

# BSc Audiology & MSc Audiological Science

## AUDL 4007: Auditory Perception

### Laboratory session on notch noise masking

#### Introduction

A popular way to estimate auditory filter shapes is based on the technique of notch noise masking. Here, the threshold of a sinusoidal probe tone is determined for a number of flat-spectrum noises that differ only in the width and position of a spectral notch. In this lab, you will measure your threshold for a 2 kHz sinusoid for 3 different notch conditions. One of these is a no-notch condition, hence a band of noise spanning 400-3600 Hz. The two others all have symmetric notches:

Condition	$g$	low band edge	low notch edge	high notch edge	high band edge	threshold (SNR dB)
<i>no notch</i>	0.00	400	-	-	3600	
	0.15	400	1700	2300	3600	
	0.30	400	1400	2600	3600	

#### Method

You will be using an adaptive technique in a three-interval, three-alternative forced-choice (3I-3AFC) format as implemented in a computer program known as *SHaPS*. The tone will be easy to hear at the beginning of the test, and its level will be modified in accordance with how well you are doing in detecting it. Once you have started *SHaPS*, right click the mouse and select *Session* to get started. Enter your details and select a notch condition by choosing one of the following specification files: Notch0.txt, Notch15.txt or Notch3.txt. Clicking on 'Documents' on the sidebar may make these files easier to find. The digits indicate the  $g$  value of the particular notch condition (0.0, 0.15 and 0.3). More detailed instructions can be found over the page.

#### Observations

Run yourself on all 3 conditions in whatever order you like. You will then use a special program called *Rshell* to inspect the results. Again, right click to start *Rshell*. After you do the analysis, this will show you both the adaptive track as well as summary statistics. Your threshold will be found at the bottom of the page (the column labelled *uRevs*) and in the figure of the adaptive track (mean level). Enter this number in the appropriate place in the table above. Plot your SNR as a function of  $g$ , the normalised notch width:

$$g = |(f - f_c)|/f_c$$

where  $f$  is the frequency of the notch edge, and  $f_c$  is the frequency of the probe, or the centre frequency of the filter being measured.

Look carefully at the adaptive track to see if you can figure out what it is showing.

Your results files can be independently accessed in the lab folder.

## Commands for using SHaPS

1. Start SHaPS
2. Right click mouse → Session
3. Enter a name and code. Ensure there are no spaces in the code
4. Pick a notch condition by selecting an appropriate text file
5. On the display of stimulus parameters: Options → Confirm
6. Run the test(s)
7. For the analyses: Right click mouse → RShell
8. Right click mouse → Choose a script  
navigate to the directory:  
C:\Users\B07\_Lab\Documents\AUDL4007 notched-noise\\*.R
9. Right click mouse → Choose one or more data files  
navigate to the directory:  
C:\Users\B07\_Lab\Documents\AUDL4007 notched-noise\Results\YourCode