

MAP: A Computer Program for Collecting Network Data

Linton C. Freeman

Institute for Mathematical Behavioral Sciences, University of California, Irvine

Data on the social network linking individuals in a community have traditionally been collected by using Moreno's (1934) sociometric technique. Each subject simply reports the others with who he or she has a personal relationship of some sort. Then the overall structure is constructed by combining the individuals' responses.

Such a procedure is, of course, vulnerable to effects of individual variation in the tendency to generate names. If a subject reports many friends, we cannot judge whether that person is a community member who has many friends or is, as a subject, rather loose in the use of the word "friend." Similarly, one who reports very few friends may indeed be a community member who has few friends or she or he may be a subject who is reticent about the use of the term.

This problem led Krackhardt (1984) to introduce an alternative procedure for collecting data. In the Krackhardt procedure each subject is required to produce a Moreno-type list--not just for herself or himself--but for every member of the community. The analyst, then, is able to distinguish between differences between subject's tendencies to come up with names and community member's tendencies to be linked to others.

Downloading the Programs From INSNALIB

The **map.exe** program, together with BASIC source code and some accessory programs, are stored in a single, self-extracting archive file called **freemap.exe** in the **insnalib.192** directory. To download this file, follow this procedure (what you type is in **boldface**, what the computer responds is in *italics*):

```
ftp univscvm.csd.sc Carolina.edu  
USER: anonymous  
>cd \insnalib.192  
>binary  
>get freemap.exe  
>quit
```

To unpack the archive, type **freemap** at your DOS prompt. This will release all the files in the archive.

Several investigators have come up with other procedures that are also able to sort out these two effects. Cairns, Perrin and Cairns (1985) asked subjects to produce free lists of the names of community members who "hang around together." Thus, as in the Krackhardt procedure, each subject produces a report on the whole community.

Freeman, Freeman and Michaelson (1988) generated the same sort of information about the total community by using a successive pile sort procedure. Subjects were provided with a deck of cards, each of which named a community member. Subjects were asked to sort the cards into piles within which everyone was "socially very close." Then, they were asked to relax the criterion of closeness and to merge piles. This merging was repeated until the subject was unwilling to go any further.

Boster (1986, 1987) used another form of the successive pile sort that generated a complete tree. Subjects began as in the Freeman, Freeman and Michaelson task. Then they were required to merge exactly two piles, and this merging is repeated again and again until all the cards are in a single pile. Then subjects return to their original split and they are required to split exactly one pile, and this is repeated again and again until each card is in a separate pile.

Each of these post-Moreno procedures undoubtedly has its own strengths and weaknesses. Comparative research on their properties is just beginning (Marsden, 1990). But, it is clear from the outset that all of them produce more and richer data than that produced by the original sociometric test.

This experiment is concerned with how individuals think about social patterns. You will be presented with a screen. Several people you know will be listed on the right. Each is identified by a letter, like "F". On the left, is a blank screen. You use the arrow keys to move the cursor around. First move to a person's letter, and hit G to grab it. Then move it to some spot on the screen and hit D to drop it. Locate all the people anywhere you want on the screen--the rule is simple. If a bunch of people seem to be socially close--if they appear to like one another--put them close together on the screen; people who seem to be less close socially should be located farther apart on the screen. Once you drop a person's letter, you can always go back and grab it again using G. Move it to where you want it then use D to drop it. When you are satisfied that all the people are arranged in a pattern that reflects the patterning of who is socially close to whom, just hit the key marked "ESC" to finish.

Hit any key to continue..

Figure 1. *The Instructional Screen*

The present paper is designed to introduce still another alternative to the Moreno procedure--one that generates even richer and more detailed data than that produced by the other new techniques. This new procedure comes in the form of an interactive micro-computer program called MAP.¹

MAP was developed from an idea originally proposed by David Morgan². It is designed to collect subjects' perceptions of the total social network linking members of the community in which they are embedded. MAP performs three tasks: (1) it prepares the subject for the task, (2) it presents the names of community members as stimuli and (3) it records detailed data about subjects' responses to those stimuli.

When MAP is run, it seeks a file called "COUNT." COUNT contains a numeral, like 1 or 14. MAP reads that numeral, augments it by 1 and writes the result back in the COUNT file. Then the numeral read from COUNT is used as a name to identify the file of the subject being run.

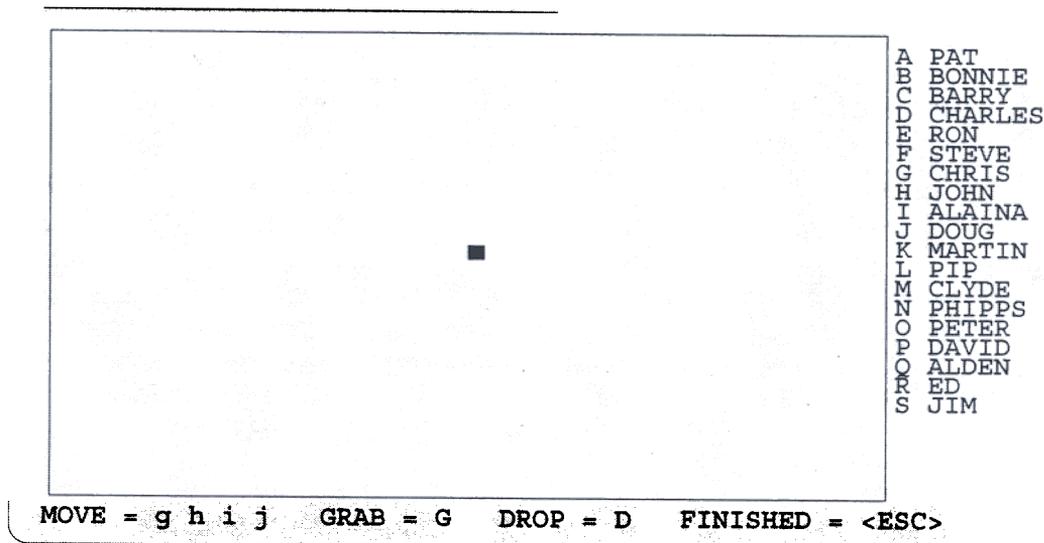


Figure 2. Initial program screen.

To prepare the subject, MAP reads a file called "INTRO." INTRO contains one or more pages of instructions that are presented to the subject. Figure 1 is an example of instructional material. Then, when the subject strikes any key, a file called "NAMES" containing a list of stimulus materials is read. That list is permuted into random order and presented to the subject

¹The MAP program was written in Q-Basic and compiled to run under DOS. It is available via anonymous FTP from the INSNALIB Electronic Library (see sidebar on previous page). For questions regarding use of the program, write the author directly at the School of Social Sciences, University of California, Irvine, CA 92717, phone at (714) 856-6698 or — best of all — send e-mail to lin@aris.ss.uci.edu.

²Personal communication.

on the right side of the screen. A square work area is framed on the left of the screen and the cursor is displayed prominently in the center of that area. All the keys except those listed at the bottom of the screen, g, h, i, j, G, D, and <ESC> are turned off. Striking any other key produces a BEEP sound but has no other effect. This working screen is shown in Figure 2.

Recording of data in the subject's file begins when the subject moves the cursor so that it covers the letter associated with a stimulus name and hits the G key. At that point, the label for the stimulus dims and a copy of that stimulus letter becomes locked to the cursor. The name chosen and the time at which the choice was made are both recorded in the subject's file.

The letter that is locked to the cursor is moved with each use of an arrow key. It will follow the cursor movement until it is dropped by pressing the D key. At that time, the cursor is freed, and the time and the location are recorded in the subject's file.

The most important feature of the MAP method is the detail of the data it records. When a subject completes the task, the result is a record of that subject's impression of the entire community. It comes in the form of a two dimensional Euclidean map that provides an index of that subject's judgments of the distances between each pair of people in the community. That map more or less automatically displays subgroups, cores and peripheries and bridging roles among community members. An example — involving hypothetical data — is shown in Figure 3.

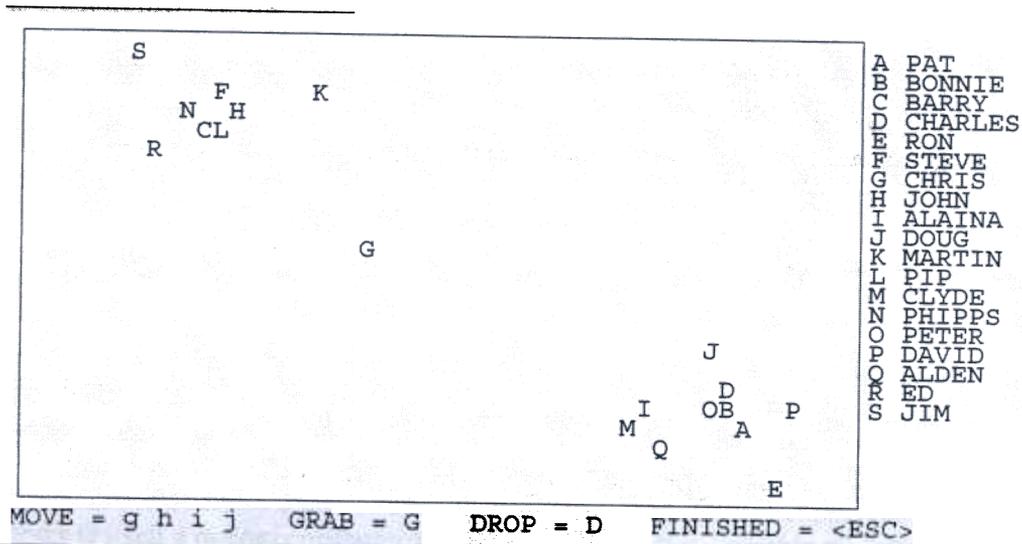


Figure 3. A possible outcome screen.

In addition to the Euclidean distances, the MAP procedure yields a great deal of information about timing and sequencing in the process of placing names on the screen. First of all, it provides a record of the order in which names are chosen by the subject. This permits analysis of a subject's tendency to pick up particular names early or late in the process and to pick up any particular collection of names close together in sequence or to space them further apart (Brewer, 1993).

Furthermore, MAP provides various indices to the ease or difficulty the subject has in handling any particular name. If a name was placed in one spot and never relocated it was probably easy to place. If, on the other hand, a name was moved again and again it was likely to have been difficult to place. MAP records information on when and the number of times each point was relocated. And it records where it was placed each time, so the analyst can determine its neighbors in each setting. In addition, MAP records precise information on the subject's timing in picking up each new name up as well as in placing that name down in its chosen location. If some names are placed quickly, while others require extended time, the analyst again has useful information on the ease or difficulty in placing particular names in the space.

Overall, then, as compared with other techniques of data collection, the MAP procedure produces richer and more detailed data about the subjects' behavior with respect to the full set of community members.

References

Brewer, Devon D. 1993 Patterns in the recall of persons in a student community. *Social Networks* 15: 5- 59.

Boster, James. 1986 Can individuals recapitulate the evolutionary development of color lexicons? *Ethnology* 25:61-74.

Boster, James. 1987 Agreement between biological classification systems is not dependent on cultural transmission. *American Anthropologist* 88:429-4 6.

Cairns, Robert B., Jane E. Perrin and Beverly D. Cairns 1985 Social structure and social cognition in early adolescence: Affiliative patterns. *Journal of Early Adolescence* 5: 9- 55.

Freeman, Linton C., Sue C. Freeman and Alaina G. Michaelson 1988 On human social intelligence. *Journal of Social and Biological Structures* 11:415-425.

Krackhardt, David 1984 *A social network analysis of the effects of employee turnover: A longitudinal field study*. PhD Thesis, University of California, Irvine.

Marsden, Peter 1990 Network data and measurement. *Annual Review of Sociology* 16:4 5-46

Moreno, Jacob L. 1943 *Who Shall Survive?* Washington, DC: Nervous and Mental Disease Publishing Company.