Psychology of Perception
Psychology 4165-100
Spring 2008

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MUEN D156, 09:30–10:45 TR

Homework 9: Speech Perception
10 Points: Due at the beginning of class, Thursday, 17 April 2008

There are two parts to this homework assignment. Each part counts 5 points. Late homework will receive a grade of zero.

Part 1:

Vowel sounds are characterized by frequency regions that have relatively more energy than neighboring frequencies. These local maxima are called formants. Each vowel has up to six formants but the first two are usually sufficient to allow a listener to distinguish one vowel form another. Below is a table modified from Wikipedia that gives the frequencies of the first and second formants of nine vowels (http://en.wikipedia.org/wiki/Formant)

	Vowel	Formant f_1	Formant f_2
1	**u**	**320 Hz**	**800 Hz**
2	o	500 Hz	1000 Hz
3	**œ**	**700 Hz**	**1150 Hz**
4	**a**	**850 Hz**	**1400 Hz**
5	ø	500 Hz	1500 Hz
6	y	320 Hz	1650 Hz
7	**æ**	**700 Hz**	**1800 Hz**
8	**e**	**500 Hz**	**2300 Hz**
9	**i**	**320 Hz**	**2500 Hz**

Plot the position of each vowel in a graph with f_1 on the horizontal axis and f_2 on the vertical. Use these limits for the x- and y-axes: xlim = c(250, 900), ylim = c(600, 2800). Label each point with the corresponding vowel. Hint: in the plot command if you set the plot character to be a series of characters, each character will be used in order. For example pch=c("a", "b", "c")) will cause the points to be labeled a, b, and c in succession. See if you can draw an enclosing polygon using the six vowels that are in bold

Part 2:

If you consider the vowel plot a perceptual space, which two vowels would be easiest to discriminate and which would be the most difficult? Explain your reasoning.