



CRIME PREVENTION AND  
SECURITY MANAGEMENT

# Social Network Analysis and Law Enforcement

Applications for Intelligence Analysis

Morgan Burcher

palgrave  
macmillan

# Crime Prevention and Security Management

**Series Editor**

Martin Gill

Perpetuity Research

Tunbridge Wells, UK

It is widely recognized that we live in an increasingly unsafe society, but the study of security and crime prevention has lagged behind in its importance on the political agenda and has not matched the level of public concern. This exciting new series aims to address these issues looking at topics such as crime control, policing, security, theft, workplace violence and crime, fear of crime, civil disorder, white collar crime and anti-social behaviour. International in perspective, providing critically and theoretically-informed work, and edited by a leading scholar in the field, this series will advance new understandings of crime prevention and security management.

More information about this series at  
<http://www.palgrave.com/gp/series/14928>

Morgan Burcher

# Social Network Analysis and Law Enforcement

Applications for Intelligence Analysis

palgrave  
macmillan

Morgan Burcher  
Faculty of Arts and Education  
Deakin University  
Victoria, VIC, Australia

Crime Prevention and Security Management  
ISBN 978-3-030-47770-7 ISBN 978-3-030-47771-4 (eBook)  
<https://doi.org/10.1007/978-3-030-47771-4>

© The Editor(s) (if applicable) and The Author(s), under exclusive licence to Springer Nature Switzerland AG 2020

This work is subject to copyright. All rights are solely and exclusively licensed by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, expressed or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Cover illustration: Yuichiro Chino/GettyImages

This Palgrave Macmillan imprint is published by the registered company Springer Nature Switzerland AG. The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

# Foreword

By way of introduction, my name is Associate Professor David Bright. I lead the Flinders Illicit Networks Lab at Flinders University in Adelaide, Australia. My lab is one of only few labs internationally dedicated to the study of illicit networks. I am also Deputy Director of the Centre for Crime Police and Research, one of the foremost centres for criminological research internationally.

I have been conducting research on illicit networks, mostly organised criminal groups and terrorist groups, over more than a decade. Much of my research, and the research undertaken in the Flinders Illicit Networks Lab, employs social network analysis (SNA) to examine the social structure and dynamics of such illicit networks. As a forensic psychologist and criminologist, I'm intrigued by both sociological and psychological explanations for individual and group-based criminal behaviour and the complementarities across these two sets of explanatory mechanisms. I remember my first introduction to networks and SNA, an introductory book on the subject, and being struck by the potential that a network perspective offered to elucidate the macro social structure of illicit groups, the nature of smaller subgroups or cliques and the contribution and influence of individuals within such groups. Much of my own work has focused on the utility of social network analysis to identify the strengths and vulnerabilities of illicit networks and to understand how law

enforcement agencies can capitalise on these network vulnerabilities to generate effective crime prevention and intervention strategies.

The community of criminal networks researchers internationally is relatively small, but growing. I have been lucky enough to work with some of the most amazing and talented scholars in this space across the globe. My journey through the illicit networks field led me to collaborate with international experts in the field, and among them a small group of talented researchers here in Australia including the author of this book, Dr Morgan Burcher (when he was a PhD student), and his supervisor Associate Professor Chad Whelan from Deakin University.

Given the focus of my research, I have been consistently interested in the extent to which law enforcement, intelligence and security agencies use SNA, how they use it, how effectively they employ such analyses and what challenges they face in employing such techniques. The answers to these questions have remained elusive for me and for other criminal networks researchers. And this brings me to the important and unique contribution this book makes to the literature on illicit networks. Dr Burcher is one of very few researchers to address this important gap in the academic literature on criminal networks: the use of SNA by law enforcement agencies in intelligence collection and operational policing. This is no easy undertaking, and may explain why few have managed to conduct such research. Gaining relevant ethics approvals, support from law enforcement agencies and the trust of sometimes highly suspicious and guarded (often for very good reason!) intelligence and security agents is a significant achievement. This book is the unique output of that achievement.

The key areas covered in the book will be of interest to students of criminology and policing, academics who study illicit networks and, of course, those at the coal face who conduct intelligence collection and investigation, including those tasked with managing intelligence analysts. The key topics of the book include: (1) the application of SNA as an investigative tool for criminal intelligence; (2) whether and how SNA is being used operationally by intelligence analysts; (3) the characteristics of criminal networks and how such characteristics create challenges in the use of SNA in operational environments and (4) the peculiar challenges of organisational environments and the implications for SNA including

the focus of investigators, working relationships (especially between operational police and management) and the unique challenges that arise in the use of information technology platforms and SNA software.

This book makes a significant and very unique contribution to the literature on illicit networks more broadly, and specifically on the use of SNA by law enforcement, security and intelligence agencies. Researchers who use SNA to study various aspects of organised criminal groups and terrorist groups are interested in how SNA is used in operational contexts, how such use could be improved and how the challenges associated with using SNA in such contexts can be addressed. This book provides researchers with some answers to these questions. Researchers are also very keen to know how their research can be used to improve practice and policy in the field. On the other hand, intelligence analysts often desire to read the work of researchers to get a sense of how to extend their understanding and use of SNA. This book will appeal to both researchers and practitioners, and may even help to bridge the gap between the two groups by stimulating possibilities for collaborative work across the divide.

Adelaide, SA, Australia

David Bright



# Acknowledgements

There are a number of people I must thank, for without their support this book would not have been possible. I must start by thanking Victoria Police and New South Wales Police Force for providing access to their staff. In particular, I must thank the 27 intelligence analysts that generously gave up their time to participate in this study. While I am unable to name them, there were several members of each organisation that also took the time to answer any further questions I had for which I am immensely grateful.

I would also like to sincerely thank my colleagues at Deakin University: Associate Professor Darren Palmer, Dr Wendy O'Brien, Dr Ian Warren, Dr Richard Evans and Dr Emma Ryan. In particular, I would like to thank Associate Professor Chad Whelan for his guidance, support and friendship over many years.

Finally, I must thank my friends and family for their support over many years leading up to this point. In particular, I must thank my parents, Richard and Gail, and my parents-in-law, Bill and Wilma, for your immense support and encouragement. To my partner, Casey, I will forever be grateful for your love and support over what has been a long journey. This book would not have been possible without you.

# Contents

<b>1</b>	<b>Introduction: Intelligence-Led Policing, Crime Intelligence and Social Network Analysis</b>	<b>1</b>
<b>2</b>	<b>Social Network Analysis in the Field of Crime Intelligence: Historical Development, Application and Limitations</b>	<b>29</b>
<b>3</b>	<b>Social Network Analysis and Crime Intelligence</b>	<b>65</b>
<b>4</b>	<b>Social Network Analysis and the Characteristics of Criminal Networks</b>	<b>95</b>
<b>5</b>	<b>Social Network Analysis and the Organisational Characteristics of Law Enforcement Agencies: Investigative Focus</b>	<b>131</b>
<b>6</b>	<b>Social Network Analysis and the Organisational Characteristics of Law Enforcement Agencies: Working Relationships</b>	<b>145</b>

<b>7</b>	<b>Social Network Analysis and the Organisational Characteristics of Law Enforcement Agencies: IT Software, Systems and Training</b>	<b>159</b>
<b>8</b>	<b>Conclusion: Social Network Analysis and the Characteristics of Criminal Networks and Law Enforcement</b>	<b>171</b>
	<b>Index</b>	<b>191</b>

# Abbreviations

ACIC	Australian Criminal Intelligence Commission
AFP	Australian Federal Police
CCR	Call charge records
CIU	Crime Investigation Unit
DIU	Divisional Intelligence Unit
DNA	Dynamic Network Analysis
ILP	Intelligence-led policing
IM	Instant messaging
IT	Information technology
OMCG	Outlaw motorcycle gang
SNA	Social network analysis
TIO	Tactical Intelligence Officer
UK	United Kingdom
US	United States
VoIP	Voice over internet protocol

## Series Editor's Introduction

Social network analysis (SNA) is described as ‘an analytical tool that examines the social relationships that exist within social entities’ and in this book it is applied to the much neglected research area of criminal networks. Its importance for policing is that SNA affords the opportunity to better understand how gangs or organised groups are structured and the nature of information flows between members.

To-date research has focused on a retrospective analysis, rather than focusing on current operations. This book redresses this and is based on interviews with intelligence analysts in two Australian state law enforcement agencies. It looks at how SNA is used in practice and the challenges analysts then face. Specific techniques are discussed. For example, you will learn about the 3-I model, depicted as a triangle, each side representing one of three elements: *interpreting* the criminal environment, *influencing* decision-makers and having an *impact* on the crime. Read on to learn about ‘boundary-specification rules’ and their appropriateness for use by intelligence analysts, the value of an ‘active library’ and the challenge of keeping it up to date.

Indeed, there are a variety of challenges that are covered in this book. Software is one, for although it has improved markedly, developments have not kept pace with the amount of data now being collected and stored by law enforcement. Moreover, analysts are expected to be

competent in a large number of software programs in order to fulfil their role but this limits their capacity to become highly knowledgeable in one or two analytical approaches, such as SNA, and the associated software.

Then there are difficulties with the data, which are often inaccurate. There are limits on the size of the networks analysts can examine. Indeed, while analysts felt that SNA was best used on large networks, they predominantly focused on small groups and increasingly smaller ones. And while SNA is best utilised in proactive investigations where it can be used to identify further avenues of inquiry, this rarely happened to its full potential with a bigger focus on the more traditional area of reactive investigations.

Personnel are also a barrier and therefore an opportunity. The majority of analysts reported both positive and negative working relationships with detectives. The single biggest factor influencing the relationship between analysts and detectives was the level of knowledge a detective had about intelligence; sadly, this was often lacking. This was less the case with senior managers who largely recognised the value of intelligence albeit were generally less informed on the mechanics of how it worked. Given that detectives and managers have considerable influence over the type of work undertaken by analysts and the actions taken as a result of their intelligence reports this, Morgan Burcher notes, educating them is a key opportunity for change. Training was also an issue for analysts. They reported that the training they received was at times inadequate and complicated by the requirement of some to undertake other duties. The author highlights the benefits of specialisation: becoming subject matter experts on a small number of analytical techniques.

In short, the author finds value in SNA as an investigative tool, including its ability to identify key actors and further avenues of enquiry: identifying information gaps and persons of interest that were previously unknown to detectives. The task then is to act on the findings of this book which is a must read for anyone working or interested in improving criminal investigation generally or tackling organised crime specifically.



# 1

## Introduction: Intelligence-Led Policing, Crime Intelligence and Social Network Analysis

### Introduction

The past two decades have seen considerable change occur within law enforcement and crime intelligence agencies. For example, along with the rest of society, law enforcement agencies have entered what is commonly referred to as the ‘information age’ (Arquilla 2014; Castells 2004; Medina 2014). The outcome has been a dramatic increase in the amount of information both produced and recorded by law enforcement agencies, creating numerous challenges as to how these data are collected, collated and analysed (Arquilla 2014; Brodeur and Dupont 2006; Hauck et al. 2002). A further change has been the blurring of the lines between the domains of law enforcement and national security following many high-profile terrorist attacks, including the 11 September 2001 hijackings and the 7 July 2005 London bombings (Brodeur and Dupont 2006; Coyne and Bell 2011b; Stainer 2013). There have also been changes in the criminal environment with the emergence of ‘new’ crime problems, including cybercrime and cyber terrorism (Taylor et al. 2014). These changes have forced law enforcement agencies to find new ways of understanding and responding to crime. Many law enforcement agencies have turned to

technology to complement longstanding policing and criminal intelligence practices (Taylor et al. 2007). For example, while law enforcement has a long history of attempting to map criminal networks (Harper and Harris 1975), due to access to powerful computing this can now be undertaken far more easily and on a scale that was largely not possible in the past. At the forefront of this more advanced form of criminal network mapping is social network analysis (SNA), a methodology that has received considerable attention as it has the potential to be of significant value to law enforcement agencies contending with a changing policing landscape.

SNA is an analytical tool that examines the social relationships that exist within social entities (Borgatti et al. 2013) such as a criminal network. It is reportedly capable of identifying the overall structure of a network (such as sub-groups), how information flows between members of a network, important individuals and possible targets for disruption (Bright et al. 2012). Reported capabilities such as these have contributed to a great deal of interest in the application of SNA to criminal networks and what it may offer law enforcement as an investigative tool. For example, Borgatti et al. (2009, p. 892) noted that network-related research is a popular topic, with ‘the number of articles in the Web of Science on the topic of “social networks” nearly tripling in the past decade’. Within the field of criminology specifically, ‘to find a manuscript using SNA methods is no longer rare, as both mainstream and specialty journals are now regularly publishing papers using network methods’ (Bouchard and Amirault 2013, p. 119). There is now a large body of literature that has advanced our understanding of criminal networks by providing insight into the structural properties and *modus operandi* of such groups (Ball 2016; Bright et al. 2015a; Koschade 2006; Morselli 2014). Despite the intense interest in SNA, the research to date has been largely confined to retrospective analyses of past criminal networks, often years after they were in operation (Bouchard and Nash 2015). This is understandable given the well-documented difficulty in gaining access to law enforcement data due to security concerns (Bright et al. 2012; Klerks 1999; Krebs 2002; Sparrow 1991). However, this means we know almost nothing about the use of SNA within operational law enforcement environments, and this constitutes a critical gap in our understanding of the



capabilities and limitations of SNA. As Mullins (2012a, p. 19) noted, if we are 'to take SNA to the next level as an investigative tool, there is a clear need for improved understanding about how it is already being used' within operational law enforcement environments.

This book provides an in-depth examination of SNA within operational law enforcement environments. It draws on the existing SNA and intelligence literature, as well as qualitative interviews with intelligence analysts from two Australian state law enforcement agencies, to examine whether and how practitioners can utilise the reported capabilities of SNA. The views of intelligence analysts offer unique insights into the role of this analytical methodology within law enforcement. The book provides an original contribution to both intelligence and SNA literature. It is the first study to explore the use of SNA by law enforcement in Australia and, more broadly, the first study to examine the use of SNA from the perspective of intelligence analysts. The primary objectives of this book are twofold: (1) to identify whether SNA is being used by intelligence analysts in operational law enforcement environments in Australia, and if so how; and (2) to determine what challenges intelligence analysts face when applying network analysis concepts and techniques to criminal networks.

This introductory chapter provides the context for this study and defines several key terms, including 'intelligence-led policing', 'crime intelligence', 'network analysis' and 'social network analysis'. It is important that terms such as network and network analysis are clearly defined, as such concepts are often used in different ways (Whelan 2012). The inconsistent use of such concepts has led to confusion within the intelligence and security fields (Whelan and Dupont 2017). The first section briefly examines some of the historical conceptual frameworks of law enforcement to better understand the latest iteration, intelligence-led policing (ILP). As ILP has been widely adopted by law enforcement agencies both in Australia and abroad (Carter and Carter 2009; Ratcliffe 2016), it is useful to understand the contextual environment in which SNA might be used. This is because the policing model adopted by law enforcement agencies heavily dictates how intelligence is used, including analytical tools like SNA. To achieve this the chapter examines the '3-I model', a framework of how ILP is intended to work within law

enforcement agencies, with ‘crime intelligence’ at its core. Attention then turns to an overview of SNA, including an outline of what differentiates it from other forms of analysis and existing claims about what it can offer law enforcement. This chapter then presents the research design of this study, explaining why semi-structured interviews provided the best opportunity for developing new insight into the use of SNA within operational law enforcement environments. The chapter concludes with a brief outline of the book’s structure.

## Conceptual Frameworks of Law Enforcement

A number of policing paradigms developed during the second half of the twentieth century. These include: community-oriented policing (or simply community policing), problem-oriented policing and CompStat (computer statistics or comparative statistics). It is important to examine these frameworks as they have influenced the development of ILP, which is both the latest iteration in policing (Ratcliffe 2016), and a focal topic for this study. While each of these policing frameworks has similarities, there are differences in their philosophy and the tactics they employ (Ratcliffe 2016). Community-oriented policing places a heavy focus on ‘community involvement in crime prevention efforts’ (Gill et al. 2014, p. 402). While there is no agreed-upon definition of community-oriented policing (McGarrell et al. 2007; Ratcliffe 2016), Taylor (2006) observed that among the different definitions there are several common themes, including a focus on providing greater autonomy to front-line officers to foster relationships with the community. Community-oriented policing is a heavily studied topic, with much of the focus on assessing its effectiveness (Fruhling 2007; Gill et al. 2014; Liederbach et al. 2008; Van Brunsot 2003). For example, a systematic review of 25 studies containing 65 independent tests of community-oriented policing, with the majority conducted in the United States (US), found that while community-oriented policing improved citizen satisfaction, perceptions of disorder and police legitimacy, community-oriented policing had limited impact on reducing incidents of crime and the fear of crime (Gill et al. 2014). This may in part help to explain why many law enforcement

agencies looked to move on to other policing frameworks in an effort to more effectively reduce crime, while maintaining some community policing programmes that are popular with citizens (Skogan 2006).

Emerging out of the US, problem-oriented policing, developed by Herman Goldstein (1979, p. 257), 'calls for the police to take greater initiative in attempting to deal with problems rather than resign themselves to living with them'. It involves analysing a wide range of information sources (including criminal databases, informants and the community) for reoccurring problems in order to develop response strategies (McGarrell et al. 2007). This focus on the community bears clear similarities to community-oriented policing (the two are sometimes bracketed together). However, problem-oriented policing is generally regarded as having a much greater emphasis on analysing available information and trying to target the underlying causes of crime (Ratcliffe 2016). It is claimed that it allows for a shift away from the reactive style of law enforcement that has dominated since the inception of professional policing in favour of a problem-solving orientation (Rogers 2010). It has been suggested that while problem-oriented policing is easy to define, it is difficult to adopt, requiring a significant investment in analytical resources, a willingness to allow policing priorities to be grounded in analysis, and for evidence to be the key determinant in designing responses (Ratcliffe 2016). According to Ratcliffe (2016), these criteria may require a substantial cultural change that is supportive of greater autonomy for lower-ranking officers. That said, problem-oriented policing has had an important role in the emergence of ILP as it helped to lay the foundation within law enforcement, particularly among management, that crime analysis can play a critical role in the formulation of operational strategies (Ratcliffe 2016).

CompStat, which in many ways extends from problem-oriented policing, aims to hold decision-makers accountable by intensely monitoring and analysing crime trends (Carter and Carter 2009, p. 320). An initiative of the New York City Police Department, CompStat was positively associated with a swift reduction in crime rates immediately following its introduction, and was consequently adopted by law enforcement agencies around the world (Vito et al. 2017). It was believed that making managers within law enforcement agencies accountable would make

them more inclined to use the intelligence available to them and subsequently develop more effective crime reduction strategies. However, questions have been raised about the effectiveness of CompStat. For example, in New York City, and many other cities in the US, crime rates had already been dropping for several years before CompStat was introduced (Levitt 2004). Levitt (2004, p. 173) argued that other factors are likely to have had a greater impact on the reduction in crime within New York City, including a 45 per cent increase in the size of the police force from 1991 to 2001, three times more than the national average. It has also been noted that CompStat is largely orientated towards addressing only street crime (Ratcliffe 2016). Despite this, some of the key principles of CompStat, including the importance of using intelligence to guide decision-making, particularly at the managerial level, have been incorporated into the latest framework, ILP.

ILP (also called intelligence-driven policing) has been widely adopted in many countries, including the US, United Kingdom (UK), Canada, Australia and New Zealand (Ratcliffe 2016). ILP draws on elements of the aforementioned frameworks, in particular problem-oriented policing and CompStat, and aims to make decision-making analysis-driven. Furthermore, ILP seeks to move away from a 'reactive' or 'prosecution-directed mode' of policing to a more 'proactive' style of crime prevention (Innes et al. 2005, p. 41; Innes and Sheptycki 2004, p. 1). According to Ratcliffe (2016, p. 66), one of the leading authors on ILP, it can be defined as follows:

Intelligence-led policing emphasises analysis and intelligence as pivotal to an objective, decision-making framework that prioritises crime hot spots, repeat victims, prolific offenders and criminal groups. It facilitates crime and harm reduction, disruption and prevention through strategic and tactical management, deployment, and enforcement.<sup>1</sup>

---

<sup>1</sup> ILP has been defined and conceptualised differently by Carter and Carter (2009). This study has adopted the version of ILP put forward by Ratcliffe (2016) for two reasons. First, the initial criticism and apparent differences between the two versions of ILP suggested by Carter (2013) have largely been addressed in updated versions of Ratcliffe's approach (Ratcliffe 2016), meaning the two are hard to distinguish. Secondly, Ratcliffe's (2016, p. 81) 3-I model (examined later in the chapter), which depicts the main components of ILP, was reportedly adapted from a diagram used

It differs from the previous law enforcement frameworks in several ways. In contrast with problem-oriented policing, which has a strong focus on tactical intelligence, ILP is concerned with both tactical and strategic intelligence. Tactical intelligence can be defined as an ‘intelligence product supporting front line units in taking case-specific action to achieve compliance or enforcement objectives’ (Innes and Sheptycki 2004, p. 7). An example would be information about the specific location of a drug manufacturing site. Unlike tactical intelligence, where a definition has been largely agreed upon (Coyne and Bell 2011a), a shared definition of strategic intelligence remains elusive (Innes and Sheptycki 2004). Therefore, this study will adopt a relatively simple definition. Strategic intelligence can be defined as an attempt ‘to provide insight and understanding, and make a contribution to broad strategies, policies and resources’ (Ratcliffe 2016, p. 74).<sup>2</sup> While both CompStat and ILP are strategically driven, CompStat is focused primarily on crime hot spots, predominantly street crime (such as robbery). ILP is seen as a much broader framework that covers the diverse range of policing activities, including tasks like traffic accident reduction (Ratcliffe 2016). As such, ILP is regarded as a ‘business model’ that places ‘crime intelligence’ at the forefront of managerial decisions concerning the prevention and control of crime (Guidette and Martinelli 2009, p. 132; Ratcliffe 2016, p. 89). Crime intelligence can be defined as:

Analysed information that blends data from crime analysis of crime patterns and hot spots and criminal intelligence drawn from the behaviour of offenders. Here the term *crime intelligence* is used to reflect a realisation that good intelligence stems not only from knowledge about offenders

---

by the Australian Federal Police (AFP). Given that this study is focused on policing within Australia it is appropriate that Ratcliffe’s version is followed.

<sup>2</sup> While much of the intelligence literature defines intelligence on these two ‘planes of operation’ (Ratcliffe 2016, p. 74), others place a third plane, *operational intelligence*, between strategic and tactical intelligence (see Aldrich 2009; Carter 2009; Ratcliffe 2016; Walsh 2011). Operational intelligence can be defined as ‘supporting area commanders and regional operational commanders in planning crime reduction activity and deploying resources to achieve operational objectives’ (Ratcliffe 2016, p. 74).