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Full Length Research Paper

Discriminant analysis: An illustrated example

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One of the challenging tasks facing a researcher is the data analysis section where the researcher needs to identify the correct analysis technique and interpret the output that he gets. The analysis wise is very simple, just by the click of a mouse the analysis can be done. The more demanding part is the interpretation of the output that the researcher gets. Many researchers are very familiar and well exposed to the regression analysis technique whereby the dependent variable is a continuous variable. But what happens if the dependent variable is a nominal variable? Then the researcher has 2 choices: either to use a discriminant analysis or a logistic regression. Discriminant analysis is used when the data are normally distributed whereas the logistic regression is used when the data are not normally distributed. This paper demonstrates an illustrated approach in presenting how the discriminant analysis can be carried out and how the output can be interpreted using knowledge sharing in an organizational context. The paper will also present the 3 criteria that can be used to test whether the model developed has good predictive accuracy. The purpose of this paper is to help novice researchers as well as seasoned researchers on how best the output from the SPSS can be interpreted and presented in standard table forms.

Key words: Data analysis, discriminant analysis, predictive validity, nominal variable, knowledge sharing.

INTRODUCTION

Many a time a researcher is riddled with the issue of what analysis to use in a particular situation. Most of the time, the use of regression analysis is considered as one of the most powerful analyses when we are interested in establishing relationships. One of the requirements of the regression analysis is that the dependent variable (Y) must be a continuous variable. If this assumption is violated, then the use of a regression analysis is no longer appropriate.

Let us say for example, we would like to predict a user of Internet banking from a non-user of Internet banking. In this case, the dependent variable is a nominal variable with 2 levels or categories with say 1 = User and 2 = Non-user. In this case, regression analysis is no longer appropriate. Next, we have a choice of using a discriminant analysis which is a parametric analysis or a logistic regression analysis which is a non-parametric analysis. The basic assumption for a discriminant analysis is that the sample comes from a normally distributed population whereas logistic regression is called a distribution free test where the normality requirement is not needed. This paper will only delve into the use of discriminant analysis as parametric tests that are much more powerful than its non-parametric alternative (Ramayah et al., 2004; Ramayah et al., 2006).

Next, we will discuss what a discriminant analysis is after which a case will be put forward for testing and the results interpreted as well as presented in tables useful in academic writing.

OVERVIEW OF DISCRIMINANT ANALYSIS

Discriminant or discriminant function analysis is a parametric technique to determine which weightings of quantitative variables or predictors best discriminate between 2 or more than 2 groups of cases and do so better than chance (Cramer, 2003) . The analysis creates a discriminant function which is a linear combination of the weightings and scores on these variables. The maximum number of functions is either the number of predictors or the number of groups minus one, whichever

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of these two values is the smaller.

$Z_{jk} = a + W_1X_{1k} + W_2X_{2k} + ... + W_nX_{nk}$

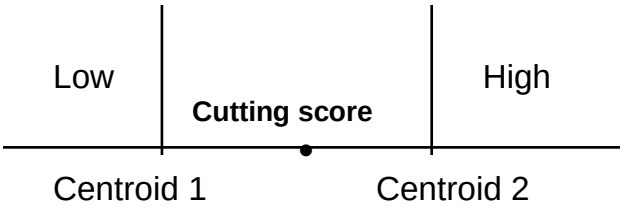
Where:

Z_{jk} = Discriminant Z score of discriminant function *j* for object *k.*
a = Intercept.
W_i = Discriminant coefficient for the Independent variable *i.*
X_j = Independent variable *i* for object *k.*

Again, caution must be taken to be clear that sometimes the focus of the analysis is not to predict but to explain the relationship, as such, equations are not normally written when the measures used are not objective measurements.

Cutting score

In a 2 group discriminant function, the cutting score will be used to classify the 2 groups uniquely. The cutting score is the score used for constructing the classification matrix. Optimal cutting score depends on sizes of groups. If equal, it is halfway between the two groups centroid. The formula is shown below:



Equal group:

$$Z_{CS} = \frac{N_A Z_B + N_B Z_A}{N_A + N_B}$$

Where:

Z_{CS} = Optimal cutting score between group A and B.
N_A = Number of observations in group A.
N_B = Number of observations in group B.
Z_A = Centroid for Group A.
Z_B = Centroid for Group B.

Unequal group

$$Z_{CE} = \frac{Z_A + Z_B}{2}$$

Where:

Z_{CE} = Optimal cutting score for equal group size.
Z_A = Centroid for Group A.
Z_B = Centroid for Group B.

THE CASE

The company of interest is a multinational company operating in the Bayan Lepas Free Trade Zone area in Penang. The population of interest is defined as all employees of this company. The management of the company has been observing a phenomenon whereby there are some employees who share information at a much higher level as compared to some others who only share at a very low level.

RESEARCH PROBLEM

In a growing organization, knowledge sharing is very important where it will lead to reduced mistakes, allow quick resolution, permit quick problem solving, quicken the learning process and importantly, all this will lead towards cost saving. Individuals do not share knowledge without personal benefits. Personal belief can change individual's thought of benefit and having self satisfaction will encourage knowledge sharing. Knowledge sharing does not only save employer's and employee's time (Gibbert and Krause, 2002) but doing so in an organizational setting results in the classic public good dilemma (Barry and Hardin, 1982; Marwell and Oliver, 1983).

The management would like to observe the factors that discriminate those who have high intention of sharing from those with low intention of information sharing. The reason being, once this can be identified, some intervention measures can be put in place to enhance the information sharing. A review of the literature unearthed 5 variables that can be identified as possible discriminators -these include attitude towards information sharing, self worth of the employee, the climate of the organization, the subjective norm related to information sharing and reciprocal relationship. Following this, the study endeavors to test the effects of the above mentioned factors on knowledge sharing in an organization. As depicted in Figure 1, a research model is advanced for further investigation.

Based on the research framework 5 hypotheses were derived as shown below:

Ajzen and Fishbein (1980) proposed that intention to engage in a behavior is determined by an individual's attitude towards the behavior. In this research, attitude is defined as the degree of one's positive feelings about sharing one's knowledge (Bock et al., 2005; Ramayah et al., 2009). This relationship has been confirmed by other researchers in the area of knowledge sharing (Bock et al., 2005; Chow and Chan, 2008). Thus, the first hypothesis conjectured that:

H_1: Attitude is a good predictor of intention to share information.

Reciprocal relationship in this research refers to the degree to which one believes that one can improve mutual relationships with others through one's information sharing (Bock et al., 2005). The more an employee perceives that his/her sharing of knowledge will be mutually beneficial, the higher likelihood that the sharing will occur (Sohail and Daud, 2009; Chatzoglu and Vraimaiki, 2009; Aulavi et al., 2009). As such, it is proposed that:

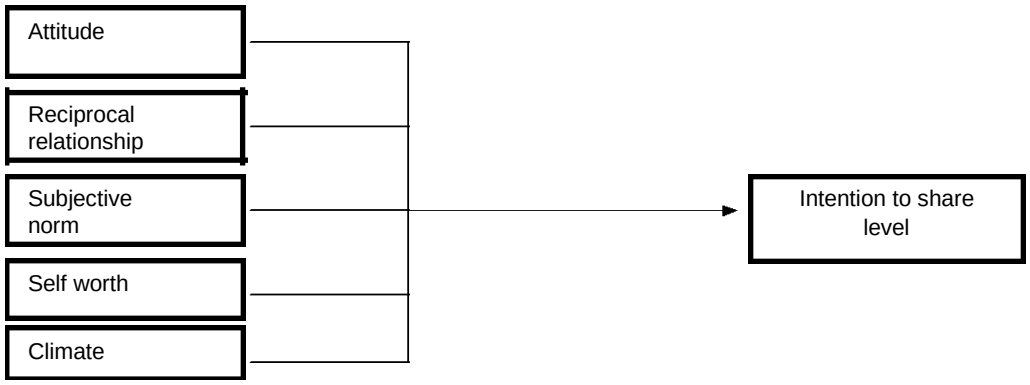


Figure 1. Research framework.

H_2: Reciprocal relationship is a good predictor of intention to share information.

Subjective norm in this research is defined as the degree to which one believes that people who bear pressure on one's actions expect one to perform the behavior (Bock et al., 2005; Ramayah et al., 2009). The more the employees perceive that significant others would want them to engage in the sharing behavior, the higher would be their intention to share and vice-versa. This linkage has been proven by several researchers in the knowledge sharing domain (Bock et al., 2005; Sohail and Daud, 2009; Chen and Hung, 2010). Thus, it is predicted that:

H_3: Subjective norm is a good predictor of intention to share information.

Sense of self-worth in this research refers to the degree to which one's positive cognition is based on one's feeling of personal contribution to the organization through one's information sharing behavior (Bock et al., 2005). In a research on knowledge sharing in Malaysian institutions of higher learning, Sadiq and Daud (2009) found that motivation to share significantly predicts knowledge sharing. Other researchers in the knowledge sharing domain have found the same results (Chow and Chan, 2008; Chatzoglu and Vraimaiki, 2009; Aulavi et al., 2009). Based on this argument, it is proposed that:

H_4: Sense of self-worth is a good predictor of intention to share information.

Organizational climate in this research is defined as the extent to which the climate is perceived to be fair which includes fairness, innovativeness and affiliation (Bock et al., 2005). Several researchers in cross cultural research have shown that group conformity and face saving in a Confucian society can directly affect intention (Tuten and Urban, 1999; Bang et al., 2000; Bock et al., 2005; Sohail and Daud, 2009). Thus, the fifth hypothesis is formulated as follows:

H_5: Climate is a good predictor of intention to share information.

Variables, Measurement and Questionnaire Design

To measure the variables of the study, various sources were used and these are summarized in Table 1, together with information regarding the layout of the questionnaire.

The analysis

Before proceeding with the analysis, we have to split the sample into 2 portions. One is called the analysis sample which is usually bigger in proportion as compared to the holdout sample which can be smaller. There is no standard splitting value but a 65% analysis sample and 35% holdout sample is typically used while some researchers go to the extent of 50: 50. The splitting follows the in sample and out sample testing which typically needs another data set to be collected for prediction purposes. This is achieved by splitting the sample whereby we develop a function using the analysis and then use that function to prediction the holdout sample to gauge the predictive accuracy of the model we have developed (Ramayah et al., 2004; Ramayah et al., 2006). To split the sample we compute a variable using the function as follows:

RANDZ = UNIFORM (1) > 0.65

The value 0.65 means that we are splitting the sample into 65% analysis and 35% the holdout sample. If we would like a 60:40 split then we can substitute the value of 0.60 after the function instead of 0.65. The procedure for setting up the analysis is presented in Appendix I while the full SPSS output is presented in Appendix II.

SUMMARY OF THE RESULTS

Tables 2, 3, 4 and 5 are summarized from the output given in Appendix II. Values of Tables 2-4 are taken from the summary table at the end of Appendix II.

To compare the goodness of the model developed, 3 benchmarks are used:

1. **Maximum chance**

C_{MAX} = Size of the largest group

2. **Proportional chance**

$C_{PRO} = p^2 + (1 - p)^2$

1 – p = Proportion of individuals in group 2

where: p = Proportion of individuals in group 1

Table 1. The measures and layout of the questionnaire.

Section	Variable Identification number		Item	Source
	Personal data		7	
A	Reciprocal relationship (Recip1 – 5)	The degree to which one believes one can improve mutual relationships with others through one's information sharing	5	Bock et al. (2005)
B	Self worth (Sw1 – 5)	The degree to which one's positive cognition based on one's feeling of personal contribution to the organization (through one's information sharing behavior)	5	Bock et al. (2005)
C	Attitude towards Sharing (Att1 – 5)	The degree of one's positive feelings about sharing one's information	5	Bock et al. (2005)
D	Subjective norm (Sn1 – 4)	The degree to which one believes that people who bear pressure on one's actions expect one to perform the behavior	4	Bock et al. (2005)
E	Intention to share	The degree to which one believes that one will engage in information sharing act	1	Low/High
F	Climate (Climate1– 6)	The extent to which the climate is perceived to be fair	6	Bock et al. (2005)

Table 2. Hit ratio for cases selected in the analysis.

Actual group	No. of cases	Predicted group membership	
		Low	High
Low	104	102 (98.1)	2 (1.9)
High	23	16 (69.6)	7 (30.4)

Percentage of "grouped" cases correctly classified: 85.8%. Numbers in italics indicate the row percentages.

Table 3. Hit ratio for cross validation* (Leave One Out Classification*).*

Actual group	No. of cases	Predicted group membership	
		Low	High
Low	104	102 (98.1)	2 (1.9)
High	23	17 (73.9)	6 (26.1)

Percentage of "grouped" cases correctly classified: 85.0%. *In cross validation, each case is classified by the functions derived from all cases other than that case. Numbers in italics indicate the row percentages.

3. **Press Q**

$$\text{Press } Q = \frac{[N - (n * k)]^2}{N(k - 1)}$$

Where:

$Q \sim \chi^2$ with 1 degree of freedom. N = Total sample size.
n = Number of observations correctly classified.

Table 4. Hit ratio for cases in the holdout sample.

Actual group	No. of cases	Predicted group membership	
		Low	High
Low	52	52 (100)	0 (0)
High	13	6 (46.2)	7 (53.8)

Percentage of "grouped" cases correctly classified: 90.8%.

Table 5. Comparison of goodness of results.

Measure	Value	Hit ratio for holdout sample
Maximum chance	0.80	90.8
Proportional chance	0.68	90.8
Comparison with Hair et al. (2010) 1.25 times higher than chance		0.85
Press Q table value		6.635
Press Q calculated value		43.22**

** p< 0.01.

k = Number of groups.

Press Q Calculation:

$$\text{Press Q} = \frac{[65 - (59 * 2)]^2}{65(2 - 1)} = 43.22$$

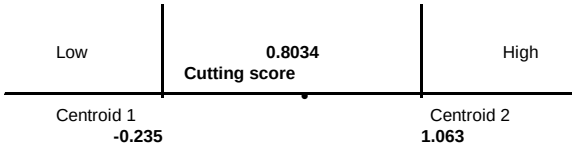
As shown above, the predictive accuracy of the model for the analysis sample was 85.8%, the cross validation sample was 85.0% and the holdout sample was 90.8% respectively (see Tables 2, 3 and 4). The values in Table 5 indicate that the hit ratio of 90.8% for the holdout sample exceeded both the maximum and proportional chance values. The Press Q statistics of 43.22 was significant. Hence, the model investigated has good predictive power. With a canonical correlation of 0.45, it can be concluded that 20.3% (square of the canonical correlation) of the variance in the dependent variable was accounted for by this model. A summary of the univariate analysis indicating the influential variables to the low/high intention to share is presented in Table 6.

Calculation of the cutting score:

$$Z_{CU} = \frac{N_A Z_B + N_B Z_A}{N_A + N_B}$$

$$Z_{CU} = \frac{104\ (1.063) + 23\ (-0.235)}{104 + 23} = 0.8236$$

The graphical depiction of the cutting score.



From the analysis we can see that the 3 significant variables carry a positive sign which means it helps to discriminate the employees with high intention to share whereas self worth carries a negative sign which helps to predict the low intention to share by employees. Employees who have a more positive attitude and perceive there is a strong reciprocal relationship and subjective norm will have high intention to share. Employees who have a lower self worth will have low intention to share. Table 7 is used to support the arguments given above.

Conclusion

This paper has presented an illustrated guide to how discriminant analysis can be conducted and how the results can be reported and interpreted in a manner that is easily understood. The following conclusions can be drawn based on the analysis:

- The higher the reciprocal relationship perceived by the employees, the higher will be the knowledge shared.
- The higher the self worth (the degree to which one's positive cognition based on one's feeling of personal contribution to the organization through one's information sharing behavior), the higher will be the knowledge shared.
- The more positive the attitude towards knowledge sharing, the higher will be the knowledge shared.
- The higher the degree to which one believes that people who bear pressure on their actions expect them to share knowledge, the higher will be the knowledge shared.
- Climate did not play a role in discriminating knowledge sharing levels.

Table 6. Summary of interpretive measures for discriminant analysis.

Independent variable	Unstandardized	Standardized	Discriminant loading (rank)	Univariate F ratio
Reciprocal relationship	0.498	0.263	0.827 (3)	21.700**
Self worth	-0.092	-0.051	0.697 (4)	15.428**
Organizational climate	0.207	0.155	0.059 (5)	0.111
Attitude	0.498	0.294	0.833 (2)	22.007**
Subjective norm	1.016	0.635	0.888 (1)	24.998**
Group centroid low			-0.235	
Group centroid high			1.063	
Wilks Lambda			0.798**	
(Canonical correlation)^2			0.203	

*p< 0.05; **p< 0.01.

Table 7. Mean comparison of low/high intention to share.

	Level of Intention to Share		
Variable	**Low**	**High**	**F value**
Reciprocal relationship	3.21	3.77	21.700**
Self worth	3.69	4.20	15.428**
Organizational climate	3.40	3.46	0.111
Attitude	3.65	4.31	22.007**
Subjective norm	3.54	4.26	24.998**

**p < 0.01.

The implications that can be drawn form this study is for organizations to leverage on creating a more positive attitude among employees which will also result in a stronger subjective norm to share knowledge. This in turn, will also have an impact on reciprocal sharing which will subsequently enhance the self worth of the employees. As such, the organizations should strive to create a more conducive environment for sharing by creating more opportunities for employees to work in small teams and project based assignments rather than individual assignments. By creating this kind of opportunities, the knowledge sharing can be enhanced which will eventually lead to better performance for the organization.

REFERENCES

Ajzen I, Fishbein M (1980). Understanding Attitudes and Predicting Social Behavior, Prentice Hall: Englewood Cliffs, New Jersey.

Aulawi H, Sudirman I, Suryadi K, Govindaraju R (2009). Knowledge sharing behavior, antecedents and their impact on the individual innovation capability. J. Appl. Sci. Res. 5(12): 2238-2246.

Bang H, Ellinger AE, Hadimarcou J, Traichal PA (2000). Consumer Concern, Knowledge, Belief and Attitude toward Renewable Energy: An Application of the Reasoned Action Theory, Psychol. Market 17(6): 449-468

Barry B, Hardin R (1982). Rational Man and Irrational Society? Sage Publications: Newbury Park, CA.

Bock GW, Zmud RW, Kim YG, Lee JN (2005). Behavioral Intention Formation in Knowledge Sharing: Examining the Roles of Extrinsic Motivators, Social-Psychological Forces, and Organizational Climate, MIS Q. 29(1): 87-111

Chang MK (1998). Predicting unethical behavior: a comparison of the theory of reasoned action and the theory of planned behavior, J. Bus. Ethics. 17(16): 1825-1834.

Chatzoglou PD, Vraimaki E (2009). Knowledge-sharing behaviour of bank employees in Greece. Bus. Process Manage. J. 15(2): 245-266.

Chau PYK, Hu PJH (2001). Information technology acceptance by individual professionals: a model comparison approach, Decis. Sci. 32(4): 699–719.

Chen CJ, Hung SW (2010). To give or to receive? Factors influencing members' knowledge sharing and community promotion in professional virtual communities. Inf. Manage. 47(4): 226-236.

Chow WS, Chan LS (2008). Social network, social trust and shared goals in organization knowledge sharing. Inf. Manage. 45(7): 458-465.

Gibbert M, Krause H (2002). Practice Exchange in a Best Practice Marketplace, in Knowledge Management Case Book: Siemens Best Practices, T. H. Davenport and G. J. B. Probst (Eds.), Publicis Corporate Publishing, Erlangen, Germany, pp. 89-105.

Hair JF, Black WC, Babin BJ, Anderson RE (2010). Multivariate Data Analysis: A global perspective, Prentice-Hall: Upper Saddle River, New Jersey.

Ling CW, Sandhu MS, Jain KK (2009). Knowledge sharing in an American multinational company based in Malaysia. J. Workplace Learning 21(2): 125-142.

Marwell G, Oliver P (1993). The Critical Mass in Collective Action: A Micro-social Theory, Cambridge University Press: New York.

Ramayah T, Jantan M, Chandramohan K (2004). Retrenchment Strategy in Human Resource Management: The Case of Voluntary Separation Scheme (VSS). Asian Acad. Manage. J. 9(2): 35-62.

Ramayah T, Md. Taib F, Koay PL (2006). Classifying Users and Non-

Users of Internet Banking in Northern Malaysia. J. Internet Bank. Commerce, August 2006, 11(2), [Online] Available: http://www.arraydev.com/commerce/JIBC/2006-08/Thurasamy.asp.htm

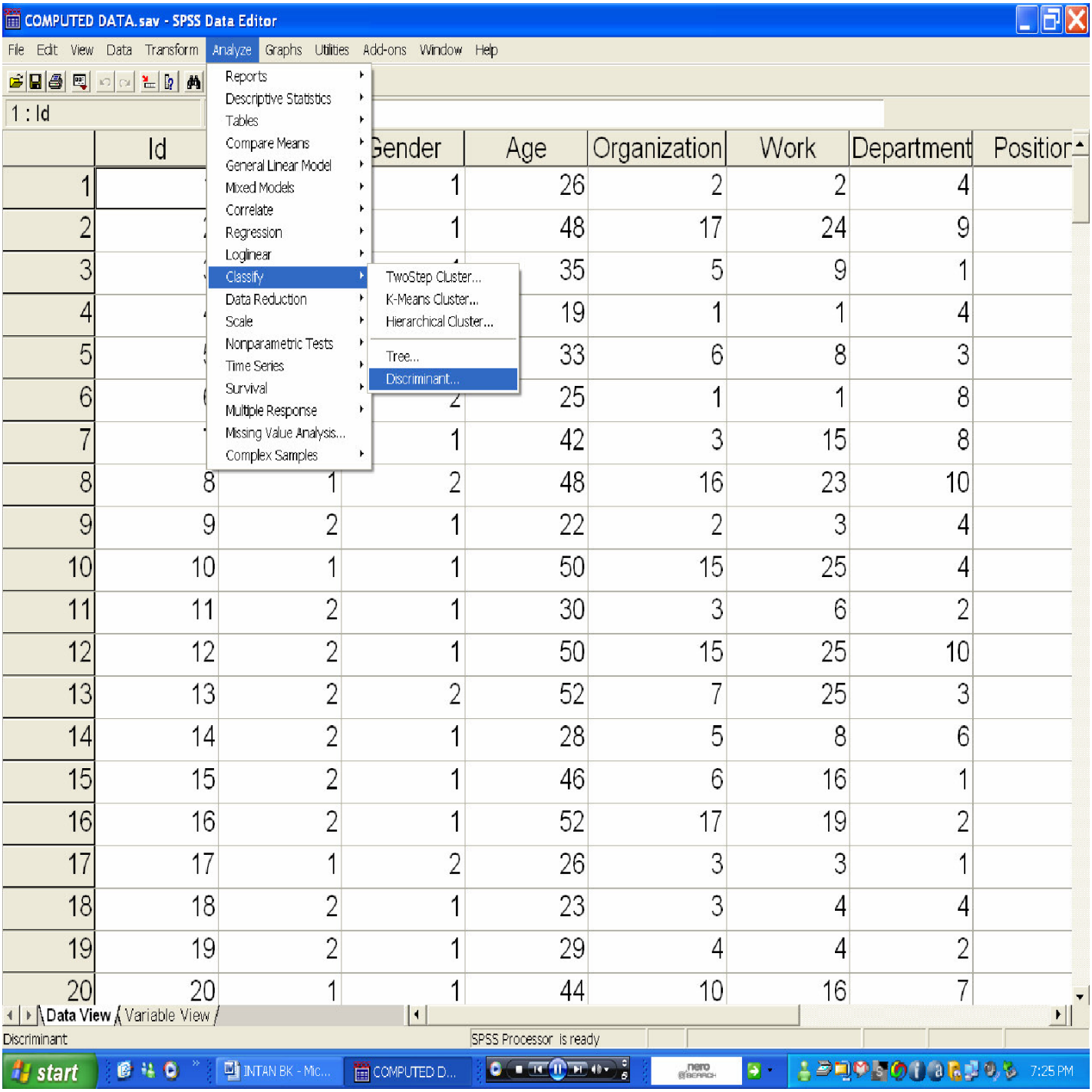
Ramayah T, Rouibah K, Gopi M, Rangel GJ (2009). A decomposed theory of reasoned action to explain Intention to use Internet stock trading among Malaysian investors. Comput. Hum. Behav. 25(2): 1222-1230.

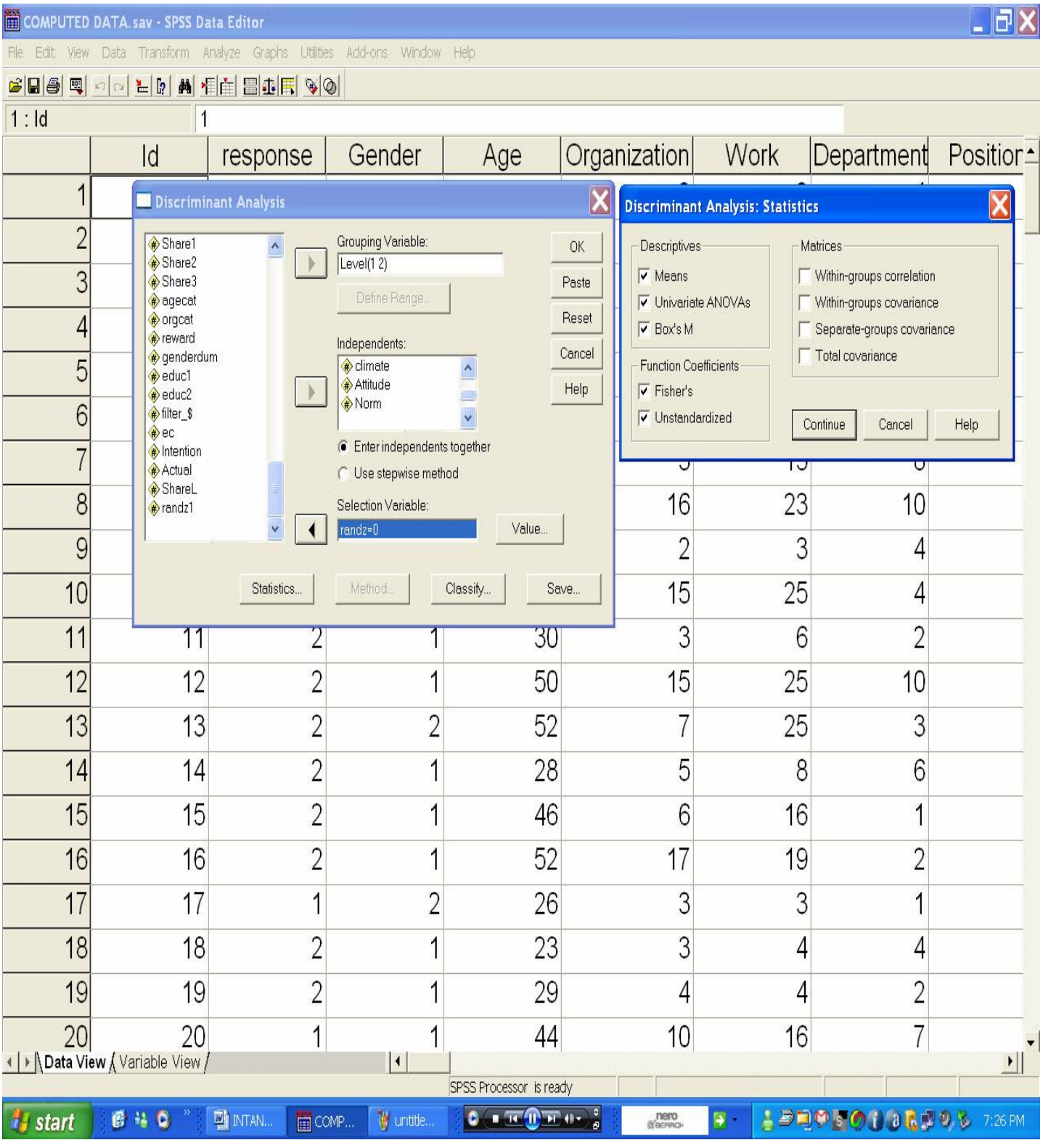
Sohail MS, Daud S (2009). Knowledge sharing in higher education institutions: Perspectives from Malaysia. VINE: J. Inf. Knowl. Manage. Syst. 39(2): 125-142.

Tuten TL, Urban DJ (1999). Specific Responses to Unmet Expectations: The Value of Linking Fishbein's Theory of Reasoned Action and Rusbult's Investment Model, Int. J. Manage. 16(4): 484-489.

APPENDIX I

SPSS procedure

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Discriminant Analysis
Share1
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randz1
Grouping Variable:
Level(1 2)
Define Range...
Independents:
climate
Attitude
Norm
Enter independents together
Use stepwise method
Selection Variable:
randz=0
Value...
OK
Paste
Reset
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Help
Statistics...
Method...
Classify...
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Means
Univariate ANOVAs
Box's M
Function Coefficients
Fisher's
Unstandardized
Matrices
Within-groups correlation
Within-groups covariance
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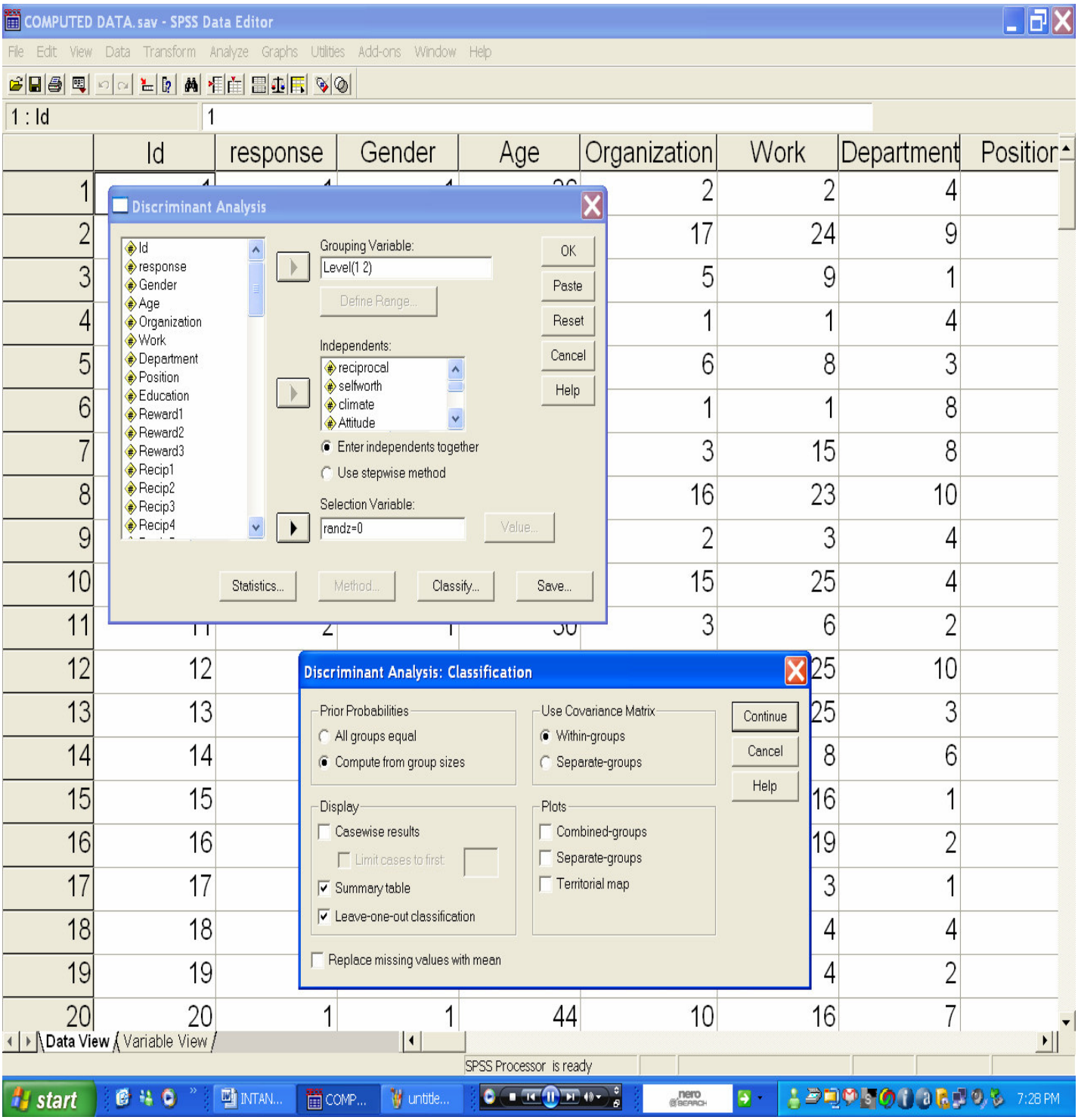
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Grouping Variable:
Level(1 2)
Define Range...
Independents:
reciprocal
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Attitude
Enter independents together
Use stepwise method
Selection Variable:
randz=0
Value...
OK
Paste
Reset
Cancel
Help
Statistics...
Method...
Classify...
Save...
Discriminant Analysis: Classification
Prior Probabilities
All groups equal
Compute from group sizes
Use Covariance Matrix
Within-groups
Separate-groups
Continue
Cancel
Help
Display
Casewise results
Limit cases to first:
Summary table
Leave-one-out classification
Plots
Combined-groups
Separate-groups
Territorial map
Replace missing values with mean
Data View
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SPSS Processor is ready
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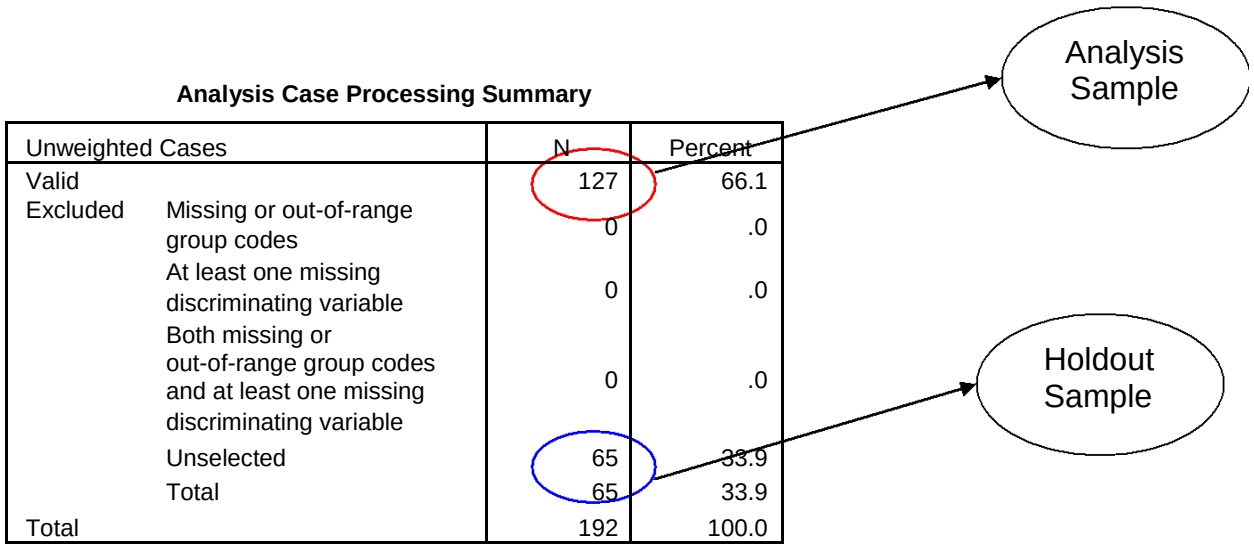
APPENDIX II

SPSS Output

Discriminant

Analysis Case Processing Summary

Unweighted Cases		N	Percent
Valid		127	66.1
Excluded	Missing or out-of-range group codes	0	.0
	At least one missing discriminating variable	0	.0
	Both missing or out-of-range group codes and at least one missing discriminating variable	0	.0
	Unselected	65	33.9
	Total	65	33.9
Total		192	100.0



Group Statistics

Level		Mean	Std. Deviation	Valid N (listwise) Unweighted	Weighted
Low	reciprocal	3.2058	.53423	104	104.000
	selfworth	3.6942	.56014	104	104.000
	climate	3.3990	.75842	104	104.000
	Attitude	3.6481	.62349	104	104.000
	Norm	3.5409	.62813	104	104.000
High	reciprocal	3.7739	.50562	23	23.000
	selfworth	4.2000	.55268	23	23.000
	climate	3.4565	.70032	23	23.000
	Attitude	4.3130	.57470	23	23.000
	Norm	4.2609	.60995	23	23.000
Total	reciprocal	3.3087	.57113	127	127.000
	selfworth	3.7858	.58996	127	127.000
	climate	3.4094	.74588	127	127.000
	Attitude	3.7685	.66448	127	127.000
	Norm	3.6713	.68190	127	127.000

Tests of Equality of Group Means

	Wilks' Lambda	F	df1	df2	Sig.
reciprocal	.852	21.700	1	125	.000
selfworth	.890	15.428	1	125	.000
climate	.999	.111	1	125	.739
Attitude	.850	22.007	1	125	.000
Norm	.833	24.998	1	125	.000

Analysis 1

Box's test of equality of covariance matrices.

Log Determinants

Level	Rank	Log Determinant
Low	5	-7.632
High	5	-9.581
Pooled within-groups	5	-7.569

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

Test Results

Box's M		50.801
F	Approx.	3.095
	df1	15
	df2	6175.171
	Sig.	.000

Tests null hypothesis of equal population covariance matric

Test of equality of variance

Measures the strength of relationship

Summary of Canonical Discriminant Functions

Eigenvalues

Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	.254[a]	100.0	100.0	.450

a. First 1 canonical discriminant functions were used in the analysis.

Wilks' Lambda

Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
1	.798	27.700	5	.000

Value that will be reported in Table 6

Standardized Canonical Discriminant Function Coefficients

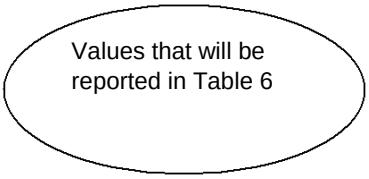
	Function 1
reciprocal	.263
selfworth	-.051
climate	.155
Attitude	.294
Norm	.635

Values that will be reported in Table 6

Structure Matrix

	Function
	1
Norm	.888
Attitude	.833
reciprocal	.827
selfworth	.697
climate	.059

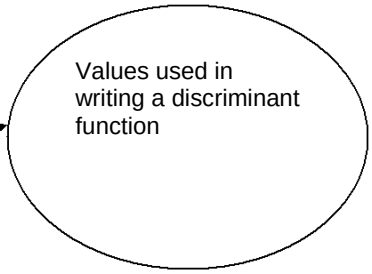
Pooled within-groups correlations between discriminating variables and standardized canonical discriminant functions Variables ordered by absolute size of correlation within function.



Canonical Discriminant Function Coefficients

	Function
	1
reciprocal	.498
selfworth	-.092
climate	.207
Attitude	.478
Norm	1.016
(Constant)	-7.535

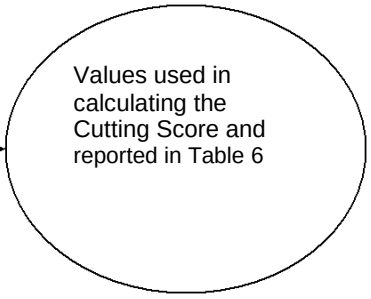
Unstandardized coefficients



Functions at Group Centroids

	Function
Level	1
Low	-.235
High	1.063

Unstandardized canonical discriminant functions evaluated at group means



Classification Statistics

Classification Processing Summary

Processed		192
Excluded	Missing or out-of-range group codes	0
	At least one missing discriminating variable	0
Used in Output		192

Prior Probabilities for Groups

		Cases Used in Analysis	
Level	Prior	Unweighted	Weighted
Low	.819	104	104.000
High	.181	23	23.000
Total	1.000	127	127.000

Classification Function Coefficients

	Level	
	Low	High
reciprocal	-.176	.470
selfworth	9.023	8.904
climate	8.196	8.464
Attitude	-.686	-.066
Norm	6.937	8.255
(Constant)	-41.544	-53.368

Fisher's linear discriminant functions

Classification Results[b,c,d]

				Predicted Group Membership		
			Level	Low	High	Total
Cases Selected	Original	Count	Low	102	2	104
			High	16	7	23
		%	Low	98.1	1.9	100.0
			High	69.6	30.4	100.0
	Cross-validated[a]	Count	Low	102	2	104
			High	17	6	23
		%	Low	98.1	1.9	100.0
			High	73.9	26.1	100.0
Cases Not Selected	Original	Count	Low	52	0	52
			High	6	7	13
		%	Low	100.0	.0	100.0
			High	46.2	53.8	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. 85.8% of selected original grouped cases correctly classified.

c. 90.8% of unselected original grouped cases correctly classified.

d. 85.0% of selected cross-validated grouped cases correctly classified.