Lewis O. Harvey, Jr.–Instructor
Steven M. Parker –Assistant
9:30–10:45 TR

Homework Assignment 5 - 10 Points
Due at beginning of class, Thursday, 19 March 2015

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 (1974) investigated the relationships among odorants using judgments of how dissimilar each pair of odorants were to each other. A two-dimensional multidimensional scaling solution from the judgments was computed (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 12 of the odorants are given in the table below.

Odorant	D1	D2	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 -5 to 5. Label each of the points with the corresponding odorant name. This graph is easily created by first making a data frame containing the above data columns and then using the plot() and text() functions. Ask us 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.

Schiffman, S. S. (1974). Physicochemical Correlates of Olfactory Quality. *Science, 185*(4146), 112-117. doi: 10.1126/science.185.4146.112