Mapping the structure of perceptions in helping networks of Alaska Natives

Hsuan-Wei Lee[ID][1]*, Miranda Melson[1], Jerreed Ivanich[ID][1], Patrick Habecker[1], G. Robin Gauthier[1], Lisa Wexler[2], Bilal Khan[1], Kirk Dombrowski[1]

1 Department of Sociology, University of Nebraska, Lincoln, NE, United States of America, **2** Community Health Education, University of Massachusetts, Amherst, MA, United States of America

* hlee21@unl.edu

Abstract

This paper introduces a new method for acquiring and interpreting data on cognitive (or perceptual) networks. The proposed method involves the collection of multiple reports on randomly chosen pairs of individuals, and statistical means for aggregating these reports into data of conventional sociometric form. We refer to the method as "perceptual tomography" to emphasize that it aggregates multiple 3rd-party data on the *perceived* presence or absence of individual properties and pairwise relationships. Key features of the method include its low respondent burden, flexible interpretation, as well as its ability to find "robust intransitive" ties in the form of perceived *non*-edges. This latter feature, in turn, allows for the application of conventional balance clustering routines to perceptual tomography data. In what follows, we will describe both the method and an example of the implementation of the method from a recent community study among Alaska Natives. Interview data from 170 community residents is used to ascribe 4446 perceived relationships (2146 perceived edges, 2300 perceived non-edges) among 393 community members, and to assert the perceived presence (or absence) of 16 community-oriented helping behaviors to each individual in the community. Using balance theory-based partitioning of the perceptual network, we show that people in the community perceive distinct helping roles as structural associations among community members. The fact that role classes can be detected in network renderings of "tomographic" perceptual information lends support to the suggestion that this method is capable of producing meaningful new kinds of data about perceptual networks.

Introduction

The way that people are classified into relational groups by knowledgeable outsiders has its own reality, a reality that says as much about where these outsiders perceive social fault lines to lie as it does the presence or absence of particular relationships [1]. In this article we present a strategy to recover some of the "heuristics" [2] people implicitly use to classify the relationships of others in their community via perceptual tomography—multiple reports on the presence or absence of social ties between randomly selected pairs of actors in a community. Following Krackhardt, such approaches are commonly referred to as cognitive social structures [3].

58. Mrvar A, Doreian P. Partitioning signed networks using constraints.; 2015. Available from: http://mrvar.fdv.uni-lj.si/pajek/SignedNetworks/UsingConstraints.pdf.

59. De Nooy W, Mrvar A, Batagelj V. Exploratory social network analysis with Pajek.; 2011.

60. Batagelj V, Mrvar A. Pajek manual 4.10.; 2016.

61. Simmel G. The number of members as determining the sociological form of the group. I. American Journal of Sociology. 1902; 8(1):1–46. https://doi.org/10.1086/211115

62. van Rijsewijk L, Dijkstra JK, Pattiselanno K, Steglich C, Veenstra R. Who helps whom? Investigating the development of adolescent prosocial relationships. Developmental psychology. 2016; 52(6):894. https://doi.org/10.1037/dev0000106 PMID: 27228450

63. Centola D, Gonzalez-Avella JC, Eguiluz VM, San Miguel M. Homophily, cultural drift, and the co-evolution of cultural groups. Journal of Conflict Resolution. 2007; 51(6):905–929. https://doi.org/10.1177/0022002707307632

64. Long JS, Freese J. Regression models for categorical dependent variables using Stata. Stata press; 2006.

65. Freeman L. The development of social network analysis. A Study in the Sociology of Science. 2004; 1.

66. Dombrowski K, Khan B, Moses J, Channell E, Dombrowski N. Network sampling of social divisions in a rural inuit community. Identities. 2014; 21(2):134–151. https://doi.org/10.1080/1070289X.2013.854718

67. Dombrowski K, Habecker P, Gauthier GR, Khan B, Moses J, Arzyutov DV, et al. Relocation Redux: Labrador Inuit Population Movements and Inequalities in the Land Claims Era. Current Anthropology. 2016; 57(6):000–000. https://doi.org/10.1086/689210