

Homework Assignment 3 - 10 Points
Due at beginning of class, Thursday, 10 February 2011

There are two parts to this homework assignment. Each part counts 5 points. Late homework will receive a grade of zero. Your homework must be typed, not handwritten. Graphs must be prepared with computer software, not hand-drawn.

Part 1:

Susan Schiffman investigated the relationships among 12 odorants by asking subjects to rate how similar pairs of the odorants were to each other. She computed a 2D multidimensional scaling solution from the similarity judgments (odorants judged similar to each other are close together; those judged dissimilar are far apart). The dimension 1 and dimension 2 coordinates of the 2D scaling solution for the 12 odorants are given in the table below.

"Odorant"	"Dim_1"	"Dim_2"	"Weight"	"Shape"	"Hedonic"
"Camphor"	-0.788	3.89	9.919	3.662	6.03
"Cinnamon"	-2.98	1.645	19.97	1.538	8.276
"Clove"	-2.266	4.517	12.39	3.032	7.265
"Eucalyptus"	-3.719	1.671	4.289	3.49	8.338
"Feces"	3.227	2.611	6.348	4.761	1.678
"Lemon"	-1.675	-1.227	15.53	4.484	6.775
"Menthol"	-1.059	1.932	6.354	2.818	6.257
"Rotten_Eggs"	3.99	-3.577	6.544	1.121	1.15
"Turpentine"	-0.788	-3.812	5.424	4.45	6.261
"Sweaty_Socks"	2.143	0.339	18.99	3.559	2.764
"Vanilla"	-4.212	-0.47	14.53	4.965	9.417
"Vinegar"	2.069	-0.313	4.432	2.175	3.456

Make a square graph of the points in the 2D space. Set the limits of the x and y axes to range from c(-5,5). Label each of the points with the corresponding odorant name. (hint: use the text() command in R to add text to a graph). This graph is easily done by putting the data columns into vectors using c() and making a script of the R-code. Ask for help.

Part 2:

To help interpret the meaning of dimensions 1 and 2, three additional characteristics of the odorants are given above: the relative weight of the molecule (Weight), the shape of the molecule (Shape) and the rated pleasantness of the odor (Hedonic) on a scale from 0 (very unpleasant) to 10 (very pleasant). Do either dimensions 1 or 2 correspond to any of these three qualities? Explain your conclusion.