

Fall 2019

"I heard it through the grapevine": A Randomized Controlled Trial on the Direct and Vicarious Effects of Preventative Specific Deterrence Initiatives in Criminal Networks

Barak Ariel
Hebrew University Faculty of Law

Ashley Englefield
University of Cambridge

John Denley
University of Cambridge

Follow this and additional works at: <https://scholarlycommons.law.northwestern.edu/jclc>



Part of the [Criminology Commons](#)

Recommended Citation

Barak Ariel, Ashley Englefield, and John Denley, *"I heard it through the grapevine": A Randomized Controlled Trial on the Direct and Vicarious Effects of Preventative Specific Deterrence Initiatives in Criminal Networks*, 109 J. CRIM. L. & CRIMINOLOGY 819 (2019).

<https://scholarlycommons.law.northwestern.edu/jclc/vol109/iss4/3>

This Criminology is brought to you for free and open access by Northwestern Pritzker School of Law Scholarly Commons. It has been accepted for inclusion in Journal of Criminal Law and Criminology by an authorized editor of Northwestern Pritzker School of Law Scholarly Commons.

CRIMINOLOGY

“I HEARD IT THROUGH THE GRAPEVINE”: A RANDOMIZED CONTROLLED TRIAL ON THE DIRECT AND VICARIOUS EFFECTS OF PREVENTATIVE SPECIFIC DETERRENCE INITIATIVES IN CRIMINAL NETWORKS

BARAK ARIEL*, ASHLEY ENGLEFIELD‡ & JOHN
DENLEY‡

A rich body of literature exists on deterrence, yet little is known about how deterrence messages are communicated through social networks. This is an important gap in our understanding, because such communication gives rise to the possibility that social institutions can utilize the vicarious effect of the threat of punishment against one individual to reduce the rate of reoffending amongst their criminal associates. To test this, we identified criminals with an extensive offending history (prolific offenders) and their co-offenders using social network analysis and then conducted a randomized controlled trial to measure the effect on both prolific offenders and their co-offenders of delivering a “specific deterrence” message. The treatment—preemptive engagements with prolific offenders by a police officer offering both ‘carrots’ (desistance pathways) and ‘sticks’ (increased sanction

* Corresponding author, PhD, Associate Professor, Institute of Criminology, Faculty of Law, Hebrew University, Mount Scopus, Jerusalem 91905 Israel, +972.2.5882502; barak.ariel@mail.huji.ac.il; and Lecturer in Experimental Criminology, Institute of Criminology, University of Cambridge, Sidgwick Avenue Cambridge CB3 9DA UK, +44.1223.767378, ba285@cam.ac.uk

‡ *Cantab*, Institute of Criminology, University of Cambridge, Sidgwick Avenue Cambridge CB3 9DA UK; ae318@cam.ac.uk

‡ *Cantab*, PhD Candidate, Institute of Criminology, University of Cambridge, Sidgwick Avenue, Cambridge, CB3 9DA UK and Head of Regional Organized Crime Unit (ROCU) for the West Midlands Region; Email: jd596@cam.ac.uk

threat)—was applied to the prolific offenders, but not to their co-offenders. The outcomes suggest that a single officer–offender engagement leads to a crime suppression effect in all comparisons, with 21.3%, 11.0%, and 15.0% reductions for specific, vicarious, and total network deterrence effects, respectively. The findings suggest that (a) social network analysis based on in-house police records can be used to cartographically understand social networks of offenders, with an aim of preventing crime; (b) deterrence messages promulgated by the police have the capacity to reduce crime beyond what was previously assumed, as the cascading of threats in co-offending relationships carries a vicarious crime reduction impact; (c) unlike “reactive specific deterrence” (i.e., a threat of punishment following a specific and detected crime) which can have perverse effects on certain offenders, preventative specific deterrence is a promising crime policy.

INTRODUCTION	821
I. LITERATURE REVIEW	824
A. Criminal Networks and Co-Offending	824
B. Messages in Networks	828
C. Specific Deterrence	833
D. Desistance	836
E. Vicarious Deterrence	837
II. THE SACRAMENTO EXPERIMENT	838
III. METHODS	840
A. Research Settings	840
B. Participants	840
1. Criminal Networks in Sacramento	840
2. Prolific Offenders	842
3. Co-offenders	843
C. Random Allocation	845
D. Treatments	845
1. Vicarious Deterrence	847
2. Total Network Effects	847
3. Control conditions	847
E. Measures	848
F. Statistical Procedure	850
G. Statistical Power	852
IV. RESULTS	852
A. Baseline Comparability	852
B. Main Effects	854
V. DISCUSSION	857
A. Theoretical Implications	857

B. Policy Implications.....	862
C. Future Research.....	863
D. Additional Study Limitations	864
VI. SUPPLEMENTARY MATERIALS	866
A. Front Side Of Leaflet.....	866
B. Backside Of Leaflet.....	867

INTRODUCTION

How are messages communicated in networks of people? When does a message become powerful enough to alter behavior? To what extent does a message conveyed by Person A to Person B influence Person C? The assumption across disciplines, including psychology, economics, sociology and public health policy, has been that emotions and behaviors are contagious, cascading between individuals or groups.¹ Concepts like peer pressure, persuasion, or susceptibility have been used since Aristotle, yet identifying the causal influences of contagion in social networks has remained empirically elusive. In part, singling out the effect of a sole message about behavior from the countless bits of information that are transmitted in social group interactions is difficult to describe, let alone to quantify within research settings. Still, the evidence we do have seems to lay out an avenue for testing these concepts in controlled yet real-life settings. Recent studies published in both *Science* and *Nature* have shown how online messaging can alter real-life behavior—for instance voting behavior, consumerism, as well as emotional contagion.² These type of studies, however, are rare.

Can social institutions, such as the police, cascade messages to individuals that reduce their criminal propensity in such a manner that the crime control effects also reduce offending levels throughout their criminal networks? This question becomes particularly pertinent when the ‘target population’ is explicitly reluctant to modify its behavior. Some evidence suggests that text message nudges are effective in the cessation of smoking³

¹ See, e.g., JOHN W. THIBAUT, *THE SOCIAL PSYCHOLOGY OF GROUPS* (1959); Sigal G. Barsade, *The Ripple Effect: Emotional Contagion and Its Influence on Group Behavior*, 47 ADMIN. SCI. Q. 644, 646–48 (2002); Adam D.I. Kramer et al., *Experimental Evidence of Massive-Scale Emotional Contagion Through Social Networks*. 111 PROC. NAT’L. ACAD. SCI. 8788 (2014).

² Robert M. Bond et al., *A 61-Million-Person Experiment in Social Influence and Political Mobilization*, 489 NATURE 295 (2012); Damon Centola, *The Spread of Behavior in an Online Social Network Experiment*, 329 SCI. 1194 (2010); see also Kramer et al., *supra* note 1.

³ William Riley et al., *Internet and Mobile Phone Text Messaging Intervention for College Smokers*, 57 J. AM. COLL. HEALTH 245, 247–48 (2008).

or as reminders to take medications,⁴ but these are generally self-initiated behavioral modifications with some degree of self-motivation. What is not known is whether such messages can become an effective instrument to modify behaviors involuntarily, particularly if the intended recipients are members of criminal groups or gangs that they are unwilling or unable to leave. While influencing members of society to vote has been successful,⁵ one might expect the social and personal costs of desisting from crime, quitting drugs, or managing anger to be substantially higher. This research therefore utilized strong and robust messages in order to maximize the psychological impact on the individuals and groups involved, but in settings that are potentially challenging to change.

Measurement of the contagion effect with quantifiable data on human behavior remains difficult when the research settings are outside of the laboratory environment. Recent experimental studies have attempted to measure the causal effect of peer influence under field-controlled settings,⁶ but there have only been a handful of these⁷ and none in criminology. The lack of randomized controlled trials in this field is interesting by itself because, without proof of causal effect, the underlying foundations of living in groups and the fundamentals of communication require us to *assume* that messages are both conveyed and change behaviors. As well-reasoned as these assumptions may be, a rigorous scientific exploration of these communication patterns in social networks of offenders is essential to provide evidence upon which informed policy decisions can be made.

To address this challenge, we investigated one particular form of potent messages—proactive engagement by police officers with criminals with an extensive offending history (prolific offenders)—that carried the aim of preventing their delinquent behavior. The police are in a position to convey a critical message to offenders: “stop committing crimes.” They can do so by letting the subject know that the police have placed him or her under intensified surveillance. The theory of deterrence predicts that offenders will reduce their criminal activity under these conditions, as it becomes too “risky” to commit crimes. Some research (reviewed below) on specific deterrence—that is, when the state punishes or threatens to punish a particular offender in order to reduce the likelihood of his or her recidivism—

⁴ Jennifer L. Matjasko et al., *Applying Behavioral Economics to Public Health Policy: Illustrative Examples and Promising Directions*, 50 AM. J. PREVENTIVE MED. S13, S16 (2016).

⁵ See Bond et al., *supra* note 2, at 297–98.

⁶ E.g., Sinan Aral & Dylan Walker, *Identifying Influential and Susceptible Members of Social Networks*, 337 SCI. 337 (2012).

⁷ See James H. Fowler & Nicholas A. Christakis, *Cooperative Behavior Cascades in Human Social Networks*, 107 PROC. NAT'L ACAD. SCI. 5334 (2010).

does exist, but has yielded conflicting recommendations.⁸ We want to revisit this approach by looking at preventative rather than reactive specific deterrence initiatives. But we explicitly go beyond that and ask: can the deterrence message “travel” to other members of the criminal community? And if so, is it effective enough to deter these co-offenders from committing crimes? More specifically, can this approach be done preventatively as a way of reducing criminality by those who are more likely to commit crimes, because they have committed them in the past but may not have *necessarily* committed a recent crime?

We conducted a randomized controlled field trial in Sacramento, California, by assigning half of all prolific offenders known to the police into “preventative specific deterrence” and in turn measuring not only the effect of officer-offender interactions on the targeted criminal (Person B) but also the effect of the messages on his co-offenders (Person C) and even other members of the criminal network (Person N). Crucially, the police did not engage with Person C or Person N, but we measured the criminal behavior of Person B, C, and N against the criminal behavior of the control persons.

In order to build our theoretical argument, we combine several intertwined conceptual frameworks. First, we discuss criminal networks more broadly and how this line of inquiry illustrates the relationship between group members, referred to hereafter as “nodes.” Directly linked to this is the study of co-offending and criminal groups, which is a rather mature body of literature in the sociology of crime that dates back to the days of the Chicago School;⁹ however, we place a greater emphasis on the more recent evidence. Second, we present the concept of dyad and group communications more specifically, and what the literature tells us about the ways in which messages are conveyed in social networks. We then move on to discuss the specific type of messages we are interested in manipulating: “preventative specific deterrence.” This type of intervention is meant to increase the perceived likelihood of the arrest of individual offenders as a result of increased sanction threats, but also to incorporate “turning point pathways” as well, as part and parcel of desistance. This then leads us to discuss the idea of vicarious deterrence, as our focus is on the ways in which messages are delivered within social networks.

We then go on to describe our research design; a field-randomized, controlled trial to test these theoretical hypotheses. Directly linked to the theoretical components of our approach, the operationalization of the

⁸ See *infra* Section I.C.

⁹ E.g., CLIFFORD R. SHAW & MAURICE E. MOORE, *THE NATURAL HISTORY OF A DELINQUENT CAREER* 26–41 (1931); Marshall B. Clinard, *The Process of Urbanization and Criminal Behavior*, 48 AM. J. SOC. 202 (1942).

intervention included both carrots and sticks; a threat of increased surveillance, on the one hand, and a referral to assistance as a way out of crime, on the other. Thus, we tested how a message from a formal social control apparatus (the police) travels informally in criminal networks. We then discuss the results of this experiment and present the implications of the findings for both theory and practice.

I. LITERATURE REVIEW

A. CRIMINAL NETWORKS AND CO-OFFENDING

The literature on co-offending—that is, the committing of crime in dyads or larger groups—is one of the most evolved and mature areas of research in criminology.¹⁰ The term “co-offending” was introduced by Professor Reiss¹¹ not too long ago, yet the scholastic enterprise on committing crimes in groups has existed for some time.¹² Recent empirical

¹⁰ See, e.g., ALEX R. PIQUERO ET AL., KEY ISSUES IN CRIMINAL CAREER RESEARCH: NEW ANALYSES OF THE CAMBRIDGE STUDY IN DELINQUENT DEVELOPMENT 2 (2007); MARK WARR, COMPANIONS IN CRIME: THE SOCIAL ASPECTS OF CRIMINAL CONDUCT (2002); Martin A. Andersen & Marcus Felson, *The Impact of Co-Offending*, 50 BRIT. J. CRIMINOLOGY 66 (2010); Peter J. Carrington, *Group Crime in Canada*, 44 CANADIAN J. CRIMINOLOGY 277 (2002); Peter J. Carrington, *Co-Offending and the Development of the Delinquent Career*, 47 CRIMINOLOGY 1295 (2009); Peter J. Carrington, & Sarah B. van Mastrigt, *Co-Offending in Canada, England and the United States: A Cross-National Comparison*, 14 GLOBAL CRIME 123 (2013); Joan McCord & Kevin P. Conway, *Patterns of Juvenile Delinquency and Co-Offending*, in 9 ADVANCES IN CRIMINOLOGICAL THEORY 15 (2002); Jean McGloin et al., *Investigating the Stability of Co-Offending and Co-Offenders Among a Sample of Youthful Offenders*, 46 CRIMINOLOGY 155 (2008); Albert J. Reiss Jr., *Co-Offending and Criminal Careers*, 10 CRIME & JUST. 117 (1988); Albert J. Reiss Jr. & David P. Farrington, *Advancing Knowledge About Co-Offending: Results from a Prospective Longitudinal Survey of London Males*, 82 J. CRIM. L. & CRIMINOLOGY 360 (1991); Jerzy Sarnecki, *Delinquent Networks: Youth Co-Offending in Stockholm*, in CAMBRIDGE STUDIES IN CRIMINOLOGY (Alfred Blumstein & David Farrington eds., 2001); Sarah B. van Mastrigt & David P. Farrington, *Co-Offending, Age, Gender and Crime Type: Implications for Criminal Justice Policy*, 49 BRIT. J. CRIMINOLOGY 552 (2009); Sarah B. van Mastrigt & David P. Farrington, *Prevalence and Characteristics of Co-Offending Recruiters*, 28 JUST. Q. 325 (2011).

¹¹ Albert J. Reiss, *Co-Offending and Criminal Careers*, in 10 CRIME AND JUSTICE: A REVIEW OF RESEARCH (Michael Tonry & Norval Morris eds., 1988).

¹² E.g., SOPHONISBA P. BRECKINRIDGE & EDITH ABBOTT, THE DELINQUENT CHILD AND THE HOME 33–35 (1912); RICHARD A. CLOWARD & LLOYD E. OHLIN, DELINQUENCY AND OPPORTUNITY, A THEORY OF DELINQUENT GANGS 150–59 (1966); ALBERT COHEN, DELINQUENT BOYS: THE CULTURE OF THE GANG 84 (1955); CLIFFORD R. SHAW & MAURICE E. MOORE, THE NATURAL HISTORY OF A DELINQUENT CAREER 26–41 (1931); CLIFFORD R. SHAW, & HENRY D. MCKAY, REPORT ON THE CAUSES OF CRIME, VOL. II (1931); EDWIN H. SUTHERLAND, *A Sociological Theory of Criminal Behavior*, in PRINCIPLES OF CRIMINOLOGY (4th ed., 1947).

evidence suggests co-offending is widespread.¹³ Co-offending is a broad term both in terms of group dynamics and the types of criminality that such groups engage in. Previous research includes groups that can vary in size, ranging from two members¹⁴ to many dozens, including gangs, mafias, and organized crime groups¹⁵ often working together in furtherance of their criminal endeavors. Further, while van Mastrigt and Farrington identified co-offending as particularly prevalent in relation to juvenile delinquency, robbery and burglary, most offenders—up to 56%¹⁶ and even 80%¹⁷—have committed a crime with others at a certain point of their careers. Co-offending can be a life-long partnership or a “one-off” association for a particular job, depending on the social capital involved¹⁸ or the opportunistic nature of the offense.¹⁹ The magnitude and stability of the co-offending network is related to a number of factors, but it has been shown that the amount of crime committed with others is more profound than by solo careerists, with larger groups generating more crimes and more serious harm to society.²⁰

It has been assumed across several lines of investigation that what sets co-offending apart from solo offending is a social process of association with other co-offenders or prospective co-offenders.²¹ For this (and other) reasons, co-offending can be contextualized as a learning process, coupled

¹³ See Peter J. Carrington, *Co-offending*, in *ENCYCLOPEDIA OF CRIMINOLOGY AND CRIMINAL JUSTICE* (Gerben Bruinsma & David Weisburd eds., 2014).

¹⁴ E.g., Albert J. Reiss Jr., *Co-Offending and Criminal Careers*, 10 *CRIME & JUST.* 117 (1988); WARR, *supra* note 10, at 31–36.

¹⁵ E.g., Malcolm W. Klein & Lois Y. Crawford, *Groups, Gangs, and Cohesiveness*, 4 *J. RES. CRIME & DELINQ.* 63 (1967).

¹⁶ See Sarnecki, *supra* note 10.

¹⁷ McCord & Conway, *supra* note 10, at 15.

¹⁸ See Bill McCarthy & John Hagan, *When Crime Pays: Capital, Competence, and Criminal Success*, 79 *SOC. FORCES* 1035, 1053–54 (2001).

¹⁹ See Brendan Lantz & Robert Hutchison, *Co-Offender Ties and the Criminal Career: The Relationship Between Co-Offender Group Structure and the Individual Offender*, 52 *J. RES. CRIME & DELINQ.* 658, 660 (2015); McGloin et al., *supra* note 10, at 179; Mark Warr, *Organization and Instigation in Delinquent Groups*, 34 *CRIMINOLOGY* 11, 27 (1996); see also Daniel S. Nagin et al., *Deterrence, Criminal Opportunities, and Police*, 53 *CRIMINOLOGY* 74 (2015).

²⁰ See Martin A. Andersen & Marcus Felson. *The Impact of Co-Offending*, 50 *BRIT. J. CRIMINOLOGY* 66, 67 (2010); Ashley Englefield & Barak Ariel, *Searching for Influential Actors in Co-Offending Networks: The Recruiter*, 5 *INT’L J. SOC. SCI. STUD.* 24, 36 (2017); Jean Marie McGloin & Alex R. Piquero, *On the Relationship between Co-Offending Network Redundancy and Offending Versatility*, 47 *J. RES. CRIME & DELINQ.* 63, 77–79 (2010).

²¹ See generally CLOWARD & OHLIN, *supra* note 12; SUTHERLAND, *supra* note 12.

with differential association behaviors.²² This exchange of ideas, or transfer of knowledge, includes not only technical skills,²³ but also the sharing of justifications, rationalizations, or normative affirmations that the crime *should* be committed.²⁴ Consequently, the conditions in which this process of association takes place—that is, how a collective criminal mindset is established across the group—are of great interest to crime scholars.²⁵ The prominent theories in this space are reviewed below.

Frank Weerman's social exchange theory is particularly pertinent.²⁶ It shows that co-offending is an interpersonal exchange of tangible and intangible goods, in which each offender has something to gain from the cooperation of the other.²⁷ Apart from relationships formed under duress and taking advantage of vulnerable people, crime is not very different from normative contractual arrangements, in the sense that parties co-operate in order to materialize a shared vision for preferential outcomes.²⁸ Whatever the goods, the risks involved in securing the goods or the methods needed to achieve it, rational co-offenders enter these relationships with the notion of gaining and receiving benefits.²⁹ Thus, co-offending can be seen as an explicit instrumental process.³⁰

²² See generally SUTHERLAND, *supra* note 12; Ronald L. Akers et al., *Social Learning and Deviant Behavior: A Specific Test of a General Theory*, 44 AM. SOC. REV. 636 (1979); Albert Bandura, *Self-Efficacy: Toward a Unifying Theory of Behavioral Change*, 84 PSYCHOL. REV. 191 (1977).

²³ See McGloin & Piquero, *supra* note 20, at 65–67.

²⁴ See JACK KATZ, *SEDUCTIONS OF CRIME: MORAL AND SENSUAL ATTRACTIONS IN DOING EVIL* (1st ed. 1988); see generally MONICA BLUMENTHAL ET AL., *JUSTIFYING VIOLENCE: ATTITUDES OF AMERICAN MEN* (1972); Gresham M. Sykes & David Matza, *Techniques of Neutralization: A Theory of Delinquency*, 22 AM. SOC. REV. 664 (1957).

²⁵ E.g., Sarnecki, *supra* note 10.

²⁶ See Frank Weerman, *Co-Offending as Social Exchange: Explaining Characteristics of Co-Offending*, 43 BRIT. J. CRIMINOLOGY 398, 404 (2003).

²⁷ *Id.*

²⁸ See *id.*

²⁹ See Gary S. Becker, *Crime and Punishment: An Economic Approach*, 76 J. POL. ECON. 169, 176 (1968); Derek B. Cornish & Ronald V. Clarke, *Opportunities, Precipitators and Criminal Decisions: A Reply to Wortley's Critique of Situational Crime Prevention*, 16 CRIME PREVENTION STUD. 41, 50, 70 (2003); Pierre Tremblay, *Searching for Suitable Co-Offenders, in* 5 ROUTINE ACTIVITY AND RATIONAL CHOICE 17, 33–36 (2017); Weerman, *supra* note 26, at 404.

³⁰ See Leanne F. Alarid et al., *Group and Solo Robberies: Do Accomplices Shape Criminal Form?*, 37 J. CRIM. JUST. 1, 6 (2009); Bill McCarthy et al., *Uncertainty, Cooperation, and Crime: Understanding the Decision to Co-Offend*, 77 SOC. FORCES 155, 173–74 (1998).

In this respect, co-offending is a rational decision, especially since it is more prevalent in crime categories that require an accomplice.³¹ If there is no "functional advantage" for collaborating,³² co-offending is less likely to occur. Some argue that this rational choice model is over-simplified,³³ given the wider critique against rational choice and the extent to which we use heuristics or social selection effects³⁴ to drive our behaviors.³⁵ However, at least one aspect of rational choice theory³⁶ can be agreed upon: the decision to co-offend is an instrumental decision to exchange.³⁷ Even if other psychosocial dimensions play a part in the decision to commit crime with others, co-offending remains a utility-based, purposeful behavior for those who partake.

Related to this line of research is "participation literature," which suggests that agency is pivotal to participation in group activities and at the same time participation affects the agent; this means that participants learn to participate by participating.³⁸ It is essentially a learning process whereby the members of the group enhance their own personal efficacy skills.³⁹ In co-offending relationships, this has been referred to as the implicit aspects of

³¹ See Marie Skubak Tillyer & Rob Tillyer, *Maybe I Should Do This Alone: A Comparison of Solo and Co-Offending Robbery Outcomes*, 32 JUST. Q. 1064, 1080–81 (2015); see generally RICHARD T. WRIGHT & SCOTT H. DECKER, *BURGLARS ON THE JOB: STREETLIFE AND RESIDENTIAL BREAK-INS* (1994).

³² See generally Sarah B. van Mastrigt, *Co-offending and Co-offender Selection*, in THE OXFORD HANDBOOK OF OFFENDER DECISION MAKING 340 (Wim Bernasco et al. eds., 2017).

³³ E.g., Amos Tversky & Daniel Kahneman, *Judgment under Uncertainty: Heuristics and Biases*, in UTILITY, PROBABILITY AND HUMAN DECISION MAKING 141 (Dirk Wendt & Charles Vlek eds., 1st ed. 1975).

³⁴ See generally Sheldon Glueck & Eleanor Glueck, *Unraveling Juvenile Delinquency*, 2 JUV. CT. JUDGES. 32 (1950); MICHAEL R. GOTTFREDSON & TRAVIS HIRSCHI, *A GENERAL THEORY OF CRIME* (1990).

³⁵ See *id.*

³⁶ See generally R. V. G. Clarke & Marcus Felson, *Routine Activity and Rational Choice*, in 5 ADVANCES IN CRIMINOLOGICAL THEORY (Ronald V. Clarke & Marcus Felson eds., 1st ed., 2004).

³⁷ See, e.g., Jean Marie McGloin & Zachary R. Rowan, *A Threshold Model of Collective Crime*, 53 CRIMINOLOGY 484, 485–86 (2015); Jean Marie McGloin & Kyle J. Thomas, *Incentives for Collective Deviance: Group Size and Changes in Perceived Risk, Cost, and Reward*, 54 CRIMINOLOGY 459 (2016); Weerman, *supra* note 26, at 404.

³⁸ Phillip Boyle, *Participation in Neighborhood Governance and Its Influence on Sense of Community, Capacity, and Legitimacy* 34 (1997) (unpublished Ph.D. dissertation, University of Colorado at Denver).

³⁹ See generally FRANCIS FUKUYAMA, *THE GREAT DISRUPTION: HUMAN NATURE AND THE RECONSTITUTION OF SOCIAL ORDER* (1999); Miller McPherson, *An Ecology of Affiliation*, 48 AM. SOC. REV. 519 (1983); Robert Putnam, *Social Capital: Measurement and Consequences*, 2 CANADIAN J. POL'Y RES. 41 (2001).

the decision to co-offend,⁴⁰ and these include “norm acquisition, modeling, tutelage, loyalty, fear of ridicule/sanction, status seeking, and peer pressure.”⁴¹ These concepts will immediately become critical when we discuss the circumstances in which group messages are communicated effectively.

Professor Akers would have undoubtedly agreed that co-offending is an important mechanism through which criminal definitions, skills, and rationalizations are transmitted from more experienced to less-experienced offenders in criminal networks.⁴² Therefore, “involvement with recruiter co-offenders early in one’s criminal career may provide particularly powerful learning opportunities in which one can directly observe and imitate the behaviors and values of more experienced teacher accomplices.”⁴³ For example, criminal behavior is learned particularly through interactions with other individuals in a process of communication; the principal part of the learning of criminal behavior occurs within intimate personal groups.⁴⁴

B. MESSAGES IN NETWORKS

In order to assume that dealing with offenders will have an effect on their co-offenders, we must accept an inherent assumption that group communications take place in these human interactions. These verbal (and nonverbal) communications are so fundamental and yet are taken for granted and often overlooked in research. However, social network scholars as well as criminal co-offending researchers should not ignore dyad or small-group communications, because even the basic inquiries in this research space may teach us about how criminal networks form, under which conditions they persist and how they could potentially be dismantled through formal or informal social control mechanisms.⁴⁵ Yet we know very little about how offenders interact with one another⁴⁶ with whom they choose to interact in

⁴⁰ See generally McGloin & Rowan, *supra* note 37, at 486.

⁴¹ Van Mastrigt, *supra* note 32, at 350.

⁴² See RONALD L. AKERS, *SOCIAL LEARNING AND SOCIAL STRUCTURE: A GENERAL THEORY OF CRIME AND DEVIANCE* (2011).

⁴³ Van Mastrigt & Farrington, *supra* note 10, at 329; see also Reiss Jr. & Farrington, *supra* note 10, at 365–66.

⁴⁴ See Jean Marie McGloin & Holly Nguyen, *It Was My Idea: Considering the Instigation of Co-Offending*, 50 *CRIMINOLOGY* 463, 484–85 (2012); see also Warr, *supra* note 19, at 12–17.

⁴⁵ See generally Christopher J. Lennings et al., *Grooming for Terror: The Internet and Young People*, 17 *PSYCHIATRY PSYCHOL. & L.* 424 (2010).

⁴⁶ See generally DIEGO GAMBETTA, *CODES OF THE UNDERWORLD: HOW CRIMINALS COMMUNICATE* (2011).

order to offend—what Felson refers to as “offender convergence”⁴⁷—and how “crime ideas” are developed outside solo acts of crimes. Do co-offending ideas progress over time; is co-offending crime more spontaneous in nature—as the phrase goes, “birds of a feather flock together”; or is it strictly based on the attractiveness of certain opportunities?⁴⁸ How much planning takes place? Who instigated whom? What types of pressure messages are placed on which party? The evidence in criminology is rather thin.

To answer these questions, we can draw from the general literature on group communications.⁴⁹ We can also draw inferences about criminal group communications from research on the cascade of online messages between peers,⁵⁰ on how messages are transpired prior to social demonstrations,⁵¹ or on social influence and political mobilization.⁵² The health behavior change literature is also informative here, including a number of behavioral theories.⁵³ A common thread that runs through all of this research has to do with how messages can be delivered effectively and in the most persuasive way. For group communications to be sustainable and efficient, some level of interdependence is needed between the parties,⁵⁴ and the group needs to

⁴⁷ Marcus Felson, *The Process of Co-Offending*, in 16 CRIME PREVENTION STUDIES 149 (Martha J. Smith & Derek B. Cornish eds., 2003).

⁴⁸ See generally Alarid et al., *supra* note 30, at 6; Nagin et al., *supra* note 19.

⁴⁹ Space limitations preclude a detailed dialogue of the intricacies and distinctions of each theory, but some reviews of the literature are useful. See generally NEW DIRECTIONS IN GROUP COMMUNICATION (Lawrence R. Frey ed., 2002); Dennis S. Gouran & Aubrey B. Fisher, *The Function of Human Communication in the Formation, Maintenance and Performances of Small Groups*, in HANDBOOK OF RHETORICAL AND COMMUNICATION THEORY 622 (Carroll C. Arnold & John Waite Bowers eds., 1984); John F. Cragan and David W. Wright, *Small Group Communication Research of the 1980s: A Synthesis and Critique*, 41 COMM. STUD. 212 (1990).

⁵⁰ E.g., Sandra Gonzales-Bailon et al., *The Dynamics of Protest Recruitment through an Online Network*, 1 SCI. REP. 197 (2011); Zi Yang et al., Tsinghua University, Presented Paper at the ACM Conference on Information and Knowledge Management: *Understanding Retweeting Behaviors in Social Networks* (October 2010).

⁵¹ E.g., Bernard Enjorlas et al., *Social Media and Mobilization to Offline Demonstrations: Transcending Participatory Divides?*, 15 NEW MEDIA & SOC'Y 890 (2013).

⁵² E.g., Bond et al., *supra* note 2.

⁵³ E.g., EMERGING THEORIES IN HEALTH PROMOTION PRACTICE AND RESEARCH: STRATEGIES FOR IMPROVING PUBLIC HEALTH (Ralph J. DiClemente et al. eds., 1st ed. 2002); Karen Glanz & Marc D. Schwartz, *Stress, Coping and Health Behavior*, in HEALTH BEHAVIOR AND HEALTH EDUCATION 210 (Karen Glanz et al. eds., 2002); Paul Krebs et al., *A Meta-Analysis of Computer-Tailored Interventions for Health Behavior Change*, 51 PREVENTIVE MED. 214 (2010).

⁵⁴ See generally KURT LEWIN, FIELD THEORY IN SOCIAL SCIENCE: SELECTED THEORETICAL PAPERS (Dorwin Cartwright ed., 1951).

share some delinquent norms and beliefs about their effectiveness and appropriateness.⁵⁵ Some level of shared identity is also required.⁵⁶ Collectively, these variables may speak to whether the network will be long-standing or a special-purpose vehicle⁵⁷ and the extent to which “crime chatter” develops into criminal actions (online social network chat rooms that promote crime are a case in point, such as human trafficking for sexual exploitation, drug markets, and illegal downloading of films).⁵⁸ Yet again, the fundamental virtue of all networks is that a certain intimate level of communication and message transference is required.

Offenders also communicate between themselves about the perceived risk of apprehension,⁵⁹ cost avoidance,⁶⁰ and whether targets are safe or risky.⁶¹ Offenders also discuss “crime ideas” with people they confide in and with whom they engage in criminal activity more freely than with others.⁶² Co-offenders are likely to be more cautious together, as they are able to identify additional risk factors, and they tend to select more lucrative targets together than alone.⁶³ The very choice of whom to co-offend with depends on the level of trust individuals accord to their potential accomplices,⁶⁴ which is fundamentally based on communications with these potential accomplices.

⁵⁵ See generally Fredric M. Jablin & Patricia Sias, *Communication Behavior in Organizations-Communicative Competence*, in THE NEW HANDBOOK OF ORGANIZATIONAL COMMUNICATION: ADVANCES IN THEORY, RESEARCH AND METHODS (Fredric M. Jablin & Linda L. Putnam eds., 2004).

⁵⁶ See generally ERNEST G. BORMANN, *SMALL GROUP COMMUNICATION: THEORY AND PRACTICE* (3d ed. 1990).

⁵⁷ See generally JOHN F. CRAGAN ET AL., *COMMUNICATION IN SMALL GROUPS: THEORY, PROCESS, SKILLS* (7th ed. 2009); Alex Bavelas, *Communication Patterns in Task-Oriented Groups*, 22 J. ACOUSTICAL SOC'Y AM. 725, 730 (1950).

⁵⁸ See generally Gulia A. Capra et al., *Current Scientific Research on Paedophilia: A Review*, 20 J. PSYCHOPATHOLOGY 17, 22–23 (2014); Dennis Howitt & Kerry Sheldon, *The Role of Cognitive Distortions in Paedophilic Offending: Internet and Contact Offenders Compared*, 13 PSYCH., CRIME & L. 469 (2007); Tejashree D. Datar & Richard Mislán, Purdue University, Presented Paper at the Annual ADFSL Conference on Digital Forensics, Security and Law: *Social Networking: A Boon to Criminals* (May 19, 2010).

⁵⁹ See *infra* note 77 and accompanying discussion.

⁶⁰ See Martin Bouchard & Holly Nguyen, *Is It Who You Know, or How Many That Counts? Criminal Networks and Cost Avoidance in a Sample of Young Offenders*, 27 JUST. Q. 130, 131, 151–52 (2010).

⁶¹ See Cornish & Clarke, *supra* note 29, at 57, 64.

⁶² See McCarthy et al., *supra* note 30, at 162.

⁶³ See generally PAUL F. CROMWELL ET AL., *BREAKING AND ENTERING: AN ETHNOGRAPHIC ANALYSIS OF BURGLARY* (1991); Wim Bernasco, *Co-Offending and the Choice of Target Areas in Burglary*, 3 J. INVESTIGATIVE PSYCHOL. & OFFENDER PROFILING 139 (2006); Serge Moscovici & Marisa Zavalloni, *The Group as a Polarizer of Attitudes*, 12 J. PERSONALITY & SOC. PSYCHOL. 125 (1969).

⁶⁴ See generally Tremblay, *supra* note 29, at 17.

Given the uncertainties about cooperating in criminal behavior, the need to efficiently communicate the costs and benefits of committing a crime is cardinal in co-offending relationships. This is why offenders are able to understand the value of cooperation. Translating this insight into action requires that offenders are willing to risk the trust that cooperation demands. Although criminal cooperation is frequently discouraged by the uncertainty involved, . . . networks . . . influence people's willingness to co-offend."⁶⁵

Consequently, Andrew V. Papachristos was accurate when he argued that "social bonding, cohesion and control, opportunity structures, diffusion, trust, and peer influence" convey the importance of an individual's network on their decision to commit crimes.⁶⁶ This may be the reason why co-offending is more likely to take place in preexisting social networks and with childhood friends,⁶⁷ unless an expert is required for co-offending. In short, being in a group requires people to trust each other as much as possible and to communicate with one another regarding the risks and perils of the profession, or else, co-offending would not be possible.

So far, we have discussed how offenders "carry" messages within social networks. An important yet missing piece of the puzzle, however, is how offenders register, process, and then cascade messages that originate from external sources and pass on to other group members. This issue can be contextualized more broadly as the ways in which formal and informal social structures interact. Both of these systems (the police on the one hand and friendships on the other, for example) have the potential to significantly affect the nature of the community.⁶⁸ Whereas formal social structures have established rules, centralized roles, and activities; informal social structures are often diffused (however, they do not have to be, such as with pyramid-shaped organized crime groups) and less stringent about the rules of social

⁶⁵ McCarthy, *supra* note 30, at 174.

⁶⁶ Andrew V. Papachristos, *The Coming of a Networked Criminology?*, in MEASURING CRIME AND CRIMINALITY: ADVANCES IN CRIMINOLOGICAL THEORY 101, 103 (John MacDonald ed., 2011); *see generally* Andy Hochstetler, *Opportunities and Decisions: Interactional Dynamics in Robbery and Burglary Groups*, 39 CRIMINOLOGY 737 (2001); van Mastrigt, *supra* note 32.

⁶⁷ *See* TRACEY BUDD ET AL., HOME OFFICE RESEARCH, DEVELOPMENT AND STATISTICS DIRECTORATE, OFFENDING IN ENGLAND AND WALES: FIRST RESULTS FROM THE 2003 CRIME AND JUSTICE SURVEY 61 (2005).

⁶⁸ *See* John M. Bolland & Debra Moehle McCallum, *Neighboring and Community Mobilization in High-Poverty Inner-City Neighborhoods*, 38 URB. AFFAIRS R. 42, 56–60, 63–64 (2002); *see generally* GLORIA J. GALANES ET AL., EFFECTIVE GROUP DISCUSSION: THEORY AND PRACTICE (11th ed. 2003); Melanie C. Green & Timothy C. Brock, *Persuasiveness of Narratives*, in PERSUASION: PSYCHOLOGICAL INSIGHTS AND PERSPECTIVES 117 (Melanie C. Green & Timothy C. Brock eds., 2d ed. 2005); Frances Cleaver, *Paradoxes of Participation: Questioning Participatory Approaches to Development*, 11 J. INT'L DEV. 597 (1999).

interactions.⁶⁹ For our purpose—and as developed more fully by Donahue—it is possible to view these two social structures as “externally imposed and internally generated, depending on the size of the community under examination.”⁷⁰

Offenders may communicate codes of behavior, the pros and cons of various tactics, the trustworthiness of certain group members, or the justification or rationalization for committing certain crimes⁷¹—all of which are internal to the norms and practices of the group—but they can also communicate sanction threats, the attractiveness of suitable targets, and the whereabouts of capable guardians.⁷² In this respect, ethnographic research on illegal drug markets is informative. Adler shows how drug dealers utilize their network of colleagues and friends not only to establish their clientele portfolio, but also to communicate information about apprehension risk by both the police as well as rival dealers.⁷³ Rafik A. Mohamed and Erik D. Fritsvold⁷⁴ uncovered similar findings. Alex Piquero and Raymond Paternoster added that drunk drivers estimate their own conviction and punishment probabilities through other drunk drivers’ experiences.⁷⁵ Other studies have shown how messages about sanction threats, risks, and the potential to avoid punishment travel in groups.⁷⁶ These “formal messages,” which are part and parcel of deterrence, are then cascaded within the

⁶⁹ See Putnam, *supra* note 39, at 42; see generally ROLAND L. WARREN, *THE COMMUNITY IN AMERICA* (3d ed. 1978).

⁷⁰ Patricia Ann Farrell Donahue, We, the Community: A Study of Participation, Community and Public Policy 31–32 (Nov. 11, 2013) (on file with author).

⁷¹ See SUTHERLAND, *supra* note 12, 77–80; see generally Sykes & Matza, *supra* note 12, at 664–65.

⁷² See Greg Pogarsky et al., *Modeling Change in Perceptions About Sanction Threats: The Neglected Linkage in Deterrence Theory*, 20 J. QUAN. CRIMINOLOGY 343, 360 (2004); see generally, e.g., PATRICIA A. ADLER, *WHEELING AND DEALING: AN ETHNOGRAPHY OF AN UPPER-LEVEL DRUG DEALING AND SMUGGLING COMMUNITY* (2d ed. 1993); Barak Ariel & Henry Partridge, *Predictable Policing: Measuring the Crime Control Benefits of Hotspots Policing at Bus Stops*, 33 J. QUANTITATIVE CRIMINOLOGY 809, 811–12 (2017); Barak Ariel et al., “Soft” Policing at Hot Spots—Do Police Community Support Officers Work? A Randomized Controlled Trial, 12 J. EXPERIMENTAL CRIMINOLOGY 277 (2016).

⁷³ ADLER, *supra* note 72.

⁷⁴ RAFIK A. MOHAMED & ERIK D. FRITSVOLD, *DORM ROOM DEALERS: DRUGS AND THE PRIVILEGES OF RACE AND CLASS* (2010).

⁷⁵ Alex Piquero & Raymond Paternoster, *An Application of Stafford and Warr’s Reconceptualization of Deterrence to Drinking and Driving*, 35 J. RES. IN CRIME & DELINQ. 3 (1998).

⁷⁶ Pogarsky, *supra* note 72, at 360; Alicia H. Sitren & Brandon K. Applegate, *Testing the Deterrent Effects of Personal and Vicarious Experience with Punishment and Punishment Avoidance*, 28 DEVIANT BEHAV. 29 (2007).

offending group, and it is this social process that our research is most interested in.

C. SPECIFIC DETERRENCE

One major type of message that the state can transmit to offenders is the threat “do not offend or else.” The direct and specific warning approach has been suggested to reduce crime, for those who are the target of these interventions, are what Enlightenment philosophers referred to as “specific deterrence” (as opposed to “general deterrence”) messages.⁷⁷ Specific deterrence is efficient when the cost of crime outweighs the profits of crime and when the threat of punishment is perceived to be real, consequential, and probable (or carries “meaningful” dosages of certainty of apprehension, severity of punishment, and the celerity with which it is carried out).⁷⁸

Beyond theory, considerable research exists on the concept of deterrence more broadly and deterrence as administered by the police, although admittedly not all of the available evidence is sufficiently rigorous when it comes to measuring the effect of deterrence on behavior.⁷⁹ There is no agreement in the literature that specific deterrence “works” as a mechanism of modifying behavior,⁸⁰ and some research suggests that under certain conditions it can backfire.⁸¹ However, it is still generally the case that when appropriately applied, “perceived sanction risk is related to lower

⁷⁷ See generally JACK P. GIBBS, *CRIME, PUNISHMENT, AND DETERRENCE* (1975).

⁷⁸ See Daniel S. Nagin, *Deterrence: A Review of the Evidence by a Criminologist for Economists*, 5 ANN. REV. ECON. 83, 85–89 (2013); Daniel S. Nagin, *Deterrence in the Twenty-First Century*, 42 CRIME & JUST. 199, 205–16 (2013); see generally Travis C. Pratt & Jillian T. Turanovic, *Celerity and Deterrence*, in 23 DETERRENCE, CHOICE, AND CRIME: CONTEMPORARY PERSPECTIVES 187 (Daniel S. Nagin et al. eds., 2018).

⁷⁹ See Anthony A. Braga & David L. Weisburd, *The Effects of Focused Deterrence Strategies on Crime: A Systematic Review and Meta-Analysis of the Empirical Evidence*, 49 J. RES. CRIME & DELINQ. 323, 347–48 (2012).

⁸⁰ See, e.g., Travis C. Pratt et al., *The Empirical Status of Deterrence Theory: A Meta-Analysis*, in TAKING STOCK: THE STATUS OF CRIMINOLOGICAL THEORY 367, 374 (Francis T. Cullen et al., eds., 2008); Francis T. Cullen et al., *Prisons Do Not Reduce Recidivism: The High Cost of Ignoring Science*, 91 PRISON J. 48S, 58S (Supp. 2011); see generally ANDREW VON HIRSCH ET AL., *CRIMINAL DETERRENCE AND SENTENCE SEVERITY: AN ANALYSIS OF RECENT RESEARCH* (1999).

⁸¹ See Anthony Petrosino et al., *Scared Straight and Other Juvenile Awareness Programs for Preventing Juvenile Delinquency: A Systematic Review of the Randomized Experimental Evidence*, 589 ANNALS AM. ACAD. POL. & SOC. SCI. 41, 52–55, 58 (2003).

offending,⁸² so the concept nevertheless remains relevant for crime control theory and policy.

Specific deterrence is a broad category and can take many forms. While arrest might be the most popular manifestation of police-based specific deterrence interventions “against” criminals (at least in popular culture); most of the contact by police with suspected offenders, which can result in specific deterrence, does not result in arrest.⁸³ In practice, such contact may refer to a *threat* of imprisonment or arrest, stop-and-frisk (without arrest), street checks, or alternative resolutions, which have gained tremendous popularity in places like England and Wales.⁸⁴ The fact that so many specific deterrence approaches exist alludes to the fact that some specific deterrence approaches can be more effective than others.⁸⁵ Given the heterogeneity of these interventions, we argue that an important distinction should be made between two types of specific deterrence, proactive and reactive, and this distinction is at the heart of our study.

First, there is what we refer to as “reactive specific deterrence,” which follows a particular crime.⁸⁶ Within this mechanism, the state reacts to a specific offense, and the threat of sanctions is then applied to a particular offender.⁸⁷ The aim of reactive specific deterrence is to dissuade him or her from committing additional crimes, above and beyond the crime for which he or she was apprehended.⁸⁸ For example, the Turning Point Diversion

⁸² Lieven Pauwels et al., *Perceived Sanction Risk, Individual Propensity and Adolescent Offending: Assessing Key Findings from the Deterrence Literature in a Dutch Sample*, 8 EUR. J. CRIMINOLOGY 386, 386 (2011).

⁸³ See Barak Ariel & Justice Tankebe, *Racial Stratification and Multiple Outcomes in Police Stops and Searches*, 28 POLICING & SOC'Y 507, 521 (2018); Donald J. Black & Albert J. Reiss, Jr., *Police Control of Juveniles*, 35 AM. SOC. REV. 63, 65–66 (1970); Douglas A. Smith & Patrick R. Gartin, *Specifying Specific Deterrence: The Influence of Arrest on Future Criminal Activity*, 54 AM. SOC. REV. 94, 94–95 (1989); see generally ALFRED BLUMSTEIN ET AL., CRIMINAL CAREERS AND “CAREER CRIMINALS” (1986); FRANKLIN E. ZIMRING & GORDON J. HAWKINS, DETERRENCE: THE LEGAL THREAT IN CRIME CONTROL (1973).

⁸⁴ See, e.g., Peter Neyroud, *Out of Court Disposals Managed by the Police: A Review of the Evidence*, NATIONAL POLICE CHIEF'S COUNCIL OF ENGLAND AND WALES (2018). [perma.cc/FP3F-6AR4]

⁸⁵ See, e.g., David Weisburd et al., *The Miracle of the Cells: An Experimental Study of Interventions to Increase Payment of Court-Ordered Financial Obligations*, 7 CRIMINOLOGY & PUB. POL'Y 9, 27–31 (2008); see also Lawrence W. Sherman & Heather M. Harris, *Increased Death Rates of Domestic Violence Victims from Arresting vs. Warning Suspects in the Milwaukee Domestic Violence Experiment (MildVE)*, 11 J. EXPERIMENTAL CRIMINOLOGY 1, 2 (2015).

⁸⁶ See David H. Bayley, *The Complexities of 21st Century Policing*, 10 POLICING: J. POL'Y & PRAC. 163, 164 (2016).

⁸⁷ See *id.*

⁸⁸ See *id.*

experiment by the West Midlands Police (U.K.) tested the premise that “offenders who have not previously been convicted at court, but whom the police would otherwise charge for prosecution, can be more cost-effectively dealt with by police-led offender management than by prosecution, subject to a certainty of prosecution in the event of reoffending or breaking an agreed ‘contract’ about their conduct.”⁸⁹ Here, the “Sword of Damocles” hangs over the neck of the offender,⁹⁰ where all the arrestees selected for treatment had a rapid (within 72 hours) diagnosis meeting with a police officer, after which the officer offered the arrestees the option of not being prosecuted if they agreed to a “turning point contract,” in which the arrestees would be prosecuted if they breached conditions of the contract or reoffended within six months.⁹¹ Recidivism or contract breach would automatically trigger prosecution for the original offense and any subsequent offenses, which creates a constant threat of punishment and by implication the focused deterrence effect.

Turning Points, however, was a reactive specific deterrence approach because the offender was already apprehended and arrested for a specific offense, and the desistance contract was in the context of *that* first offense. While promising and reflecting a wider and robust approach in criminology,⁹² these interventions follow a particular case (e.g., a specific crime). A person or property had already been victimized. We are interested in a more *preventative* approach; to contact prolific offenders for whom we have no evidence to link them to live cases and to deliver a proactive specific deterrence aimed at reducing their future offending.

Inspiration is drawn from initiatives such as the “Pulling Levers” case outlined in Boston (Operation Ceasefire), which had the broad idea of increasing the “certainty, severity, and swiftness of sanctions” in a number

⁸⁹ Peter Neyroud et al., *Operation Turning Point: An Experiment in “Offender Desistance Policing”*, UNIV. CAMBRIDGE INST. OF CRIMINOLOGY (2009) <https://www.crim.cam.ac.uk/global/docs/events/epb2012/operationturningpoint.pdf/view> [perma.cc/W8KU-NNSQ].

⁹⁰ See Lawrence W. Sherman, *Al Capone, the Sword of Damocles, and the Police-Corrections Budget Ratio: Afterword to the Special Issue*, 10 CRIMINOLOGY & PUB. POL’Y 195, 201 (2011).

⁹¹ Neyroud et al., *supra* note 89.

⁹² See, e.g., Anthony Petrosino et al., *Formal System Processing of Juveniles: Effects on Delinquency*, 9 CRIME PREVENTION RES. REV. 4 (2013); Heather Strang et al., *Reducing the Harm of Intimate Partner Violence: Randomized Controlled Trial of the Hampshire Constabulary CARA Experiment*, 1 CAMBRIDGE J. EVIDENCE-BASED POLICING 160 (2017); Heather Strang et al., *Restorative Justice Conferencing (RJC) Using Face-to-Face Meetings of Offenders and Victims: Effects on Offender Recidivism and Victim Satisfaction. A Systematic Review*, 12 CAMPBELL SYSTEMATIC REVIEWS 3 (2013); David B. Wilson et al., *Police-Initiated Diversion for Youth to Prevent Future Delinquent Behavior: A Systematic Review*, 5 CAMPBELL SYSTEMATIC REVIEWS 5 (2018).

of innovative ways, often by directly interacting with offenders and communicating clear incentives for compliance and consequences for criminal activity.⁹³ An antecedent to a successful focused deterrence approach is that the target population realizes the police can increase the costs of crime through any legal means necessary. The perception of effectiveness is a more important issue,⁹⁴ and as the literature review above suggests, specific deterrence can *only* work when the delivering authority is indeed considered capable of materializing the threat and the consequences of noncompliance are real.⁹⁵ Effective deterrence messages must be perceived as “credible threats,”⁹⁶ delivered by an authority that is considered effective and who can materialize the threat (e.g., arrests) to “deter[] repeated criminality because people respond[] . . . to a subjective pleasure/pain calculus.”⁹⁷ Again, however, the aim of the Pulling Levers program was primarily to carb down ongoing and intense spikes in violent crimes.

D. DESISTANCE

However, deterrence alone does not seem to be able to pull offenders out of a life of crime, certainly not in the long run.⁹⁸ Instead, a mixture of sticks and carrots is necessary. Effective crime control includes pathways of desistance for serious offenders.⁹⁹ Previous research on U.K. initiatives such

⁹³ Braga & Weisburd, *supra* note 79, at 327; see also Anthony A. Braga et al. *Focused Deterrence Strategies and Crime Control: An Updated Systematic Review and Meta-Analysis of the Empirical Evidence*, 17 CRIMINOLOGY & PUB. POL’Y 205 (2018); Anthony A. Braga et al., *Problem-Oriented Policing, Deterrence, and Youth Violence: An Evaluation of Boston’s Operation Ceasefire*, 38 J. RES. CRIME & DELINQ. 195, 196–201 (2001); David M. Kennedy, *Pulling Levers: Chronic Offenders, High-Crime Settings, and a Theory of Prevention*, 31 VAL. U. L. REV. 449, 451–53 (1997). For a critique of this approach, see Mike Rowe & Thomas F. Sogaard, ‘Playing the Man, Not the Ball’: Targeting Organised Criminals, Intelligence and the Problems with Pulling Levers, POLICING & SOC’Y 1 (2019).

⁹⁴ See generally Pogarsky et al., *supra* note 72, at 366.

⁹⁵ See Sherman, *supra* note 90, at 201.

⁹⁶ Robert Jervis, *Rational Deterrence: Theory and Evidence*, 41 WORLD POL. 183, 200 (1989).

⁹⁷ Smith & Gartin, *supra* note 83, at 95; see generally JEREMY BENTHAM, *An Introduction to the Principles of Morals and Legislation*, in THE WORKS OF JEREMY BENTHAM 17 (John Bowring ed., 1962).

⁹⁸ See, e.g., Mark W. Lipsey, *What Do We Learn From 400 Research Studies on the Effectiveness of Treatment with Juvenile Delinquents*, in WHAT WORKS: REDUCING REOFFENDING: GUIDELINES FROM RESEARCH AND PRACTICE 63, 67 (James McGuire ed., 1995).

⁹⁹ See generally David M. Kennedy et al., *Beyond Deterrence: Strategies of Focus and Fairness*, in HANDBOOK OF CRIME PREVENTION AND COMMUNITY SAFETY 157 (Nick Tilley & Aiden Sidebottom eds., 2d ed. 2017).

as the Liverpool Desistance Study,¹⁰⁰ the Sheffield Study,¹⁰¹ and the Bristol Integrated Offender Management Project¹⁰² provided valuable information on how law enforcement agencies can be agents of turning points. Based on these experiences, it appears that when officers manage offenders through a focused deterrence method, recidivism can be minimized. As the officer is acting as both the agent of change via desistance pathways and a tool of threat, this approach is arguably more promising than other channels of intervention.¹⁰³

E. VICARIOUS DETERRENCE

Vicarious deterrence is the final piece of the theoretical framework that forms the basis of this research as it combines the three lines of research we depicted above—co-offending, dyad, or group communications and specific deterrence—together to create a multiplier effect. As far as we can tell, Gibbs was the first to discuss this concept¹⁰⁴ in the framework of capital punishment,¹⁰⁵ but it was more formally introduced by Beylvelde: “Vicarious deterrence occurs when a deterrent effect is achieved by the sanction threatening, not the potential offender personally, but someone other than the potential offender.”¹⁰⁶ Yet it was Stafford and Warr who solidified vicarious deterrence as a more grounded approach; they demonstrated that this process takes place when an offender calculates the certainty of apprehension based on the punishment (or avoidance thereof) of others in their networks.¹⁰⁷ Paternoster and Piquero extended this model by indicating that the

¹⁰⁰ Shadd Maruna et al., *Pygmalion in the Reintegration Process: Desistance from Crime through the Looking Glass*, 10 PSYCHOL. CRIME & L. 271 (2004); Shadd Maruna et al., *The Liverpool Desistance Study and Probation Practice: Opening the Dialogue*, 51 J. COMMUNITY & CRIM. JUST. 221 (2004).

¹⁰¹ Anthony Bottoms & Joanna Shapland, *Steps Towards Desistance among Male Young Adult Recidivists*, in ESCAPE ROUTES: CONTEMPORARY PERSPECTIVES ON LIFE AFTER PUNISHMENT 43 (Stephen Farrall et al. eds., 2011).

¹⁰² Andrew E. Williams & Barak Ariel, *The Bristol Integrated Offender Management Scheme: A Pseudo-Experimental Test of Desistance Theory*, 7 POLICING: J. POL’Y & PRACTICE 123 (2012).

¹⁰³ See Mark W. Lipsey & Francis T. Cullen, *The Effectiveness of Correctional Rehabilitation: A Review of Systematic Reviews*, 3 ANN. REV. L. SOC. SCI. 297, 302–04 (2007).

¹⁰⁴ Jack P. Gibbs, *Preventive Effects of Capital Punishment Other Than Deterrence*, 14 CRIM. L. BULL. 34, 40–41 (1978).

¹⁰⁵ See also Dane Archer et al., *Homicide and the Death Penalty: A Cross-National Test of a Deterrence Hypothesis*, 74 J. CRIM. L. & CRIMINOLOGY 991, 1004 (1983).

¹⁰⁶ Deryck Beylvelde, *Identifying, Explaining and Predicting Deterrence*, 19 BRIT. J. CRIMINOLOGY 205, 213 (1979).

¹⁰⁷ Mark C. Stafford & Mark Warr, *A Reconceptualization of General and Specific Deterrence*, 30 J. RES. CRIME & DELINQ. 123, 124–27 (1993).

information an offender has about the criminal activity of their peers and how successful their crimes are heavily influences an offender's judgment about the certainty of apprehension.¹⁰⁸

The concept of vicarious deterrence across social networks fits squarely within the ways formal social control messages are cascaded. In this respect, we emphasize that there are different levels of vicariousness (i.e., the distance from the threatened/punished node in the network) and that we are most concerned about direct and immediate relationships between offenders (that is, one degree of separation only). Mark Granovetter suggested that in social circumstances in which offenders face sanction threats, they are likely to be affected by the experiences of their peers.¹⁰⁹ The relevance of trust in this equation has to do with the likelihood of the effect of vicarious deterrence to modify the behavior of the co-offenders. Aili Malm et al. have found that vicarious deterrence within social networks outperforms traditional direct deterrence variables in an offender's risk prediction; which leads to the assumption that between peers or colleagues, vicarious deterrence can carry tremendous potential in formal crime prevention initiatives.¹¹⁰ A similar argument was recently made by Anthony Braga, Robert Apel, and Brandon C. Welsh, where they refer to "spillover effects."¹¹¹ However, to our knowledge, a *direct* and controlled test of vicarious deterrence initiated by the state has not been conducted.

II. THE SACRAMENTO EXPERIMENT

Whom within these criminal networks should the state target with deterrence messages? The first logical step is to go after the most prolific offenders: as they are what Lawrence R. Sherman referred to as the "power few," the central actors in the network causing the most harm to society.¹¹² An offender arrested more often than others is likely to be a suitable target,

¹⁰⁸ Alex Piquero & Raymond Paternoster, *An Application of Stafford and Warr's Reconceptualization of Deterrence to Drinking and Driving*, 35 J. RES. IN CRIME & DELINQ. 3 (1998).

¹⁰⁹ MARK GRANOVETTER, TOWARD A SOCIOLOGICAL THEORY OF INCOME DIFFERENCES (1981); see also Bouchard & Nguyen, *supra* note 60, at 130–31, 152–53.

¹¹⁰ Aili Malm et al., *More Structural Holes, More Risk? Network Structure and Risk Perception Among Marijuana Growers*, 51 SOC. NETWORKS 127, 132 (2017) (finding that "network-based vicarious deterrence has a significant effect on perceived risk").

¹¹¹ Anthony A. Braga et al., *The Spillover Effects of Focused Deterrence on Gang Violence*, 37 EVALUATION REV. 314, 316 (2013).

¹¹² Lawrence W. Sherman, *The Power Few: Experimental Criminology and the Reduction of Harm*, 3 J. EXPERIMENTAL CRIMINOLOGY 299, 318–19 (2007) (defining the "power few" and arguing that "big effects in experimental criminology do appear more likely" when resources are allocated to addressing the "power few").

as one's criminal history is a strong predictor of future criminal behavior.¹¹³ In this sense, the state through its social control agents—the police, social workers, probation and parole officers, etc.—ought to compile a list of targets of the most serious offenders and apply a preventative specific deterrence intervention on them.¹¹⁴

However, the list should go beyond the prolific nature of these offenders. If “formal messages” are indeed cascaded within criminal networks, the state would benefit by targeting serious offenders who are these offenders' criminal associates (or “co-offenders”). Thus, the specific deterrence message will affect the target, but the formal message would have an informal effect vicariously as well. In practical terms, the most direct manifestation of this relationship is where an offender is linked to a disproportionate number of co-offenders, compared to the overall population of offenders. Moreover, it is likely that the target is someone within the network of esteemed respectability, trust or power, and the most straightforward assumption is age: a mature offender is more likely to pass on an effective communication within the social network.

Using police records on arrests and charges,¹¹⁵ we were able to conduct a pretest-posttest randomized controlled field trial, in order to test the effect of preventative specific deterrence on prolific Sacramento offenders, which we referred to as “targets.” We then were able to measure the vicarious deterrence effect of these interventions on co-offenders linked to these prolific targets, as well as on the “total network” in which these offenders operate. Our methods were designed to test the effect of messages in criminal networks, whereby a “stop offending, or else! and here are ways for you to get help” message was delivered by a formal, social control apparatus (i.e., the police) and then cascaded informally within groups of offenders.

¹¹³ Daniel S. Nagin & Raymond Paternoster, *On the Relationship of Past to Future Participation in Delinquency*, 29 CRIMINOLOGY 163, 183 (1991) (concluding that the results from their study suggest that “prior involvement in illegal activity has a genuine behavioral impact on future involvement”).

¹¹⁴ See generally Gavin Dudfield et al., *The “Power Curve” of Victim Harm: Targeting the Distribution of Crime Harm Index Values Across All Victims and Repeat Victims Over 1 Year*, 1 CAMBRIDGE J. EVIDENCE-BASED POLICING 38 (2017); Lawrence W. Sherman et al., *Crime, Punishment, and Stake in Conformity: Legal and Informal Control of Domestic Violence*, 57 AM. SOC. REV. 680 (1992).

¹¹⁵ As correctly argued by Jean Marie McGloin et al., “official record data [do] not contain many theoretically relevant predictors of co-offending and co-offenders. Future research should attempt to collect a wide range of data to examine what constellation of individual, environmental, and situational variables are related to co-offending and co-offender patterns.” McGloin et al., *supra* note 10, at 179–80. We return to these observations when discussing the limitations of our study.

III. METHODS

A. RESEARCH SETTINGS

In conducting this study, we collaborated with the Sacramento Police Department (Sacramento P.D.). There are approximately 1.5 million residents in the greater metropolitan area of Sacramento; in 2016, the metropolitan population was comprised of 11% African-Americans and 23% Hispanics, with 87% of the residents having a high school diploma.¹¹⁶ In terms of crime, there were about seven homicides, 242 robberies, and 812 burglaries per 100,000 population.¹¹⁷ In the year before the experiment, approximately 100,000 individuals were arrested for a number of crimes committed in Sacramento, or thirty-four per 1,000 residents.¹¹⁸

B. PARTICIPANTS

1. Criminal Networks in Sacramento

Social network analysis is increasingly implemented in the study of criminal behavior, particularly in “big data” environments.¹¹⁹ Here, we used open-source software (Gephi) to create cartographic network maps. This software allowed us to capture graphically the relationships between offenders and their co-offenders in ways that tabulated data formats cannot. The maps were created by computing the number of links that each offender had with other offenders (co-offenders). We looked at the “betweenness” of these actors,¹²⁰ which is a measure of the centrality of the actor in a network: this meant that each actor and the degree of betweenness were measured by their relative value from within the graph. Every individual is represented

¹¹⁶ See *QuickFacts Sacramento City, California; Sacramento County, California*, UNITED STATES CENSUS BUREAU, <https://www.census.gov/quickfacts/fact/table/sacramentocitycalifornia,sacramentocountycalifornia/INC110216> (last visited Sept. 9, 2019) [perma.cc/K5KF-H897].

¹¹⁷ See *Crime in the United States 2013 California Offenses Known to Law Enforcement*, FEDERAL BUREAU OF INVESTIGATION CRIMINAL JUSTICE INFORMATION SERVICES DIVISION, https://ucr.fbi.gov/crime-in-the-u.s/2013/crime-in-the-u.s.-2013/tables/table-8/table-8-state-cuts/table_8_offenses_known_to_law_enforcement_california_by_city2013.xls. [perma.cc/8BSX-2YX2].

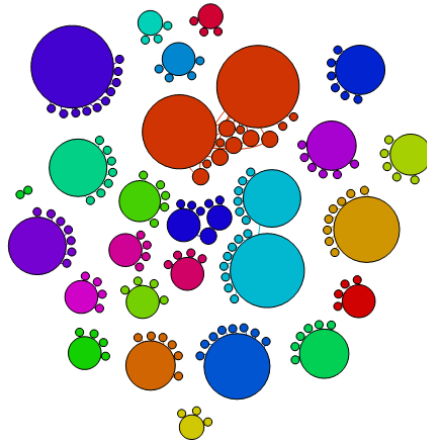
¹¹⁸ See *id.*

¹¹⁹ E.g., Christian Frydensberg et al., *Targeting the Most Harmful Co-Offenders in Denmark: A Social Network Analysis Approach*, 3 CAMBRIDGE J. EVIDENCE-BASED POLICING 21 (2019).

¹²⁰ See generally Linton C. Freeman, *A Set of Measures of Centrality Based on Betweenness*, 40 SOCIOMETRY 35 (1977); M.E.J. Newman, *A Measure of Betweenness Centrality Based on Random Walks*, 27 SOC. NETWORKS 39 (2005).

by a circle, or node, and the size of each circle represents the number of connections, or edges, that each node has with other nodes. Thus, the more an individual co-offends, the more nodes he or she is linked to (see Illustration 1).¹²¹

Illustration 1: Graphic Visualization of co-offending networks.



Legend: large circles represent the target population, and the smaller circles connected with a line to the target population represent associates (co-offenders).

Using this approach, we utilized the computerized list of virtually all known criminals who live in the Sacramento area and were arrested for any type of offense, from which eligible participants could be drawn. No major inclusion restrictions were set in terms of ethnic, social, economic, or demographic variables. While this approach may increase the heterogeneity of the sample,¹²² a wider range of eligible offenders should create a stratified sample of the offenders' community, which in turn is more likely to increase the generalizability of this experiment. At the same time, we included a few operational inclusion criteria, which were designed, as described below, to sit squarely within the potential theoretical contribution of our work, as well as in view of the practical considerations of running a field trial.

¹²¹ See generally John Denley & Barak Ariel, *Whom Should We Target to Prevent? Analysis of Organized Crime in England Using Intelligence Records*, 27 EUR. J. CRIME, CRIM. L. & CRIM. JUST. 13, 22 (2019).

¹²² See generally David Weisburd et al., *Design Sensitivity in Criminal Justice Experiments*, 17 CRIME & JUST. 337, 362–67 (1993) (explaining the effect heterogeneity has on the “statistical power of experimental studies”).

2. Prolific Offenders

To be operationally defined as a “target” for the police intervention, an offender must have had a prolific criminal background,¹²³ which we defined as having been arrested at least three times in the forty-eighty months prior to the experiment, at least once in the last two years, and at least once for a Part I crime.¹²⁴ Given the type of data we had (police records), we naturally excluded offenders who were unknown to the police, meaning that offenders must have been arrested by Sacramento P.D. at least once to become eligible. Second, our upper bound threshold was restricted to three arrests, although this may not have been deemed “highly prolific” in other co-offending studies,¹²⁵ because any tighter restriction would have excluded too many potential offenders. It seemed unlikely that a California offender would have been arrested for a major crime three or more times and not be incarcerated for a long period of time, for example, under the “three strikes” law.¹²⁶ Either way, our attempt was not to focus on high-volume criminals per se, but rather to address offenders that were likely to be persistent and by implication to take part in the offending community and communicate a message to their colleagues and peers.

Another reason for selecting prolific offenders is theoretically driven: there is a distinction between them and novice or immature offenders.¹²⁷ Given the biological, psychological, and sociological disparities between persistent offenders and time-dependent juvenile offenders, and given the

¹²³ See generally McGloin & Nguyen, *supra* note 44, at 465–68; see also Reiss, Jr. & Farrington, *supra* note 10.

¹²⁴ In the United States, the Uniform Crime Reporting (UCR) Program divides offenses into two groups, Part I and Part II crimes. Each month, participating law enforcement agencies submit information on the number of Part I offenses that become known to them; those offenses cleared by arrest or exceptional means; and the age, sex, and race of persons arrested for each of the offenses. Contributors provide only arrest data for Part II offenses.

Crime in the United States 2011 Offense Definitions, FEDERAL BUREAU OF INVESTIGATION CRIMINAL JUSTICE INFORMATION SERVICES DIVISION, (last visited Sept. 10, 2019) <https://ucr.fbi.gov/crime-in-the-u.s/2011/crime-in-the-u.s.-2011/offense-definitions> [perma.cc/EV8B-YJA8]. Part I crimes include the violent crimes of murder and non-negligent manslaughter, rape, robbery, and aggravated assault, the property crimes of burglary, larceny-theft, motor vehicle theft, and arson. *Id.*

¹²⁵ E.g., Peter J. Carrington, *Co-Offending and the Development of the Delinquent Career*, 47 CRIMINOLOGY 1295, 1314 (2009).

¹²⁶ See generally James A. Ardaiz, *California's Three Strikes Law: History, Expectations, Consequences*, 32 MCGEORGE L. REV. 1 (2000); Elsa Y. Chen, *Impacts of 'Three Strikes and You're Out' on Crime Trends in California and throughout the United States*, 24 J. CONTEMP. CRIM. JUST. 345 (2008).

¹²⁷ See, e.g., Terrie E. Moffitt, *Adolescence-Limited and Life-Course-Persistent Antisocial Behavior: A Developmental Taxonomy*, 100 PSYCHOL. REV. 674 (1993).

idea that the police should target persistent criminal careerists;¹²⁸ our aim was to directly tackle the criminal activity of experienced offenders. Furthermore, if the intervention is in a position to increase the sanction threat among prolific offenders, it is conceivable that the intervention will affect naïve offenders but not vice versa.¹²⁹

Second, a target must have had at least three links to other co-offenders. We assumed that in order to test the effect of messages in criminal networks, the targets must be offenders who do not act alone, or at least are usually in the business of reaching out to criminal associates. Our approach was to look at co-offending networks according to arrest records: individuals who were arrested with other offenders. This criterion does limit the population of interest, as it does not include occasions when co-offending takes place but only one of the offenders is arrested, due to either a lack of identification or evidence against the others. A more efficient approach could have been contacting offenders and surveying them about their co-offending behavior.¹³⁰ Intelligence records may have also achieved this goal more productively, as such records often contain additional information about links between criminals that does not directly relate to a specific arrest. However, we had access to neither of these rich sources. While this may limit the external validity of our findings, we needed to assume *a priori* that the cascading of messages in groups *can* happen with our group of offenders and the most direct measures of co-offending were these co-arrest records.

3. Co-offenders

As reviewed earlier, messages are conveyed more effectively when the conveyor is of respected status or a revered member of the network, which is often associated with the conveyor's age.¹³¹ Therefore, we defined co-offenders as offenders who were younger when compared to the targets. "If the nature of the relationship ought to be somewhat similar to a pupil–mentor

¹²⁸ See Wim Bernasco, *Them Again? Same-Offender Involvement in Repeat and Near Repeat Burglaries*, 5 EUR. J. CRIMINOLOGY 411, 427–29 (2008); Susan E. Martin & Lawrence W. Sherman, *Selective Apprehension: A Police Strategy for Repeat Offenders*, 24 CRIMINOLOGY 155, 156–57, 170 (1986).

¹²⁹ See George S. Bridges & James A. Stone, *Effects of Criminal Punishment on Perceived Threat of Punishment: Toward an Understanding of Specific Deterrence*, 23 J. RES. CRIME & DELINQ. 207, 230–31 (1986); but see Charles W. Thomas & Donna M. Bishop, *The Effect of Formal and Informal Sanctions on Delinquency: A Longitudinal Comparison of Labeling and Deterrence Theories*, 75 J. CRIM. L. & CRIMINOLOGY 1222, 1241–42 (1984).

¹³⁰ See, e.g., McGloin & Rowan, *supra* note 37.

¹³¹ See generally Paul Brantingham & Patricia Brantingham, *Crime Pattern Theory*, in ENVIRONMENTAL CRIMINOLOGY AND CRIME ANALYSIS 78 (Richard Wortley & Lorraine Mazerolle eds., 2008).

affiliation for efficient messages to be cascaded in a network,”¹³² then we should first start by testing the vicarious effect on co-offending relationships for which we can assume that the conveyor of the message would be listened to. We did not limit the age gap between the target and the co-offenders, as we found no theoretical basis for any particular age criterion; for instance, a persuasive 28-year-old prolific offender may have the capacity to convince an 18-year-old but also a 27-year-old first-time offender to do a “job” with them. Likewise, having a rigid criterion (e.g., more than 3 years apart), would limit our capacity to look at co-offending patterns in juveniles. Overall, the age criterion may omit certain relationships or certain offenders, yet we believe this exclusion criterion was necessary in order to achieve maximum effectiveness under our experimental conditions. Future research may choose to broaden the sample definition further, a point we will consider when discussing the implications of our findings.

Second, we limited the sample populations to those in which each co-offender was linked to one target only. This criterion was necessary to prevent diffusion of treatments,¹³³ where co-offenders in control conditions are influenced by their counterpart treatment targets and alter their behavior given the message applied to the target population, regardless of random allocation conditions. Again, this limits the generalizability of the study, but it was nevertheless critical to avoid violations of the stable unit treatment value assumption (SUTVA), which requires that “the [potential outcome] observation on one unit should be unaffected by the particular assignment of treatments to the other units.”¹³⁴

¹³² Englefield & Ariel, *supra* note 20, at 29–30.

¹³³ See WILLIAM R. SHADISH ET AL., *Construct Validity and External Validity*, in EXPERIMENTAL AND QUASI-EXPERIMENTAL DESIGNS FOR GENERALIZED CAUSAL INFERENCE 64, 81 (2002).

¹³⁴ D. R. COX, PLANNING OF EXPERIMENTS 19 (1958). As more recently explained by Barak Ariel et al., *Preventing Treatment Spillover Contamination in Criminological Field Experiments: The Case of Body-Worn Police Cameras*, J. EXPERIMENTAL CRIMINOLOGY (Nov. 27, 2018), <https://doi.org/10.1007/s11292-018-9344-4>, “[s]pillovers in randomized trials corrupt the core counterfactual comparison of the experimental design. The spillovers can operate at different levels, bleeding from treatment to control, between different treatment groups, within statistical blocks or clusters or within individual treatment units . . . For example, when the threat of spillover comes from major interference of the treatment group treatments into the control group, it leads to contaminated control conditions; this challenges the desired counterfactual contrast between units that were exposed to the intervention and units that were not When spillover occurs, participants (or units) in the control group experience a direct or indirect treatment effect from the program. While not allocated to the experimental group, controls may experience a spillover from other individuals/units who were assigned to a treatment group. In the case of *spillover from treatment to control*, in which everyone gets some treatment, differences between the two groups are shrunk.” *Id.* (emphasis in original).

C. RANDOM ALLOCATION

Given these exclusion criteria, 421 targets were eligible and were each randomly allocated into either treatment or control groups. Using a computer-generated simple randomization syntax, 206 targets were assigned to the treatment group, and 215 were assigned to the control group. Using social network analysis, we detected that the targets were linked to 2,005 eligible co-offenders. Consequently, our treatment group was linked to 1,014 individuals, while the control group was linked to 991 individuals. In total, we observed the criminal behavior of 2,436 offenders.

We compared the two groups on key characteristics to verify that participants in both the target groups as well as the co-offending groups were comparable at baseline (Table 1). Chi-square tests and t-tests (depending on the type of the distribution of these variables) indicated that none of the differences reached statistical significance at the 0.05 level. These figures suggest that, at baseline, our groups are comparable on key indicators. Offenders were generally mature, at about thirty years old. The number of prior arrests was similar in the experimental and control groups across the three layers of the proposed analysis (at the level of the targets, the level of the co-offenders, as well as overall, in the entire criminal network to which each offender belonged). Our prolific offender targets had six arrests on average at baseline and nearly fourteen prior charges, or a mean of 0.30 arrests and about 0.80 charges in the twelve months prior to random assignment. The co-offenders were less experienced, with about half of the mean arrests and charges as well as total arrests and charges as the targets.

D. TREATMENTS

Our operationalization of specific deterrence included the following ingredients: field contacts were conducted with each target in the treatment group once during the experimental period (120 days). Assignments of officers (see more below) were made based on geography, as Sacramento is a wide jurisdiction. Patrol sergeants were assigned up to six targets per month. In turn it was their responsibility to ensure that each of the six targets received a visit by a patrol officer in that month. The following month, each patrol sergeant received a different group of six targets, for which it was their responsibility to ensure that each of the targets was visited. This rotation of targets was used to reduce any risk of personal bias by officers against particular offenders, as well as to remove the interaction effect between officers and study outcomes because our aim was to test the policy, rather

than the application of the intervention.¹³⁵ The list of targets was communicated to the sergeants on a monthly basis from the Crime Analysis Team, and sergeants were accountable for fidelity to treatment protocols. If an offender was not presently available to interact with an officer, it was the responsibility of the sergeant to further inquire how to reach the target. We explore this below in more detail.

Officers that were assigned a contact were provided the identifying information of that target by the sergeant, including criminal history, available intelligence briefs, contact information, and any other relevant material that existed on police records about the individual (for example, if they were on probation or parole). A method for documentation was put in place for targets that had been incarcerated, killed, or otherwise prevented from participating in the experiment.

Each officer was tasked with conducting a face-to-face interaction with the targets. The orders were to convey to the targets that they were now under increased police scrutiny and that there would be regular unannounced visits by the police. The justification for the increased scrutiny was the target's criminal behavior. It was then up to the individual officer to use her personal skills to carry out a safe contact with the target, where the deterrence message and "pathways" messages were conveyed clearly and explicitly. In this sense, we were cognizant that different officers have different approaches to criminals and communication skills. Therefore, to accord some systematization to the application of the treatments across officers, a leaflet was handed to every participating target.¹³⁶ Among other key messages, the leaflet informed the targets that given their

history of offending[,] the Sacramento Police Department will be making regular visits to ensure that [the target is not] continuing to break the law. These visits will be random and unannounced. Any questions can be directed at the officer from whom [the target] received this card or the Sacramento Police Department. Resources for altering [his or her] pattern of offending can be located on the reverse side of this card.¹³⁷

By providing this information, the risk sanction threat was elevated in a systematic manner, but the pathways message was conveyed methodically as well. Offenders were then invited to contact a telephone number where they could obtain information to help them stop committing crimes, including health, social, and other services.

¹³⁵ For more on intention to treat models, see generally Lewis B. Sheiner & Donald B. Rubin, *Intention-to-Treat Analysis and the Goals of Clinical Trials*, 57 *CLINICAL PHARMACOLOGY & THERAPEUTICS* 6 (1995).

¹³⁶ See Supplementary Materials A.

¹³⁷ *Id.*

1. *Vicarious Deterrence*

We stress that the co-offenders—both treatment and control participants—did not receive any additional police interventions as part of this experiment; only the “business as usual” interventions that they encountered through routine police activity. If new crimes committed by co-offenders were detected, whether they violated parole or probation conditions, Sacramento P.D. would intervene as they normally would. However, they were not subjugated to proactive targeting by the police as part of the experiment. In fact, the list of co-offenders—in both the treatment and control groups—was not shared with sergeants or other field agents. This was done to avoid any treatment crossover contamination, purposeful or otherwise. The hypothesis was that the specific deterrence effect would *vicariously* affect the co-offenders, by way of informal communications without the need to engage with them directly.

2. *Total Network Effects*

Similar to the co-offending offenders, the entire criminal networks associated with the targets were not targeted with the focused deterrence intervention beyond the ordinary interpositions applied to offenders in Sacramento. The hypothesis was that the messages would be further cascaded in these networks beyond the immediate environment of the target population and the co-offending population.

3. *Control conditions*

There were three layers of control conditions in this study. First, there were target offenders who were similar to the treatment targets (given the random allocation; see Table 1), to which the focused deterrence effects could be compared. Second, there were control conditions in the co-offending group as well, where the vicarious deterrence effects could be compared under rigorous settings. Notice that neither group of co-offenders (experimental or control) was directly treated by any police intervention, but the hypothesis was that the treatment co-offending group was affected by the administration of the messages in their respected target population, as opposed to the control co-offending group, in which neither the target nor the co-offenders were assigned to any message effects. Finally, we compared the entire criminal network that treatment offenders were linked to with the entire criminal network that the control offenders were linked to. These control settings enabled us to show the total network effects of the intervention and to observe the impact of the deterrence message across a wider community of criminals.

E. MEASURES

A major difficulty in analyzing behavior in networks has always been its measurement.¹³⁸ Further, how can scholars detect the effect of one message in a world filled with constant flows of information, nudges, and cues? Consequently, how can we measure the outcome of the message if we are not entirely sure the message was even registered by the participant? Apart from participant observations or continuous self-reporting exercises, the options for direct observations are limited. Incidentally, observations are not risk-free, as the presence of an observer, particularly in systematic observations, may have an effect on the observed party. Therefore, assessing the extent to which, in what forms, and magnitude; a deterrent message from the police has travelled in the criminal network community can be challenging.

Another issue was cost. Given our research questions, a longitudinal survey of thousands of offenders that would result in satisfactory response rates—a methodological struggle by itself—and with enough waves to not risk telescoping or other memory biases would be very expensive. The chaotic lives some prolific offenders have, the transient nature of others, illiteracy, communication skills, and language barriers are only some of the challenges we would face if a survey was administered. In practice, the most concerning issue was the inability to reach the offenders to measure the treatment effect. The operational risks are exacerbated when considering observations: a sample of 1,000 participants and only two data points (for example, immediately after the application of the intervention and another observation in a follow-up period) would require a team of research assistants that was outside the scope of this research.

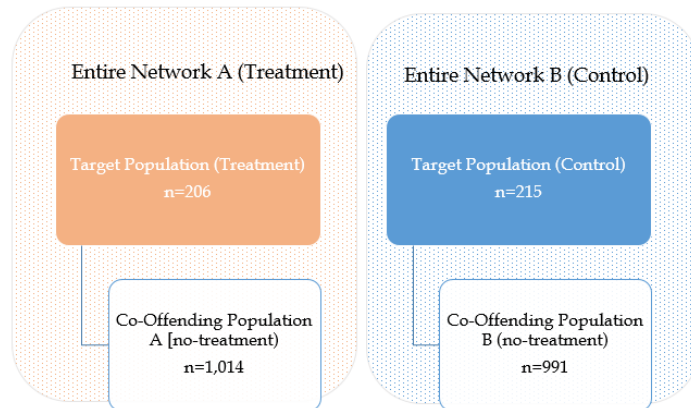
Surveys were also likely to contaminate our experiment. A survey itself can become an intervention (not least by way of a nudge), which would reduce the external validity of our findings.¹³⁹ This is particularly true for administering a survey to the control group: it would lead to an observer effect on a group that we hoped to keep as “clean” as possible. Announcing to control participants that we are interested in the way messages affect their behavioral patterns could by itself lead to variations in their behavior. They may, for example, have questioned how we were able to obtain their contact details, and ethically we would be obliged to inform them that such information was obtained from the police.

¹³⁸ See generally MODELS AND METHODS IN SOCIAL NETWORK ANALYSIS (Peter J. Carrington et al. eds., 2005).

¹³⁹ See Thea F. van de Mortel, *Faking It: Social Desirability Response Bias in Self-Report Research*, 25 AUSTL. J. ADVANCED NURSING 40, 41, 45–46 (2008).

In principle, surveys and observations allow researchers the scope of analyzing a privileged and rich set of variables, especially for scholars who are interested in decision-making processes. Instead, we relied strictly on official statistics: arrests and charges for new offenses post random-assignment. These outcomes provide direct, reliable, and unmediated measures of the messages. Once the intervention is put in place, we can then compare the average effect across all four “cells” of participants: treatment targets, control targets, treatment co-offenders, and control co-offenders, as well as through the entire network of offenders (Fig. 1). As noted, we applied a pretest–posttest design, with measures taken before and after the experiment, with both left and right-censored data dimensions (e.g., same baseline and follow up period for all participants, annualized).

Fig. 1: Illustration of Study Flow (Hypotheses, Measures and Random Assignment):



Arrests. These figures represent the counts of new arrests accrued by offenders within the follow-up period of twelve months post-random assignment. An arrest event takes place when the offender is taken into custody by the police. In order to reduce the potential risk of officers proactively engaging with the target offenders—that is, anything beyond the assigned treatment or “business as usual” in the form of responding to crimes that were committed by the offenders—we observed arrest counts associated with victim-generated events only. In other words, we did not measure arrests following proactive policing, such as stop and account, crackdowns, or street stops. Arrests associated with proactive policing may be entirely an artifact of the experiment, as the officers might now have a “special list” of offenders they would target. We made an assumption that arrests following victim-generated calls for service are less susceptible to proactive policies and the likelihood of an arrest under no-treatment conditions is broadly

stochastic. The decision to exclude street checks and stop-and-accounts obviously dilutes the potential magnitude of the effect but clears out some of the statistical noise associated with the experimenter effect.

We measured these arrest counts separately at three levels. First, we counted the number of arrests within the target populations: the offenders that were assigned to treatment conditions and the counterfactual conditions. This gave us a direct measure of recidivism in the context of specific deterrence. Second, we measured the number of times co-offenders linked to the target populations were arrested during the experimental period. We counted the number of arrests for both the co-offenders who were associated with the target population and for co-offenders linked to control targets. This measure allowed us to assess vicarious deterrence effects as a result of the cascaded message delivered through the target population. Third, we measured the number of arrests for the entire network of offenders, as discussed above. Thus, the study demonstrated the extent to which the deterrent message travelled to other members of the offender population. We referred to this as the *Total Network Effect*.

Charges. One arrest could lead to several charge counts. For example, an offender might be arrested for a violent offense and charged for the aggravated assault. However, the offender might also be carrying drugs and threatening the life of his victim. In this scenario, the offender was only arrested once, and once in custody, a prosecutor from the District Attorney's office would then decide the nature and scope of the charges against the offender — in this case, likely for three separate offenses, to which the offender will have to respond in due course in court.

Thus, we observed these measures for all six comparisons: twice for the targets (specific deterrence effects in treatment versus control), twice for co-offenders (vicarious deterrence effects in treatment versus control), and twice for the entire criminal network to which the targets were linked (treatment versus control).

F. STATISTICAL PROCEDURE

Our crime data is comprised of counts. Our analyses incorporated six models—once across 421 total units (206 T and 215 C cases), then across 2,005 units (1014 T and 991 C cases), and finally then 2,426 units (1,220 T and 1,206 C cases). Three models were set to look at arrests, and then three models looked at charge data. However, under all models, there was

suspicion of over-dispersion,¹⁴⁰ as we often expect in criminology.¹⁴¹ We applied D. Wayne Osgood's¹⁴² approach to fixing this problem by analyzing the data using a generalized linear model with an adjusted Poisson model.¹⁴³ In this procedure, an adjusted Poisson distribution is created using a Pearson Chi-Square Scale Parameter Method within the generalized linear model. This procedure corrects for over-dispersion in regression distributions, and by implication corrects the standard errors of the estimates. The standard errors of the parameter estimates are multiplied by the square root of the new scale statistic, making the statistical tests more conservative.

Group assignment ('treatment' [1]/'control' [0]) was the predictor and a Pearson Scale parameter for the over-dispersion correction, with the base rates of each outcome variable taken from the twelve months that preceded the experiment and the outcome variable in the twelve months post-random assignment, all using a generalized linear model. We present the estimated marginal means¹⁴⁴ to report the mean responses for the treatment effect. We repeated the analysis several times to account for the treatment effect on (a) targets, (b) co-offenders, and (c) the total network. We conducted these analyses for both arrests and charges and present the 90% Wald confidence interval for the parameter.¹⁴⁵

We then observed the magnitude of the difference between treatment and control conditions using Cohen's¹⁴⁶ effect sizes and the corresponding

¹⁴⁰ See generally A. Colin Cameron & Pravin K. Trivedi, *Regression-Based Tests for Overdispersion in the Poisson Model*, 46 J. ECONOMETRICS 347 (1990).

¹⁴¹ See, e.g., John M. MacDonald & Pamela K. Lattimore, *Count Models in Criminology*, in HANDBOOK OF QUANTITATIVE CRIMINOLOGY 683, 687, 697 (Alex R. Piquero & David Weisburd eds., 2010).

¹⁴² D. Wayne Osgood, *Poisson-Based Regression Analysis of Aggregate Crime Rates*, 16 J. QUANTITATIVE CRIMINOLOGY 21 (2000).

¹⁴³ We contemplated using a more generic negative binomial assumption. However, we have found that the most functional form of the variance was the adjusted Poisson regression model, as the Bayesian Information Criteria (BIC) was lower for the latter model. See Gideon Schwarz, *Estimating the Dimension of a Model*, 6 ANNALS OF STAT. 461 (1978); see generally Richard Berk & John M. MacDonald, *Overdispersion and Poisson Regression*, 24 J. QUANTITATIVE CRIMINOLOGY 269 (2008). For further methodological considerations of the two approaches and the model fitness in various circumstances, see P. McCULLAGH & J.A. NELDER FRS, *Generalized Linear Models*, in 37 MONOGRAPHS ON STATISTICS AND APPLIED PROBABILITY 123–135 (2d ed. 1989).

¹⁴⁴ For more on marginal means, see generally CHARLES E. McCULLOCH ET AL., *GENERALIZED, LINEAR, AND MIXED MODELS* (2d ed. 2008).

¹⁴⁵ For a justification for a 0.1 threshold, see generally Lawrence W. Sherman & David Weisburd, *General Deterrent Effects of Police Patrol in Crime "Hot Spots": A Randomized, Controlled Trial*, 12 JUST. Q. 625, 637–38 (1995).

¹⁴⁶ See generally Jacob Cohen, *Statistical Power Analysis*, 1 CURRENT DIRECTIONS PSYCHOL. SCI. 98 (1992).

95% confidence intervals as a measure of reliability of the estimation procedure.¹⁴⁷ The data were inputted into Comprehensive Meta-Analysis 2.0, which consisted of the estimated marginal means for (i) arrests and (ii) charges across all three comparison levels.

G. STATISTICAL POWER

As noted, 421 participants were used in the first layer of the experiment (focused deterrence) and 2,005 participants in the second layer (vicarious deterrence). This created a study with sufficient statistical power for inference. Statistical power was defined by Cohen as the probability of detecting a statistically significant outcome in an experiment, given the true difference between the treatment group and the control group.¹⁴⁸ By using G*Power 3,¹⁴⁹ we could estimate that the smaller group's sample size was large enough to detect small effects¹⁵⁰ in which the significance level is 0.05. The hypotheses are assumed to be unidirectional and the estimated power is 0.80.

IV. RESULTS

A. BASELINE COMPARABILITY

Table 1 lists the descriptive statistics, including information on the targets and their co-offenders, at their pretest values. As shown, most offenders were approximately thirty-years-old at the time of the experiment. The targets were more experienced offenders than the co-offenders, with over six prior arrests compared to about 3.5 arrests, respectively. The mean number of charges filed against the targets was about fourteen and less than half of that for the co-offenders. These criminal records suggest that we could compare the direct effect of focused deterrence of generally prolific and experienced offenders, whereas the vicarious deterrence effect is applied on generally novel offenders, although none are particularly young of age. When we look at the entirety of each network, we see that the mean number of charges and arrests is closer to the co-offender means rather than the target means, which is expected given that for every target there are approximately

¹⁴⁷ See generally MARK W. LIPSEY & DAVID B. WILSON, PRACTICAL META-ANALYSIS (Applied Soc. Research Method Series Vol. 49, Leonard Bickman & Debra J. Rog eds., 2001).

¹⁴⁸ See generally JACOB COHEN, STATISTICAL POWER ANALYSIS FOR THE BEHAVIORAL SCIENCES (2d ed. 1988).

¹⁴⁹ See generally Franz Faul et al., *G*Power 3: A Flexible Statistical Power Analysis Program for the Social, Behavioral, and Biomedical Sciences*, 39 BEHAV. RES. METHODS 175 (2007).

¹⁵⁰ See generally COHEN, *supra* note 148.

five co-offenders. Importantly, none of these between-group comparisons are statistically significant due to the random allocation of units into treatment and control conditions.

Table 1: Descriptive Statistics: 2,426 offenders in Sacramento – Treatment (T) and Control (C) Conditions

	Targets		Co-Offenders		Entire Network	
	<u>T</u>	<u>C</u>	<u>T</u>	<u>C</u>	<u>T</u>	<u>C</u>
N	206	215	1,014	991	1,220	1,206
Mean Age (SD)*	30.6 (11.1)	29.4 (9.9)	30.5 (12.2)	29.9 (11.5)	30.5 (12.0)	29.8 (11.2)
Prior Arrests (n)	1,283	1,304	3,370	3,242	4,653	4,546
Mean Prior Arrests (SD)	6.23 (3.54)	6.07 (3.72)	3.27 (3.18)	3.32 (3.17)	3.81 (3.41)	3.77 (3.45)
Mean Prior Arrests 12 months pretest (SD)	.29 (.72)	.30 (.58)	.22 (.62)	.20 (.60)	.23 (.64)	.22 (.60)
Prior Charges (n)	2,870	3,271	6,659	6,634	9,529	9,905
Mean Prior Charges (SD)	13.93 (9.04)	15.21 (12.26)	6.57 (7.29)	6.69 (8.13)	7.81 (8.10)	8.21 (9.58)
Mean Prior Charges 12 months pretest (SD)	.79 (2.22)	.95 (2.28)	.46 (1.39)	.48 (1.59)	.51 (1.56)	.54 (2.03)
N visits	128	0	--	--	128	0
Offenders visited	62.1%	0%	--	--	10.5%	0%
Post Arrests^ (n)	156	188	460	464	616	652
Mean Post Arrests (SD)	.76 (2.30)	.87 (2.33)	.45 (1.62)	.47 (1.95)	.50 (1.75)	.54 (2.03)
Post Charges^ (n)	396	524	988	1,080	1,384	1,604
Mean Post Charges (SD)	1.92 (6.28)	2.44 (8.74)	.97 (3.86)	1.09 (5.14)	1.13 (4.37)	1.33 (5.96)

^ 12 months post-test; SD = standard deviation

B. MAIN EFFECTS

Table 1 provides the raw figures for the treatment and control group at post-test values. First, we see that in terms of implementation, a large proportion of offenders were not reached by the police. Reasons for dropout vary, but mainly dropout was due to inaccurate contact information held on file for the targets. Police officers assigned to interact with the targets reported that many addresses were incorrect (e.g., the offender was no longer living at that address, or was not employed at the same establishment as the one recorded at the last known address), and no new contact information was available to pursue the contact further. We return to these issues below, but note at this stage that such dropping out is not uncommon when dealing with offending populations.¹⁵¹ Overall, officers made 128 contacts with the targets (62.1%).

In all comparisons post-random assignment, the treatment groups offended less than control conditions. In terms of arrests, we show the percent change in the target populations was -12.6% relative to the control targets, -4.3% in the co-offending population relative to its controls, and -7.4% for the entire network. The rate of arrests per 1,000 offenders in the treatment group was 504.9, while the rate of arrests per 1,000 offenders in the control group was 540.1. In terms of new charges, the percent changes were more pronounced, -21.3%, -11.0%, and -15.0% for the specific, vicarious, and total network deterrence effects, respectively. Here, the rate of new charges per 1,000 offenders was 1,134.4 in the treatment group versus 1,330.0 in the control.

Table 2 lists the outcomes of our statistical model results under the three conditions: focused, vicarious, and total network effects. The table provides the predictor values for the intercepts, the baseline values of the dependent variables and the treatment effect, and the standard errors (SE). We also present the exponential parameter estimates and Wald confidence intervals (lower and upper bounds). These inferential estimates mimic the story told by the descriptive statistics. We have found a significant deterrence effect of the police intervention against prolific targets ($\beta = -1.60$, $SE = .109$; $p \leq .10$), with the exponential predictor ranging between -28.7% and +1.9%. While the effect on arrests for co-offenders was not statistically significant, it was nevertheless in the hypothesized direction ($\beta = -.023$, $SE = .066$; $p \geq .10$), with $\text{Exp}(\beta) = .978$ [.90% CI .877, 1.089]. Overall, the total network effect is significant, with the coefficient ranging between -15.4% and +1.8% arrests

¹⁵¹ See Linda G. Mills et al., *The Next Generation of Court-Mandated Domestic Violence Treatment: A Comparison Study of Batterer Intervention and Restorative Justice Programs*, 9 J. EXPERIMENTAL CRIMINOLOGY 65, 74–75 (2013).

on average compared to control conditions. One final observation is the overall significant effect of previous criminal background on future criminality, which was pronounced and expected.¹⁵²

Table 2: Focused Deterrence, Vicarious Deterrence and Total Network Effects: Post Random-Assignment Arrest Estimates (Poisson Model Coefficients)

		β	SE	Exp(B)	90% Wald CI for Exp(B)	
					Lower	Upper
Targets (focused deterrence)	Treatment	-.160*	.109	.853	.713	1.019
	Prior arrests	.362***	.059	1.436	1.303	1.582
	<i>(intercept)</i>	-268***	.078	.765	.673	.869
Co- Offenders (vicarious deterrence)	Treatment	-.023	.066	.978	.877	1.089
	Prior arrests	.575***	.020	1.778	1.720	1.838
	<i>(intercept)</i>	-1.010***	.050	.364	.335	.395
Entire Network (total effect)	Treatment	-.075*	.056	.928	.846	1.018
	Prior arrests	.543***	.019	1.721	1.668	1.776
	<i>(intercept)</i>	-.838***	.042	.433	.404	.463

* $p \leq .10$; ** $p \leq .05$; *** $p \leq .01$

Next, we show the results of our three models (targets, co-offenders, and then the entire network) in terms of charges filed (Table 3). We detected significant treatment effects in all three models ($\beta = -.221$, $SE = .067$; $\beta = -.060$, $SE = .216$; $\beta = -.124$, $SE = .047$, respectively). The largest effect was detected in terms of specific deterrence, with a 19.8% reduction in charges (ranging between -28.1% and -10.5%), whereas the vicarious deterrence effect on co-offenders yielded a 12.8% reduction in charges (ranging between -12.5% and 10.3%). We then show that the effect on the entire network resulted in 11.7% reduction in charges against the treatment network

¹⁵² See generally David P. Farrington, *Developmental and Life-Course Criminology: Key Theoretical and Empirical Issues—The 2002 Sutherland Award Address*, 41 *CRIMINOLOGY* 221 (2003).

compared to the control network (ranging between -16.9% and -6.2%). Table 3 further shows that previous charges predict future charges as well.

Table 3: Focused Deterrence, Vicarious Deterrence and Total Network Effects: Post Random-Assignment Charges Estimates (Poisson Model Coefficients)

		β	SE	90% Wald CI for Exp(B)		
				Exp(B)	Lower	Upper
Targets (focused deterrence)	Treatment	-.221***	.067	.802	.719	.895
	Prior charges	.091***	.010	1.095	1.076	1.114
	(intercept)	.777***	.047	2.175	2.014	2.350
Co- Offenders (vicarious deterrence)	Treatment	-.060*	.044	.872	.875	1.103
	Prior charges	.216***	.006	1.242	1.228	1.255
	(intercept)	-.137***	.033	.872	.826	.921
Entire Network (total effect)	Treatment	-.124***	.037	.883	.831	.938
	Prior charges	.183***	.005	1.201	1.190	1.211
	(intercept)	.093***	.027	1.097	1.049	1.147

* $p \leq .10$; ** $p \leq .05$; *** $p \leq .01$

Using the estimated marginal means of these models, we provide a visual illustration of the differences between experimental and control groups in terms of arrests and then in terms of charges (Fig. 2 and Fig. 3). Notice that these modest changes consider the baseline values of the outcome variables as well. Using these means, we computed effect sizes using Cohen's d .¹⁵³ In terms of arrests, the magnitude of the effect is generally small (the effect size for targets is $d = -0.142$ [95% CI -0.093, 0.045], for co-offenders $d = -0.015$ [95% CI -0.102, 0.073], and for the total network $d = -0.053$ [95% CI -0.132, 0.027]). The treatment effect size in terms of charges

¹⁵³ See generally Jacob Cohen, *A Power Primer*, 112 *PSYCHOL. BULL.* 155 (1992).

is more pronounced, reaching small-to-medium magnitudes based on Cohen's¹⁵⁴ criteria (for targets $d=-0.321$ [95% CI -0.514, -0.129], for co-offenders $d=-0.059$ [95% CI -0.147, 0.028], and for total network effects $d=-0.134$ [95% CI -0.214, -0.054]).

V. DISCUSSION

In this paper, we argue that deterrence literature can be broadly compartmentalized into two types, and based on this approach we can extract the effective from the potentially ineffective specific deterrence approaches.¹⁵⁵ We ought to differentiate between "preventative specific deterrence" and "reactive specific deterrence." Whereas reactive specific deterrence refers to those approaches that attempt to threaten and/or punish for a specific crime already (and recently) committed, preventative specific deterrence looks at offenders more broadly, attempting to persuade them not to recidivate using both carrots (desistance pathways) and sticks (increased surveillance).¹⁵⁶ In our study, we focused on the former. We then observed the cascaded effect across the social network of the target offenders by measuring the vicarious deterrence effects. Given our findings, several key implications emerge in terms of theory, practice, and future research.

A. THEORETICAL IMPLICATIONS

Communication is key to the human condition. Yet we found limited guidance in the literature, not only on the nature of co-offending communications, but on the effect on crime of various types of messages within these settings. Specifically, we found very little empirical evidence on how formal deterrence messages work in co-offending groups: how *formal* control messages are effective in the *informal* domain. We still know very little, such as the ways in which messages are delivered most efficiently, how many social nodes in criminal networks deterrence messages reach, or who is the most influential actor in the network, which would trigger the most change due to the original message. However, we now have some direct evidence about one messaging platform that seems to exert a behavioral adaption as a result of the message: "*I will be watching you, and here are some ways for you to get help. Stop offending!*" This missive led to a reduction in arrests and charges in what is otherwise a tough group to change: persistent offenders in their early 30s with a rich (and fairly recent) criminal history. Arguably more important is the reduction in charges and new arrests

¹⁵⁴ See COHEN, *supra* note 148.

¹⁵⁵ See *supra* Section I.C.

¹⁵⁶ See *supra* Section I.D.

of their co-offending partners: the targets then went on to communicate these messages to their co-offenders, and in turn the latter group recidivated less than their control counterparts.

These findings have implications for understanding the mechanisms in which deterrence messages are transmitted in these social circumstances, even though we are only able to infer these processes from the behavioral modifications we observed as a result of our interventions. We return to this limitation below, but what seems clear from the data is intuitive and logical, yet rare in scientific explorations: a single, manipulated, and identifiable independent message that affects a wider audience, beyond the person who was the target of a threat. Criminologists have been writing about it for years,¹⁵⁷ and there have been observational studies on vicarious deterrence,¹⁵⁸ yet direct observation of these effects was missing from the discourse. The trial suggests that offenders are acutely aware of their environment and are specifically attuned to cues presented to them by their peers. When social control agents deliver what influential actors in social networks perceive as a credible threat—i.e., a single message of increased scrutiny—other actors are affected by it; the effect is not just on cognitive awareness of risks and decision-making processes (which we did not observe), but on the behavioral outcomes (which we did observe). Thus, while the psychosocial mechanisms of the message are less understood in this study, or what some sociologists refer to as the “black box” of experiments,¹⁵⁹ we nevertheless show that deterrence messages are translated into actioned and measurable outcomes.

That said, we are aware that the single message we refer to is more complex than a naïve “don’t offend” deterrent threat. However, we argue that this treatment’s heterogeneity is not a study limitation. The message was delivered by a wide range of officers, and by its very nature is susceptible to the influences of officers’ approaches, demeanor, level of engagement and attitudes. More substantially, the deterrent message was delivered in conjunction with a desistance message with information to the offenders on how they could obtain help. There may be an interaction effect between deterrence and desistance that is not fully explored in this paper.¹⁶⁰ Yet we

¹⁵⁷ See, e.g., Raymond Paternoster & Alex Piquero, *Reconceptualizing Deterrence: An Empirical Test of Personal and Vicarious Experiences*, 32 J. RES. CRIME & DELINQ. 251 (1995); Stafford & Warr, *supra* note 107.

¹⁵⁸ See, e.g., Braga et al., *supra* note 111, at 314–15; Malm et al., *supra* note 110, at 127.

¹⁵⁹ See generally Donald P. Green et al., *Enough Already About “Black Box” Experiments: Studying Mediation Is More Difficult Than Most Scholars Suppose*, 628 ANNALS AM. ACAD. POL. & SOC. SCI. 200 (2010).

¹⁶⁰ See generally LAWRENCE W. SHERMAN ET AL., OFFENDER-DESISTANCE POLICING AND THE SWORD OF DAMOCLES (2012).

do place more emphasis on the deterrent message because 100% of all participating offenders were assigned a visit by a uniformed officer who, through symbolism of authority and insignia and literal powers of the state,¹⁶¹ threatened criminals. The very nature of the contact with a power-holder is assumed to carry a deterrent message to offenders.¹⁶² On the other hand, we do not know the extent to which offenders took advantage of the offer to get help, a study limitation by its own merit. We could assume that some offenders sought assistance for desistance, but we cannot characterize the scope of this treatment manipulation or how well officers emphasized this portion of the delivery. To the point, the single message is not as simple as a 280-character message on Twitter. It is, however, a single message in the sense that the study intervention consisted of a single interaction between an officer of the law and an offender with a pre-emptive, preventative aim. We therefore conclude that a “*don’t offend or else*” conversation between an officer and an offender is a teachable moment that impacts not only the offender, but his partners in crime as well.¹⁶³

This conclusion, however, is more nuanced than the customary specific deterrence theorem postulated centuries ago, as well as the empirical developments in the last thirty years.¹⁶⁴ The primary difference—and perhaps a reason why backfiring effects were detected for some previous specific deterrence initiatives—is the preventative rather than reactive measure taken “against” offenders. We distinguished earlier between interventions that come as an antecedent to more crime (preventative) and interventions that follow a specific crime and are aimed to teach the offender a lesson that the crime for which s/he is punished is costly. Yet the evidence is mixed at best¹⁶⁵ or advises against the reactive specific deterrence approach altogether, at least in the punitive formalization it currently holds in the United States.¹⁶⁶ It appears that specific deterrence can be risky because there is a subset of offenders that react adversely to attempts to threaten them.

¹⁶¹ See generally Justice Tankebe et al., *A Multidimensional Model of Police Legitimacy: A Cross-Cultural Assessment*, 40 L. & HUM. BEHAV. 11 (2016).

¹⁶² See Ariel, et al., *supra* note 72, at 307.

¹⁶³ See Tom R. Tyler et al., *Street Stops and Police Legitimacy: Teachable Moments in Young Urban Men’s Legal Socialization*, 11 J. EMPIRICAL LEGAL STUD. 751, 757–58 (2014).

¹⁶⁴ See Pogarsky et al., *supra* note 72, at 346–47.

¹⁶⁵ See Cullen et al., *supra* note 80, at 58S–61S.

¹⁶⁶ See Mona Lynch, *The Culture of Control: Crime and Social Order in Contemporary Society*, 25 POL. & LEGAL ANTHROPOLOGY REV. 109, 111 (2002).

There is a wide range of reasons for this, including defiance,¹⁶⁷ resistance¹⁶⁸ and alienation.¹⁶⁹ Leaving aside the question of just deserts,¹⁷⁰ from a utilitarian perspective it appears that reactive specific deterrence is inefficient. On the other hand, preventative specific deterrence acknowledges that the offender *is* an offender by the virtue of his/her prolific criminal background, but the temporal sequence is flipped: there is a *threat* but no *literal* materialization of the sanction of the offender, which the law requires to be specific and bespoke to a certain criminal act. The cost for past offending is increased scrutiny: The Sword of Damocles.¹⁷¹ The focus is not on a particular past behavior, but on an unwanted pattern that the police are looking to break.

In this sense, our study illustrates the capacity of the state to act as a social control agent to reduce future offending of a targeted population, even without a particular offense in mind but with a pattern of offending. Deterrence and desistance scholars should be encouraged by these findings. First, we show that preventative specific deterrence works beyond the targets to their social networks. However crude and difficult to characterize the exact infrastructure in which these messages transpire and under which conditions these informal social contacts operate, the data suggest that a causal pathway exists in these deterrence contexts. The object of preventative specific deterrence is a contagion element which passes through messages, from the formal social contact onto the informal social contacts; by doing so, it reduces criminal behavior across the entire network.

We did not approach targets and their co-offenders with surveys to understand how these psychosocial mechanisms literally and latently operate. Future research should look more closely at the human condition associated with these effects. We can only speculate at this stage on how these messages operate: when the officer knocked on the door of the offender, the latter did not hold complete information about the reason for the contact made with her. She did not know if the police had become aware of a particular crime she had committed or whether the officer held information about her involvement in ongoing future criminal endeavors, for example

¹⁶⁷ See Lawrence W. Sherman, *Defiance, Deterrence, and Irrelevance: A Theory of the Criminal Sanction*, 30 J. RES. CRIME & DELINQ. 445, 448–49 (1993).

¹⁶⁸ See Roni Factor et al., *A Social Resistance Perspective for Delinquent Behaviour Among Non-Dominant Minority Groups*, 53 BRIT. J. CRIMINOLOGY 784, 784–88 (2013).

¹⁶⁹ See Hayden P. Smith & Robert M. Bohm, *Beyond Anomie: Alienation and Crime*, 16 CRITICAL CRIMINOLOGY 1, 6–13 (2008).

¹⁷⁰ See Anthony Bottoms, *The Philosophy and Politics of Punishment and Sentencing*, in THE POLITICS OF SENTENCING REFORM 17 (Chris Clarkson & Rod Morgan, eds., 1995).

¹⁷¹ See Sherman, *supra* note 90.

though the work of covert police agents or signals intelligence (SIGINT). Either way, the lack of information increased the risk portfolio and the decision may have been to lay low until the level of risk was reduced to more manageable levels.

In our view, the abovementioned interpretation also explains why these interactions between the prolific offender and the officer had a spillover effect on the co-offenders. Gabriel De Tarde defended the view that people adopt new behaviors and attitudes through symbolic interactions, where "ideas precede imitation of their expression."¹⁷² For imitation to take place, people must first "perceive a person's attitudes and behavior as salient, internalize the pattern and, especially, the meanings attached to the act, and then 'decide' whether the action fits with their own value-orientations, cherished norms, and self-interest."¹⁷³ We learn from particular individuals to which we are anchored, predominantly from those whom we come to consider significant others.¹⁷⁴ This learning process occurs when ideas are "appropriated through interaction and evaluated based on the exposed person's own social psychological disposition . . . even those 'imposed' from superiors involve a cognitive, moral/aesthetic, and/or affectual dimension".¹⁷⁵ Thus, if the "superior person" shares with his peers that an agent of the state paid him a visit with a credible deterrent threat, the peers respond by laying low as well.

It should therefore become immediately clear why learning, imitation, and persuasion through a crime-mentorship relationship is more powerful than simple co-offending: criminogenic ideas are more likely to survive under these conditions.¹⁷⁶ It has been repeatedly shown that co-offending relationships can shape the co-offenders' subsequent criminal careers.¹⁷⁷ There also seems to be a greater likelihood for "criminogenic lifestyles" following co-offending.¹⁷⁸ Drawing again from learning theories, if the prolific offender is idolized and his ideas are internalized by the co-offenders

¹⁷² GABRIEL TARDE, *THE LAWS OF IMITATION* 207 (Elsie Clews Parsons trans. 1903).

¹⁷³ Seth Abrutyn & Anna S. Mueller, *Reconsidering Durkheim's Assessment of Tarde: Formalizing a Tardian Theory of Imitation, Contagion, and Suicide Suggestion*, 29 *SOC. F.* 698, 702–03 (2014).

¹⁷⁴ See Arthur Aron & Tracy McLaughlin-Volpe, *Including Others in the Self: Extensions to Own and Partner's Group Memberships*, in *INDIVIDUAL SELF, RELATIONAL SELF, COLLECTIVE SELF* 89 (Constantine Sedikides & Marilynn B. Brewer eds., 2001).

¹⁷⁵ Abrutyn & Mueller, *supra* note 173, at 703.

¹⁷⁶ See generally Englefield & Ariel, *supra* note 20.

¹⁷⁷ E.g., Andersen & Felson, *supra* note 10, at 67; McGloin & Nguyen, *supra* note 44, at 480–87; Carlo Morselli et al., *Mentors and Criminal Achievement*, 44 *CRIMINOLOGY* 17 (2006).

¹⁷⁸ See McGloin & Nguyen, *supra* note 44, at 484.

as legitimate, then a life of crime is more likely to persist.¹⁷⁹ The target becomes a significant other.¹⁸⁰ In this experiment, we suggest that the emulation can take the form of positive behavior as well: a reduction in criminal behavior. Thus, the cascading of preventative specific deterrence messages in criminal networks provides a teachable event for the co-offender and by implication changes his behavior.

B. POLICY IMPLICATIONS

Policing scholars as well as desistance practitioners have argued that turning points enabled by a rule-enforcer can lead to reductions in crime; however, the evidence has been largely observational. Empirical research and more specifically field experiments in this space are scarce, with some notable but rare exceptions.¹⁸¹ The findings thus provide policymakers with more substantiated evidence that preventative measures—i.e., preventative specific deterrence—have the capacity to reduce criminal behavior in the target population and their co-offenders.¹⁸² A key finding is that the police matter as preventative agents. Much like place-based interventions,¹⁸³ a focused and precautionary approach applied by the police to problems,¹⁸⁴ places,¹⁸⁵ and individuals¹⁸⁶ can have substantial albeit modest consequences in harm reduction.

Beyond that, we see that formal messages are, on average, effective despite being delivered by a generally mixed group of officers. Different frontline officers, in six different geographic districts were able to reduce the number of crimes committed by offenders. This so-called treatment heterogeneity is important, because it suggests that the preventative specific deterrence is likely to be shaped, although not completely nullified, by

¹⁷⁹ See Moffitt, *supra* note 127, at 686–88.

¹⁸⁰ See, e.g., AKERS, *supra* note 42, at 254–85; Abrutyn & Mueller, *supra* note 173, at 701, 703–04, 709–10.

¹⁸¹ See, e.g., Jonathan Goosey et al., *Integrated Case Management of Repeated Intimate Partner Violence: A Randomized, Controlled Trial*, 1 CAMBRIDGE J. EVIDENCE-BASED POLICING 174, 187–88 (2017).

¹⁸² See Barak Ariel, *Disrupting Organised-Crime Networks: An Evidence-Based Approach to Establishing Effective Interventions*, in DISRUPTING ORGANISED CRIME: DEVELOPING THE EVIDENCE BASE TO UNDERSTAND EFFECTIVE ACTION 48 (Clare Ellis ed. 2014).

¹⁸³ See Anthony A. Braga et al., *The Effects of Hot Spots Policing on Crime: An Updated Systematic Review and Meta-Analysis*, 31 JUST. Q. 633, 635–37 (2014).

¹⁸⁴ See Anthony A. Braga & Brenda J. Bond, *Policing Crime and Disorder Hot Spots: A Randomized Controlled Trial*, 46 CRIMINOLOGY 577, 580–82 (2008).

¹⁸⁵ See Sherman & Weisburd, *supra* note 145, at 629–30.

¹⁸⁶ See Braga & Weisburd, *supra* note 79, at 327–28.

environmental circumstances. On average, the treatment effect was significant on both offenders and their co-offenders (at least in terms of charges), and throughout all measures, pointed to the same hypothesized direction of fewer crimes in the treatment groups compared to control groups. Put differently, the *policy* of preventative specific deterrence leads to reductions in crime notwithstanding the different ways of *delivering* the content of these messages.

Finally, it ought to be stressed that the tested police intervention consisted of *one* contact. On the one hand, there are great perils in applying a one-off intervention, especially in deterrence. This is what Ariel referred to as a "toothless" policy because it might send a perverse message to the offender that the threat is hollow.¹⁸⁷ The police officer is informing the offender that if she commits more crimes, then the officer will increase the certainty of apprehension. Yet with one encounter, it is likely that the intervention will fade over time. Residual deterrence depends on many factors, but at the very least it seems logical to assume that *some* follow-up is required to demonstrate to the offender that the threat is not in vain.

On the other hand, our experiment was more modest: our aim was to illustrate under rigorous conditions the causal inference between a deterrent message and its direct and vicarious effects on criminal elements and their co-offenders. A more comprehensive program can now be put in place with the acknowledgement that the one-off intervention is unlikely to survive or perhaps backfire. It would be naïve to believe that one preventative specific deterrence message would, on average, stop crime, rather than reduce it compared to no-treatment conditions. In practical terms, persistence is likely required to sustain the observed reduction. However, any substantive new approach must start somewhere, and we suspect more developments will soon follow.

C. FUTURE RESEARCH

Beyond the need for more replications and different locations, there are analytical considerations upon which future studies should reflect. First, would a bespoke team of officers who specialize in specific deterrence as a full-time role be more effective than front-line officers delivering deterrence messages alongside their day job? It is likely that despite the additional costs, a bespoke team delivers more effective results in policing. A bespoke team would also be able to run a more comprehensive offender management program (such as the Integrated Offender Management programs that have

¹⁸⁷ Barak Ariel, *Deterrence and Moral Persuasion Effects on Corporate Tax Compliance: Findings from a Randomized Controlled Trial*, 50 CRIMINOLOGY 27, 39 (2012).

gained popularity in England and Wales in recent years). Such a team can also deal with the one-off limitation we mentioned earlier by targeting the most harmful offenders in the police's jurisdiction over several sessions. The extent to which these assumptions are true should be a subject of future inquiries.

Second, a closer look at the take-up rate of the desistance pathways will indicate under what conditions desistance is more likely to be achieved. We currently do not have this information, as the data were not kept on these referrals, but it seems pertinent for future protocol-based impact evaluations.

Finally, a more nuanced evaluation of the types of offenders and their co-offenders that are more susceptible to these messages is needed. In this sense, research efforts should be devoted to looking at third-order relationships—i.e., the co-offenders of the co-offenders, and so on—and whether deterrence decays over these relationships.¹⁸⁸

D. ADDITIONAL STUDY LIMITATIONS

There are several, key limitations of our study, which future research in this sphere should consider. First, our use of official statistics to both define the criminal networks and to measure the behavioral changes due to the deterrent messages (in any of the studied groups) is limited to the knowledge held by the police. Criminologists are aware of the lack of external validity that such records hold and the limited picture they depict about the crime problem and about offenders more broadly.¹⁸⁹ We cannot fully defend against an argument emphasizing the missing links in our depiction of the criminal networks in Sacramento, including the unmasked co-offending associations not based on arrest records, how messages are transferred between the second, third, and *n*th node in the networks, and the extent to which deterrence threats are delivered through the grapevine.¹⁹⁰ In short, relying strictly on police data on co-offending is reliable but not necessarily

¹⁸⁸ See generally Sherman, *supra* note 113.

¹⁸⁹ See Barak Ariel & M. Bland, *Is Crime Rising or Falling? A Comparison of Two Methods: Police Recorded Crime and Victimization Surveys*, in *METHODS OF CRIMINOLOGY AND CRIMINAL JUSTICE RESEARCH 7* (Mathieu Deflem & Derek M.D. Silva eds., 2019).

¹⁹⁰ There is a utilitarian justification for using police records. The police, especially specialized units, are *de facto* the formal social institution to deal with criminal networks. Therefore, what they know, despite the criminological iceberg bias, represents the necessary conditions for the targeting of offenders. Our results suggest to the police that by implementing a proactive and preventative measure against prolific offenders, the benefits are far-reaching: not just against those whom they directly interact, but to their peers, colleagues and co-offenders. While we would welcome a richer depiction of the criminal community and the links between its members, we are nevertheless able to provide evidence, however partial, on the effect of preventative specific deterrence as well as vicarious deterrence messages.

valid, so future research could benefit from self-reported data on co-offending behavior.

Our second methodological limitation is the potential for treatment spillover,¹⁹¹ which can potentially violate the stable unit treatment value assumption.¹⁹² We tried to reduce the diffusion of treatments by having each co-offender linked to one target only. We admit, however, that messages may have been conveyed between co-offending relationships of which we were unaware (e.g., not based on co-arresting links), but there are no methods of controlling for these risks without more data. This of course is linked to the broader limitations of our reliance on official statistics only. However, we remain confident in our results, despite the potential for diffusion, as the risk it creates implicitly means that our Type I error threshold is more stringent: statistically significant differences emerged across most comparisons, *despite* the potential for undocumented spillover, and thus the magnitude of the treatment may potentially be even stronger in reality. Still, future research will benefit from having tighter controls over these perils.

¹⁹¹ See generally SHADISH ET AL., *supra* note 133, at 64–102; see also Ariel et al., *supra* note 134 and accompanying text.

¹⁹² See generally COX, *supra* note 134, at 14–21, 191–203.

VI. SUPPLEMENTARY MATERIALS

A. FRONT SIDE OF LEAFLET



You have been identified by the Sacramento Police Department Crime Analysis Unit as being a habitual offender. Our records indicate that you have been arrested at least three or more times in the past 4 years, at least once in the last two years, and at least once for a Part I crime. Because of your history of offending the Sacramento Police Department will be making regular visits to ensure that you are not continuing to break the law. These visits will be random and unannounced. Any questions can be directed at the officer from whom you received this card or the Sacramento Police Department. Resources for altering your pattern of offending can be located on the reverse side of this card.

B. BACKSIDE OF LEAFLET

Resources

WEAVE
916-920-2952

Narcotics Anonymous
1-800-600-4673

Sacramento County Alcohol and Drug Services
916-874-9754

CalWORKS
916-875-2050

Sacramento County Probation
916-875-0300

CA Parole
Sac Natomas 916-574-2414
Sac Florin 916-445-5993
Sac North 916-574-2414
Sac Metro 916-324-4141
Sac South 916-445-5993

Crime Alert
1-800-aa-crime

Sacramento Police Department
North Command – 916-566-6401
South Command – 916-277-6001
East Command – 916-808-4500
Central Command – 916-808-4500

Sacramento County Welfare
916-874-2072

Sacramento County District Attorney
916-874-6218

SAFE Team 290
916-874-5090

Sacramento Veterans Resource Center
916-393-9387