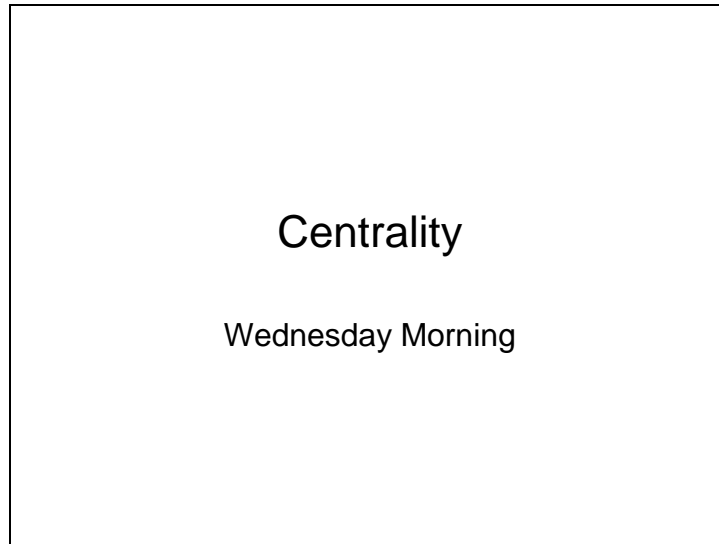


Slide 1



Centrality is a measure of how network structure and position contributes to a node's importance. However, there are multiple measures of centrality that capture different forms of importance such as power, influence, popularity, risk, etc. In this session we will discuss how we can identify central nodes.

Objectives:

After this section, you should be able to:

- Describe at least four different types of Centrality and the implications of each measure
- Use UCINET to calculate different measures of Centrality
- Use NetDraw to calculate and visualize different measures of Centrality

























































# 2009 LINKS Center Summer Workshop

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## Centrality Lab

For this lab we will use 3 datasets:

### **WIRING:**

This is a stacked dataset that includes many different files. We will be working with **RDGAM**. This is a dichotomous adjacency matrix of 14 employees of the bank wiring room of Western Electric. Ties are symmetric and represent participation in games during work breaks.

### **PRISON:**

This is a dichotomous adjacency matrix of 67 prisoners. Ties are directed and represent each ego's friends. Each was free to choose as few or as many "friends" as he desired.

### **DRUGNET:**

This is a dichotomous adjacency matrix of drug users in Hartford. Ties are directed and represent the lending of drug needles. We will also work with the attribute file **DRUGATTR**.

### **EXERCISES:**

#### 1) Centrality using UCINET and NetDraw with **RDGAM**

If you have not done so already use UCINET to unpack **WIRING**

- a) Open **RDGAM** in Netdraw to familiarize yourself with the data  
In UCINET calculate the following measures of cohesion using Network | Centrality  
Degree  
Betweenness  
Closeness  
Eigenvector
- b) Using your Netdraw visualization, compare your calculations of various Centrality measures
- c) Now run Centrality multiple measures in UCINET using Network | Centrality | Multiple measures
- d) Compare the profile of W1 with W5 across all measures. Note that W1 is stronger in eigenvector while W5 is stronger on betweenness. Interpret this result
- e) Compare W5 with W7. They have same degree yet differ on eigenvector centrality. Why is W7 so much weaker on eigenvector centrality?
- f) Remove isolates using Data | Remove Isolates on **RDGAM** and recalculate centrality measures
- g) Compare the results for closeness centrality (especially the descriptive statistics) with those from the previous run.

#### 2) Directed Centrality using UCINET with **PRISON**

- a) Open **PRISON** in NetDraw to familiarize yourself with the data

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- b) Using UCINET calculate Centrality measures (first, using individual measures, and next using the “multiple measures” option) and compare the results. What is the program doing?
  - c) Identify which individuals have the most friends in this dataset
- 3) Directed Centrality using NetDraw with **PRISON**
- a) Open **PRISON** in NetDraw
  - b) Using NetDraw calculate Centrality measures under Analysis | Centrality
  - c) Resize the nodes based on various Centrality measures
  - d) Identify which individuals list the most number of friends
  - e) Identify which individuals are listed as friends by the most number of others
- 4) Directed Centrality using UCINET with **DRUGNET**
- a) Open **DRUGNET** in NetDraw to familiarize yourself with the data
  - b) Using UCINET identify which individuals are at highest risk of contracting a disease based on their needle sharing habits
  - c) In NetDraw, open **DRUGATTR** by clicking on the folder with the A
  - d) Calculate Centrality measures in NetDraw (remember that this is directed data)
  - e) Using NetDraw color the nodes based on different attributes and size the nodes based on different Centrality measures. Do you see any pattern?