Analyzing Social Networks Detailed Instructions on the Examples in the Text

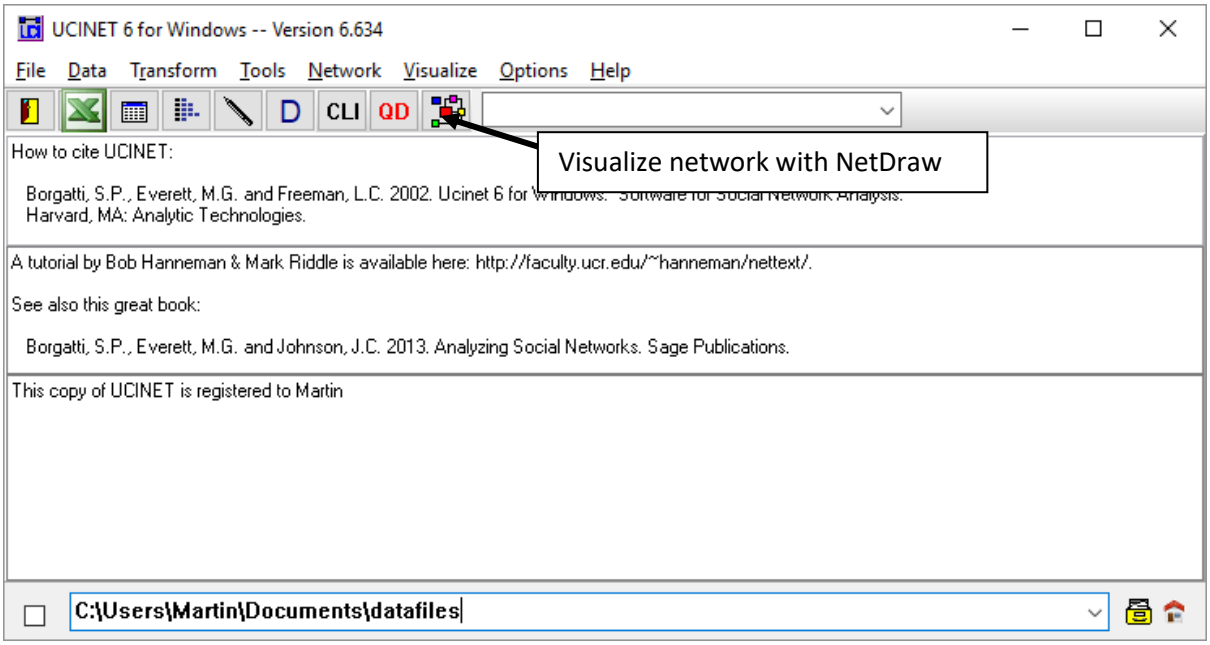
This gives the detailed commands required to reproduce all the examples in the text created using UCINET, E-Net and Netdraw. Note we do not show details for Siena or PNet. We are grateful to Daniel Tischer who has documented most of the examples. Occasionally the outputs will not match exactly, this can be for a number of reasons. Some routines use random number generators and the output is dependent on some random number. This may affect the ordering of the output or some values may be different but any differences should be slight. Secondly newer versions of UCINET may have more efficient or later algorithms and this could marginally affect the results but again any differences will be slight.

Steve, Martin and Jeff

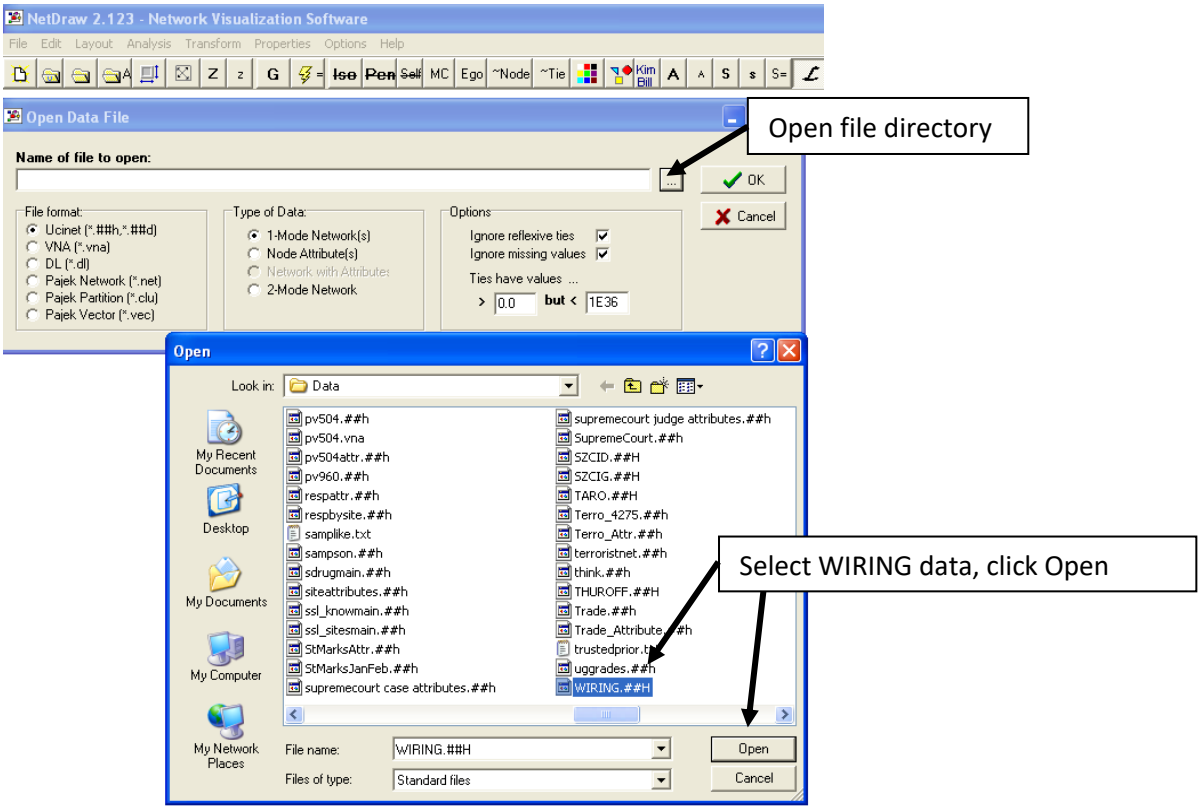
Contents

Section 2.2 Graphs

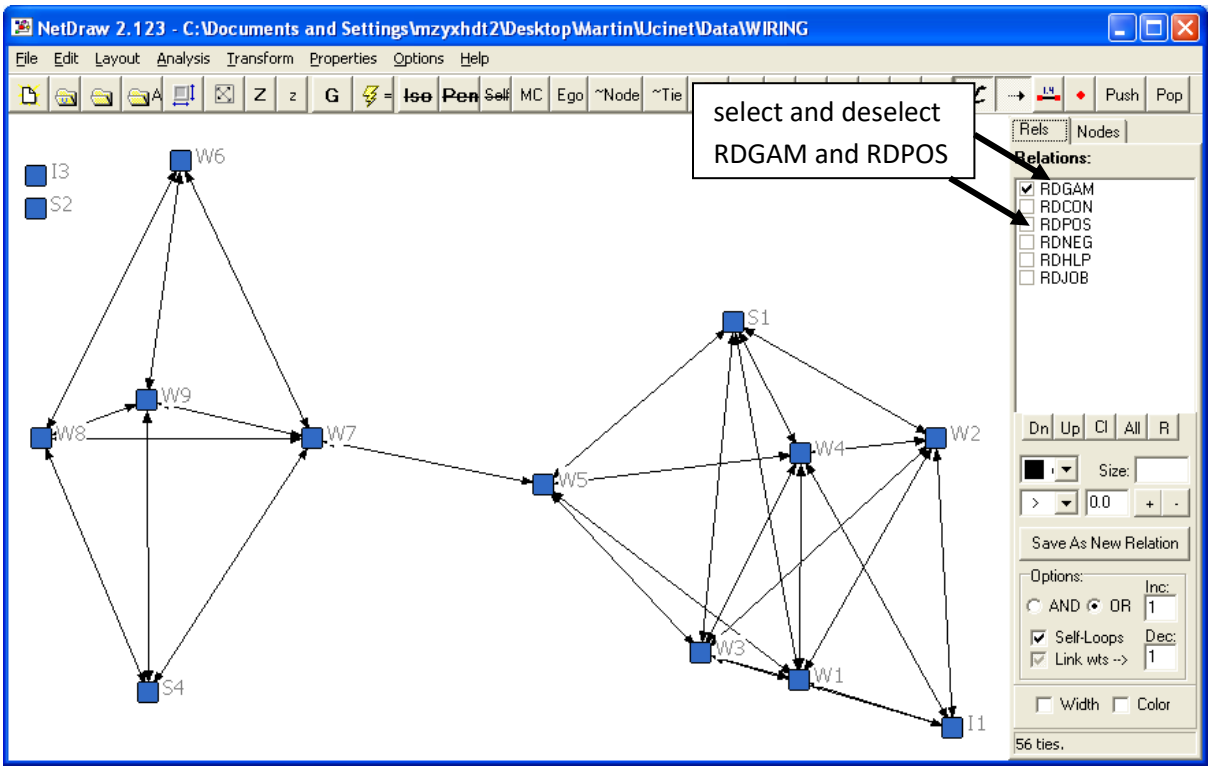
To visualise the "**Wiring**" dataset open UCINET and run NetDraw:



Open the UCINET dataset "**WIRING**"



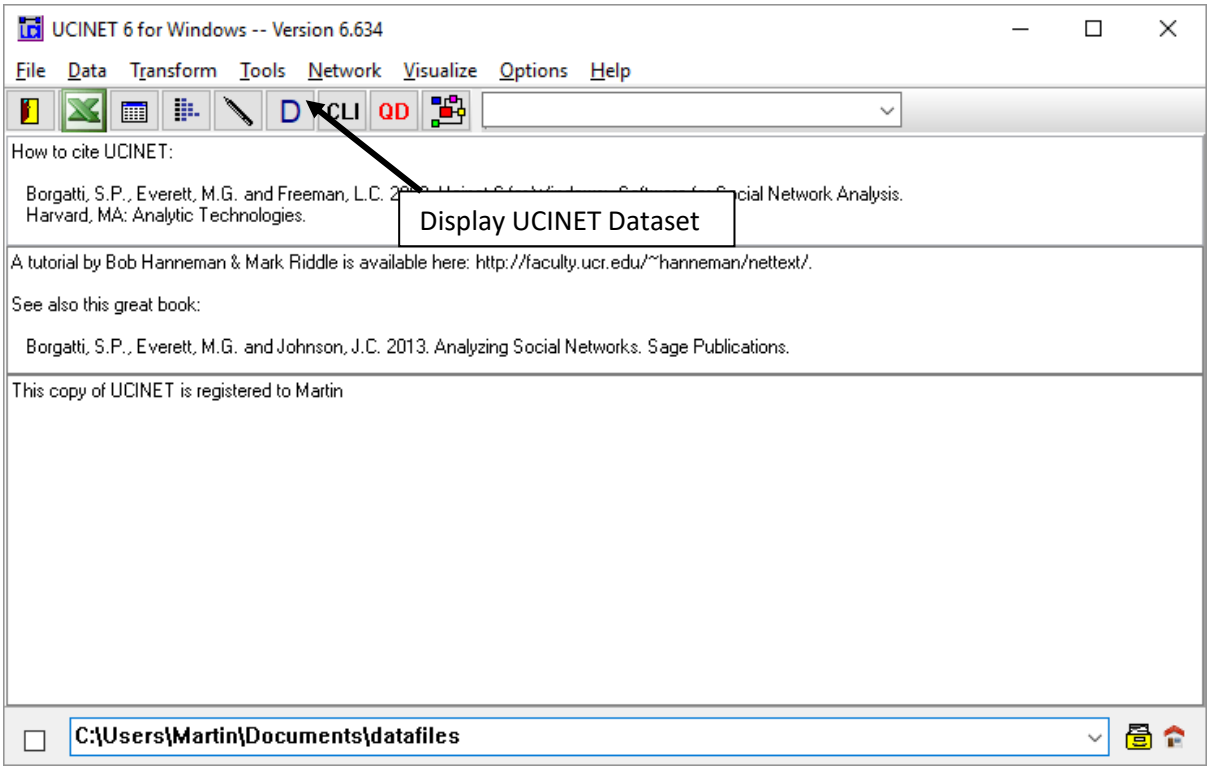
To show the different kinds of social ties in the dataset as illustrated in **Figure 2.2**, select and deselect **RDGAM** ("Plays games") and **RDPOS** ("Friendship ties") or any of the other routines.



Follow the same steps to illustrate the **Campnet** dataset to see if your visualization matches **Figure 2.3** in the book

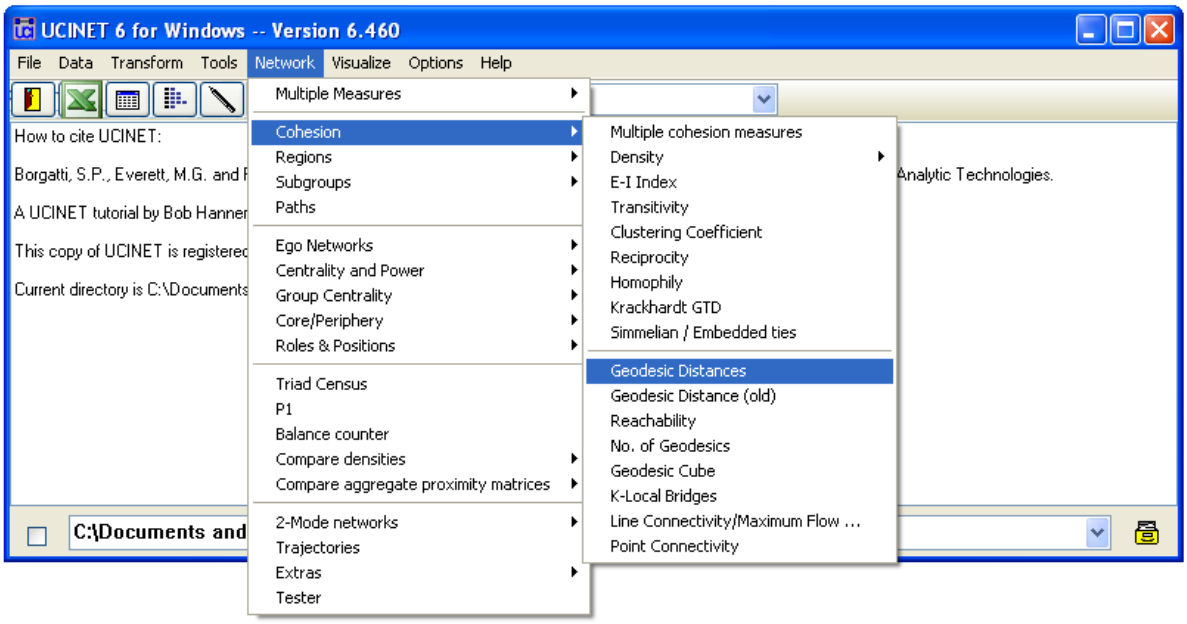
Section 2.4 Adjacency Matrix

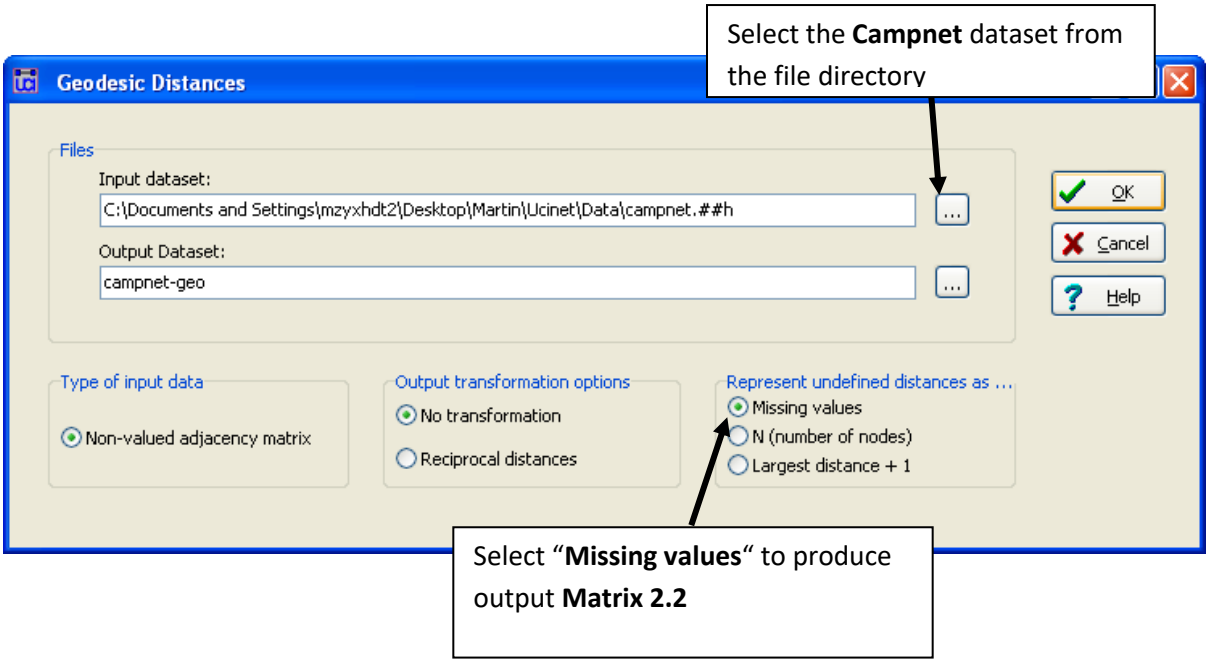
To display the Matrix 2.1 and 2.2 open the UCINET "Display" function



Select the dataset **Wiring** and a new window will open. The first Matrix "**RDGAM**" is the adjacency matrix depicted in **Matrix 2.1.**

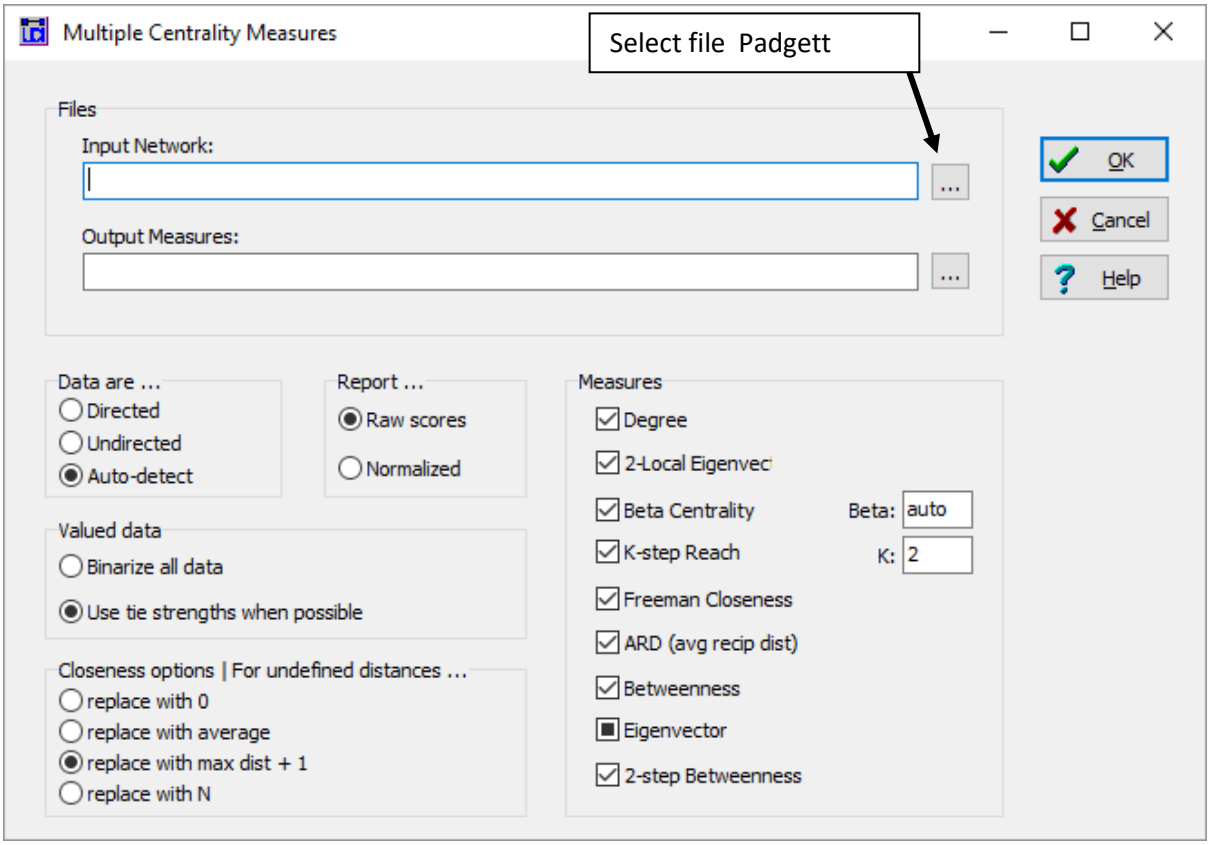
To produce output **Matrix 2.2** select the Geodesic Distances routine under **Network|Cohesion|Geodesic Distances** which will open a new window



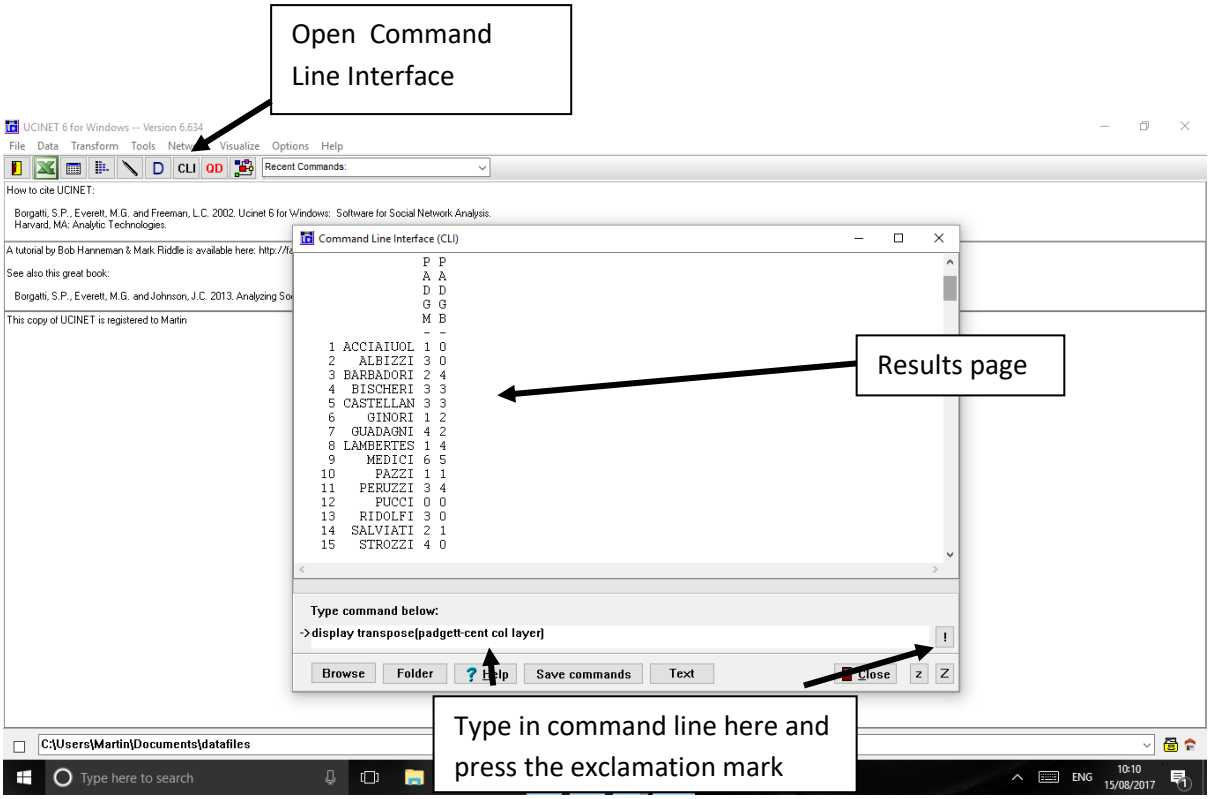

Select the **Campnet** dataset from the file directory
Geodesic Distances
Files
Input dataset:
C:\Documents and Settings\mzyxhdt2\Desktop\Martin\Ucinet\Data\campnet.##h
Output Dataset:
campnet-geo
OK
Cancel
Help
Type of input data
Non-valued adjacency matrix
Output transformation options
No transformation
Reciprocal distances
Represent undefined distances as ...
Missing values
N (number of nodes)
Largest distance + 1
Select "**Missing values**" to produce output **Matrix 2.2**

Section 5.4.1 Transposing

To run the centrality routine described in section 5.4, open UCINET **Network|Centrality and Power|Multiple Measures** and select the **Padgett** file from the file directory. The measures should be selected as depicted below and the results will be displayed in a new window.

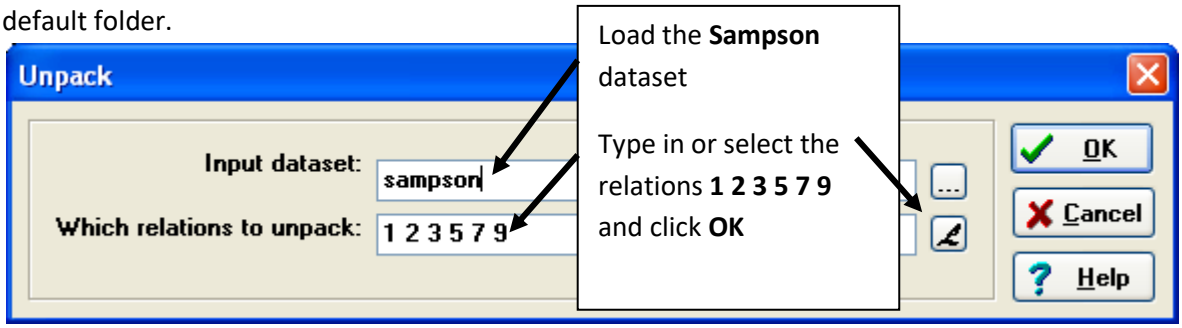


Open the **Command Line Interface Window** **CLI** and type in the command line "**display transpose(Padgett-cent col layer)**". Click the exclamation mark and the results will appear in the Matrix Algebra Command Window when scrolling down.


Open Command Line Interface
UCINET 6 for Windows -- Version 6.634
File Data Transform Tools Visualize Options Help
CLI
QD
Recent Commands:
How to cite UCINET:
Borgatti, S.P., Everett, M.G. and Freeman, L.C. 2002. Ucinet 6 for Windows: Software for Social Network Analysis. Harvard, MA: Analytic Technologies.
A tutorial by Bob Hanneman & Mark Fliddle is available here:
See also this great book:
Borgatti, S.P., Everett, M.G. and Johnson, J.C. 2013. Analyzing So
This copy of UCINET is registered to Martin
Command Line Interface (CLI)
P P
A A
D D
G G
M B
- -
1 ACCIAIUOL 1 0
2 ALBIZZI 3 0
3 BARBADORI 2 4
4 BISCHERI 3 3
5 CASTELLAN 3 3
6 GINORI 1 2
7 GUADAGNI 4 2
8 LAMBERTES 1 4
9 MEDICI 6 5
10 PAZZI 1 1
11 PERUZZI 3 4
12 PUCCI 0 0
13 RIDOLFI 3 0
14 SALVIATI 2 1
15 STROZZI 4 0
Results page
Type command below:
-> display transpose(padgett-cent col layer)
!
Browse
Folder
Help
Save commands
Text
Close
z
Z
Type in command line here and press the exclamation mark
C:\Users\Martin\Documents\datafiles
Type here to search
ENG
10:10
15/08/2017

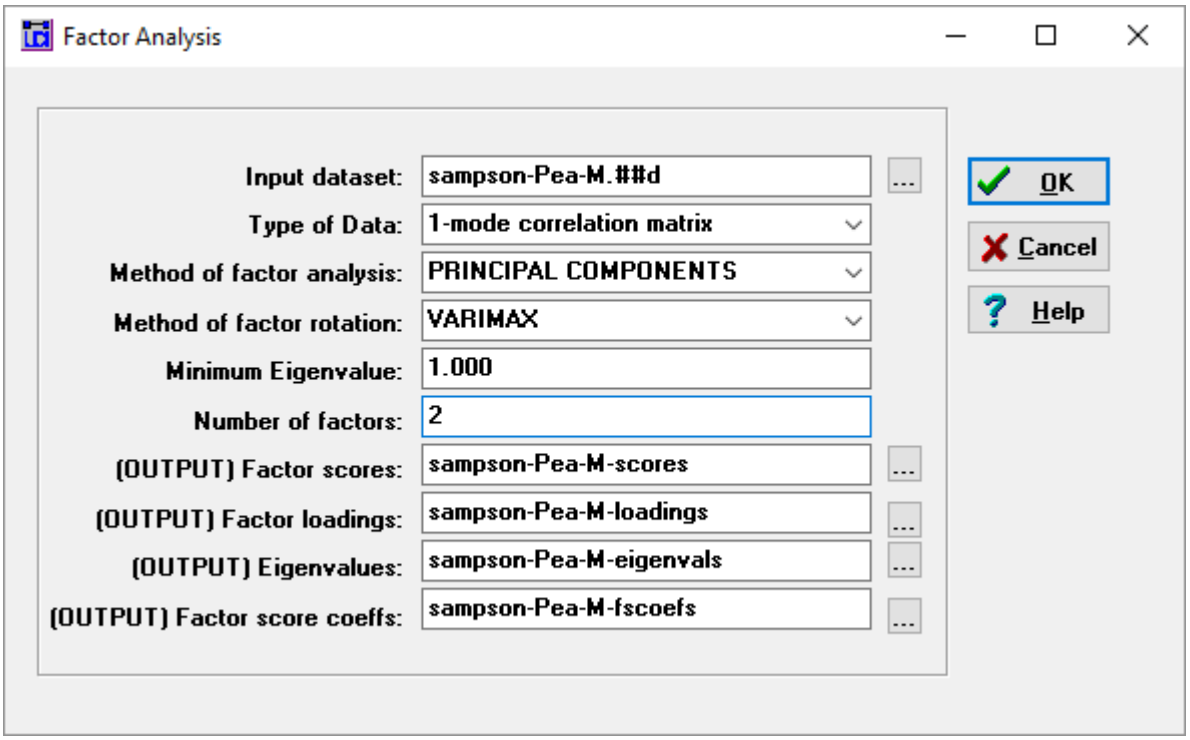
Section 5.4.5 Combining Relations

To create a new relation called positive, first unpack the **Sampson** dataset: go to Data|Unpack and select the **Sampson** file. In the box named "Which relations to unpack" enter **1 2 3 5 7 9** (or select from the dropdown box) and click OK. The individual relations are automatically saved in your default folder.

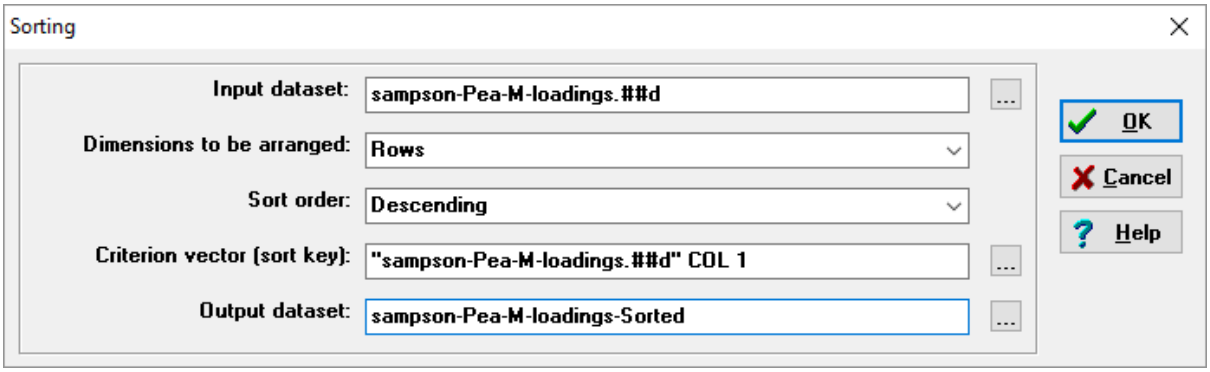


Then open the Command Line Interface Window and type in the command →**positive = add(samplk1 samplk2 samplk3 sampes sampin samppr)**. The new relation is saved as **positive** in your default folder.

To run the Factor Analysis you will need to correlate the matrices. Go to **Tools|Similarities &Distances** and load the **Sampson** data. Select the options **Pearson correlation** and **MATRICES** and click OK. Then go to **Tools|Scaling/ Decomposition|Factor Analysis** and load the **Sampson-Pea-M** file. Select the options "**1-mode correlation matrix**", "**PRINCIPAL COMPONENTS**" and "**VARIMAX**" and set the "**Number of factors**" to **2**. Click OK and your results will open in a new window and are headed "**Rotated Factor Loadings**".

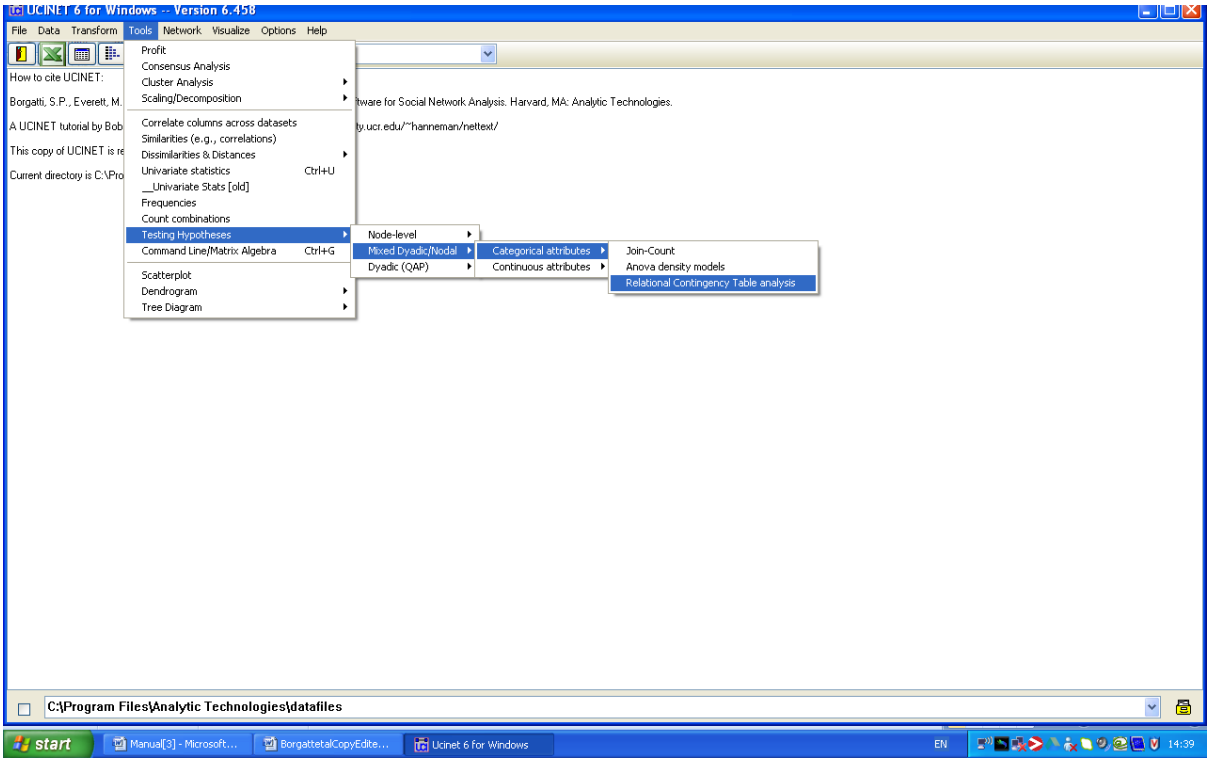


To obtain the order given in matrix 5.6 then run Data|Sort on sampson-Pea-M-loadings and select descending.

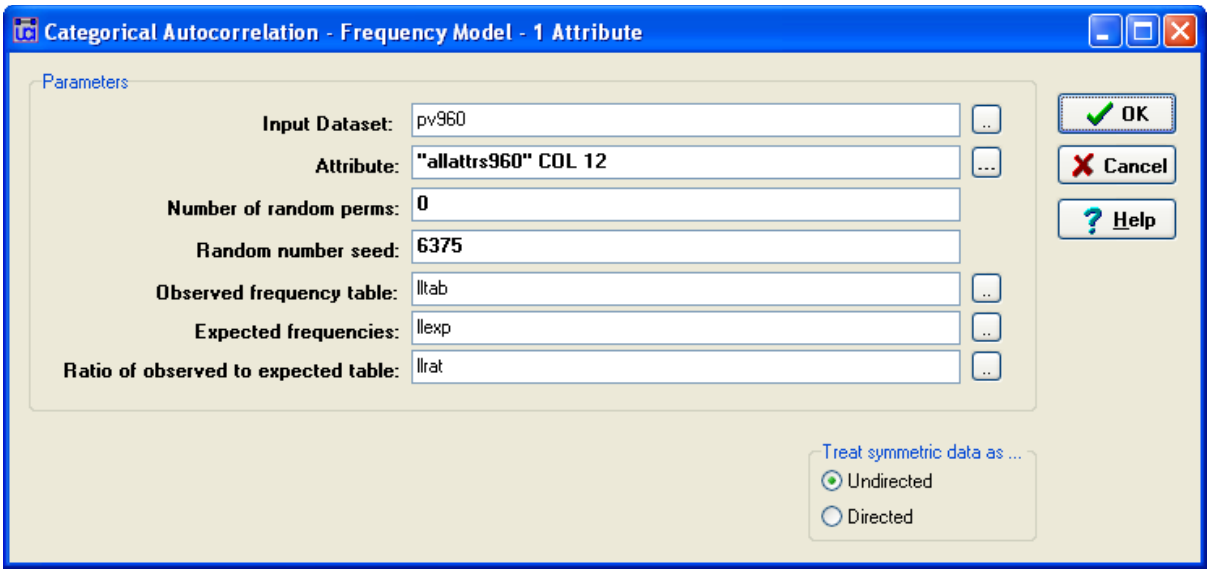

Sorting
Input dataset:
sampson-Pea-M-loadings.##d
Dimensions to be arranged:
Rows
Sort order:
Descending
Criterion vector (sort key):
"sampson-Pea-M-loadings.##d" COL 1
Output dataset:
sampson-Pea-M-loadings-Sorted
OK
Cancel
Help

Section 5.4.6 Combining Nodes

There is no procedure to normalize by expected values as shown in matrix 5.7 but this is an output given in another routine Tools|Testing Hypothesis|Mixed Dyadic/Nodal|Catergorical Attributes|Relational Contigency Table analysis.



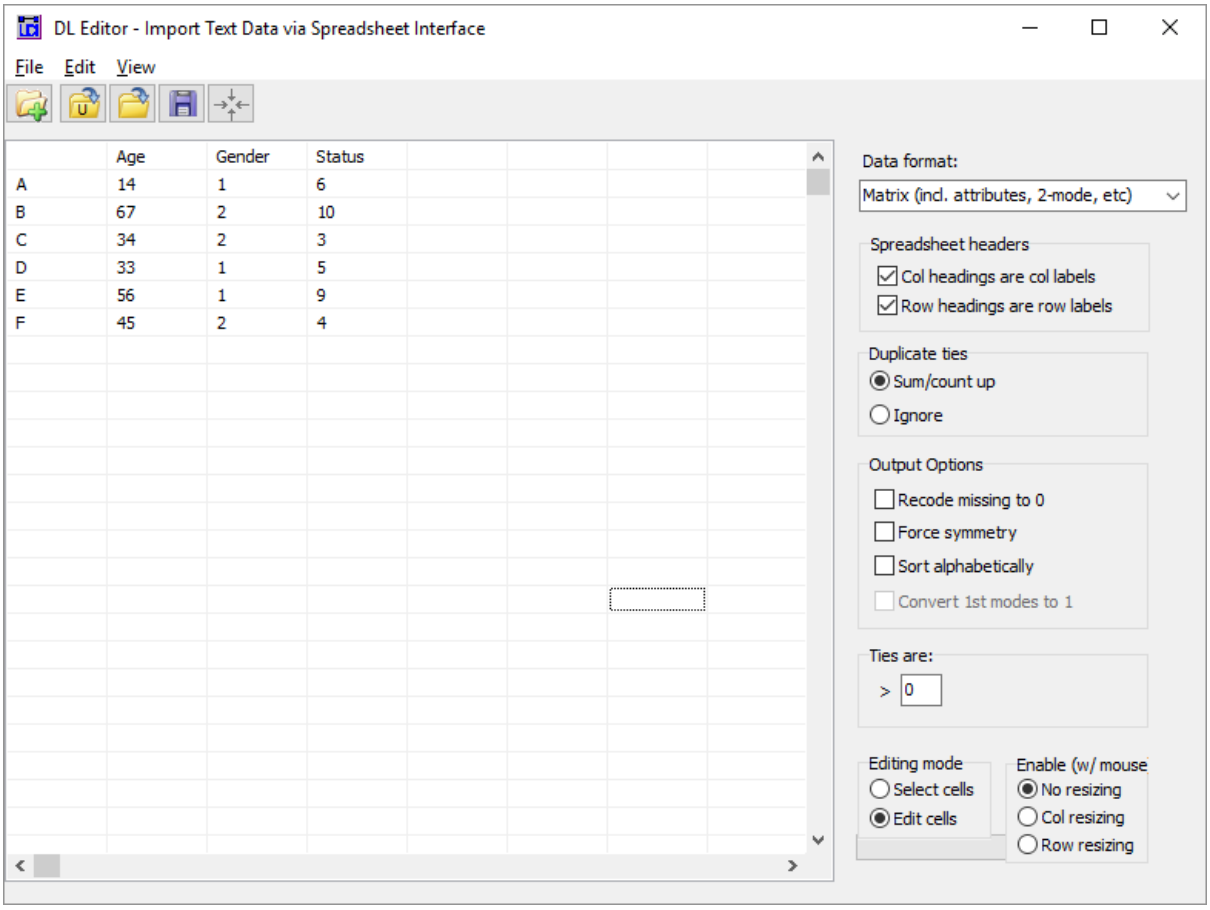
The dataset is PV960 and the departments are in column 12 of the attribute dataset Allattrs960 as we do not want to do the permutation test we set the number of random permutations to 0.



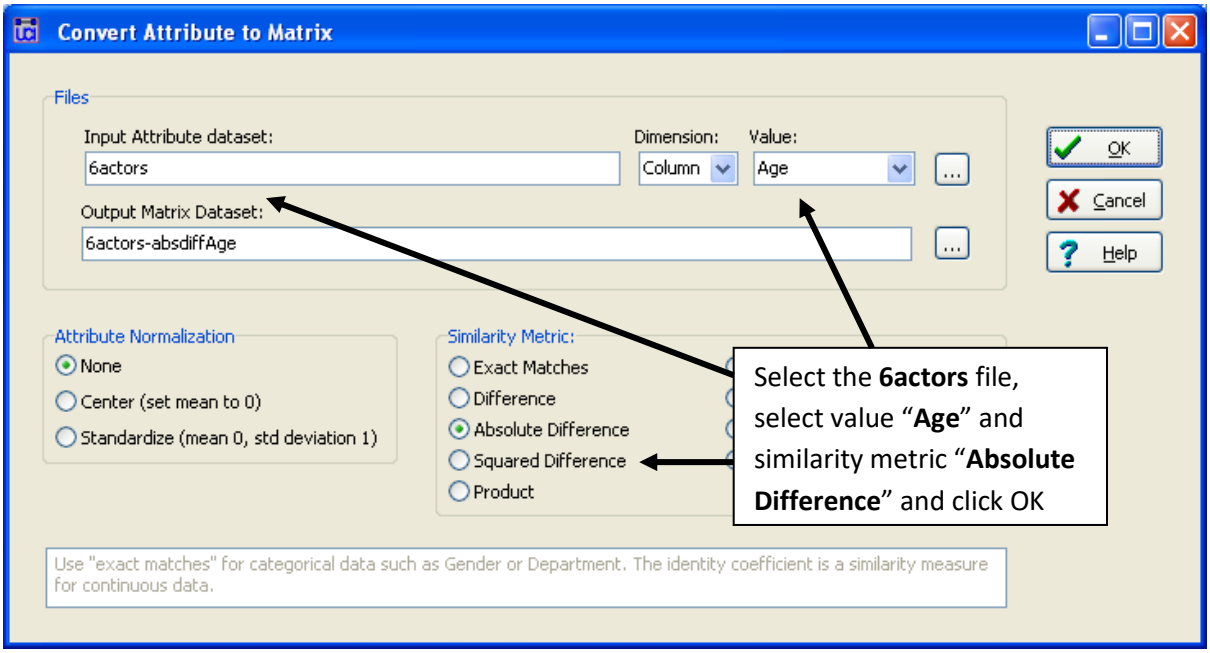
The third matrix in the output is Matrix 5.7 and it is saved in a file called llrat if this is dichotomised at a value of 1.4 and the labels added and then viewed in Netdraw we obtain the network shown in Figure 5.13.

Section 5.8 Converting Attributes to Matrices

To run this routine, we must first create attribute datasets in UCINET. To do this open the dl editor and use fullmatrix format and enter the information shown below.

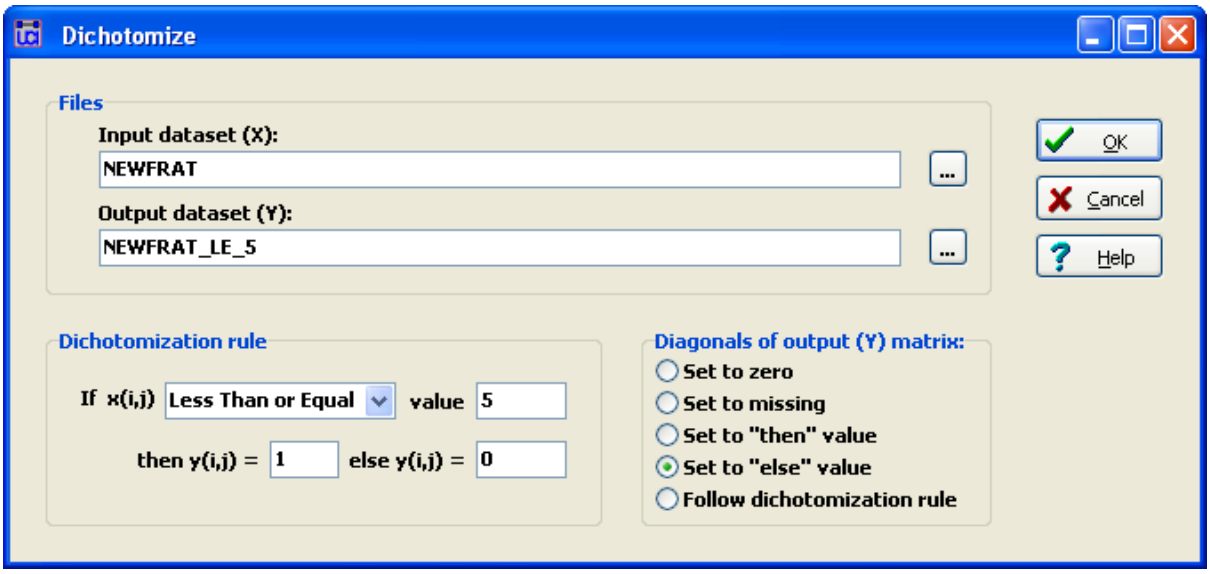


Save this attribute file as 6actors. To convert the attributes in matrices, open the procedure Data|Attribute to matrix. Select the file 6actors and select “Age” and “Absolute Difference” to generate Figure 5.15. Change the Value and Similarity Metric as given in the book to generate Figure 5.16 , 5.17 and 5.18. Note to create 5.18 the Similarity Metric is Dup. rows (receiver effect).

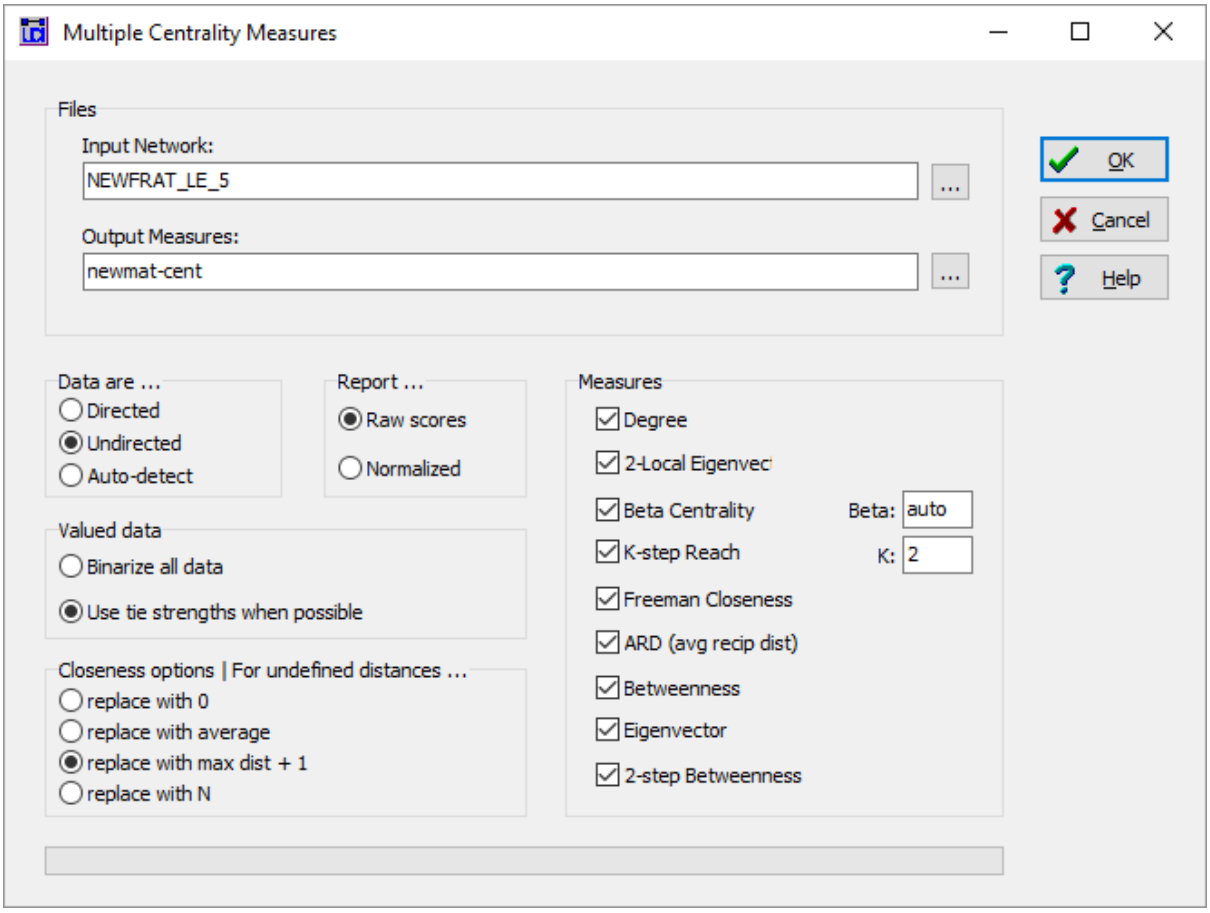


Section 5.9 Data Export

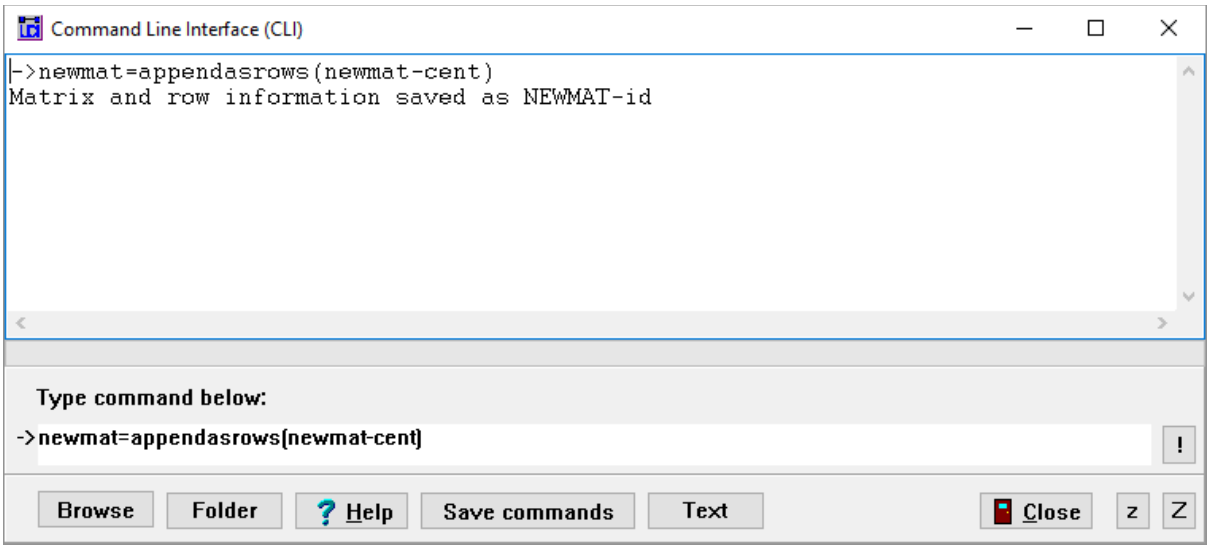
To obtain these results we first need to dichotomise the NEWFRAT data. The data contains rankings and we want to replace the top 5 choices by a one and the rest by a zero. We use Transform|Dichotomise selecting NEWFRAT as the data choosing the k less than or equal to rule and putting 5 in the value box. Note the name of the output dataset is generated automatically as follows.



We then run the multiple centrality routine found under Network|Multiple Measures|Node level and we treat the data as undirected by clicking the radio button as follows and setting the output to newmat-cent.



We then launch the CLI and type the command as given in the book and reproduced below



Finally we launch the UCINET spreadsheet editor and load the new file NEWMAT as shown.

Matrix Editor - C:\Users\Martin\Documents\datafiles\NEWMAT.##h

File Edit Transform

Symmetrize as you type

255 x 9

Change

Use row & column 0 for labels

		1	2	3	4	5	6	7	8	9
		Degree	2local	BetaCent	2Step	ARD	Closeness	Eigenvector	Between	2StepBet
1	NEWC0-1	6	50	1219.87268	16	11	26	0.54463219	2.24285721	2.24285721
2	NEWC0-2	6	46	1133.67773	15	10.8333330	27	0.50595635	2.05833339	2.05833339
3	NEWC0-3	5	50	1237.81726	16	10.5	27	0.55320310	0.26785713	0.26785713
4	NEWC0-4	5	39	957.242187	16	10.5	27	0.42723000	2.17916655	2.11666655
5	NEWC0-5	7	61	1535.06689	16	11.5	25	0.68573445	1.83333337	1.70833337
6	NEWC0-6	7	50	1281.66906	16	11.5	25	0.57201874	4.91249990	4.84999990
7	NEWC0-7	8	66	1649.24108	16	12	24	0.73645615	4.06369066	3.87619042
8	NEWC0-8	6	49	1246.11755	15	10.8333330	27	0.55652952	1.49285709	1.49285709
9	NEWC0-9	8	66	1672.28686	16	12	24	0.74685823	4.23333311	4.23333311
10	NEWC0-10	9	69	1751.72534	16	12.5	23	0.78205394	6.75833320	6.50833320
11	NEWC0-11	10	77	2005.34020	16	13	22	0.89552658	7.625	7.375
12	NEWC0-12	10	81	2070.65039	16	13	22	0.92478334	5.45535707	5.26785707
13	NEWC0-13	6	47	1169.95397	16	11	26	0.52228707	2.23333334	2.10833334
14	NEWC0-14	6	46	1157.80773	16	11	26	0.51683175	2.41249990	2.34999990
15	NEWC0-15	9	65	1688.70996	16	12.5	23	0.75384604	8.55535697	8.24285697
16	NEWC0-16	6	50	1231.34082	16	11	26	0.54980063	1.97083330	1.90833330

We can also view the created file NEWMAT-id in the editor as follows

Matrix Editor - C:\Users\Martin\Documents\datafiles\NEWMAT-id.##h

File Edit Transform

Symmetrize as you type

255 x 2

Change

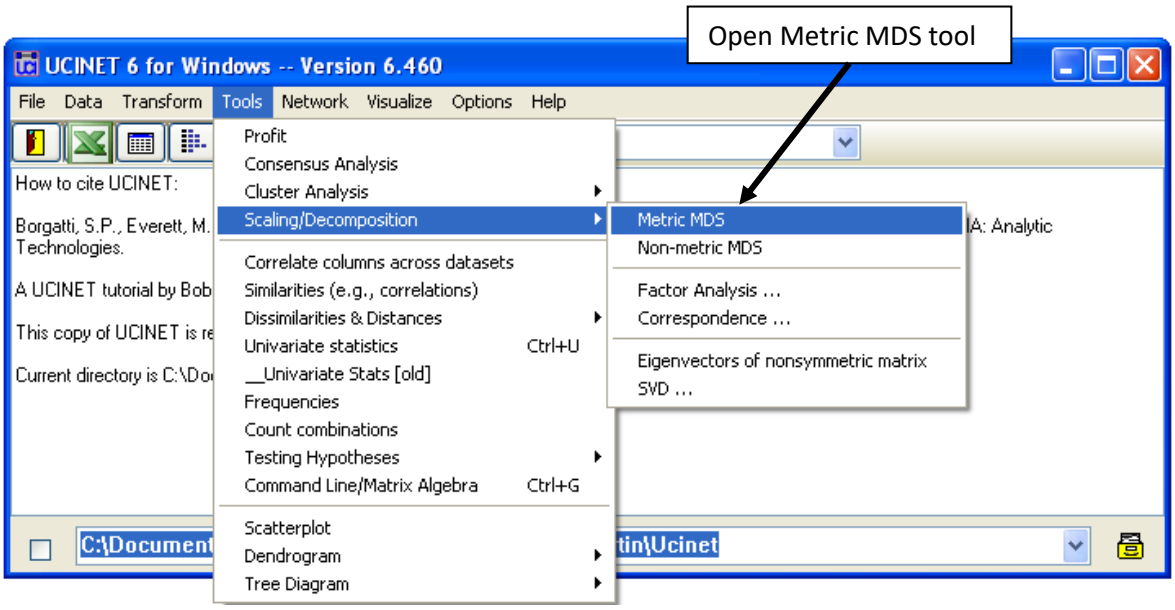
Use row & column 0 for labels

		1	2
		Matrix	Row
1	NEWC0-1	1	1
2	NEWC0-2	1	2
3	NEWC0-3	1	3
4	NEWC0-4	1	4
5	NEWC0-5	1	5
6	NEWC0-6	1	6
7	NEWC0-7	1	7
8	NEWC0-8	1	8
9	NEWC0-9	1	9
10	NEWC0-10	1	10
11	NEWC0-11	1	11
12	NEWC0-12	1	12
13	NEWC0-13	1	13
14	NEWC0-14	1	14
15	NEWC0-15	1	15
16	NEWC0-16	1	16

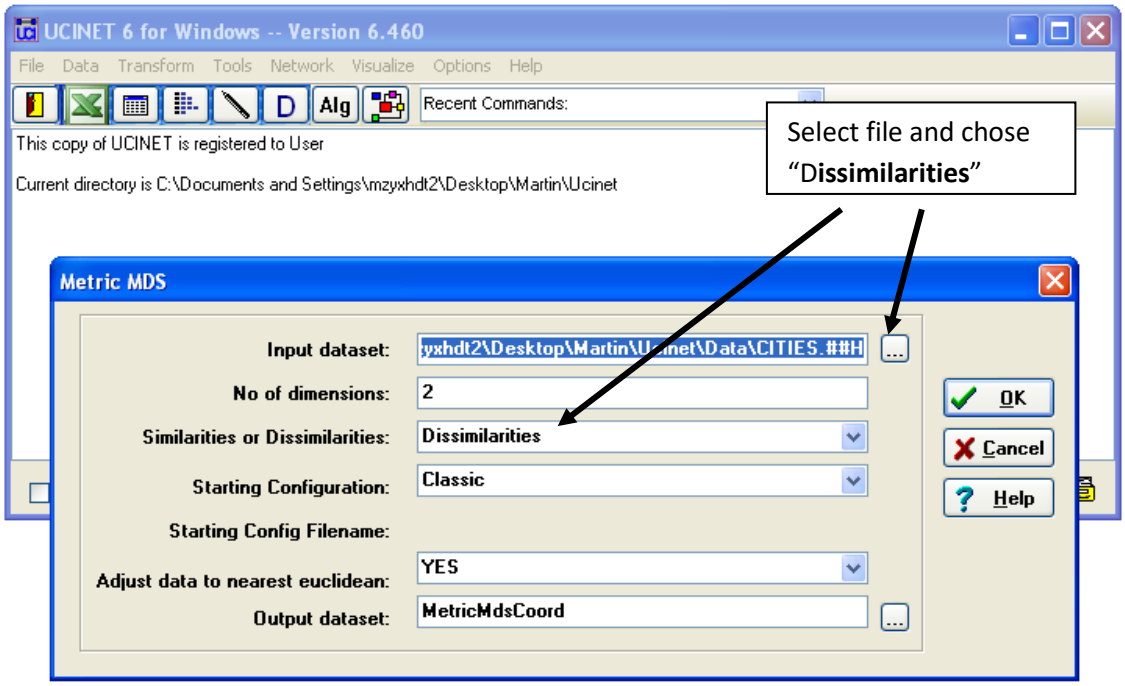
These can then be cut and pasted into Excel.

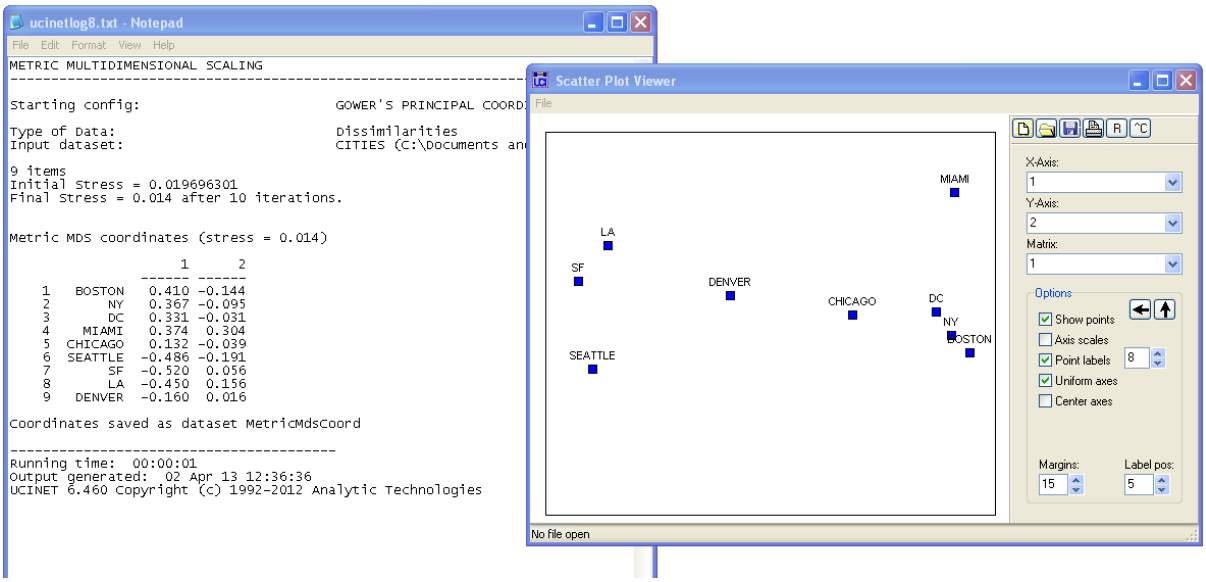
Section 6.2 Multidimensional Scaling

Open the MDS tool in UCINET: **Tools|Scaling/Decomposition|Metric MDS**



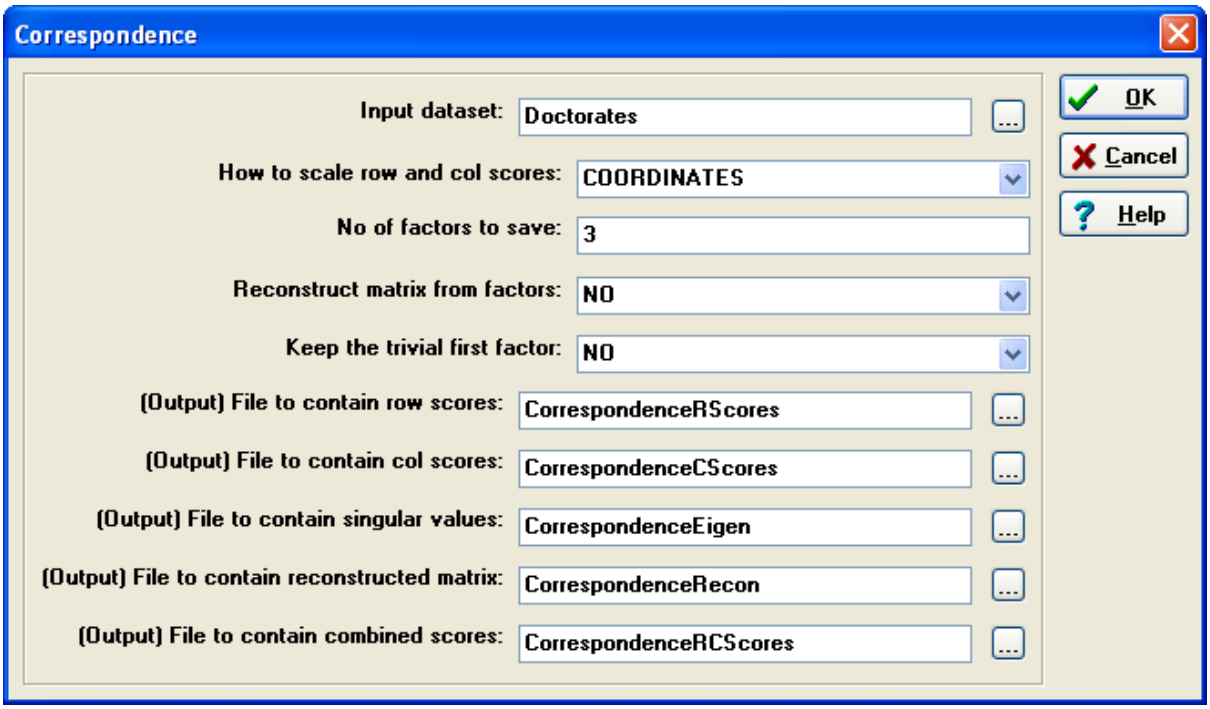
Select the file **CITIES** from the file directory. Keep the number of dimensions at two, but choose the "**Dissimilarities**" option. Click OK and two new windows will open: a UCINET log file which gives you values for "**stress**" and the metric MDS coordinates and a "**Scatter Plot Viewer**" which maps the results as shown in **Figure 6.1**



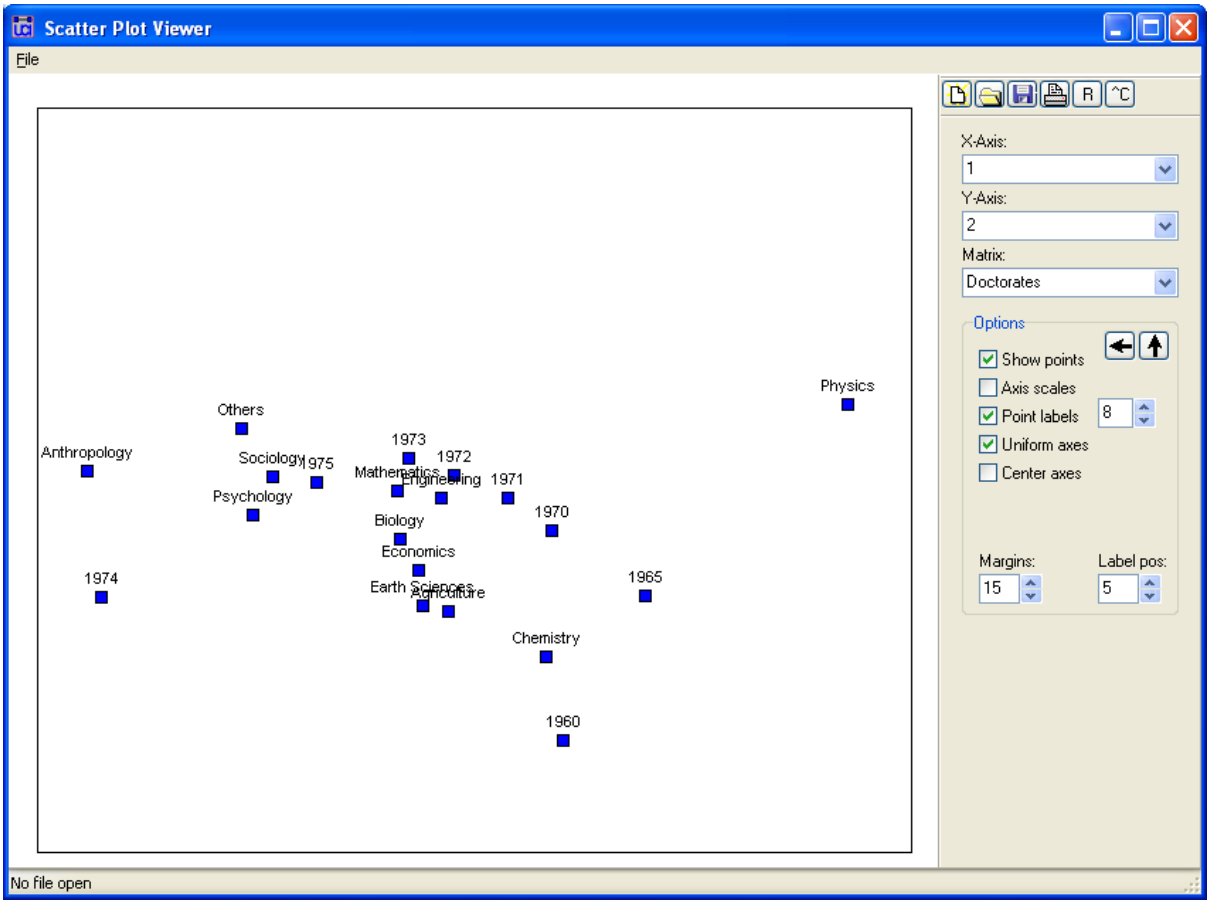

ucinetlog8.txt - Notepad
File Edit Format View Help
METRIC MULTIDIMENSIONAL SCALING
Starting config: GOWER'S PRINCIPAL COORD
Type of Data: Dissimilarities
Input dataset: CITIES (C:\Documents an
9 items
Initial Stress = 0.019696301
Final Stress = 0.014 after 10 iterations.
Metric MDS coordinates (stress = 0.014)
1 2
1 BOSTON 0.410 -0.144
2 NY 0.367 -0.095
3 DC 0.331 -0.031
4 MIAMI 0.374 0.304
5 CHICAGO 0.132 -0.039
6 SEATTLE -0.486 -0.191
7 SF -0.520 0.056
8 LA -0.450 0.156
9 DENVER -0.160 0.016
Coordinates saved as dataset MetricMdsCoord
Running time: 00:00:01
Output generated: 02 Apr 13 12:36:36
UCINET 6.460 Copyright (c) 1992-2012 Analytic Technologies
Scatter Plot Viewer
File
MIAMI
LA
SF
DENVER
CHICAGO
DC
NY
BOSTON
SEATTLE
X-Axis:
1
Y-Axis:
2
Matrix:
1
Options
Show points
Axis scales
Point labels
8
Uniform axes
Center axes
Margins:
15
Label pos:
5
No file open

Section 6.3 Correspondence Analysis

To reproduce Figure 6.2 run Tools|Scaling/Decomposition|Correspondence on the dataset leaving all the defaults alone.

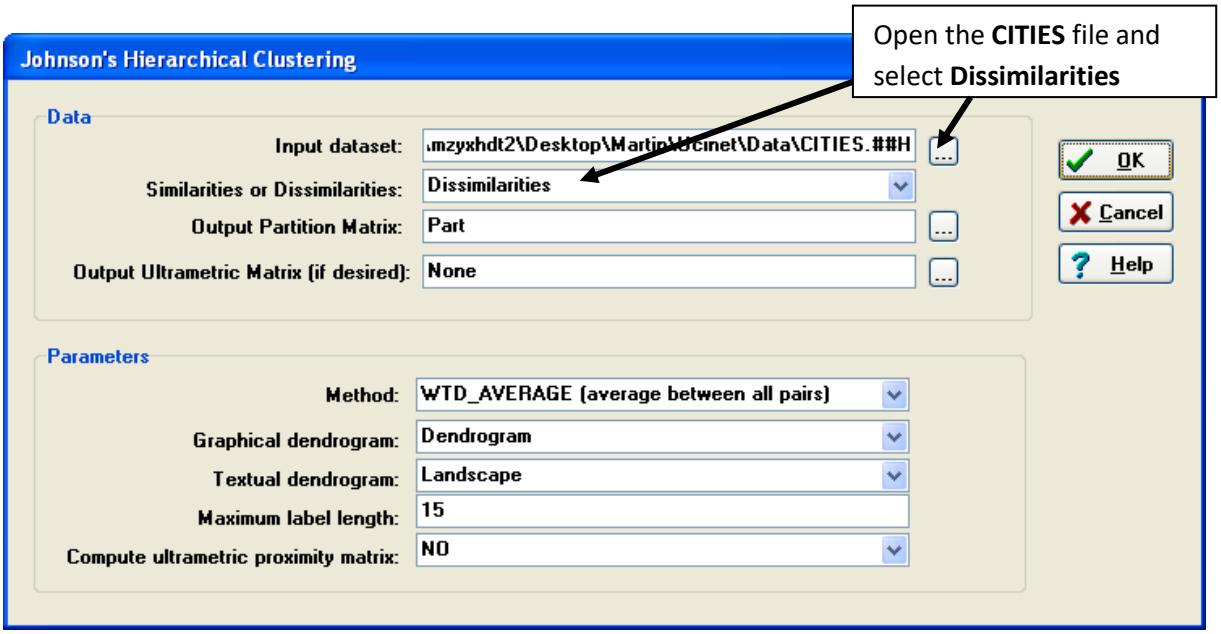


This produces the following as shown in the book.

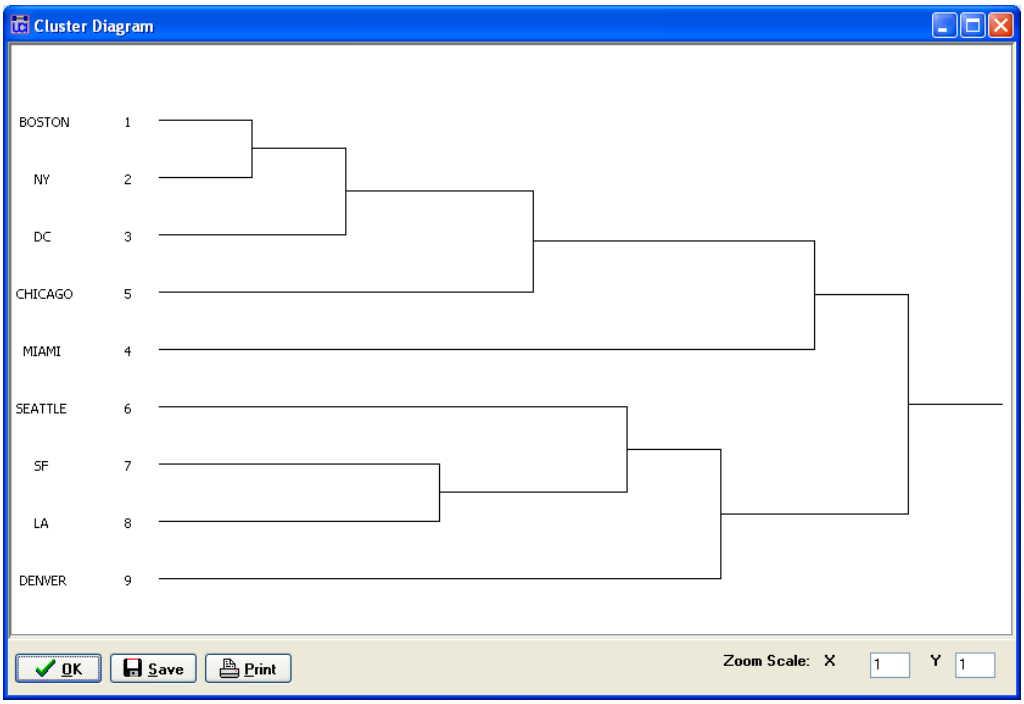

Scatter Plot Viewer
File
X-Axis:
1
Y-Axis:
2
Matrix:
Doctorates
Options
Show points
Axis scales
Point labels
8
Uniform axes
Center axes
Margins:
15
Label pos:
5
Physics
Others
Anthropology
Sociology
1975
1973
1972
Mathematics
Engineering
1971
Psychology
1970
Biology
Economics
1974
Earth Sciences
Agriculture
1965
Chemistry
1960
No file open

Section 6.4 Hierarchical Clustering

To run the **Hierarchical Clustering** routine open the tool under **Tools|Cluster Analysis|Hierarchical…** Select your Input dataset **CITIES** and select the **Dissimilarities** option.



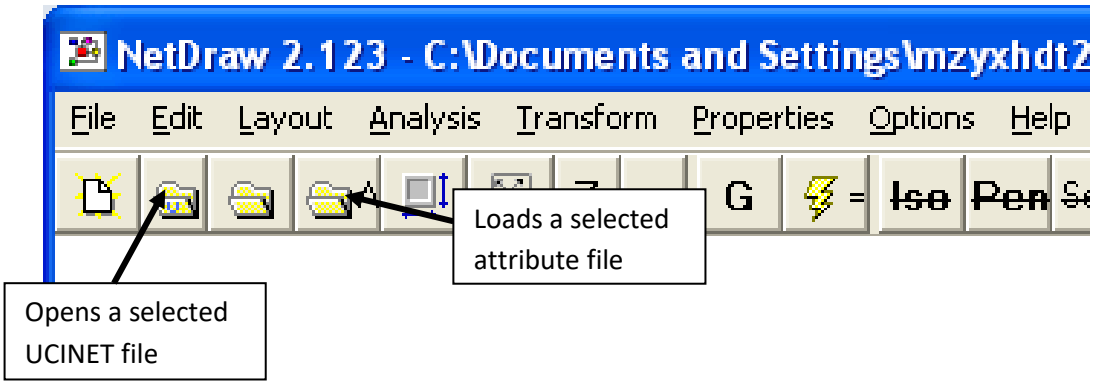
Two new windows will display the output in **Figure 6.5** (**Note**: the order of cities may change, but the clustering remains the same). The Second window will depict the **cluster diagram** shown below which is another way of illustrating the clusters and mergers similar to Figure 6.5.

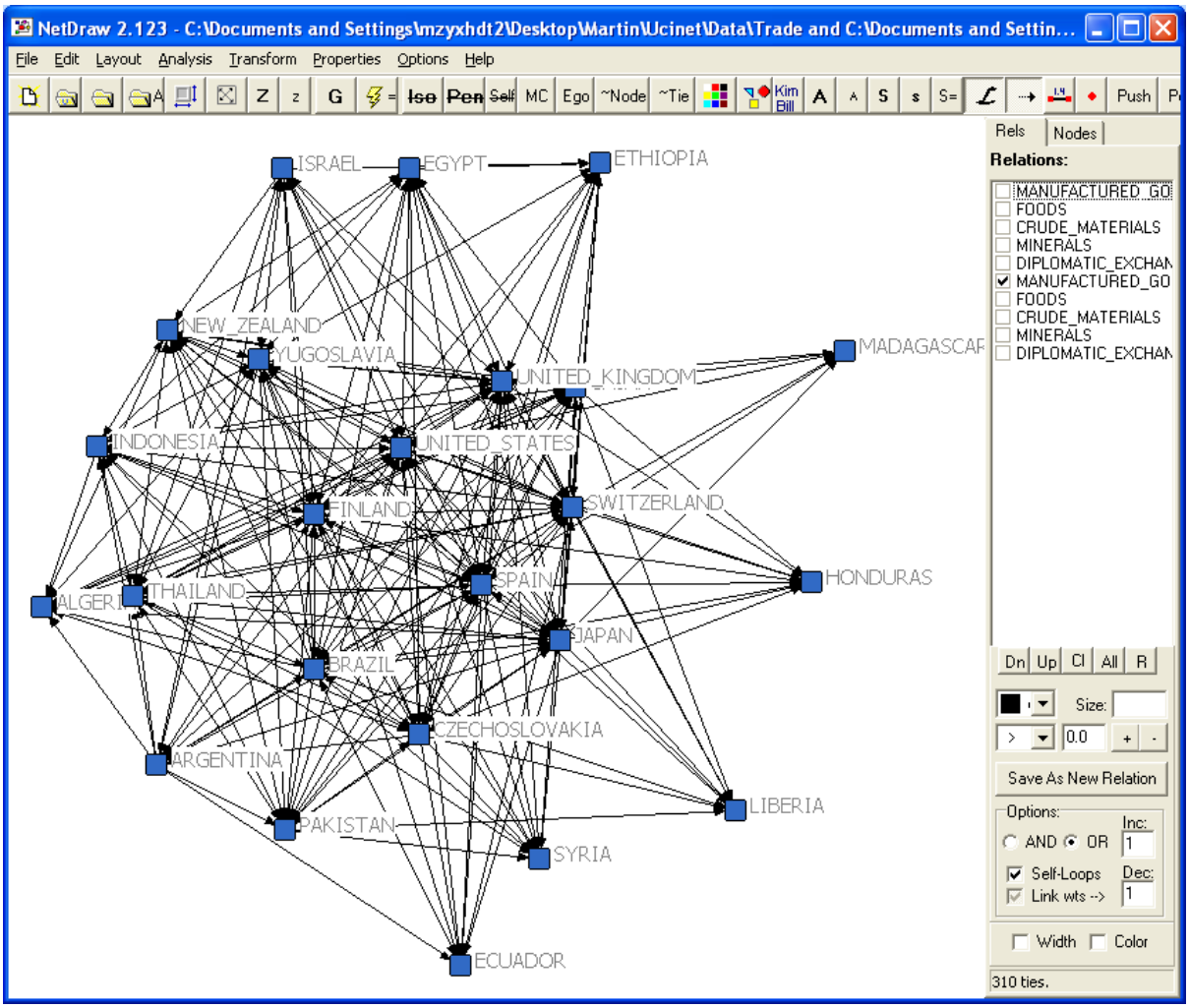


Section 7.2 Layout

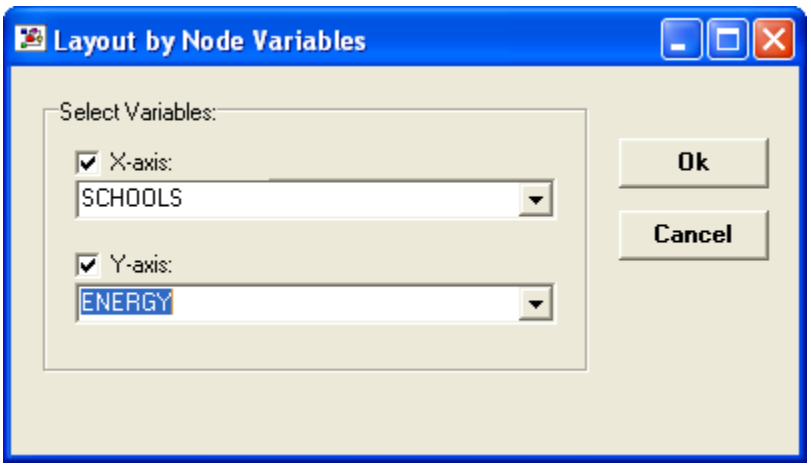
7.2.1 Attribute-based scatter plot:

To produce the Attribute-based scatter plot depicted in **Figure 7.3,** open **NetDraw** and open the files **Trade** using the **File|Open|Ucinet dataset|Network** and corresponding attributes **Trade_attribute** using the **File|Open|Ucinet dataset|Attribute data** (you can also simply click the open file buttons marked "u" and "A" in the menu. The output is depicted below.

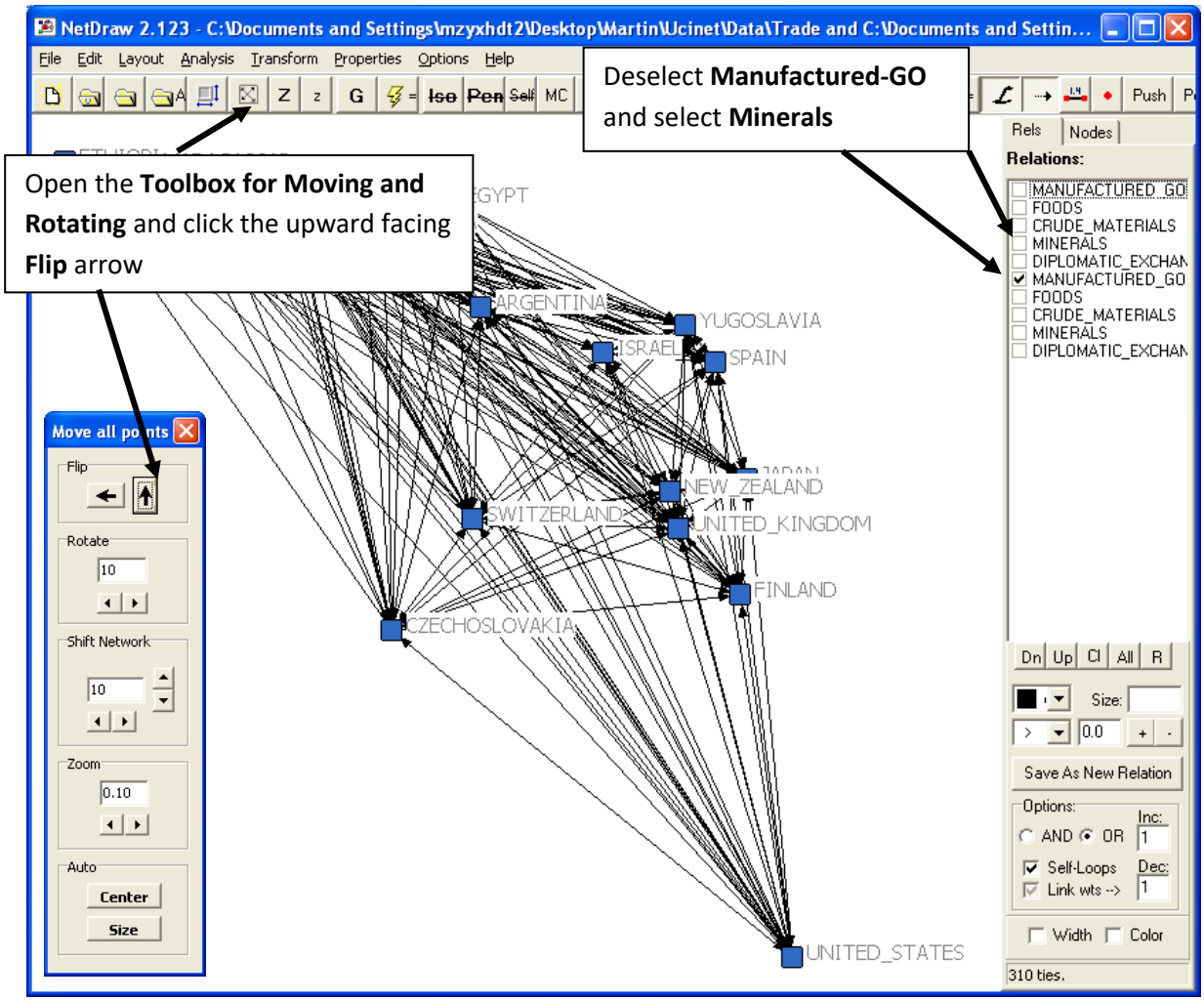




Then select the attributes as coordinates option from the **Layout|Attribs as Coordinates** which will open the following window. Select **Schools** on the X-Axis and **Energy** on the Y-Axis and click okay. The output is shown below.



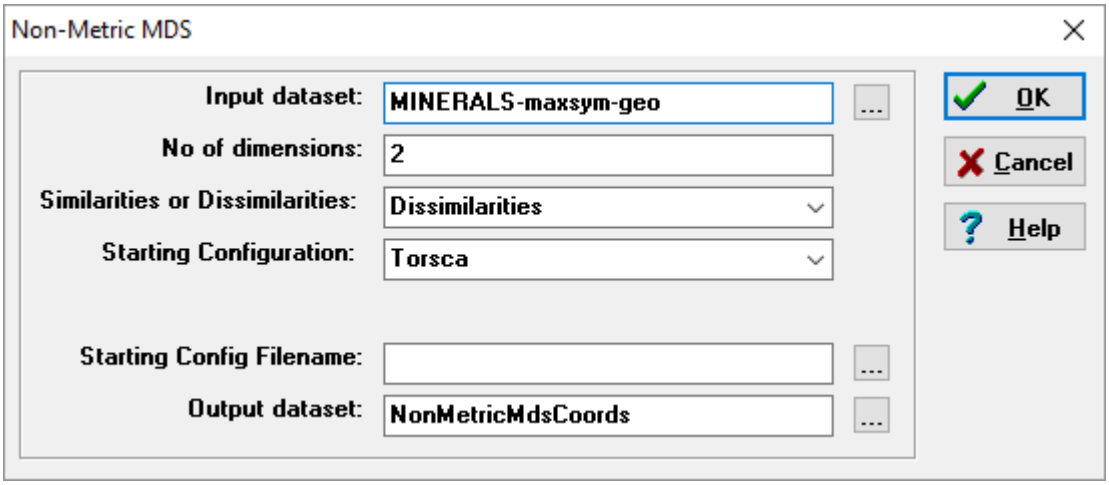
This picture displayed below shows an attribute-based scatter plot for the **Trade** network and the attribute selections Schools and Energy. However you may recognise that it is not the same picture as in **Figure 7.3**. To get the output shown in 7.3, simply deselect the **Relations** option "**Manufactured-GO**" in the right hand menu and select the "**Minerals**" option instead.



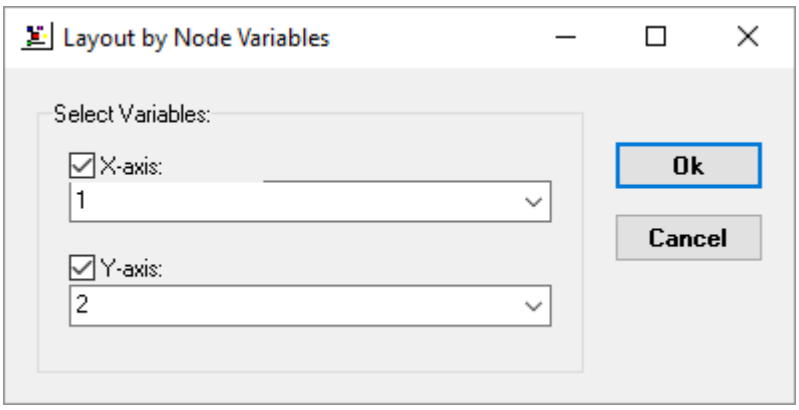
The outcome you generate is upside down so you need to select the **Toolbox for moving, rotating etc.** and click the upward facing arrow and you will see the same output as shown in **Figure 7.3**

7.2.2 Ordination:

To produce figure 7.4 unpack the Trade data symmetrize Minerals using the maximum method. Then run Network|Cohesion|Geodesic distances to form MINERALS-maxsym-geo now run Tools|Scaling/Decomposition|Non-metric MDS of geo distances on MINERALS-maxsym-geo



Open up Nedraw load minerals and then bring in NonMetricMdsCords as attributes turn off the arrowheads and then select Layout|Attrib as coordinates and select 1 for the x-axis and 2 for the y-axis.



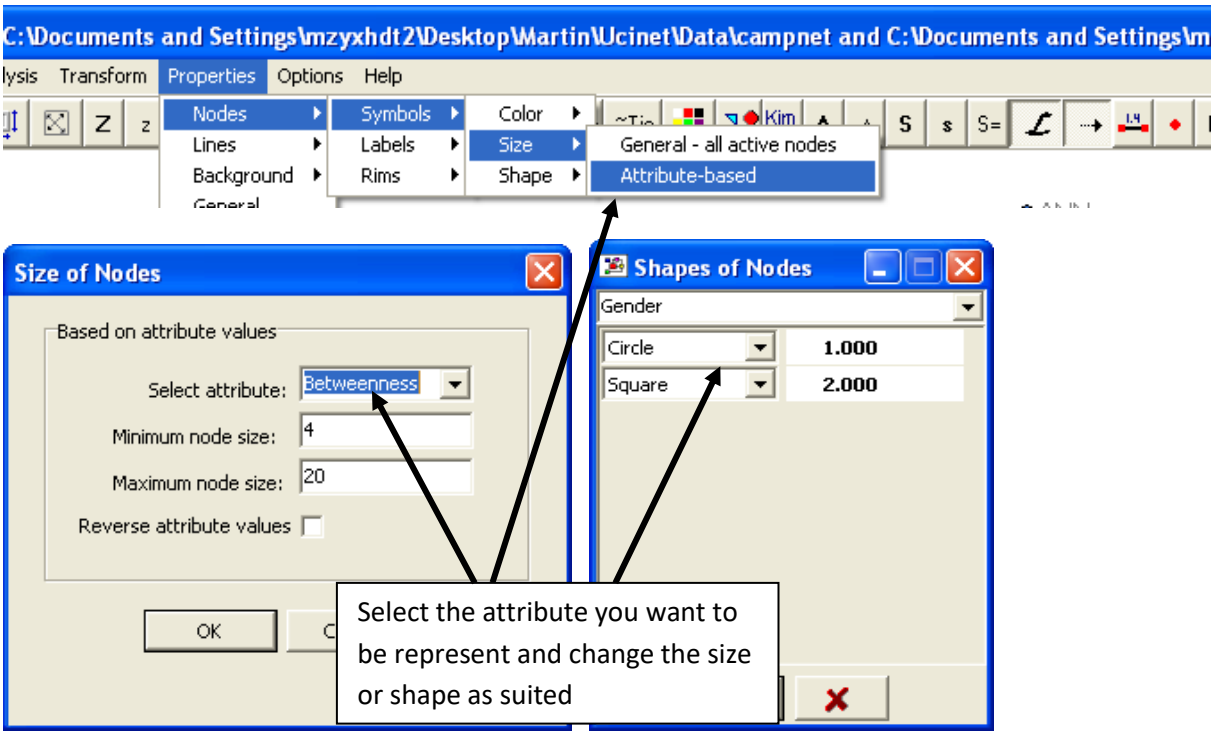
The result will be figure 7.4

7.2.3 Graph layout algorithms

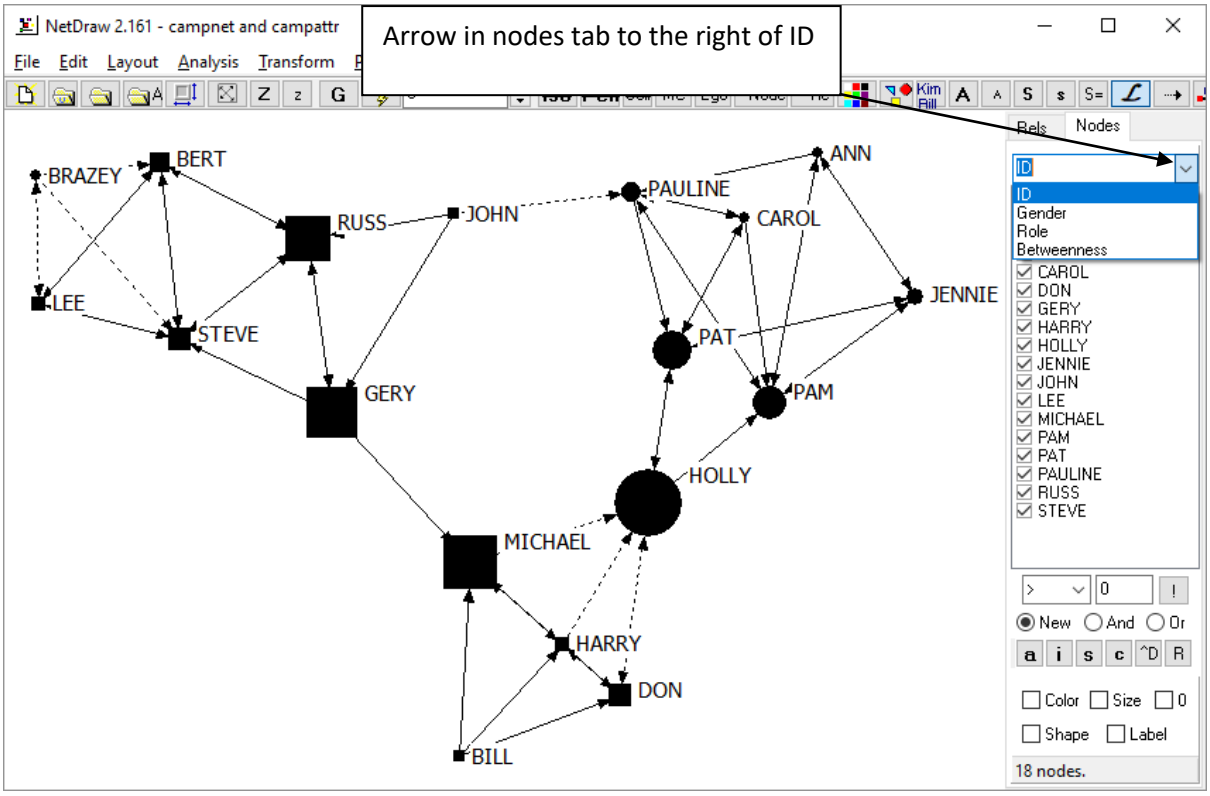
Figure 7.5 is produced by simply using the lightning bolt button. The final layout will not look the same as in the book as the routine involves some random decisions about the placing of nodes but the picture should look similar but may be rotated.

Section 7.3 Embedding Node Attributes

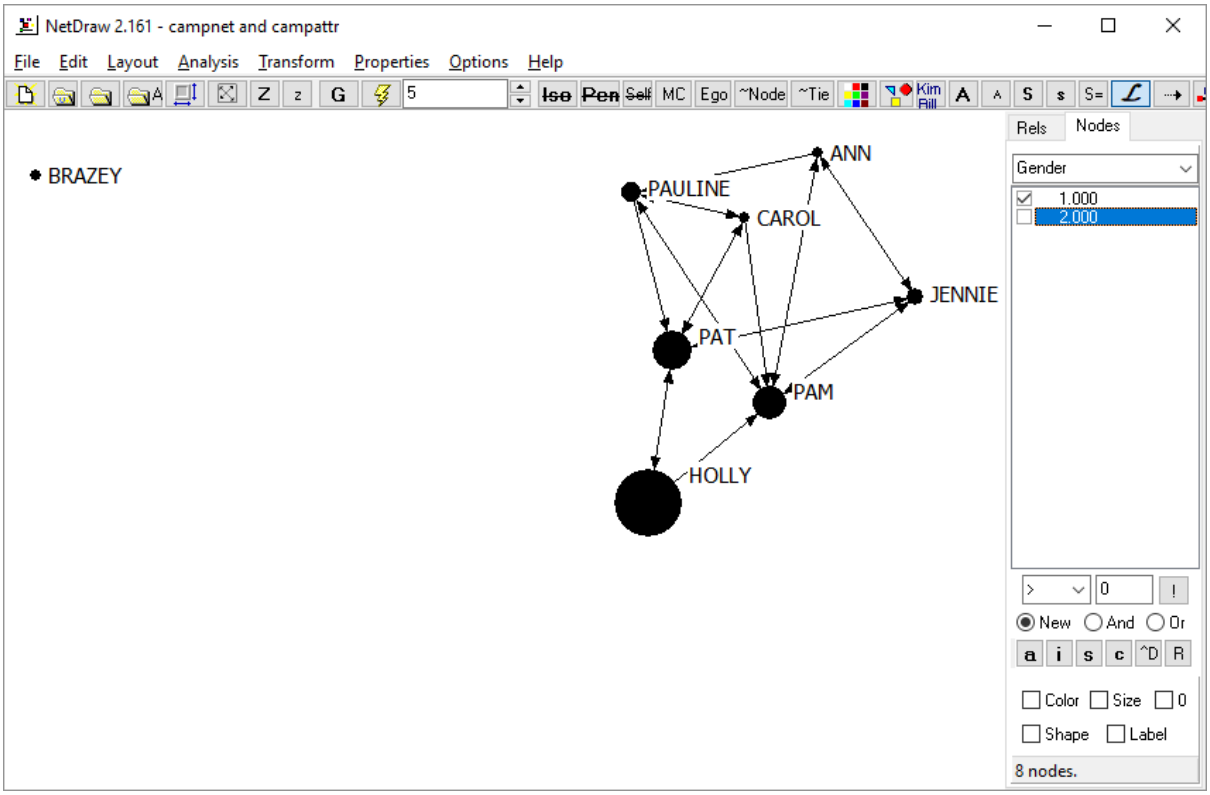
To draw **Figure 7.6** open the **Campnet** (network) and **campattr** (attribute) files; you will see the same figure as **Figure 2.3**. Select **Properties|Nodes|Symbols|Size|Attribute-based** and select "**Betweenness**" from the scroll down menu to visualize the betweenness centrality of each node. Click Okay and you should see the size of the nodes changing. To change the node shape, repeat the process opening **Properties|Nodes|Symbols|Shape|Attribute-based** and select gender.



To change the lines we first change all lines to dotted lines. Similar to the nodes select Properties|Lines|Style|All active ties. Then selected dot from the drop down menu. Now clique the arrow to the right of ID on the nodes tab at the top right of the screen and you will see a list of attributes.



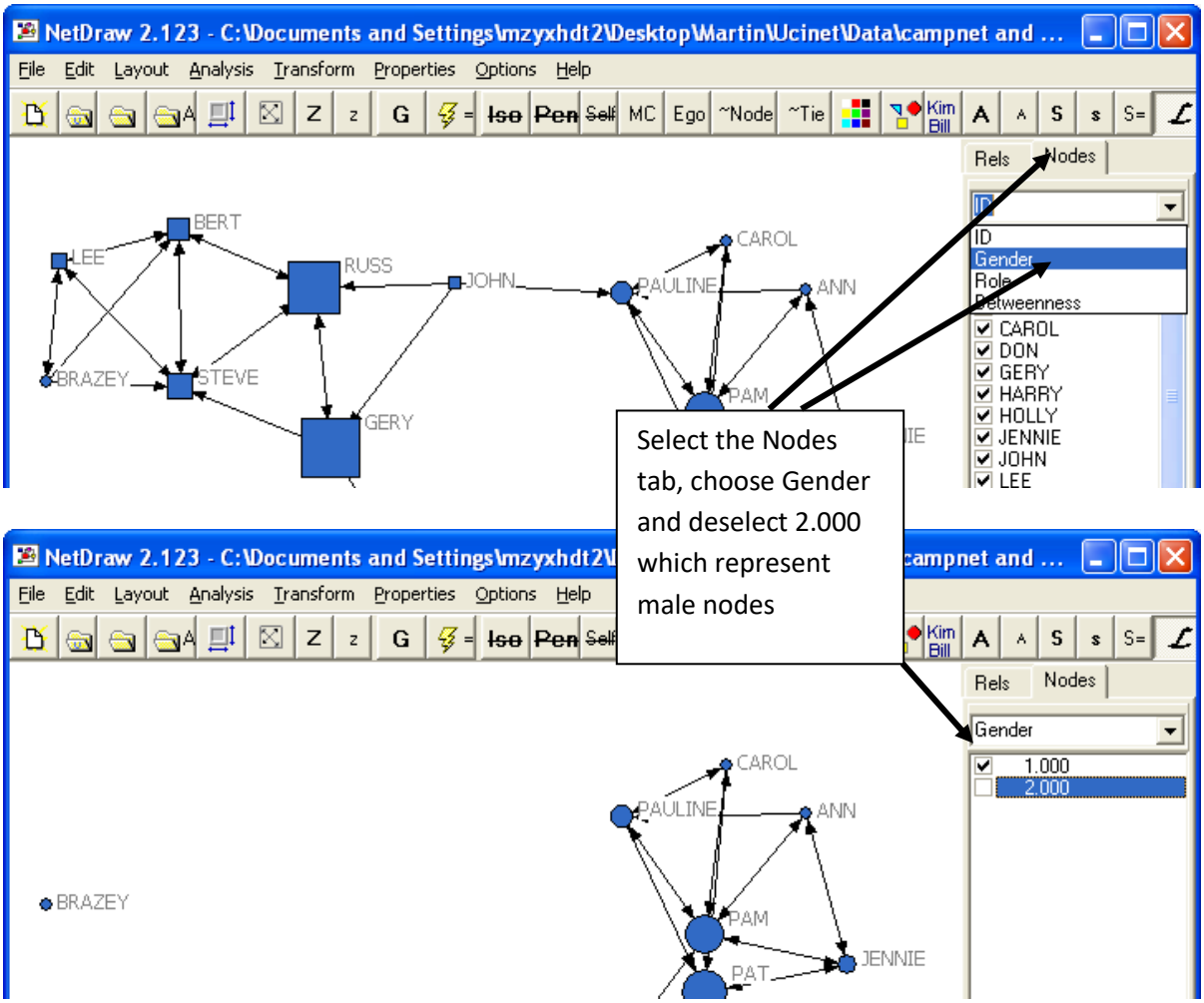
From the drop down menu select gender. If you click on a single attribute (say 1 for the women) then just those actors are left.



Now change the active edges to solid lines the same way as the dotted ones were created. Do the same for the other attribute. Highlighting all attributes will result in Figure 7.6. This is also illustrated in the next section.

Section 7.4 Node Filtering

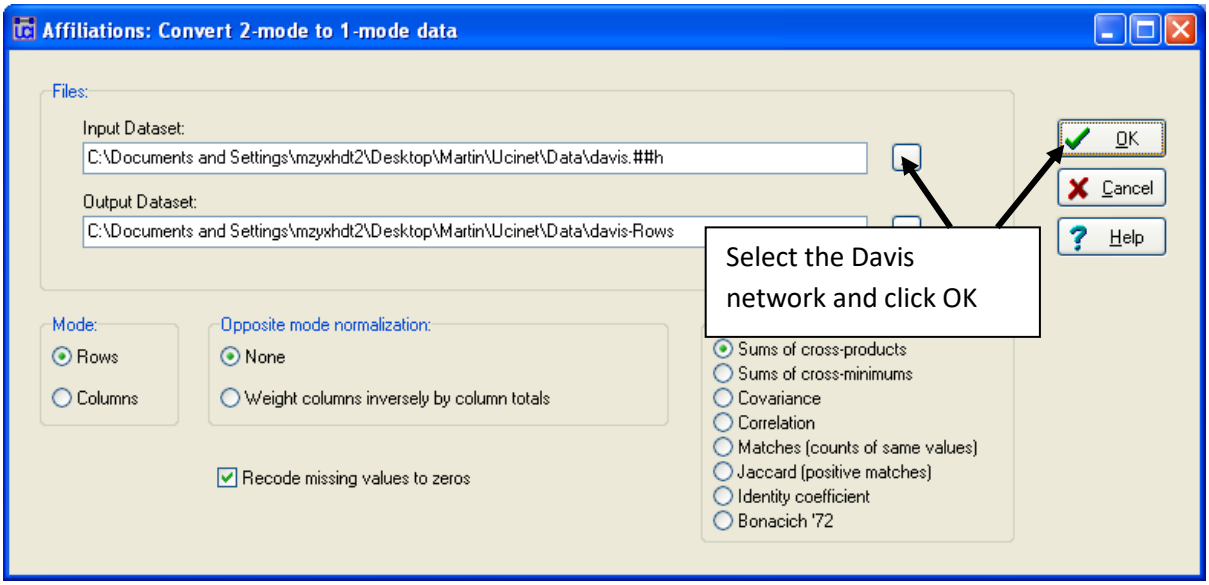
To deselect males to be shown in the network, simply select the "**Nodes**" tab in the upper right hand corner, select **Gender** from the menu and deselect "**2.000**" .



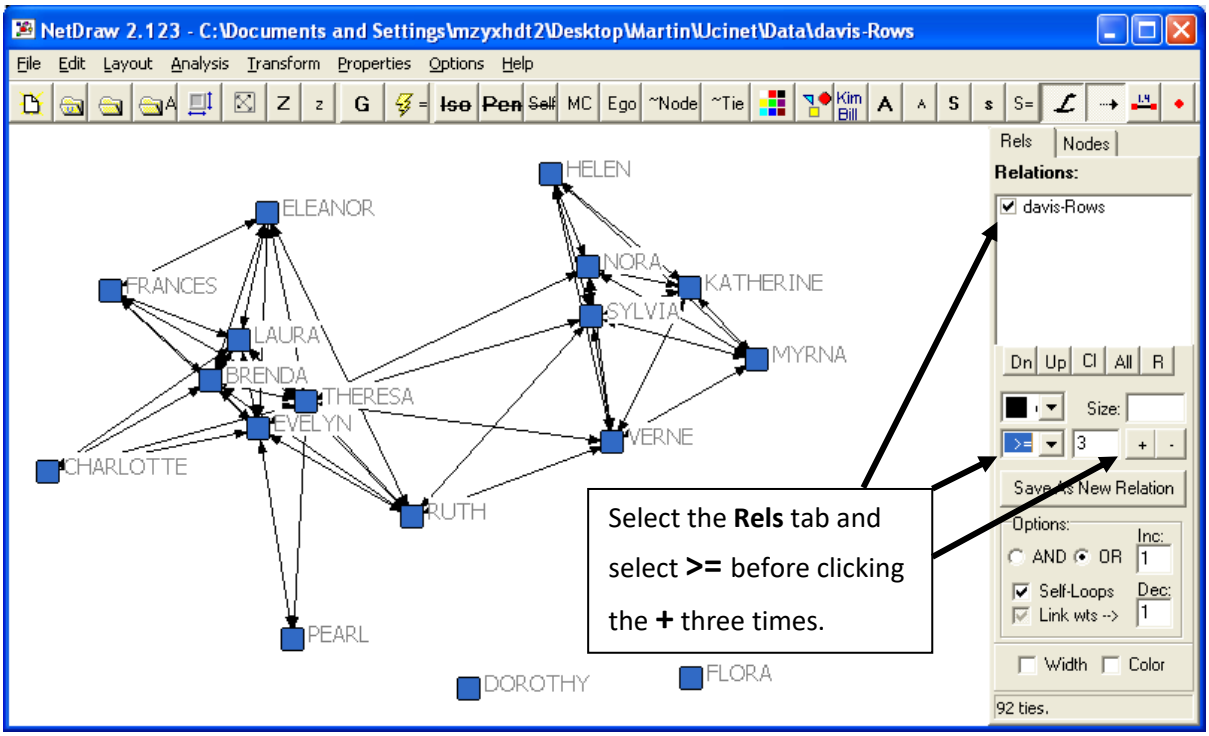
Section 7.6 Embedding Tie Characteristics

7.6.1 Tie Strength

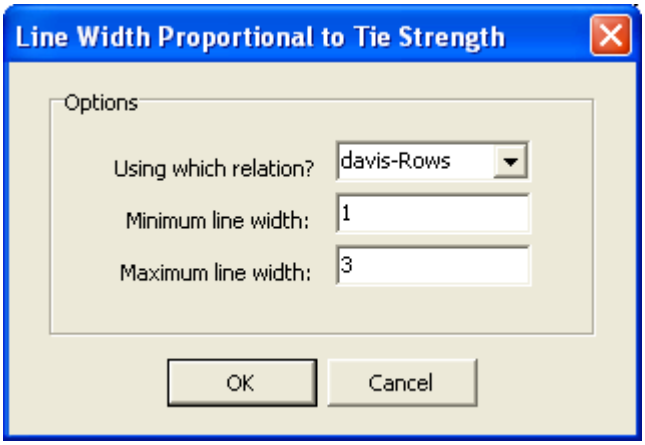
To transform the two-mode **Davis** women-events dataset into a one-mode woman-by-woman dataset run **data|affiliations (2-mode to 1-mode**) and select the **Davis** network. Click okay. Now load davis-Rows into netwdraw.



The output will be similar to that depicted in **Figure 7.12**. To suppress weak ties select the **Rels** tab on the right, select "**>=**" from the drop box and click three times on the **+** button. This will remove the weak ties and give you the output visible in **Figure 7.13**.

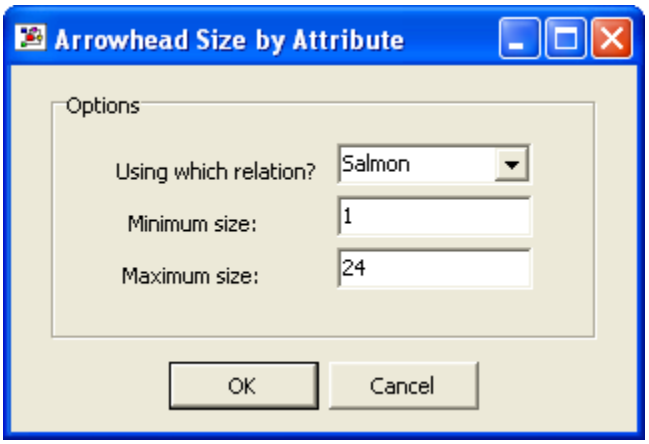


To produce **Figure 7.14** simply restore the weak ties (by re-setting the3 to 0and >= back to >) and then open the "**Line Width Proportional to Tie Strength**" box **Properties|Lines|Size|Tie Strength**. Select the Davis-Rows relation and enter Minimum and Maximum line width (**minimum=1; maximum=3** in this case) and click OK.



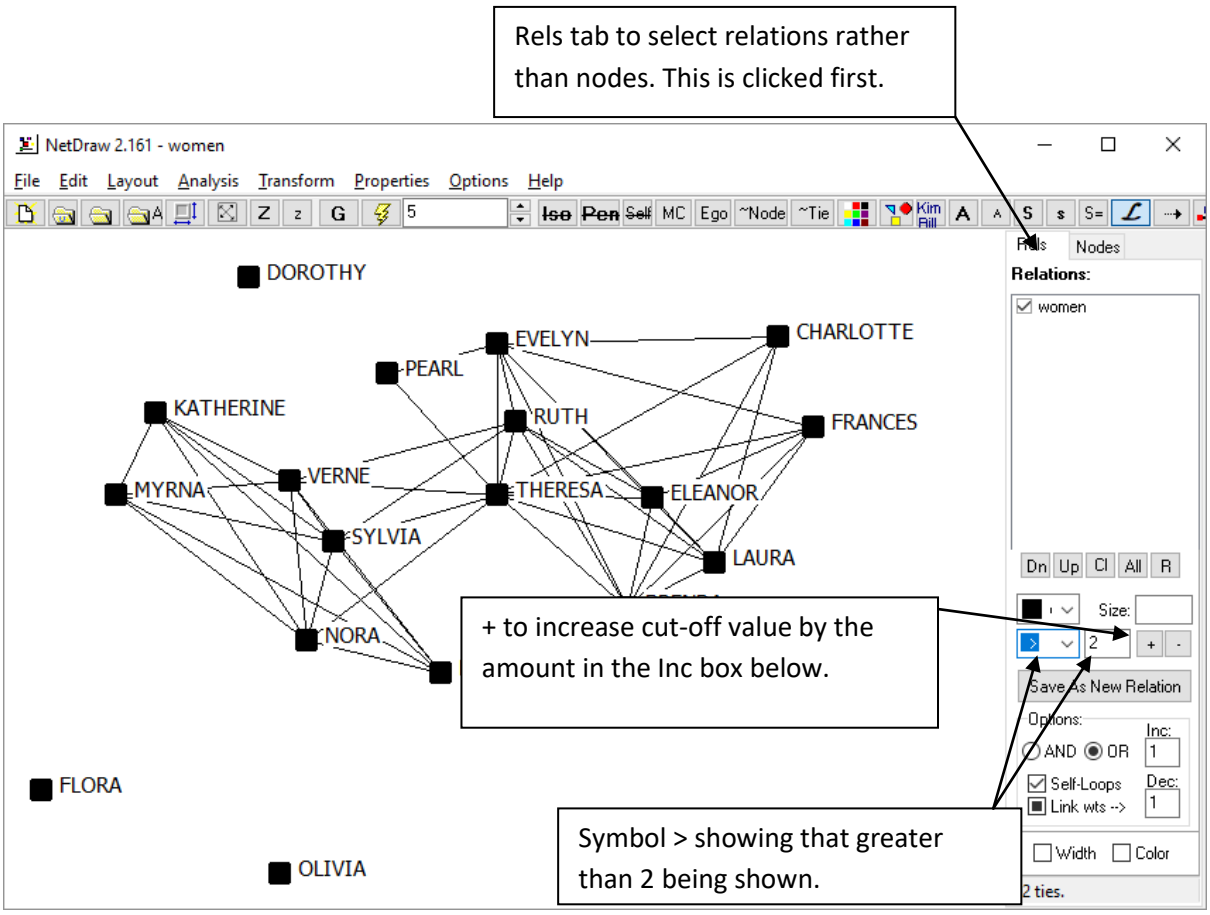
Your network now shows strong ties as thick black lines whereas weak ties remain thin.

To increase arrow head size first load the dataset Salmon into Netdraw turn-off the labels and now select Properties|Lines|Arrow heads|Size|by Ties Strength change the mimum to 1 and the maximum to 24 in the box that opens up as follows.



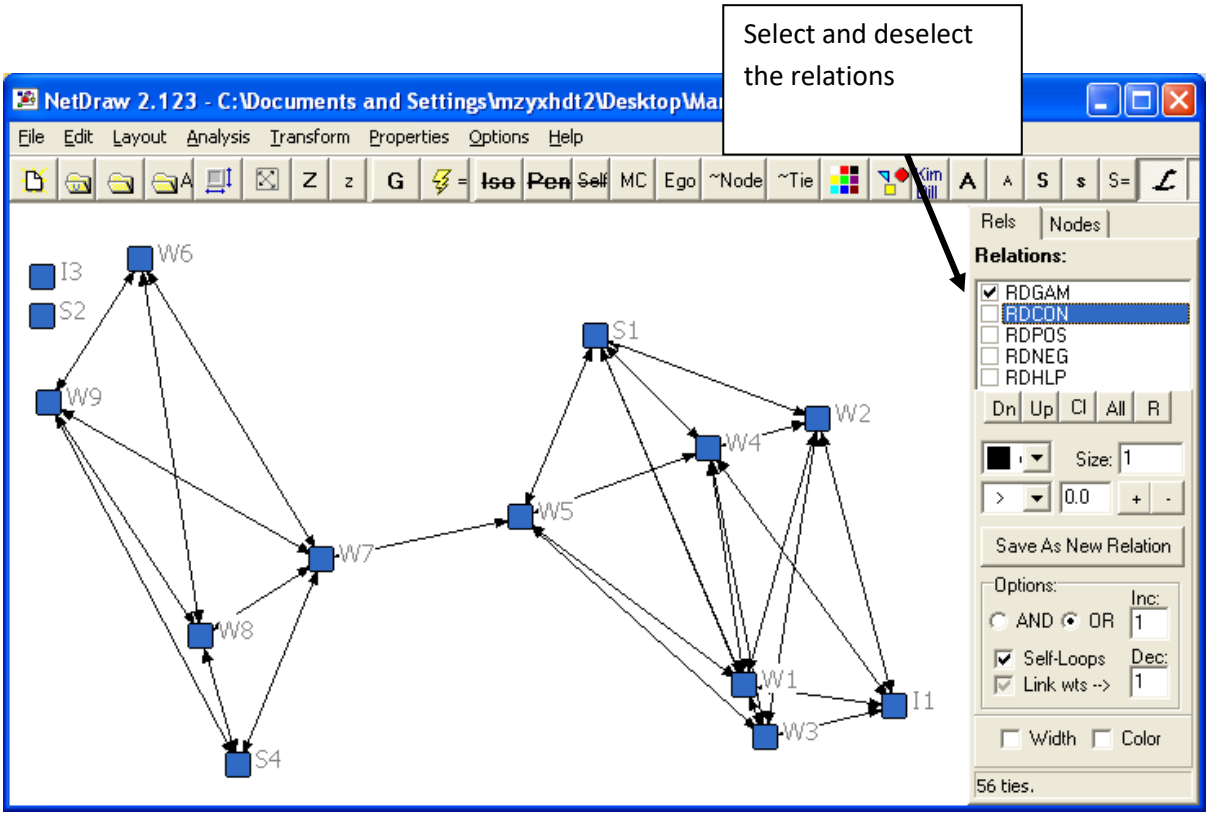
Clicking OK reproduces Figure 7.15

To produce the series of **Figures 7.16a**-d load the davis-Rows in Netdraw. In the rels tab press the + to increase the cut-off by one and after each press the lightning bolt. The example below shows this with a tie strength shown greater than 2 corresponding to Figure 7.16b.



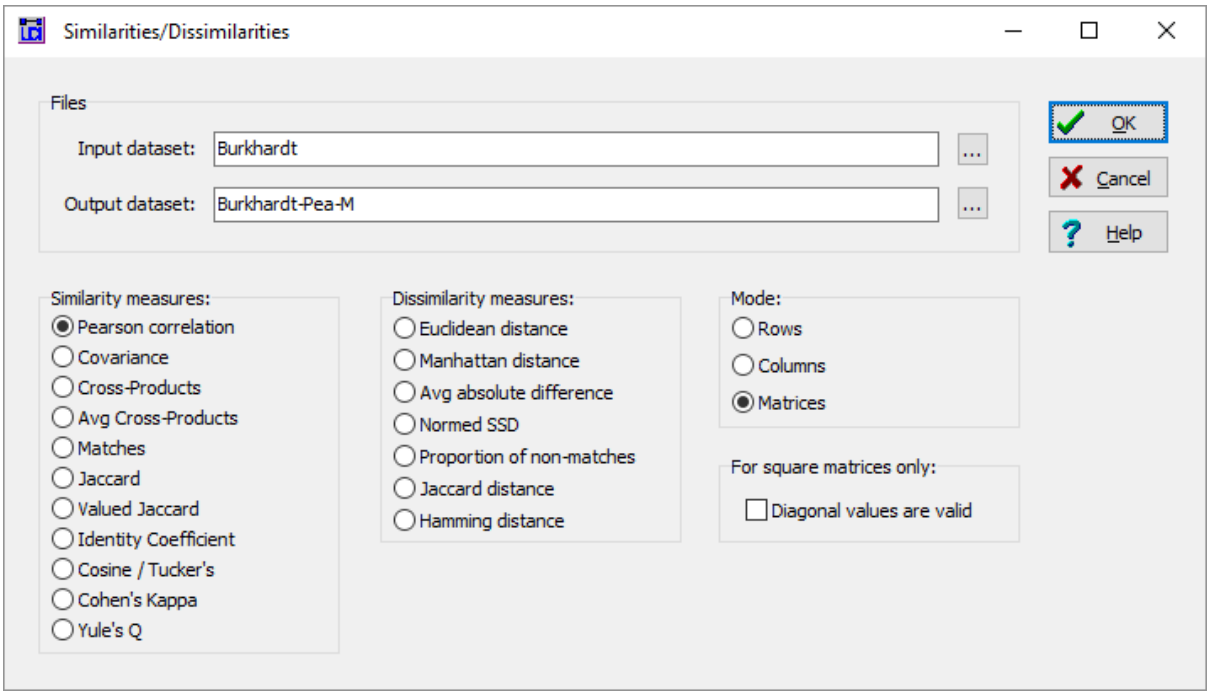
7.6.2 Type of tie

To visualise **Figures 7.17** and **7.18** simply load the **WIRING** file in **NetDraw** and select and deselect the relations you want to visualise. **RDGAM** refers to the Game-playing relation in **Figure 7.17** and **RDCON** visualises **Figure 7.18**.

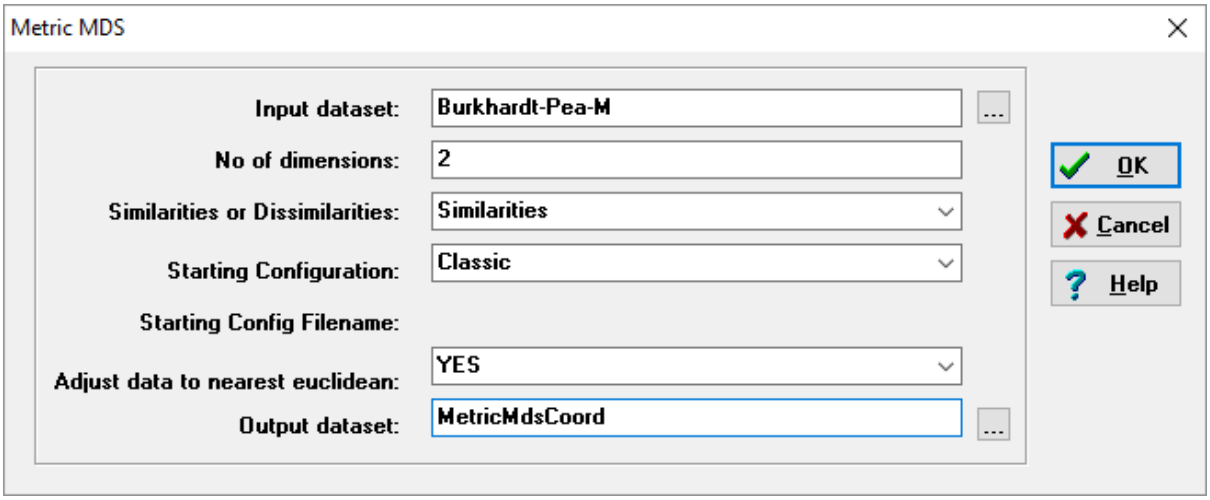

Select and deselect the relations
NetDraw 2.123 - C:\Documents and Settings\mzyxhdt2\Desktop\Ma
File Edit Layout Analysis Transform Properties Options Help
Rels
Nodes
Relations:
RDGAM
RDCON
RDPOS
RDNEG
RDHLP
Dn Up Cl All R
Size: 1
0.0
Save As New Relation
Options:
AND OR
Inc: 1
Self-Loops
Link wts -->
Dec: 1
Width Color
56 ties.
I3
S2
W6
W9
W7
W8
S4
S1
W5
W4
W2
W1
W3
I1

Section 7.7 Visualizing Network Change

To create the correlation matrix run Tools|Similarities & Distances on the Burkhardt dataset making sure you select correlation as the measure of similarity and you compute the similarities among matrices as follows. The output will be matrix 7.1

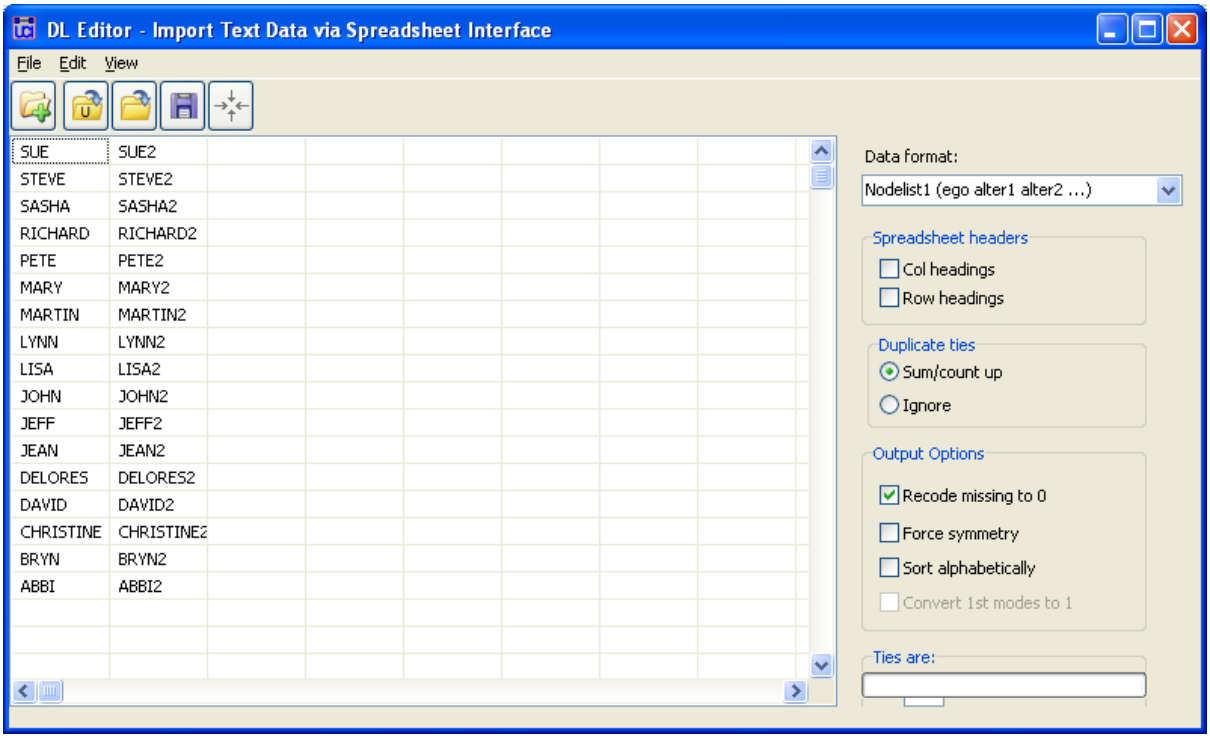


To obtain Figure 7.19 submit the matrix Burhardt-Pea-M to the metric mds routine under Tools|Scaling/Decomposition|Metric mds

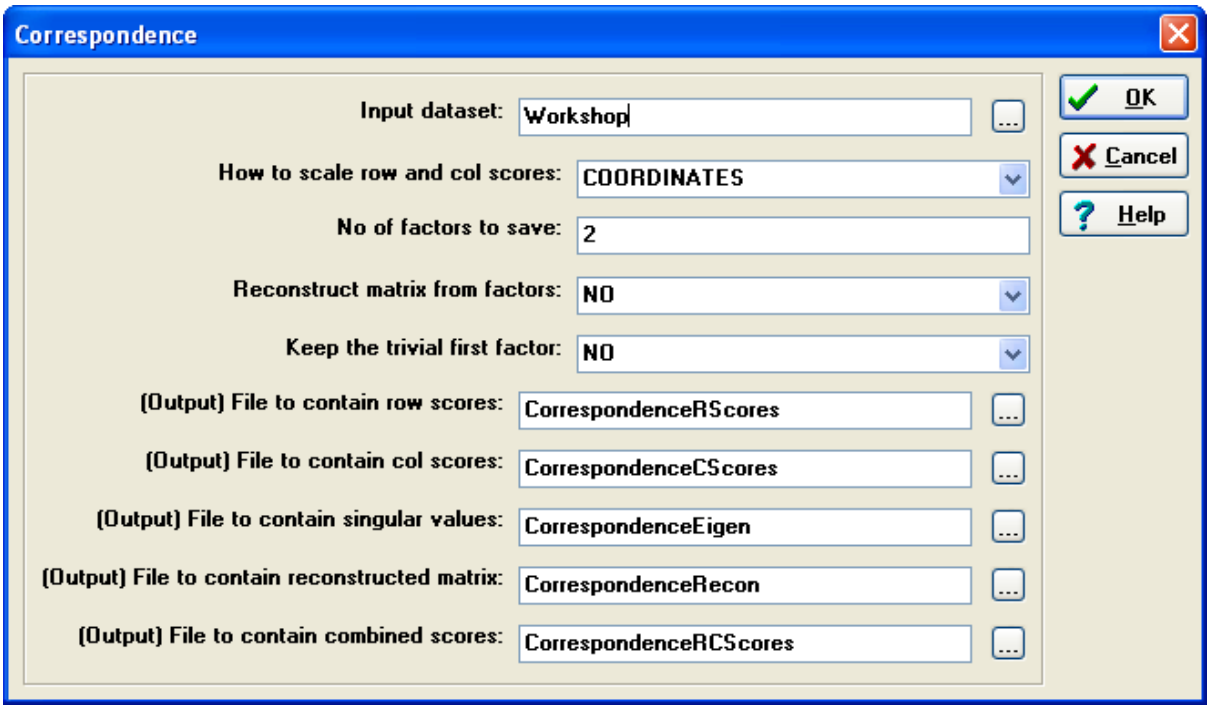


To obtain Figures 7.20 and 7.21 simply load Burkhardt into Netdraw and use the Rels tab to see the relations at time T1 and T2 with a cut-off value set at greater than 5.

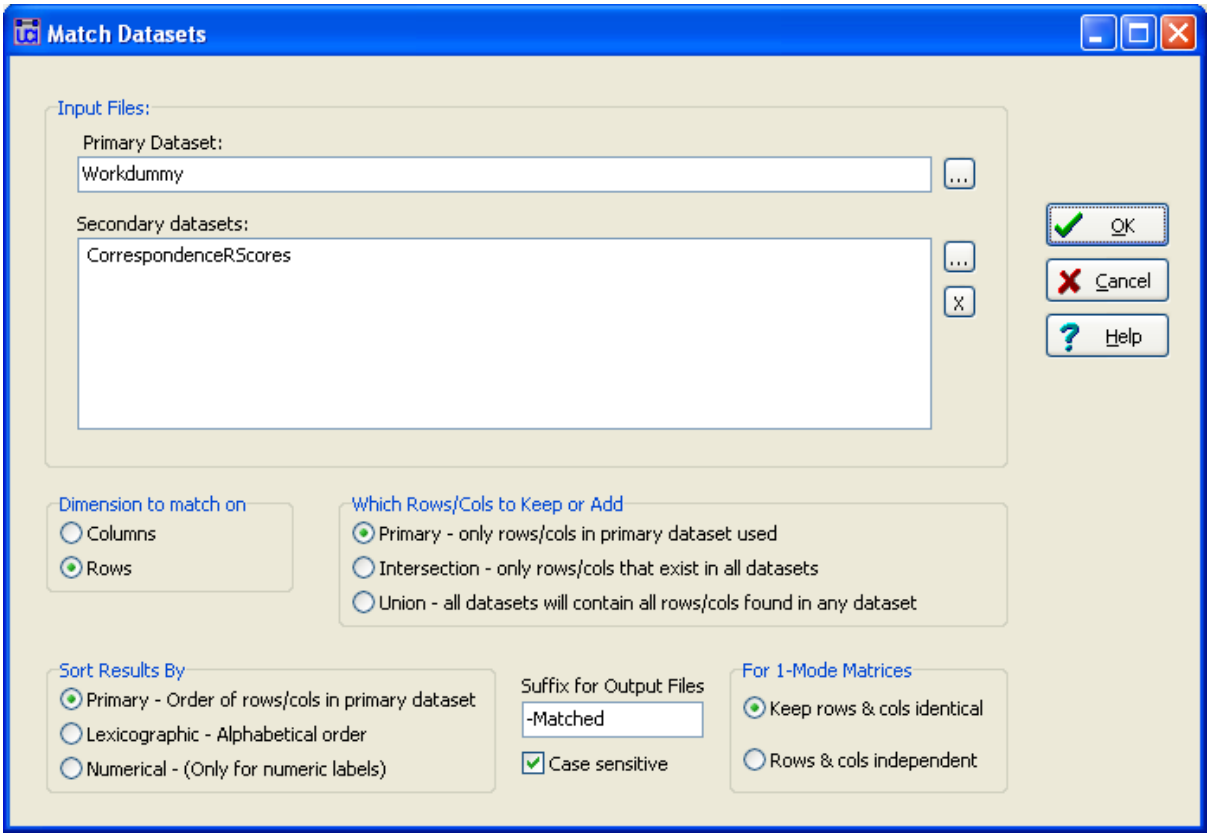
Before running the correspondence analysis on the dataset workshop in order to create Figure 7.23 we need to create a dummy network which will connect each actor at time period one to a copy of themselves in time period 2. This can easily be done using the dl editor as follows.



This is then saved as a UCINET dataset we have called Workdummy. We can create the time stacked data from two separate time matrices by running Transform|Timestack and selecting append as rows.We now run correspondence analysis on the stacked dataset Workshop and we save just two factors ie Tools|Scaling/Decomposition|Correspondence as follows

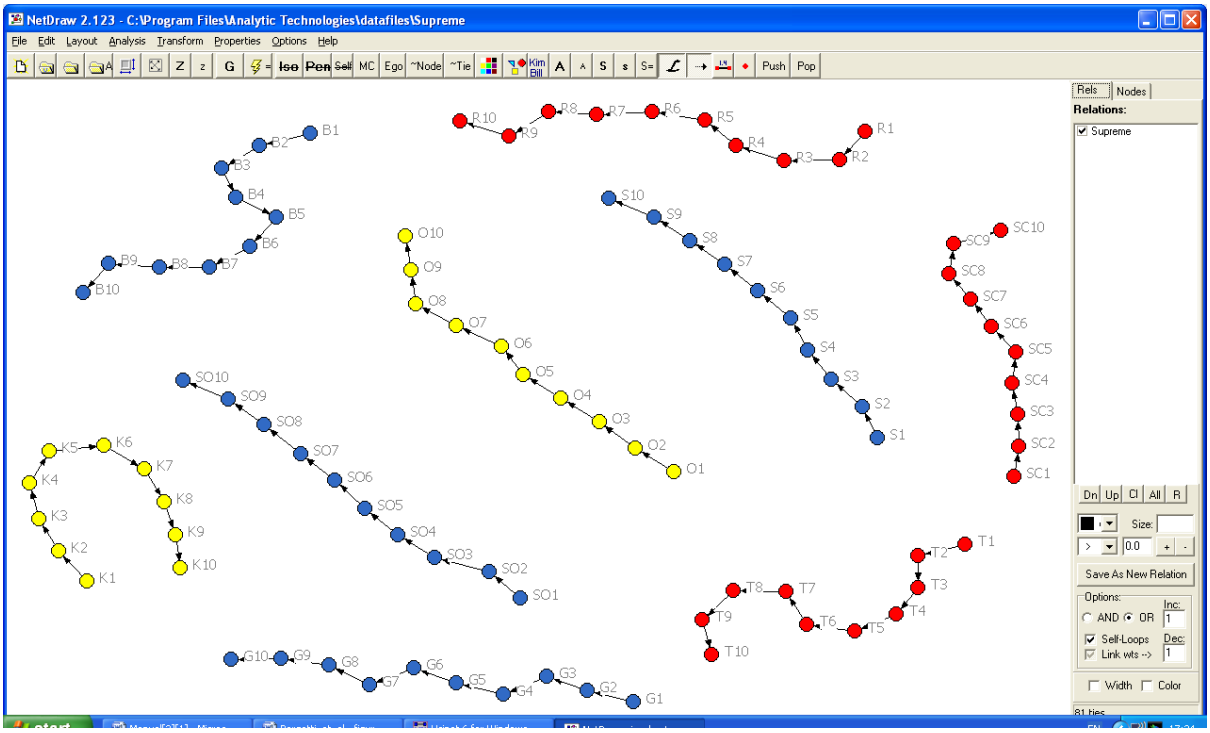


We now should match the co-ordinates to our dummy data to make sure they correspond. To do this run Data|Match Multiple Datasets set Workdummy as the primary and CorrespondenceRScores as the secondary dataset to create a new co-ordinate file called CorrespondenceRScores-matched.

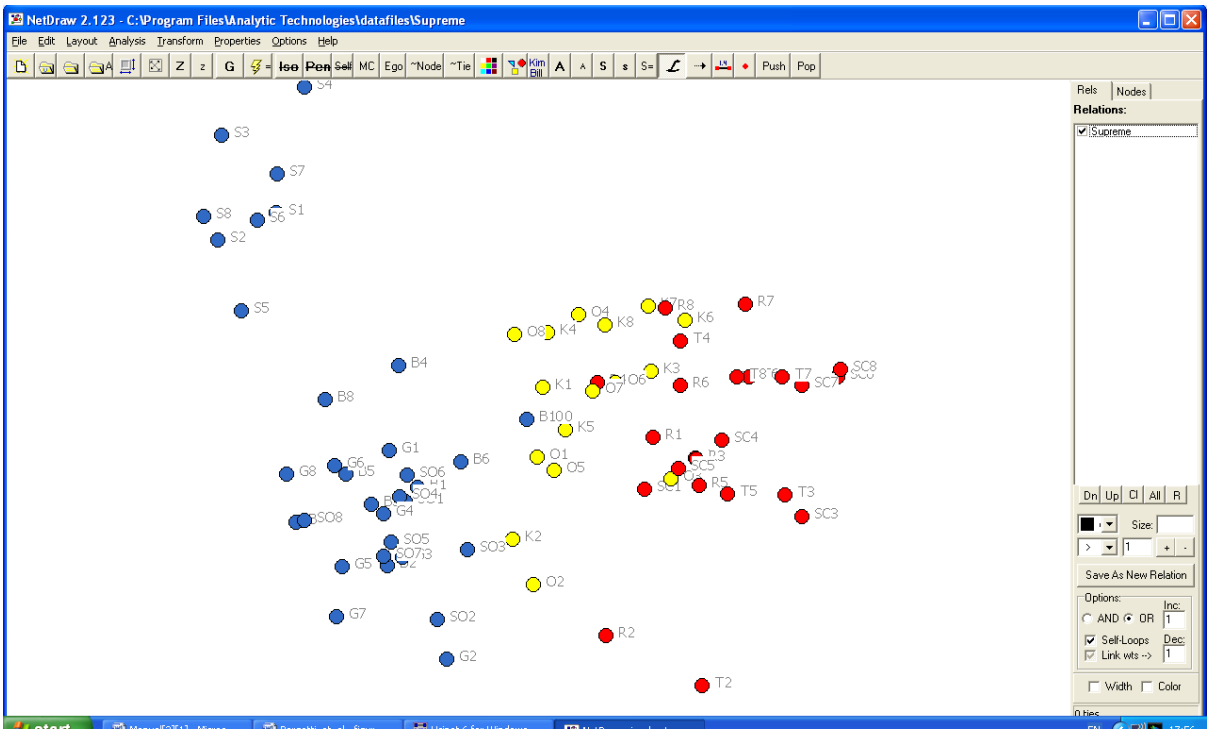


We now open the UCINET dataset Workdummy in Netdraw and then bring in the co-ordinates by using File|Open|Ucinet dataset|Cordinates and selecting CorrespondenceRScores-matched this will give Figure 7.23.

The data for the supreme court for the correspondence analysis is called Supremeall there is also a dataset called supreme which has the connections between all the judges. In Netdraw load supreme and then colour the nodes according to their political persuasion ie leave as Blue S,B,G,SO, colour K and O yellow and T,R SC red. This can easily be done since the trails are in separate components and you can left click to open up a box that covers each trail in turn and colour groups of nodes. Once this is done you get the following.

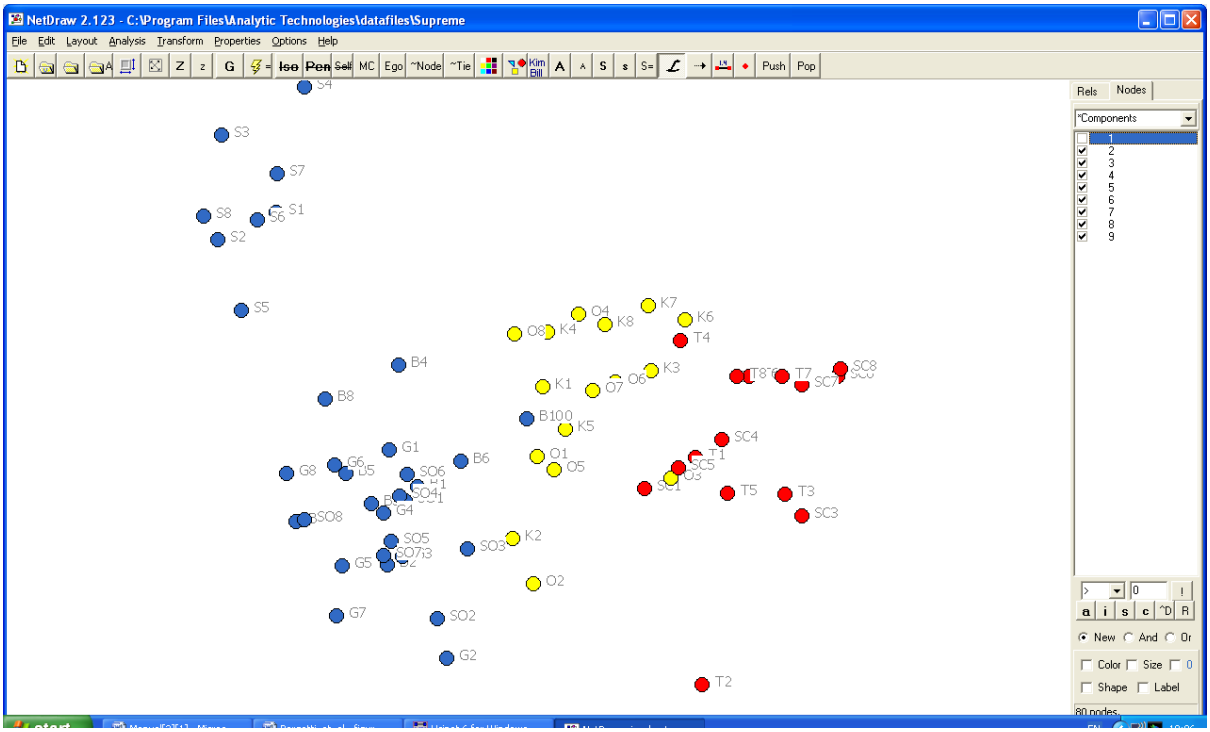


You can now run the correspondence analysis and do the matching as in the previous example and then bring in the coordinates. You may need to flip the diagram but if you view edges greater than zero you obtain Figure 7.24 as below.

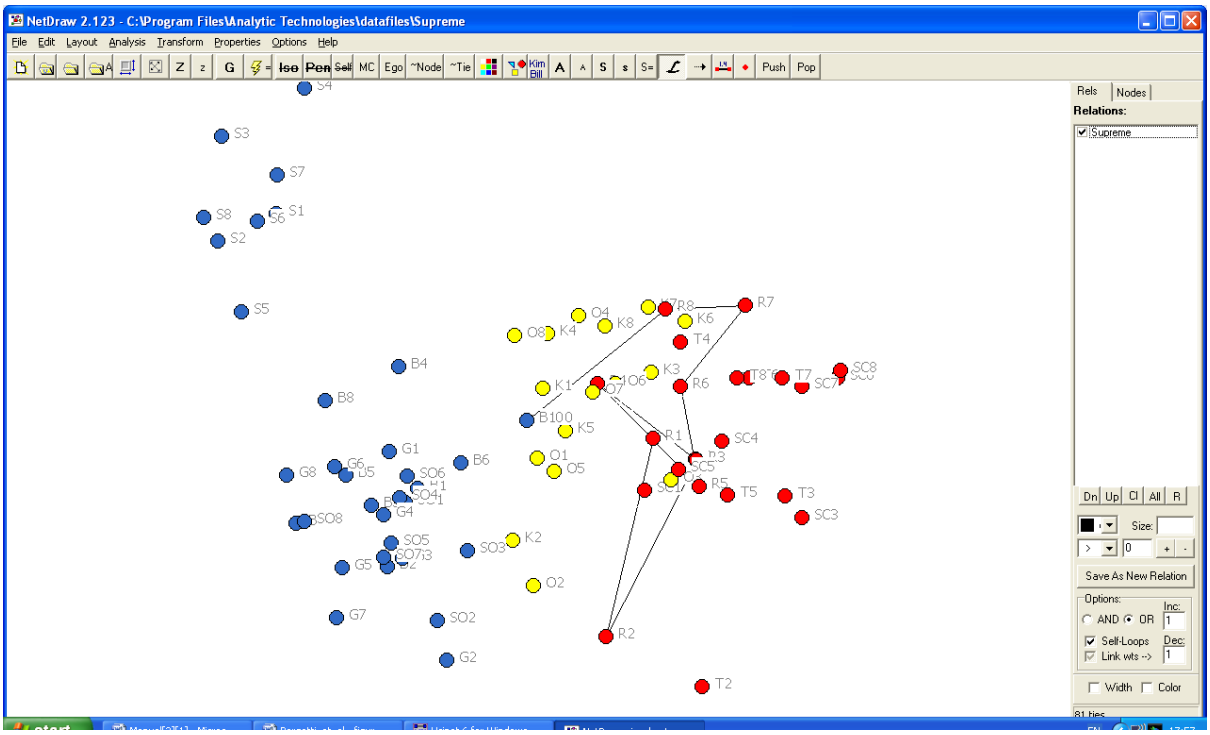


To see just the trail left by Renquist first show all the edges and then run Analysis|components. Now show all the components that are not Renquist (ie all those except component 1) and then colour all

active edges to white using Properties|Lines|Color|General so that you have the following.



If you now click the box to include component 1 you obtain Figure 7.23 as follows.

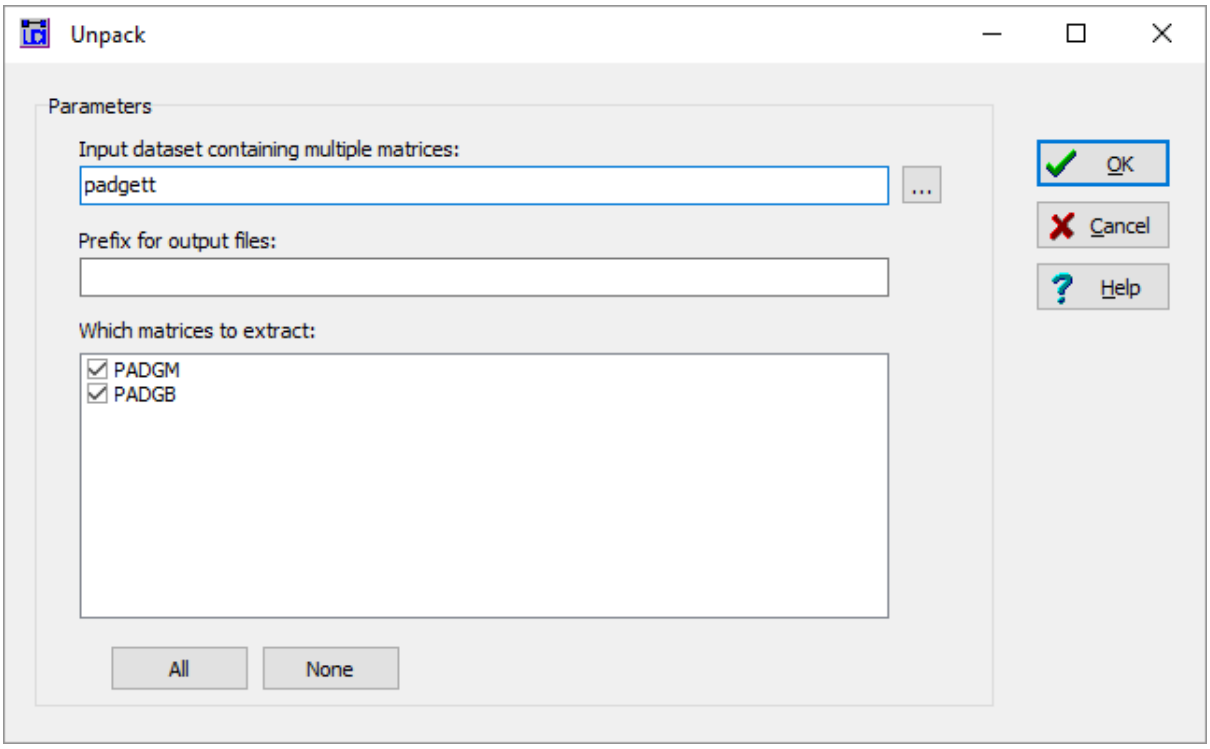


Section 8.3 Dyadic Hypothesis

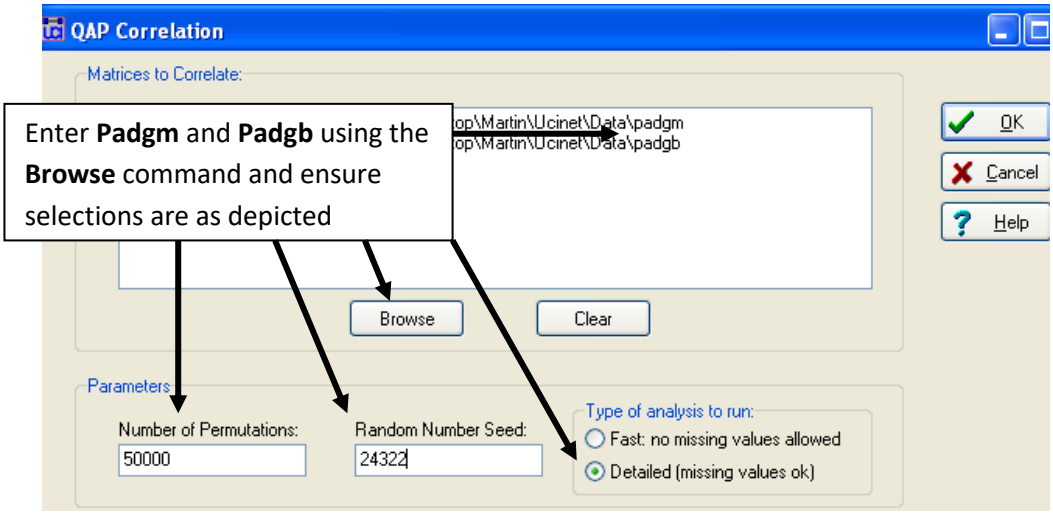
QAP Correlation

Before running the QAP routine, we must split the **PADGETT** dataset to obtain individual dataset for **Padgm** (marriage network) and **Padgb** (business network). .

Select data|unpack and choose **Padgett** as input dataset. Afterwards chose the relations you'd like to unpack: **PADGM** and **PADGB** from the list provided by ticking the ones required, clearly there are only two in this case. This will create two new dataset files **PADGM** and **PADGB** in your file directory.



To run the **QAP** routine on the Padgett and Ansell's data open UCINET and open **Tools|Testing Hypotheses|Dyadic (QAP)|QAP Correlation** and add both matrices (**Padgm and Padgb**) to correlate. Select the option "**Detailed**" in the "**Type of analysis to run**" section and ensure that Number of **Permutations** is set to **50000** and **Random Number Seed** is set to **24322** to replicate the results. Click OK; the UCINET log file will show the same results as in **Figure 8.1**.

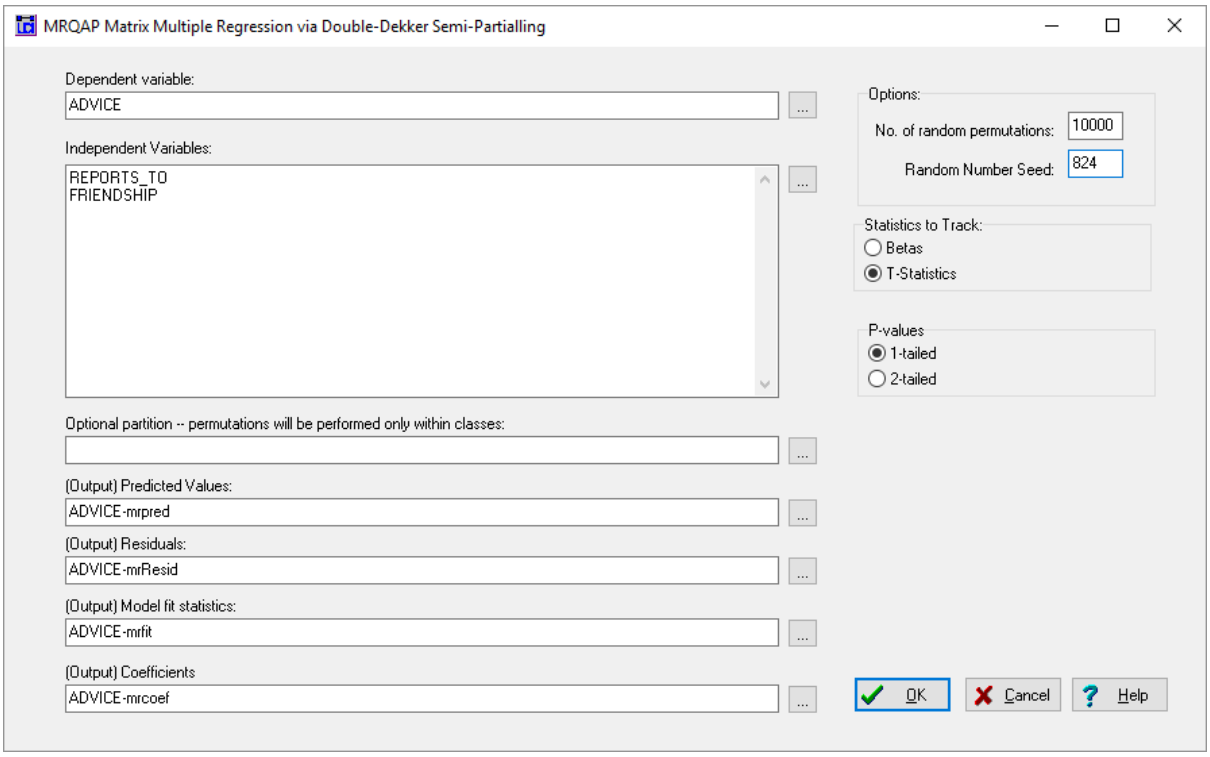


8.3.1 QAP Regression

Before beginning with the routine we must again unpack the dataset we are using **Krack-High-Tec** using the **data|unpack** function in UCINET and selecting all three relations: **ADVICE**, **FRIENDSHIP** and **REPORTS_TO**.

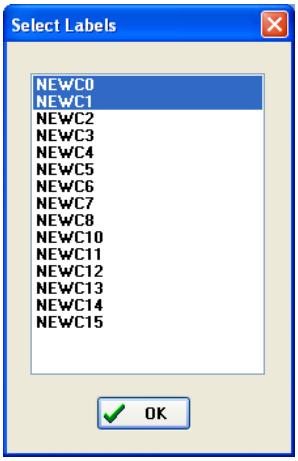
MR-QAP

To perform the QAP Regression, open **Tools|Testing Hypotheses|Dyadic (QAP)|MR-QAP Linear Regression|Semi-Partialling method** and select **ADVICE** as your Dependent variable and **FRIENDSHIP** and **REPORTS_TO** (to make multiple selections press CTRL) as Independent variables. Set the numbers of permutations to **10000** and Random Number Seed to **824** to replicate findings in **Figure 8.2**. Click OK and results will open in a new window.

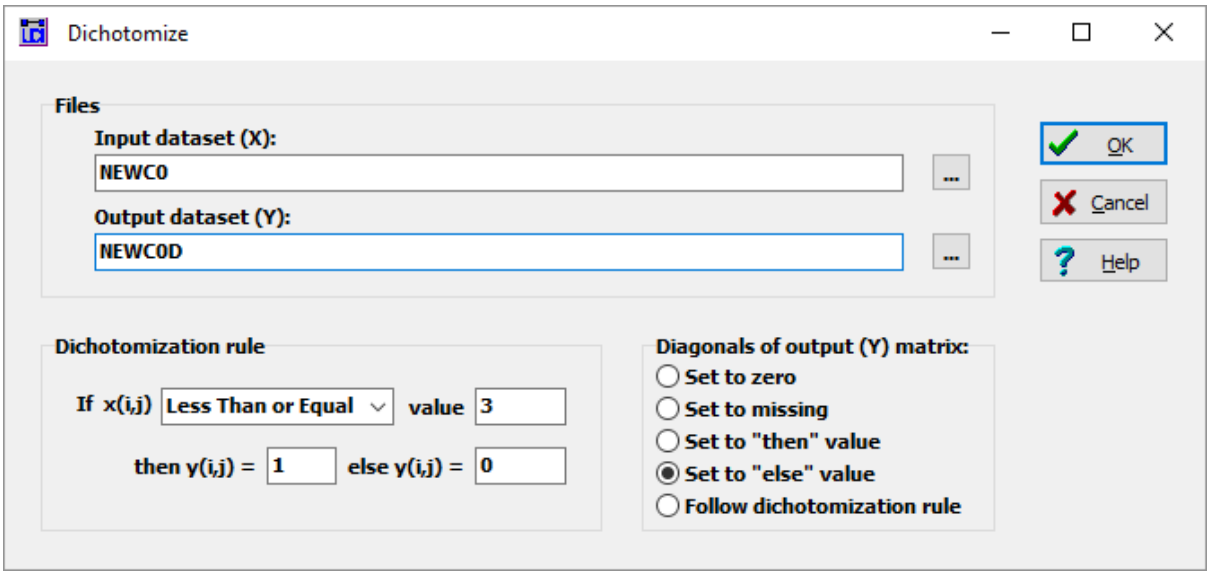


LR-QAP

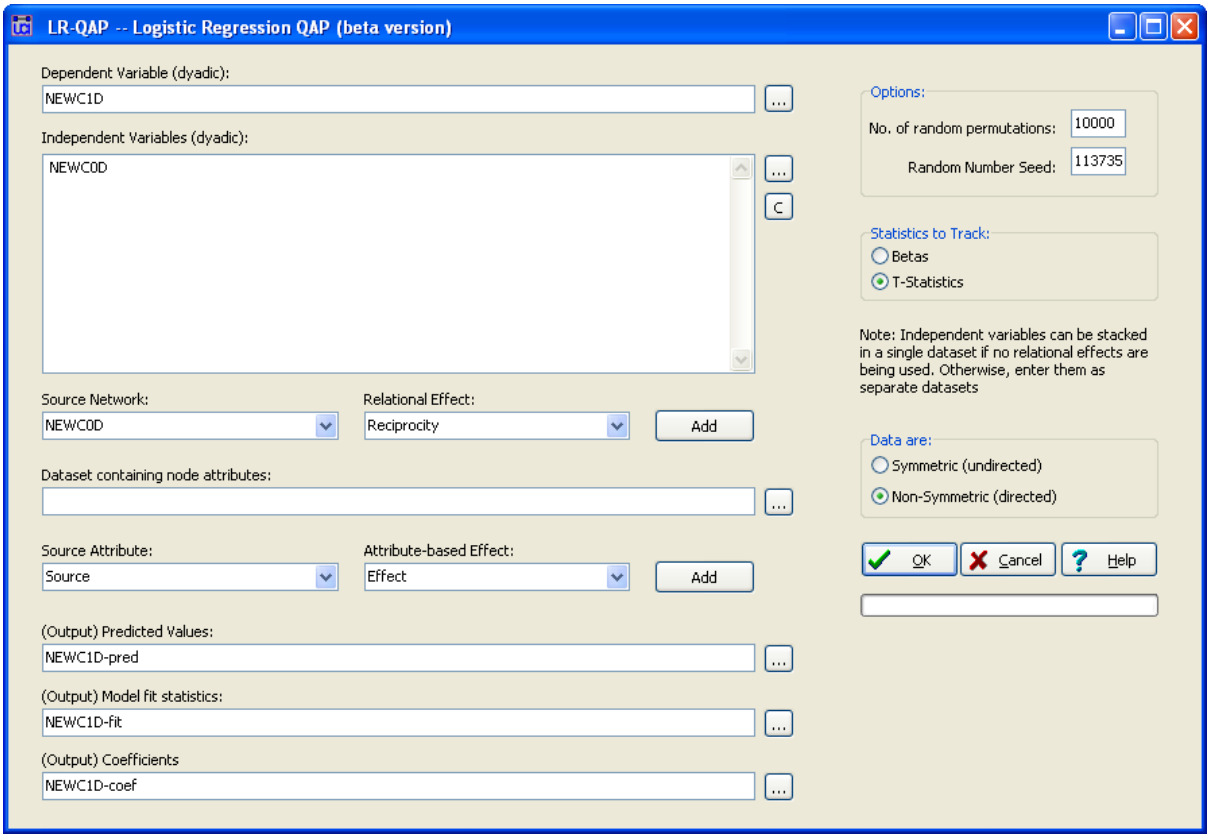
To perform the logistic regression in 8.3 we need to dichotomize the Newcomb (1961) fraternity data so that it only accounts for the top three choices in week zero and week one. First of all, **NEWC0** and **NEWC1** need to be unpacked from the **NEWFRAT** dataset: **Open data|unpack**, select the **NEWFRAT** dataset and unpack **NEWC0** amd **NEWC1**.



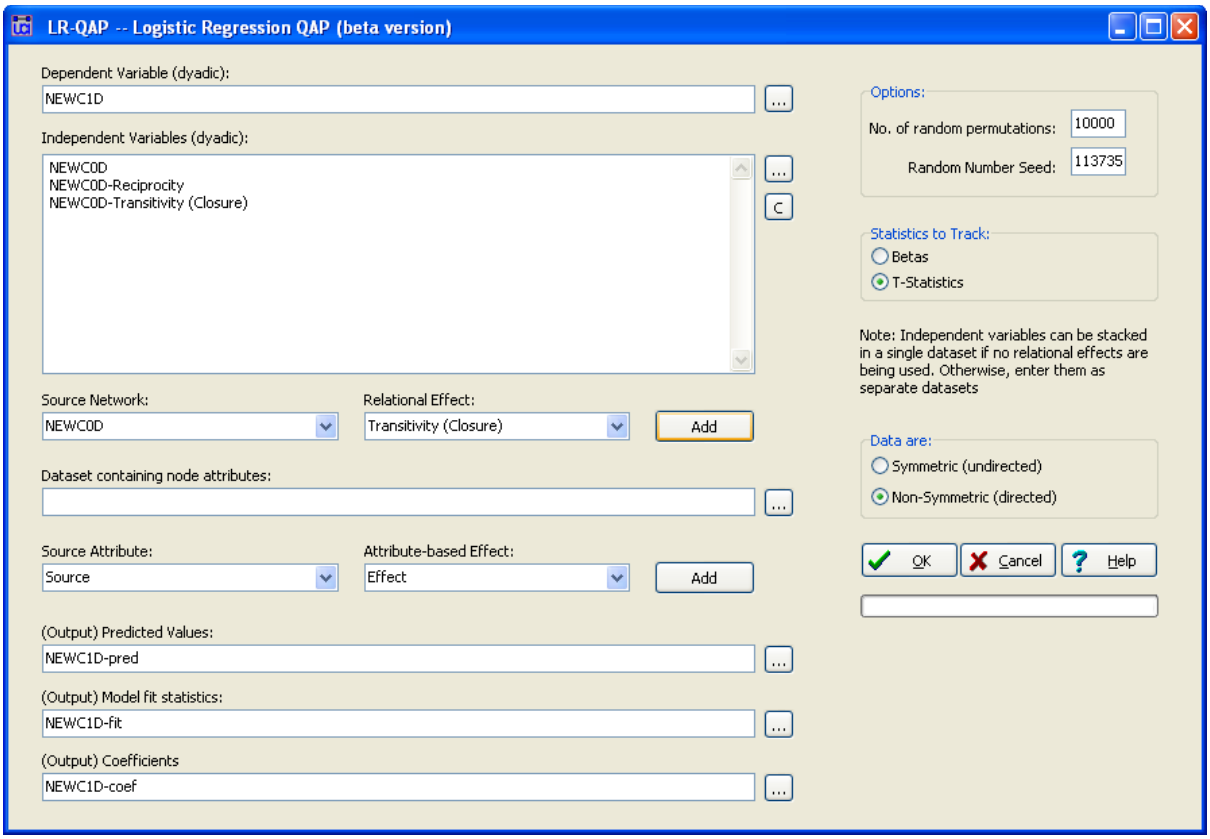
To dichotomize **NEWC0** and **NEWC1**, open **Transform|Dichotomize** Load the **NEWC0** file, enter the **Cutoff value** "**3**" and select **LE- less than or equal to** and save the new matrix as **NEWC0D**. Repeat the step for the NEWC1 and save it as NEWC1D.



The logistic regression routine has a built in system that allows us to construct the reciprocity matrix and the transitivity matrix from a given source matrix. We first load in the dependent variable NEWC1D and the first independent variable NEWC0D under Tools|Testing Hypothesis|Dyadic (QAP)|LR QAP Logistic Regression once this has been loaded we can select reciprocity as a relational effect as follows



If we then click add and repeat to add transitivity we get the following



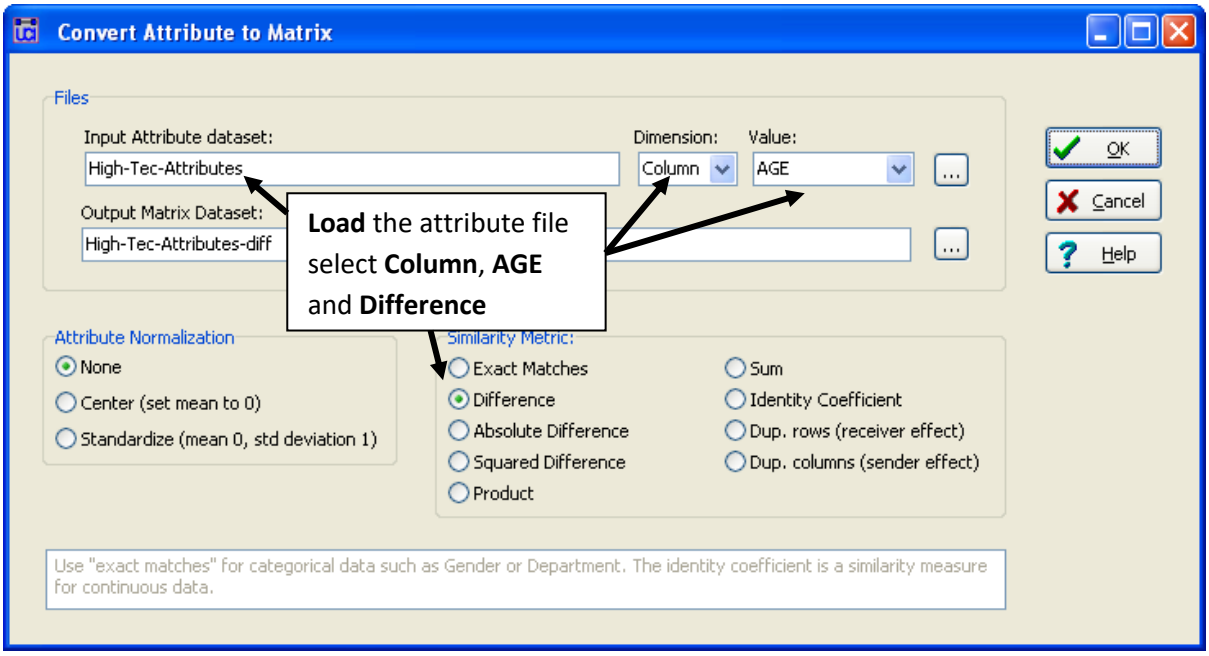
If we now press OK we get similar results to the ones in the book. The number of permutations are not quite high enough to obtain an exact replication but the significance levels should be very close.

Section 8.4 Dyadic-Monadic Hypotheses

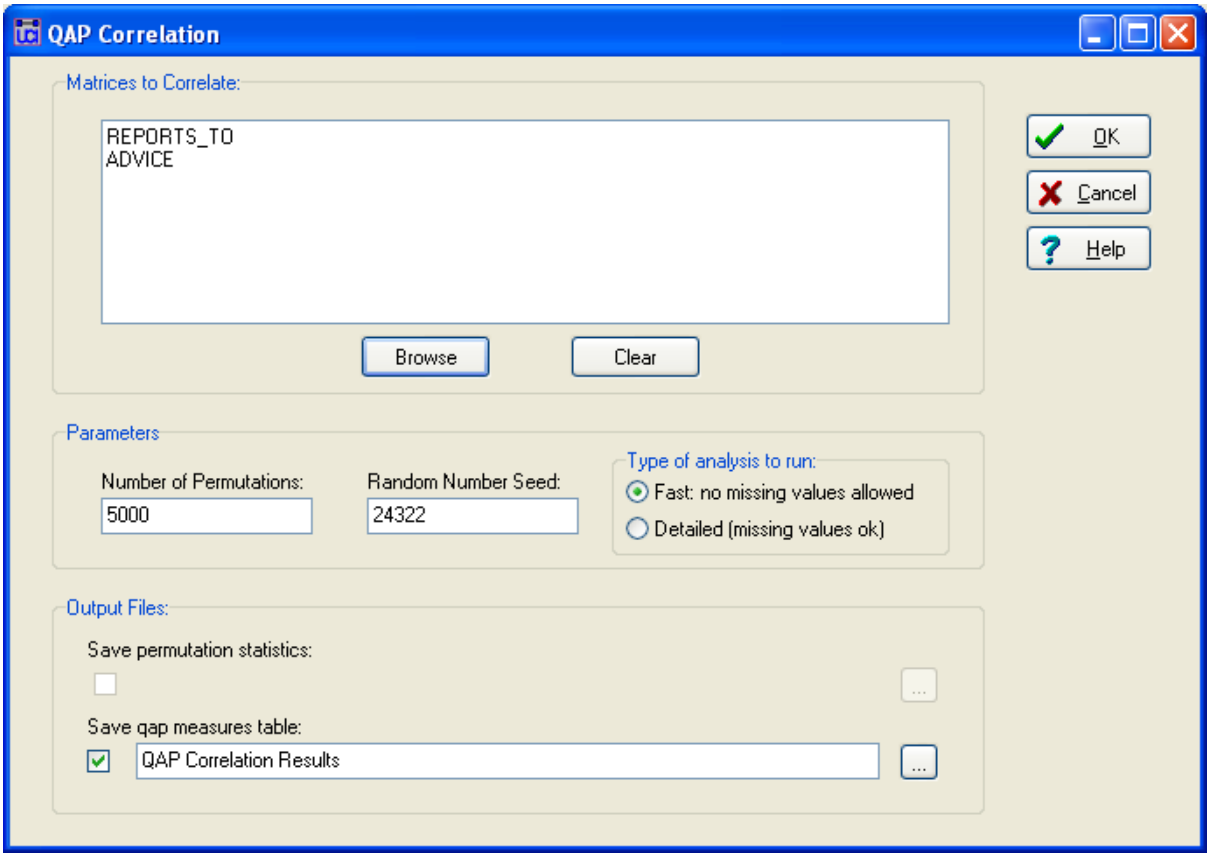
To visualise **Figure 8.4** simply go to **NetDraw** and load the **campnet** file. Turn off the arrowheads by clicking the (arrow)-button. Click on the -button in the toolbar and load the **campattr** attribute file. Go to **Properties|Nodes|Symbols|Shape|Attribute-based**, select **Gender** and adjust the shapes (**1** (female) gets a **Circle** / **2** (male) gets a **Square**).

8.4.1 Continuous Attributes

The first step under 8.4.1 is to transform the attributes in a matrix. To do this go to **Data|Attribute to matrix** and load the **High-tec-Attributes** file. Select the **Dimension** "**Column**", **Value** "**AGE**" and select "**Differences**" amongst the **Similarity Matches** options. Save as **High-Tec-Attributes-diff**, click OK and the output in the log file should match that in **Matrix 8.1**.



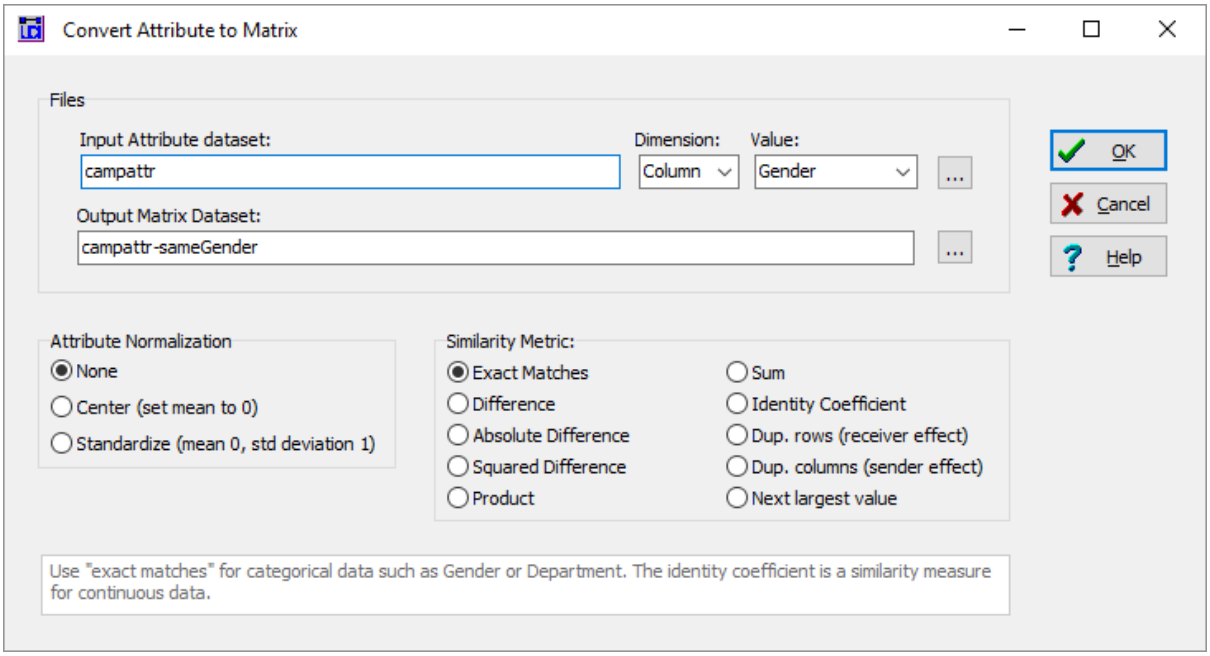
The second step is to unpack the **REPORTS_TO** relation found in the **Krack-High-Tec** file. Go to **Data|Unpack**, open the file and select option **3** which corresponds with **REPORTS_TO**. To run the QAP correlation illustrated in **Figure 8.5** go to **Tools|Testing Hypotheses|Dyadic (QAP)| QAP Correlation** and load the **High-Tec-Attributes-Diff** and the **REPORTS_TO** matrices. As follows



Pressing OK will reproduce the results in Figure 8.5.

8.4.2 Categorical Attributes

Open the **Data|Attribute** to matrix and select the **Campattr** dataset. Select Dimension "**Column**" and Value "Gender" and double-check that the Similarity Metric is set to "**Exact Matches**". Click OK and a matrix will open in a new window which will be saved as "**Campattr-sameGender**".



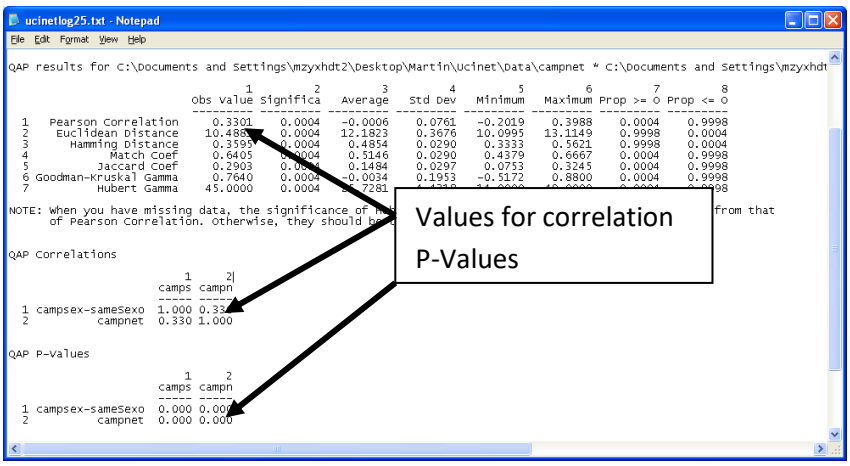
ucinetlog30.txt - Notepad

File Edit Format View Help

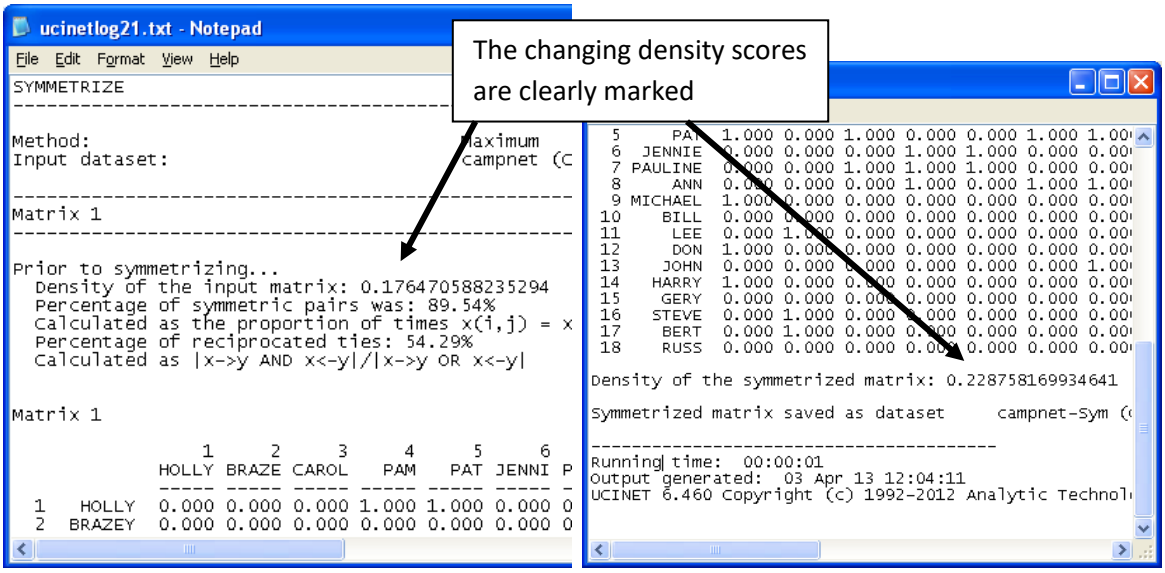
```
CONVERT ATTRIBUTE TO MATRIX
-------------------------------------------------------------------------------

Input file:                          campattr (C:\Users\Martin\Documents\datafiles\campattr
Dimension:                           Column
Variable:                            Gender


              1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18
             HO BR CA PA PA JE PA AN MI BI LE DO JO HA GE ST BE RU
             LL AZ RO  M  T NN UL  N CH LL  E  N HN RR RY EV RT SS
              Y EY  L       IE IN    AE              Y     E
                                E     L
             -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
   1   HOLLY  1  1  1  1  1  1  1  1  0  0
   2  BRAZEY  1  1  1  1  1  1  1  1  0  0
   3   CAROL  1  1  1  1  1  1  1  1  0  0
   4     PAM  1  1  1  1  1  1  1  1  0  0
   5     PAT  1  1  1  1  1  1  1  1  0  0  0  0  0  0  0  0  0  0
   6  JENNIE  1  1  1  1  1  1  1  1  0  0  0  0  0  0  0  0  0  0
   7 PAULINE  1  1  1  1  1  1  1  1  0  0  0  0  0  0  0  0  0  0
   8     ANN  1  1  1  1  1  1  1  1  0  0  0  0  0  0  0  0  0  0
   9 MICHAEL  0  0  0  0  0  0  0  0  1  1  1  1  1  1  1  1  1  1
  10    BILL  0  0  0  0  0  0  0  0  1  1  1  1  1  1  1  1  1  1
  11     LEE  0  0  0  0  0  0  0  0  1  1  1  1  1  1  1  1  1  1
  12     DON  0  0  0  0  0  0  0  0  1  1  1  1  1  1  1  1  1  1
  13    JOHN  0  0  0  0  0  0  0  0  1  1  1  1  1  1  1  1  1  1
  14   HARRY  0  0  0  0  0  0  0  0  1  1  1  1  1  1  1  1  1  1
  15    GERY  0  0  0  0  0  0  0  0  1  1  1  1  1  1  1  1  1  1
  16   STEVE  0  0  0  0  0  0  0  0  1  1  1  1  1  1  1  1  1  1
  17    BERT  0  0  0  0  0  0  0  0  1  1  1  1  1  1  1  1  1  1
  18    RUSS  0  0  0  0  0  0  0  0  1  1  1  1  1  1  1  1  1  1

18 rows, 18 columns, 1 levels.
```

The 1 correspond to the nodes being of the same gender

Now open the **Tools|Testing Hypotheses|Dyadic (QAP)|QAP Correlation** and insert the **Campattr-sameGender** and the **Campnet** matrices, select **50000** permutations and make sure the "**Type of analysis to run**" is set to "**Detailed**." Click OK and a new window will open with the results:



To symmetrise **Campnet** as described in the book open **Transform|Symmetrize…** and select the **Campnet** file. Ensure the setting for method is set to "**Maximum**" and that missing values are handled by "**Choose non-missing values**". Click OK to see the new matrix. **Note**: The statistics before the new matrix is displayed tells you that the "Density of the input matrix" is 0.1764 (17.6%) amongst other things. At the bottom of the log you can find the density value for the symmetrised matrix which in this case has increase to 0.2287 (22.9%).

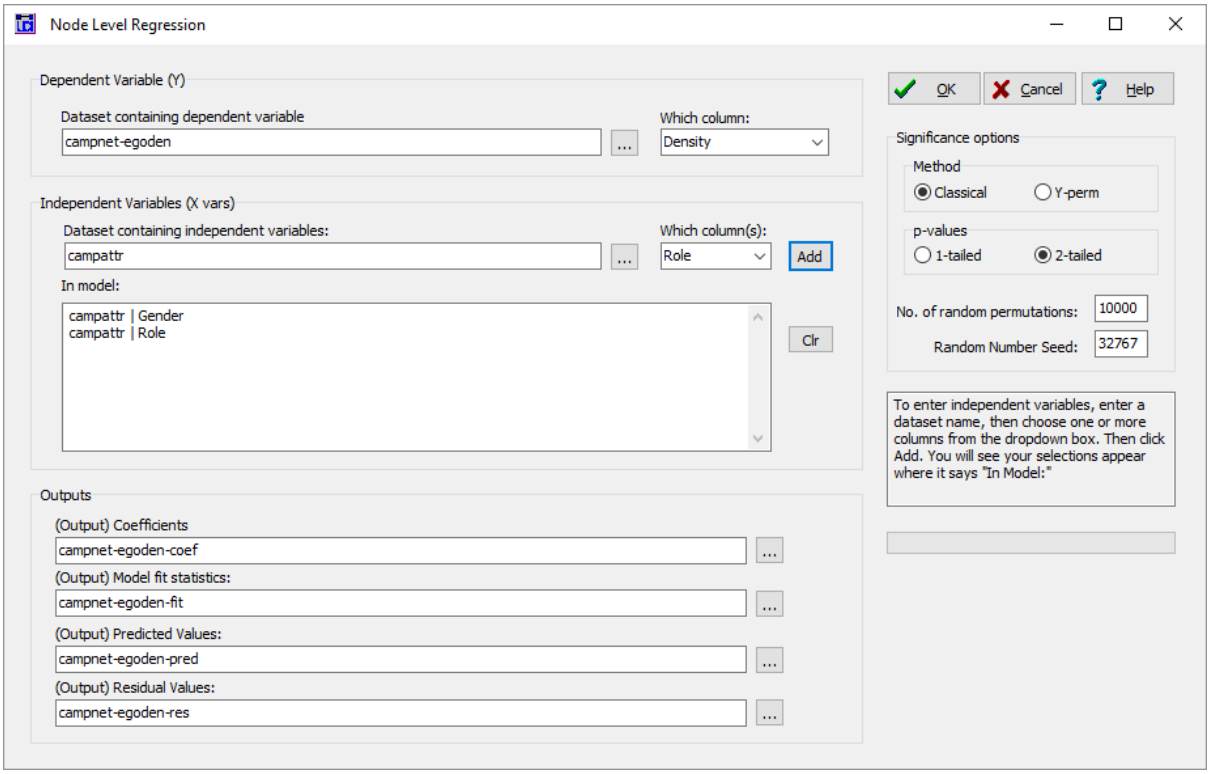


Follow the above steps to repeat the **QAP Correlation** but this time select **Campnet-Sym** and the **Campattr-sameGender** file. Click OK and a new window will open depicting the same results as in **Figure 8.6**.

Section 8.5 Node-level hypothesis

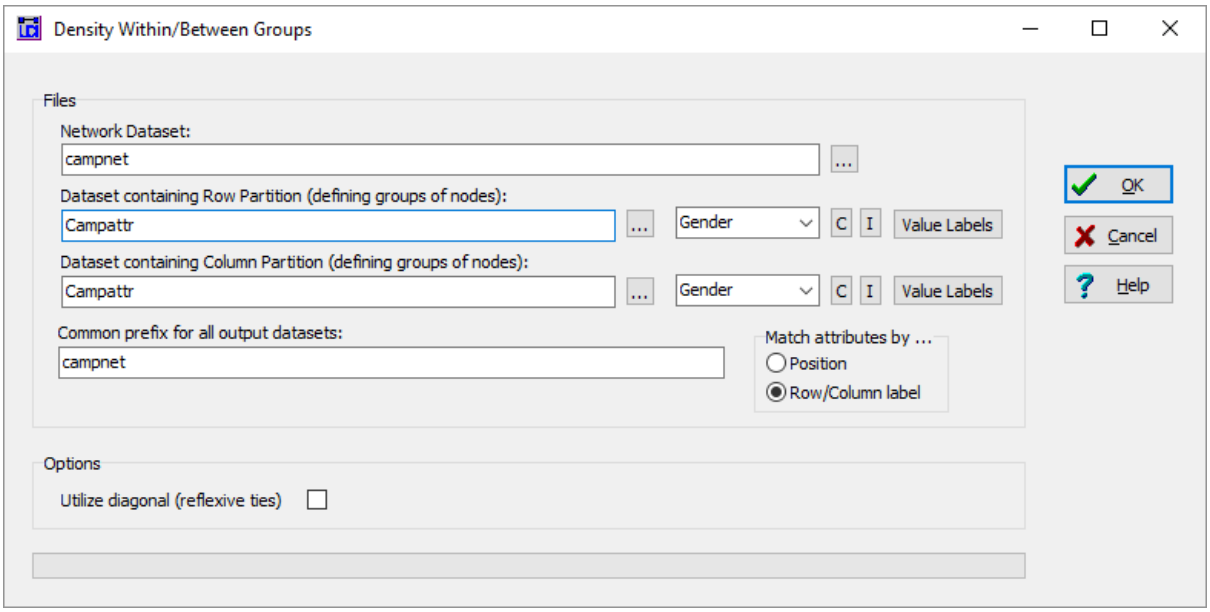
To generate the output discussed in **Figure 8.7** open the **Network|Ego Networks| Egonet density** procedure and select the Campnet dataset. Click OK and a window will open showing three columns (Size, Avg Deg and Density). Now open the **Tools|Testing Hypotheses|Node-level|Regression…**

routine and select the **Campnet-egoden** dataset as dependent variable selecting the density column. Then open **Campattr** as **Independent dataset** and select columns for "**Gender**" and "**Role**" attributes, these are added by clicking the add button. When both have been included click OK. This should result in **Figure 8.7**.



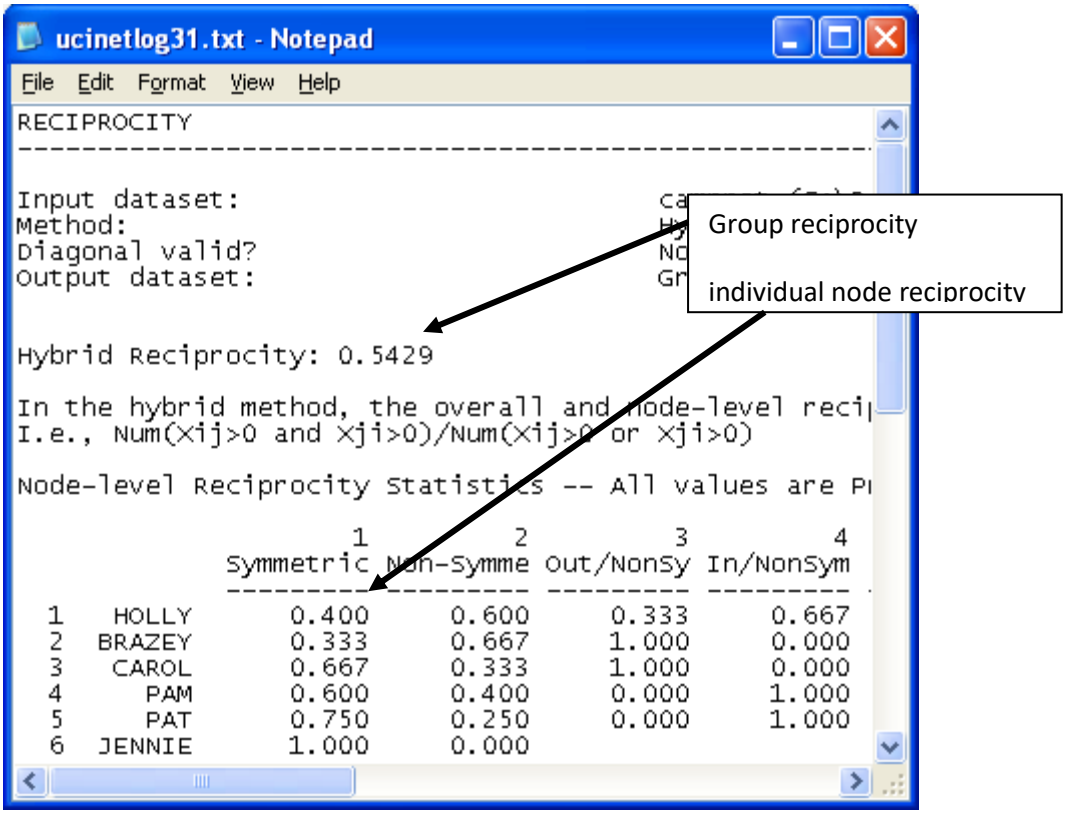
Section 9.2 Cohesion

To obtain Table 9.1 run Network|Cohesion|Density|Density by groups. Load in Campnet and Campattr as the attribute matrix and select gender as the row partition (the column will automatically be the same).



Section 9.3 Reciprocity

To run the reciprocity procedure open Network|Cohesion|Reciprocity and select the Campnet dataset. Click OK and a new log file will open depicting the reciprocity value for the network (Hybrid Reciprocity which is the same as dyad if there are no partitions) and individual nodes:

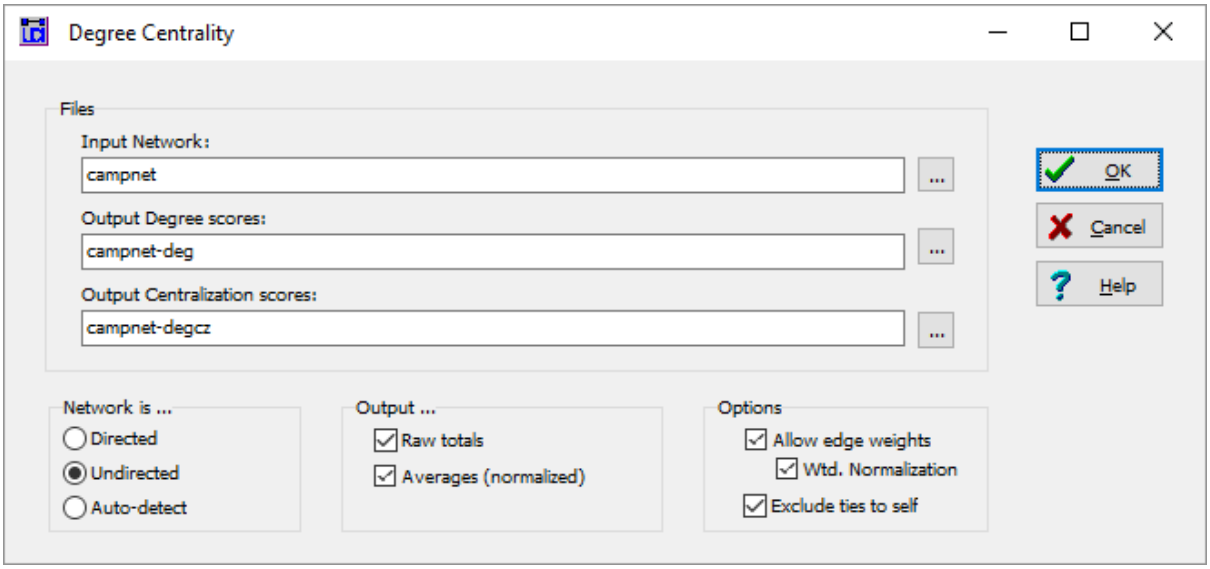



```
RECIPROCITY
-----------------------------------------------------

Input dataset:
Method:
Diagonal valid?
Output dataset:


Hybrid Reciprocity: 0.5429

In the hybrid method, the overall and node-level recip
I.e., Num(Xij>0 and Xji>0)/Num(Xij>0 or Xji>0)

Node-level Reciprocity Statistics -- All values are Pr

                    1          2          3          4
              Symmetric Non-Symme Out/NonSy In/NonSym
              --------- --------- --------- --------- .
  1    HOLLY      0.400     0.600     0.333     0.667
  2   BRAZEY      0.333     0.667     1.000     0.000
  3    CAROL      0.667     0.333     1.000     0.000
  4      PAM      0.600     0.400     0.000     1.000
  5      PAT      0.750     0.250     0.000     1.000
  6   JENNIE      1.000     0.000
```

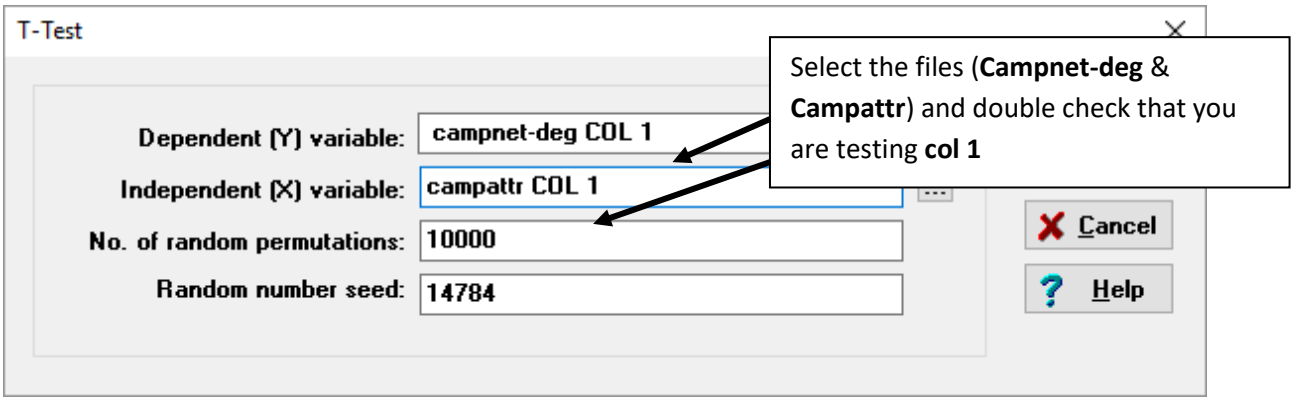
Section 10.3 Undirected, Non-valued Networks

10.3.1 Degree Centrality

To run the Centrality procedure open **Network|Centrality and Power|Degree**… and select the **Campnet** file. Because we want to ignore tie direction select undirected a new window will open showing the same results as in **Figure 10.1.**



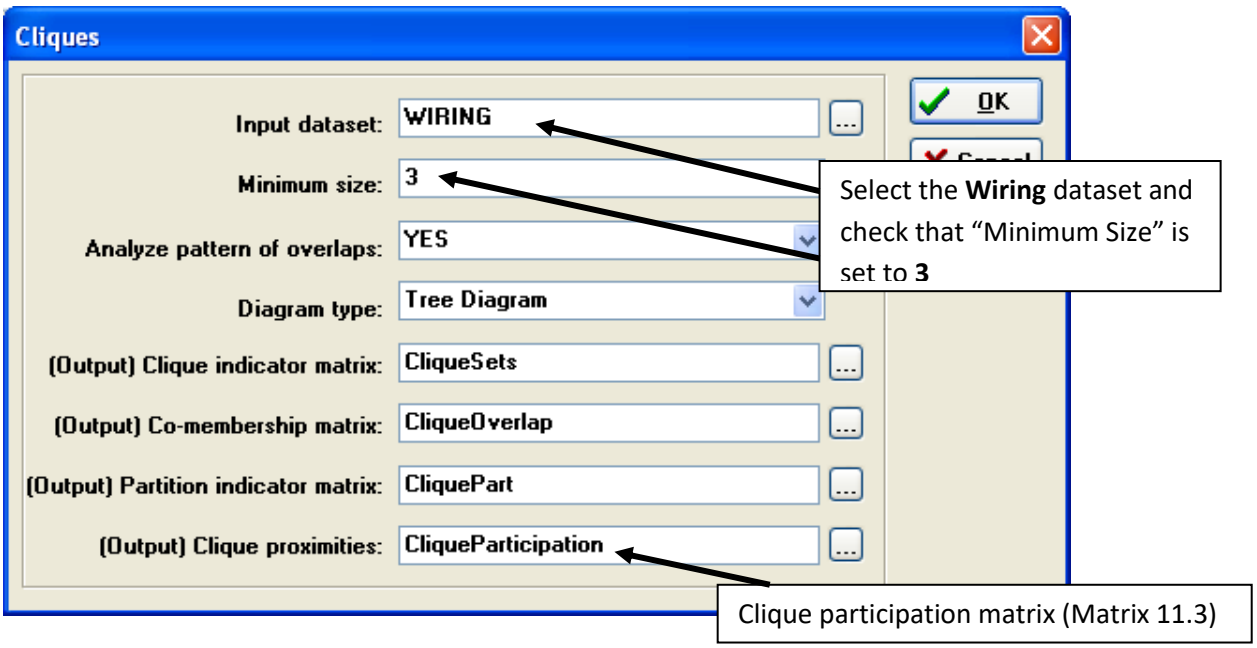
To run the t-Test open **Tools|Testing Hypotheses|Node-level|T-Test…** and select the **Campnet-deg** dataset column 1 (**col 1**) as dependent variable and **Campattr** column 1 (**col 1**)as the independent variable. Click OK and compare your results with those in Figure 10.2; they should match.



Section 11.2 Cliques

11.2.1 Analyzing clique overlaps

To perform the Cliques routine as discussed in the book go to **Network|Subgroups|Cliques…** and select the **Wiring** dataset. The output in **Matrix 11.2** uses a clique defined as containing **3** or more actors which can be changed in the "**Minimum size**" labelled box. Click OK to see the results in a new log file.



The cliques in section 11.2 are listed followed by the clique participation matrix Matrix 11.3, the co-clique matrix Matrix 11.2 and the hierarchical clustering in Figure 11.2.

11.2.2 Bimodal method

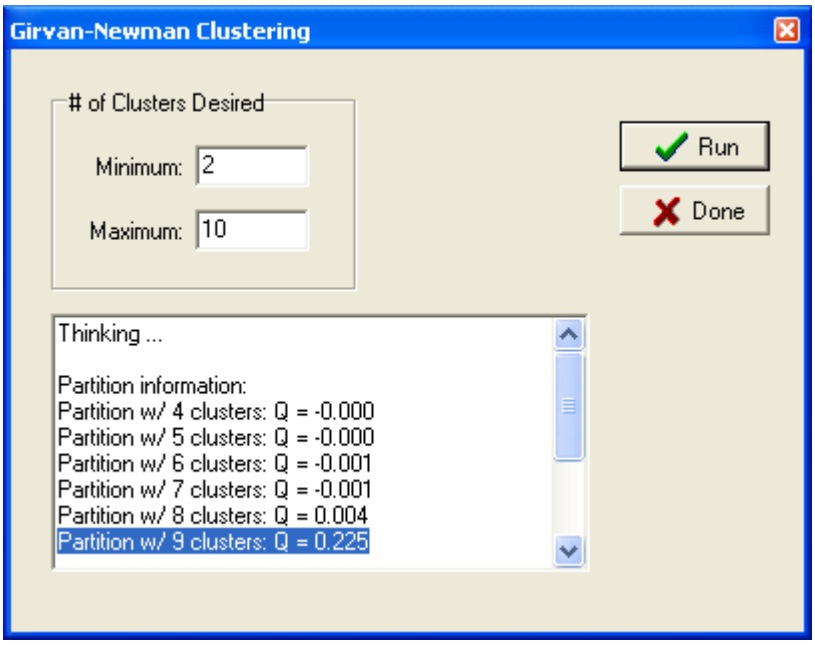
To visualise this network as shown in **Figure 11.3** open **NetDraw** and open the **File|Open|Ucinet Dataset|2-Mode network** and select the **CliqueParticipation** file from the folder. Click OK. You can now change the colours and add the tie strengths as demonstrated earlier in the visualization chapter.

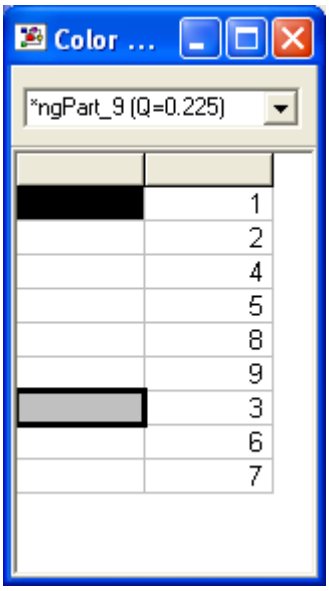
To produce the hierarchical clustering shown in **Figure 11.4** open **Network|Subgroups|Cliques…** and select the **ZACKAR** file and you can draw the clique participation matrix in **NetDraw** following the steps in the previous example and will receive **Figure 11.5**

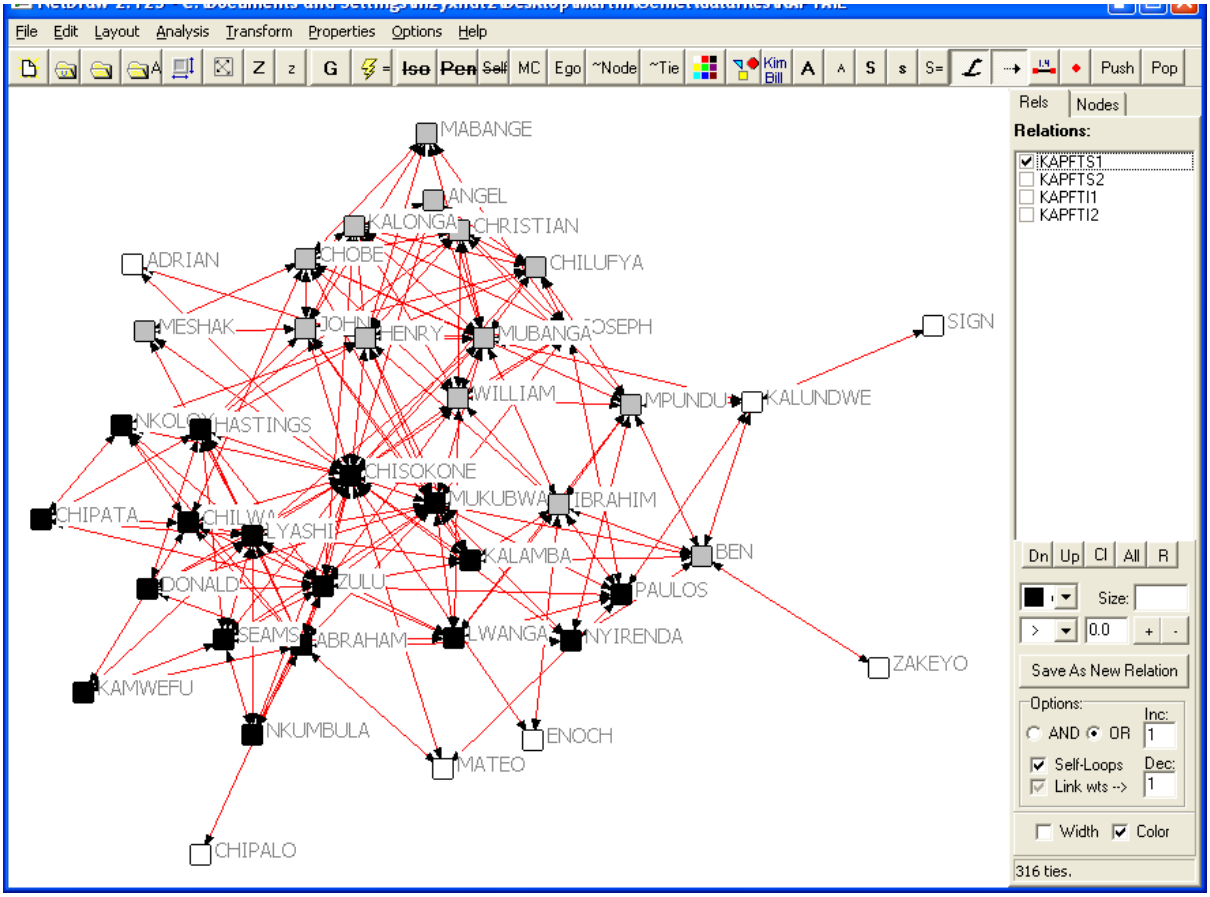
Note: doing this routine will overwrite the previous (Wiring) output CliqueParticipation unless you change the name.

11.3 Girvan-Newman Algorithm

To run the Girvan-Newman routine, open **NetDraw** and load the **Kaptail file**. Then run **Analysis|Subgroups|Girvan-Newman** and click **Run** to see the Partitions within the window. To colour the partitions as in **Figure 11.6** according to the subgroups given by **Parition w/9 clusters: Q = 0.225**, go to **Properties|Nodes|Symbols|Colours|Attribute based** and select ***ngPart_9 (Q=0.225)** and re-recolor the nodes as shown below which should give you the same outcome as in Figure 11.6

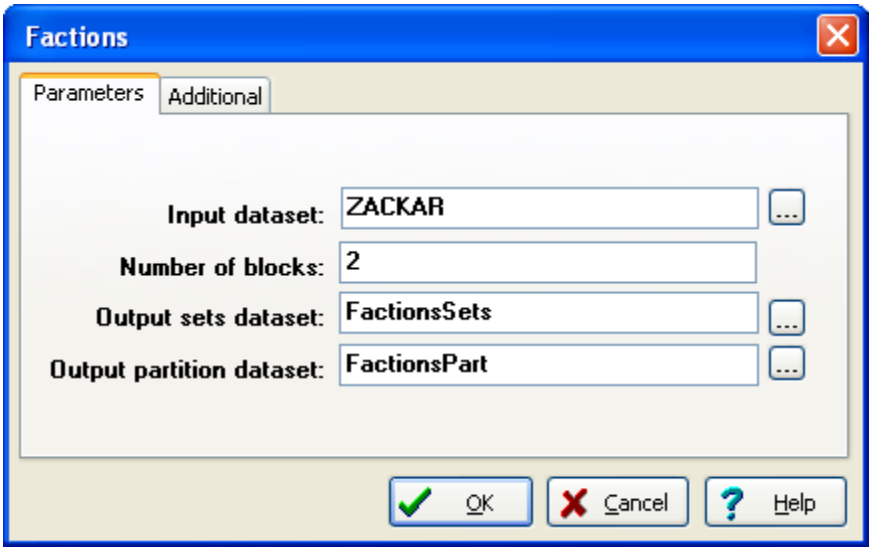




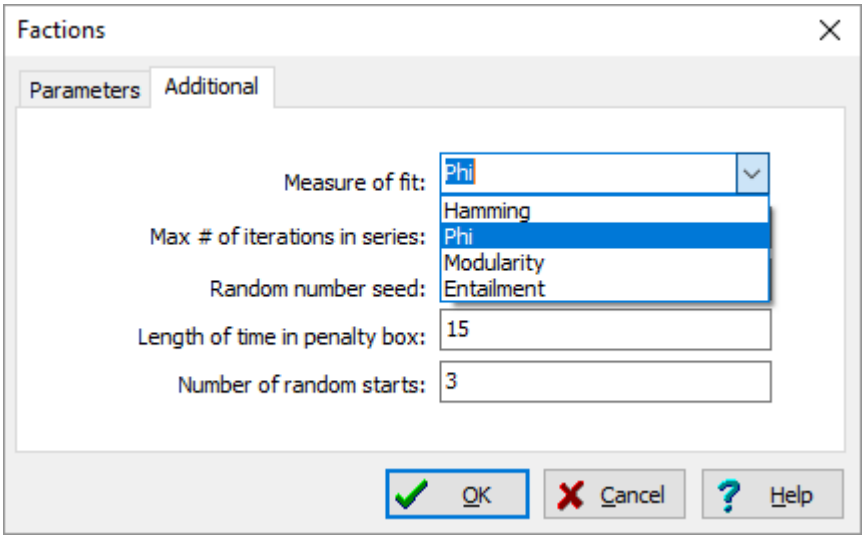


Section 11.4 Factions and modularity optimization

To produce Figure 11.8 open **Network|Subgroups|Factions** and select the **ZACKAR** dataset.



Click the additional tab and select Phi (the name of the correlation measure)as the measure of fit.

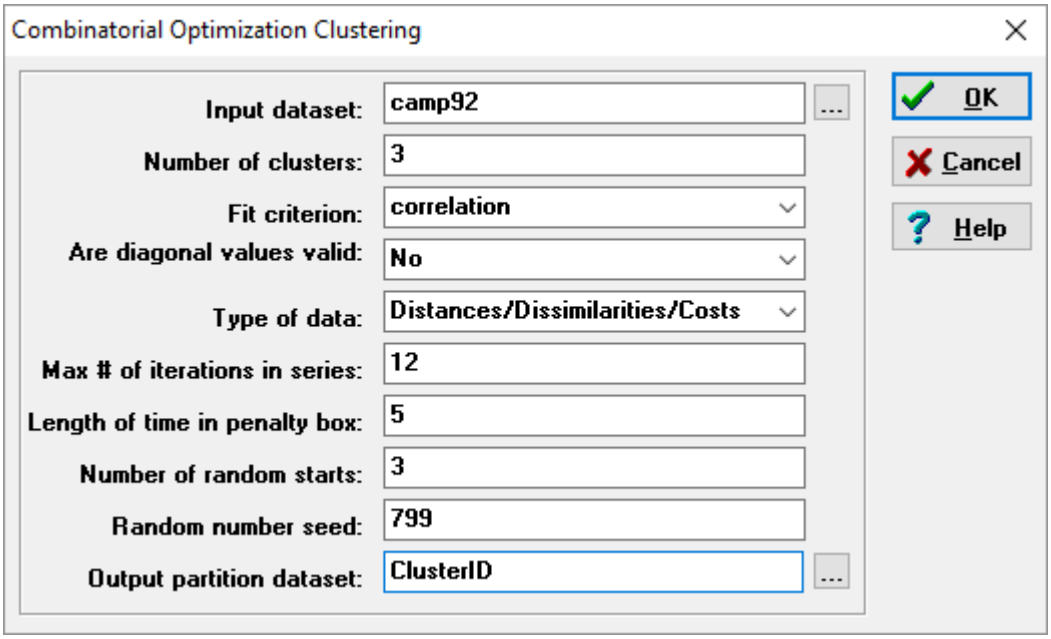


The output will be the same partition as shown in Figure 11.8 but the order of the nodes and the blocks will probably be different.

Repeat the above selecting modularity to get the same partition using the modularity fit function.

Section 11.5 Directed and Valued Data

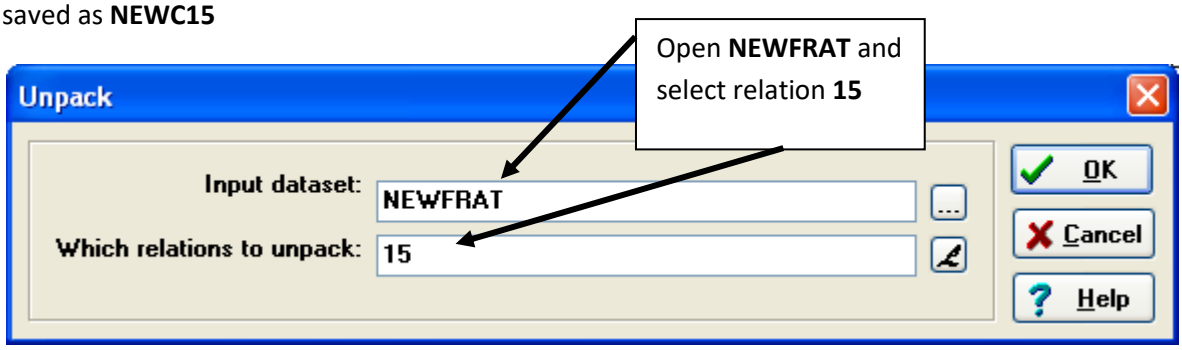
To run the routine described in 11.5, go to **Tools|Cluster Analysis|Optimization…** and load the **Camp92** dataset selecting correlation as the fit and making sure the type of data is distances.



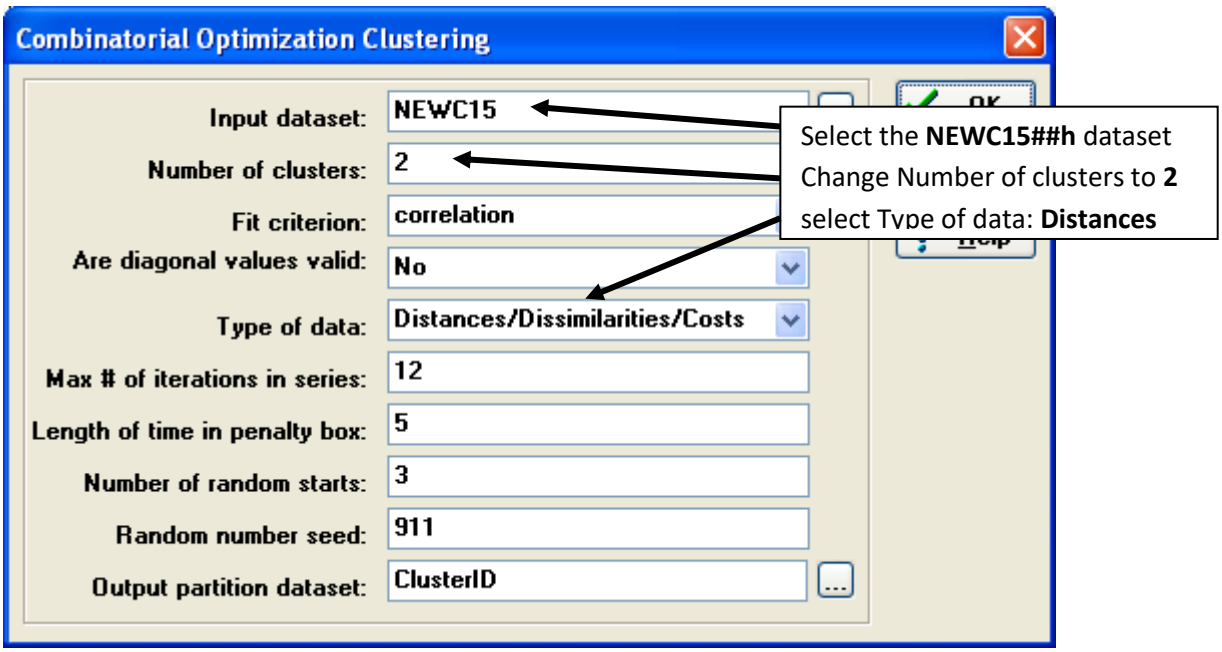
The output shown in Figure 11.9 relates to week 3 and to see this in the output scroll down through the week 2 data to the week 3 data at the bottom of the output.

Section 11.7 Performing a Cohesive Subgraph Analysis

First unpack the dataset "**week 15**" from the **NEWFRAT** by opening **Data|Unpack**, selecting the **NEWFRAT** dataset and select **15** from the dropdown menu as shown below. The new dataset will be saved as **NEWC15**

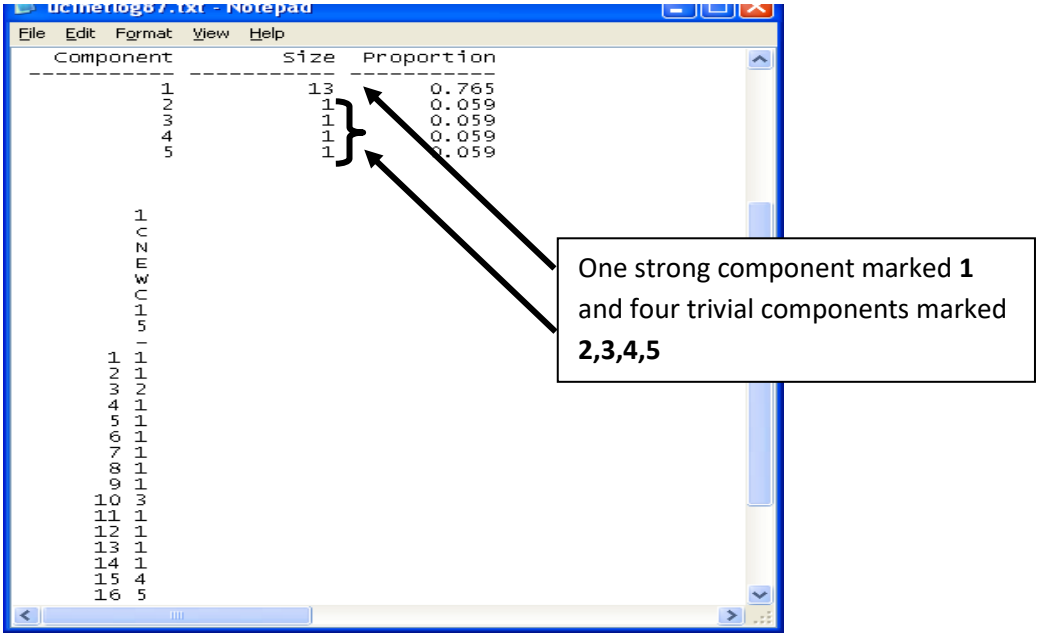


To create **Figure 11.10** go to **Tools|Cluster Analysis|Optimization…** and open the **NEWC15** dataset. Change the settings for **Number of clusters** to "**2**" and for **Type of data** select "**Distances/Dissimilarities/Costs**". Click OK.

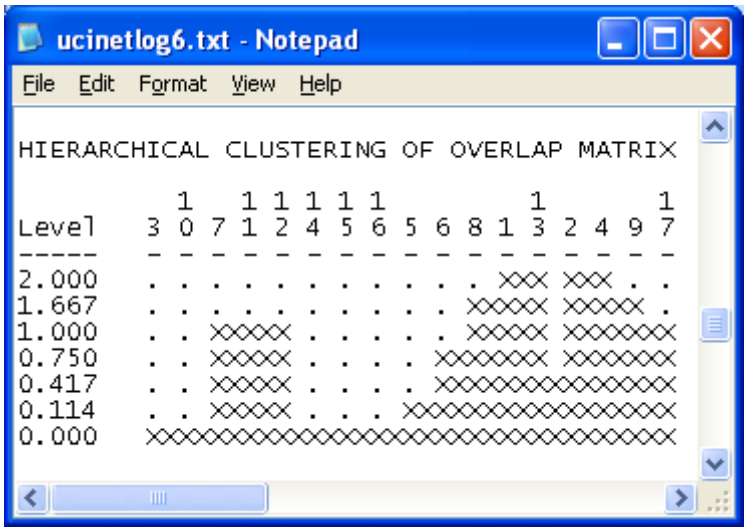


To dichotomize the **NEWC15** go to **Transform|Dichotomize interactive** and load **NEWC15**. Select a **Cutoff** value of "**5**" and **LE – less than or equal to** and save dataset as **NEWC15D**. The log file in a new window will display **Matrix 11.6**.

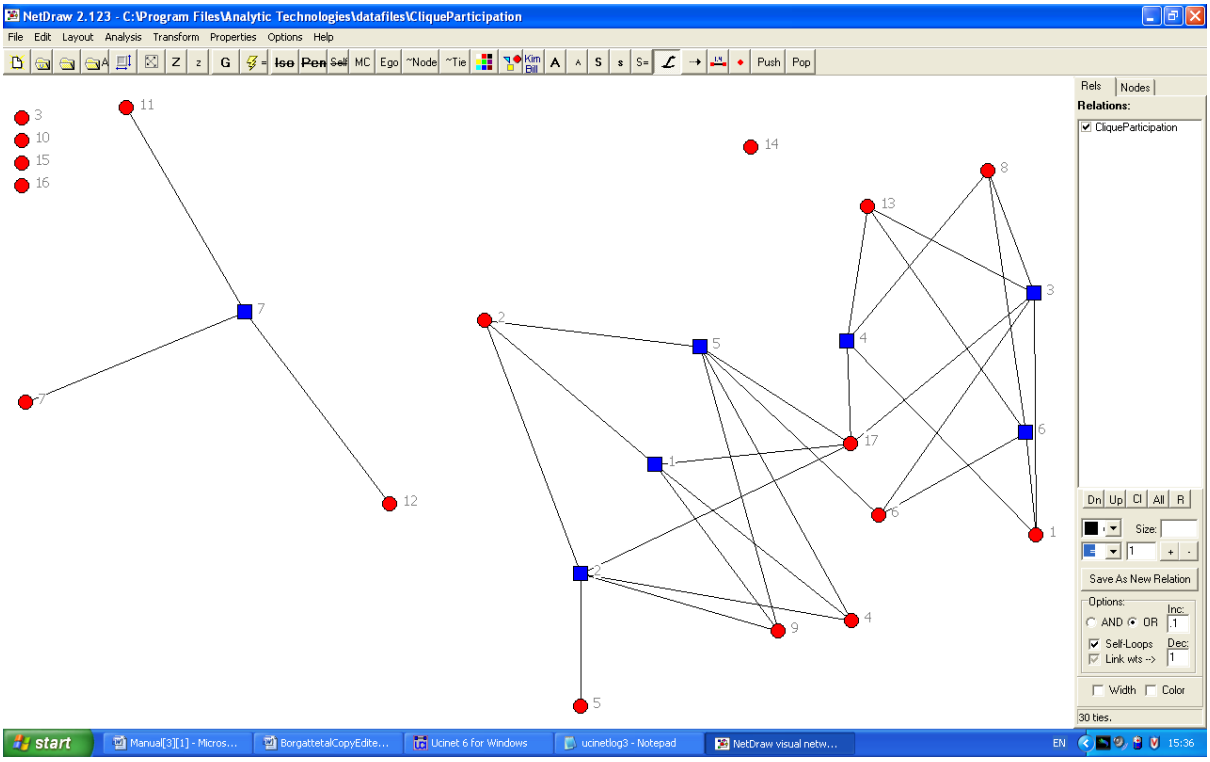
Run the component analysis by going to **Network|Regions|Components…|Binary graph** and select the **NEWC15D** dataset. Run the component analysis on strong component by selecting "**Strong Component**" on the bottom left. The outcome shows the one large and four trivial strong components described in the book:



To perform the clique analysis go to **Network|Subgroups|Cliques…** and select the **NEWC15D** dataset keeping the minimum size set to **3**. The log file will show the same results as in **Figure 11.11**. The discussion below figure 11.11 is based on the Hierarchical Clustering of the overlap Matrix shown below which clearly indicates that 3,10,14,15,16 are only part of the cluster at level 0.



If we now take the matrix cliqueparticipation into netwdraw as a 2-mode dataset and look just at clique membership ie set a cut-off value of one we obtain the following

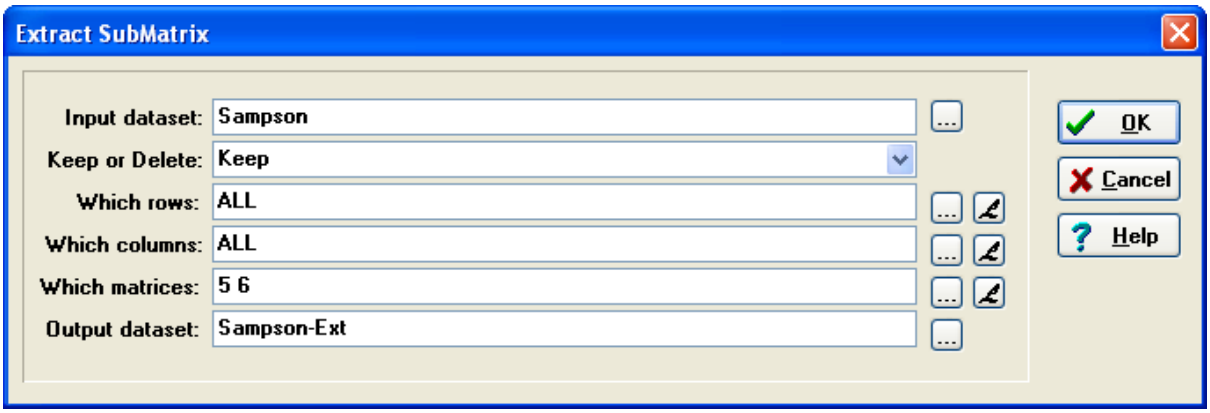


This clearly shows the split in the main group on the right as described in the book.

Follow the same procedure to run the Example on the “top three” and “top seven” choices to replicate the findings (**Note**: use the **Transform|Dichotomize interactive** command and change the **Cutoff** point to “**3**” and “**7**”).

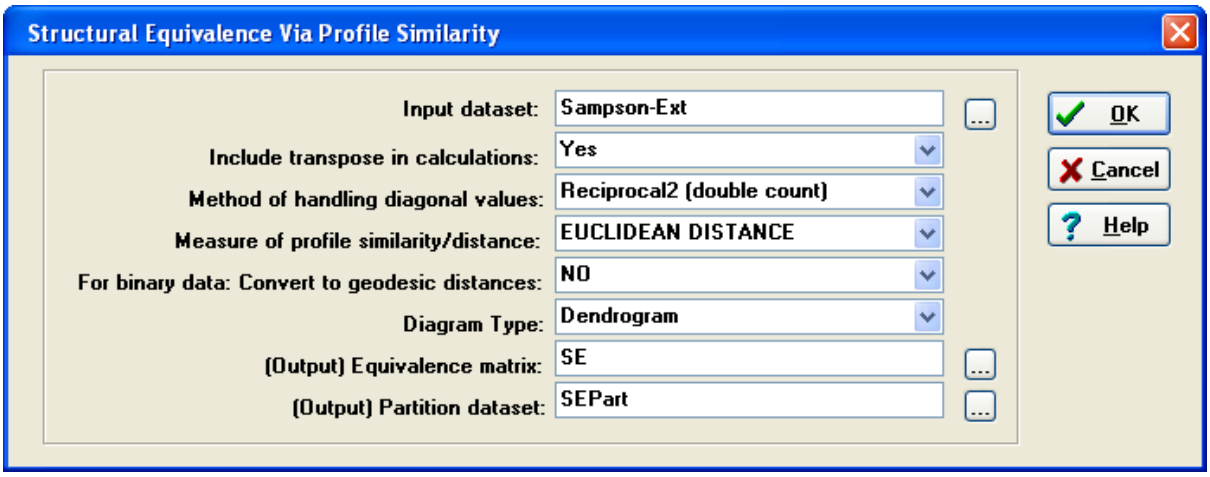
Section 12.3 Profile Similarity

First we need to create a version of the **Sampson** dataset that only contains the esteem and disesteem matrices. To do that, go to **Data|Filter/Extract|Submatrix** input the Sampson dataset and select the Esteem and Disesteem matrices as follows

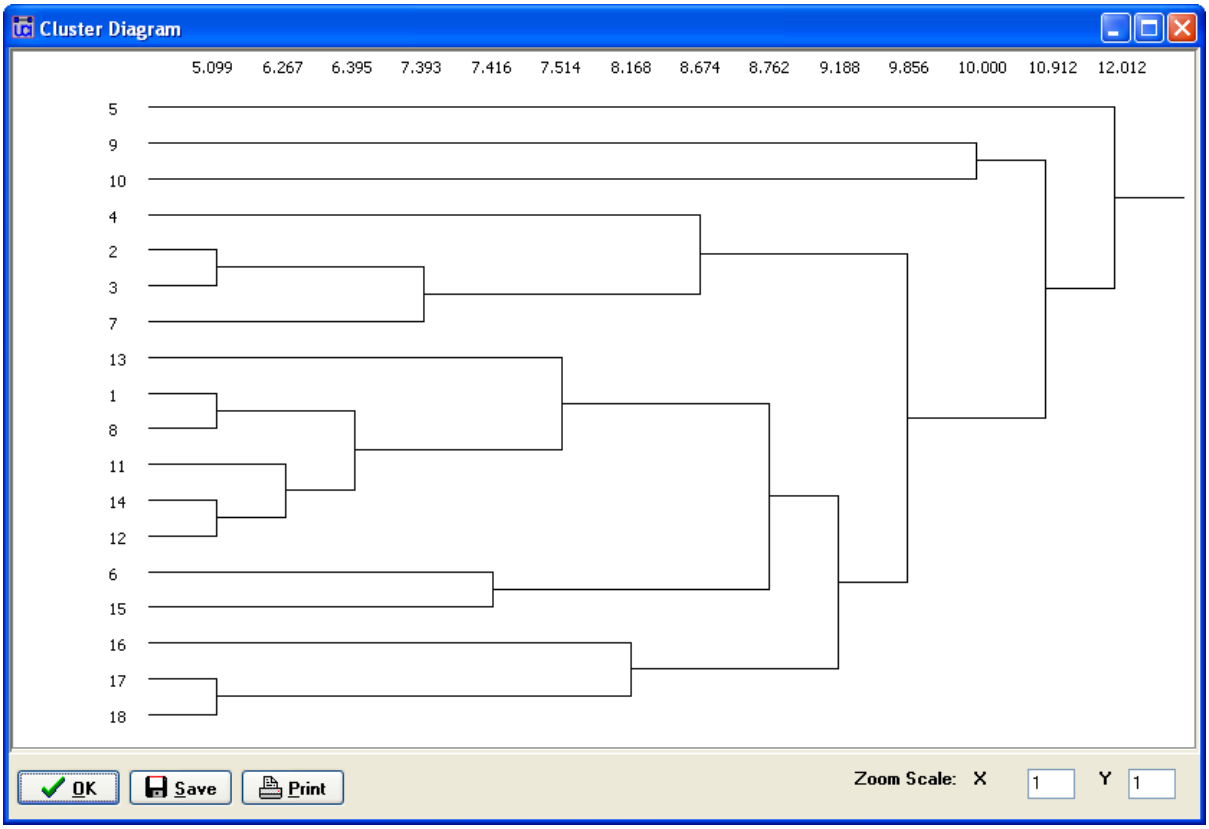


If you do not know the numbers of the matrices these can be selected by clicking the $\mathcal{L}$on the right of the window.

To run the procedure go to **Network|Roles & Positions|Structural|Profile…** and open **Sampson-Ext** and select the option "Methods of handling diagonal values" **Reciprocal2 (double count)** as depicted below:

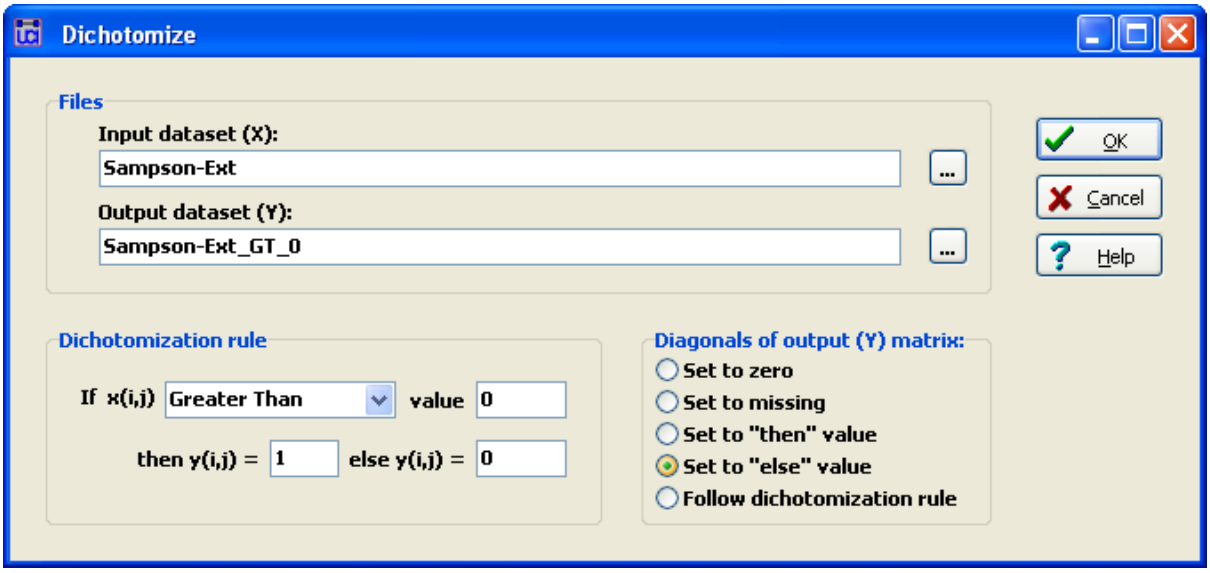


The results will be shown in a new log file **Structural Equivalence matrix** for the Esteem and Disesteem matrices (visible in **Matrix 12.3**) and a **hierarchical clustering of the equivalence matrix** (**Figure 12.2**)and are accompanied by a **Cluster Diagram**:

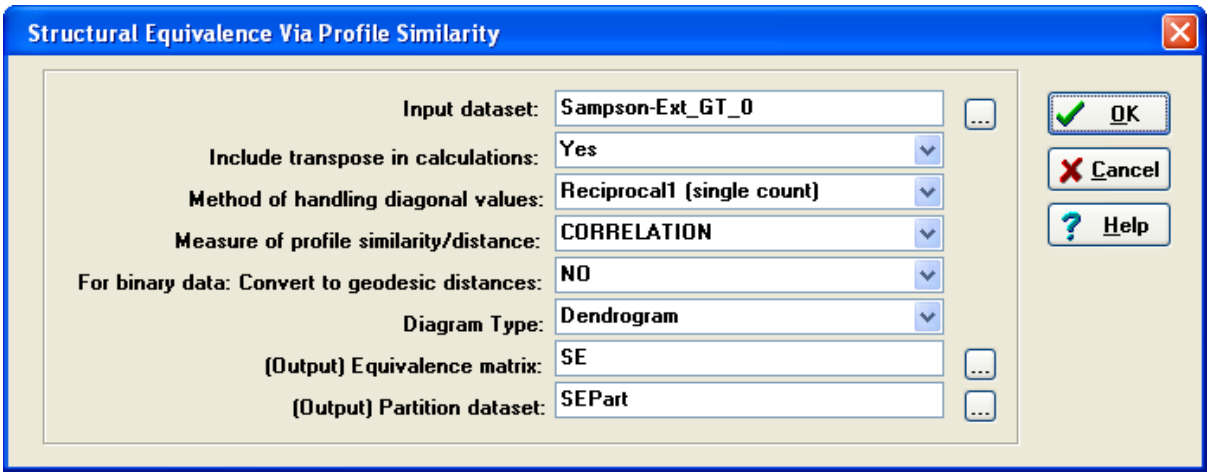

Cluster Diagram
5.099
6.267
6.395
7.393
7.416
7.514
8.168
8.674
8.762
9.188
9.856
10.000
10.912
12.012
5
9
10
4
2
3
7
13
1
8
11
14
12
6
15
16
17
18
OK
Save
Print
Zoom Scale: X
1
Y
1

Section 12.4 Blockmodels

First we begin by dichotomizing the **SAMPSON-Ext** using the **Transform|Dichotomize** procedure and save the new datasets as **SAMPSON-Ext_GT_0 as follows**



We now run profile similarity on this selecting correlation and our method for handling the diagonal is reciprocal1 which ignores the repeated reciprocal pairing in the transpose as follows:

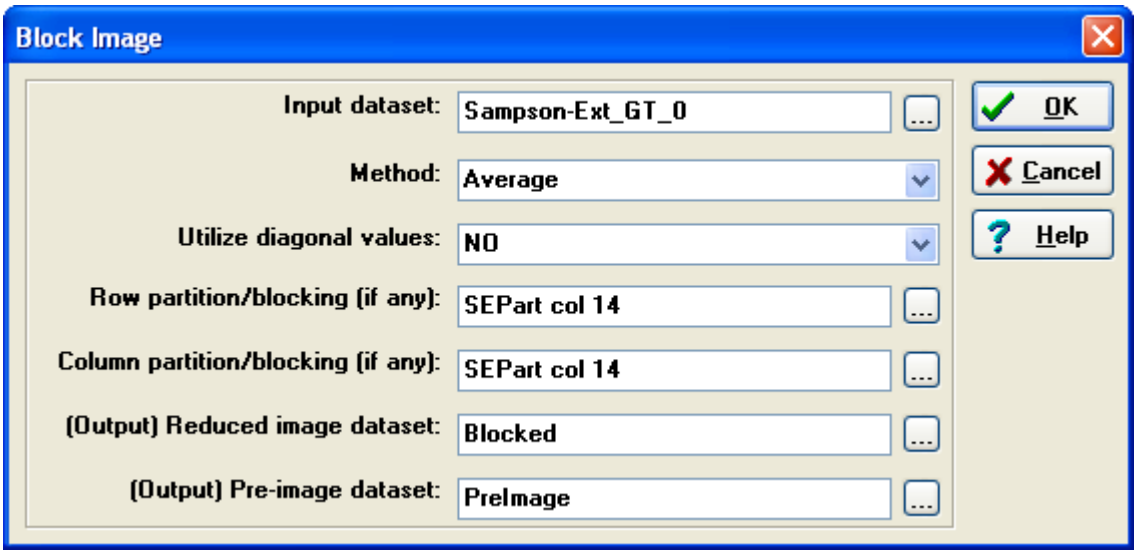


We can see a four split in the clustering diagram in the output log at the level 0.122 the partitions are saved in the dataset SEPart and this is not displayed but we can view this and it would look like this

```
DISPLAY
-------------------------------------------------------------------------
-----

Input dataset:                          SEPart (C:\Program Files\Analytic
Technologies\datafiles\SEPart


Partition Indicator Matrix
```

```
          1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16  17
         0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0. -0 -0
         83  64  61  46  43  41  37  36  35  30  24  23  13  12  10 .0 .0
          2   0   6   8   9   0   7   0   8   5   1   9   5   2   6 21 67
         --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
  1       1   1   1   1   1   1   1   1   4   5   5   7   7   7   7   7 18
  2       2   2   2   2   2   2   3   3   3   3   3   3   3   7   7   7 18
  3       3   3   3   3   3   3   3   3   3   3   3   3   3   7   7   7 18
  4       4   4   4   4   4   4   4   4   4   5   5   7   7   7   7   7 18
  5       5   5   5   5   5   5   5   5   5   5   5   7   7   7   7   7 18
  6       6   6   6   6   6   6   6   6   6   6  15  15  15  15  18  18 18
  7       7   7   7   7   7   7   7   7   7   7   7   7   7   7   7   7 18
  8       8  12  12  12  12  12  12  14  14  14  14  14  14  14  14  18 18
  9       9   9   9   9   9  10  10  10  10  10  10  10  14  14  14  18 18
 10      10  10  10  10  10  10  10  10  10  10  10  10  14  14  14  18 18
 11      11  11  11  12  12  12  12  14  14  14  14  14  14  14  14  18 18
 12      12  12  12  12  12  12  12  14  14  14  14  14  14  14  14  18 18
 13      13  13  14  14  14  14  14  14  14  14  14  14  14  14  14  18 18
 14      14  14  14  14  14  14  14  14  14  14  14  14  14  14  14  18 18
 15      15  15  15  15  15  15  15  15  15  15  15  15  15  15  18  18 18
 16      16  16  16  16  18  18  18  18  18  18  18  18  18  18  18  18 18
 17      18  18  18  18  18  18  18  18  18  18  18  18  18  18  18  18 18
 18      18  18  18  18  18  18  18  18  18  18  18  18  18  18  18  18 18

18 rows, 17 columns, 1 levels.
```

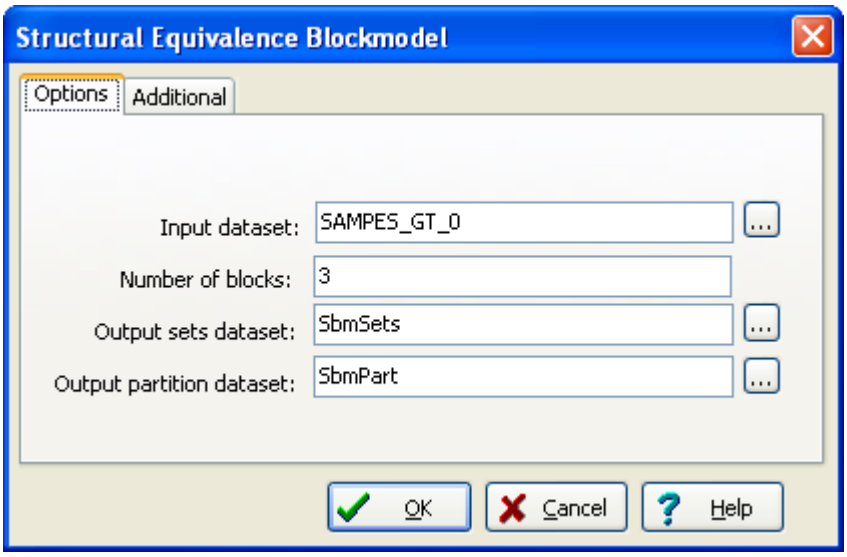
Note that column 14 with the label 0.122 contains the split to interpret this actor 1 is in the group labelled 7 along with 2,3,4.5 and 7; actor 6 is in the group labelled 15 along with 15. The groups are labelled by the highest number of the actor that they contain. We use column 14 of this matrix to get the blockmodel. This is done using Transform|Aggregate (including CSS)|Block. We select Sampson-Ext_GT_0 as our dataset and SEPart col 14 for the partition as follows:



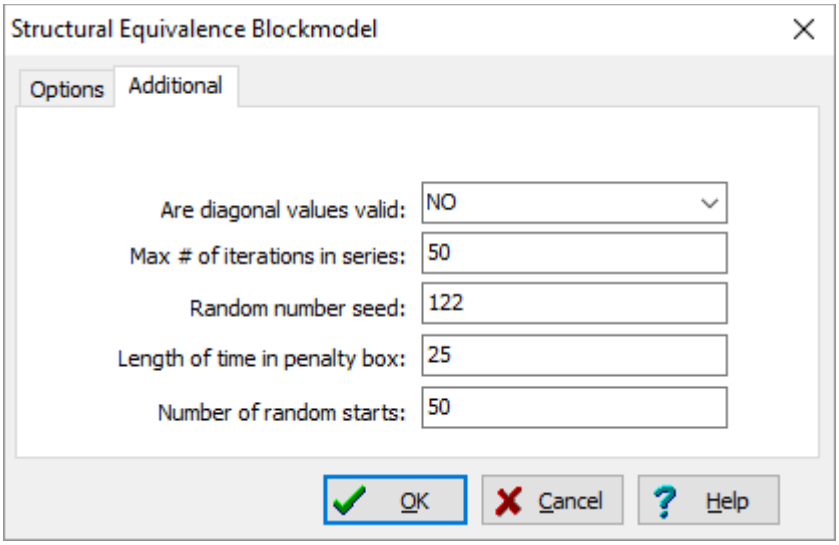
Running this gets the blockmodel shown in Figure 12.4.

Section 12.5 The Direct Method

To run the structural equivalence optimization routine go to **Network|Roles & Positions|Structural|Optimization|Binary…** and select the dichotomized Sampson esteem relation "**SAMPES_GT_0.**".



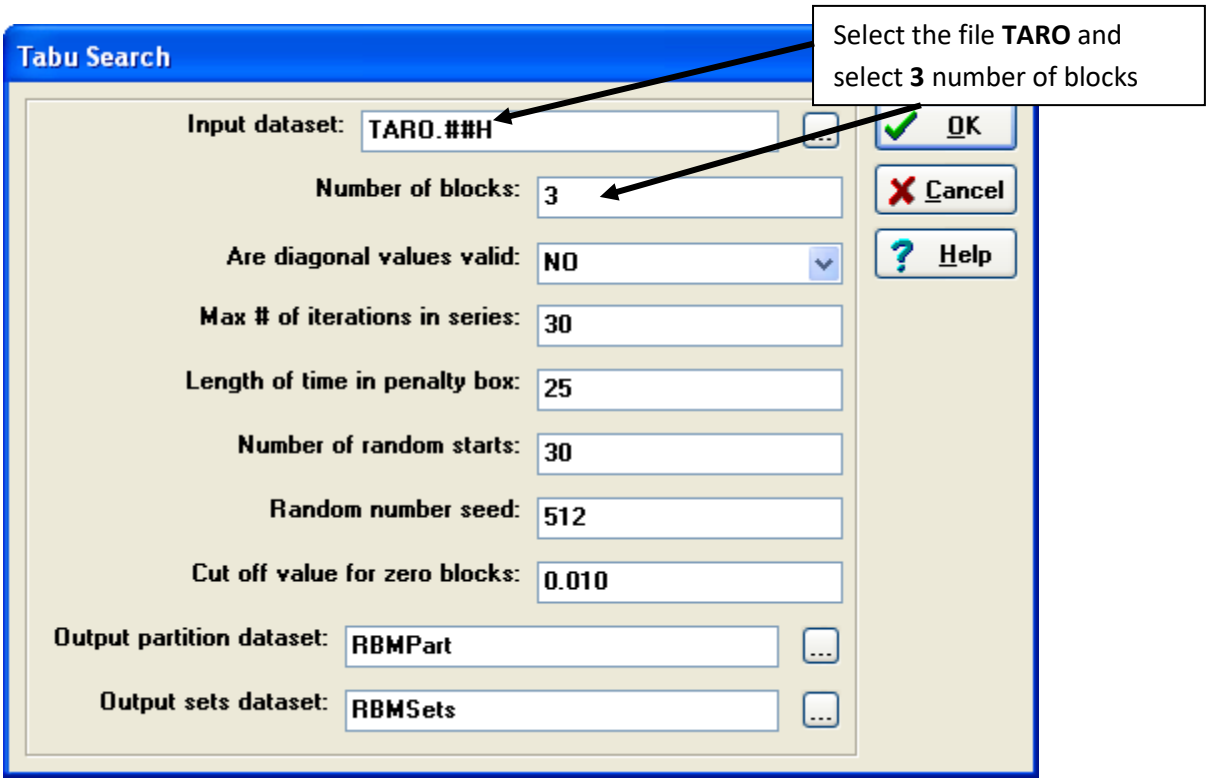
To obtain a solution the same as the book we need to increase the number of runs. Clique additional and set the number of random starts to 50 as shown below.



If this is now run it should give the same partition as in Matrix 12.5 but possibly ordered differently.

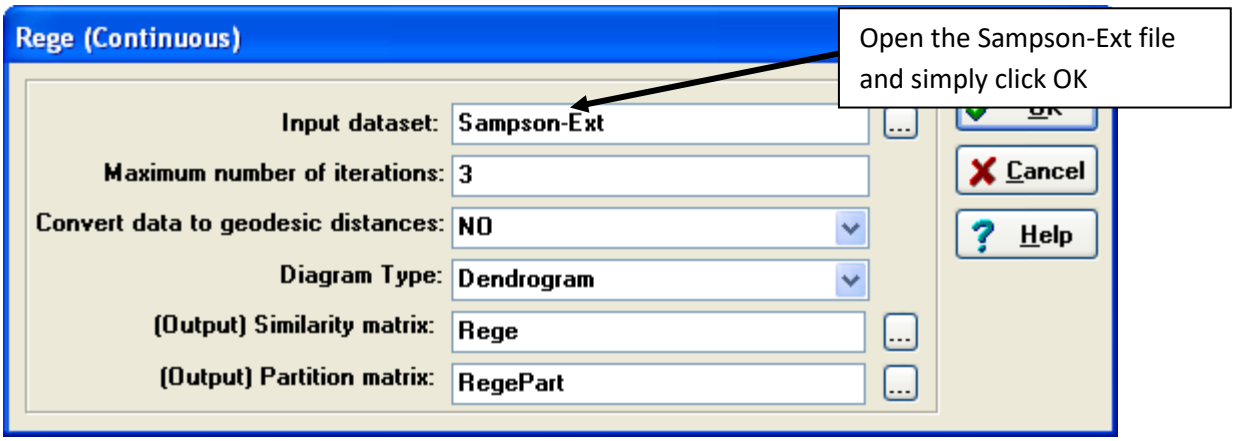
Section 12.6 Regular Equivalence

To run the procedure described in **Matrix 12.7** go to **Network|Roles & Positions|Maximum Regular|Optimization…** and load the **TARO** file. Select "**3**" blocks and click OK to see the outcome (which will be similar but not the same) in a new log file.



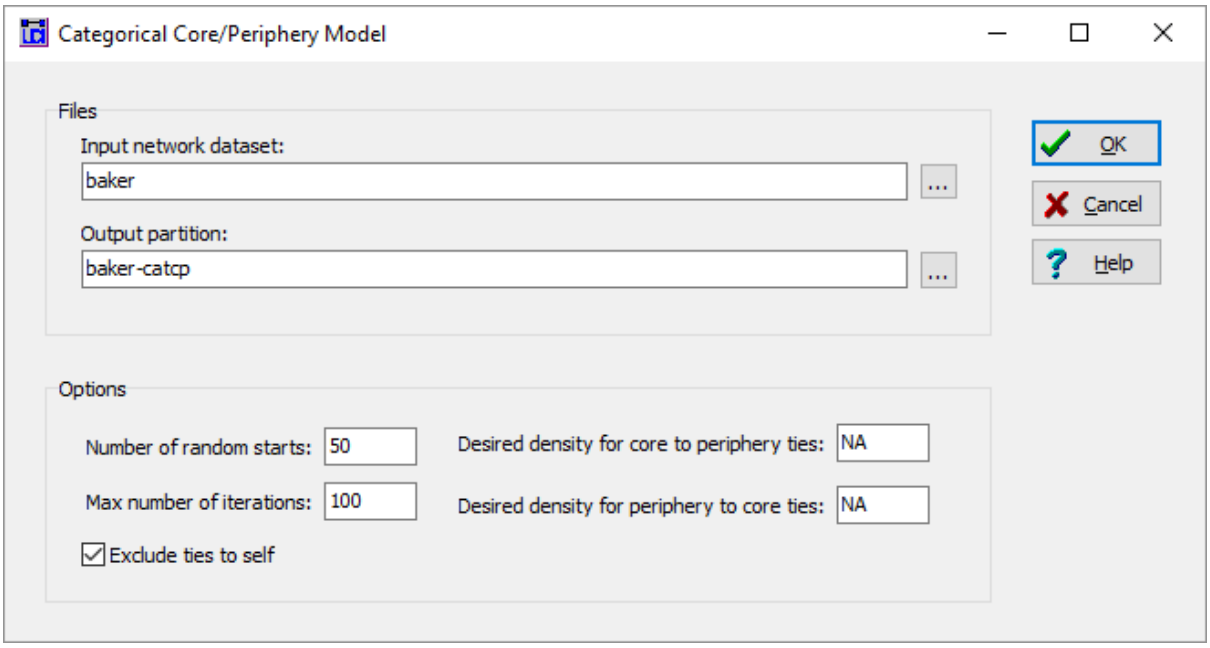
Section 12.7 REGE

To run the REGE routine go to **Network|Roles & Positions|Maximum Regular|REGE...** and select the **Sampson-Ext** file (this file should contain valued and not dichotomized data!). Keep the standard setting and click okay to receive the output described in Figure 12.5 in the book.



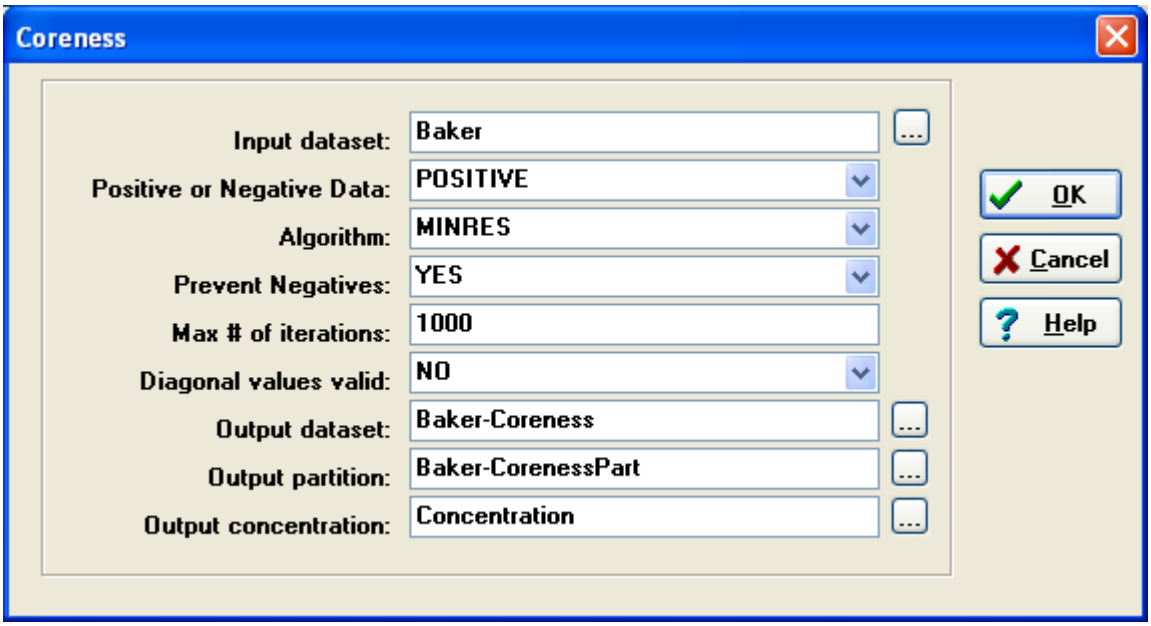
Section 12.8 Core-Periphery Models

Simply run Network|Core/Periphery|Categorical on the Baker data with the defaults ie



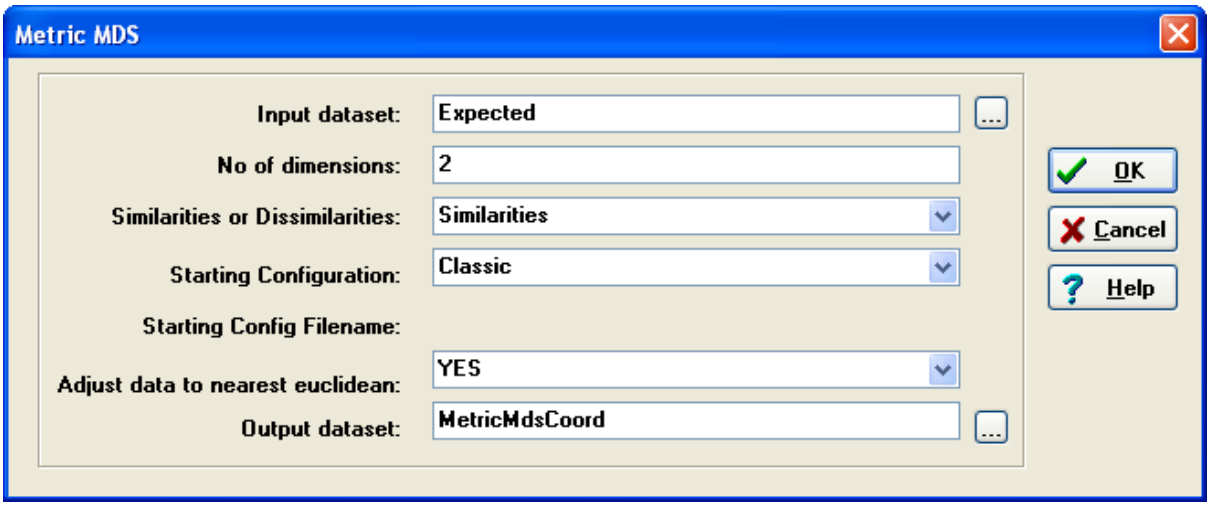
The output is similar to 12.8 but improvements in the algorithm mean that the solution that places ASW in the periphery rather than the core has been found and is an improvement. In this data the diagonal is valid but we elect to ignore it as we expect journals to cite themselves. Including the diagonal would not affect the partition but would lower the correlation as peripheral actors connect to themselves.

For the continuous run Network|Core/Periphery|Continuous with the defaults as follows.

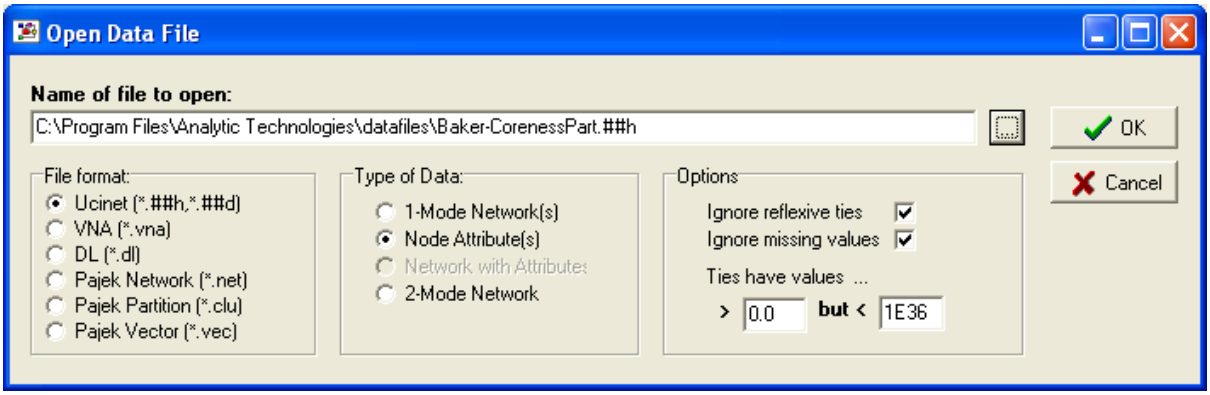


The output contains the values as shown in Table 12.3 with a recommended split of 8 core nodes.

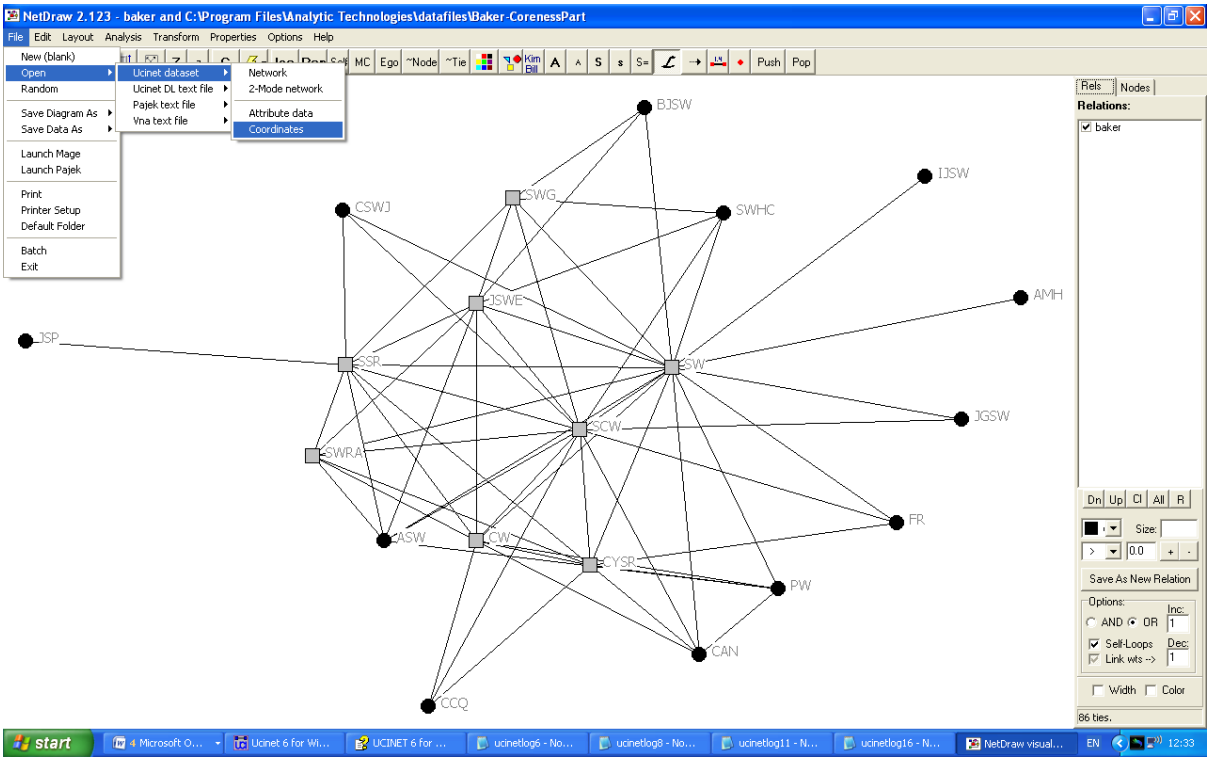
The Δ matrix is saved as “Expected” and this needs to be submitted to the metric-mds program under Tools|Scaling/Decomposition|Metric MDS ie



In netdraw load the Baker dataset and turn off the arrows by clicking the arrow head button on the tool bar marked with an arrow →. Next load the dataset created by the coreness routine which indicates which actors are in the core namely BakerCorenessPart as shown below



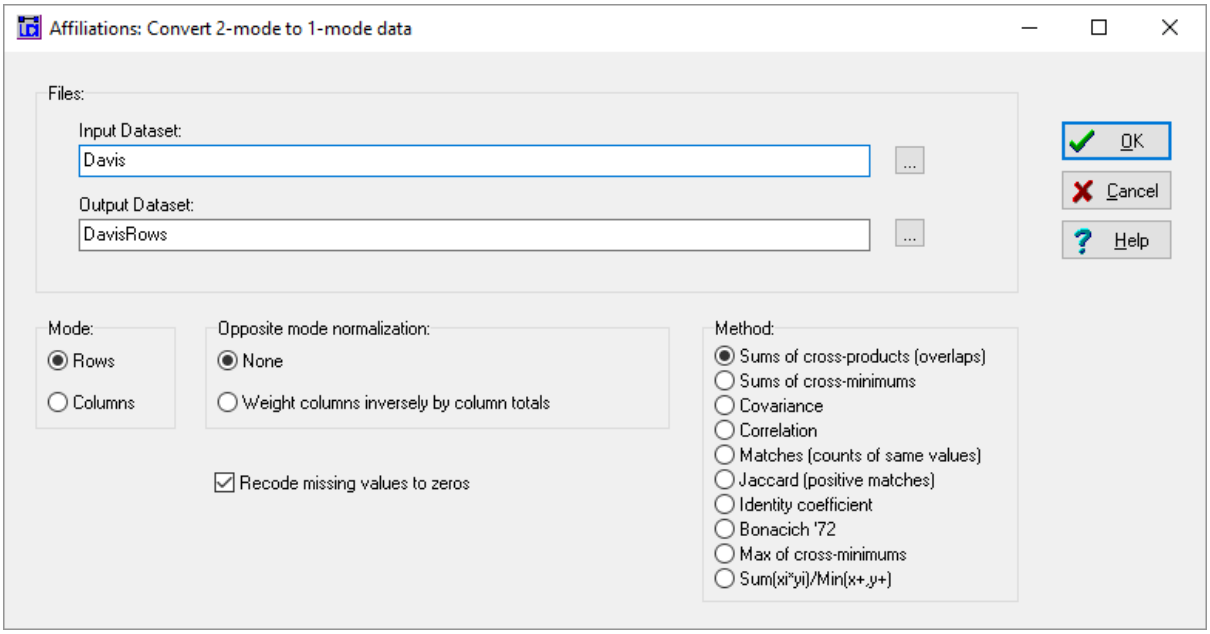
Use this attribute to both colour and shapes the nodes. Finally (and this needs to be done last) position the nodes using the created co-ordinates MetricMdsCoord. This is done by clicking File|Open|Ucinet dataset|coordinates and then selecting MetricMdsCorod. Alternatively the coordinates can be imported as attributes and the Layout|Attribs as coordinates can be used selecting one dimension for x and the other dimension for y.



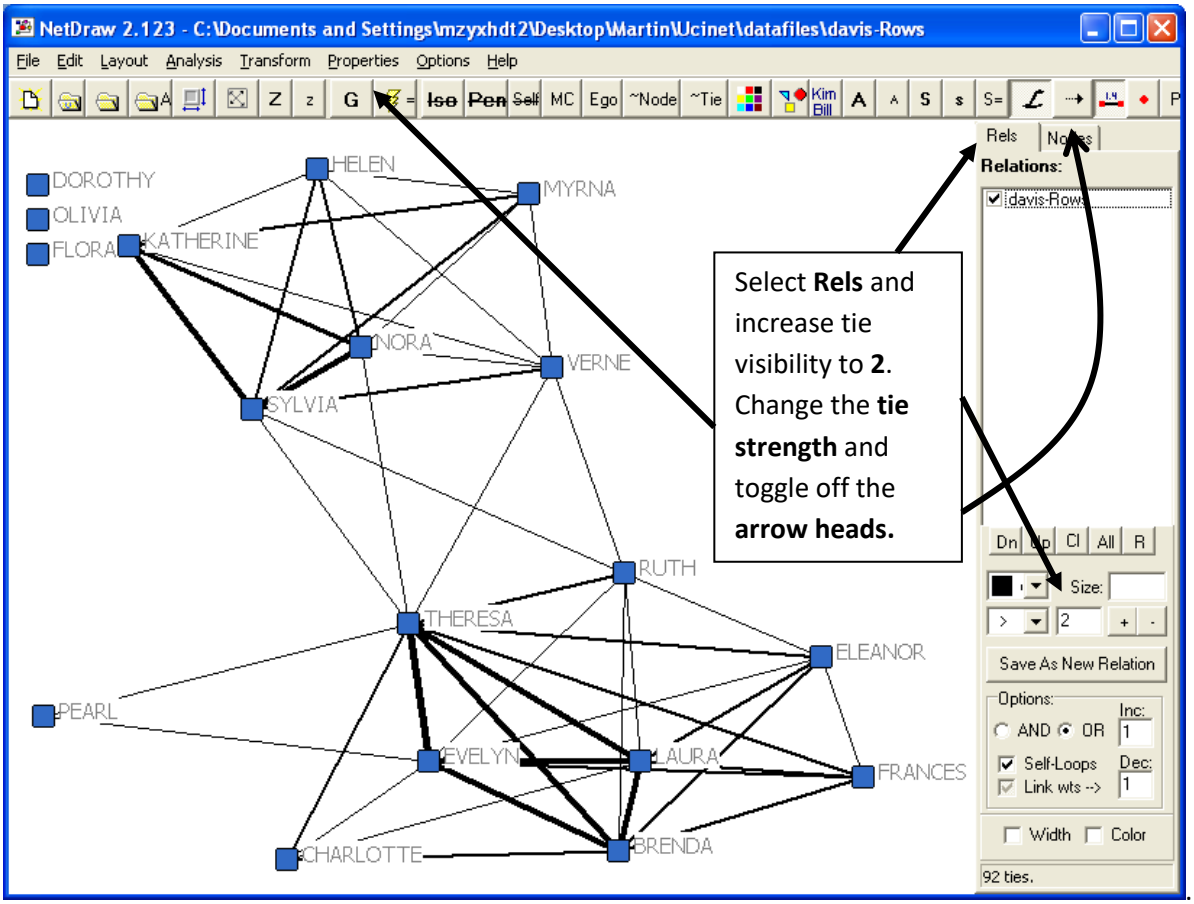
Once this has been done the picture will be the same as Figure 12.7.

Section 13.2 Converting to One-Mode Data

To convert a Two-Mode data set, like the DD**vis** data into a One-Mode matrix, simply go to **Data|Affiliations (2-mode to 1-mode)** and open the **davis** file and click OK. The output log file should match Matrix 13.2 and the matrix is saved as D**avisRows**.

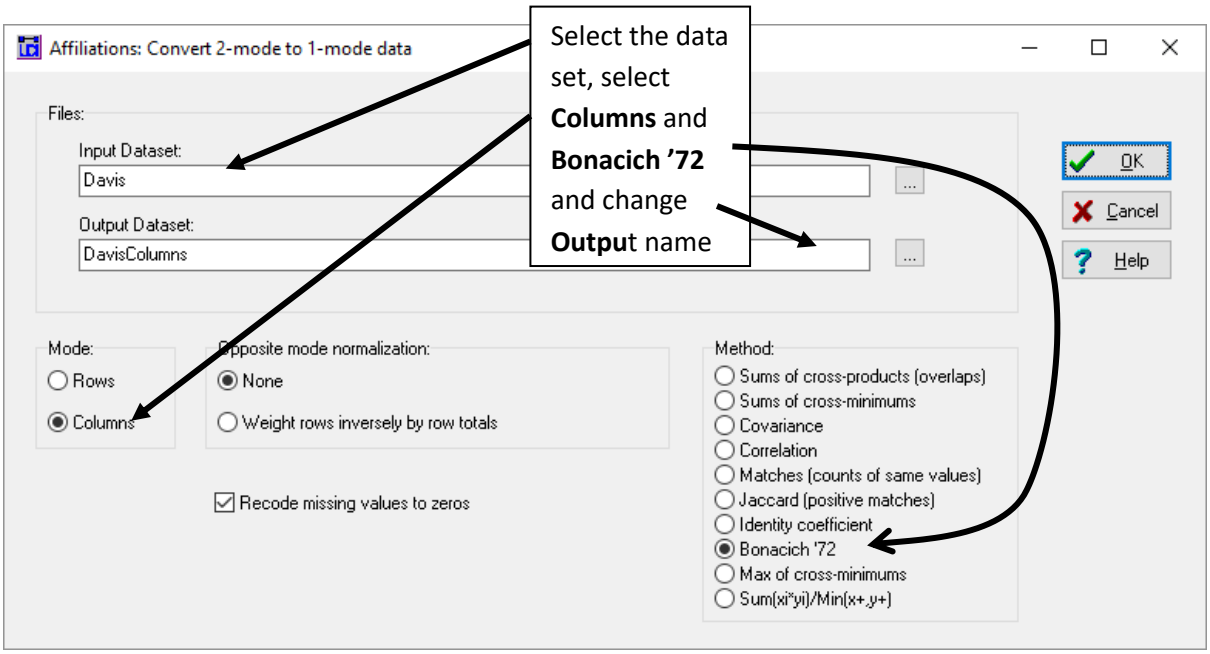


To visualise the network, open **NetDraw** and select the **Davis-Rows** file. The result will show a relatively dense network because most of the woman have attended at least one event together. Therefore we are increasing the minimum tie strength to >2 in the options for **Rels** to the right. Then go to **Property|Lines|Size|Tie strength** to represent the number of events attended in the thickness of the tie and turn off the **arrow heads** by clicking the arrow-symbol in the **toolbar**. The result should be similar to **Figure 13.1**.

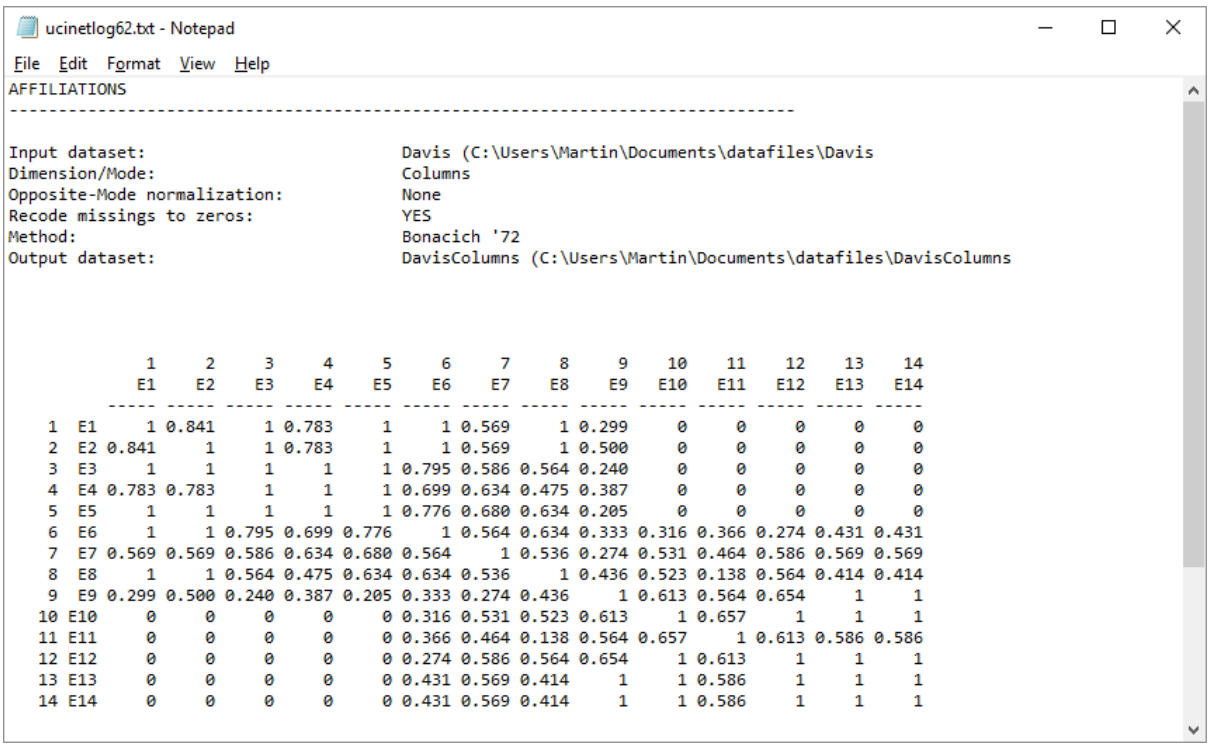


The **event-by-event matrix 13.3** is generate like the woman-by-woman matrix by loading the **Davis** dataset in the Affiliations (2-mode to 1-mode) procedure; however, this time we need to select the Mode "**Columns**" in the bottom left corner. The output will be saved as D**avis-Columns**.

The event-by-event **matrix 13.4** is generated in the same way but with the selection of **Bonacich '72** made in the Methods box. Please be aware that this will **overwrite** the previous result **davis-Columns** unless the output dataset is renamed (for example into **davis-Column72**). The resulting log file is shown below.



The result is as follows.



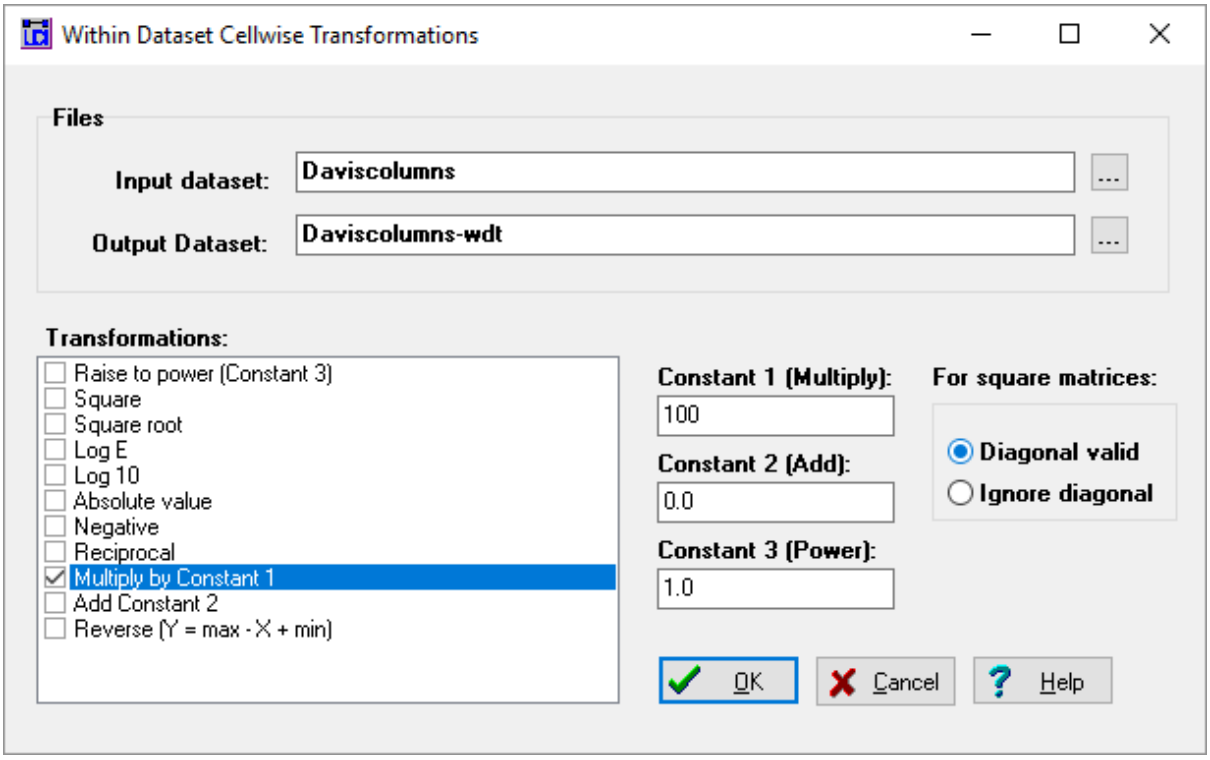
ucinetlog62.txt - Notepad

File Edit Format View Help

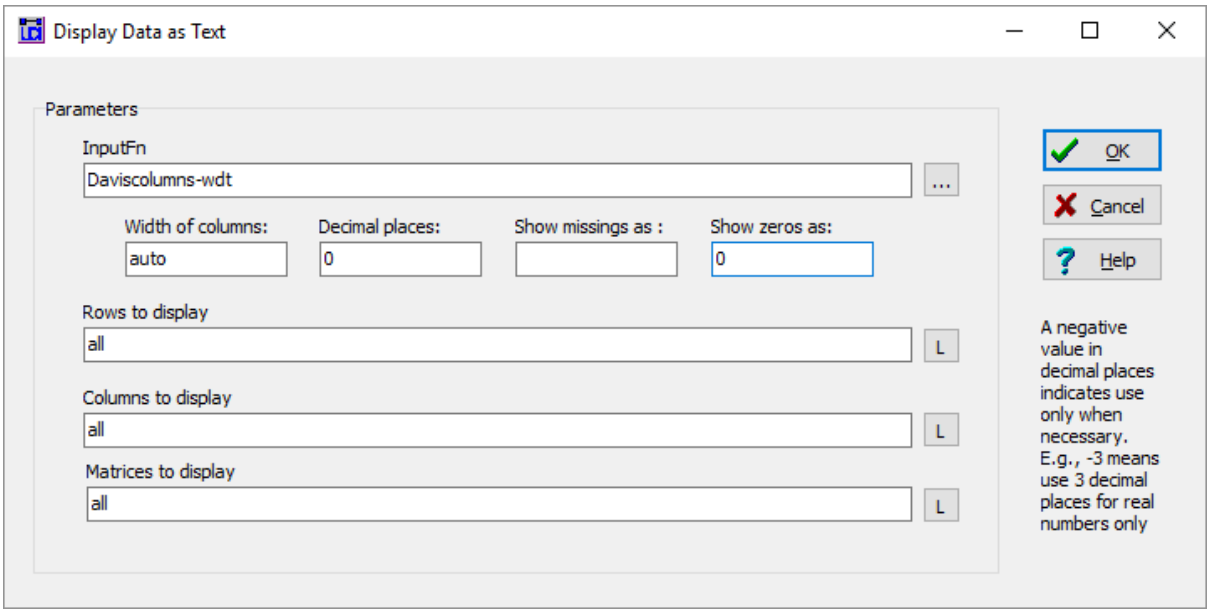
```
AFFILIATIONS
-------------------------------------------------------------------------------

Input dataset:                          Davis (C:\Users\Martin\Documents\datafiles\Davis
Dimension/Mode:                         Columns
Opposite-Mode normalization:            None
Recode missings to zeros:               YES
Method:                                 Bonacich '72
Output dataset:                         DavisColumns (C:\Users\Martin\Documents\datafiles\DavisColumns
```

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
		E1	E2	E3	E4	E5	E6	E7	E8	E9	E10	E11	E12	E13	E14
1	E1	1	0.841	1	0.783	1	1	0.569	1	0.299	0	0	0	0	0
2	E2	0.841	1	1	0.783	1	1	0.569	1	0.500	0	0	0	0	0
3	E3	1	1	1	1	1	0.795	0.586	0.564	0.240	0	0	0	0	0
4	E4	0.783	0.783	1	1	1	0.699	0.634	0.475	0.387	0	0	0	0	0
5	E5	1	1	1	1	1	0.776	0.680	0.634	0.205	0	0	0	0	0
6	E6	1	1	0.795	0.699	0.776	1	0.564	0.634	0.333	0.316	0.366	0.274	0.431	0.431
7	E7	0.569	0.569	0.586	0.634	0.680	0.564	1	0.536	0.274	0.531	0.464	0.586	0.569	0.569
8	E8	1	1	0.564	0.475	0.634	0.634	0.536	1	0.436	0.523	0.138	0.564	0.414	0.414
9	E9	0.299	0.500	0.240	0.387	0.205	0.333	0.274	0.436	1	0.613	0.564	0.654	1	1
10	E10	0	0	0	0	0	0.316	0.531	0.523	0.613	1	0.657	1	1	1
11	E11	0	0	0	0	0	0.366	0.464	0.138	0.564	0.657	1	0.613	0.586	0.586
12	E12	0	0	0	0	0	0.274	0.586	0.564	0.654	1	0.613	1	1	1
13	E13	0	0	0	0	0	0.431	0.569	0.414	1	1	0.586	1	1	1
14	E14	0	0	0	0	0	0.431	0.569	0.414	1	1	0.586	1	1	1

The values in Matrix 13.4 are as a percentage. We simply need to multiply each entry by 100 and just display 3 figures to reproduce this Matrix. First go to Transform|Matrix Operations|Within Datasets|Cellwise Transformations. Load Daviscolumns and select Multiply by constant1 as a transformation and set constant 1 to 100.



Next go to Data|Display and set decimals to zero and show zeros as 0.

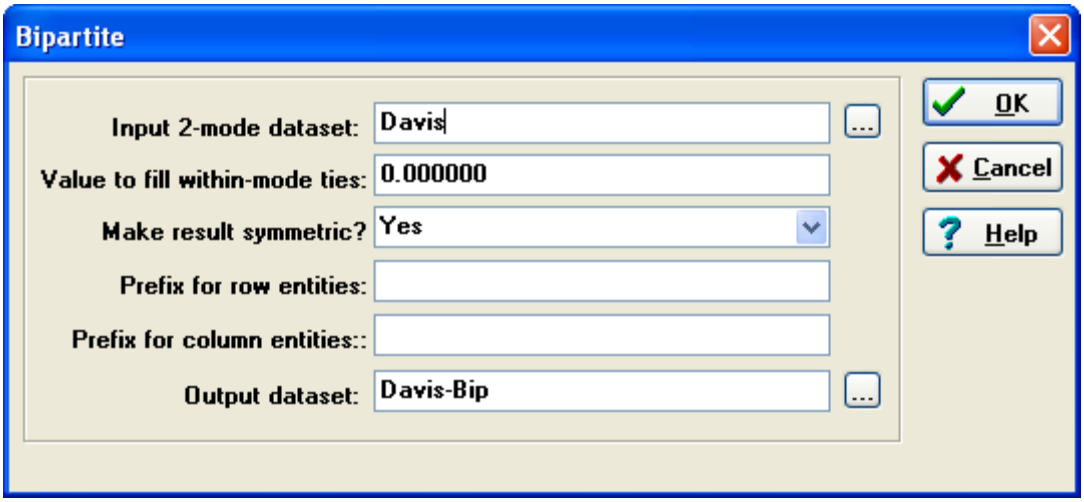


Yhis will reproduce Matrix 13.4.

The event-by-event (**DavisColumns**) matrix can be visualised repeating the steps used to visualise the woman-by-woman matrix and represent tie-strength by line thickness. Enter **0.5** to set the **minimum tie-strength** visualised in the network (because we have normalised the dataset using **Bonacich '72** values are between 0 and 1 and we select a cut-off point of 0.5).

Section 13.4 Bipartite Networks

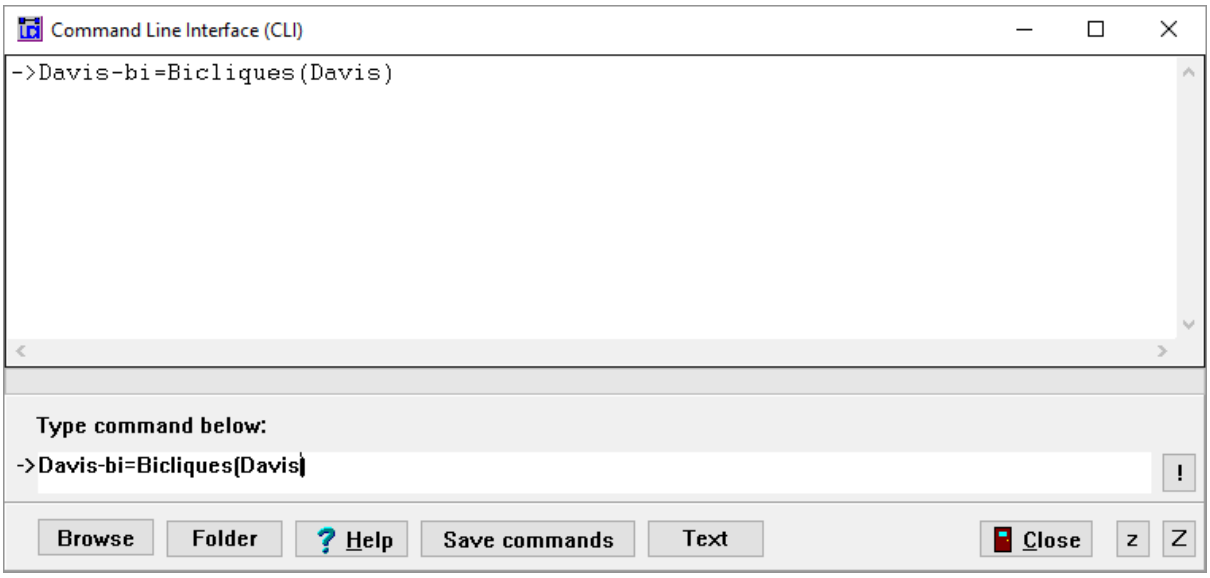
To create a bipartite network from a two-mode dataset simply run Transform|Graph Theoretic|Bipartite



This will create the dataset Davis-Bip as shown in Matrix 13.5.

Section 13.5 Cohesive Subgroups

Unfortunately automated bi-cliques has not been fully implemented but it is available as a command in CLI. The command has the form → biclique(filename x y) where x is the minimum size of mode 1 (the rows) and y is the minimum size of mode 2 (the columns) if these are omitted it has a default of 3 for each mode. The output has each bi-clique as a column with the nodes in the rows and a 1 in row i column j indicating tact node I is a member of bi-clique j. To find the (3,3) bi-cliques of the Davis data we run matrix algebra and then type →Davis-bi = biclique(Davis) as follows

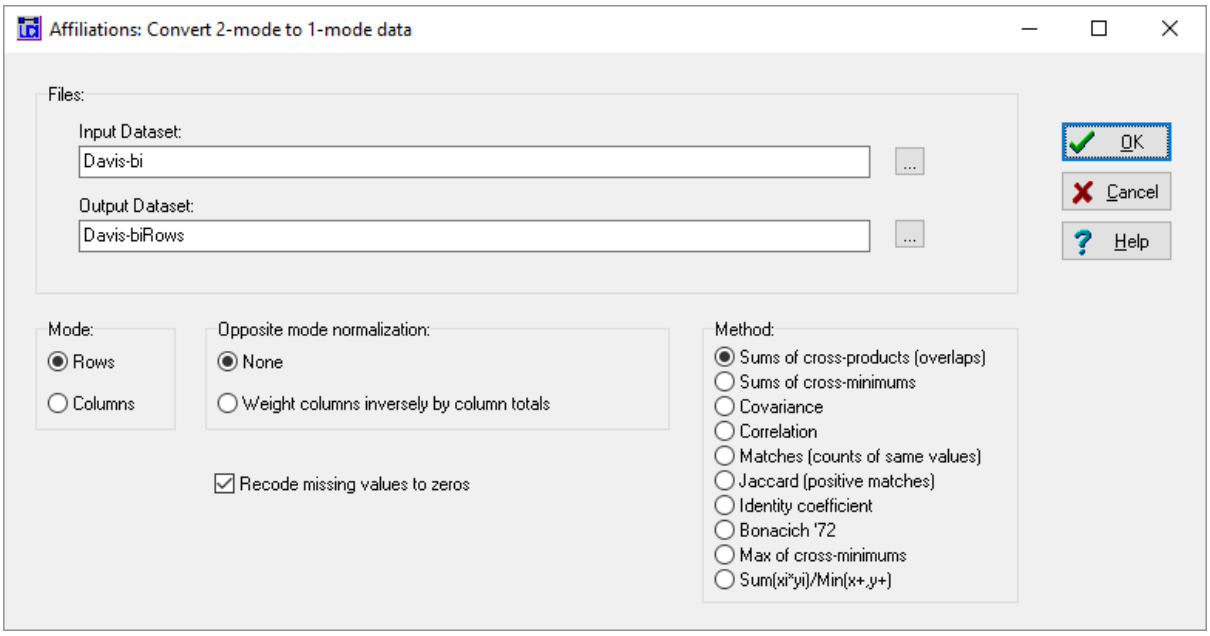


If we display Davis-bi we get

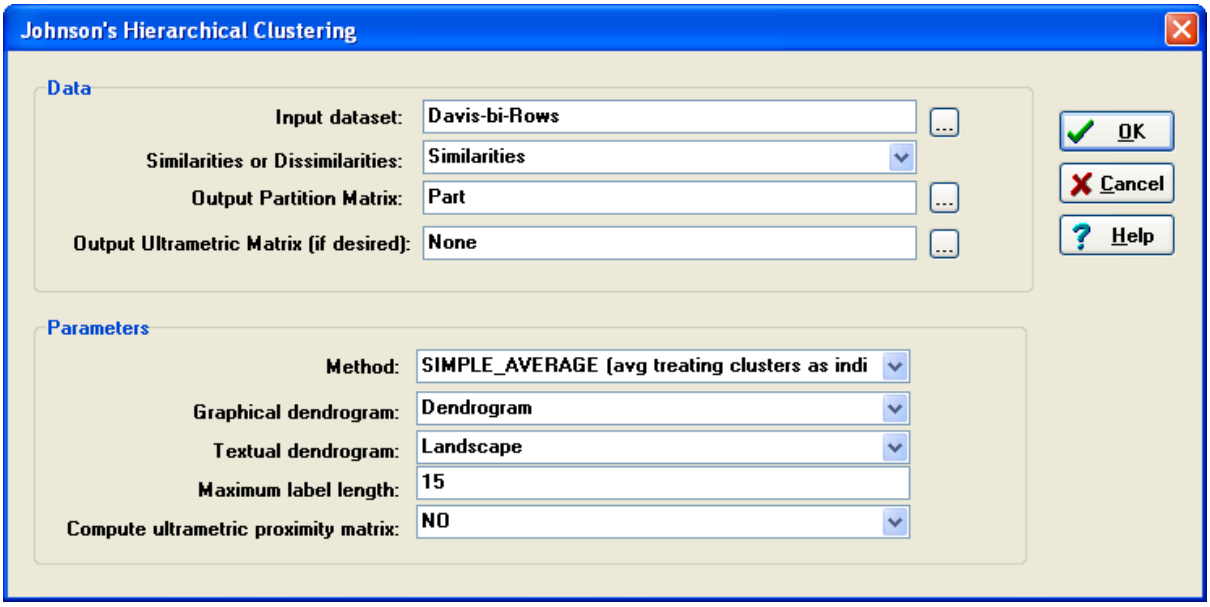
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1	EVELYN	0	1	0	0	1	1	1	1	0	0	0	1	0	0	1	0	0	1	0	0	0	0
2	LAURA	0	0	0	0	0	1	1	0	1	1	1	1	0	0	1	1	0	0	0	0	0	0
3	THERESA	1	1	0	0	1	1	1	1	1	1	1	0	0	0	1	1	1	1	0	0	0	0
4	BRENDA	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	1	1	1	0	0	0	0
5	CHARLOTTE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0
6	FRANCES	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	ELEANOR	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
8	PEARL	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	RUTH	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
10	VERNE	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0
11	MYRNA	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0
12	KATHERINE	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0
13	SYLVIA	1	0	1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	1	1	1

14	NORA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1
15	HELEN	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1
16	DOROTHY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	OLIVIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	FLORA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	E1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
20	E2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
21	E3	0	0	0	0	0	0	1	1	0	0	1	1	0	0	1	1	1	1	0	0	0	0
22	E4	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0
23	E5	0	0	0	0	1	1	1	1	1	1	1	1	0	0	1	1	1	1	0	0	0	0
24	E6	0	1	0	0	0	1	1	1	0	1	1	1	0	0	1	0	0	0	0	0	0	0
25	E7	1	0	0	0	0	0	0	0	1	1	1	0	1	0	0	1	1	0	0	0	1	1
26	E8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
27	E9	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0
28	E10	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	1
29	E11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	E12	0	0	1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	1	1	1
31	E13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
32	E14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0

We now create the co-membership matrix by running Data|Affiliations on this output.

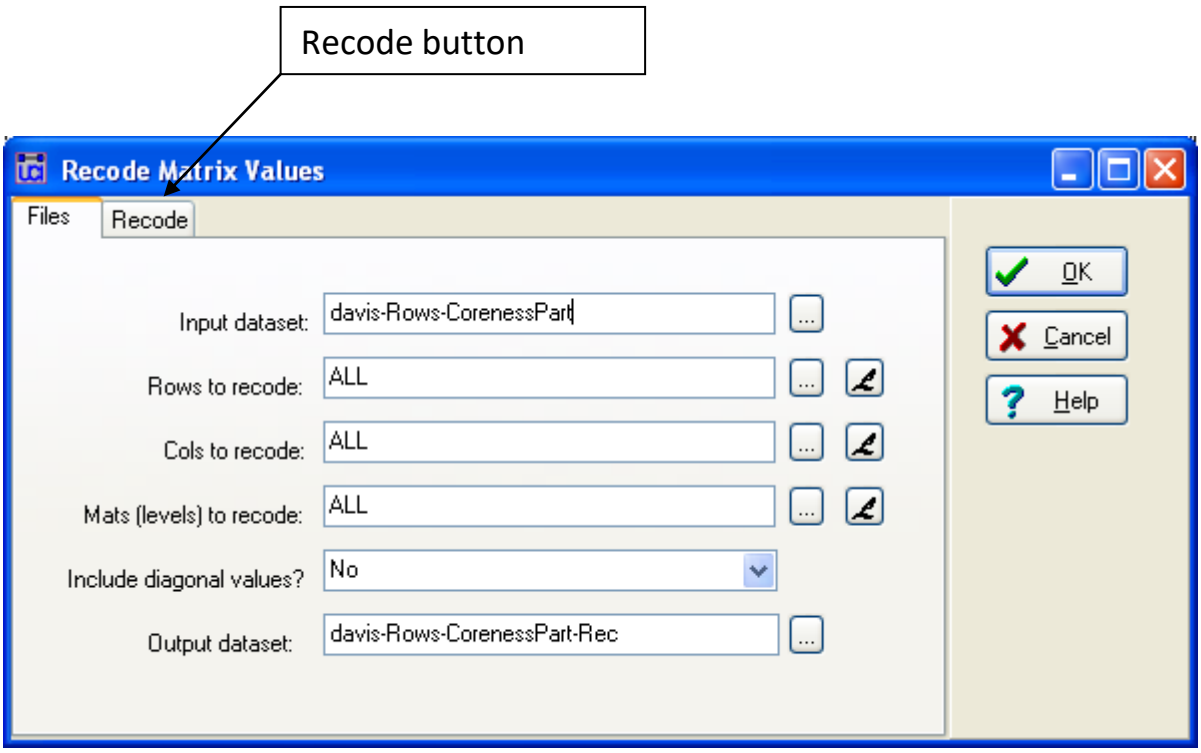


Finally running Tools|Cluster Analysis|Hierarchical and selecting similarities and the simple average method as shown below gives Figure 13.4.

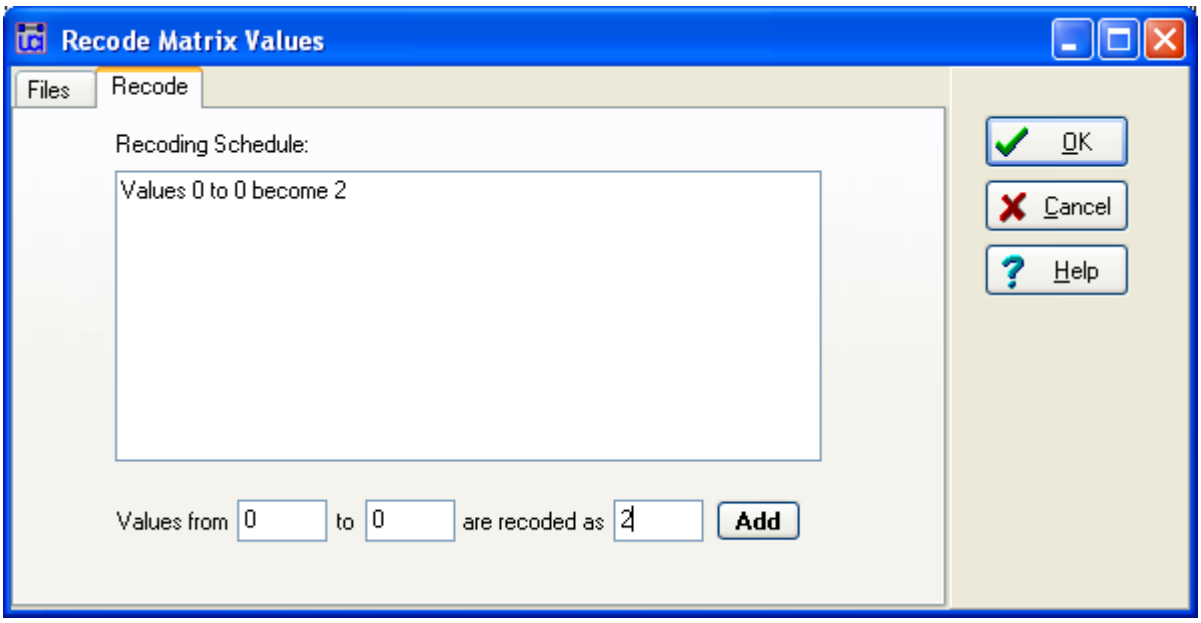


Section 13.6 Core-Periphery Models

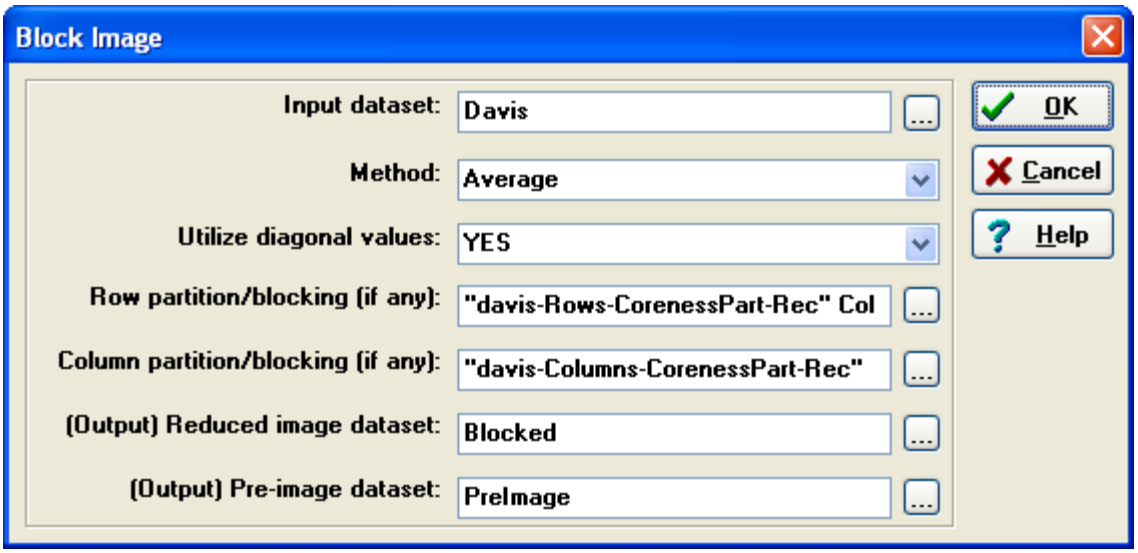
The first thing to do is create davis-Rows and davis-Columns as described in section 13.2. Now run the continuous core-periphery routine on each of these as shown in section 12.8. We now need to recode the two files davis-Rows-corenessPart and davis-Columns-corenessPart. Run Transform|Recode to bring up the following and type in or select the first dataset as shown



Click on the recode button to show the following window complete the values boxes as shown click add then run the routine.



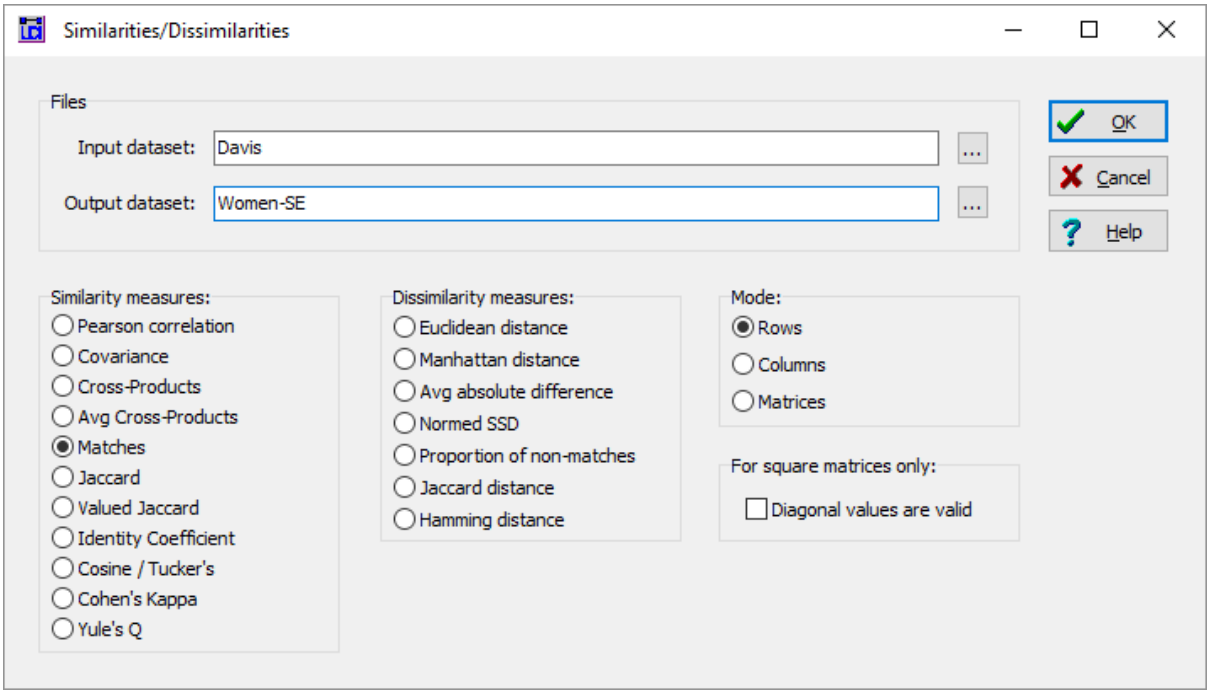
You need to repeat the same procedure davis-Columns-CorenessPart. We can now use these to get a core-periphery partition of Davis. Run Transform|Aggregate|Block with input data as Davis with the row partition as davis-Rows-CorenessPart-Rec and the column partition as davis-Columns-CorenessPart-Rec as shown below.

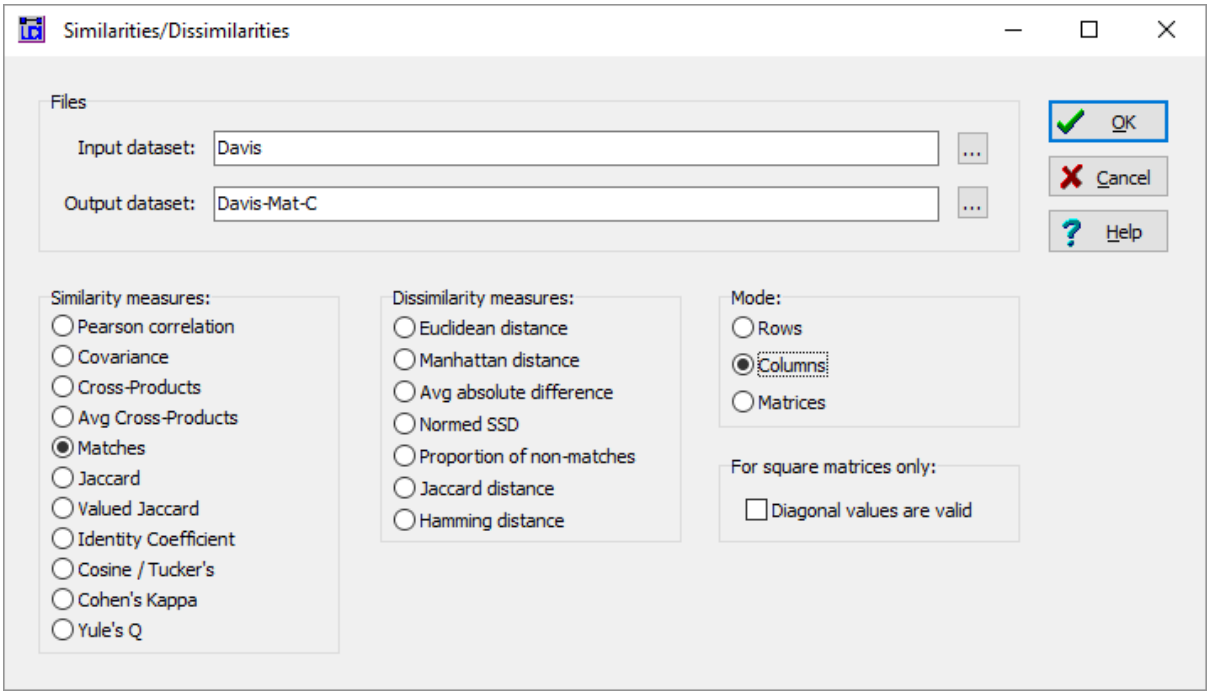


If you now click OK you will get the core-periphery image as shown in Figure 13.5.

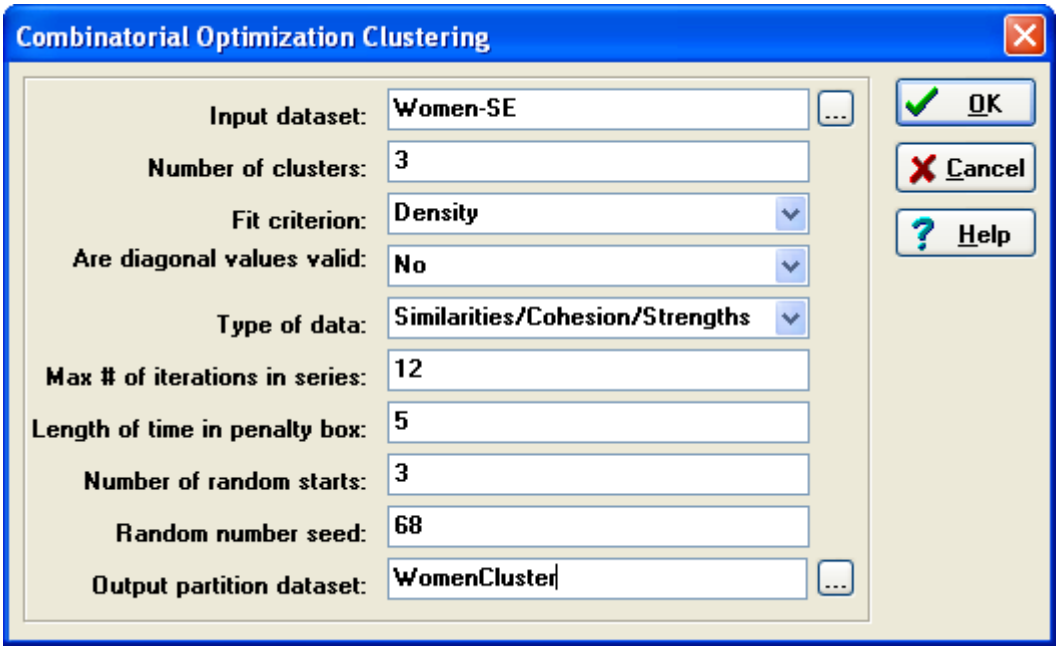
Section 13.7 Equivalence

The structural equivalence for the women and events are found by running Tools|Similarities & Distances using Matches and we label the output as women-SE when we calculate matches across the rows and Events-SE when we calculate across the columns as follows

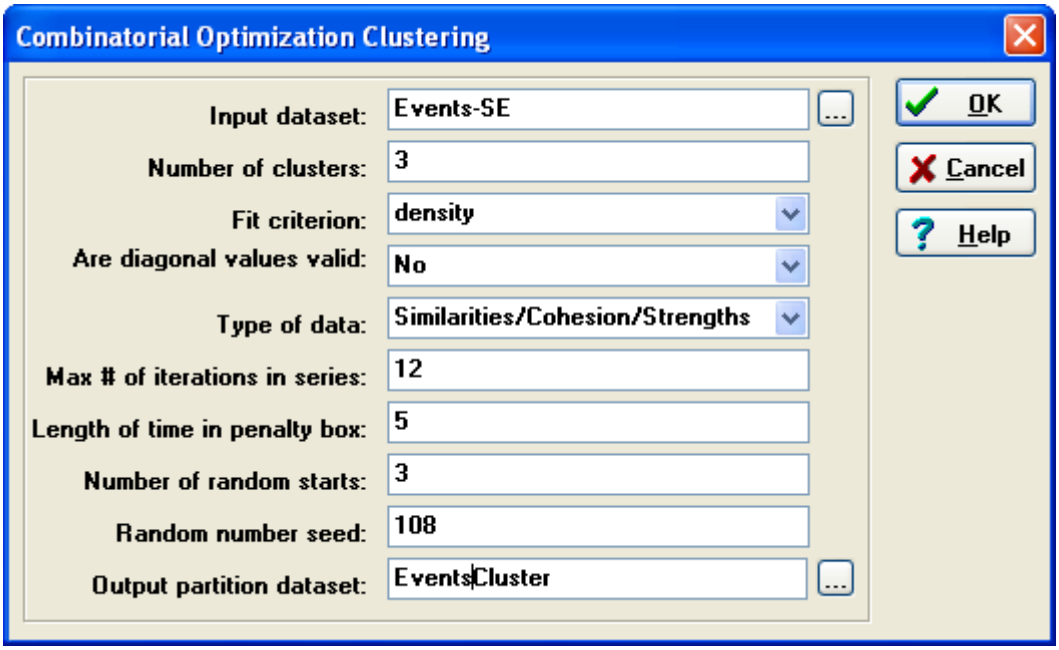




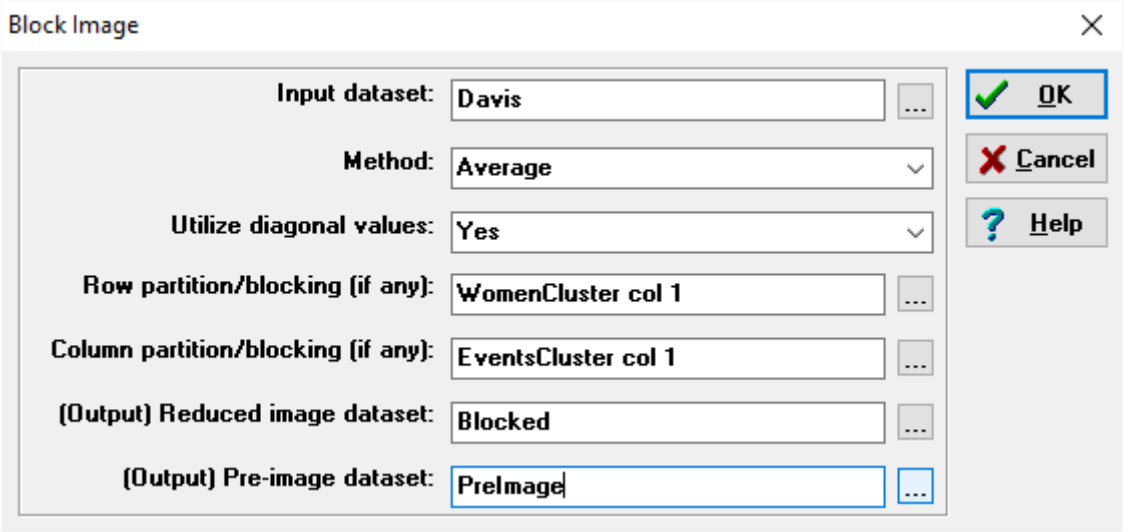
We then submit the ouput of each of these to the Tools|Cluster Analysis|Tabu Optimization selecting 3 clusters and calling the output dataset WomenCluster



This leads to a partition of the rows as shown in Figure 13.7, we repeat the process for the columns.

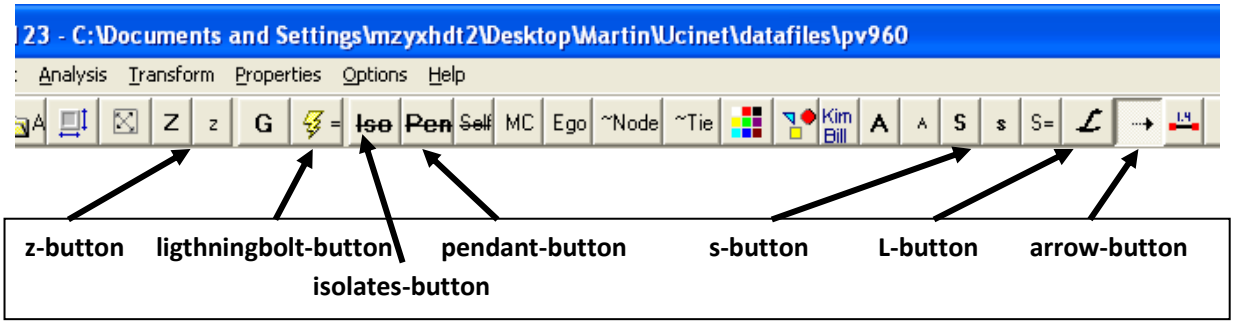


Finally to get the blockmodel shown in Figure 13.8 we apply the clustering to the rows and columns of Davis using Transform|Aggregate (including CSS)|Block using the clusters found above as follows


Block Image
Input dataset:
Davis
Method:
Average
Utilize diagonal values:
Yes
Row partition/blocking (if any):
WomenCluster col 1
Column partition/blocking (if any):
EventsCluster col 1
(Output) Reduced image dataset:
Blocked
(Output) Pre-image dataset:
PreImage
OK
Cancel
Help

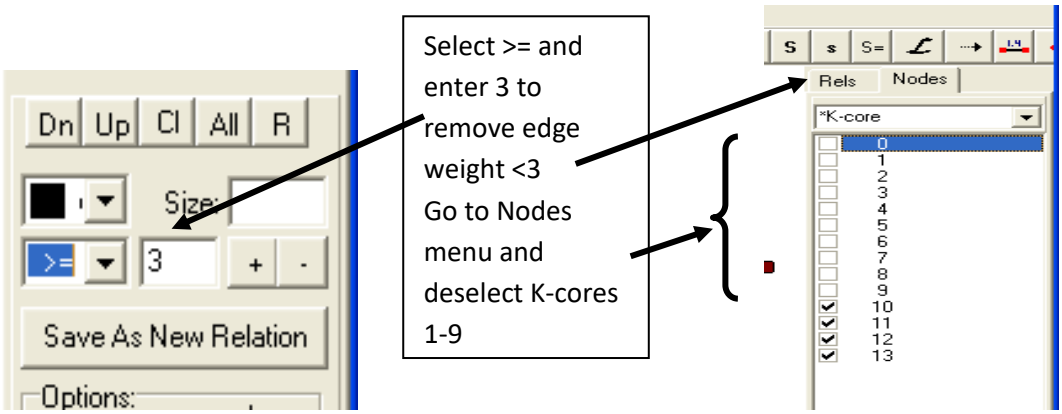
Section 14.2 Reducing the Size of the Problem

To visualise the **PV960** dataset as in **Figures 14.1** and **14.2** open the matrix in **NetDraw**. Once loaded (**Note:** this may take longer than with small matrices) you may have to zoom out using the **z-button** in the **toolbar** and reorganise the network by clicking the **lightningbolt-button** (if you hold your mouse over the button it should say "layout w/ noder repulsion and equal edge length bias". Following this you should see a less square network. Now turn off the node labels (**L-button** in the toolbar) and the arrow heads (**arrow-button** next to L-button), and reduce the size of the nodes by clicking repeatedly on the **s-button**. Finally click on the **pendant-button** to delete pendants (nodes with degree 1).



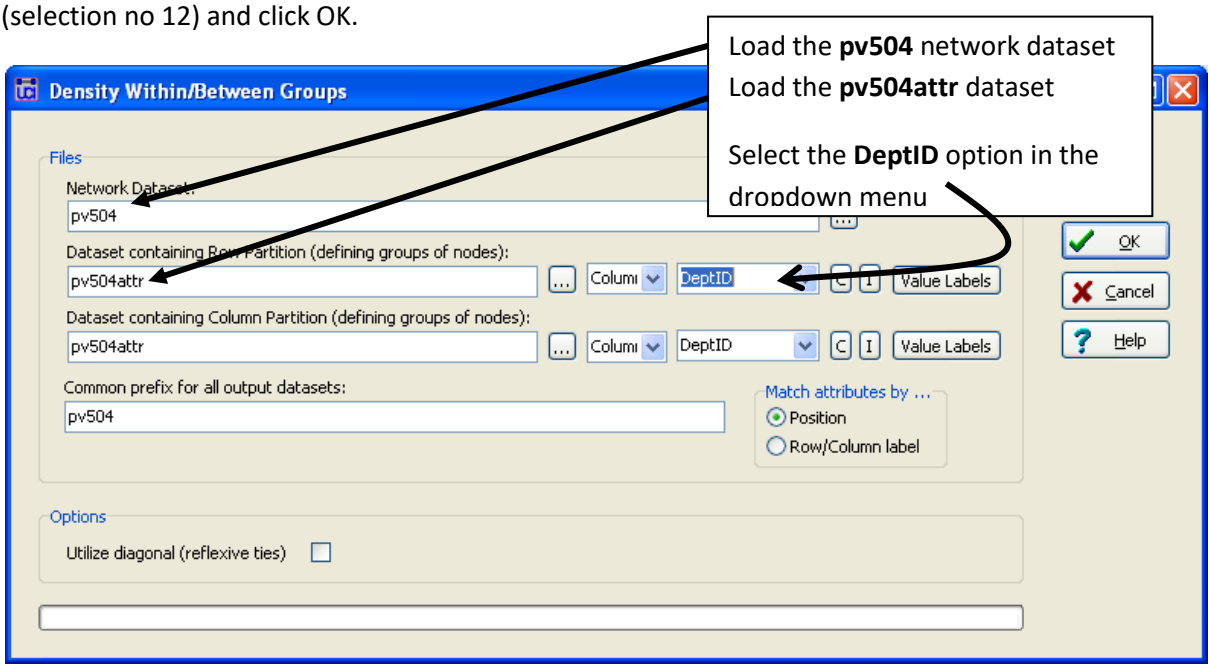
For **Figure 14.2**, simply remove edge weights of less than **"3**" as done previously in the **Rels-** menu to the right. Then remove the isolates by clicking on the **isolate-button** and NewDraw will visualise Figure 14.2.

To illustrate **Figure 14.3** click **Analysis|K-cores**. Now go to the **Nodes-**menu to the right and select ***K-core**. Remove the ticks in the first **9 boxes** and reorganise the network by click on the **ligthningbolt-button**.



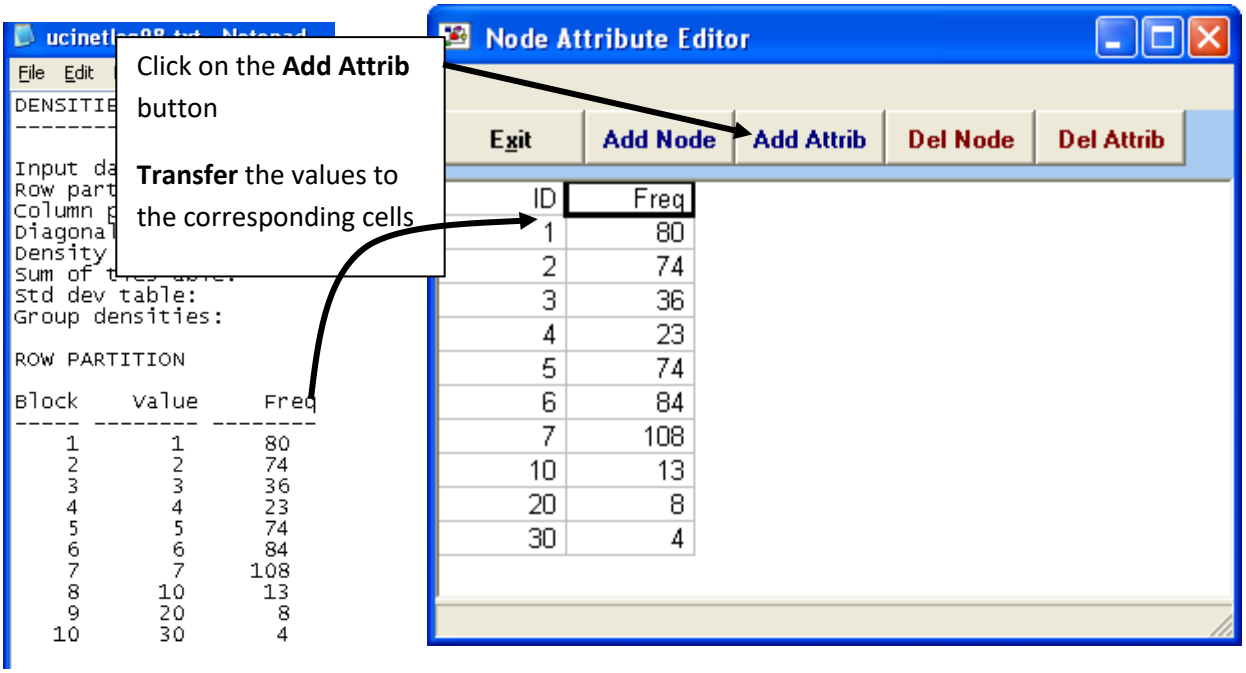
14.2.4 Aggregation

To run the Group by Density routine go to **Network|Cohesion|Density|Density by Groups** and open the **pv504 dataset**. Load **pv504attr** dataset which contains the row partition and select **DeptID** (selection no 12) and click OK.



A new log file will open and the results shown in **Matrix 14.1** can be found about half way down the log file in a matrix titled "**Density (prop of ties) / Average tie strength**". (**Note**: keep the log file open)

To visualise this relation as shown in **Figure 14.4** go to **NetDraw** and open the **pv504-den** dataset. To adjust the **node size** by using the average department size we must create an **attribute** file. To do this go to **Transform|Node attribute editor**. The editor will display a column named **ID** and list the **10** departments. Click the **Add Attrib** button and transfer the **Freq**-values displayed in the **log file** under **ROW PARTITIONING** (towards the top of the log file) into the **corresponding cells** in the **Node attribute editor**. Close the editor by clicking on **Exit**.



Now go to **Properties|Nodes|Symbols|Size|Attribute based** and select the **Freq** attribute. Adjust **Maximum node size** to "**10**" and click **OK**. Now set the shape of symbols to circles (**Properties|Nodes|Symbols|Shape|General - all active nodes**). Remove connections that are smaller than **0.4** by going into the **Rels**-menu and adjust the selection to 

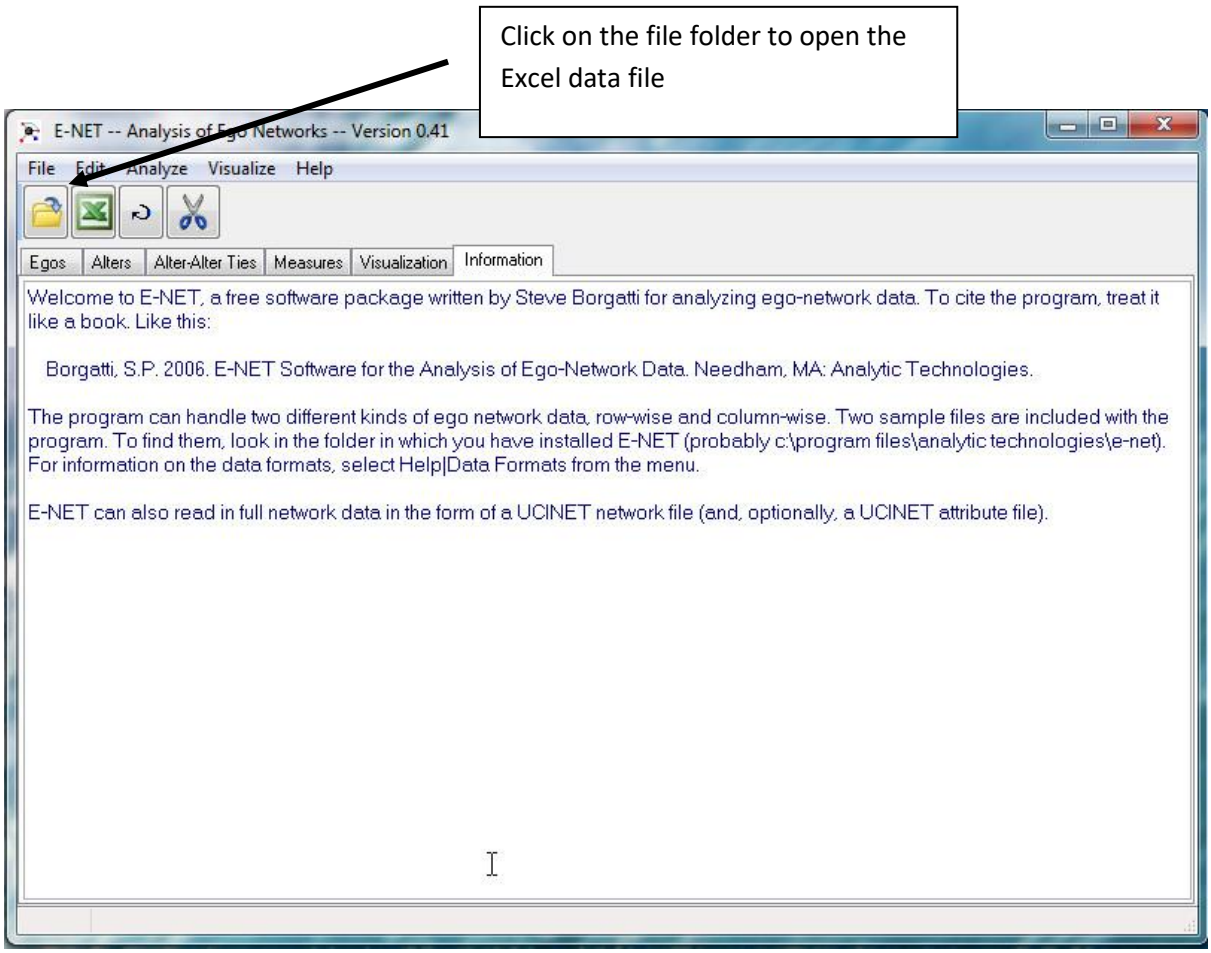
and press the **lighningbolt**-button (Note: you may want to **flip** the network by going into  and by clicking the left-facing arrow-button).

14.3.1 Using specialized algorithms:

To run the Louvain method on Terro_4275 select **Network|subgroups|Louvain.** Simply input Terro_4275 and the logfile reports the results as described in the book along with the final allocation of actors to clusters.

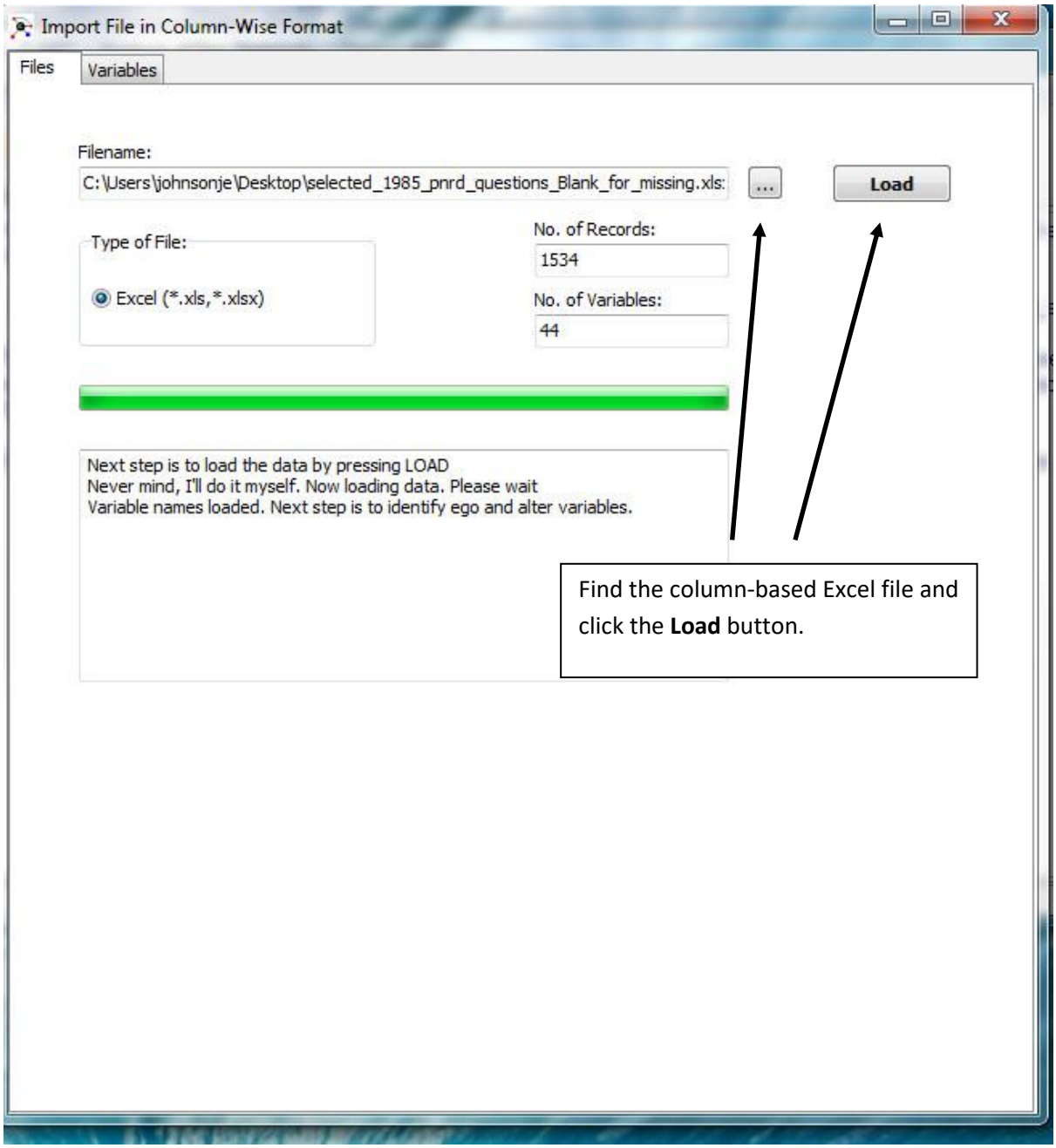
Section 15.5 Example 2 of an ego network study

To run the structural holes measures on the GSS column-based data format an Excel data file can be directly opened by E-Net.

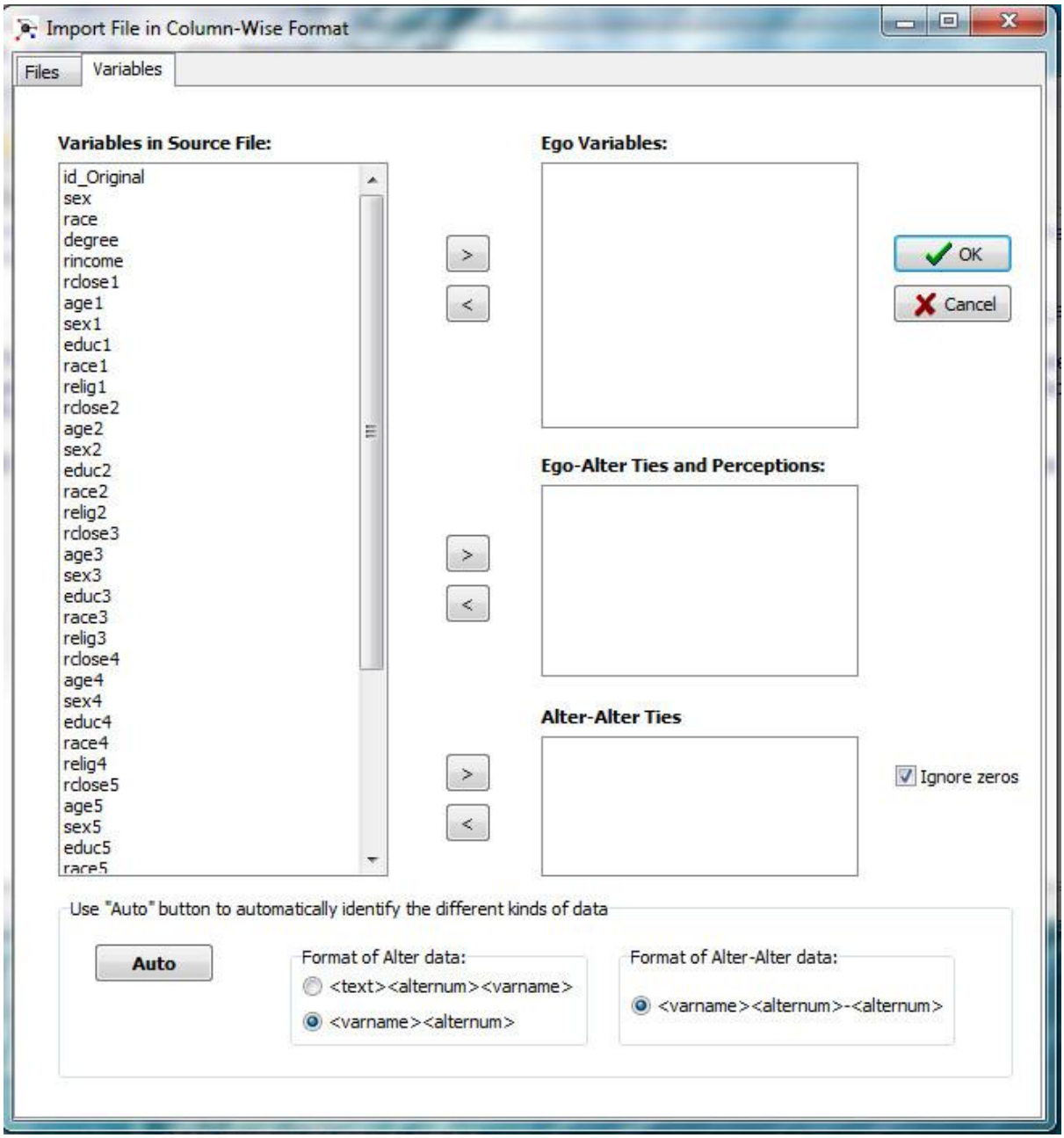


This will open a screen asking the type of data you wish to open. Note that each of the data types will read only specific file types. Since this is a column-wise data format it is an Excel file type.

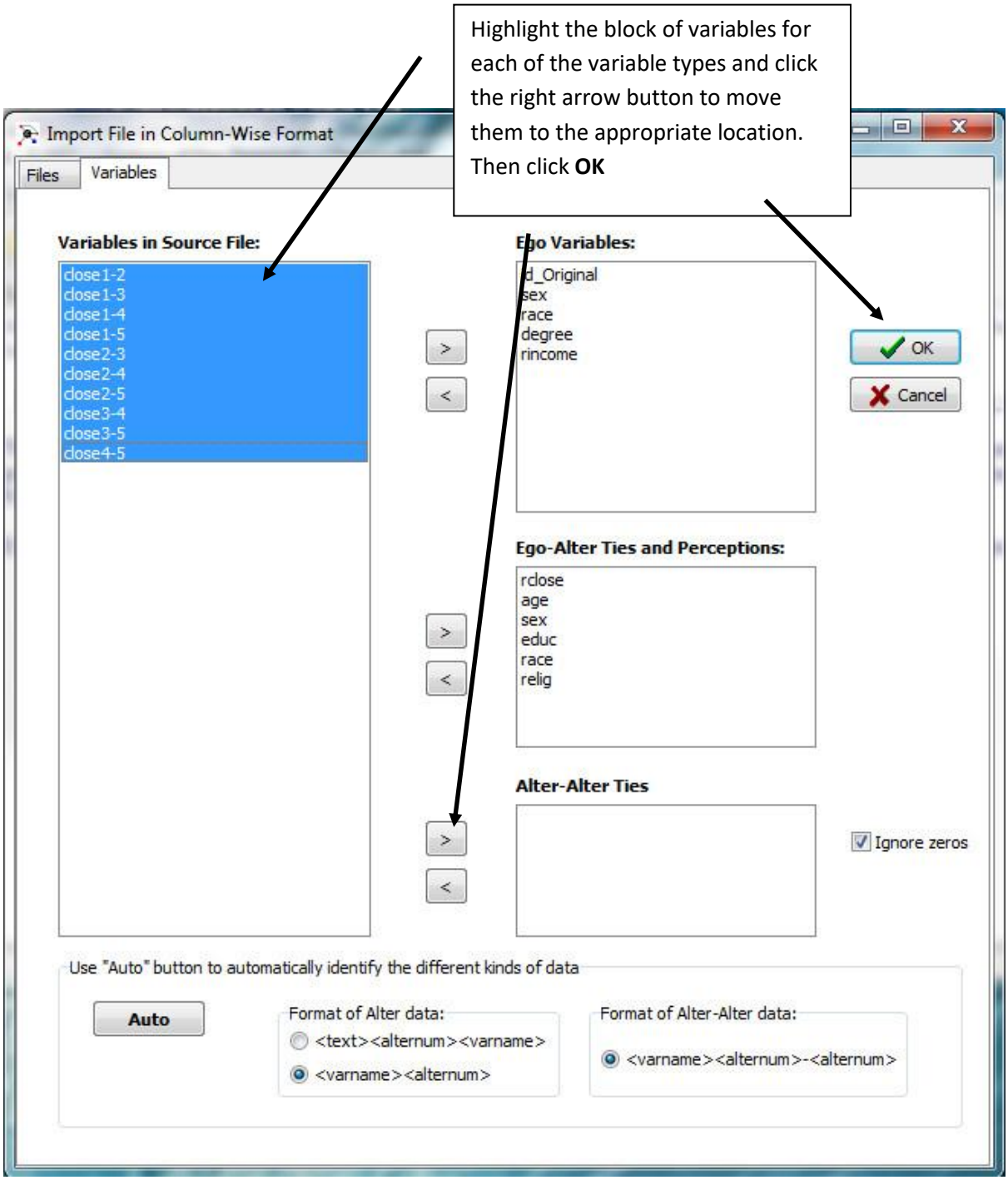
Click **OK** and a separate window will query about for the location of the file to be loaded.



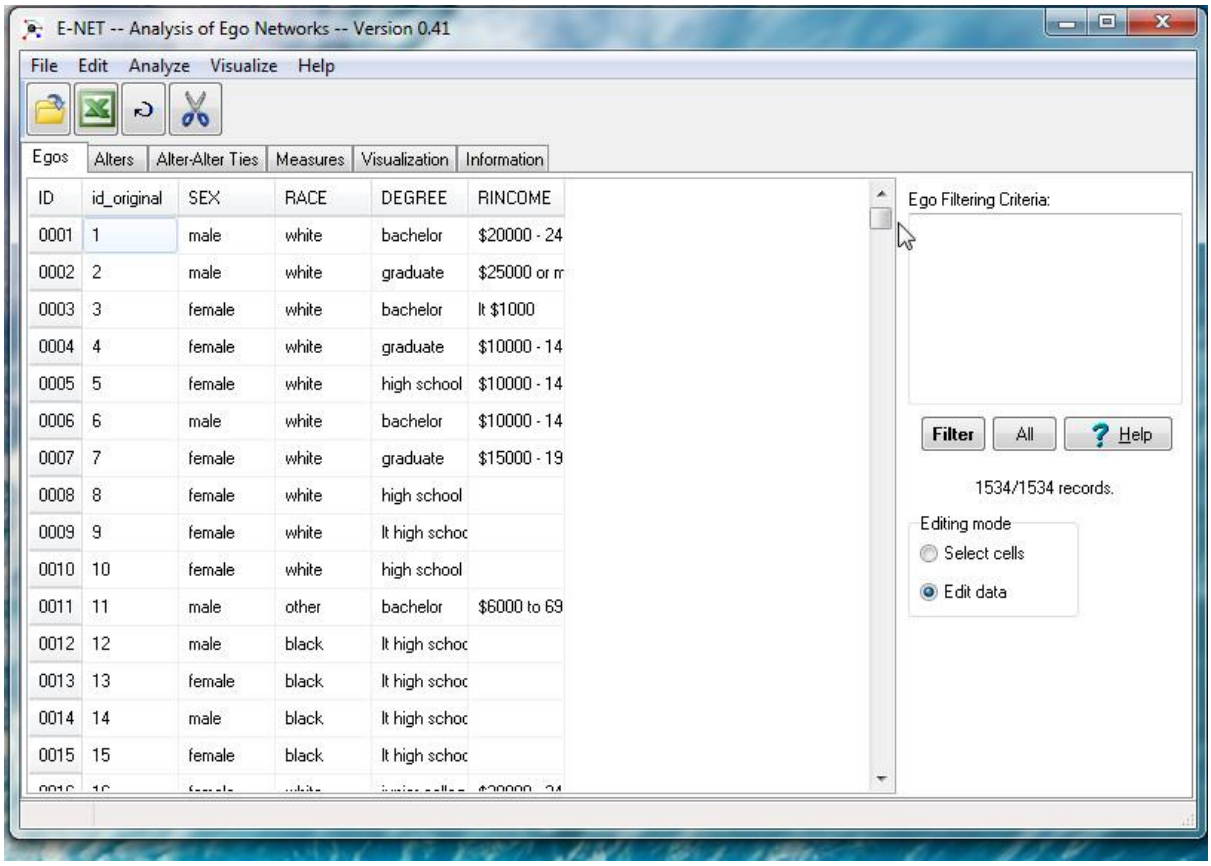
The file will be loaded into a separate window and then you will need to select the variables to be used in the analysis. In this case we will load all variables.



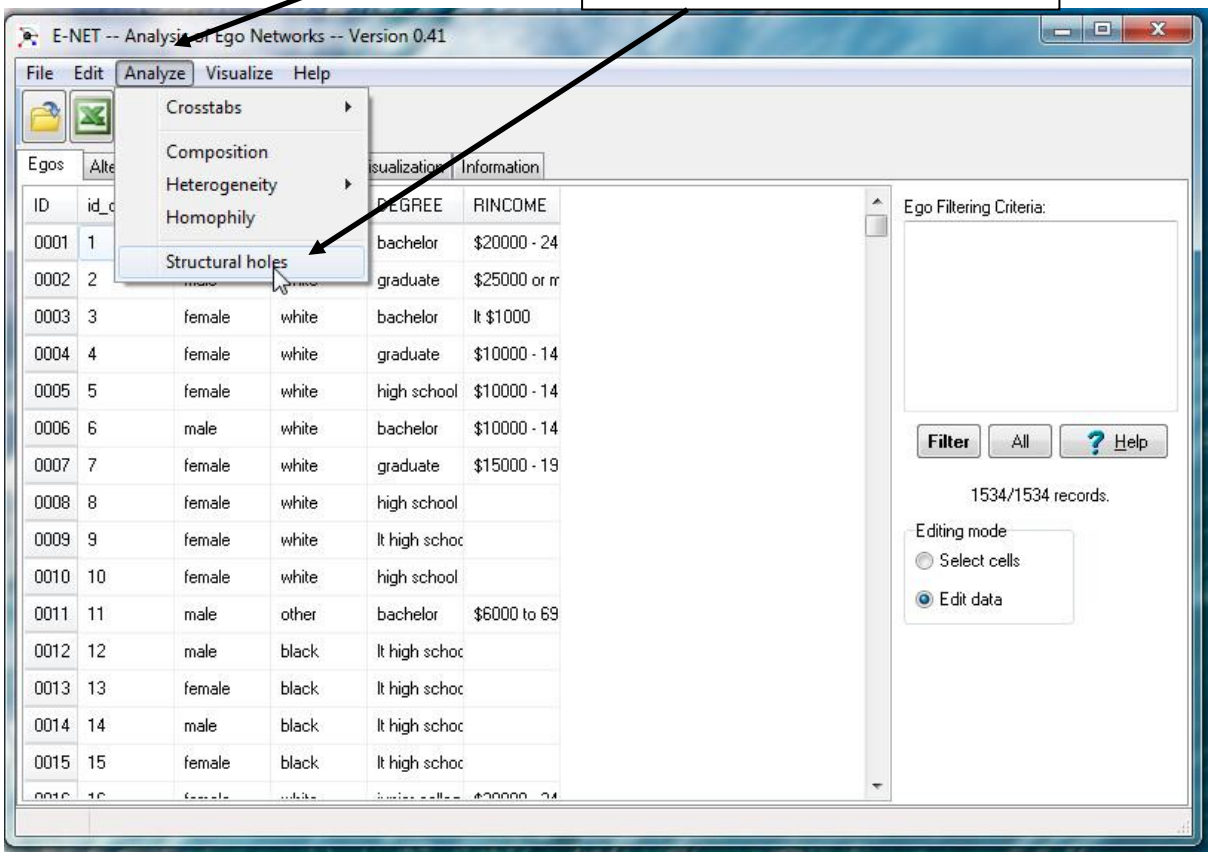
Highlight the variables on the left and click on the arrow in the middle to move the different types of variables into their appropriate box.



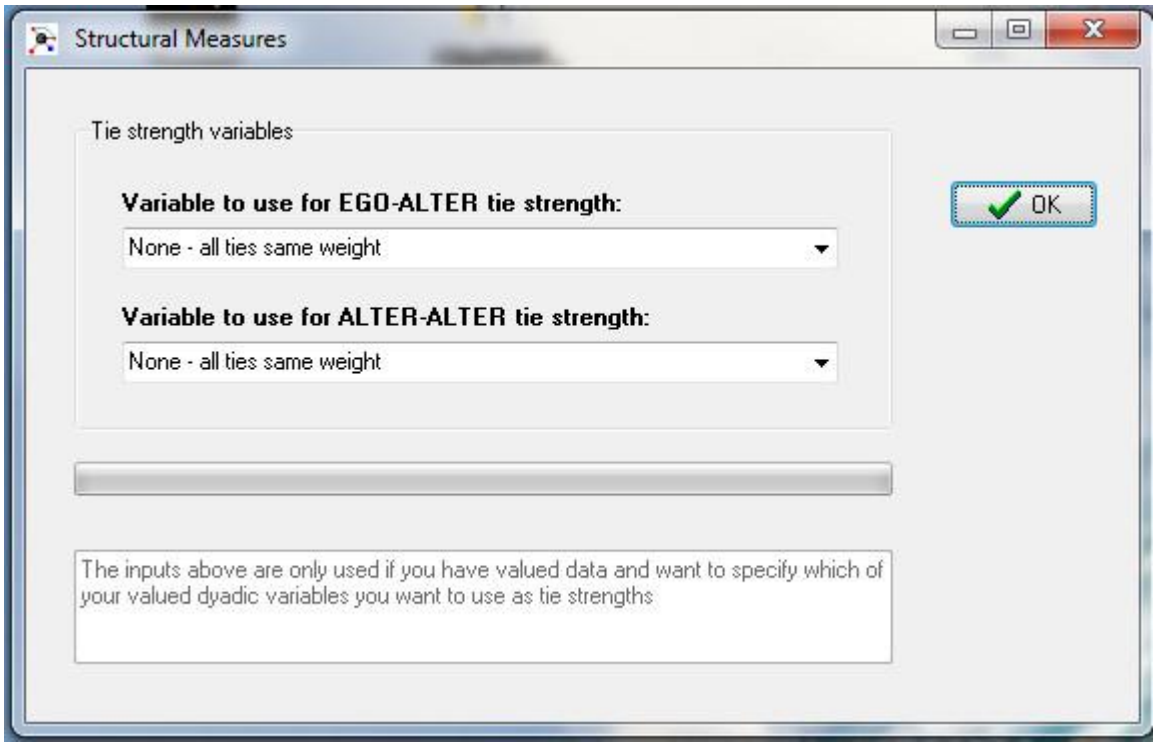
Data will be imported and is now ready for analysis and visuzlization.

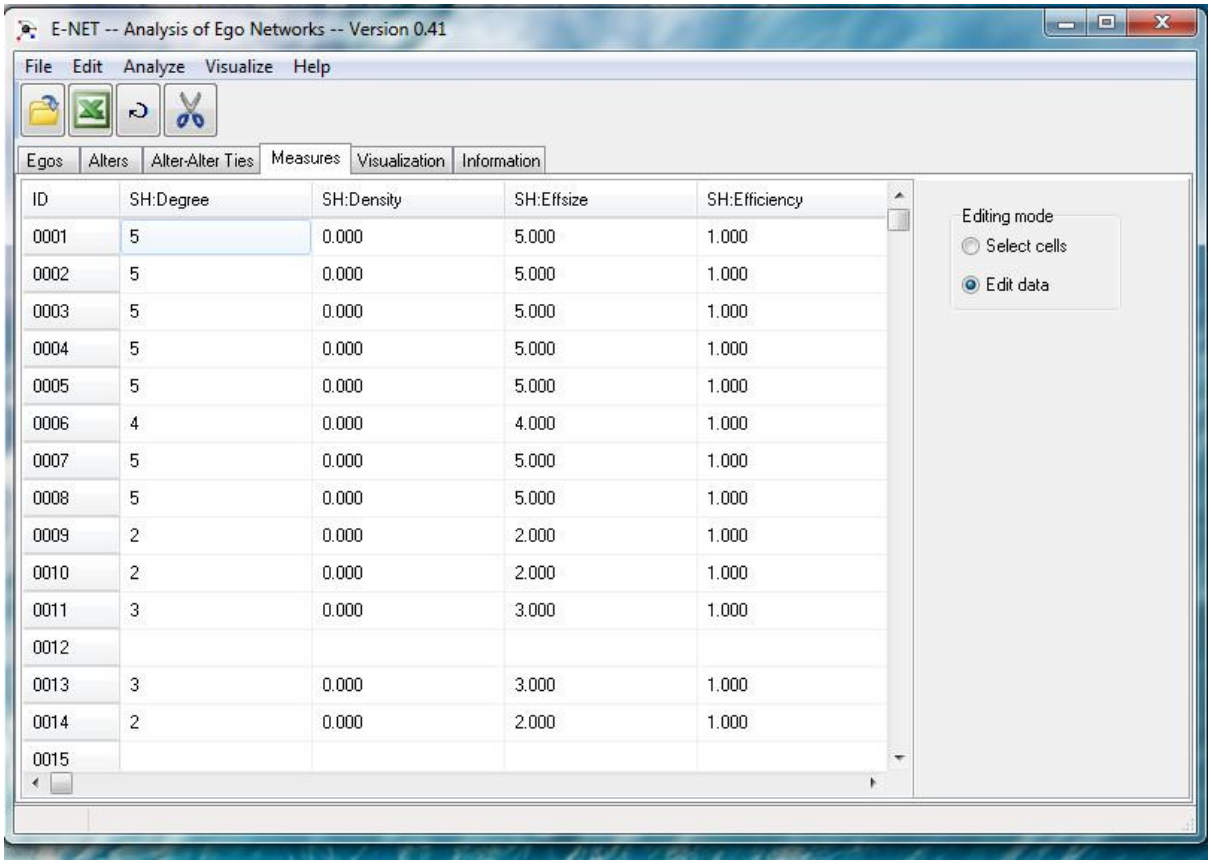

E-NET -- Analysis of Ego Networks -- Version 0.41
File Edit Analyze Visualize Help
Egos
Alters
Alter-Alter Ties
Measures
Visualization
Information
ID id_original SEX RACE DEGREE RINCOME
0001 1 male white bachelor $20000 - 24
0002 2 male white graduate $25000 or m
0003 3 female white bachelor lt $1000
0004 4 female white graduate $10000 - 14
0005 5 female white high school $10000 - 14
0006 6 male white bachelor $10000 - 14
0007 7 female white graduate $15000 - 19
0008 8 female white high school
0009 9 female white lt high schoc
0010 10 female white high school
0011 11 male other bachelor $6000 to 69
0012 12 male black lt high schoc
0013 13 female black lt high schoc
0014 14 male black lt high schoc
0015 15 female black lt high schoc
Ego Filtering Criteria:
Filter
All
Help
1534/1534 records.
Editing mode
Select cells
Edit data

To analyse the data click on the **Analysis Menu**. And then click on **Structural holes.**



A window will then query about how you want to handle the strength of EGO-ALTER and ALTER-ALTER ties. For this analysis there is no weighting. Click **OK** to proceed with the analysis.





ID	SH:Degree	SH:Density	SH:Effsize	SH:Efficiency
0001	5	0.000	5.000	1.000
0002	5	0.000	5.000	1.000
0003	5	0.000	5.000	1.000
0004	5	0.000	5.000	1.000
0005	5	0.000	5.000	1.000
0006	4	0.000	4.000	1.000
0007	5	0.000	5.000	1.000
0008	5	0.000	5.000	1.000
0009	2	0.000	2.000	1.000
0010	2	0.000	2.000	1.000
0011	3	0.000	3.000	1.000
0012				
0013	3	0.000	3.000	1.000
0014	2	0.000	2.000	1.000
0015				