Chapter 17

Discriminant Function Analysis

Merle Canfield

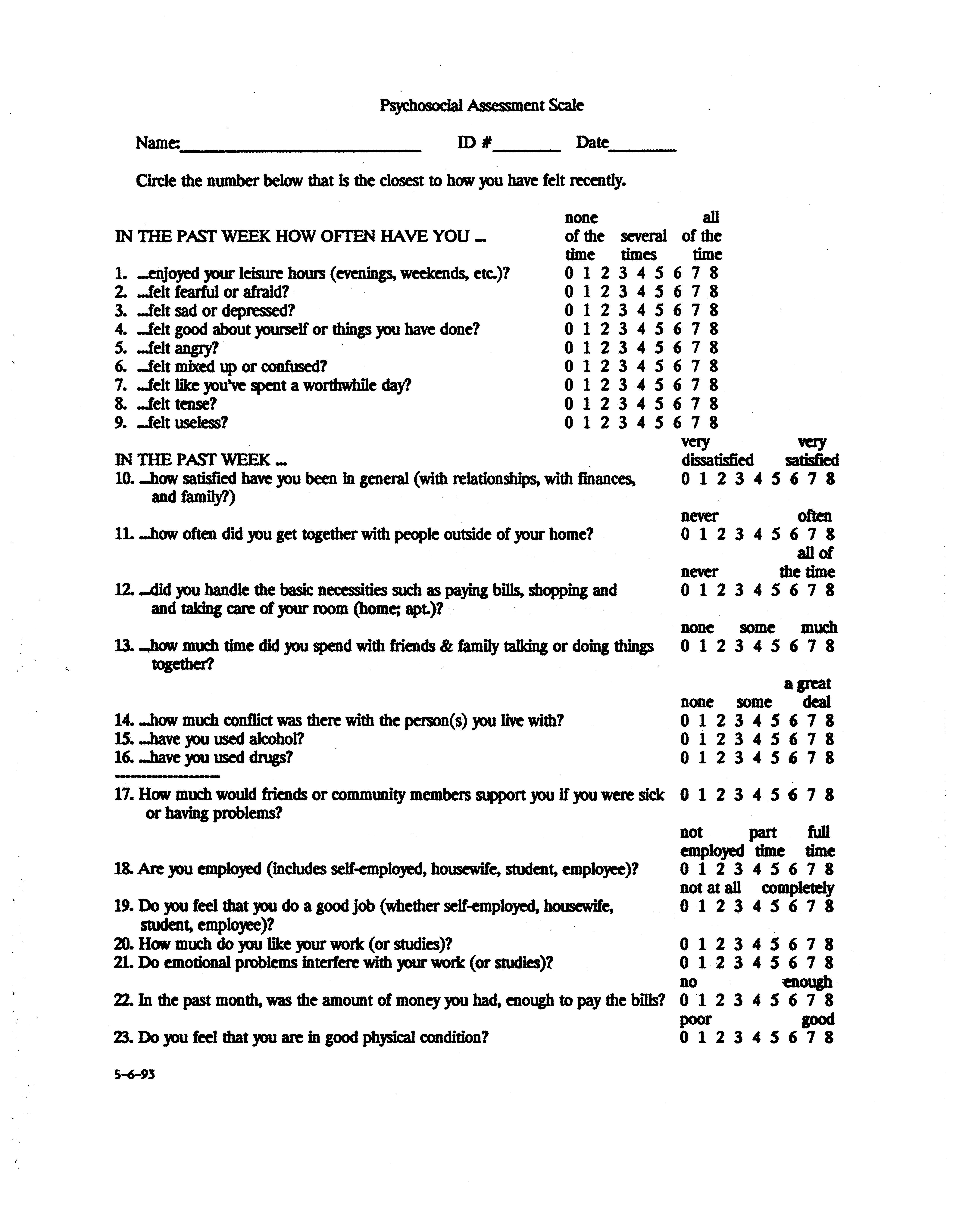
The purpose of discriminant is to predict group membership (a categorical or noncontinuous DV) from a set of continuous variables. Diagnostic groups would be the best way to think about what we are doing. How do you diagnose people? This statistic can be used to develop such diagnostic categories or to decide how to assign people categories. That is diagnostic groups.

What is it that contributes to the flu? High fever, drippy nose, runny eyes, achy muscles, and etc. A formula can be developed that will predict whether the person might have the flu or not.

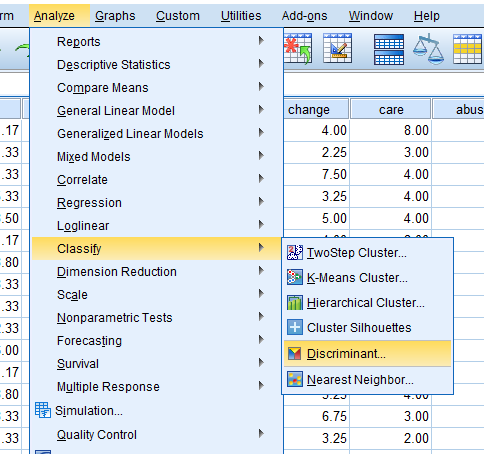
Mathematically MANOVA and discriminant analysis are the same. Although there are some computations that each does and the other does not, the basic difference is that the DVs and IVs are reversed on the continuous and categorical variables. When using MANOVA the IVs are the categorical variables are and the DVs are the continuous. When using discriminant analysis the IVs are the continuous variables and the DVs are the categorical variables. Having pointed out their similarity it should be noted that when they are used in practice the appear to be statistics of a completely different nature.

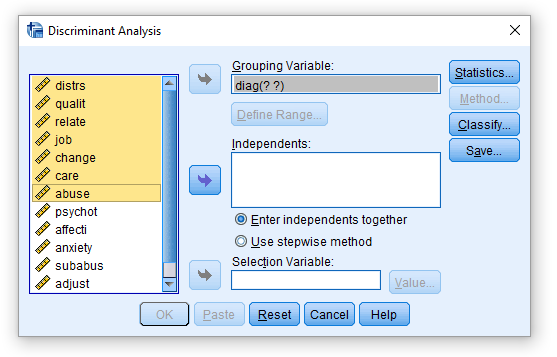
MANOVA answers the question of whether there are differences in group means of the DVs, while discriminant analysis answers the question of whether the IVs can predict group membership. In this case the methods are still somewhat similar in their purpose. They differ more when discriminant function provides methods of classifying subjects into groups based on the IVs. Consequently, the goals of discriminant analysis are to predict groups and classify subjects with a minimum number of variables. Another task for discriminant is to find the minimum number of variables that maximize the ratio of between‑groups sum of squares to within‑groups sum of squares.

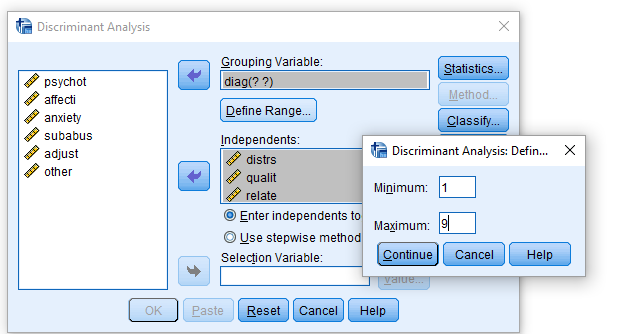
On the following page is the same questionnaire that has been used throughout the manual with a few added items ‑‑ particularly items about change. Seven subtests have been computed from the items.

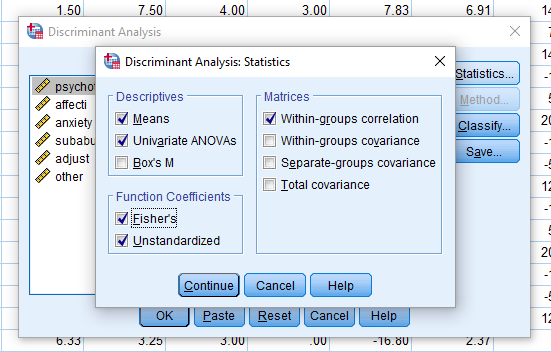


The following spss job stream is used compute the discriminant function on th above questionnaire.









|  |
| --- |
| File Name = pasdsc4.sps |
| DISCRIMINANT  /GROUPS=diag(1 9)  /VARIABLES=distrs qualit relate job change care abuse  /ANALYSIS ALL  /METHOD=MINRESID  /function=6,100,.05  /PIN=.05  /POUT=.10  /PRIORS SIZE  /HISTORY  /STATISTICS=MEAN STDDEV UNIVF COEFF RAW TABLE  /PLOT=MAP  /PLOT=CASES  /CLASSIFY=NONMISSING POOLED. |

|  |
| --- |
| File Name = pasall4.sav |
| |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | diag | distrs | qualit | relate | job | change | care | abuse | | 3.00 | 1.17 | 1.40 | 1.50 | 2.67 | 4.00 | 8.00 | 6.00 | | 5.00 | 1.33 | 3.20 | 4.25 | 3.50 | 2.25 | 3.00 | 2.00 | | 8.00 | 1.33 | 4.20 | 4.75 | 1.50 | 7.50 | 4.00 | 3.00 | | 5.00 | 5.33 | 5.40 | 5.25 | 2.25 | 3.25 | 4.00 | 2.00 | | 4.00 | 3.50 | 2.20 | 4.00 | 3.33 | 5.00 | 4.00 | 7.00 | | 2.00 | 0.17 | 2.80 | 5.33 | 6.25 | 4.00 | 8.00 | 1.00 | | 3.00 | 3.80 | 2.80 | 4.75 | 3.00 | 3.25 | 4.00 | 3.00 | | 3.00 | 3.33 | 4.50 | 7.00 | 4.00 | 6.75 | 3.00 | 8.00 | | 2.00 | 1.33 | 4.80 | 4.50 | 1.50 | 3.25 | 2.00 | 1.00 | | 5.00 | 2.33 | 3.80 | 1.00 | 3.75 | 1.50 | 0.00 | 0.00 | | 8.00 | 6.00 | 5.20 | 4.00 | 3.00 | 5.00 | 7.00 | 0.00 | | 2.00 | 0.17 | 2.80 | 5.33 | 6.25 | 4.00 | 8.00 | 1.00 | | 3.00 | 3.80 | 2.80 | 4.75 | 3.00 | 3.25 | 4.00 | 3.00 | | 3.00 | 3.33 | 4.50 | 7.00 | 4.00 | 6.75 | 3.00 | 8.00 | | 2.00 | 1.33 | 4.80 | 4.50 | 1.50 | 3.25 | 2.00 | 1.00 | | 5.00 | 2.33 | 3.80 | 1.00 | 3.75 | 1.50 | 0.00 | 0.00 | | 8.00 | 6.00 | 5.20 | 4.00 | 3.00 | 5.00 | 7.00 | 0.00 | | 2.00 | 2.00 | 1.40 | 4.00 | 6.33 | 3.25 | 3.00 | 0.00 | | 4.00 | 5.00 | 4.60 | 5.25 | 6.25 | 5.25 | 3.00 | 8.00 | | 5.00 | 3.50 | 4.80 | 5.25 | 2.00 | 5.75 | 6.00 | 0.00 | | 5.00 | 1.50 | 4.75 | 2.00 | 5.00 | 2.00 | 8.00 | 0.00 | | 4.00 | 3.50 | 5.40 | 5.75 | 4.25 | 4.00 | 8.00 | 8.00 | | 2.00 | 2.20 | 3.40 | 5.00 | 4.00 | 1.25 | 3.00 | 0.00 | | 5.00 | 6.00 | 3.00 | 2.50 | 6.00 | 1.50 | 8.00 | 0.00 | | 5.00 | 6.00 | 3.00 | 2.50 | 6.00 | 1.50 | 8.00 | 0.00 | | 1.00 | 7.67 | 8.00 | 6.50 | 4.00 | 8.00 | 8.00 | 3.00 | | 8.00 | 3.83 | 4.40 | 1.50 | 3.25 | 4.25 | 3.00 | 3.00 | | 3.00 | 6.50 | 4.40 | 6.00 | 4.00 | 7.00 | 9.00 | 0.00 | | 4.00 | 3.50 | 4.00 | 5.75 | 5.25 | 5.00 | 6.00 | 6.00 | | 3.00 | 2.67 | 5.00 | 4.00 | 5.25 | 6.00 | 4.00 | 0.00 | | 3.00 | 2.67 | 5.00 | 4.00 | 5.25 | 6.00 | 4.00 | 0.00 | | 2.00 | 2.00 | 1.00 | 3.00 | 2.25 | 2.50 | 2.00 | 7.00 | |

The variables DISTRS, QUALIT, RELATE, JOB, CHANGE, CARE, and ABUSE are subtest of the questionnaire. Their reliability was tested in the reliability chapter. The subtests are comprised of the items in the following manner.

DISTRS

FEARFUL, DEPRESSED; ANGRY CONFUSED; TENSE

QUALIT

LEISURE; FEEL GOOD ABOUT SELF; WORTHWILE DAY; BORED OR USELESS;

RELATE

SATISFIED; GET TOGETHER; SPEND TIME WITH FRIENDS; CONFLICT

JOB

EMPLOYED; GOOD JOB; LIKE WORK; PROBLEMS INTERFERE; AMOUNT OF MONEY

CHANGE

SENSE OF HUMOR; SEE THINGS DIFFERENT; CHANGE IN LIFE; MORE SENSE

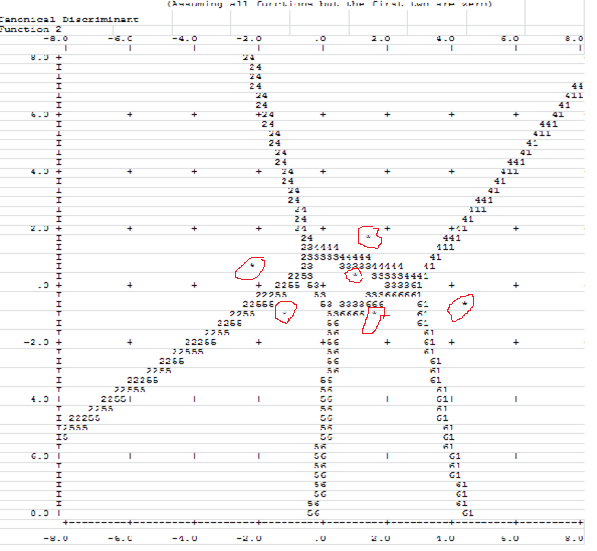
SELCAR

HANDLE BASIC NECESSITIES

ALCDRUG

USE ALCOHOL OR DRUGS

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Group Statistics** | | | | | |  |  |  |  | |  |  |  |  |
| diag | | Mean | Std. Deviation | Valid N (listwise) | |  |  |  |  | |  |  |  |  |
| Unweighted | Weighted |  |  |  |  | |  |  |  |  |
| psychotic | distrs | 7.6700 | .a | 1 | 1.000 |  |  |  |  | |  |  |  |  |
| qualit | 8.0000 | .a | 1 | 1.000 |  |  |  |  | |  |  |  |  |
| relate | 6.5000 | .a | 1 | 1.000 |  |  |  |  | |  |  |  |  |
| job | 4.0000 | .a | 1 | 1.000 |  |  |  |  | |  |  |  |  |
| change | 8.0000 | .a | 1 | 1.000 |  |  |  |  | |  |  |  |  |
| care | 8.0000 | .a | 1 | 1.000 |  |  |  |  | |  |  |  |  |
| abuse | 3.0000 | .a | 1 | 1.000 |  |  |  |  | |  |  |  |  |
| affective | distrs | 1.3143 | .85090 | 7 | 7.000 |  |  |  |  | |  |  |  |  |
| qualit | 3.0000 | 1.48773 | 7 | 7.000 |  |  |  |  | |  |  |  |  |
| relate | 4.5229 | .82907 | 7 | 7.000 |  |  |  |  | |  |  |  |  |
| job | 4.0114 | 2.27726 | 7 | 7.000 |  |  |  |  | |  |  |  |  |
| change | 3.0714 | .95431 | 7 | 7.000 |  |  |  |  | |  |  |  |  |
| care | 4.0000 | 2.76887 | 7 | 7.000 |  |  |  |  | |  |  |  |  |
| abuse | 1.5714 | 2.43975 | 7 | 7.000 |  |  |  |  | |  |  |  |  |
| anxiety | distrs | 3.4088 | 1.51081 | 8 | 8.000 |  |  |  |  | |  |  |  |  |
| qualit | 3.8000 | 1.30822 | 8 | 8.000 |  |  |  |  | |  |  |  |  |
| relate | 4.8750 | 1.82248 | 8 | 8.000 |  |  |  |  | |  |  |  |  |
| job | 3.8963 | .98617 | 8 | 8.000 |  |  |  |  | |  |  |  |  |
| change | 5.3750 | 1.60913 | 8 | 8.000 |  |  |  |  | |  |  |  |  |
| care | 4.8750 | 2.29518 | 8 | 8.000 |  |  |  |  | |  |  |  |  |
| abuse | 3.5000 | 3.46410 | 8 | 8.000 |  |  |  |  | |  |  |  |  |
| sub-abuse | distrs | 3.8750 | .75000 | 4 | 4.000 |  |  |  |  | |  |  |  |  |
| qualit | 4.0500 | 1.36015 | 4 | 4.000 |  |  |  |  | |  |  |  |  |
| relate | 5.1875 | .82601 | 4 | 4.000 |  |  |  |  | |  |  |  |  |
| job | 4.7700 | 1.26026 | 4 | 4.000 |  |  |  |  | |  |  |  |  |
| change | 4.8125 | .55434 | 4 | 4.000 |  |  |  |  | |  |  |  |  |
| care | 5.2500 | 2.21736 | 4 | 4.000 |  |  |  |  | |  |  |  |  |
| abuse | 7.2500 | .95743 | 4 | 4.000 |  |  |  |  | |  |  |  |  |
| adjustment | distrs | 3.5400 | 1.97422 | 8 | 8.000 |  |  |  |  | |  |  |  |  |
| qualit | 3.9688 | .91610 | 8 | 8.000 |  |  |  |  | |  |  |  |  |
| relate | 2.9688 | 1.73945 | 8 | 8.000 |  |  |  |  | |  |  |  |  |
| job | 4.0313 | 1.53202 | 8 | 8.000 |  |  |  |  | |  |  |  |  |
| change | 2.4063 | 1.48166 | 8 | 8.000 |  |  |  |  | |  |  |  |  |
| care | 4.6250 | 3.42000 | 8 | 8.000 |  |  |  |  | |  |  |  |  |
| abuse | .5000 | .92582 | 8 | 8.000 |  |  |  |  | |  |  |  |  |
| other | distrs | 4.2900 | 2.22272 | 4 | 4.000 |  |  |  |  | |  |  |  |  |
| qualit | 4.7500 | .52599 | 4 | 4.000 |  |  |  |  | |  |  |  |  |
| relate | 3.5625 | 1.41973 | 4 | 4.000 |  |  |  |  | |  |  |  |  |
| job | 2.6875 | .80039 | 4 | 4.000 |  |  |  |  | |  |  |  |  |
| change | 5.4375 | 1.41973 | 4 | 4.000 |  |  |  |  | |  |  |  |  |
| care | 5.2500 | 2.06155 | 4 | 4.000 |  |  |  |  | |  |  |  |  |
| abuse | 1.5000 | 1.73205 | 4 | 4.000 |  |  |  |  | |  |  |  |  |
| Total | distrs | 3.2850 | 1.93943 | 32 | 32.000 |  |  |  |  | |  |  |  |  |
| qualit | 3.9484 | 1.42577 | 32 | 32.000 |  |  |  |  | |  |  |  |  |
| relate | 4.2472 | 1.64508 | 32 | 32.000 |  |  |  |  | |  |  |  |  |
| job | 3.9166 | 1.50455 | 32 | 32.000 |  |  |  |  | |  |  |  |  |
| change | 4.1484 | 1.91436 | 32 | 32.000 |  |  |  |  | |  |  |  |  |
| care | 4.8125 | 2.59575 | 32 | 32.000 |  |  |  |  | |  |  |  |  |
| abuse | 2.5313 | 2.99445 | 32 | 32.000 |  |  |  |  | |  |  |  |  |
| a. Insufficient data | | | | | |  |  |  |  | |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  | |  |  |  |  |
| **Tests of Equality of Group Means** | | | | | |  |  |  |  | |  |  |  |  |
|  | Wilks' Lambda | F | df1 | df2 | Sig. |  |  |  |  | |  |  |  |  |
| distrs | .550 | 4.257 | 5 | 26 | .006 |  |  |  |  | |  |  |  |  |
| qualit | .595 | 3.535 | 5 | 26 | .014 |  |  |  |  | |  |  |  |  |
| relate | .675 | 2.501 | 5 | 26 | .056 |  |  |  |  | |  |  |  |  |
| job | .870 | .778 | 5 | 26 | .574 |  |  |  |  | |  |  |  |  |
| change | .404 | 7.663 | 5 | 26 | .000 |  |  |  |  | |  |  |  |  |
| care | .920 | .450 | 5 | 26 | .810 |  |  |  |  | |  |  |  |  |
| abuse | .495 | 5.315 | 5 | 26 | .002 |  |  |  |  | |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  | |  |  |  |  |
| **Pooled Within-Groups Matrices** | | | | | | | | |  | |  |  |  |  |
|  | | distrs | qualit | relate | job | change | care | abuse |  | |  |  |  |  |
| Correlation | distrs | 1.000 | .110 | .227 | .136 | -.089 | .227 | -.211 |  | |  |  |  |  |
| qualit | .110 | 1.000 | .477 | -.109 | .382 | -.055 | -.270 |  | |  |  |  |  |
| relate | .227 | .477 | 1.000 | -.065 | .613 | .162 | .096 |  | |  |  |  |  |
| job | .136 | -.109 | -.065 | 1.000 | -.034 | .384 | -.327 |  | |  |  |  |  |
| change | -.089 | .382 | .613 | -.034 | 1.000 | .105 | .033 |  | |  |  |  |  |
| care | .227 | -.055 | .162 | .384 | .105 | 1.000 | -.257 |  | |  |  |  |  |
| abuse | -.211 | -.270 | .096 | -.327 | .033 | -.257 | 1.000 |  | |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  | |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  | |  |  |  |  |
| **Analysis 1** | |  |  |  |  |  |  |  |  | |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  | |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  | |  |  |  |  |
| **Stepwise Statistics** | | | |  |  |  |  |  |  | |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  | |  |  |  |  |
| **Variables Entered/Removeda,b,c,d** | | |  |  |  |  |  |  |  | |  |  |  |  |
| Step | Entered | Residual Variance |  |  |  |  |  |  |  | |  |  |  |  |
| 1 | change | 8.948 |  |  |  |  |  |  |  | |  |  |  |  |
| 2 | abuse | 6.885 |  |  |  |  |  |  |  | |  |  |  |  |
| 3 | distrs | 5.330 |  |  |  |  |  |  |  | |  |  |  |  |
| 4 | relate | 4.376 |  |  |  |  |  |  |  | |  |  |  |  |
| At each step, the variable that minimizes the sum of the unexplained variation for all pairs of groups is entered. | | |  |  |  |  |  |  |  | |  |  |  |  |
| a. Maximum number of steps is 14. | | |  |  |  |  |  |  |  | |  |  |  |  |
| b. Maximum significance of F to enter is .05. | | |  |  |  |  |  |  |  | |  |  |  |  |
| c. Minimum significance of F to remove is .10. | | |  |  |  |  |  |  |  | |  |  |  |  |
| d. F level, tolerance, or VIN insufficient for further computation. | | |  |  |  |  |  |  |  | |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  | |  |  |  |  |
| **Variables in the Analysis** | | | | |  |  |  |  |  | |  |  |  |  |
| Step | | Tolerance | Sig. of F to Remove | Residual Variance |  |  |  |  |  | |  |  |  |  |
| 1 | change | 1.000 | .000 |  |  |  |  |  |  | |  |  |  |  |
| 2 | change | .999 | .001 | ##### |  |  |  |  |  | |  |  |  |  |
| abuse | .999 | .008 | 8.948 |  |  |  |  |  | |  |  |  |  |
| 3 | change | .992 | .003 | 7.219 |  |  |  |  |  | |  |  |  |  |
| abuse | .955 | .007 | 7.106 |  |  |  |  |  | |  |  |  |  |
| distrs | .949 | .014 | 6.885 |  |  |  |  |  | |  |  |  |  |
| 4 | change | .562 | .000 | 6.530 |  |  |  |  |  | |  |  |  |  |
| abuse | .922 | .010 | 5.598 |  |  |  |  |  | |  |  |  |  |
| distrs | .806 | .003 | 6.035 |  |  |  |  |  | |  |  |  |  |
| relate | .525 | .032 | 5.330 |  |  |  |  |  | |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  | |  |  |  |  |
| **Variables Not in the Analysis** | | | | | |  |  |  |  | |  |  |  |  |
| Step | | Tolerance | Min. Tolerance | Sig. of F to Enter | Residual Variance |  |  |  |  | |  |  |  |  |
| 0 | distrs | 1.000 | 1.000 | .006 | 10.091 |  |  |  |  | |  |  |  |  |
| qualit | 1.000 | 1.000 | .014 | 10.247 |  |  |  |  | |  |  |  |  |
| relate | 1.000 | 1.000 | .056 | 11.729 |  |  |  |  | |  |  |  |  |
| job | 1.000 | 1.000 | .574 | 13.824 |  |  |  |  | |  |  |  |  |
| change | 1.000 | 1.000 | .000 | 8.948 |  |  |  |  | |  |  |  |  |
| care | 1.000 | 1.000 | .810 | 13.539 |  |  |  |  | |  |  |  |  |
| abuse | 1.000 | 1.000 | .002 | 11.115 |  |  |  |  | |  |  |  |  |
| 1 | distrs | .992 | .992 | .016 | 7.106 |  |  |  |  | |  |  |  |  |
| qualit | .854 | .854 | .058 | 7.640 |  |  |  |  | |  |  |  |  |
| relate | .624 | .624 | .079 | 7.546 |  |  |  |  | |  |  |  |  |
| job | .999 | .999 | .623 | 8.273 |  |  |  |  | |  |  |  |  |
| care | .989 | .989 | .955 | 8.761 |  |  |  |  | |  |  |  |  |
| abuse | .999 | .999 | .008 | 6.885 |  |  |  |  | |  |  |  |  |
| 2 | distrs | .949 | .949 | .014 | 5.330 |  |  |  |  | |  |  |  |  |
| qualit | .773 | .773 | .072 | 5.812 |  |  |  |  | |  |  |  |  |
| relate | .618 | .618 | .126 | 6.035 |  |  |  |  | |  |  |  |  |
| job | .892 | .892 | .292 | 6.207 |  |  |  |  | |  |  |  |  |
| care | .921 | .921 | .859 | 6.643 |  |  |  |  | |  |  |  |  |
| 3 | qualit | .766 | .766 | .295 | 4.896 |  |  |  |  | |  |  |  |  |
| relate | .525 | .525 | .032 | 4.376 |  |  |  |  | |  |  |  |  |
| job | .888 | .865 | .317 | 4.800 |  |  |  |  | |  |  |  |  |
| care | .886 | .886 | .980 | 5.267 |  |  |  |  | |  |  |  |  |
| 4 | qualit | .659 | .452 | .121 | 3.777 |  |  |  |  | |  |  |  |  |
| job | .885 | .523 | .368 | 3.975 |  |  |  |  | |  |  |  |  |
| care | .879 | .521 | .986 | 4.327 |  |  |  |  | |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  | |  |  |  |  |
| **Wilks' Lambda** | | | | | | | | | | | | | | |
| Step | Number of Variables | Lambda | df1 | df2 | df3 | Exact F | | | | | Approximate F | | | |
| Statistic | df1 | df2 | | Sig. | Statistic | df1 | df2 | Sig. |
| 1 | 1 | .404 | 1 | 5 | 26 | 7.663 | 5 | ##### | | .000 |  |  |  |  |
| 2 | 2 | .222 | 2 | 5 | 26 | 5.604 | 10 | ##### | | .000 |  |  |  |  |
| 3 | 3 | .127 | 3 | 5 | 26 |  |  |  | |  | 4.952 | 15 | 66.655 | .000 |
| 4 | 4 | .077 | 4 | 5 | 26 |  |  |  | |  | 4.514 | 20 | 77.232 | .000 |
|  |  |  |  |  |  |  |  |  | |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  | |  |  |  |  |  |
| **Summary of Canonical Discriminant Functions** | | | | | | | | | | |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  | |  |  |  |  |
| **Eigenvaluesa,b** | | | | |  |  |  |  |  | |  |  |  |  |
| Function | Eigenvalue | % of Variance | Cumulative % | Canonical Correlation |  |  |  |  |  | |  |  |  |  |
| 1 | 3.444c | 70.8 | 70.8 | .880 |  |  |  |  |  | |  |  |  |  |
| 2 | .968c | 19.9 | 90.6 | .701 |  |  |  |  |  | |  |  |  |  |
| 3 | .356 | 7.3 | 98.0 | .513 |  |  |  |  |  | |  |  |  |  |
| 4 | .099 | 2.0 | 100.0 | .300 |  |  |  |  |  | |  |  |  |  |
| a. Maximum number of functions is 5. | | | | |  |  |  |  |  | |  |  |  |  |
| b. Minimum cumulative percent of variance is 100. | | | | |  |  |  |  |  | |  |  |  |  |
| c. First 2 canonical discriminant functions were used in the analysis. | | | | |  |  |  |  |  | |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  | |  |  |  |  |
| **Wilks' Lambda** | | | | |  |  |  |  |  | |  |  |  |  |
| Test of Function(s) | Wilks' Lambda | Chi-square | df | Sig. |  |  |  |  |  | |  |  |  |  |
| 1 through 4 | .077 | 66.764 | 20 | .000 |  |  |  |  |  | |  |  |  |  |
| 2 through 4 | .341 | 27.983 | 12 | .006 |  |  |  |  |  | |  |  |  |  |
| 3 through 4 | .671 | 10.379 | 6 | .110 |  |  |  |  |  | |  |  |  |  |
| 4 | .910 | 2.456 | 2 | .293 |  |  |  |  |  | |  |  |  |  |
| Maximum significance of Wilks' Lambda is .05. | | | | |  |  |  |  |  | |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  | |  |  |  |  |
| **Standardized Canonical Discriminant Function Coefficients** | | |  |  |  |  |  |  |  | |  |  |  |  |
|  | Function | |  |  |  |  |  |  |  | |  |  |  |  |
| 1 | 2 |  |  |  |  |  |  |  | |  |  |  |  |
| distrs | .780 | -.378 |  |  |  |  |  |  |  | |  |  |  |  |
| relate | -.724 | .722 |  |  |  |  |  |  |  | |  |  |  |  |
| change | 1.092 | -.289 |  |  |  |  |  |  |  | |  |  |  |  |
| abuse | .499 | .680 |  |  |  |  |  |  |  | |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  | |  |  |  |  |
| **Structure Matrix** | | |  |  |  |  |  |  |  | |  |  |  |  |
|  | Function | |  |  |  |  |  |  |  | |  |  |  |  |
| 1 | 2 |  |  |  |  |  |  |  | |  |  |  |  |
| change | .595\* | .210 |  |  |  |  |  |  |  | |  |  |  |  |
| distrs | .414\* | -.331 |  |  |  |  |  |  |  | |  |  |  |  |
| qualitb | .023\* | .008 |  |  |  |  |  |  |  | |  |  |  |  |
| abuse | .302 | .819\* |  |  |  |  |  |  |  | |  |  |  |  |
| relate | .170 | .524\* |  |  |  |  |  |  |  | |  |  |  |  |
| jobb | -.047 | -.311\* |  |  |  |  |  |  |  | |  |  |  |  |
| careb | .046 | -.173\* |  |  |  |  |  |  |  | |  |  |  |  |
| 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 | | |  |  |  |  |  |  |  | |  |  |  |  |
| b. This variable not used in the analysis. | | |  |  |  |  |  |  |  | |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  | |  |  |  |  |
| **Canonical Discriminant Function Coefficients** | | |  |  |  |  |  |  |  | |  |  |  |  |
|  | Function | |  |  |  |  |  |  |  | |  |  |  |  |
| 1 | 2 |  |  |  |  |  |  |  | |  |  |  |  |
| distrs | .497 | -.241 |  |  |  |  |  |  |  | |  |  |  |  |
| relate | -.491 | .489 |  |  |  |  |  |  |  | |  |  |  |  |
| change | .822 | -.217 |  |  |  |  |  |  |  | |  |  |  |  |
| abuse | .217 | .296 |  |  |  |  |  |  |  | |  |  |  |  |
| (Constant) | -3.506 | -1.134 |  |  |  |  |  |  |  | |  |  |  |  |
| Unstandardized coefficients | | |  |  |  |  |  |  |  | |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  | |  |  |  |  |
| **Functions at Group Centroids** | | |  |  |  |  |  |  |  | |  |  |  |  |
| diag | Function | |  |  |  |  |  |  |  | |  |  |  |  |
| 1 | 2 |  |  |  |  |  |  |  | |  |  |  |  |
| psychotic | 4.340 | -.652 |  |  |  |  |  |  |  | |  |  |  |  |
| affective | -2.208 | .559 |  |  |  |  |  |  |  | |  |  |  |  |
| anxiety | .972 | .297 |  |  |  |  |  |  |  | |  |  |  |  |
| sub-abuse | 1.402 | 1.569 |  |  |  |  |  |  |  | |  |  |  |  |
| adjustment | -1.118 | -.909 |  |  |  |  |  |  |  | |  |  |  |  |
| other | 1.671 | -1.162 |  |  |  |  |  |  |  | |  |  |  |  |
| Unstandardized canonical discriminant functions evaluated at group means | | |  |  |  |  |  |  |  | |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  | |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  | |  |  |  |  |
| **Classification Statistics** | | | | |  |  |  |  |  | |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  | |  |  |  |  |
| **Classification Processing Summary** | | |  |  |  |  |  |  |  | |  |  |  |  |
| Processed | | 32 |  |  |  |  |  |  |  | |  |  |  |  |
| Excluded | Missing or out-of-range group codes | 0 |  |  |  |  |  |  |  | |  |  |  |  |
| At least one missing discriminating variable | 0 |  |  |  |  |  |  |  | |  |  |  |  |
| Used in Output | | 32 |  |  |  |  |  |  |  | |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  | |  |  |  |  |
| **Prior Probabilities for Groups** | | | |  |  |  |  |  |  | |  |  |  |  |
| diag | Prior | Cases Used in Analysis | |  |  |  |  |  |  | |  |  |  |  |
| Unweighted | Weighted |  |  |  |  |  |  | |  |  |  |  |
| psychotic | .167 | 1 | 1.000 |  |  |  |  |  |  | |  |  |  |  |
| affective | .167 | 7 | 7.000 |  |  |  |  |  |  | |  |  |  |  |
| anxiety | .167 | 8 | 8.000 |  |  |  |  |  |  | |  |  |  |  |
| sub-abuse | .167 | 4 | 4.000 |  |  |  |  |  |  | |  |  |  |  |
| adjustment | .167 | 8 | 8.000 |  |  |  |  |  |  | |  |  |  |  |
| other | .167 | 4 | 4.000 |  |  |  |  |  |  | |  |  |  |  |
| Total | 1.000 | 32 | 32.000 |  |  |  |  |  |  | |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  | |  |  |  |  |
| **Classification Function Coefficients** | | | | | | |  |  |  | |  |  |  |  |
|  | diag | | | | | |  |  |  | |  |  |  |  |
| psychotic | affective | anxiety | sub-abuse | adjustment | other |  |  |  | |  |  |  |  |
| distrs | 4.224 | .315 | 1.954 | 2.297 | 1.596 | 2.581 |  |  |  | |  |  |  |  |
| relate | -1.472 | 1.594 | -.213 | -.009 | .158 | -1.468 |  |  |  | |  |  |  |  |
| change | 5.908 | .673 | 3.342 | 2.876 | 1.406 | 4.311 |  |  |  | |  |  |  |  |
| abuse | 1.152 | .231 | .892 | 1.647 | .287 | .662 |  |  |  | |  |  |  |  |
| (Constant) | -38.567 | -6.818 | -15.144 | ##### | -6.614 | ##### |  |  |  | |  |  |  |  |
|  | | | | | | |  |  |  | |  |  |  |  |
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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Canonical Discriminant Function 1 | | | | | | | | | | | | | |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Symbols used in territorial map | | | | | |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Symbol Group Label | | | |  |  |  |  |  |  |  |  |  |  |
| ------ ----- -------------------- | | | | | | |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1 1 psychotic | | | | |  |  |  |  |  |  |  |  |  |
| 2 2 affective | | | | |  |  |  |  |  |  |  |  |  |
| 3 3 anxiety | | | | |  |  |  |  |  |  |  |  |  |
| 4 4 sub-abuse | | | | |  |  |  |  |  |  |  |  |  |
| 5 5 adjustment | | | | |  |  |  |  |  |  |  |  |  |
| 6 8 other | | | |  |  |  |  |  |  |  |  |  |  |
| \* Indicates a group centroid | | | | | | | |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Casewise Statistics** | | | | | | | | | | | | |  |
| Case Number | | Actual Group | Highest Group | | | | | Second Highest Group | | | Discriminant Scores | |  |
| Predicted Group | P(D>d | G=g) | | P(G=g | D=d) | Squared Mahalanobis Distance to Centroid | Group | P(G=g | D=d) | Squared Mahalanobis Distance to Centroid | Function 1 | Function 2 |  |
| p | df |  |
| Original | 1 | 3 | 3 | .996 | 2 | .578 | .007 | 4 | .210 | 2.036 | .928 | .223 |  |
| 2 | 5 | 2\*\* | .895 | 2 | .915 | .222 | 5 | .083 | 5.016 | -2.648 | .727 |  |
| 3 | 8 | 3\*\* | .790 | 2 | .493 | .472 | 8 | .272 | 1.661 | 1.637 | .126 |  |
| 4 | 5 | 5 | .469 | 2 | .401 | 1.516 | 3 | .355 | 1.760 | -.329 | .037 |  |
| 5 | 4 | 4 | .736 | 2 | .535 | .613 | 3 | .379 | 1.303 | 1.898 | .964 |  |
| 6 | 2 | 2 | .907 | 2 | .920 | .196 | 5 | .078 | 5.127 | -2.534 | .859 |  |
| 7 | 3 | 5\*\* | .349 | 2 | .350 | 2.103 | 2 | .286 | 2.510 | -.627 | .456 |  |
| 8 | 3 | 4\*\* | .600 | 2 | .897 | 1.023 | 3 | .100 | 5.419 | 1.996 | 2.387 |  |
| 9 | 2 | 2 | .975 | 2 | .780 | .051 | 5 | .213 | 2.649 | -2.166 | .337 |  |
| 10 | 5 | 5 | .731 | 2 | .874 | .626 | 2 | .112 | 4.732 | -1.607 | -1.531 |  |
| 11 | 8 | 8 | .861 | 2 | .856 | .300 | 3 | .108 | 4.441 | 1.621 | -1.708 |  |
| 12 | 2 | 2 | .907 | 2 | .920 | .196 | 5 | .078 | 5.127 | -2.534 | .859 |  |
| 13 | 3 | 5\*\* | .349 | 2 | .350 | 2.103 | 2 | .286 | 2.510 | -.627 | .456 |  |
| 14 | 3 | 4\*\* | .600 | 2 | .897 | 1.023 | 3 | .100 | 5.419 | 1.996 | 2.387 |  |
| 15 | 2 | 2 | .975 | 2 | .780 | .051 | 5 | .213 | 2.649 | -2.166 | .337 |  |
| 16 | 5 | 5 | .731 | 2 | .874 | .626 | 2 | .112 | 4.732 | -1.607 | -1.531 |  |
| 17 | 8 | 8 | .861 | 2 | .856 | .300 | 3 | .108 | 4.441 | 1.621 | -1.708 |  |
| 18 | 2 | 5\*\* | .681 | 2 | .523 | .767 | 2 | .462 | 1.016 | -1.805 | -.365 |  |
| 19 | 4 | 4 | .572 | 2 | .729 | 1.117 | 3 | .217 | 3.536 | 2.453 | 1.456 |  |
| 20 | 5 | 3\*\* | .532 | 2 | .410 | 1.261 | 8 | .295 | 1.918 | .381 | -.658 |  |
| 21 | 5 | 5 | .618 | 2 | .657 | .964 | 2 | .338 | 2.293 | -2.099 | -.951 |  |
| 22 | 4 | 4 | .468 | 2 | .799 | 1.519 | 3 | .186 | 4.431 | .435 | 2.333 |  |
| 23 | 2 | 2 | .264 | 2 | .967 | 2.665 | 5 | .033 | 9.421 | -3.840 | .511 |  |
| 24 | 5 | 5 | .620 | 2 | .809 | .955 | 8 | .104 | 5.063 | -.519 | -1.681 |  |
| 25 | 5 | 5 | .620 | 2 | .809 | .955 | 8 | .104 | 5.063 | -.519 | -1.681 |  |
| 26 | 1 | 1 | 1.000 | 2 | .973 | 0.000 | 8 | .024 | 7.386 | 4.340 | -.652 |  |
| 27 | 8 | 8 | .972 | 2 | .804 | .056 | 3 | .149 | 3.434 | 1.804 | -1.358 |  |
| 28 | 3 | 8\*\* | .686 | 2 | .729 | .755 | 1 | .169 | 3.674 | 2.531 | -1.284 |  |
| 29 | 4 | 4 | .844 | 2 | .628 | .338 | 3 | .347 | 1.527 | .822 | 1.524 |  |
| 30 | 3 | 8\*\* | .676 | 2 | .554 | .782 | 3 | .294 | 2.053 | .787 | -1.124 |  |
| 31 | 3 | 8\*\* | .676 | 2 | .554 | .782 | 3 | .294 | 2.053 | .787 | -1.124 |  |
| 32 | 2 | 3\*\* | .214 | 2 | .353 | 3.080 | 4 | .313 | 3.322 | -.411 | 1.379 |  |
| \*\*. Misclassified case | | | | | | | | | | | | |  |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Classification Resultsa** | | | | | | | | | |  |  |  |  |
| diag | | | Predicted Group Membership | | | | | | Total |  |  |  |  |
| psychotic | affective | anxiety | sub-abuse | adjustment | other |  |  |  |  |
| Original | Count | psychotic | 1 | 0 | 0 | 0 | 0 | 0 | 1 |  |  |  |  |
| affective | 0 | 5 | 1 | 0 | 1 | 0 | 7 |  |  |  |  |
| anxiety | 0 | 0 | 1 | 2 | 2 | 3 | 8 |  |  |  |  |
| sub-abuse | 0 | 0 | 0 | 4 | 0 | 0 | 4 |  |  |  |  |
| adjustment | 0 | 1 | 1 | 0 | 6 | 0 | 8 |  |  |  |  |
| other | 0 | 0 | 1 | 0 | 0 | 3 | 4 |  |  |  |  |
| % | psychotic | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 100.0 |  |  |  |  |
| affective | 0.0 | 71.4 | 14.3 | 0.0 | 14.3 | 0.0 | 100.0 |  |  |  |  |
| anxiety | 0.0 | 0.0 | 12.5 | 25.0 | 25.0 | 37.5 | 100.0 |  |  |  |  |
| sub-abuse | 0.0 | 0.0 | 0.0 | 100.0 | 0.0 | 0.0 | 100.0 |  |  |  |  |
| adjustment | 0.0 | 12.5 | 12.5 | 0.0 | 75.0 | 0.0 | 100.0 |  |  |  |  |
| other | 0.0 | 0.0 | 25.0 | 0.0 | 0.0 | 75.0 | 100.0 |  |  |  |  |
| a. 62.5% of original grouped cases correctly classified. | | | | | | | | | |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |

|  |
| --- |
| File Name = cmpdsc1.sps |
| compute psychot = ( distrs\*4.223727)+((‑1.471706)\*relate)+(change\*5.908059).  compute psychot = psychot+(abuse\*1.151814)+(‑38.56666).  compute affecti = (distrs\*.3147697)+(relate\*1.593594)+(change\*.6730551).  compute affecti = affecti +(abuse\*.2313193)+(‑6.817778).  compute anxiety = ( distrs\*1.954008)+((‑.1231648)\*relate)+(change\*3.341649).  compute anxiety = anxiety+(abuse\*.8917886)+(‑15.14384).  compute subabus = (distrs\*2.29737)+(relate\*(‑.008612015))+(change\*2.876287).  compute subabus = subabus +(abuse\*1.646836)+(‑19.11142).  compute adjust = ( distrs\*1.596124)+(.1578773\*relate)+(change\*1.405559).  compute adjust = adjust+(abuse\*.2873630)+(‑6.614153).  compute other = (distrs\*2.581243)+(relate\*(‑1.467931))+(change\*4.310739).  compute other = other +(abuse\*.6623786)+(‑16.93038).  list psychot affecti anxiety subabus adjust other  /format=wrap numbered. |

PSYCHOT AFFECTI ANXIETY SUBABUS ADJUST OTHER

1 ‑5.29 .02 5.67 4.95 2.84 5.11

2 ‑23.61 2.35 ‑3.77 ‑6.33 ‑.08 ‑8.71

3 7.83 6.91 14.61 10.42 7.66 13.85

4 ‑2.28 5.88 7.27 5.73 7.86 4.46

5 7.93 5.64 14.15 14.80 8.64 12.42

6 ‑20.91 4.65 ‑1.21 ‑5.61 .41 ‑6.41

7 ‑6.85 4.83 5.23 3.87 5.63 1.90

8 14.29 11.78 20.19 21.07 11.59 15.79

9 ‑19.22 3.19 ‑1.35 ‑5.10 1.07 ‑5.43

10 ‑21.33 ‑3.48 ‑5.70 ‑9.45 ‑.63 ‑5.92

11 10.43 4.81 12.80 9.02 10.62 14.24

12 ‑20.91 4.65 ‑1.21 ‑5.61 .41 ‑6.41

13 ‑6.85 4.83 5.23 3.87 5.63 1.90

14 14.29 11.78 20.19 21.07 11.59 15.79

15 ‑19.22 3.19 ‑1.35 ‑5.10 1.07 ‑5.43

16 ‑21.33 ‑3.48 ‑5.70 ‑9.45 ‑.63 ‑5.92

17 10.43 4.81 12.80 9.02 10.62 14.24

18 ‑16.80 2.37 ‑.87 ‑5.20 1.78 ‑3.63

19 15.06 8.51 18.66 20.61 11.87 16.20

20 2.46 6.52 10.26 5.42 7.88 9.18

21 ‑23.36 ‑1.81 ‑5.78 ‑9.93 ‑1.09 ‑7.37

22 .60 7.99 11.49 13.56 7.80 6.21

23 ‑29.25 2.68 ‑7.28 ‑10.50 ‑.56 ‑13.20

24 ‑8.04 .06 1.28 ‑1.03 5.47 1.35

25 ‑8.04 .06 1.28 ‑1.03 5.47 1.35

26 34.98 12.03 28.45 26.40 18.76 29.80

27 3.97 .33 9.03 6.84 6.57 11.06

28 21.41 9.50 20.21 15.90 14.55 21.22

29 4.21 8.20 13.05 13.14 8.63 9.19

30 2.27 4.44 9.63 4.25 6.71 9.95

31 2.27 4.44 9.63 4.25 6.71 9.95

32 ‑11.70 1.89 2.99 4.18 2.58 ‑.76

Number of cases read: 32 Number of cases listed: 32

|  |
| --- |
| File Name = cmpdsc2.sps |
| compute fun1 = ( distrs\*0.4970089)+((‑.4907447)\*relate)+(change\*0.8215985).  compute fun1 = fun1+(abuse\*0.2171575)+(‑3.506419).  compute fun2 = (distrs\*(‑0.2405888))+(relate\*0.4891394)+(change\*(‑0.2173887)).  compute fun2 = fun2 +(abuse\*0.2956920)+(‑1.133779).  list fun1 fun2  /format=wrap numbered. |

FUN1 FUN2

1 .93 .22

2 ‑2.65 .73

3 1.64 .13

4 ‑.33 .04

5 1.90 .96

6 ‑2.53 .86

7 ‑.63 .46

8 2.00 2.39

9 ‑2.17 .34

10 ‑1.61 ‑1.53

11 1.62 ‑1.71

12 ‑2.53 .86

13 ‑.63 .46

14 2.00 2.39

15 ‑2.17 .34

16 ‑1.61 ‑1.53

17 1.62 ‑1.71

18 ‑1.81 ‑.36

19 2.45 1.46

20 .38 ‑.66

21 ‑2.10 ‑.95

22 .43 2.33

23 ‑3.84 .51

24 ‑.52 ‑1.68

25 ‑.52 ‑1.68

26 4.34 ‑.65

27 1.80 ‑1.36

28 2.53 ‑1.28

29 .82 1.52

30 .79 ‑1.12

31 .79 ‑1.12

32 ‑.41 1.38

Number of cases read: 32 Number of cases listed: 32