The one-ten data

March 8, 2011

The data:

```
en 0 2 2  7 6  6   6  6  7  9 9
no 2 0 1  5 4  6   6  6  7  8 9
dk 2 1 0  6 5  6   5  5  6  8 9
nl 7 5 6  0 5  9   9  9 10  8 9
de 6 4 5  5 0  7   7  7  8  9 9
fr 6 6 6  9 7  0   2  1  5 10 9
es 6 6 5  9 7  2   0  1  3 10 9
it 6 6 5  9 7  1   1  0  4 10 8
pl 7 7 6 10 8  5   3  4  0 10 9
hu 9 8 8  8 9  10 10 10 10  0 8
sf 9 9 9  9 9  9   9  8  9  8 0
```

The SAS code and output:

```
data lang(type=distance);
        infile "one-ten.dat";
        input lang $ en no dk nl de fr es it pt hu sf;

proc print;

proc cluster method=single outtree=tree;
  id lang;

proc tree horizontal;
  id lang;
```

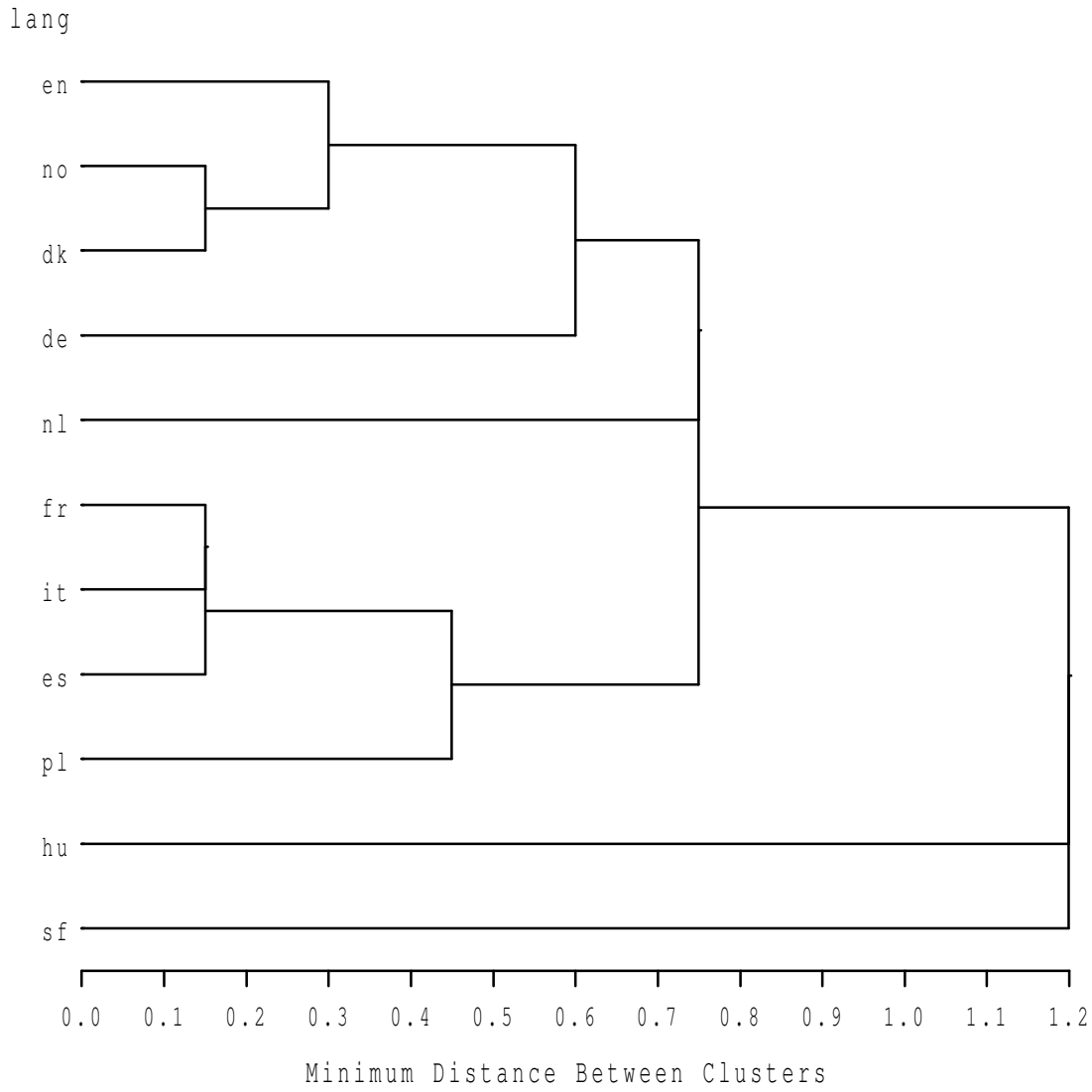
Obs	lang	en	no	dk	nl	de	fr	es	it	pt	hu	sf
1	en	0	2	2	7	6	6	6	6	7	9	9
2	no	2	0	1	5	4	6	6	6	7	8	9
3	dk	2	1	0	6	5	6	5	5	6	8	9
4	nl	7	5	6	0	5	9	9	9	10	8	9
5	de	6	4	5	5	0	7	7	7	8	9	9
6	fr	6	6	6	9	7	0	2	1	5	10	9
7	es	6	6	5	9	7	2	0	1	3	10	9

8	it	6	6	5	9	7	1	1	0	4	10	8
9	pl	7	7	6	10	8	5	3	4	0	10	9
10	hu	9	8	8	8	9	10	10	10	10	0	8
11	sf	9	9	9	9	9	9	9	8	9	8	0

The CLUSTER Procedure
Single Linkage Cluster Analysis
Mean Distance Between Observations 6.672727

Cluster History

NCL	--Clusters Joined---		FREQ	Norm Min Dist	Tie
10	no	dk	2	0.1499	T
9	fr	it	2	0.1499	T
8	CL9	es	3	0.1499	
7	en	CL10	3	0.2997	
6	CL8	pl	4	0.4496	
5	CL7	de	4	0.5995	
4	CL5	nl	5	0.7493	T
3	CL4	CL6	9	0.7493	
2	CL3	hu	10	1.1989	T
1	CL2	sf	11	1.1989	

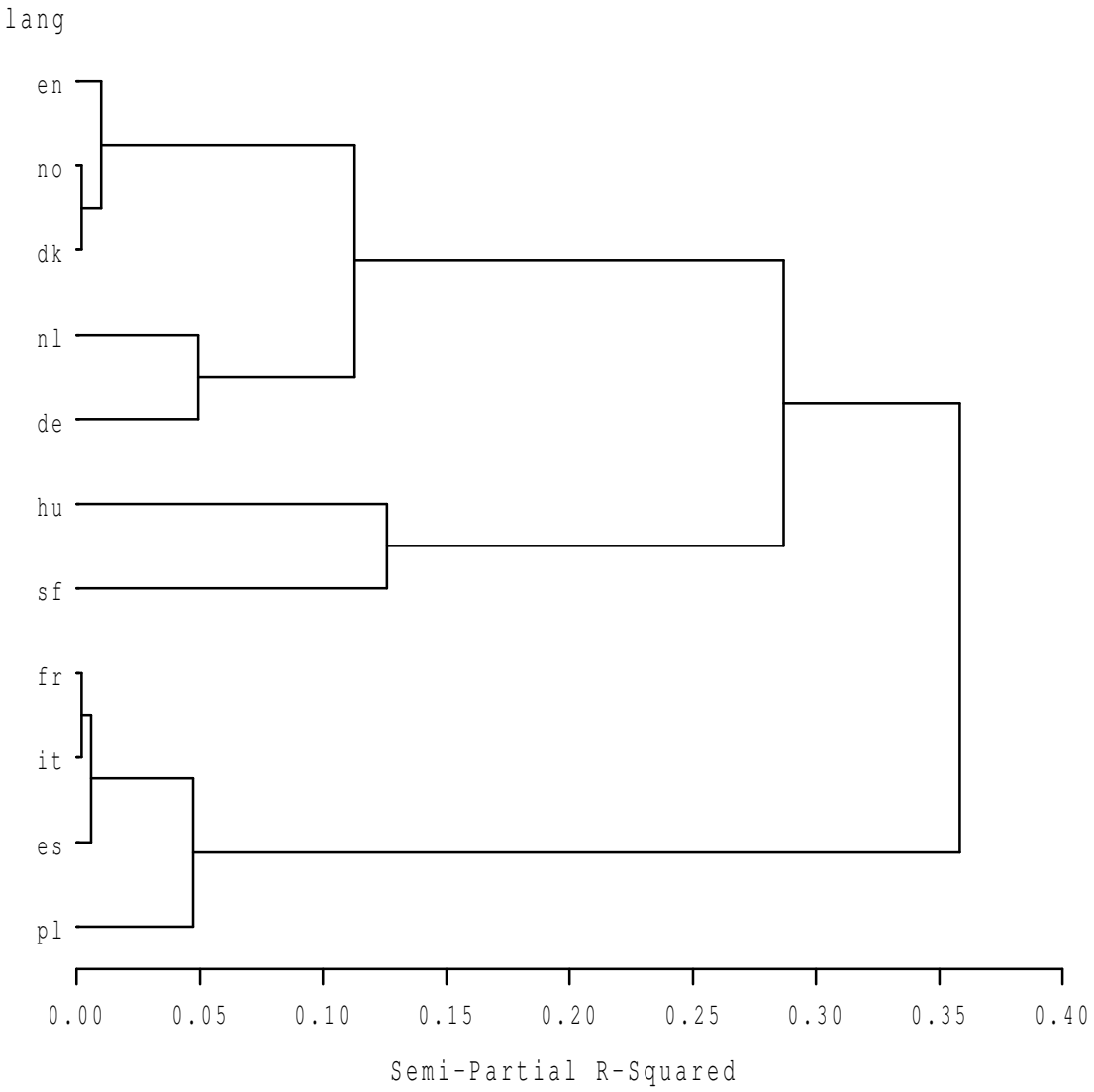



```
proc cluster data=lang method=ward outtree=tree2;
  id lang;

proc tree horizontal data=tree2;
  id lang;


run;
```

The CLUSTER Procedure
Ward's Minimum Variance Cluster Analysis
Root-Mean-Square Distance Between Observations 7.131237

Cluster History

NCL	--Clusters Joined---		FREQ	SPRSQ	RSQ	Tie
10	no	dk	2	0.0020	.998	T
9	fr	it	2	0.0020	.996	T
8	CL9	es	3	0.0059	.990	
7	en	CL10	3	0.0098	.980	
6	CL8	pl	4	0.0472	.933	
5	nl	de	2	0.0492	.884	
4	CL7	CL5	5	0.1129	.771	
3	hu	sf	2	0.1258	.645	
2	CL4	CL3	7	0.2869	.358	
1	CL2	CL6	11	0.3584	.000	


lang
en
no
dk
nl
de
hu
sf
fr
it
es
pl
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
0.40
Semi-Partial R-Squared