition code
steady-state speech-spectrum-shaped noise (SSSN)	Nz
SSSN amplitude modulated at 10 Hz with a square wave	NzAM
one male talker	1M
two male talker	2M
two female talkers	2F

### Method

This experiment needs to be done singly. Look on PC where you are sitting for its number, ranging from PC183-61 to PC200-61. The 3-digit number following 'PC' is your listener number, which you need. You will first run a practice session consisting of 5 trials in each masker condition, just to familiarise you with the task and stimuli.

In order to run the program, click on the **Computer** icon on the desktop, which will open a window that will show the network location **Temp\_Data**. Double-click on that and then navigate to **/Temp\_Data/CCRM-AUDLGS08-GAV1**. Double-click on the file **Practice.m** and it will open up Matlab, and this small program will appear in the edit window:  
`runCCRMseq('practice', 'P02.csv')`

You start the program by clicking on 'Run' in the toolbar. You will then get instructions about what to do. Once you finish the 5 parts of the practice session, open the appropriately numbered file into Matlab (i.e., if your listener number is 187, load the file **L187.m**). Run that as you did before, and fill in the listener identification information. You will then see a set of instructions. Each test is preceded by a short practice session.

Run yourself through the 5 conditions. There is no point in trying to think too hard about the response when you are not sure. Go with your initial impulse.

### **Observations**

Your results files can be found under **My Documents\GS08GAV1Results**. There are two files generated for each test, both of them being .csv files which can be opened in Excel. One of them has the trial-by-trial record of the test (similar to the files you analysed from SHaPS, when you measured frequency selectivity and gap detection), and the other some summary values. You probably only need to look at the summary files (indicated by ‘\_sum’ in the name) but feel free to look at the other files. The file names indicate the listener characteristics, the targets (which are always the same in this lab), which masker was used, and the time of the test, for example:

MM\_18-11-1928\_M\_3FTargets\_6FFmaskers\_11-Dec-2015\_10-57-37\_sum.csv

The crucial outcome parameter is labelled *uLevs*, which is the mean of the levels visited in the adaptive track (once the final step size has been reached).

masker condition	SRT
Nz	
NzAM	
1M	
2M	
2F	

### **Things to think about**

Thinking first about the two noise conditions, which of them led to the best performance? Why do you think this was?

Thinking now about the 3 maskers involving speech, which was the best and which the worst? What factors contributed to this pattern of results? What aspects of the masking signals govern the degree of similarity between the maskers and the target?

Comparing only the SRTs for steady-state noise and the single male talker, what properties of these two signals might account for the pattern of results?