

## **Network Theory and Data**

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A great deal of recent interest has centered on the extent to which there are universal organizing principles in networks including, for example, the world wide web, cells, proteins, genes, food webs, and human societies. However, although network data of various kinds are becoming increasingly available, to date there has been a reliance on a relatively small number of network data sets in investigating the possible empirical consequences of such principles. Additionally, sufficient numbers, or replicates, of specific types of networks are required in comparative analysis to be able to adequately address issues of degrees of freedom and better assessments of theoretical assertions. It is common in social network-oriented research to use single case study design or simply a single static network. Thus, a single case social network (an organization) at one point in time would be studied in an attempt to test some theoretical proposition relating an aspect of network structure to some outcome (or visa versa), a fundamentally macro level problem. But the ability of the single case study to provide an adequate test must be called into question, thus impeding our ability to both develop and validate macro level theories in the study of social networks and to discover potential underlying organizing principles of human networks more generally. This talk discusses the importance of developing a comparative network approach to aid in both the development and testing of social network theories. In addition, the importance of network data (e.g. reliability, validity, robustness, primary, secondary) in valid tests of theories and models is examined. Several examples are provided that illustrate the importance of various types of comparative forms in the development of theory including comparative experimental, comparisons of experimental tests with real world tests, dynamic comparisons and cross-cultural comparisons.