

Why Context Matters

Many elements of our society are embedded in network structures in which actors depend on each other as well as the structural context of their actions. This is reflected by the wide use of concepts and terms of social network analysis, such as the concept of the small world, the strength of weak ties, opinion leaders, gate keepers, viral marketing, terrorist networks, stakeholders and the like. This volume provides a sample of the broad range of research in which social network analysis can be fruitfully applied. Topics addressed include networks of academic hiring, epidemic dynamics of diseases in populations such as HIV/AIDS, flow of information, semantic networks of the internet, relationships in private and public spheres, patent authorship, paper citation and networks in linguistic as well as political systems.

Due to its interdisciplinary approach, this book is of relevance to researchers and students from the social sciences as well as economics, informatics, and mathematics.

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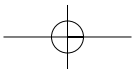
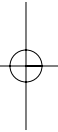
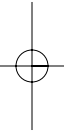
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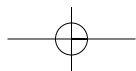
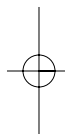
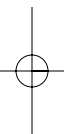
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More information about the conference can be found on the conference website: <http://www.asna.ch> or <http://www.ipmz.uzh.ch/asna>.

Thomas N. Friemel

Why Context Matters

Thomas N. Friemel

Applications of social network analysis are implicit answers to the question of whether context matters. The answer is consistently yes, context does matter. This finding is troublesome because it fundamentally questions the wide array of research which ignores context. But what is *context* and for what types of research questions does it matter? First, *context* is defined and its relevance to research is outlined. The second paragraph of this introduction gives an outlook on the various applications of social network analysis compiled in this book and groups them by application.

1 Re-incorporating context by applied social network analysis

Kurt Lewin stated that “every event depends upon the totality of the contemporary situation” (Lewin 1966: 10). Most of the time, however, the totality of a given situation cannot be captured in its entire complexity and reductions are unavoidable. Foremost, this holds true for quantitative research like that collected in this volume. Therefore, reductionism should not be questioned per se but is worth reflecting on. Reflecting critically is particularly important because reducing complexity is not always a fully systematic or intentional process. Often an incongruity between units of analysis and the units of recording (the units for which data is collected / observational units) exists. This gap is part of the definition of *context*. The *context* consists of all information which would be of interest to a research question less the information represented by the units of recording. Consequently, the question is not *if* context matters (because it matters by definition) but rather *why* context matters. It will be argued that the gap between the units of analysis and the units of recording is systematically biased and that social network analysis (SNA) is a powerful way to question and even overcome these biases and fill the gap by re-incorporating the context into the research setting.

In most scientific disciplines the units of recording are chosen by two guiding principles. On the one hand, the units are chosen according to naturally given enti-

ties. These are for instance human actors for which data is gathered in many social sciences, countries in political science and organisations in economics. On the other hand, the units are chosen according to the restrictions of data compilation. If primary data is collected, the unit needs to be able to react to an applied stimulus or expose the relevant information in a “readable” way. In social science, oral or written language is used as both a stimulus and reaction in the vast majority of research (i.e. people filling in a pencil and paper questionnaire). From a critical point of view, it can be questioned whether this technique is chosen because of its pertinence or rather because of its easy implementation. Especially when latent variables like feelings, personal traits, social groups, economic systems or political processes are the topic under study, appropriate alternatives are either not at hand or just difficult to realize.

Most often both mentioned factors – bias to (natural) given entities and data restrictions – privilege the same entities as units of recording. Hence, it is seldom questioned whether the chosen unit is meaningful and over time, well established standards have emerged in all research fields. For example, data is often gathered from individuals even though the research question addresses social groups and the true unit of analysis would therefore be an entity consisting of multiple individuals. By focusing on individuals as units of recording, the context (including the relations between the persons) is excluded from the analysis. Instead of incorporating context, most research systematically isolates the individual by applying random sampling. This is why Barton compared sample surveys to “a sociological meatgrinder, tearing the individual from his social context and guaranteeing that nobody in the study interacts with anyone else in it” (Barton 1968: 1). How absurd this is becomes apparent by the comparison with biology: “It is a little like a biologist putting his experimental animals through a hamburger machine and looking at every hundredth cell through a microscope; anatomy and physiology get lost, structure and function disappear, and one is left with cell biology” (Barton 1968: 1). This does not question the value of the micro-perspective in general but suggests that its scope is limited and that *context* does matter because the complex interactions across units of recording (cells or persons) in themselves constitute the unit of analysis (animals or social systems).

Social network analysis (SNA) is a way to re-incorporate context and bridge the gap between the micro and the macro, the cells constituting the animal, the individuals constituting groups, or the actors constituting a political system. SNA allows researchers to retain the traditional units of recording but simultaneously broadens the perspective by including information about the relationships across these units. This additional structural information allows researchers to address

existing research questions with new tools and to approach them from a different theoretical angle. The next section outlines eight selected examples.

2 Selected Applications of SNA

Applications of social network analysis can be divided in two groups of research: descriptive and explanative applications. *Descriptive applications* assess and describe the context by focusing on structural aspects. The question here is whether the observed structure is significantly different from a random structure. Measures for reciprocity, triadic structures, degree distribution and other regularity like multiplexity are at the core of this line of research. The contribution by *Victor Kryssanov et al.* is a prototype for this group. By analyzing the degree distribution, they take up an aspect of SNA which has been intensively investigated in recent years, foremost by physicists. A model framework is proposed to overcome the shortcomings of the existing power-law inspired approaches to modeling degree distributions of social networks. The proposed model is applied to datasets from patent authorship, paper citation, website visiting rate and delays in email reply. While this contribution focuses on the quantitative distribution of ties, the chapter by *Georg Müller* highlights the qualitative aspect of relations. He proposes a new methodology building on three-value logic of tie values. Beside the binary differentiation between true and false, a third value “possibly true” is introduced, which overcomes the inconsistent or contradictory coding that can emerge in binary logics. The technique is demonstrated in qualitative content analysis of semantic networks. The third contribution to the group of descriptive SNA is less methodologically and more substantially oriented. *Gerald Mollenhorst* addresses the sociological research question as to what extent people’s public and private lives are two distinct spheres. This is tested by examining the congruency of social contexts in which people meet their acquaintances. In addition he analyses whether relationships are more uni- or multiplex. Analyzing a representative data set from the Netherlands, he finds differences for public and private contexts both for the structure overlap and the multiplexity of the relations.

The second group of studies can be labeled *explanative applications* because its focus lies on attributes which are used as dependent and independent variables in classic research. This line of research tries to explain how attributes of individual units are dependent on their structural embedding within a set of other units and their respective attributes. Likewise the causal order can be in the opposite direction where attributes are the independent variables which determine the structure

of the network. The first paper of this group addresses the prevailing topic of the semantic web. Based on the idea of two-mode networks, a rising amount of data is created on the internet linking people and objects. *Sheila Kinsella et al.* demonstrate how information from multiple online sources can be aggregated to a social network to highlight related people and objects. A second paper is also affiliated to the realm of communication and knowledge. *Wolfgang Sodeur and Volker Täube* address the question of how information flows in evolving social groups. In a first step, they look at social grouping among students and combine these findings in a second step with data on information exchange.

Centrality measures are among the most used concepts in SNA. This volume includes two contributions which apply centrality measures in connection with actor attributes. *Debra Hevenstone* analyses the relation between the prestige of academic departments' and their centrality in academic hiring networks. Her findings for US sociology departments suggest that this network resembles a positive feedback system. *Daniel Bochslers* shows that SNA can be combined with traditional statistical tools. He uses data from inter-governmental cooperation between Swiss cantons and uses the results from quadratic assignment procedure (QAP) and centrality measures in an OLS regression. Additional explanatory power of SNA is revealed applied in a longitudinal setting. Finally, *Shah Alam and Ruth Meyer* use agent-based simulations to describe the epidemic dynamics of HIV/AIDS within a population. This technique can help researchers design more precise interventions.

This compilation of applications of SNA includes theoretical, methodological and substantial advancements in a wide array of scientific fields and demonstrates the breadth of possible applications of SNA. It illustrates that SNA can approach long standing research questions more holistically, incorporating context into research. Classic research settings are extended and enriched by relational information. At the same time, SNA sheds light on new research areas (descriptive applications) which were completely ignored by previous research. With regard to the title of this book, we can conclude that for both groups of research *context matters*. Furthermore, it can be hypothesized that this research becomes ever more important as actors and objects which were once isolated become connected (Friemel 2007: 15). SNA, therefore, is not only an improvement to meet today's research challenge but also a promise for the future.

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