Multimodal Political Networks

Research on social networks has become a significant area of investigation in the social sciences, and social network concepts and tools are widely employed across many subfields within the field. This volume introduces political theorists and researchers to new theoretical, methodological, and substantive tools for extending political network research into new realms and revitalizing established domains. The authors synthesize new understandings of multimodal political networks, consisting of two or more types of social entities – voters, politicians, parties, events, organizations, nations – and the complex relations between them. They discuss ways to theorize about multimodal connections, methods for measuring and analyzing multimodal datasets, and how the results can reveal new insights into political structures and action. Several empirical applications demonstrate in great detail how multimodal analysts can detect and visualize political communities consisting of diverse social entities.

DAVID KNOKE is Professor of Sociology at the University of Minnesota.

MARIO DIANI is Professor of Sociology at the University of Trento.

JAMES HOLLWAY is Associate Professor of International Relations/ Political Science at the Graduate Institute, Geneva.

DIMITRIS CHRISTOPOULOS is Director of Research at the Edinburgh Business School and Associate Professor at MU Vienna.

STRUCTURAL ANALYSIS IN THE SOCIAL SCIENCES

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The series Structural Analysis in the Social Sciences presents studies that analyze social behavior and institutions by reference to relations among such concrete social entities as persons, organizations, and nations. Relational analysis contrasts on the one hand with reductionist methodological individualism and on the other with macro-level determinism, whether based on technology, material conditions, economic conflict, adaptive evolution, or functional imperatives. In this more intellectually flexible, structural middle ground, analysts situate actors and their relations in a variety of contexts. Since the series began in 1987, its authors have variously focused on small groups, history, culture, politics, kinship, aesthetics, economics, and complex organizations, creatively theorizing how these shape and in turn are shaped by social relations. Their style and methods have ranged widely, from intense, long-term ethnographic observation to highly abstract mathematical models. Their disciplinary affiliations have included history, anthropology, sociology, political science, business, economics, mathematics, and computer science. Some have made explicit use of social network analysis, including many of the cutting-edge and standard works of that approach, whereas others have kept formal analysis in the background and used "networks" as a fruitful orienting metaphor. All have in common a sophisticated and revealing approach that forcefully illuminates our complex social world.

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DAVID KNOKE
University of Minnesota

MARIO DIANI
University of Trento

JAMES HOLLWAY
Graduate Institute of International and Development Studies

DIMITRIS CHRISTOPOULOS
Heriot Watt University

CAMBRIDGE
UNIVERSITY PRESS

CAMBRIDGE
UNIVERSITY PRESS

University Printing House, Cambridge CB2 8BS, United Kingdom

One Liberty Plaza, 20th Floor, New York, NY 10006, USA

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Preface

In this book, we synthesize new understandings of multimodal political networks: what they are, how to measure and analyze them, and what they can reveal about political structures and actions. Multimodal networks consist of two or more types of social entities and the relations connecting them. Two broad categories of social entities are actors and objects. Actors have agency, that is, they have some capability to act and freely make choices among alternatives. Voters casting ballots for party candidates is a classic instance of political agency. Actors may be persons, groups, teams, organizations, institutions, nations, and other collectivities. Although actors create and use many objects – such as texts, information, events, photos and videos, web pages, geospatial locales, funds and physical resources, vehicles, tools, and weapons – the objects themselves lack agency. Multimodal complexity arises because actors not only interact with one another, but are indirectly connected through their association to collectivities and such diverse objects.

Two contemporary developments outside of political network analysis fed into our synthesis. First, computer scientists investigated multimodal folksonomies on the World Wide Web, ways that users organize digital data and content. A familiar example is Facebook, whose users add tags ("likes" and comments) to the posts, photos, videos, and other content uploaded on their friends' personal pages. Because people are free to create their own keywords, the results are unique taxonomies generated by folks, hence, folksonomies. Second, a family of community detection algorithms propagated among mathematicians, physicists, and computer scientists. Those algorithms allow researchers to discover communities in large or small, dense or sparse networks. They can be readily applied to multimodal network data.

Our synthesis applies both developments to identify complex political groupings on a variety of multimodal political networks. These procedures can uncover structural properties underlying the ties among entities, discover

interacting communities or clusters of actors and objects, and identify the most important or influential political participants. If networks are observed over time, a further contribution of multimodal analysis is to describe trends and explain the evolution of different modalities.

Multimodal network phenomena are common; however, the typical approach has been to "project" them into 1-mode networks to facilitate analysis. We synthesize recent advances in multimodal network analysis that offer researchers several advantages over such reductive approaches. Multimodal network analysis captures more of the complexity of real-world political interactions and the context for the choices political actors make. It allows the identification of important entities across different modes that are vital for connecting the network. It enables the detection of communities that span and are structured around nodes in different modes. It retains information about the actual paths across the network for studying the diffusion of ideas, innovations, and resources and for mobilizing collective actions. And it assists with modelling how those networks are structured and change depending on other, interlocking networks and nodes.

As in all types of network analysis, visualization plays a key role, drawing maps and topological representations of the social distances and proximities among heterogeneous entities. Because network theories and network methods always advance hand-in-hand, multimodal political analyses facilitate opportunities for creative inquiry, generating and testing new analytic propositions and applications that paint an intricate picture of the political world. They can help identify structural gaps, or holes, that impede the performances of entities, or suggest opportunities for improving systemic outcomes.

A primary purpose of this book is to draw the attention of political theorists and researchers to new theoretical, methodological, and substantive tools for extending political network research into new realms and revitalizing established domains. By making these developments more accessible to political network analysts, we believe that advances in knowledge are potentially immense. To that end, our concluding chapter sketches the research designs of a handful of future projects. We hope that graduate students, instructors, and network analysts in political science, political sociology, public administration, and related fields will take up those and related challenges in their own multimodal political network projects.

OVERVIEW OF CHAPTERS

Chapter 1 lays out the cornerstones of our argument. We highlight how power is multidimensional and is related to network position. We review several works on field theory, contest arenas, and social spaces to highlight how analysts can theorize political action in multimodal settings. Then we explain why communities are a key concept for theory and research in political networks: how they can be identified, how they are created, and what effects they

have on individual-, community-, and systemic-level outcomes. Last, we show that, while some researchers have studied multimodal social networks (particularly 2-mode networks), few have conducted systematic treatments of multimodal political networks.

Chapter 2 is methodological, offering a primer on multimodal network analysis. It proceeds by quickly reviewing 1-mode network analysis, paying special attention to summarizing several measures of network centrality and how they relate to power. Often, relational data that are 2-mode or multimodal are "projected" into one of the node sets. Ties are then defined by their shared relations to the second-mode nodes so that 1-mode measures of centrality and algorithms for community detection can be employed. We discuss the loss of information on structure and agency that projection entails and argue that, in many cases, projection is neither helpful nor necessary. We then proceed to detailed discussions of methods for 2-mode and 3-mode network analysis, from first principles of matrix algebra to centrality measures and core-periphery analysis; faction analysis and community detection; as well as structural/regular equivalence and blockmodeling. We conclude with a brief introduction to recent advances in statistical network modelling that facilitate inferences about multimodal networks.

Chapter 3 tackles a major theme applied throughout successive chapters: agency. We begin with an overview of how agency, leadership, and entrepreneurship have been identified using network analysis. We present political entrepreneurship and leadership as network constructs and identify political influence as often operating across multiple modes. We demonstrate these arguments with three applications: a unimodal case of EU competition policy, a 2-mode case analyzing interests in US labor policy, and a multimodal case inferring agency at multiple levels in global fisheries governance.

Chapter 4 analyzes public policy networks, especially in relation to policy-making events. We begin by reviewing key concepts in this field – policy communities, policy events, and event public networks – before presenting a restricted 2-mode perspective on policy communities. Our application is to the US labor policy domain, analyzed with concepts and methods introduced in the preceding chapters: core/periphery models and optimal modularity community analysis. We next extend the application to a less-restricted 3-mode network of private-sector organizations' interests in events, government organizations' interests in events, and direct communication ties between (but not within) the private and government organizations. A multidimensional scaling analysis of this 3-mode structure reveals how homogenous and relatively tightly structured this policy field is. By preserving complete multimodal network information, the results both support previous research on event publics and yield a more nuanced understanding of the structural contexts within which policy communities attend to their interests.

Chapter 5 identifies the participation and roles of individuals in civil society. We argue that concentrating only on individuals would be more taxing and less

meaningful than a multimodal analysis of interactions between individuals and associations in collective action fields. Individuals' overlapping memberships allow organizations to monitor their environment, allocate resources, communicate, ally with others, and define the boundaries of their actions. At the same time, organizations enable individuals to meet similar others, strengthen their collective identity, share their skills and experiences, deal with threats, explore opportunities, and develop individual identities. We demonstrate how to use data on individual participation from the European Values Survey to conduct a relational, comparative analysis of the structure of political communities. Although multiple membership data are often employed to classify organizational types, here we investigate the structure and roles of the actors involved using projection and structurally equivalent blockmodeling. We examine networks of individuals and organizations in Italy, the UK, and Germany in 1990 and 2008 for a rich, comparative design that reveals the different profiles of political communities in those three countries.

Chapter 6 extends beyond the preceding chapter and explores collective action fields. It begins by reviewing some limitations with the previous approach: its granularity is limited to organizational types and not particular associations, and it does not incorporate the role of events in the political process in tandem for individuals and organizations. Our example illustrates how to overcome such limitations where data allow it. Focusing on civil society actors in one British city, Bristol, we explore the networks linking citizens' associations, their core members, and local public events of both a contentious and non-contentious kind. We treat those networks from two different perspectives: first as a "restricted" 3-mode network in which ties only occur between elements that are logically proximate to each other (in our case, individuals participating in organizations that themselves promote or support specific events); then as a "general" 3-mode network that additionally allows for ties across all different modes (in our case, this means including individuals' direct participation in events). We show that again, where data allow, multimodal political network analysis offers a fruitful avenue to the analysis of political settings.

Chapter 7 examines nations trading and fighting. It begins by reviewing networks-related research in three fields: world systems, world polity, and international relations. We proposed two hypotheses from these fields: the trade-conflict hypothesis that there is an inverse relationship between trade and conflict; and the democratic peace hypothesis that democratic states are less likely to engage in militarized disputes. We investigate both hypotheses using data collected by the Correlates of War project from 2001 to 2010. Analysis of a 2-mode network of bilateral trade ties and memberships in intergovernmental organizations identifies four communities. A 2-mode network of diplomatic exchanges and memberships in military alliances also finds four communities. To test the hypotheses, we use Quadratic Assignment Procedure to regress militarized interstate disputes (MIDs) between dyads on

trading communities, alliance communities, and types of governmental regimes. Nations belonging to the same international trade community were more likely to engage in MIDs. Democratic states were not less likely to fight one another, nor were authoritarian regimes more likely to experience MIDs. But, conflicts were very much more likely to erupt between democratic and authoritarian states. We conclude that multimodal network analysis yields novel insights into political action and political contest at the level of relations among nations.

Chapter 8 investigates legislative influence. It begins by reviewing the wealth of network and other approaches to the study of legislative influence, particularly in the United States. For an illustration, we take US senators' voting on bills presented in the 112th Congress and the campaign contributions senators received from PACs. Because PACs do not vote on bills, the dataset is a restricted 3-mode network. We apply three community-detection methods to this network, uncover three different legislative community structures. Optimal modularity analysis identifies communities by maximizing the densities of ties within communities while minimizing between-community ties. Applied to the legislative network, it finds great polarization between Republican and Democratic senators, their campaign financiers, and their legislative voting agendas. The core-periphery model maximizes the density of ties among entities in the core position, minimizes the density within the peripheral position, and allows sparse connections between core and periphery. This model finds that the core and peripheral communities are both heterogeneous mixtures of senatorial partisan affiliations, funding sources, and voting decisions. To resolve the discrepancy, the affiliated graph model (AGM) relaxes that requirement by allowing some entities to belong to more than one community and others to belong to none. On balance, the AGM result strikes us as providing a more plausible and nuanced depiction of the complex nexus between political money and legislative voting than do either of the conventional community detection algorithms. Each community contains almost all the senators of one political party, their PAC funders, and their preferred legislative bills. But both communities exhibit heterogeneous mixtures of entities due to a substantial dual-community component comprising subsets of the three entities. The AGM approach strongly supports a research hypothesis that US legislative communities are divided into two bipartisan camps consisting of heterogeneous sources of campaign contributions, funding recipients, and legislative voting agendas. However, a subgroup of entities belonging to both communities has the structural potential to play a power brokerage, or go-between, role.

Chapter 9 concludes this volume with a brief reflection on the future of multimodal political network analysis. We also offer suggestions about the benefits and research designs of a set of future projects that would apply the multimodal political network analyses theories and methods illustrated throughout the volume.