Appendix F:
Clusteranalyse

Ergebnisse der Clusteranalyse mit SPSS 9.0:

Initial Cluster Centers

	Cluster				
	1	2	3	4	5
REGR factor score 1 for analysis 1	-2.37633	1.27577	-2.22196	-.14989	1.58201
REGR factor score 2 for analysis 1	2.86156	-1.14007	-.49319	.83406	-1.56042
REGR factor score 3 for analysis 1	-1.70452	.68195	-.39514	2.08121	-2.58426
REGR factor score 4 for analysis 1	-.32612	-2.19879	.61423	.80668	1.63538
REGR factor score 5 for analysis 1	-.67978	.05071	1.85861	-2.05578	-.14581
REGR factor score 6 for analysis 1	.71113	.96561	-.25029	1.04912	-2.32134
REGR factor score 7 for analysis 1	-.06453	.36752	.65795	.90770	-.34456

Iteration History[a]

	Change in Cluster Centers				
Iteration	1	2	3	4	5
1	2.520	2.178	2.192	2.321	2.357
2	.548	.219	.194	.258	.259
3	.316	7.656E-02	.139	6.639E-02	.175
4	.249	3.668E-02	.000	.110	.000
5	.134	4.558E-02	3.216E-02	.130	.227
6	.198	6.747E-02	.000	5.234E-02	.000
7	.194	.106	6.623E-02	.150	.000
8	.000	.115	5.965E-02	.167	.000
9	.000	6.907E-02	6.638E-02	7.064E-02	.000
10	.000	.000	.000	.000	.000

a. Convergence achieved due to no or small distance change. The maximum distance by which any center has changed is .000. The current iteration is 10. The minimum distance between initial centers is 4.654.

Final Cluster Centers

	Cluster				
	1	2	3	4	5
REGR factor score 1 for analysis 1	-1.21269	.45839	-.74310	.55073	.92082
REGR factor score 2 for analysis 1	.48165	.16121	-.19176	-.06567	-.74803
REGR factor score 3 for analysis 1	-.22381	-.11181	.14637	.84263	-1.53779
REGR factor score 4 for analysis 1	-.14040	-.31701	.34229	.18464	.14136
REGR factor score 5 for analysis 1	-.97397	.41146	.84096	-.97215	-.38223
REGR factor score 6 for analysis 1	-.26799	.30777	-.32312	.32680	-.67885
REGR factor score 7 for analysis 1	-.08810	.14434	-.25630	.20605	-.19471

ANOVA

	Cluster		Error			
	Mean Square	df	Mean Square	df	F	Sig.
REGR factor score 1 for analysis 1	20.886	4	.588	152	35.506	.000
REGR factor score 2 for analysis 1	3.775	4	.573	152	6.590	.000
REGR factor score 3 for analysis 1	13.649	4	.512	152	26.660	.000
REGR factor score 4 for analysis 1	2.919	4	.706	152	4.132	.003
REGR factor score 5 for analysis 1	21.589	4	.359	152	60.083	.000
REGR factor score 6 for analysis 1	4.970	4	.707	152	7.028	.000
REGR factor score 7 for analysis 1	1.393	4	.555	152	2.511	.044

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Number of Cases in each Cluster

Cluster	1	21.000
	2	55.000
	3	38.000
	4	30.000
	5	13.000
Valid		157.000
Missing		8.000

Graphische Darstellung mittels Diskriminanten-Analyse:

1. Box's Test of Equality of Covariance Matrices

Log Determinants

Cluster Number of Case	Rank	Log Determinant
1	7	-5.083
2	7	-5.816
3	7	-4.965
4	7	-4.592
5	7	-6.377
Pooled within-groups	7	-4.274

The ranks and natural logarithms of determinants printed are those of the group covariance matrices.

Test Results

Box's M		159.483
F	Approx.	1.229
	df1	112
	df2	11295.523
	Sig.	.051

Tests null hypothesis of equal population covariance matrices.

2. Summary of Canonical Discriminant Functions

Eigenvalues

Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	1.893[a]	42.6	42.6	.809
2	1.306[a]	29.4	71.9	.753
3	.954[a]	21.4	93.4	.699
4	.295[a]	6.6	100.0	.477

a. First 4 canonical discriminant functions were used in the analysis.

Wilks' Lambda

Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
1 through 4	.059	423.907	28	.000
2 through 4	.171	264.554	18	.000
3 through 4	.395	139.248	10	.000
4	.772	38.788	4	.000

Structure Matrix

			Function			
			1	2	3	4
REGR factor score	5 for analysis	3	-.832*	.143	.503	.078
REGR factor score	1 for analysis	3	.195	.804*	.064	-.224
REGR factor score	3 for analysis	3	.270	-.229	.671*	-.471
REGR factor score	6 for analysis	3	.153	.145	.324*	.214
REGR factor score	2 for analysis	3	.100	-.145	.153	.596*
REGR factor score	4 for analysis	3	-.036	-.111	-.034	-.550*
REGR factor score	7 for analysis	3	.128	.112	.119	.134*

Pooled within-groups correlations between discriminating variables and standardized canonical discriminant functions
Variables ordered by absolute size of correlation within function.

*. Largest absolute correlation between each variable and any discriminant function

Functions at Group Centroids

	Function			
Cluster Number of Case	1	2	3	4
1	1.041	-1.943	-1.062	.692
2	-.296	.909	.540	.489
3	-1.689	-.949	.337	-.459
4	2.214	.148	.490	-.605
5	-.602	1.728	-2.685	-.449

Unstandardized canonical discriminant functions evaluated at group means

3. Classification Statistics

Classification Processing Summary

Processed		165
Excluded	Missing or out-of-range group codes	0
	At least one missing discriminating variable	8
Used in Output		157

Prior Probabilities for Groups

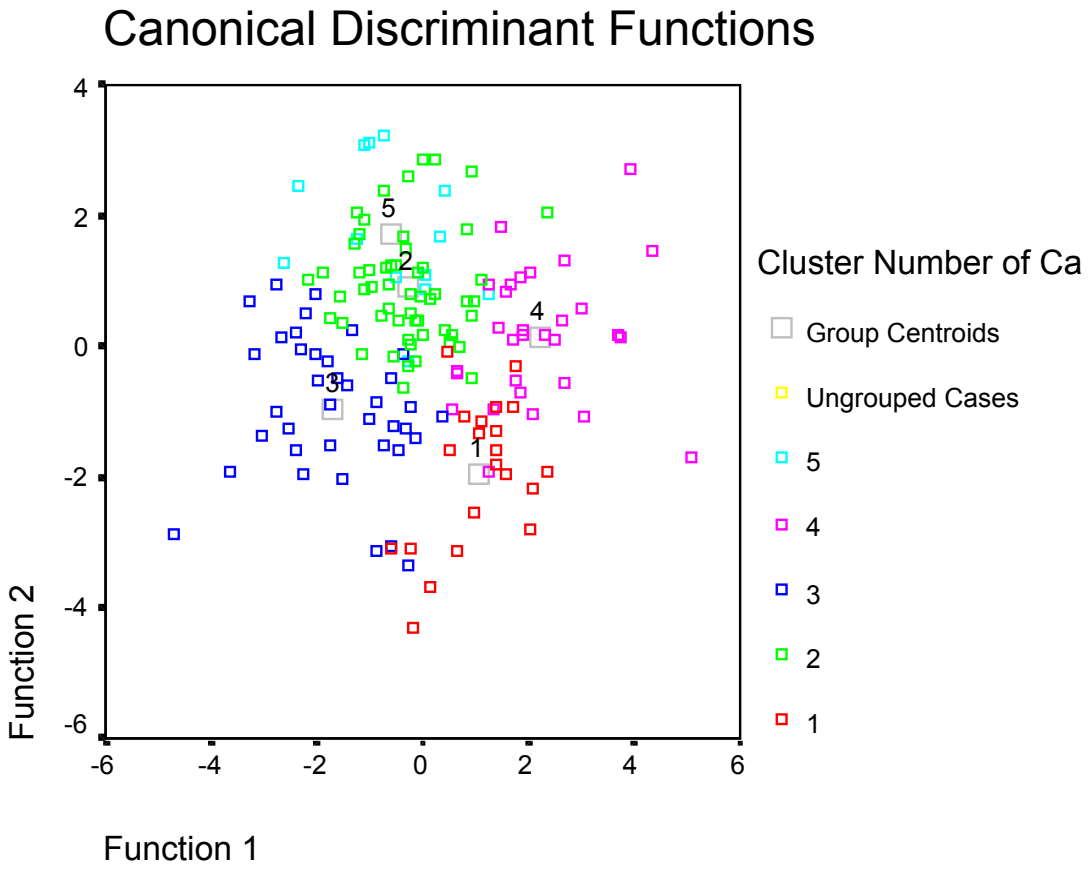
		Cases Used in Analysis	
Cluster Number of Case	Prior	Unweighted	Weighted
1	.200	21	21.000
2	.200	55	55.000
3	.200	38	38.000
4	.200	30	30.000
5	.200	13	13.000
Total	1.000	157	157.000

Classification Function Coefficients

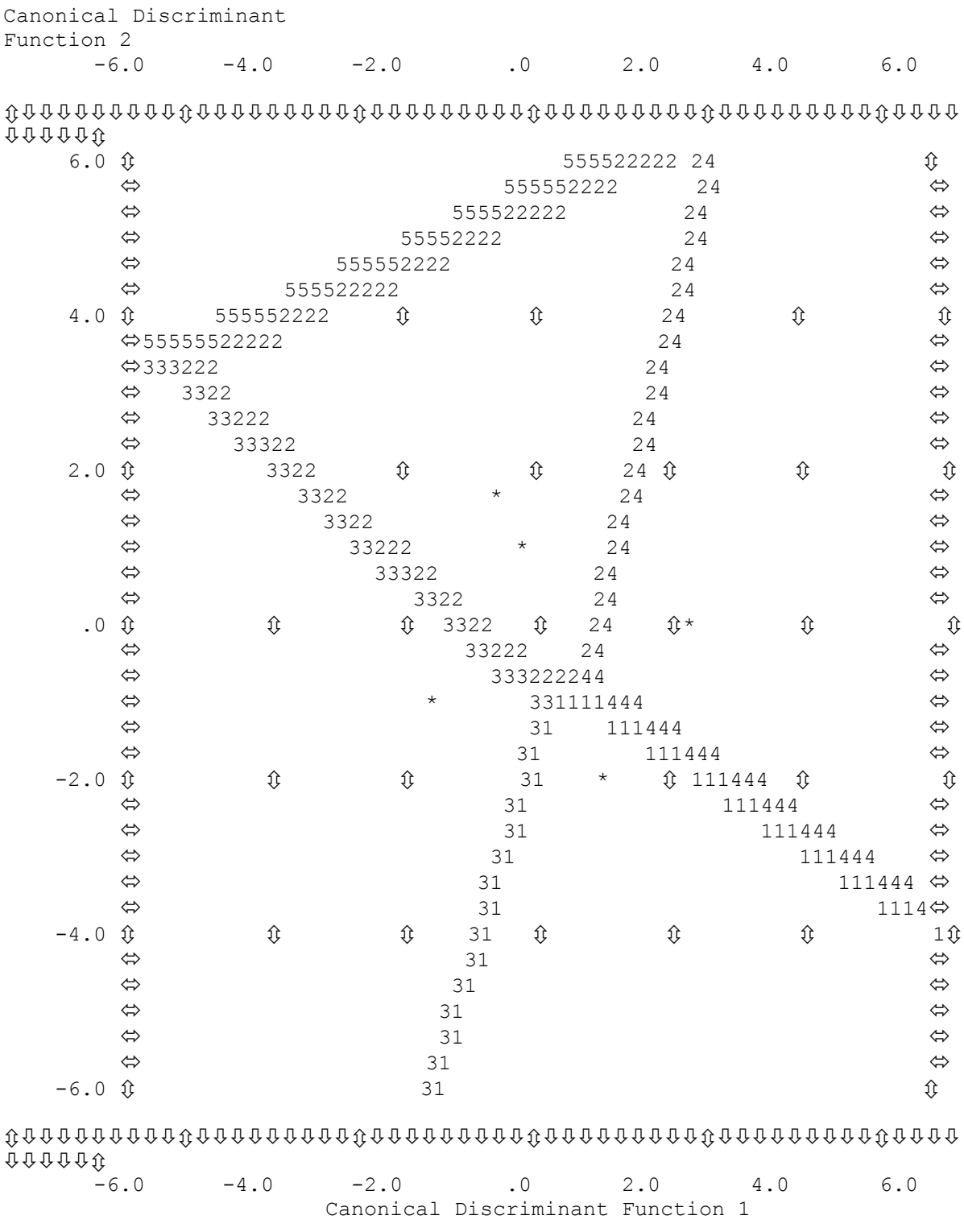
	Cluster Number of Case				
	1	2	3	4	5
REGR factor score 1 for analysis 3	-2.366	1.004	-1.553	.973	1.867
REGR factor score 2 for analysis 3	1.231	.196	-.519	.420	-2.272
REGR factor score 3 for analysis 3	-1.79E-02	-.236	9.884E-02	1.988	-3.851
REGR factor score 4 for analysis 3	-3.27E-02	-.592	.732	.156	5.812E-02
REGR factor score 5 for analysis 3	-2.853	1.129	2.450	-2.918	-.600
REGR factor score 6 for analysis 3	-.717	.671	-.750	.889	-1.541
REGR factor score 7 for analysis 3	-.276	.461	-1.008	.928	-.703
(Constant)	-4.842	-2.331	-3.649	-4.375	-6.990

Fisher's linear discriminant functions

4. Graphic Display



5. Territorial Map (Assuming all functions but the first two are zero)



Symbols used in territorial map

Symbol	Group	Label
1	1	
2	2	
3	3	
4	4	
5	5	
*	Indicates a group centroid	

Classification Results[b,c]

			Predicted Group Membership					
		Cluster Number of Case	1	2	3	4	5	Total
Original	Count	1	20	0	0	1	0	21
		2	0	52	1	1	1	55
		3	1	0	37	0	0	38
		4	0	0	0	30	0	30
		5	0	0	0	0	13	13
	%	1	95.2	.0	.0	4.8	.0	100.0
		2	.0	94.5	1.8	1.8	1.8	100.0
		3	2.6	.0	97.4	.0	.0	100.0
		4	.0	.0	.0	100	.0	100.0
		5	.0	.0	.0	.0	100	100.0
Cross-validated[a]	Count	1	20	0	0	1	0	21
		2	0	52	1	1	1	55
		3	3	0	35	0	0	38
		4	3	0	0	27	0	30
		5	0	0	0	0	13	13
	%	1	95.2	.0	.0	4.8	.0	100.0
		2	.0	94.5	1.8	1.8	1.8	100.0
		3	7.9	.0	92.1	.0	.0	100.0
		4	10.0	.0	.0	90.0	.0	100.0
		5	.0	.0	.0	.0	100	100.0

a. Cross validation is done only for those cases in the analysis. In cross validation, each case is classified by the functions derived from all cases other than that case.

b. 96.8% of original grouped cases correctly classified.

c. 93.6% of cross-validated grouped cases correctly classified.