

Surveying data on connected personal networks

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ARTICLE INFO

Article history:

Available online 12 December 2013

Keywords:

Social network analysis
Snowball sampling
Name generator
Sampling bias
Cooperation rate
Data protection

ABSTRACT

This survey study combined name generators with snowball sampling to collect information on personal leisure networks and underlying “global” network structure. Although such an arrangement is not unusual, this large-scale study – with around 700 respondents – reported nearly 15,500 social contacts. Furthermore, snowball chains were limited to leisure contacts with no further limitation on collecting data or continuing recruitment.

While our methodological frame allowed analysis of both personal and global network structure within one data collection, it also included several sources of bias. To decrease bias, the study employed several especially designed mechanisms.

The paper examines both survey methodology and instrument in detail. It presents a methodology to survey personal network structures as well as characteristics of a population-wide leisure network structure. We discuss tools to decrease bias and statistics on their possible impacts, with rather surprising results. The paper closes with a discussion of data security issues and ethical considerations: important factors in projects using such methodologies. The Swiss Federal Data Protection and Information Commissioner evaluated this study, making this section particularly interesting for those planning similar projects.

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Introduction

Leisure travel and social network analysis

Leisure-oriented travel is an important travel segment in western societies, in both time and miles spent on these trips (ARE/BfS, 2007). However, explaining leisure travel is challenging because it is different from other forms of travel: it is strongly influenced by external factors like weather conditions and social contacts and thus sporadic, while other kinds of travel, e.g. commuting, are often driven by constant needs (Schlich et al., 2004). To investigate the influence of social contacts on leisure travel patterns, numerous studies in transport planning used social network analysis (SNA) methods in recent years. They identified leisure travel as being primarily undertaken to join others in leisure activities; it is also referred to as ‘social’ or ‘activity’ travel. In focusing mainly on network topology statistics (i.e., number of personal contacts, geographical distances between tied persons, and contact modes and frequencies used to maintain relationships), these projects confirmed SNA-methods productivity, producing new empirical insights and results (Larsen et al., 2006; Carrasco et al.,

2008; Silvis et al., 2006; Frei and Axhausen, 2007; den Berg et al., 2007). In addition, the projects offered insights into challenges in data collection and modeling (Frei and Axhausen, 2008; Hogan et al., 2007; Carrasco et al., 2008; Van den Berg et al., 2011). However, one issue was ignored by previous studies: topology of a population-wide ‘global’ leisure network. Information on this structure is needed to allow analyses on network structures underlying personal networks as well as an implementation of a ‘global’ leisure network in agent-based travel demand simulations.

The Institute for Transport Planning and Systems (IVT) of ETH Zurich and the Institute for Sea- and Land-Transport (ILS) of TU Berlin conducted a joint survey study between January 2009 and March 2011 to investigate this global leisure network topology. This paper introduces the survey in detail and thus aims to present a methodology to collect information on personal networks as well as a population-wide network structure. Section 2 discusses different methodological options to focus on global networks and describes the design chosen. Section 3 introduces the survey instrument and discusses selected features. Survey protocol, closely linked to bias-decreasing measures developed for this project, is presented in Section 4. Section 5 discusses issues of representativeness and presents some empirical findings. Relevant ethical and data protection issues are addressed in Section 5. Section 6 discusses issues of data analysis and inferences of survey results. Finally, conclusions are summarized in Section 7.

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Survey methodology, instrument and aspects of survey protocol were described in earlier papers and conference presentations, available at the Homepage of the Institute for Transport Planning and Systems (IVT) of ETH Zurich (Kowald et al., 2008b,c, 2009a,b,c, 2010, 2011; Kowald and Axhausen, 2010, 2012; Kowald, 2010; Axhausen, 2010; Kowald and Arentze, 2010). However, these papers presented preliminary results because the survey was still in the field when they were written. Furthermore, they focus on a few selected aspects, or discuss subjects in a broad overview. In contrast, this paper introduces all relevant methodological and fieldwork aspects and discusses them in relation to each other. Importantly, it was written after fieldwork was completed, with results based on the final sample.

Connected personal networks: survey methodology

The term 'social networks analysis' does not refer to one fixed method of collecting and analyzing data, but to a whole set of methods; an appropriate choice must be made according to project goals (Wasserman and Faust, 2007; Scott, 2007). Basically, SNA-methods allow focus on interacting actors, e.g. people, companies, or countries, and their ties at the same time; a tie is defined by whatever is circulating in the network, e.g. information, money, or simply willingness to spend free time together. So, explanations can consider actors' characteristics and their social environment.

One sees how social structures, emerging from interactions, provide both opportunities and constraints for actors' activities. For our survey study's aims, tools to collect two types of information were necessary: first, data on peoples' individual leisure network to replicate and enhance analyses from former studies and allow for comparisons and second, data on these individual network structures' embedded nature in a population-leisure relations network.

Social relationships cannot be sampled per se; SNA-methods suggest using samples of actors for observation or questions about their relationships (Knoke and Kuklinski, 1982). Leisure networks are normally developed over time, influenced by decisions like retaining or losing contact. These structures are individual; people can move physically and socially throughout their lives, relatively unfettered by institutional settings like companies, municipalities, or even national borders. Given these factors, the 'personal network approach' was used to survey leisure networks. It focuses on social environment, here in terms of leisure contacts, and allows a survey of information about representative population samples, which often facilitates generalization of survey results. The counterpart to surveying personal networks is the 'full network approach', where all actors and relations in an institutional setting are observed. This approach results in a comprehensive network structure picture and is only feasible for small populations (Marsden, 1990).

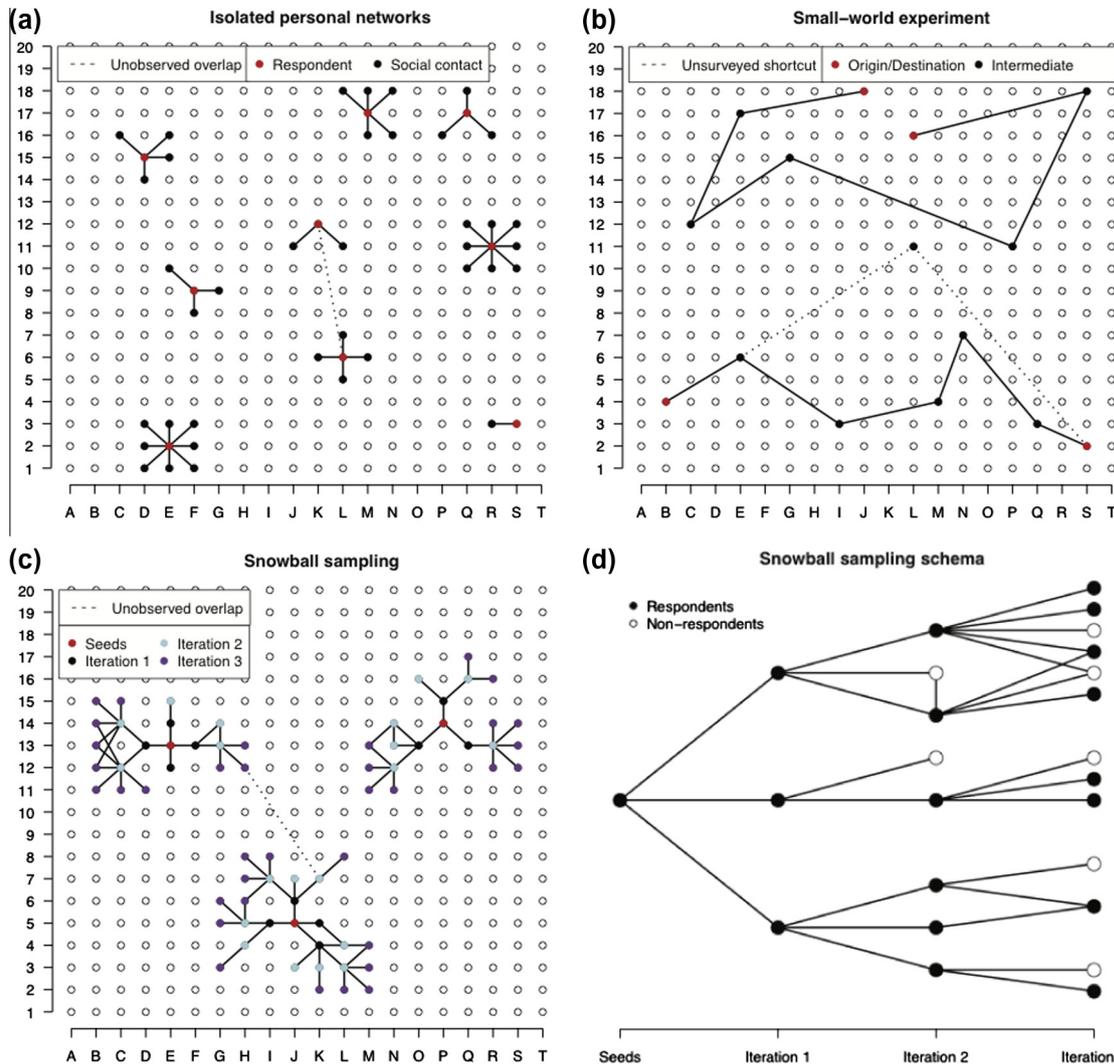


Fig. 1. Graph: (a) isolated personal networks in population; (b) population and small world; (c) population and snowball sampling; (d) schema snowball sampling.

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