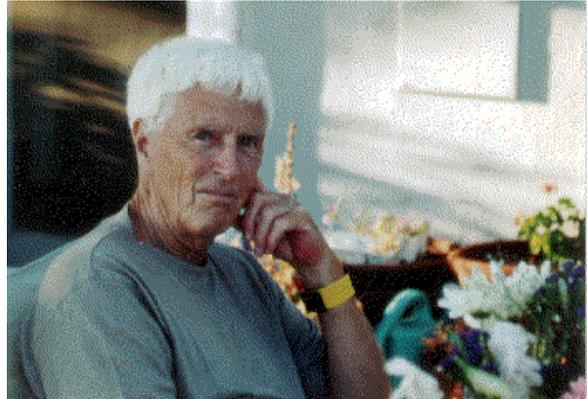# Some Antecedents of Social Network Analysis[1]

Linton C. Freeman
University of California, Irvine

Writers often suggest that modern social network analysis began with the publication in 1934 of Jacob L. Moreno's pioneering book on sociometry, *Who Shall Survive?* (Alba, 1982; Freeman, 1989, p.17; Wasserman and Faust, 1994, p. 12; Degenne and Forsé, 1994, p. 31).[2] The purpose of the present note is to show that, before 1934 when his book was published, there were antecedents for both Moreno's own ideas and for a great many of the more recent ideas of social network analysis.

My aim here is not to belittle the tremendous impact of Moreno's work on our field, but only to suggest that several others—people working primarily in educational and developmental psychology—deserve credit for the origination of many of the ideas and methods we now use in network analysis. I will review six of these pre-1934 innovative contributions here:

1. **Almack, J. C. 1922. The influence of intelligence on the selection of associates. *School and Society*, 16:529-530.**

In 1922—even before Moreno started thinking about his method—John Almack, a professor at Stanford, published a paper that anticipated the development of the sociometric instrument. Almack asked children, grades 4 to 7, in a California school to answer a series of questions about those with whom they would like to work and those with whom they would like to play. One question, for example, was, "If you had a party, which boy from your class would you invite?" Almack tabulated chooser-chosen pairs and then ran correlations between the I.Q.'s of pairs and examined the still-current hypothesis that choices are homophilous.

---

[1] I am grateful to Devon Brewer who first called my attention to the structuralist line of research in developmental and educational psychology.

[2] Wasserman and Faust also indicated that Moreno introduced the essential ideas behind sociometry publicly a year earlier at a medical convention. And Degenne and Forsé pointed out that in the preface to the French language edition of his book (*Fondements de la sociométrie*, 1954), Moreno wrote that he had begun work on the sociometric perspective in 1923.

2. Wellman, B. 1926. The school child's choice of companions. *Journal of Educational Research*, 14:126-132.

Like Almack, Beth Wellman focused on homophilous choices among pairs of individuals. But while Almack depended on reports of choices, Wellman recorded those pairs of individuals whom she had observed as being together frequently. Thus her approach anticipated the kind of observational techniques later used by Roethlisberger and Dickson (1939) and by Davis, Gardner and Gardner (1941).

She studied 63 boys and 50 girls who were enrolled in junior high in the Lincoln School, run by Teachers College, Columbia University. Over a period of five months, she went to different places around the school and recorded who she could observe interacting with whom during periods of free activity. She also collected trait data; for each child she recorded height, school grades, I.Q., performance on a test of physical coordination and position on a teacher's rating scale of introversion-extroversion. Wellman studied homophily with respect to all of these traits.

3. Chevaleva-Janovskaja, E. 1927. Groupements spontanés d'enfants à l'age préscolaire. *Archives de Psychologie*, 20:219-223.

Eugénie Chevaleva-Janovskaja designed the first large scale observation-based study of group structure. She developed a program in which preschool teachers in Odessa were taught how systematically to observe children's tendencies to get together to interact. Teachers were provided with a list of 19 items that specified what and how to observe.

The items were designed to guide observation and to standardize what was to be recorded and how. They were distributed to teachers and data were collected on 888 groups involving 276 children. Chevaleva-Janovskaja studied the impact of age on group formation, and the extent to which the groups were homogeneous with respect to both age and sex.

4. Bott, H. 1928. Observation of play activities in a nursery school. *Genetic Psychology Monographs*, 4:44-88.

Helen Bott's work was the precursor for a great deal of contemporary work in social networks. She studied children in a preschool attached to the University of Toronto. She began as an ethnographer might and sought to uncover any forms of behavior that recurred regularly among the children. She uncovered five such forms: (1) talked to another, (2) interfered with another, (3) watched another, (4) imitated another, and (5) cooperated with another.

Bott set about the task of systematic observation of these behavioral forms. Each day one child was designated as "focal" and all observations were centered on that child and his or her partners. In this approach Bott anticipated Smith (1931) who was the earliest user of focal sampling found by Altman (1974) in her exhaustive review of observational sampling methods. In any case, Bott tallied every instance of each form of behavior, along with information on which other child was the target of that behavior.

As Freeman and Wellman (1995) reported earlier, Helen Bott's approach anticipated that of Forsyth and Katz (1946) by organizing data into matrices. And it anticipated the work of Moreno (1934) by discussing the results in terms of kinds of interpersonal linkages.

5. **Hubbard, R. M. 1929. A method of studying spontaneous group formation. In *Some New Techniques for Studying Social Behavior.* Dorothy Swaine Thomas, ed. Pp. 76-85. New York: Teachers College, Columbia University, Child Development Monographs.**

Ruth Hubbard pioneered in the study of techniques for observing interaction. She systematically examined inter-observer reliability in recording patterns of who interacted with whom among a collection of 18 preschool children.

6. **Hagman, E. P. 1933. The companionships of preschool children. *University of Iowa Studies in Child Welfare.* 7:10-69.**

Elizabeth Hagman anticipated the Bernard-Killworth-Sailer (Killworth and Bernard, 1976, 1979; Bernard and Killworth, 1979; Bernard, Killworth and Sailer, 1980, 1981, 1982) approach to the study of informant accuracy by more than 40 years. She first observed interaction frequencies—who played with whom—repeatedly over a school term. Then she interviewed her subjects and asked them to recall their playmates of today, those with whom they played yesterday and those with whom they played at the beginning of the school term.

These six studies provided models for a great deal of subsequent research in educational and developmental psychology. This tradition of research into children's networks is maintained to this day (Liddell and Kruger, 1989; Nabuzoka and Smith, 1993; Newcomb and Bagwell, 1995). And at least since the 1940's, psychologists studying these networks have recognized, and cited, related research in sociometry. But those of us who come from the sociometric tradition seem to be pretty much unaware of this parallel line of work; at least we seldom cite psychologists working in this tradition. The unfortunate consequence of this ignorance is that we have had to re-invent many of the ideas and tools that had already been introduced and adopted in developmental and educational psychology.

References

Alba, R. D. 1982. Taking stock of network analysis: a decade's results. *Research in the Sociology of Organizations* 1:39-74.

Almack, J. C. 1922. The influence of intelligence on the selection of associates. *School and Society*, 16:529-530. Altmann, J. 1974. Observational study of behavior: Sampling methods. *Behaviour* 49:227-267.

Bernard, H. R. and P. D. Killworth. 1979. Informant accuracy in social network data II. *Human Communication Research* 4:3-18.

Bernard, H. R., P. D. Killworth, and L. Sailer. 1980. Informant accuracy in social network research IV: A comparison of clique-level structure in behavioral and cognitive data. *Social Networks* 2:191-218.

Bernard, H. R., P. D. Killworth and L. Sailer. 1981. A review of informant accuracy in social network data. In *Modelle für Ausbreitungsprozesse in Socialen Strukturen.* H. J. Hummell and W. Sodeur, eds. Pp. 153-186. Duisberg, FRG: Sozialwissenschaftlichen Kooperative.

Bernard, H. R., P.D. Killworth and L. Sailer. 1982. Informant accuracy in social-network data V: An experimental attempt to predict actual communication from recall data. *Social Science Research* 11:30-66.

Bott, H. 1928. Observation of play activities in a nursery school. *Genetic Psychology Monographs*, 4:44-88.

Chevaleva-Janovskaja, E. 1927. Groupements spontanés d'enfants à l'age préscolaire. *Archives de Psychologie*, 20:219-223.

Davis, A., B. B. Gardner and M. R. Gardner. 1941. *Deep South.* Chicago: The University of Chicago Press.

Degenne, A. and M. Forsé. 1994. *Les Réseaux Sociaux.* Paris: Armand Colin.

Forsyth, E. and L. Katz. 1946. A matrix approach to the analysis of sociometric data. *Sociometry* 9:340-347.

Freeman, L. C. 1989. Network representations. In *Research Methods in Social Network Analysis.* L. C. Freeman, D. R. White and A. K. Romney, eds. Pp. 11-40. Fairfax, VA: George Mason University Press.

Freeman, L. C. and B. Wellman. 1995. A note on the ancestral Toronto home of social network analysis. *Connections* 18: 15-19.

Hagman, E. P. 1933. The companionships of preschool children. *University of Iowa Studies in Child Welfare.* 7:10-69.

Hubbard, R. M. 1929. A method of studying spontaneous group formation. In *Some New Techniques for Studying Social Behavior.* Dorothy Swaine Thomas, ed. Pp. 76-85. New York: Teachers College, Columbia University, Child Development Monographs.

Killworth, P. D. and H. R. Bernard. 1976. Informant accuracy in social network data. *Human Organization* 35:269-286.

Killworth, P. D. and H. R. Bernard. 1979. Informant accuracy in social network data III: A comparison of triadic structures in behavioral and cognitive data. *Social Networks* 2:19-46.

Liddell, C. And P. Kruger. 1989. Activity and social behaviour in a crowded South African township nursery—a follow-up study on the effects of crowding at home. *Merrill-Parmer Quarterly-Journal of Developmental Psychology* 35:209-226.

Moreno, J. L. 1934. *Who Shall Survive?* Washington, DC: Nervous and Mental Disease Publishing Company.

Nabuzoka, D. and P. K. Smith. 1993. Sociometric status and social behavior of children with and without learning difficulties. *Journal of Child Psychology & Psychiatry & Allied Disciplines* 34:1435-1448.

Newcomb, A. F. and C. L. Bagwell. 1995. Children's friendship relations—a meta-analytic review. *Psychological Bulletin* 117:306-347.

Roethlisberger, F. J. and W. J. Dickson. 1939. *Management and the Worker.* Cambridge, MA: Harvard University Press.

Smith, M. 1931. *A Study of the Unsupervised Behavior of a Group of Institutionalized Children.* Nashville: Marshall & Bruce Co.

Wasserman, S. and K. Faust. 1994. *Social Network Analysis: Methods and Applications.* Cambridge: Cambridge University Press.

Wellman, B. 1926. The school child's choice of companions. *Journal of Educational Research*, 14:126-132.

Social Network Analysis - Mapping growth of a NetworkDocuments. Social Network Analysis Encyclopedia Entry - BEBR Home Reports/sna · Social Network Analysis ...…Documents. Social Network Analysis of company social networksTechnology. CS190 Part 2: The Social Web - eugene/cs190/lectures/april9-osn1.pdfIndex •Introduction to Social Network •Social Network and KMS •Social Network Analysis •Application of Social Network Analysis •Technology –LinkedInDocuments. Some Antecedents of Social Network AnalysisDocuments. Canada as Social Structure Social Network Analysis and as Social Structure: Social Network Analysis and Canadian Sociology SOCIAL NETWORK ANALYSIS AND CANADIAN SOCIOLOGY.Documents. Some Antecedents of Social Network Analysis (Freeman) – A free PowerPoint PPT presentation (displayed as a Flash slide show) on PowerShow.com - id: 18f48-ZjBIZ. Network analysis allows us to examine how the configuration of networks influences how individuals and groups, organizations, or systems function. 4 Network Analysis. It can be applied across disciplinesthere are social networks, political networks, electrical networks, transportation networks, and so on. 5 History of (Social) Network Analysis. First, lets discuss the history of network analysis, to give an idea of what sorts of questions can be posed. Then, well discuss some basic concepts. Much early research in network analysis is found in educational psychology, and studies of child develo