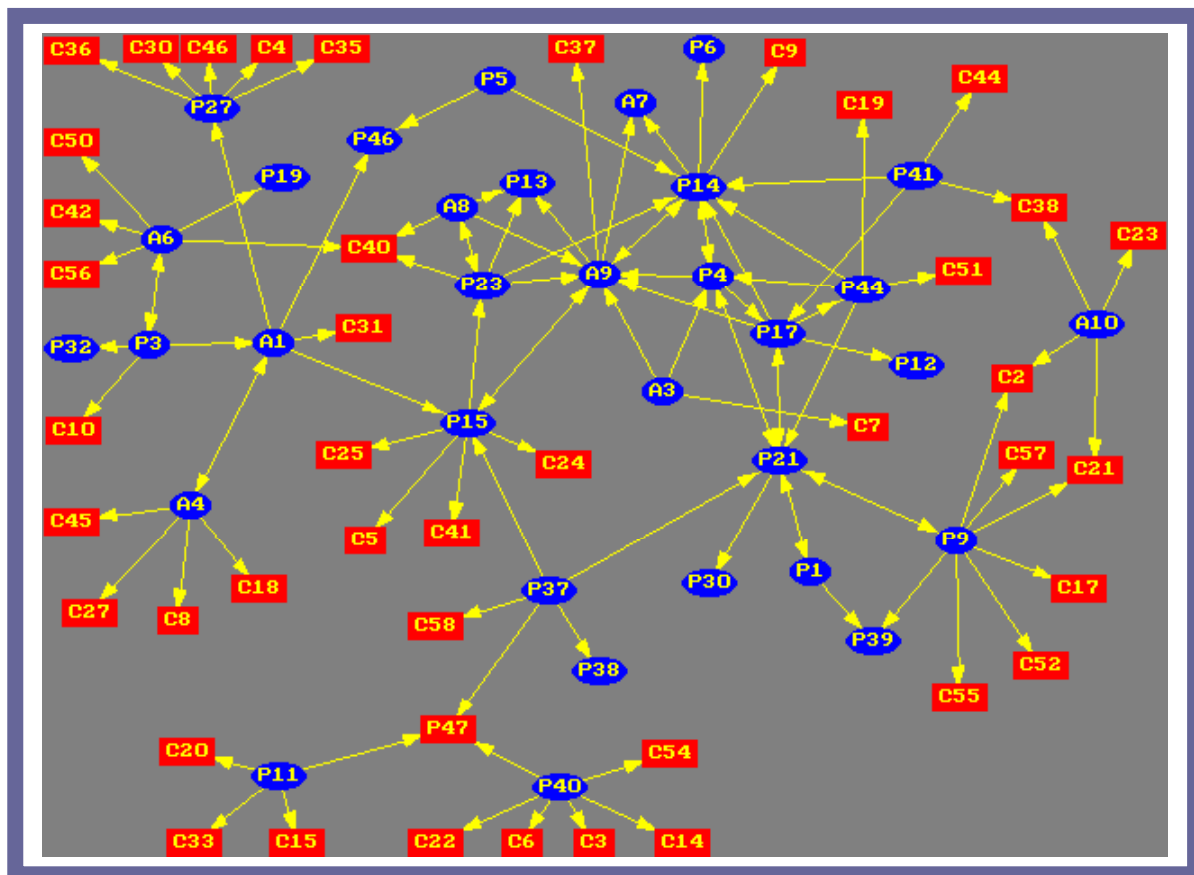


Understanding Sociograms ©

A Guide to Understanding Network Analysis Mapping

Developed for Clients of:
Durland Consulting, Inc.
Elburn, IL



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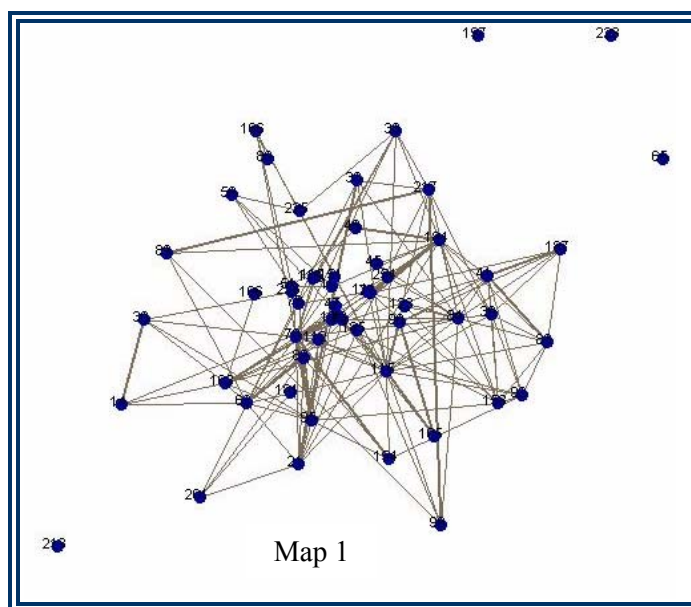
Understanding Sociograms

Sociograms, or maps, are graphic pictures, or images, of a kind of relationship. Sociograms are illustrations of a relationship at a point in time.

Each shape (*node*) indicates an individual, group, organization, nation, etc. Each line indicates a connection. The connections can have strength (color or width of line) and direction - which individual(s) indicated the communication (arrows). In **Map 1**, there are no arrows, so the direction of the communication was not important. The strength of the relationship is indicated by the wider lines, such as between the two individuals on the far left, person 1 and the individual above them.

Map 1 is a communication map for a subgroup, there are four individuals who are not connected to anyone else in their group; they are *isolates*.

To begin the process, Network measures are calculated using mathematical formulas based on a definition about the relationship. For example, degree centrality is calculated as a measure of popularity – a frequency count. However, betweenness centrality is calculated as a measure of how many times a *node* lies between all other pairs of *nodes*. For communication networks, a popular person may not be the same person who is connected behind the scenes and who may be a gatekeeper or a facilitator for the network.



Next, the data is then imported into another computer program to create sociograms or maps. The maps in this document were created with the programs NETMINER (both data analysis and visualization) or Krackplot. Each visualization program uses unique algorithms to align the maps with the network measures; this is an area in various stages of development and application

Sociograms are a tool that can then be used along with other network measures, to understand and evaluate a relationship within the context of a particular situation, such as work teams, restructuring or company mergers.

Another example of a relationship is the availability and spread of leadership throughout a network, another is the overall level of communication around a specific focus or initiative. Another might be the identification of cohesive sub groups, such as teams. Another might be the identification of areas in the network that seem to be very strong and those that are not as strongly connected. This short guide will introduce sociograms, a few of the important characteristics of sociograms and will provide a framework for thinking about the sociograms created specifically for your organization by Durland Consulting.

Organizational Applications

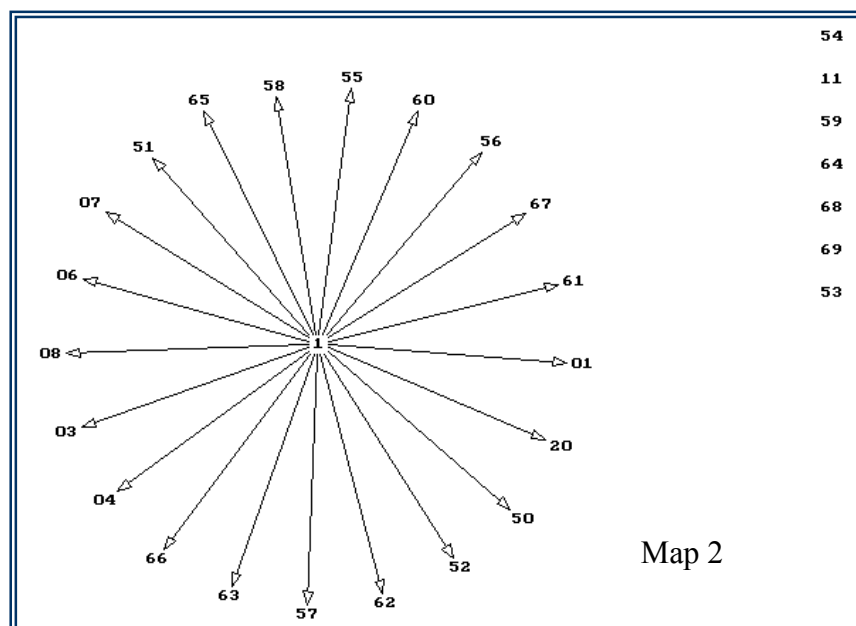
Sociograms and network analysis data are important organizational tools because they can provide a framework for clarifying other available data within the context of organizational capacity. Maps and network data illustrate the capacity of an organization to achieve goals. They can provide a diagnostic tool, a baseline measure, or a framework for replication. Sociograms highlight both strengths and weaknesses within an organizational structure. These tools can illustrate the alignment of the actual organization's structure with the theorized structure based on the assumptions required to attain defined goals.

Sociograms provide a picture of the general pattern of communication or relationship studied, but this general pattern should be evaluated within the context of the major questions that are being asked and other relevant data. Usually, no one characteristic is more critical than any other. Social network data, sociogram mapping and other data fit together to tell a total story about a network.

Components

Components indicate the overall connectedness of a network. Connectedness is an indication of how easily everyone can be reached, if you are studying people. Connectedness describes large subgroups within the larger network. Connectedness indicates major breaks or divisions in the network. Each *isolate* – individual or object that stands alone - is a component. If you have a communication network, components tell you how easy it is to get information through the network. For each component, theoretically a message could be given to one member and in some way it would get to all the members.

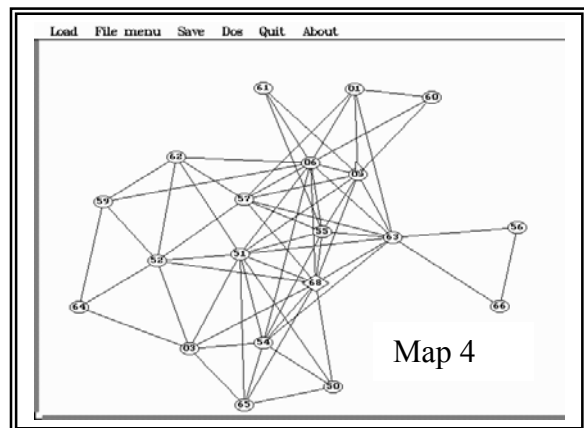
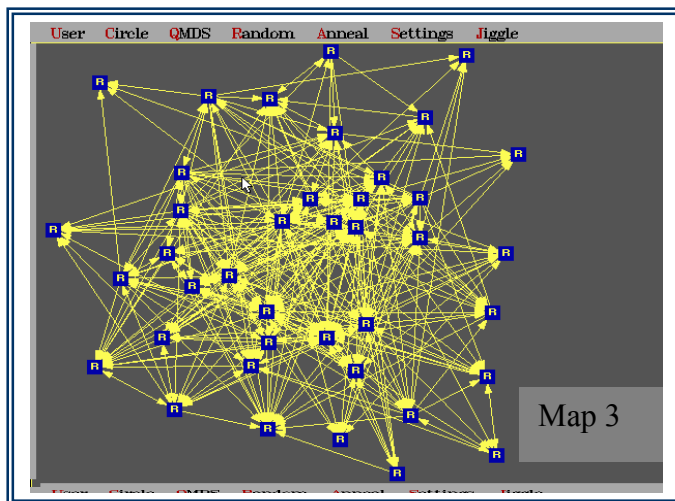
Map 2 has *isolates* along the right side, 54,11,59,64,68,69, and 53 and one large *component* (1). The arrows moving out from the 1, define the members of component 1. **Map 2** is a map of the components of a network, and not of the individual connections from *node* to *node* as in **Map 1**.



The network of **Map 3** illustrates an organization that seems to be somewhat tightly connected. Most individuals are linked to others in multiple ways. There are also two distinct core groups. However, the overall network is linked together and has a “webbed” look. In this organization, there are no isolates.

Bridges and Cutpoints

Bridges and *Cutpoints* illustrate where there are potential breaks in the network paths. *Bridges* or *Cutpoints* may indicate weak links, which may indicate barriers, or they might be between individuals who facilitate communication or the relationship that is studied. *Bridges* are the lines of connection, *cutpoints* are the nodes.



Bridges and *Cutpoints* are two characteristics that indicate how strong or how weak the overall network paths are.

If many individuals can be disconnected from the overall network with the removal of one cut point or bridge, then the overall connection is very weak.

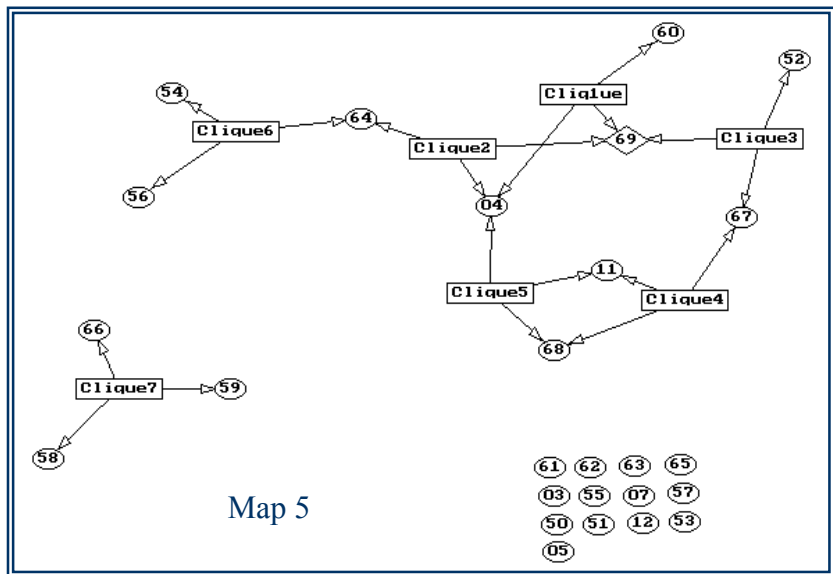
Individual number 63 is a *cutpoint* in **Map 4** and if removed from the network then Individuals 56 and 66 would be disconnected.

Cutpoints and *bridges* are important for locating individuals who may be helpful for increasing the strength of the network. Even without knowing the individuals, knowing that the network tends to form loosely linked subgroups would facilitate in planning how to develop and enhance communication processes and procedures. Often these weak links are keys to bonding networks.

Cliques

Cliques are smaller subsets of a larger network. *Cliques* are defined as three or more the members of the network that have mutually reciprocated connections. The size of the *clique* indicates how many members are within the *clique*. In **Map 5**, there are seven *cliques*. This map illustrates the *clique* co-membership –individuals membership across all *cliques*. The *cliques* are numbered rectangles, and the individuals in a *clique* are ovals. The lines extending from the *clique* indicates the number of individuals in that specific *clique*. There are also numerous *isolates* in **Map 5**, in bottom right. These individuals may have other connections, but are not members of a *clique*. Clique 7 has three members, who only have membership in this one clique. Person 64 is a member of two cliques. Persons 04 and 69 are members of three cliques.

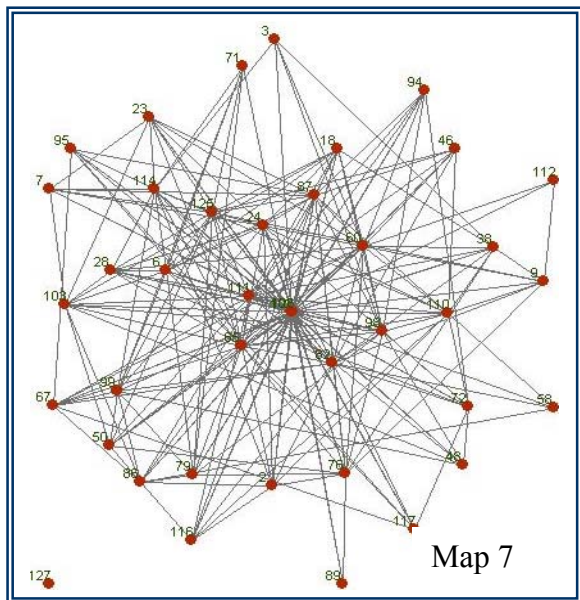
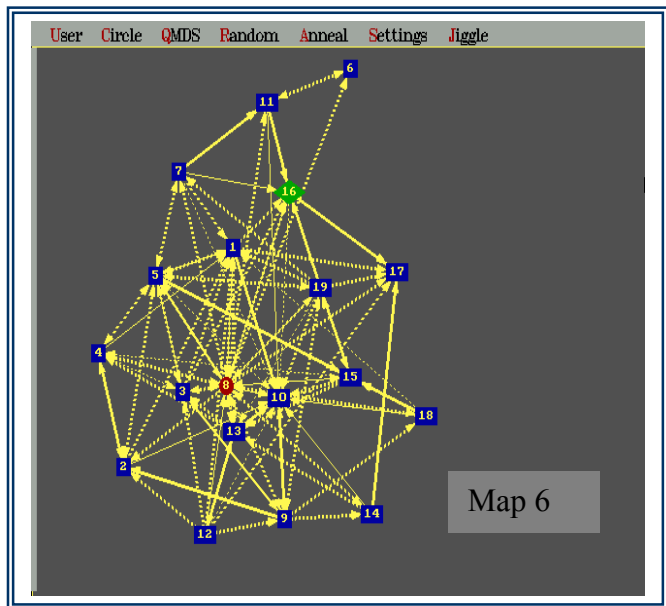
The networks illustrated in *Understanding Sociograms* are communication networks within organizations, but the same analyzes and descriptions of connection apply to any defined relationship such as countries, citations, trade relationships, Internet site visits, and so on.



In network analysis, decisions are made about the theory that describes the network relationship (communication, trade, leadership, teaming, etc.), and at what level to study the relationship – at the group level, sub group, or individual or all three.

Two other maps are illustrated here. **Map 6** on the left illustrates an organization where the most “popular” individuals are indicated in red and green, depending on their role. The green diamond is an individual in a key leadership position.

The line patterns indicate the strength of the relationship and there are arrows, so the connections are directional. **Map 7** illustrates a preliminary map layout for an organization. Notice the central individual in the middle of the map and the one isolate on the bottom left.



If you would like more information about social network analysis and/or understanding the organizational and structural dynamics of your organization, please contact:

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