

**The FASTCLUS Procedure**  
**Replace=FULL Radius=0 Maxclusters=2 Maxiter=20 Converge=0.02**

Initial Seeds										
Cluster	x1	x2	x3	x4	x5	x6	x7	x8	x9	x10
1	1.000000000	1.000000000	1.000000000	1.000000000	1.000000000	1.000000000	1.000000000	1.000000000	1.000000000	1.000000000
2	5.000000000	5.000000000	5.000000000	5.000000000	5.000000000	5.000000000	5.000000000	5.000000000	5.000000000	5.000000000

Minimum Distance Between Initial Seeds = 13.85641

Iteration History			
Iteration	Criterion	Relative Change in Cluster Seeds	
		1	2
1	1.4646	0.2369	0.2997
2	0.9506	0.0354	0.0186
3	0.9422	0.0175	0.00933

Convergence criterion is satisfied.

Criterion Based on Final Seeds = 0.9407

Cluster Summary						
Cluster	Frequency	RMS Std Deviation	Maximum Distance from Seed to Observation	Radius Exceeded	Nearest Cluster	Distance Between Cluster Centroids
1	107	1.0120	7.3426		2	8.1204
2	186	0.9024	6.5845		1	8.1204

7 Observation(s) were omitted due to missing values.

Statistics for Variables				
Variable	Total STD	Within STD	R-Square	RSQ/(1-RSQ)
x1	1.38836	1.36137	0.041821	0.043646
x2	1.34963	1.28146	0.101601	0.113092
x3	1.31256	1.13478	0.255149	0.342550
x4	1.36519	1.04190	0.419559	0.722828
x5	1.38784	0.91039	0.571195	1.332061
x6	1.43532	0.82200	0.673155	2.059552
x7	1.49185	0.74642	0.750532	3.008525
x8	1.53485	0.70022	0.792596	3.821498
x9	1.57357	0.65412	0.827799	4.807177
x10	1.57250	0.68648	0.810078	4.265312
x11	1.59060	0.77151	0.765549	3.265277
x12	1.60994	0.88004	0.702235	2.358356
OVER-ALL	1.47117	0.94401	0.589688	1.437172

Pseudo F Statistic = 418.22

Approximate Expected Over-All R-Squared = 0.08070

Cubic Clustering Criterion = 197.210

**WARNING: The two values above are invalid for correlated variables.**

Cluster Means										
Cluster	x1	x2	x3	x4	x5	x6	x7	x8	x9	x10
1	1.924528302	1.819047619	1.730769231	1.688679245	1.634615385	1.613207547	1.641509434	1.692307692	1.716981132	1.886792453

<b>2</b>	2.513513514	2.711956522	3.108695652	3.521739130	3.816216216	4.054347826	4.320652174	4.530054645	4.684782609	4.820652174
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Cluster Standard Deviations										
Cluster	x1	x2	x3	x4	x5	x6	x7	x8	x9	x10
<b>1</b>	1.357154679	1.158421940	1.026169891	0.919246146	0.738112159	0.724677330	0.770759418	0.813441963	0.870191188	1.017192726
<b>2</b>	1.363770780	1.346384951	1.191559769	1.106150326	0.993870758	0.872959046	0.732096032	0.627154307	0.488766661	0.384690080

Distance Between Cluster Centroids		
Nearest Cluster	1	2
<b>1</b>	.	8.120413511
<b>2</b>	8.120413511	.

## The LOGISTIC Procedure

Model Information		
Data Set	WORK.TMP	
Response Variable	CLUSTER	Cluster
Number of Response Levels	2	
Model	binary logit	
Optimization Technique	Fisher's scoring	

Number of Observations Read	243
Number of Observations Used	236

Response Profile		
Ordered Value	CLUSTER	Total Frequency
1	1	84
2	2	152

Probability modeled is CLUSTER=1.

**Note:** 7 observations were deleted due to missing values for the response or explanatory variables.

Model Convergence Status
Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	309.292	322.554
SC	312.756	374.512
-2 Log L	307.292	292.554

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	14.7373	14	0.3963
Score	14.7006	14	0.3989
Wald	13.2554	14	0.5065

Analysis of Maximum Likelihood Estimates					
Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	1	-1.0579	1.5415	0.4710	0.4925
dist	1	-0.0988	0.1030	0.9211	0.3372
Age	1	0.0984	0.1543	0.4067	0.5237
Gender	1	-0.0256	0.3530	0.0053	0.9422
Married	1	-0.1772	0.4044	0.1920	0.6612
License	1	0.5203	0.9234	0.3175	0.5731
Adults	1	-0.3329	0.2522	1.7424	0.1868
Children	1	0.0246	0.1757	0.0195	0.8888
Cars	1	0.4054	0.2196	3.4069	0.0649
Education	1	-0.0881	0.1061	0.6905	0.4060
SpouseEd	1	-0.1225	0.1213	1.0208	0.3123
Years	1	-0.0330	0.1212	0.0740	0.7855
Workers	1	-0.0913	0.2300	0.1574	0.6915
Income	1	-0.0247	0.0930	0.0705	0.7907

<b>Ethnic</b>	1	1.0567	0.5011	4.4462	0.0350
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<b>Odds Ratio Estimates</b>			
<b>Effect</b>	<b>Point Estimate</b>	<b>95% Wald Confidence Limits</b>	
<b>dist</b>	0.906	0.740	1.108
<b>Age</b>	1.103	0.815	1.493
<b>Gender</b>	0.975	0.488	1.947
<b>Married</b>	0.838	0.379	1.850
<b>License</b>	1.682	0.275	10.278
<b>Adults</b>	0.717	0.437	1.175
<b>Children</b>	1.025	0.726	1.446
<b>Cars</b>	1.500	0.975	2.307
<b>Education</b>	0.916	0.744	1.127
<b>SpouseEd</b>	0.885	0.698	1.122
<b>Years</b>	0.968	0.763	1.227
<b>Workers</b>	0.913	0.582	1.433
<b>Income</b>	0.976	0.813	1.171
<b>Ethnic</b>	2.877	1.077	7.682

<b>Association of Predicted Probabilities and Observed Responses</b>			
<b>Percent Concordant</b>	64.4	<b>Somers' D</b>	0.293
<b>Percent Discordant</b>	35.1	<b>Gamma</b>	0.295
<b>Percent Tied</b>	0.5	<b>Tau-a</b>	0.135
<b>Pairs</b>	12768	<b>c</b>	0.647

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**Actual vs. Predicted on hold-out sample using LR****The FREQ Procedure**

Frequency Percent Row Pct Col Pct	Table of actual by into_l			
	actual	into_l		
		1	2	Total
<b>1</b>		4	19	23
		7.02	33.33	40.35
		17.39	82.61	
		57.14	38.00	
<b>2</b>		3	31	34
		5.26	54.39	59.65
		8.82	91.18	
		42.86	62.00	
<b>Total</b>		7	50	57
		12.28	87.72	100.00

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The DISCRIM Procedure

Total Sample Size	236	DF Total	235
Variables	14	DF Within Classes	234
Classes	2	DF Between Classes	1

Number of Observations Read	243
Number of Observations Used	236

Class Level Information					
CLUSTER	Variable Name	Frequency	Weight	Proportion	Prior Probability
1	_1	84	84.0000	0.355932	0.500000
2	_2	152	152.0000	0.644068	0.500000

Pooled Covariance Matrix Information	
Covariance Matrix Rank	Natural Log of the Determinant of the Covariance Matrix
14	-8.67171

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**The DISCRIM Procedure**

Generalized Squared Distance to CLUSTER		
From CLUSTER	1	2
1	0	0.28732
2	0.28732	0

**The DISCRIM Procedure**  
**Canonical Discriminant Analysis**

	Canonical Correlation	Adjusted Canonical Correlation	Approximate Standard Error	Squared Canonical Correlation	Eigenvalues of $\text{Inv}(\mathbf{E})^* \mathbf{H} = \text{CanRs}q/(1-\text{CanRs}q)$				Test of H0: The canonical correlations in	
					Eigenvalue	Difference	Proportion	Cumulative	Likelihood Ratio	Approximate F Value
1	0.249581	0.146158	0.061169	0.062291	0.0664		1.0000	1.0000	0.93770928	1.05

**Note:** The F statistic is exact.



**The DISCRIM Procedure**  
**Canonical Discriminant Analysis**

<b>Total Canonical Structure</b>		
<b>Variable</b>	<b>Label</b>	<b>Can1</b>
<b>dist</b>	dist	0.222276
<b>Age</b>	Age	-0.162976
<b>Gender</b>	Gender	-0.017887
<b>Married</b>	Married	0.125933
<b>License</b>	License	-0.106278
<b>Adults</b>	Adults	0.089158
<b>Children</b>	Children	-0.105804
<b>Cars</b>	Cars	-0.265394
<b>Education</b>	Education	0.431749
<b>SpouseEd</b>	SpouseEd	0.473609
<b>Years</b>	Years	0.043631
<b>Workers</b>	Workers	0.069582
<b>Income</b>	Income	0.198403
<b>Ethnic</b>	Ethnic	-0.590094

<b>Between Canonical Structure</b>		
<b>Variable</b>	<b>Label</b>	<b>Can1</b>
<b>dist</b>	dist	1.000000
<b>Age</b>	Age	-1.000000
<b>Gender</b>	Gender	-1.000000
<b>Married</b>	Married	1.000000
<b>License</b>	License	-1.000000
<b>Adults</b>	Adults	1.000000
<b>Children</b>	Children	-1.000000
<b>Cars</b>	Cars	-1.000000
<b>Education</b>	Education	1.000000
<b>SpouseEd</b>	SpouseEd	1.000000
<b>Years</b>	Years	1.000000
<b>Workers</b>	Workers	1.000000
<b>Income</b>	Income	1.000000
<b>Ethnic</b>	Ethnic	-1.000000

<b>Pooled Within Canonical Structure</b>		
<b>Variable</b>	<b>Label</b>	<b>Can1</b>
<b>dist</b>	dist	0.215573
<b>Age</b>	Age	-0.157949
<b>Gender</b>	Gender	-0.017321
<b>Married</b>	Married	0.122008
<b>License</b>	License	-0.102950
<b>Adults</b>	Adults	0.086358
<b>Children</b>	Children	-0.102491
<b>Cars</b>	Cars	-0.257561
<b>Education</b>	Education	0.420534
<b>SpouseEd</b>	SpouseEd	0.461859
<b>Years</b>	Years	0.042253
<b>Workers</b>	Workers	0.067390
<b>Income</b>	Income	0.192360
<b>Ethnic</b>	Ethnic	-0.577719



**The DISCRIM Procedure**  
**Canonical Discriminant Analysis**

<b>Total-Sample Standardized Canonical Coefficients</b>		
<b>Variable</b>	<b>Label</b>	<b>Can1</b>
<b>dist</b>	dist	0.2639731240
<b>Age</b>	Age	-.2123378243
<b>Gender</b>	Gender	0.0317802985
<b>Married</b>	Married	0.1450579939
<b>License</b>	License	-.1683997920
<b>Adults</b>	Adults	0.5295221319
<b>Children</b>	Children	-.0531030230
<b>Cars</b>	Cars	-.7539062621
<b>Education</b>	Education	0.2707008680
<b>SpouseEd</b>	SpouseEd	0.3049188801
<b>Years</b>	Years	0.0806570008
<b>Workers</b>	Workers	0.1245973956
<b>Income</b>	Income	0.0972594872
<b>Ethnic</b>	Ethnic	-.6031578697

<b>Pooled Within-Class Standardized Canonical Coefficients</b>		
<b>Variable</b>	<b>Label</b>	<b>Can1</b>
<b>dist</b>	dist	0.2641291903
<b>Age</b>	Age	-.2126149478
<b>Gender</b>	Gender	0.0318478154
<b>Married</b>	Married	0.1452957966
<b>License</b>	License	-.1686998598
<b>Adults</b>	Adults	0.5305209883
<b>Children</b>	Children	-.0531978127
<b>Cars</b>	Cars	-.7538562703
<b>Education</b>	Education	0.2696991083
<b>SpouseEd</b>	SpouseEd	0.3034274798
<b>Years</b>	Years	0.0808243684
<b>Workers</b>	Workers	0.1248445152
<b>Income</b>	Income	0.0973475170
<b>Ethnic</b>	Ethnic	-.5978540616

<b>Raw Canonical Coefficients</b>		
<b>Variable</b>	<b>Label</b>	<b>Can1</b>
<b>dist</b>	dist	0.181670146
<b>Age</b>	Age	-0.187772908
<b>Gender</b>	Gender	0.067417409
<b>Married</b>	Married	0.322770738
<b>License</b>	License	-0.990523360
<b>Adults</b>	Adults	0.637298225
<b>Children</b>	Children	-0.059038883
<b>Cars</b>	Cars	-0.758467223
<b>Education</b>	Education	0.170465203
<b>SpouseEd</b>	SpouseEd	0.234075906
<b>Years</b>	Years	0.059623606
<b>Workers</b>	Workers	0.163004461
<b>Income</b>	Income	0.046805254

<b>Ethnic</b>	Ethnic	-2.051929931
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<b>Class Means on Canonical Variables</b>	
<b>CLUSTER</b>	<b>Can1</b>
<b>1</b>	-.3452324822
<b>2</b>	0.1907863718

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The DISCRIM Procedure

Linear Discriminant Function for CLUSTER			
Variable	Label	1	2
Constant		-60.94135	-60.42816
dist	dist	1.19085	1.28823
Age	Age	4.25007	4.14942
Gender	Gender	4.54253	4.57866
Married	Married	10.55040	10.72341
License	License	32.93791	32.40697
Adults	Adults	-0.13306	0.20854
Children	Children	2.43716	2.40551
Cars	Cars	3.45684	3.05029
Education	Education	2.07917	2.17054
SpouseEd	SpouseEd	0.79410	0.91957
Years	Years	0.94753	0.97949
Workers	Workers	0.73014	0.81751
Income	Income	1.22045	1.24554
Ethnic	Ethnic	12.61094	11.51107

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**The DISCRIM Procedure**  
**Classification Summary for Calibration Data: WORK.TMP**  
**Resubstitution Summary using Linear Discriminant Function**

Number of Observations and Percent Classified into CLUSTER			
From CLUSTER	1	2	Total
.	3 42.86	4 57.14	7 100.00
1	44 52.38	40 47.62	84 100.00
2	47 30.92	105 69.08	152 100.00
Total	94 38.68	149 61.32	243 100.00
Priors	0.5	0.5	

Error Count Estimates for CLUSTER			
	1	2	Total
Rate	0.4762	0.3092	0.3927
Priors	0.5000	0.5000	

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**The DISCRIM Procedure**  
**Classification Summary for Test Data: WORK.TMP\_HOLD**  
**Classification Summary using Linear Discriminant Function**

Observation Profile for Test Data	
Number of Observations Read	57
Number of Observations Used	57

Number of Observations and Percent Classified into CLUSTER			
	1	2	Total
Total	22 38.60	35 61.40	57 100.00
Priors	0.5	0.5	

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**Actual vs. Predicted on hold-out sample using DA****The FREQ Procedure**

Frequency Percent Row Pct Col Pct	Table of actual by _INTO_			
	actual	_INTO_(Cluster)		
		1	2	Total
<b>1</b>	11	12	23	
	19.30	21.05	40.35	
	47.83	52.17		
	50.00	34.29		
<b>2</b>	11	23	34	
	19.30	40.35	59.65	
	32.35	67.65		
	50.00	65.71		
<b>Total</b>	22	35	57	
	38.60	61.40	100.00	



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**Prediction of DA vs. Prediction of LR on hold-out sample****The FREQ Procedure**

Frequency Percent Row Pct Col Pct	Table of _INTO_ by into_I			
	_INTO_(Cluster)	into_I		
		1	2	Total
	<b>1</b>	7 12.28 31.82 100.00	15 26.32 68.18 30.00	22 38.60
	<b>2</b>	0 0.00 0.00 0.00	35 61.40 100.00 70.00	35 61.40
	<b>Total</b>	7 12.28	50 87.72	57 100.00