

Interpreting MDS Scaling Solutions Using Regression and Clustering

Preparing the Attribute Rating Data

Each person's rating of each stimulus on each attributes is entered into the program below

```
data list free/ subn age
smooth1 smooth2 smooth3 smooth4 smooth5 smooth6 smooth7
  smooth8 smooth9 smooth10 smooth11 smooth12 smooth13
  smooth14 smooth15 smooth16 smooth17
hard1 hard2 hard3 hard4 hard5 hard6 hard7
  hard8 hard9 hard10 hard11 hard12 hard13
  hard14 hard15 hard16 hard17
slipp1 slipp2 slipp3 slipp4 slipp5 slipp6 slipp7
  slipp8 slipp9 slipp10 slipp11 slipp12 slipp13
  slipp14 slipp15 slipp16 slipp17
flat1 flat2 flat3 flat4 flat5 flat6 flat7
  flat8 flat9 flat10 flat11 flat12 flat13
  flat14 flat15 flat16 flat17
warm1 warm2 warm3 warm4 warm5 warm6 warm7
  warm8 warm9 warm10 warm11 warm12 warm13
  warm14 warm15 warm16 warm17.

begin data.
24 1
62 18 07 64 61 55 22 06 83 87 87 66 45 43 36 18 10 ← ratings on 100-point scale
47 04 40 59 47 84 64 07 70 85 75 72 59 15 84 48 25
44 39 07 44 52 41 23 08 68 84 87 38 39 28 40 25 39
23 16 06 56 47 26 28 06 21 86 88 19 33 05 10 25 06
53 22 57 55 29 30 27 49 23 07 09 69 36 49 61 44 85

. . . . .
22 1
60 57 56 54 45 52 01 58 68 73 49 38 38 62 03 26 02
09 01 66 61 82 87 69 60 16 09 89 17 32 11 87 46 04
67 47 35 55 57 47 17 56 61 75 46 47 44 35 45 33 21
54 30 37 55 54 55 10 72 33 84 18 57 62 51 17 31 08
45 44 50 45 46 37 47 38 41 45 43 45 45 72 44 47 46

descriptives smooth1 to warm17. ← computes mean for each attribute rating
                                or each stimulus
```

Assembling the attribute ratings (averages) and mds solution coordinates for the interpretational analyses

data list free/ smooth hard slippery flat warm dim1 dim2 dim3.

```
begin data.
54 40 55 47 54   -.421  .614 -1.12  ← Each "case" is a stimulus
72 05 63 63 66   -1.13  1.236 -.617
30 56 38 22 50   1.416  .610  .554
52 58 54 54 46    .716  .442  1.539
.   .   .   .   .   .   .   .
14 12 17 15 73    .848  -.460 -1.47
end data.
```

Dimensional interpretation using multiple regression

```
regression variables = smooth d1 d2 d3  ← interpretative regressions use each attribute
/dependent = smooth                    as a criterion, and the solution coordinates
/enter d1 d2 d3.                       as the predictors.
```

```
regression variables = hard d1 d2 d3    If there are "many" attributes, they might
/dependent = hard                       be factored, and the factor scores used.
/enter d1 d2 d3.
```

SPSS Output

```
Multiple R          .95130
R Square            .90497
```

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	3	.86187	.28729
Residual	13	.09051	.00696

F = 41.26436 Signif F = .0000

----- Variables in the Equation -----

Variable	B	SE B	Beta	T	Sig T
D3	.048005	.021166	.193943	2.268	.0410
D2	.123270	.020300	.221999	6.073	.0000
D1	-.162916	.019574	-.715574	-8.323	.0000
(Constant)	.441120	.020237		21.798	.0000

←use β-values to plot attribute vectors

```
Multiple R          .88534
R Square            .78383
Adjusted R Square   .73394
Standard Error      .13740
```

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	3	.88994	.29665
Residual	13	.24544	.01888

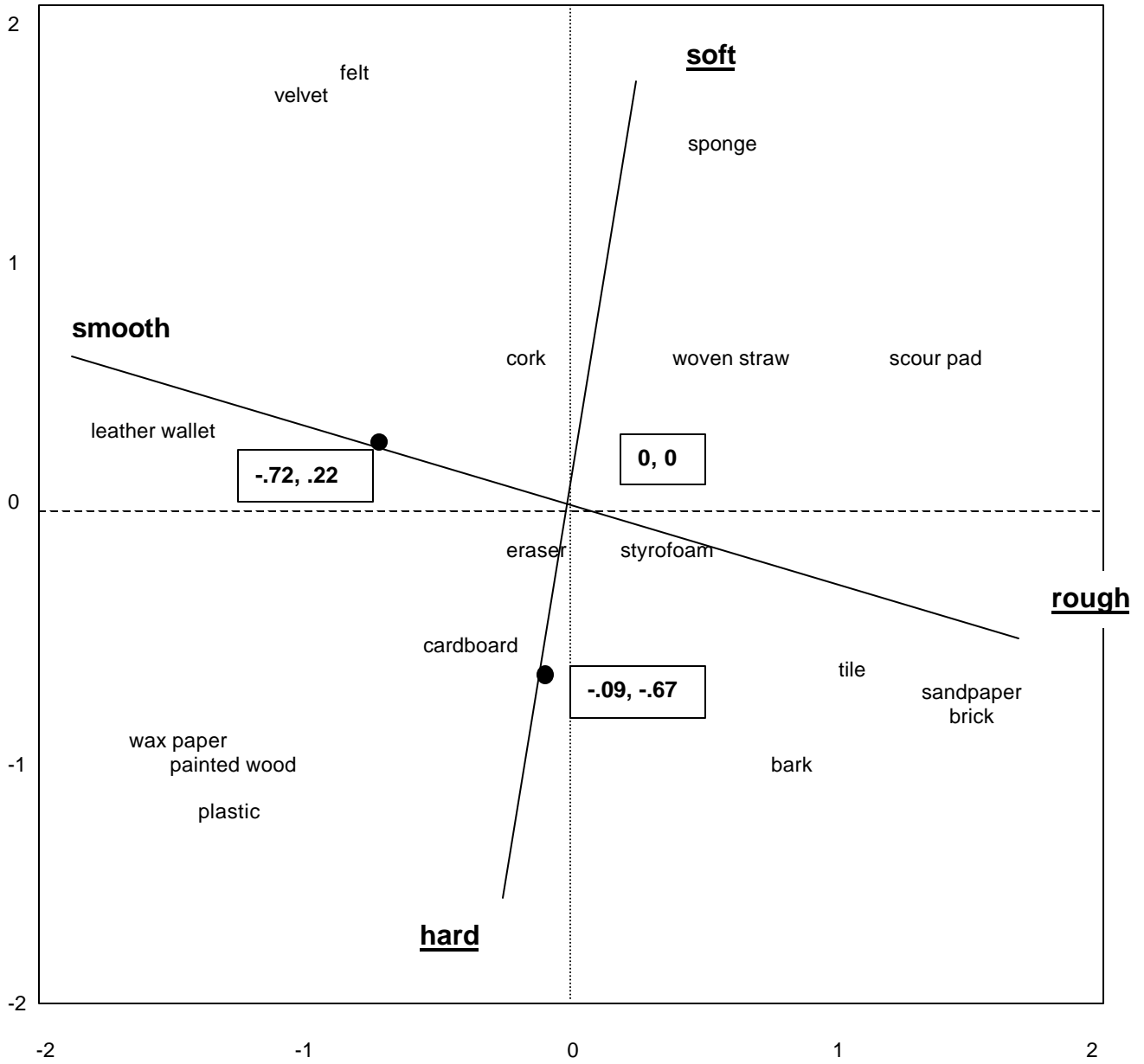
F = 15.71222 Signif F = .0001

----- Variables in the Equation -----

Variable	B	SE B	Beta	T	Sig T
D3	.148882	.034856	.550888	4.271	.0009
D2	-.172816	.033428	-.670242	-5.170	.0002
D1	.033442	.032233	-.094529	1.038	.3184
(Constant)	.511159	.033325		15.338	.0000

←use β-values to plot attribute vectors

Adding the "attribute vectors" to the MDS scaling solution



Dimension 1 - horizontal
Dimension 2 - vertical

Neighborhood interpretation using clustering

cluster d1 d2 d3 / plot dendrogram. ← remember, are clustering mdscaling coordinates

SPSS Output

Agglomeration Schedule using Average Linkage (Between Groups)

Stage	Clusters Cluster 1	Combined Cluster 2	Coefficient	Stage Cluster Cluster 1	1st Appears Cluster 2	Next Stage
1	6	15	.070230	0	0	16
2	4	5	.102416	0	0	5
3	8	16	.122388	0	0	8
4	9	14	.150708	0	0	7
5	4	13	.182234	2	0	9
6	10	12	.240882	0	0	12
7	2	9	.251981	0	4	10
8	8	17	.284126	3	0	11
9	3	4	1.277068	0	5	14
10	1	2	1.282823	0	7	13
11	7	8	2.135605	0	8	14
12	10	11	3.016181	6	0	13
13	1	10	4.310026	10	12	15
14	3	7	6.801044	← "too few" 9	11	15
15	1	3	7.769951	13	14	16
16	1	6	8.301203	15	1	0

Dendrogram using Average Linkage (Between Groups)

