Analyzing Two-mode Network Data

**Definition:** One-mode networks detail the relationship between one type of entity, for example between people. In contrast, two-mode networks are composed of two types of entities. These entities could be people and teams or people and organizations. Two-mode networks summarize the association between one entity and another, for example, the teams that individuals are members of. For this reason, two-mode networks are often called affiliation networks. They can also be called bipartite networks.

**Implications:** Gathering data on two-mode networks, such as people and teams, can be a quick way of understanding the web of relationships in an organization. You can use this data as a proxy for employee-employee relationships. However, caution must be taken when using two-mode data in large teams or teams that evolve over time because not every person on a given team may know one another. In addition, individuals have ties that are outside their teams.

Data comprising employee affiliations with teams can be useful in itself. It can highlight which teams (and the individuals in the teams) are central in the network and hence influential. It can also highlight which teams and individuals are playing broker roles within an organization.

**Analysis:** Two-mode data can be visualized and analyzed in several ways. It can be visualized so that ties between an individual and teams make up the structure of the network. UCINET also has some specific analysis routines for two-mode data. Two-mode data can be made into square matrices called bipartite networks, which allows for all the analysis routines in UCINET to be used. Finally two-mode networks can be reduced to one mode of teams-teams or employees-employees. Each of these options is detailed in the following sections.
Visualizing Two-mode Networks

**Visualizing two-mode data in Netdraw**

In this analysis, we are going to visually examine our two-mode network. The Excel spreadsheet below shows individuals who are members of teams. Notice the names of the respondents are in the first column and the team names are along the first row.

![Excel spreadsheet showing team membership](image)

**Step 1.** Load the network into UCINET the same way that you would any network. Name the file “Teams.” In Netdraw, File > Open > UCINET dataset > 2-Mode network. Then select the “Teams” file and press OK.

In the network diagram, the teams are the blue squares and the individuals are the red circles. There is obvious clustering by team, with Team 6 connecting the two subgroups together.
Analyzing Two-mode Networks

Analyzing two-mode data in UCINET

**Step 1.** Network > 2-Mode networks > 2-Mode Centrality.
**Step 2.** Select the “Teams” network and press OK.

This routine produces normalized scores based upon the maximum possible value. The people with scores of 0.267 have the most ties. The most central team is team 5, with 0.283. Note that Team 6 (the one on the center of the network diagram) has the highest betweenness score.
Analyzing two-mode data in UCINET
We cannot run all the analytical measures in UCINET on two-mode data because the matrix is not square. To create a square matrix, we need to run the bipartite function. This function adds the names of the teams to the rows and the names of the people to the columns.

**Step 1.** Transform > Graph Theoretic > Bipartite

**Step 2.** Select the “Teams” network and press OK.

**Step 3.** Once you have constructed your bipartite dataset, you can analyze it the same way as other networks. The interpretation of the findings, however, needs to take into account that the data has two modes.

Creating one-mode networks from two-mode data
Sometimes it may be useful to transform two-mode data into one-mode data. For example in our teams network, you can create a one-mode network of ties between individuals where the ties represent being part of the same team.

Step 1. Data > Affiliations (2-mode to 1-mode)
Step 2. Select the “Teams” network, then under mode select the rows button, then press OK.

In the new network, each value represents the number of teams each pair of people works on together. For most of the analysis in UCINET, you would need to dichotomize the data.

You can also visualize the data in Netdraw in the usual way. In the diagram on the right, the width of the ties indicates the number of shared teams each pair of people are on using the properties > lines > size > tie strength option.
Methodological papers and books:


Empirical and conceptual papers:

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