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Exploratory Social Network Analysis with Pajek, Models and Methods in Social Network Analysis

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Joint Review

W. De Nooy, A. Mrvar and V. Batagelj

Exploratory Social Network Analysis with Pajek

Cambridge: Cambridge University Press, 2005, £50.00 hbk, £22.99 pbk (ISBN: 0 521 60262 9), xxvi+334 pp.

P.J. Carrington, J. Scott and S. Wasserman (eds)

Models and Methods in Social Network Analysis

Cambridge: Cambridge University Press, 2005, £40.00 hbk, £18.99 pbk (ISBN: 0 521 60097 9), xiv+329 pp.

■ **Reviewed by Nick Crossley, University of Manchester**

Social network analysis has yet to make the impact upon UK sociology that it has made in the US and certain European countries, notably France and Italy. A small UK-based study group has formed recently¹ but the formal methods of network analysis are not widely known or used. These methods are important and fascinating from a sociological point of view, however, because they afford the opportunity to empirically operationalize two of the key concepts in the sociological lexicon: social relations and social structure. Social structures, according to some definitions, consist of patterns of social relations between multiple concrete individuals, roles, positions, organizations etc; that is to say, social structures are social networks. Social network analysis is a set of techniques that allow one to visually map such networks, exploring their architecture and ascertaining their (mathematically defined) properties.

There have been many important advances in network analysis in recent years and the emergence of a number of excellent software packages has served to make state-of-the-art analytic and visualization techniques widely available and accessible. One such software package is *Pajek*, which was written by the Slovenian academics, Andrej Mrvar and Vladimir Batagelj. Named after the Slovenian word for spider and available to download free,² *Pajek* is one of the main packages used by contemporary social network analysts. Its strengths and weaknesses, relative to

other key packages, are discussed in one of the chapters of the Carrington et al. collection being reviewed here. Suffice it to say for present purposes, however, that its two key strengths are generally held to be its impressive visualization capabilities and its ability to handle very large datasets (the program can handle networks comprising several million nodes (or 'vertices')).

Exploratory Social Network Analysis with Pajek, co-written by Mrvar, Batagelj and Wouter de Nooy, is an introduction to both network analysis in general and to the *Pajek* package in particular. It is an excellent book for the beginner: clearly written, well presented, comprehensive and engaging. Most key concepts and applications are covered and all are illustrated by reference to important studies and examples. Moreover, the authors have gathered together a number of important datasets from the literature and made them available as free downloads from a website devoted to the book (the site also offers a beginners' version of the basic software, which corresponds exactly to the version of the package discussed in the book). Thus one can try out the various techniques explained in the book immediately, using 'real life' sociological datasets which are meaningful and which have been discussed, sometimes at length, in important published works. Lest the reader wants to begin immediately with their own data, moreover, the simple procedure for preparing and loading data files is also clearly explained.

The book is designed as a workbook. Each chapter contains both comprehension exercises and instructions for practical sessions. When concepts/techniques have been introduced and illustrated the authors explain how to implement them in *Pajek* and the expectation is that the reader will be sitting at a computer trying out what they are being told, as they read. To this end specific datasets (from the website) are identified for each application, and possible variations in on-screen presentation are discussed. Although the learning-by-doing format is increasingly common in methods books, and particularly quantitative method books, I have never come across one quite as engaging as this, or as easy. I was particularly impressed, on a practical level, by the authors' use of a shorthand system explaining how to implement specific analytic routines. They explain, in detailed longhand, how to obtain, in *Pajek*, the various measures and models that they are discussing (e.g. density, centrality measures, blockmodels, partitions) but they supplement this with easy shorthand guides, located in wide outside margins beside the text, which literally indicate 'which buttons to press'. This makes it very easy, when one finishes reading and starts playing, to follow the instructions and obtain the results.

The book does not venture into advanced territory. It is aimed at the beginner, although anyone wanting to get going with *Pajek* or to find out what the software is capable of will find it very helpful. It is also a practical book. The idea is to get the reader sitting at a computer exploring networks with the software. This is not the book to read if you want methodological or mathematical exposition and debate. Likewise, on occasion the authors offer brief introductions to sociological concepts that are potentially quite contentious, without unpacking or exploring them. In these respects the book is limited. But every book is limited and this one is extremely successful at what it sets out to do. Getting stuck into theoretical, methodological or mathematical debates would undoubtedly have detracted from

the aim of getting readers to do some network analysis, and it is arguable that readers are better placed to debate the theory etc. when they have taken this more practical first step.

The second book reviewed here, Carrington et al.'s *Models and Methods*, is also a very good book, but it is pitched at the opposite end of the spectrum. It is an edited collection focused on recent advances in social network analysis. Leading experts in the field offer, in most cases, detailed reviews of recent developments in those aspects of network analysis for which they are known. Thus there are discussions of sampling, of such key concepts as centrality, blockmodelling and diffusion, and there is a review of the major software packages. There are also interesting discussions of the uses of both correspondence analysis and multi-dimensional scaling for visualization and, in the former case, for analysis of affiliation networks. The standard of the chapters is variable. Some, such as Everett and Borgatti's discussion of centrality, seemed to me innovative, persuasive and well written. Others were less impressive. On the whole, however, the book succeeds in presenting a range of key developments within network analysis in a single volume.

Having said this, I was struck by three significant omissions. Firstly, with the exception of one very good chapter on longitudinal analysis and perhaps also the chapter on diffusion, the book does not have a great deal to say with respect to temporality and network dynamics. It is my impression that this is an up and coming area in network analysis and it would have been interesting to have heard a bit more about it. Secondly, I would like to have heard a little more about qualitative aspects of network analysis. Innovations in this area are admittedly thin on the ground, with the exception of some recent pioneering work by Harrison White and Ann Mische, but there are important questions about, for example, the meaning of relationships for those involved in them and the consequences of such meanings, which qualitative analysis can tap into. Social network analysis began life as a qualitative-quantitative mix, mathematical and yet ethnographically rooted, and it would have strengthened the volume if the possibility of resurrecting this mix had been contemplated. Finally, though this perhaps goes beyond the scope of the volume and would undoubtedly open up many a can of worms, I would like to have seen some discussion of the relationship of network analysis to broader debates in social theory. Some network analysts (Burt and White respectively), for example, have used their basis in network analysis to fashion an approach to social theory. Perhaps these could have been reviewed? Similarly, many network analysts describe themselves as 'structuralists'; perhaps this sense of 'structuralism' and the conception of social structure it hangs upon could have been discussed relative to other conceptions and senses? In addition, theoretical notions are sometimes smuggled into network analysis, often with a minimal level of qualification and discussion, in a problematic manner. The equation of 'structural equivalence' with 'role', for example, is deeply question begging but frequently glossed over. Perhaps this important volume was the place to address such theoretical claims? There would have been dangers in doing this. I am inclined to agree with Scott (2000), who argues that network analysis does not presuppose any one given sociological theory but rather can be used from a variety of perspectives. From this point of view reviews of the kind I am

suggesting may have risked fixing the methods of network analysis, unnecessarily, to one or another kind of theory. That would be counter-productive. And so too would wild and speculative theoretical discussion which had no direct bearing upon the doing of network analysis. But there are other dangers when the theory is evidently 'hanging around' and not being addressed critically or indeed when theoretical questions are being ignored. An imaginative chapter on theory and methods could have spelled out some of the issues without necessarily committing the method to any one single theoretical framework. Of course, one cannot address everything and in many respects the omissions in the book reflect omissions in the wider field of research. The book offers strong accounts of many key contemporary developments and thereby makes a very valuable contribution. My suggestion is that it could have sought to put a few neglected but important issues on the agenda too.

A final word should be made with the respect to the level at which the volume is pitched. It is variable but some of the papers presuppose a good familiarity with network analysis, statistics and mathematical modeling. I would not pass from the *Pajek* book straight to this book without first digesting, for example, John Scott's (2000) excellent *Social Network Analysis: A Handbook* and even perhaps Wasserman and Faust's (1994) lengthy *Social Network Analysis*, and I certainly did have to brush up on a little maths to make my way through a few chapters.

Notes

- 1 For details contact nick.crossley@manchester.ac.uk
- 2 <http://vlado.fmf.uni-lj.si/pub/networks/pajek/>

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- Scott, J. (2000) *Social Network Analysis: A Handbook*, 2nd edn. London: Sage.
Wasserman, S. and K. Faust (1994) *Social Network Analysis*. Cambridge: Cambridge University Press.