**Cohesion Lab**

For this lab we will use three sets of data:

CAMPNET:

This is a dichotomous adjacency matrix of 18 participants in a qualitative methods class. Ties are directed and represent that the ego indicated that the nominated alter was one of the three people with which s/he spent the most time during the seminar.

KAPTAIL:

This is a stacked dataset containing four dichotomous matrices. There are two adjacency matrices each for social ties (indicating the pair had social interaction) and instrumental ties (indicated the pair had work-related interaction). The two pairs of matrices represent two different points in time. The names of the datasets encode the type of tie in the sixth letter, and the time period in the seventh. Thus, the dataset KAPFTS1 is social ties at time 1 and KAPFTI2 is instrumental ties at time 2, etc.

ZACKAR & ZACHATTR:

ZACKAR is another stacked dataset, containing a dichotomous adjacency matrix, ZACHE, which represents the simple presence or absence of ties between members of a Karate Club, and ZACHC, which contains valued data counting the number of interactions between actors. ZACHATTR is a rectangular matrix with three columns of attributes for each of the actors from the ZACKAR datasets.

**EXERCISES:**

1. Cohesion using UCINET with **CAMPNET**

a) Calculate the following measures of cohesion using Network | Dyadic Measures  
 Density

Distance

Maximum Flow

Point Connectivity

1. Compare the point connectivity values and the maximum flow values. (Ignore values on the diagonal.) What is the relationship between them? Why do you think that is? Can you find the edge-independent paths (maximum flow) and node independent paths (point connectivity) between Bill and Pat by visualizing Campnet in NetDraw?
2. Using your Netdraw visualization, verify a couple entries in the distance matrix produced (Campnet-Geo)
3. Average Degree & Centralization using **KAPTAIL**
4. Run Network | Centrality | Degree on KAPTAIL. This will generate results for all four networks (matrices, levels) in the dataset. First it will show you node level data for each of the four networks, then appropriate centralization scores for the appropriate measures in each of the four networks. Why are there some zeroes in the Centralization scores? (Hint: Look at those measures for those networks in the previous output.)
5. To find average degree, you can run descriptive statistics on the node level data. By default running degree centrality created a dataset called KAPTAIL-deg with the node level degree measures for it (and another one called KAPTAIL-degcz for the centralization scores). Use the menu **Tools | Univariate statistics** to run Univariate statistics on the degree scores by node and find the appropriate average degree scores.
6. Compare the results for KAPFTS1 and KAPTFTS2 (the social ties at time 1 and time 2). What happened to average degree? What happened to network centralization? Does this make sense?
7. Compare the results for KAPFTI1 and KAPFTI2 (the instrumental/work ties at time 1 and time 2). What happened to average degree and centralization here? Does this make sense? Why do you think the results differ across type of relationships?
8. Fragmentation using UCINET and **KAPTAIL**  
   1. Using the **KAPFTS1** dataset (you may have to unpack **KAPTAIL** if you have not already done so using **Data | Unpack**), calculate its fragmentation under **Network | Centrality | Fragmentation** using the default options. This reports both “Fragmentation” and “Distance Weighted Fragmentation.” Why are the numbers different? Which one is more useful for this network? When would you choose to use one or the other?
   2. Based on the results from Exercise 2 above, what do you think will happen to each of the fragmentation measures if you run them for **KAPFTS2.** Run them to check your answers. Were you surprised? By which measure(s)? Why are the results what they are?
   3. Running Fragmentation also gives you node level scores. We did not cover this in the lecture, but what do you think this may mean? (For a hint, go back to the dialog box for running Fragmentation and look at the option given.)
9. Core-Periphery using UCINET with **KAPTAIL**  
   1. Run Network | Core/Periphery | Categorical on **KAPFTS1** and **KAPFTS2**. How do the results differ? During which time period was there a more clear core/periphery structure to the social ties? What happened to the core between time 1 and time 2?
   2. Run Network | Core/Periphery | Continuous on **KAPFTS1**. Find the line where it recommends how many nodes should be in the core. Does that match the size of the core found from the Categorical procedure? How might you determine which one better captures the core/periphery nature of the data?
10. Transitivity and Simmelian ties with ZACKAR
    1. Unpack ZACKAR to get ZACHE and ZACHC (get rid of the prefix if there is one by default, to keep the file names simple).
    2. Run Network | Cohesion | Simmelian /Embedded Ties on ZACHE
    3. Open ZACHE in NETDRAW, then open (AS A NETWORK) ZACHE-Simmel. Because it has the same actors, they should both be present on the relations tab. Switch between them and see the difference.
    4. Select only ZACHE-Simmel relation. The output from the Simmelian tie analysis is a network with the COUNT of how many Simmelian ties each pair of actors share. Turn on the link weights to see those counts. Which actors have the MOST sets of embedded ties?
    5. Turn off the link weights and check both relations. Go to Properties | Lines | Color Relations. Choose a different color for ZACHE, ZACHE-Simmel, and “Multiplex” (which is when a line represents more than on relationship, in this case both ZACHE and ZACHE-Simmel). How much of this network is embedded in Simmelian ties?
    6. Back in UCINET, run Network | Cohesion | Transitivity to see the score. Does it surprise you based on the previous analysis in NetDraw?