Disrupting Criminal Networks

Network Analysis in Crime Prevention

edited by
Gisela Bichler and
Aili E. Malm

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To Ronald V. Clarke—
Mentor, inspiration, and
winner of the 2015 Stockholm Prize in Criminology

Acknowledgments

Producing an edited volume is not easy. It takes a dedicated team of contributors and supporters, and for this reason, we have a number of people to acknowledge.

The first step in producing an edited volume is to develop a good idea. Shortly after finishing my (Gisela) PhD in 2000, Ronald V. Clarke and I found ourselves in San Diego, California, for the 11th annual Problem-Oriented Policing Conference. At that time he extended an offer, although perhaps it was better described as a challenge. If I ever came up with a clever idea for a volume for the Crime Prevention Studies series, I should send him a short proposal. Needless to say, it took a while to come up with a clever idea. We would like to offer our enduring gratitude to Professor Clarke for seeing the value in this project and affording us the opportunity to contribute a volume to the series. For more than 20 years, Professor Clarke has guided the careers of young academics. This is but one of the many opportunities he has provided.

The second step is to assemble an all-star cast of contributors who are able to fit yet another request for a manuscript into their busy research schedules. When we sat down to develop our wish list of contributors we very quickly ran out of room on the page. Knowing what people were currently working on, we selected a group for the first wave of invitations. Nearly everyone accepted with great enthusiasm. We were thrilled at the response, and in the coming months we were continually astounded at the authors' efforts to meet all of our requests, no matter how demanding.

We would like to extend our heartfelt appreciation to the following individuals; without their contributions and support this book would not have been written: Rémi Boivin, Martin Bouchard, David A. Bright, Stacy Bush, Francesco Calderoni, Eric R. Cheney, David Décary-Hétu, Robert R. Faulkner, Thomas U. Grund, Kila Joffres, Shane D. Johnson, Dominique Laferrière, Jean Marie McGloin, Carlo Morselli, Andrew V. Papachristos, Zachary Rowan, Michael Sierra-Arevalo, and Lucia Summers.

The third step is to assemble a supporting staff. The Crime Prevention Studies series is peer-reviewed. This meant that we needed to assemble a group of subject experts to examine each chapter. Since the review process was blind we cannot name individuals, however, we can say that all reviewers are associated to some extent with one of two working groups: the Illicit Networks Workshop or the Environmental Criminology and Crime Analysis Symposium. Their efforts were instrumental in shaping the contributions. Thank you.

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Contents

1

Why Networks?

Aili E. Malm and Gisela Bichler

WHY FOCUS AN ENTIRE VOLUME ON THE UTILITY OF USING network analysis to prevent crime? *Why consider networks at all?* The answer is simple—crime is dependent on the behavior of individuals interacting with others within a social system. Many crimes are possible because of the opportunities provided through our connections to others, and at different levels of aggregation, this can be viewed as associations among groups, organizations, systems and places. Researching these relationships requires theory, methods and analysis which focus on how people affect one another within the context of the entire group. The people we associate with influence us, and we influence them. Sometimes these influences are indirect. For instance, through a friend of a friend someone may learn of a new application that strips audio files off YouTube videos. As a result they violate copyright laws. This is not a novel way to pass information—criminal or otherwise. Rather, information *usually* diffuses through a network of people, many of whom do not know each other directly.

From this introduction, it is easy to see why network analysis, more specifically, examination of social relations (social network analysis or SNA), is quickly becoming an essential part of the methodological toolbox of criminologists and analysts. To date, criminological applications of network analysis generally focus on describing the social structure rather than explicitly considering how networks can be used to reduce crime. In this volume, we seek to do just that. The chapters presented in this book demonstrate how the associations among individuals, groups, and/or activities can foster criminal opportunity by bringing offenders and targets together in social systems. Just as crime is not random, neither are social

systems; patterns emerge as each person is embedded within a web of inter-related actors (Freeman et al. 1992). We argue that in order to understand the behavior of individuals, the individuals must be viewed within the large social context.

This book also begins to extend the way we think about networks. While we have been talking about the relationships between people, these concepts can be applied toward understanding many different phenomena. Though still relatively rare, researchers have begun to explore how network analysis can be used to examine how the interacting parts of a system generate crime opportunity, i.e., street networks and ease of mobility (e.g., Summers and Johnson, Chapter 11 this volume), trade flow (e,g., Bichler and Franquez 2014; Bichler and Malm 2013), and financial exchange mechanisms (Bichler, Bush, and Malm 2013; Malm and Bichler 2013). The crime prevention implications of what Andrew Papachristos (2011) calls a networked-criminology, will expand considerably by pushing beyond direct social interactions, and moving into an exploration of the structure of systems.

Placing crime opportunity within a broader context is an accepted practice among criminal justice scholars and practitioners. For instance, geographic information system (GIS) technology opened the door to examining incidents and individuals as they interact with the built environment; much as multi-level modeling offered a mechanism to study the influence of group level characteristics on individuals. A network perspective adds to this exploration of inter-dependence by broadening the range of factors that can be considered as part of the opportunity structure. Network studies are not limited to a single unit of analysis (groups and places can be mixed); models can integrate, time, space, individual attributes, and social relations; and finally, network techniques can demonstrate changes in flow dynamics (i.e., drug market disruption). For these reasons, network analysis is fast becoming an invaluable approach to understanding the situational context of crime.

Criminological applications of network analysis already encompass a broad spectrum. Shedding new light on debates about the structure of criminal enterprise (e.g., Calderoni 2011; Morselli and Roy 2008) and victimization (e.g., McCuish, Bouchard, and Corrado 2015; Papachristos, Braga, and Hureau 2012; Randle and Bichler 2015), as well as other types of collaborative crime networks such as gangs (e.g., McGloin and Piquero 2010), terrorism (Everton and Cunningham 2014; Medina and Hepner 2008), computer hacking (Décary-Hétu, Morselli, and Leman-Langlois 2012) and drug trafficking (e.g., Bright and Delaney 2013; Malm and Bichler 2011). Collectively, this research highlights the utility of identifying the central or unifying forces that generate criminal networks. The available

toolkit provides an arsenal of strategies to identify foci for crime prevention activity, in addition to a methodology for evaluating anti-crime efforts. This is important to the field because conventional statistics are not appropriate for examining inter-dependent networks of operatives and processes (Borgatti 2002; Wang et al. 2004-05; Wasserman and Faust 1994).

Book tour

To our knowledge, this is the first book dedicated to discussing the crime prevention implications of social network research. While developing a list of contributors, we sought to demonstrate the utility of a network approach by bringing together a wide range of applications, both in terms of topic coverage and methods. This volume is divided into 11 substantive chapters and covers eight different types of crimes from five different data sources. All but two chapters report on original research. What unites this diverse assortment of scholarship is that each of these chapters effectively demonstrates why *networks matter to crime prevention.*

Before moving on to a review of the content of this book, it is important to say something about the editing process. All of the books in the *Crime Prevention Studies* series are peer-reviewed. When Ronald V. Clarke launched the series, he set out to create a forum that would encourage the dissemination of innovative studies to advance the development of practical and effective crime prevention. By insisting on a peer-review protocol, volume editors were also held accountable for producing high quality scholarship. We are indebted to him for continuing with this mandate for over 20 years, producing 28 volumes.

In keeping with this tradition of academic excellence, each chapter was peer-reviewed by at least two scholars. To select reviewers for each chapter, we identified one subject matter expert and one researcher familiar with the methods. Each chapter also received a heavy edit from us. Reviewers were tasked with ensuring not only that the scholarship was sound, but also, that the chapters could be understood by people unfamiliar with social network methods. Faced with the burden of launching network analysis into the field of situational crime prevention, we wanted to make sure that key concepts translated well. To support this crossover, this volume contains an appendix which is really a short primer and glossary of terms. While essential terms are defined within each chapter, we were aware that for many, the lexicon is new, and many people would benefit from including a short explanation of concepts. We also suggest resources that provide a more comprehensive introduction into SNA theory, methods and analytic tools.

Table 1.1 provides our readers with a thumbnail sketch of the remaining chapters by topic area, data sources, social network theory and methods, and primary crime prevention implications. While there is no reason to start at the beginning and work your way to the end of the book, readers should note that the methodological complexity of the research is greater toward the end. The purpose behind crafting this table, and the chapter commentary that follows, is to offer a brief tour, after which readers can select their own spot to jump into the realm of SNA for crime prevention.

Chapters 2 through 4 explore gang relations and co-offending. In Chapter 2, McGloin and Rowan examine the utility of adopting a social network approach for crime prevention policy in the context of street gangs and juvenile co-offenders. They argue that using SNA to guide research hypotheses, data collection, and analysis provides insight for crime prevention. The authors offer four crime prevention recommendations in using SNA to study of street gangs: 1) use street gang rivalry and alliance networks to nominate certain gangs for targeted intervention; 2) determine the cohesion among gang members; 3) identify individuals in a position of leverage or vulnerability; and, 4) include non-traditional street gang members, especially those in the legitimate market, when building a profile of the group structure. When considering juvenile co-offending more broadly, it is also important to reduce opportunities for youth to gather and socialize with potential co-offenders.

Some of these recommendations are exemplified in Chapter 3 where Sierra-Arevalo and Papachristos present a systematic review of the group audit process using the city of New Haven, Connecticut as a case study. They effectively demonstrate how knowledge of the structure of criminal groups is critical to implementing effective focused-deterrence strategies. Capturing the feuds and rivalries through the analysis and the geo-social visualizations of networks among and between violent groups will improve the success of crime prevention initiatives while avoiding the pitfalls inherent to national and geographic conflation. Conflation is the tendency, common within law enforcement, to unite several smaller, distinct groups into larger and more generally named groups. Conflation weakens crime prevention as the situationally-specific factors inherent to local crime problems are more likely to be overlooked.

In Chapter 4, Morselli, Grund, and Boivin, show how crime involvement, frequency, and stability vary within a co-offending population extracted from seven years of arrest data from Quebec, Canada. Varied levels of stability in co-offending partnerships suggest that prevention efforts must be tailored to the social position of active offenders, and that among the individuals who co-offend more than once, there is a high

tendency to reuse some of their partners. The results also reveal that one's social position within the co-offending network exhibits some crime specificity: individuals involved in market crimes are more likely to hold core positions in the network; whereas, violent and property crime co-offenders are more peripheral. Taken together, these results demonstrate how social networks constrain and facilitate co-offending differently for subgroups of offenders.

Chapters 5 through 10 illustrate how network analysis can be applied to specific types or classes of crime to sharpen the effect of crime prevention efforts or to evaluate the impact of anti-crime policy. In Chapter 5, Bright shows how SNA can be used to help law enforcement identify high value targets whose removal is likely to disrupt or dismantle criminal enterprise, specifically illicit drug production and distribution. The identification of highly-connected actors and/or actors who play critical roles in a criminal organization can contribute to the suite of crime prevention strategies focused on criminal networks. He argues that certain social positions and operational roles within the drug distribution process are more critical than others; efforts to make it more difficult for individuals occupying these positions to act will produce greater overall network disruption than simply removing specific individuals.

In Chapter 6, Calderoni analyses meeting attendance of the 'Ndrangheta organized crime group to map the social hierarchies supporting local criminal activities. He shows that leaders can be identified through meeting attendance, and that these leaders could be targeted by police to disrupt operations and prevent organized crime by restricting the ability of leaders to communicate with their staff. Two general crime prevention strategies are supported by Chapters 5 and 6: 1) using SNA to maximize organized crime group disruption, and 2) using SNA to increase investigative efficiency.

While Chapters 7 through 10 cover white-collar crime, computer crime, and terrorism, they are linked through their use of publicly available data. These chapters also show how to use network analysis to most effectively prevent crimes that have been difficult to disrupt using conventional approaches. Faulkner and Cheney (Chapter 7) use historical data from a corporate fraud case to illustrate how social relations can impact a conspirator's likelihood of defecting and turning state's evidence. This novel use of SNA demonstrates how white collar criminal investigations and prevention efforts can be aided with knowledge of network devolution.

Table 1.1 Synopsis of Chapter Content

Ch.	Topic Area	Data	SNA Theory and Methods	Crime Prevention Implication
2	Street gangs, co-offending	Secondary data	Cohesion, brokers, social capital	Focused-deterrence, disruption of accomplice generation, and counter-intelligence
3	Criminal gangs	Police data	Centrality, visualization of geo-social networks	Focused-deterrence targeting situational-specific leverage and vulnerability
4	Co-offending	Police data	Core-periphery, weak ties, affiliation networks	Target social position with situational-specific strategies
5	Illicit drug networks	Court transcripts, police data	Small-world structure, hubs and brokers	Disrupt networks by making it harder to fulfill duties associated with operational roles
6	Organized crime	Court transcripts, police data	Group structure, brokerage, affiliation networks	Target in-person operational meetings that promote leader influence
7	Fraud (white-collar)	Open source	Core-periphery, clustering, network devolution	Target defection-heavy positions for education and auditing to cultivate whistle-blowers
8	Carding (cybercrime)	Embedded web metadata	Inter-group ties	Discredit vendors with strategic use of market mechanisms
9	Child pornography (cybercrime)	Embedded web metadata	Small-world structure, hubs and brokers, fragmentation	Strategic removal of key sites prevents access to materials, deflects offenders, and reduces emotional arousal
10	Terror group messaging	Declassified intelligence	Dynamic network analysis, centrality	Target locally important actors (functional leaders) to prevent rebuilding
11	Offender movement	Street network	Connectivity, integration, local and global structures	Strategically modify urban structure to reduce offender mobility and enhance surveillance

With the dramatic increase in online crime (Holt and Lampke 2010) over the past decade, we would have been remiss to exclude chapters on how SNA is essential in helping prevent crime on the Internet. In Chapter 8, Décary-Hétu and Laferrière use SNA to investigate the formation of trust and business relationships in an online illicit market (carding forum). They then analyze the feasibility of implementing disruption strategies, such as Sybil attacks, to prevent the sale of illegally obtained financial data. This removes the illicit gains associated with hacking. Joffres and Bouchard (Chapter 9) continue the application of SNA to internet crime by examining online child pornography networks—websites which link to each other and facilitate the spread of materials. The authors show how using SNA on data extracted using a web-crawler can reduce the availability of online child pornography. Targeted disruption by removing key sites in a network can impede an individual from accessing illicit materials, deflect offenders to less popular sites, conceal remaining sites, and reduce emotional arousal.

In Chapter 10, Bush and Bichler apply dynamic network analysis to publicly available correspondence between Usama Bin Ladin and members of the Al Qa'ida network to determine how information flow and operational efficiency changes after military action. Changes in network structure highlights how criminal networks are resilient when under attack as operational roles are re-staffed when individuals are removed. The authors suggest how tactical responses and prevention strategies can be used together to weaken network structures and decrease social support so as to impede rebuilding efforts.

To close the book, Summers and Johnson (Chapter 11) return us to the intersection of geography and networks that was introduced in Chapters 2 and 3. This chapter is also gently leads the reader into the realization that network-oriented research is larger than *social* network analysis. While network approaches have traditionally been used to study social interactions such as co-offending, gang violence, and criminal organizations, the methodology can also be used to examine systems and spatial mobility. Summers and Johnson introduce us to space syntax, a method developed within the field of urban planning to estimate vehicular and pedestrian flow on street segments. This chapter describes how networks may be used to inform preventative efforts such as the correct positioning of surveillance systems and crime-free urban planning.

The Future of Network Analysis and Crime Prevention

Situational crime prevention scholars understand that crime is influenced by a context that shifts over time and space. The chapters in this volume unequivocally demonstrate that crime is also influenced by social systems.

Understanding how victims and offenders interact is essential to preventing crime, and network methods are the tools through which we can best understand the interconnectiviey of the social world.

1. We urge crime researchers to seriously consider the network perspective in their work. Think about how crime is embedded within a social structure: criminals and victims alike are social beings who have friends, families, colleagues, acquaintances, and enemies. These social ties impact people in every aspect of their lives. People are not equally positioned within these networks, nor do they have the same number of connections. This structure is important as it constrains and expands the pool of the opportunities we encounter, and not all of these opportunities are legal.
2. We challenge researchers to stop treating criminals and victims as if they exist in isolation. It is really the *interaction* between potential offenders and victims that is important. Therefore the basic unit of analysis is the two actors *and* the link between them. Re-read criminological theories with this in mind, and then consider how network variables and methods could improve our collective understanding of crime.
3. We also advise crime researchers and crime prevention practitioners looking to use network methods to read widely-used books that discuss these methods at length, i.e., Wasserman and Faust (1994). As with all methods, there are limitations associated with SNA and our understanding of these limits is still in its infancy. It is important to go beyond this book and read about network theory and statistics.

The application of network analysis to crime prevention has just begun, and the future is sure to see progress in the following areas: 1) understanding of the intersection of individual agency and the social world; 2) dynamic models capturing structural change; 3) geo-social analysis that integrates spatial properties with social structures; 4) network simulation studies; and, 5) policy evaluation. After reading this volume, we hope you agree with us that network analysis is an essential tool in reducing crime.

2

Street Gangs and Co-Offending Networks

Jean Marie McGloin and Zachary Rowan

IN RECENT YEARS, THERE HAS BEEN MARKED GROWTH IN THE use of social network methods in criminology and criminal justice research. Though skeptics may view this growth as yet another example of scholars becoming "seduced" by a new method (Sampson and Laub 2005), it is clear that a social network approach to data collection and analysis is not merely a shallow, "fashionable" trend, but instead provides the opportunity for unique and important insight into questions of criminological interest (Morselli 2009b). Furthermore, though this method undeniably aids in the testing and refinement of theory (e.g., Haynie 2001; Hipp 2008; Hipp and Boessen 2013), it is not limited to this domain. To be sure, adopting a social network approach for the study of criminal networks provides added value that can be converted into policy and intervention guidance; in other words, it can be a powerful tool in the pursuance of "translational criminology" (Laub 2010) by bridging the gap between academics and criminal justice practitioners.

Over the past two decades, "the orthodox organized crime doctrine that focuses on more or less stable and hierarchical organizations is slowly giving way to new and more sophisticated paradigmatia, such as…the concept of fluid social networks" (Klerks 2001: 53; see also Clarke and Brown 2003; Eck and Gersh 2000). Perhaps not surprisingly then, several organized crime scholars have explicitly advocated for using network analysis when developing intervention strategies (e.g., Coles 2001; Morselli 2010) and there are numerous examples of where application of this method reveals aspects of the organization, structure and social processes of various criminal networks, including Russian organized crime (Finkenauer and