**Lab 4: Network Cohesion Measures**

For this lab we will import a sociomatrix, symmetrize and extract subnetworks using attributes, and examine network cohesion and triadic closure in the network.

Complete all tasks and answer all questions for full credit.

**NOTE:** Before starting, make sure UCINET shows that your default directory is set where you want the program to store the files. If not, click on the file folder to set it.

**Dataset:**

For this exercise, you will be working with the friendship data from a single school from the Add Health study. This dataset is made up of 7th and 8th grade students. The dataset for the exercise consists of the 42 students who participated.

**Task 1.** Import the study dataset into Ucinet.

1. The AH126.txt file is a saved as a Data Language (DL) file. Import the AH126.txt file into Ucinet to create a Ucinet dataset.

**Questions**

**1: Is the AH126 dataset a directed or an undirected network? How do you know?**

Directed network. We can match the nodes across diagonals. We can see 1 has coneection to 3 but 3 doesn’t have a connection to 1. Basically, the triangles across the diagonal will be the same if the network is undirected.

**Task 2.** Display network cohesion statistics

1. Use Network->Cohesion->Multiple Cohesion Measures to display multiple network cohesion measures for AH126.

**Questions:**

1. **How many possible ties are there in this directed network (i.e., if everyone was connected to everyone else, how many ties would be present)?**

**n(n-1) = 1722**

1. **What is the value for the density of this directed network?**

**0.06**

1. **How many components are in the directed network? Why are there so many?**

**25**

**everyone is reachable to everyone else. for directed, one-directional path can not ensure that everyone can get to everyone else. 1->2 means 1 can go to 2 but 2 can not go to 1. So they will be in different component.**

1. **What is the value for dyad reciprocity of the directed network?**

**0.195**

1. **What does the value for dyad reciprocity in this network say about the strength of friendships in the class?**

**arc - for every tie, is there the opposite tie, of 104 how many are reciprocal**

**dyad - only/at least 1 tie and that is reciprocal(both)**

**we see many one directional reciprocal.**

**dyad: no of at least one tie/no of reciprocal ties**

**arc: no of reciprocal/# of total ties**

**dyad: no of reciprocal dyad/reciprocal dyads + unidirectional dyads**

**Task 3.** Display network transitivity statistics

1. Use Network-> Triad Census to display the triplet transitivity for AH126.

**Questions:**

1. **Display the full triad census for the directed AH126 network. A complete 3-person subgraph is a 3-person triad in which all possible ties are present. How many complete 3-person subgraphs are there in the class?**

**1**

1. **What is the value for the triadic transitivity in the directed AH126 network?**

**0.251 - the triad is close in some way**

**9, 12, 13, 16 are transitive.**

**Task 4.** Symmetrize the network

1. Create a symmetric network from the AH126 sociomatrix (Transform->Symmetrize). Choose the symmetrize option that creates a tie between two students if either one of them or both of them lists the other as a friend. Name the new Ucinet matrix as AH126Symm.
2. Display the network cohesion statistics for AH126Symm (Network->Cohesion->Multiple Cohesion Measures). Display the AH126Symm triad census (Network-> Triad Census).

**Questions:**

1. **How many possible network ties are there in the undirected network (i.e., how many ties would be present if everyone was connected to everyone else)?**

**n(n-1)/2  
(1/density) \* # of ties**

**861**

1. **What is the value for the density of the undirected AH126 network?**

**0.101**

1. **How many components are in the undirected AH126 network?**

**1**

1. **What is the value for reciprocity in the undirected AH126 network?**

**1**

1. **What is the value for triadic transitivity in the undirected AH126 network?**

**0.175**

1. **Print the full triad census for the undirected AH126 network.**

**Triad Census for dataset AH126-maxsym**

**AH126-max**

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**1 003 8323.000**

**2 012 0.000**

**3 102 2882.000**

**4 021D 0.000**

**5 021U 0.000**

**6 021C 0.000**

**7 111D 0.000**

**8 111U 0.000**

**9 030T 0.000**

**10 030C 0.000**

**11 201 227.000**

**12 120D 0.000**

**13 120U 0.000**

**14 120C 0.000**

**15 210 0.000**

**16 300 48.000**

**1. 003 = A,B,C, the empty subgraph.**

**2. 012 = A->B, C, subgraph with a single directed edge.**

**3. 102 = A<->B, C, the subgraph with a mutual connection between two vertices.**

**4. 021D = A<-B->C, the out-star.**

**5. 021U = A->B<-C, the in-star.**

**6. 021C = A->B->C, directed line.**

**7. 111D = A<->B<-C.**

**8. 111U = A<->B->C.**

**9. 030T = A->B<-C, A->C.**

**10. 030C = A<-B<-C, A->C.**

**11. 201 = A<->B<->C.**

**12. 120D = A<-B->C, A<->C.**

**13. 120U = A->B<-C, A<->C.**

**14. 120C = A->B->C, A<->C.**

**15. 210 = A->B<->C, A<->C.**

**16. 300 = A<->B<->C, A<->C, complete subgraph.**

**9, 12, 13, 16 are transitive**

**6, 7, 8, 10, 11, 14, 15 are intransitive**

**Transitivity**

**1**

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**1 Transitivity 0.175**

**Task 5.** Import attributes. Create 2 submatrices of the symmetrized network based on attributes: 1 network composed of just the boys in the school and 1 network composed of just the girls in the school.

The AH126Attr.txt file is a dataset of attributes of the actors in the study. See the codebook for AH126Attr.txt at the end of this instruction set.

1. Import the AH126Attr.txt file into Ucinet to create \_\_\_.###d and \_\_\_.###h files.
2. Use Data->Filter/Extract->Subgraph via attribute vector to create a submatrix of boys from AH126Symm. Name the new Ucinet file AH126Boys. Display the boys’ network in Netdraw.
3. Use Data->Filter/Extract->Subgraph via attribute vector again and this time include only the girls from AH126Symm. Name the new Ucinet file AH126Girls. Display the girls’ network in Netdraw.

**Questions:**

1. **What is the value for density of the undirected boys’ network?**

**0.100**

1. **What is the value for transitivity of the undirected boys’ network?**

0.037

1. **What is the value for density of the undirected girls’ network?**

**0.126**

1. **What is the value for transitivity of the undirected girls’ network?**

**0.238**

**Task 6.** Add attribute data on alcohol use to the Netdraw displays.

**Questions:**

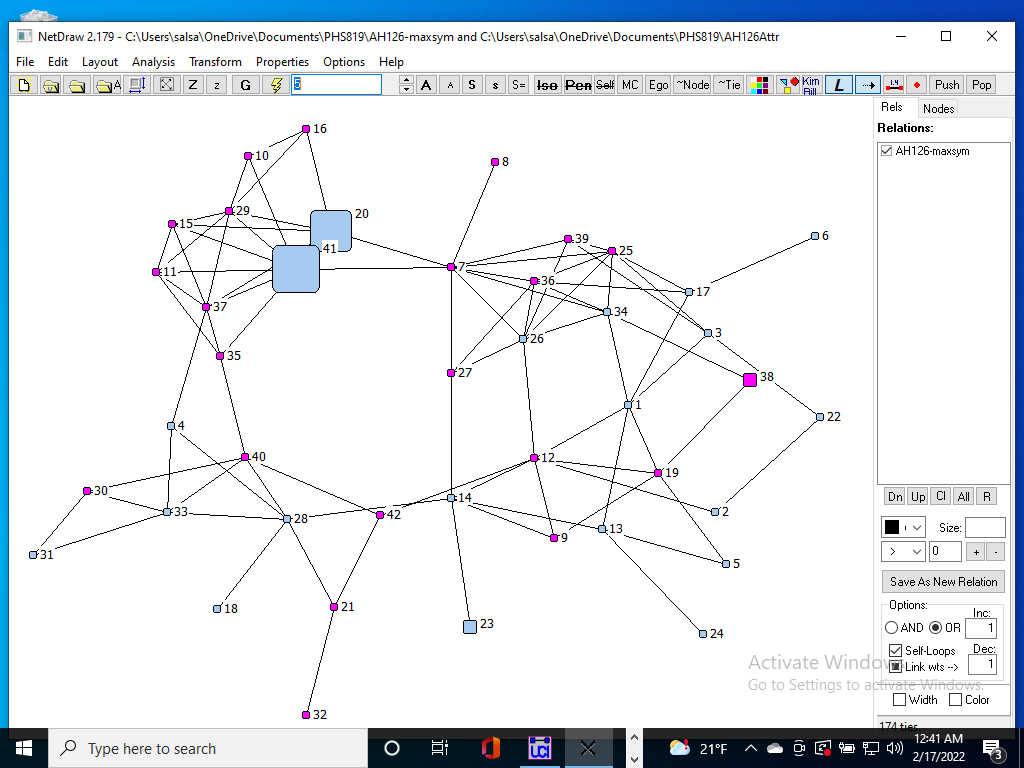
1. **Describe how triadic closure and alcohol use may be related among the adolescents in this class.**

people having high triadic closure do not seem like having any connection with being frequent drinker.

**Task 7.** Summary write-up

Write up a short description of your SNA analysis of cohesiveness observed among students in the AH126 dataset in relation to their health behaviors. Illustrate your findings with graphs. Suggest directions for future research.

From the analysis, we can see that the girls have higher cohesiveness among themselves rather than the boys. We can also see the drinking frequency was higher among boys. So it might be worth testing on a higher dataset that if drinking frequency have any connection with the density of the network

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