ILLICIT NETWORKS WORKSHOP 2019

Snake Eyes Edition

JUNE 26-27-28, 2028

@ INSTITUT DE TOURISME ET D'HÔTELLERIE DU QUÉBEC (ITHQ)

Host: Université de Montréal

Illicit Networks Workshop

June 26th 2019	
7:00 pm to 9:00 pm	Welcoming reception at **Abreuvoir** (403 Ontario street East) on the terrace in the back.

June 27th 2019	
8:30 am to 9:00 am	Registration and breakfast at **ITHQ** (3535 Saint-Denis street)
9:00 am to 10:00 am	Opening statement Keynote I: Steve Borgatti
10:00 am to 10:30 am	Break
10:30 am to 12:00 pm	Subgroup workshops I
12:00 pm to 1:15 pm	Lunch at the restaurant on the main floor of **ITHQ**
1:15 pm to 2:15 pm	Keynote II: Jacob Young
2:15 pm to 2:45 pm	Break
2:45 pm to 4:15 pm	Subgroup workshops II
7:00 pm to 11:00 pm	Evening Reception at **La Fabrique l'Annexe** (3621 Saint-Denis street)

June 28th 2019	
8:30 am to 9:00 am	Registration and breakfast at **ITHQ** (3535 Saint-Denis street)
9:00 am to 10:15 am	Early career researchers' presentations
10:15 am to 10:45 am	Break
10:45 am to 12:00 pm	Award for best Early career researcher Session on the Illicit Networks Research Association
11:45 am to 12:15 pm	Closing remarks
12:15 pm to 2:00 pm	Lunch at restaurant on main floor of **ITHQ**

Important information

WELCOMING RECEPTION

All the participants at the workshop are invited for a pre-conference cocktail and light diner offered by INW at l'Abreuvoir (403 Ontario street East), about a 5 minutes' walk from the conference venue. We will have a reserved section just for us on the back terrace.

SUBGROUP WORKSHOPS

INW will feature two subgroup workshops. During each subgroup workshops, the presenters will join their assigned table either in the main or alternate conference room (see the end of the program for the list of presenters and tables). Each table will have its own monitor. Presenters will have 5-10 minutes each to present their project and 10-15 minutes to solicit tips and help from their fellow table members. Participants are free to present their project in the format that fits their needs the best (ex. PowerPoint slides, bullet-point list in Word, Gephi network).

Participants who are not presenting will be free to join whatever table they wish and can move from one table to another over the course of the subgroup workshop. Participants can listen to others talking and are encouraged to participate as much as possible in the discussions.

The aim of these subgroups is to provide an informal setting where social network analysists of all levels can interact and exchange on how to design research projects, analyze data and discuss the most relevant impacts of findings. Our goal is to create free flowing conversations and to stimulate the formation of new research partnerships and research designs.

LUNCHES

INW will cover the costs for both lunches for all participants. Alcoholic beverages will be available but not covered by INW.

EVENING RECEPTION

The evening reception, for presenters only, will be held at **La Fabrique l'Annexe** (3621 Saint-Denis street), a 2 minutes' walk from the conference venue. La Fabrique l'Annexe is a private venue that INW booked for the evening reception. INW will cover the cost of food and as many drinks as the regulations from the Université de Montréal allows. All participants will be invited to join us at the traditional karaoke session after the evening reception at **Club Date** (1218 Sainte-Catherine street East).

EARLY CAREER RESEARCHER PRESENTATION AND AWARD

Early career researchers (ECR) – researchers that are still students or are at the Assistant Professor level – will be invited to present a paper that has been submitted, was under review or has been accepted to a scientific journal in the 12 months period before INW. ECR will have 10 minutes to present their paper using a presentation. All participants will judge these presentations based on their research design, their findings and the style of the presentation using an online voting system. The best ECR will receive the **Early Career Award** from the INW which comes with a C$500 prize.

ILLICIT NETWORKS RESEARCH ASSOCIATION SESSION

INW brings together the best researchers in the field of social network analysis and illicit networks. Many in our group have suggested in the past the need to better organize our very dynamic field by creating more structures to foster collaborations and develop more ambitious international projects. During this session, we will discuss how we could develop new structures such as an association for illicit networks researchers, what their aim should be and how these structures could be funded over the next years.

SUBGROUP WORKSHOPS I

TABLE	TITLE	PRESENTERS
1	Mapping Transnational Illicit Drug Supply Chains – From Mexico To Australia	Caitlin Hughes, David Bright, R.V. Gundur, Carlo Morselli, Aili Malm
1	A Respondent Driven Sampling Study On Cannabis Dealers In Québec City	Yanick Charrette
1	The New Frontier Of Online Drug Discussion	Oskar Enghoff
1	Shared Wildlife Trafficking Paths: Uncovering Routes Of Biological Exploitation	David Bright, Phil Cassey
1	Modelling Interpersonal Trust In Criminal Networks Using Social Network Analysis And Agent-Based Modelling	David Bright, Thomas Britz, Johan Koskinen
2	Mapping The Evolving Structure Of Gang Violence In Los Angeles	Gisela Bichler, Citlalik Ibarra, Alexis Norris
2	The Role Of Personal Networks In Gang Membership Persistence	Krysta Dawson, Martin Bouchard, Evan Mccuish, Ray Corrado
2	Social Distance As A Predictor Of Gang Violence	Martin Bouchard, Surena Bains
2	An Experimental Study Of Peer Influence And Deterrence	Marie Ouellet, David Maimon, Scott Jacques
3	The Role Of Distrust In Illicit Trust Networks: How Hackers Implement Dispute Resolution	Benoit Dupont, Jonathan Lusthaus
3	Cryptomarket Transaction Networks: Explaining The Structure Of An Online Illicit Market	David Décary-Hétu, Rasmus Munksgaard
3	Becoming A Hacker: A Network Of Support And Conflict Ties In A Hacking Community	David Décary-Hétu, Justine Barron-Marcil
3	Between The Devil And The Deep Blue Sea: An Exploration Of Trafficking, Organised Crime And Security Ploys In The Port Of Montreal Within Comparative Perspectives	Anna Sergi
4	Temporality In Criminal Networks	Paolo Campana
4	Growing Apart: Examining Network Decay In Organized Crime	Bryan Monk, Martin Bouchard
4	Predicting The Complexities Involved In Network Intervention With Children In Ireland	Sean Redmond
4	A Network Theory Of Social Gravity And Its Effect On The ‘Search For Suitable Co-Offenders’	Mitch Macdonald
5	The Correlates And Consequences Of Police-Citizen Interactions In Newark, New Jersey	Sadaf Hashimi, Vijay F. Chillar, Sarah Lageson

5	The Effects Of Police Social Networks On Positive And Negative Behavior	Michael D. White, Aili Malm
5	Network Signatures Of Police Use Of Force	George Wood, Akshay Jain, Sushmita Gopalan, Andrew Papachristos
5	Simulating The Recruitment Into Organized Crime Through A Multilevel Network Approach	Francesco Calderoni, Gian Maria Campedelli, Tommaso Comunale, Ernesto U. Savona, Giulia Andrighetto, Mario Paolucci

SUBGROUP WORKSHOPS II

TABLE	TITLE	PRESENTERS
1	Cryptomarket Transaction Networks: Explaining The Structure Of An Online Illicit Market	David Décary-Hétu, Rasmus Munksgaard
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ABSTRACTS

TITLE: Between the Devil and the Deep Blue Sea: an exploration of trafficking, organised crime and security ploys in the port of Montreal within comparative perspectives

AUTHOR: Anna Sergi

Ports are unique environments; they are universes of processes and meanings. Ports are border zones, liminal areas across different juridical systems and morphologically they are in flux, both places of arrival and places of transit, in between economic processes and political decisions. Departing from considerations on the evolution of port security to counter criminal activities, including but not limited to illicit trafficking, this research project involves comparative qualitative research conducted with authorities in different ports. The main aim of this comparative research project is to enhance policy understanding of how the complex relationships within seaports act as conduits or facilitators in how criminal networks operate in the territory of ports and their hinterland. Research will be carried out in two European ports (Liverpool and Genoa) and three extra-European ones (Montreal, New York and Melbourne), which are either targets of, or transit zones for, criminal activities and networks. By June 2019 fieldwork in Genoa and in Melbourne will be completed and Montreal will come next, to leave New York to September 2019 and Liverpool during Autumn 2019. In fact, with specific attention to the changing geopolitical conditions surrounding the port of Liverpool during and after Brexit, the study will aim to look at what could be learned from international experiences both in terms of security and in terms of transnational risk assessments in the case of Liverpool. As prior research has established (see Brewer, 2014; Eski, 2016) studying security networks, institutional responses and policing arrangements in the port to counter threats including serious and organised crime is quite an intense task that require inputs from different theoretical backgrounds, including network analysis. Among studies on policing, on organised crime and urban sociology, this work will specifically focus on a) the different types of illicit activities detected in the port; b) how different criminal groups make use of the port; c) security and crime prevention in the port through environmental design (under critical lenses); and d) the challenges and the shortcomings of current arrangements. Montreal has been chosen because of the peculiar nature and history of this port. Servicing Toronto and the rest of Central Canada, the port of Montreal is on the shortest direct route from Europe to North America. It is both a port of transit and a target. A 2015 commission (Charbonneau Commission) revealed, among inquiries into corruption in the construction sector, deep involvement of organised crime in the construction of new areas of the port, following plans to expand port terminals and increase traffics and trades.In Montreal, as in other locations, I will collect juridical data through national databases, press releases from law enforcement authorities and official policy documents. I will also interview officials from port authorities, waterfront commissions, police forces, special prosecutors, and security firms working at the ports. Topics will cover security plans, national and international regulations, perceptions of illegal activities in the ports, assessments of risks and vulnerabilities, perceptions of efficiency in responses. Access to port terminals will be negotiated to pair interviews with visual material, i.e. photographs: this is part of a “walking methodology” that will allow for more complete and diverse type of data.

TITLE: The role of distrust in illicit trust networks: how hackers implement dispute resolution

AUTHORS: Benoit Dupont, Jonathan Lusthaus

Most of the literature on the social organization of hackers studies the nature and utility of trust, a key enabler of complex project-based crimes involving strangers who deal in deception. The problem we seek to address is how to examine instead the role distrust plays in communities of online offenders, the challenges it poses for their effectiveness and growth, how it can escalate into formal complaints between members and how these complaints are resolved. Based on an empirical study of an invitation only forum of more than 400 elite hackers and malware developers active between 2008 and 2015, we have assembled a sample of 160 formal complaints filed by vetted members in order to understand the causes and behaviours that lead to the public expression of distrust, the status of the plaintiffs and accused within that community, the financial implications of such disputes, the time invested by all parties to settle them, the role played by administrators and third parties to reduce the collective level of distrust, and finally the outcomes of those complaints. We would like to leverage these results to discuss in a more contrarian fashion than is usually found in the cybercrime literature the general effectiveness of trust-building mechanisms used by communities of online offenders where the individual costs of defection, failure and betrayal remain extremely low. Our sample is both of a qualitative and quantitative nature: it contains the discussion threads used as the main mode of communication to resolve these conflicts, which have been coded to capture data about the type of dispute, the identities of the plaintiff and the complainant, the participants in the adjudication process, their general position with regard to the two parties, and the outcome of the process (when known). We welcome ideas and insights from workshop participants on what they believe would be the most interesting ways to study this network of distrust.

TITLE: Growing apart: Examining network decay in organized crime

AUTHORS: Bryan Monk, Martin Bouchard

The persistence of criminal dyads is an understudied area of organized crime networks. Who individuals choose to maintain relationships with provides an important baseline for interpreting longitudinal change. The natural loss of relationships between individuals - network decay, mitigates the impacts of network disruption and alters inferences for network change and evolution. The short-lived and volatile nature of co-offending ties suggest that network decay is a prominent fixture within criminal dyads, however, in organized criminal networks relationships are multiplex and not primarily formed or cultivated for a small number of criminal events. In this study, the ego networks of members of organized crime groups are examined over two time periods to ascertain the natural decay of relationships. Networks were generated from Criminal Intelligence Services in Western Canada in two waves yielding over 3000 individual nodes, including 272 nodes appearing across time periods. Each wave consists of ties generated from 11 sources – four from police data and seven from secondary sources. Organized crime networks then, are more complete than pure co-offending networks and the loss of relationship is not simply due to the police failing to make an arrest of a dyad. Excluded from these multiplex networks are group affiliation ties as they inherently bias the network towards cohesiveness and create a series of perfect cliques. Additionally, group membership doesn't necessarily constitute a relationship tie especially as group size moves beyond a few members. A loss of a group affiliation tie will likely be reflected in the loss of other relationships as well thus, making decay redundant. Conversely, a loss of a relationship in the form of a co-offending tie, or a friendship tie while maintaining group affiliation may indicate decay. This data inclusion argument informs the first area where feedback from participants could be sought. The chosen analysis allows us to visualize how structural holes get filled, and how new ones get created. The results suggest that transitive triads are more likely to persist, and that network decay differentially affects offenders who are higher in brokerage. Transitivity provides an important mechanism for relationship maintenance and continuity suggesting that decay is not random. The second problem that we are trying to solve and would like feedback on relates to this measurement of network decay. While we use traditional measures such as Freeman's betweenness to operationalize nodal importance and transitivity for tie formation, we would like feedback on additional ways to conceptualize and measure this problem. The first author and presenter has intermediate level of experience with network methods.

TITLE: Mapping transnational illicit drug supply chains – from Mexico to Australia

AUTHORS: Caitlin Hughes, David Bright, R.V. Gundur, Carlo Morselli, Aili Malm

The persistence of criminal dyads is an understudied area of organized crime networks. Who individuals choose to maintain relationships with provides an important baseline for interpreting longitudinal change. The natural loss of relationships between individuals - network decay, mitigates the impacts of network disruption and alters inferences for network change and evolution. The short-lived and volatile nature of co-offending ties suggest that network decay is a prominent fixture within criminal dyads, however, in organized criminal networks relationships are multiplex and not primarily formed or cultivated for a small number of criminal events. In this study, the ego networks of members of organized crime groups are examined over two time periods to ascertain the natural decay of relationships. Networks were generated from Criminal Intelligence Services in Western Canada in two waves yielding over 3000 individual nodes, including 272 nodes appearing across time periods. Each wave consists of ties generated from 11 sources – four from police data and seven from secondary sources. Organized crime networks then, are more complete than pure co-offending networks and the loss of relationship is not simply due to the police failing to make an arrest of a dyad. Excluded from these multiplex networks are group affiliation ties as they inherently bias the network towards cohesiveness and create a series of perfect cliques. Additionally, group membership doesn't necessarily constitute a relationship tie especially as group size moves beyond a few members. A loss of a group affiliation tie will likely be reflected in the loss of other relationships as well thus, making decay redundant. Conversely, a loss of a relationship in the form of a co-offending tie, or a friendship tie while maintaining group affiliation may indicate decay. This data inclusion argument informs the first area where feedback from participants could be sought. The chosen analysis allows us to visualize how structural holes get filled, and how new ones get created. The results suggest that transitive triads are more likely to persist, and that network decay differentially affects offenders who are higher in brokerage. Transitivity provides an important mechanism for relationship maintenance and continuity suggesting that decay is not random. The second problem that we are trying to solve and would like feedback on relates to this measurement of network decay. While we use traditional measures such as Freeman's betweenness to operationalize nodal importance and transitivity for tie formation, we would like feedback on additional ways to conceptualize and measure this problem. The first author and presenter has intermediate level of experience with network methods.

TITLE: Shared wildlife trafficking paths: uncovering routes of biological exploitation

AUTHORS: David Bright, Phil Cassey

The persistence of criminal dyads is an understudied area of organized crime networks. Who individuals choose to maintain relationships with provides an important baseline for interpreting longitudinal change. The natural loss of relationships between individuals - network decay, mitigates the impacts of network disruption and alters inferences for network change and evolution. The short-lived and volatile nature of co-offending ties suggest that network decay is a prominent fixture within criminal dyads, however, in organized criminal networks relationships are multiplex and not primarily formed or cultivated for a small number of criminal events. In this study, the ego networks of members of organized crime groups are examined over two time periods to ascertain the natural decay of relationships. Networks were generated from Criminal Intelligence Services in Western Canada in two waves yielding over 3000 individual nodes, including 272 nodes appearing across time periods. Each wave consists of ties generated from 11 sources – four from police data and seven from secondary sources. Organized crime networks then, are more complete than pure co-offending networks and the loss of relationship is not simply due to the police failing to make an arrest of a dyad. Excluded from these multiplex networks are group affiliation ties as they inherently bias the network towards cohesiveness and create a series of perfect cliques. Additionally, group membership doesn't necessarily constitute a relationship tie especially as group size moves beyond a few members. A loss of a group affiliation tie will likely be reflected in the loss of other relationships as well thus, making decay redundant. Conversely, a loss of a relationship in the form of a co-offending tie, or a friendship tie while maintaining group affiliation may indicate decay. This data inclusion argument informs the first area where feedback from participants could be sought. The chosen analysis allows us to visualize how structural holes get filled, and how new ones get created. The results suggest that transitive triads are more likely to persist, and that network decay differentially affects offenders who are higher in brokerage. Transitivity provides an important mechanism for relationship maintenance and continuity suggesting that decay is not random. The second problem that we are trying to solve and would like feedback on relates to this measurement of network decay. While we use traditional measures such as Freeman's betweenness to operationalize nodal importance and transitivity for tie formation, we would like feedback on additional ways to conceptualize and measure this problem. The first author and presenter has intermediate level of experience with network methods.

TITLE: Modelling interpersonal trust in criminal networks using social network analysis and agent-based modelling

AUTHORS: David Bright,Thomas Britz,Johan Koskinen

The proposed study aims to model the dynamics of trust within criminal networks and to determine the implications of different types or modes of trust for the strengths and vulnerabilities of criminal networks. The dynamics of trust is a scarcely studied and poorly understood concept in the context of criminal networks. Indeed, more broadly, there is little consensus on how trust should be defined and operationalized (see McKnight & Chervany, 1996). For the purpose of the proposed study, we define trust as the expectation of P, under conditions of uncertainty, that O will not harm them, even though O could harm P (Dunn, 1988; Gambetta, 1988). Drawing on the small literature on the nature of trust in criminal networks, we propose to model trust as a property of dyadic relations (Lampe & Johanson, 2004) to determine how trust between individual actors influences the strengths and vulnerabilities of the network as a whole. We propose to model trust in one real-world network and two simulated networks (where the simulated networks have properties commensurate with the real-world network). We propose to allocate relevant trust-related attributes to actors and ties. These attributes will calibrate trust between actors modelled via valued, directed ties (e.g., on a scale of 0-10). We will then simulate both endogenous and exogenous shocks to the network that may precipitate the erosion of trust between actors. We will allocate actor attribute scores on the following dimensions related to trust: (1) reputation scores (Dalgupta, 1998) which will influence the extent to which actors are trusted by others (higher reputation scores mean higher trust and slower erosion of trust); (2) ethnicity where actors with the same ethnic background will share higher trust values and slower erosion of trust (see Gambetta, 1988; Welter, 2012: (3) group membership whereby actors who share formal group membership will equate to higher trust and slower erosion of trust. Ties based on family or kinship relationships will also be commensurate with higher trust values and slower erosion of trust. Finally, following results of Bright et al., 2018, triadic structures within the networks will be associated with higher trust values and slower erosion of trust. The aim of the study is the determine the implications of trust for network vulnerability and strength following endogenous and exogenous shocks. Endogenous shocks may include disagreements and /or competition between network actors which may undermine interpersonal trust. Exogenous shocks will include law enforcement interventions on the network (based on the work of Bright et al., 2017) such as targeting and arresting (i.e., removing) high degree or high betweenness actors in the network. We will set a trust threshold for the maintenance of ties between actors. Once trust between two actors falls below the threshold, the tie will be broken (and this can occur unilaterally). Arrests of actors may lead other actors in the local network vicinity to become suspicious of their partners, reduce trust and potentially break links (e.g., when actors become concerned about infiltration by law enforcement, or that an actor to whom they are connected has become a police informant).

TITLE: Cryptomarket Transaction Networks: Explaining the Structure of an Online Illicit Market

AUTHORS: David Décary-Hétu, Rasmus Munksgaard

Cryptomarkets are online illicit markets hosted on the darknet. Cryptomarkets are run by administrators who put in place and enforce regulations. Independent vendors are vetted before being allowed to post ads for the goods and services they wish to sell. Customers can browse through the ads, negotiate with vendors and make purchases using virtual anonymous currencies. When physical goods are bought, the goods are shipped through the regular mail to the buyer. Cryptomarkets now facilitate the sale of hundreds of millions of dollars of goods and services each year. These goods and services are wide ranging and include illicit drugs, prescription drugs, hacking services, stolen personal and financial information as well as counterfeit items. After completing a purchase, buyers are encouraged to leave a feedback to rate their vendor and help the community identify opportunistic or fraudulent vendors. Usually, this feedback is anonymous. In the case of the Silk Road 3.1 cryptomarket however, the administrators of the cryptomarket publish the full username of the buyer. This allows us to build a network of transactions where each actor is either buying or selling (sometimes both) on Silk Road 3.1. We usually know for each actor what their transaction record is, the country where they are located and how long they have been active in the network. Each tie is a transaction for which we have a price, a type of product and a country of operation. This network is of course dynamic and can be segmented in weekly or monthly timeframes as well segmented based on the type of product or the origin of the actors. Our problem at this point is that we are not sure how to best explain the structure of this network. The structure will inform us on how customers and vendors match with each other and decide to enter into an economic relationship. The concept of repeat purchases has been in part investigated in the past but never with much details. This dataset provides an opportunity to test many theories around the strength of weak ties and the tie formation process in general.

TITLE: Becoming a Hacker: a Network of Support and Conflict ties in a hacking community

AUTHORS: David Décary-Hétu,Justine Barron-Marcil

TITLE: Simulating the recruitment into organized crime through a multilevel network approach

AUTHORS: Francesco Calderoni, Gian Maria Campedelli, Tommaso Comunale, Ernesto U. Savona, Giulia Andrighetto, Mario Paolucci

Organized crime in embedded in multiple social relations comprising family, friendship, working and criminal connections. While social relations support the activities of criminal groups, they are also a major driver of the recruitment of new members. Project PROTON aims at developing agent-based models (ABM) of the recruitment into organized crime to test possible policy scenarios aiming at preventing recruitment. The ABM will rely on empirically grounded family, friendship, work and criminal relations to analyze the mechanisms driving individuals into organized crime. The simulation relies on approximately 10,000 agents representing individuals who are socially connected through different layers representing family, friendship, working, and criminal relations. Furthermore, every agent has a set of individual attributes (e.g. gender, age, wealth, education, criminal records). Social relations and individual attributes are modelled based on empirical evidence. This simulated society evolves in time: agents establish new relations (e.g. make friends, have children) and modify their attributes (e.g. get a degree, commit a crime). From the beginning of the simulation a set of individuals (e.g. approximately 30 agents) are labelled OC members and their relations and individual attributes are based on empirical evidence on organized crime groups. The main output of the simulation is the recruitment of new members into organized crime. The proposed simulation currently assumes that the recruitment process goes through the following steps:

1. At every tick in time, agents have a probability C of committing a crime. C is a function of each agent's social relations and individual characteristics based on available empirical evidence.
2. A share of crimes is committed by more than one individual, based on empirical evidence of co-offending patterns. For crimes involving more than one offender, non-OC agents will select co-offenders based on a social proximity score derived from relational attributes and homophily.
3. When OC members commit a crime with another agent, they will select one or more co-offenders though a score R of social embeddedness. R is the weighted proportion of OC members among the social relations of each individual (comprising family, friendship, working and co-offending relations).
4. Recruitment occurs when a non-OC agent commits a crime with an OC member.

The current simulation is mostly based on data on the city of Palermo (e.g. demographic, work, wealth, crime rates) or on general evidence from systematic reviews on crime (e.g. effect of friendship and parent delinquency on crime). The complexity of the ABM entails a number of problems, ranging from the definition of the networks, the multiplex network dynamic, the interplay of social relations and individual attributed in the crime commission process and the process of recruitment. Comments, criticisms and feedback on all these elements are welcome. The PROTON project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°699824. PROTON (projectproton.eu) is conducted by a consortium of 21 partners coordinated by Università Cattolica del Sacro Cuore – Transcrime and including several universities, law enforcement agencies and policy makers.

TITLE: Network Signatures of Police Use of Force

AUTHORS: George Wood,Akshay Jain,Sushmita Gopalan,Andrew Papachristos

High-profile killings of civilians have once again focused attention on police misconduct and the use of excessive force. Such events highlight the vast disparities in police use of force across demographic groups and neighborhoods. However, despite progress in analyzing these disparities, we have not unpacked the trajectory of misconduct among officers who end up unjustly using excessive force. This paper maps these trajectories using data on complaints filed against police officers in Chicago and the payout of settlements by the city from 2000-2016. Settlements are a stringent measure of unjustified use of force because each settlement requires an independent evaluation of the merits of a complaint. We identify 976 officers whose use of excessive force against civilians resulted in a settlement payout. We then retrace the complaint history of each of these officers. As officers are frequently co-named in complaints alongside other officers, we are able to observe the growth of each officers' complaint network since their appointment. We identify common network signatures associated with the use of excessive force and subsequently evaluate the extent to which these signatures might be used to identify other officers, or groups of officers, who may be prone to using excessive force. Finally, we go back to the entire co-complaint network of more than 8,000 officers to determine the prevalence of such network signatures.

We use three primary sources of data:

1. Civilian-filed and officer-filed complaints against police in Chicago from 2000–2016.
2. Settlement payouts by the City of Chicago 2000–2016.
3. Officer attributes from public employment records

We project a co-complaint network based on complaints in which two or more officers are co-named. We analyze how these networks develop over time. There are several interesting problems that would benefit from discussion and feedback at the Illicit Networks Workshop.

1. How might the resolution of time (i.e. networks in yearly intervals versus networks that update with every edge) influences the findings?
2. How important are smaller network structures (such as transitive triads) compared to larger structures?
3. Should the “network signatures” be purely structural or should they take into account officer attributes?
4. How should career stage and discrete career events, such as promotion or disciplinary actions, be incorporated into the analysis?
5. How might the attributes of the complainant be incorporated into the analysis?

TITLE: Mapping the Evolving Structure of Gang Violence in Los Angeles

AUTHORS: Gisela Bichler,Citlalik Ibarra,Alexis Norris

Mapping the changing structure of attack behavior, this study aims to understand the long-term impact that civil gang injunctions (CGIs), turf proximity, rivalries, and alliances have on the evolution of violent conflict as revealed by prosecutions involving 246 gangs based in the City of Los Angeles (1997-2015). Before we begin exploring the changing structure of gang-on-gang conflict with stochastic actor-oriented models, we must first identify appropriate observation periods that are useful for exposing meaningful patterns and reducing random noise. With little precedence to guide us, we compare equal intervals centered on a modal period of high CGI use, natural breaks, and a rolling average. Lacking definitive results, this paper questions how we should proceed in our efforts to examine the dynamic web of complex hierarchical structures that change dramatically between observation periods. What is the optimal method for partitioning sparse networks observing rare events?

TITLE: The Role of Personal Networks in Gang Membership Persistence

AUTHORS: Krysta Dawson, Martin Bouchard, Evan McCuish, Ray Corrado

Previous research found that gang members who are more embedded within the gang remain in the gang longer than those on the periphery. Yet, no research to date has examined how the social structure and organization of a gang member's personal network influences membership longevity. Who a gang member is closely connected to may impact the amount of time spent in the gang, as well as the level of commitment (e.g., likelihood of committing more serious offences). Using data from the Incarcerated Serious and Violent Young Offender Study, the current study wants to address this gap by examining the personal networks (e.g., co-offending ties, social ties) of a subsample of persons from the ISVYOS. The ISVYOS is a longitudinal study that began in 1998 and includes approximately 1,400 participants. This study focuses on the personal networks of 68 participants in cohort II that identified themselves as gang involved during their intake interview. Participants in cohort II were born between 1988-1996 making them currently between the ages of 23-32 years old. In addition to their intake interview, a variety of official data sources, including daily logs completed by custody staff and community probation officers, were coded over a ten-year follow-up period. This allows us to compare pre-gang, during-gang, and post-gang network changes and whether who gang members associate with changes during periods of active gang membership. Further, the data include community and prison networks, which gives us the opportunity to analyze whether connections formed in custody versus the community are more strongly associated with gang membership longevity. An important aspect of the study is to examine the role of cohesiveness in and out of gangs. Previous research has found gangs that are more likely to survive need to balance cohesiveness with recruitment opportunities, but does this translate over to the individual-level? For example, is pre-gang status about establishing connections while active gang membership is about maintaining cohesive connections? Do gang members that have failed to establish cohesive ties spend less time in a gang than those who were successful in making cohesive ties? The data provide us the opportunity to analyze network trajectories over time, and contains a mix of individual measures and social structures. The challenge that is currently being faced with this paper is the best way to frame it, and what methodological approach to use. Currently, the data consist of ego networks, but is this the most appropriate way of analyzing the data? There is a possibility of having a matched control sample of 68 participants from cohort II that did not identify as gang involved during their intake interview. Should the control group be used to help us identify differences in tie formation between gang and non-gang involved youth over time? The first author and presenter of this study has intermediate level experience with social network methods.

TITLE: An experimental study of peer influence and deterrence

AUTHORS : Marie Ouellet,David Maimon,Scott Jacques

Recent studies have marshalled experimental methods to demonstrate the causal effect of peer influence on deviance. The current study draws from this research to investigate whether peers may be leveraged to deter deviant behavior. Specifically, we apply an experimental research design to examine how exposure to peers who facilitate, and support deterrence cues may decrease the likelihood of deviance. The study implements an experimental research designs across sections of an online course, where avatars pose as students. The control condition involves a post by the Instructor on the announcements page of the online course informing students about class policies on cheating, including that they cannot participate in group messaging apps. The first experimental condition involves a post by the student avatar on the group messaging app re-iterating the Instructor's announcement one day before a major assignment. The second experimental condition draws from previous studies which have shown that deviant behavior is conditioned by an individual's network position, involving a private message by the student avatar to the most central student re-iterating the Instructor's announcement one day before a major assignment, to examine how deterrence messages may spread throughout the network. The effectiveness of the deterrence cues will be assessed through the participation of students within the group messaging applications, measured by the (1) number of students in the group; (2) frequency of interactions (number of posts); (3) the number of students who communicate study guide or quiz answers (send versus receive networks); and (4) number of days students remain in the group. We will control for students' year, GPA, major, place of residence, sex, age, race/ethnicity, and school networks, using information from prior class rosters, where students may be linked based on their joint participation within the same classroom. Finally, we will measure students' confirming behaviors by focusing on the activity logs as recorded on the online course platform (e.g., number of times they access an assignment; time spent on the online course; downloading instructions).

TITLE: Social distance as a predictor of gang violence

AUTHORS: Martin Bouchard,Surena Bains

A handful of studies in the US have linked gang violence to social networks. The central idea is that violence spreads through networks, and clusters around individuals who know each other and have an unusually high probability of being a victim. In a nutshell, an individual's social distance to victims is one of the strongest predictors of one's probability of getting shot. The present study attempts to replicate and extend this line of work in the Canadian context. Specifically, the study capitalizes on the emergence of a violent conflict between relatively young gang members from Surrey, BC. The starting points for the study are the personal networks of 23 gang-related victims of gun homicide or attempted homicide in 2015. Drawing from 5 years of data leading to the shootings (2011-2015), the network grew to 355 individuals connected to the 23 seeds. We distinguished between co-offending, social, and conflictual ties in the network. The preliminary results show that 299 of the 355 individuals in the total network were connected to each other, including 18 of the 23 victims. Two clear factions emerge in the network, suggesting a tit-for-tat pattern of conflictual relationships that started to develop before the sudden surge in violence of 2015. Of the first seven victims shot in 2015, five were the most connected individuals in the network, suggesting that the most "connected" victims were generally getting shot first. Of the 355 individuals in the 2011-2015 network, 8 were shot in either 2016 or 2017. These 8 victims were significantly better connected in the 2015 victim network, suggesting an important role for social distance in predicting current, and future violence. We are exploring various options to push the analysis further than the current descriptive results, something we hope to discuss with workshop participants.

TITLE: The effects of police social networks on positive and negative behavior

AUTHORS: Michael D. White,Aili Malm

Recent research (Quispe-Torreblanca & Steward, 2019; Ouellet, Gravel, Hashimi & Papachristos, forthcoming) suggests that police officers' peer groups have a causal effect on police misconduct. Both studies conclude that deviant police behavior is spread through socialization. However, this research uses a rather general operationalization of officer peer groups – officers are deemed peers if they are linked to the same line manager or squad. Therefore, identifying the type of relationship and mechanism driving these peer influences is not possible. The current project expands upon this research by collecting network data on the informal social structure among officers in a mid-sized southwestern police department. Specifically, we collect data on four different types of officer networks – "hang-out with", "get along with", "get advice from", and "work with." We will investigate how different network structure affects several positive and negative police actions, including use-of-force, complaints, de-escalation techniques, and procedurally-just behaviors. Findings from this project will be used to inform both police misconduct policy, and training programs, including but not limited to de-escalation and procedural justice education.

TITLE: A network theory of social gravity and its effect on the ‘search for suitable co-offenders’

AUTHORS: Mitch MacDonald

How do co-offenders ‘end up together’? Co-offending is mostly argued as a social selection process, where the overlap observed in peer and delinquent social networks of youth is the result of a search process that’s limited within neighbourhood and school settings. Ethnographies of criminal subcultures give some evidence that similar social selection effects remain relevant in adulthood, with a search process that’s largely dependent upon ‘who you know’ and the residential distribution of the criminal population. So, what make some co-offenders more ‘suitable’ than others? One argument is that a person’s ‘co-offending potential’ is a function of the frequency and intensity of their social interactions with criminal populations at large, which is constrained by their decision-making, social settings, and other contextual factors like motivation(s). I generate experimental data using pairwise observations of co-offenders ij from incident and arrest records to test the effects of co-offending networks and the residential distribution of the criminal population, or what I call the social gravity effect, on the ‘search for suitable co-offenders’. I generate these data using agent-based modelling—a computer simulation of an artificial society of co-offenders, who use heuristics and decision-making logic to learn from experience and adapt to changes in their social settings and physical environments, that is modeled after co-offenders listed in police-generated incident and arrest records. The search for suitable co-offenders that plays out in each run of this computer-simulation is conditioned upon a set of user-specified rules and other heuristic arguments that are grounded in theory. Here, I’m able to overcome some of the shortcomings of incident and arrest data and consider the effects of unobserved micro-level social processes that influence offender decision-making and social interactions like bounded rationality, differential association, and social disorganization of neighbourhoods. I generate other plausible, counterfactual worlds, or how changes in individual-level behaviour affects the collective behaviour of the larger social system, by making slight changes to the conditions of my computer simulation that are tested against what’s expected from theory. Insofar that my computer simulations are any ‘good’, individual-level decision-making and social interactions should reproduce the same aggregate-level social processes that are observed in these incident and arrest records, particularly: (1) a power-law distribution of co-offending networks; (2) residential segregation of criminal populations; and (3) distance decay observed in journeys to crime and search for co-offenders. I test these hypotheses by regressing the probability of observing a co-offending pair ij on a network measure of social gravity that quantifies the strength of someone’s co-offending potential: a standardized measure of the absolute difference of i and j’s social capital, derived using multiple individual-level network statistics, divided by the distance separating i and j. A positive social gravity coefficient indicates a search process that’s grounded in network theory and obeys the gravity law, with most co-offending ‘networks’ being incidents involving two or three people, who come together through the social processes of homophily and distance decay.

TITLE: The new frontier of online drug discussion

AUTHORS: Oskar Enghoff

Reddit is home to a large volume of illicit drug discussion, with at least one million 'redditors' subscribed to one of the many hundred 'sub-reddits' related to various aspects of illicit drugs use, and over 100,000 monthly submissions. Previous research has established the impact that online drug discussion can have on real-word drug use and trade, but the literature has so far not dealt with the recent emergence of Reddit as the largest platform for this phenomenon. Reddit differs from the 'classic' discussion forums treated in previous research in many significant ways: The platform structure is much more sophisticated and involves a voting/point system, it hosts discussion on every topic (not just drug use), every post is public and can potentially be promoted to the 'front page', the content is subject to stricter terms of service and the demographic composition of the user base is different, most likely with a larger proportion of young people. Because of this, the patterns of interaction of people discussing drugs discussion on Reddit are different from those previously studied, and consequently the real-world impact of these discussions is also likely to be different. In the interest of bringing the literature on online drug discussion up to date and thus bringing forth new salient issues and perspectives in this field, I am conducting a comparative study of the drug discussion taking place on Reddit and a 'classic' drug discussion forum. I use the monthly Reddit data collected available from Pushshift.io and a database dump from Bluelight.org, the most prominent 'classic' drug discussion forum. Instead of the small-scale sampling and qualitative analysis characterising online ethnography, I employ quantitative methods – specifically, social network analysis (intermediate expertise) and digital text analysis (advanced expertise). I am specifically interested in comparing these four aspects of the discussions:

1. Levels of discussion activity – number of users, number of posts/comments, number of comments pr. post, etc.
2. Patters of participation at the level of the individual user – frequency of posts/comments, number of threads contributed to, numbers of users interacted with, numbers of sub-forums participated in, etc.
3. Patterns of interaction at the level of the community – levels of density, clustering, etc. Based on user to user interactions networks and potentially sub-forum to sub-forum overlap networks.
4. The topics of the discussion content – most frequent topics (e.g. substances) on a monthly basis.

The methods used for this analysis are simple counting methods (1), social network analysis (2+3) and digital text analysis (4). Choosing an appropriate approach to text analysis one of the two main challenges of this analysis. This approach needs to be able to account for very short texts, and needs to allow for the comparison of topics/clusters across datasets. The second challenge is the fundamental differences in the data sources I am comparing– if I do find a difference in e.g. network density, I need to make sure this difference is meaningful and not due to fundamental differences in the two platforms.

TITLE: Temporality in criminal networks

AUTHORS: Paolo Campana

The proposed session will discuss issues related to modelling temporality in illicit networks. Changes over time are a crucial feature of illicit networks and a full understanding of how and why things might change is of paramount importance to both scholars and practitioners. However, modelling temporality might be rather challenging. Statistical models that are very valuable in explaining temporal changes in rather stable environments, such as classroom settings, might struggle to adequately model instances characterized by a high rate of change. What are the approaches we can rely upon when exploring issues related to temporality? In this session, we will discuss this issue with reference to criminal networks, and particularly networks of co-offenders reconstructed from police data. I will use, as an example, a study on violence committed by organized crime group (OCG) members in a mid-size Police force in the United Kingdom. This study is based on around 7,000 crime events that were classified as involving violence against a person and recorded by the police between 2010 and 2016. In total, the dataset includes around 700 organized crime members and 4,700 other individuals (non-OCG members), both in the role of co-offender and/or victim.

TITLE: The Correlates and Consequences of Police-Citizen Interactions in Newark, New Jersey

AUTHORS: Sadaf Hashimi,Vijay f. Chillar,Sarah Lageson

Public support, compliance, and belief in the legitimacy of law enforcement are key for maintaining social stability and public order. Yet, in high-crime, disadvantaged areas where violence and victimization are likely to concentrate, there exists an inherent mistrust amongst residents in highly surveilled areas. Aggressive strategies such as “zero tolerance” policing, which has conventionally centered on the use of stop-and-frisk practices, and pre-textual stops that target quality-of-life infractions subject residents to intense forms of police suspicion, interrogation, and interferences which, in return, undermines trust and confidence amongst those that the police are charged to protect. Understanding the structure of relations amongst those repeatedly stopped by the police, and those arrested is crucial for understanding how surveillance is tied to various (and vicarious) forms of social control. The current study uses three years (2014-2016) of administrative records from the Newark Police Department to understand the correlates and consequences of high-frequency police-citizen contact in Newark, New Jersey. These data comes from four sources: 1) field inquiry data, 2) arrest data, 3) homicide data indicating whether the victim or suspect is/was a “gang member” (i.e., gang-related murders), and 4) a proxy for gang involvement noting all individuals in the area that are (or were at one time) flagged as a gang member along with their group name. Criminal justice contact is disproportionately distributed, as such residents are extremely cynical of law enforcement. Recognizing the larger context of this area, and the state of policing in the United States, we need a framework that acknowledges the consequences of criminal justice contact while considering the concentrated nature of crime, violence, and victimization. As such, at the macro level, we examine the social structure of co-stop and co-arrestee networks and explore whether field inquiry incidents can be used to predict the probability of arrest. Conversely, it would be helpful to get feedback on an analytical strategy, or a family of methods in which diffusion, and the vicarious effects of contact can be operationalized, and empirically tested. For example, at the micro level, to what extent do individuals overlap across these networks. Are those stopped (i.e., co-stop networks) or arrested (i.e., co-arrestee network) with a group, or alternatively with a labelled gang member, likely to be heavily policed thereafter, facing the vicarious consequences of prescribed group behavior in comparison to others within these highly surveilled areas? Although studies have examined similar problems, they tend to be descriptive in nature, relying on a handful of measures with a cross-sectional design. We try to get around these shortcomings by comparing various data sources and incorporating a longitudinal design that examines how change and stability in behaviors impacts police surveillance overtime.

TITLE: Predicting the complexities involved in network intervention with children in Ireland

AUTHORS: Sean Redmond

Problem posed: Advice on translating research findings and a conceptual model of crime network intervention designed by experts in a community setting. How can risks based on evidence informed assumptions be mitigated and what practical models exist which are sufficiently nuanced to gauge impact.

Background: Original case study research conducted in Ireland sought to better understand the influence of criminal networks in children's abnormal serious and persistent offending. The 'Greentown' study designed a new technique 'Twinsight' which permitted researchers to examine networks quantitatively and qualitatively in parallel. This capability meant that researchers could in addition to identifying patterns and flows of influence could also simultaneously zoom in to examine the narratives of individual actors and groups of actors. This study has been replicated twice in Ireland 2018-2019 (Bluetown and Redtown). Findings of all three studies are currently being synthesised and it is proposed to share these findings, in addition to a national prevalence survey of youth- specialist police officers with the Workshop in June. In addition to the problem centred research, at the request of the Irish Government, work commenced on programme design in 2018. Programme design used a deliberative model and a process significantly influenced by the literature on 'Wicked problems'. The process involved international and national scientific experts, experts in youth crime, policy and child welfare. The programme focuses on; a) reducing network influence for youth engaged or at risk of engagement and b) providing alternative pathways away from network membership and to encourage youth to choose these pathways. This process delivered a conceptual model of intervention based on four mutually supporting pillars; improved community efficacy, improved child and family agency, improved pro-social opportunities and effective and efficient network disruption. Programme content and assumptions based on expert input, evidence from the literature and primary evidence from the Greentown studies has been further 'stress-tested' over 2018-2019 with specially selected groups of practitioners in law enforcement and child welfare. A seasoned, multiple stress tested but still laboratory-based programme has emerged which it is intended to pilot later in 2019. Our judgment is that the conceptual model is still reasonably intact. However we have decided that local context will determine the degree to which each pillar requires full implementation. In addition we intend for local professional networks and community members to compete for the programme to improve the probability that it will operate in a 'ready' community. Despite all the controls identified above designed to reduce the risk of poor performance and unintended consequences, there are still many unknowns, particularly in situations described by Professor Malcolm Sparrow in Harvard where there are harms in equilibrium, harbouring conscious opponents.

TITLE: A respondent driven sampling study on cannabis dealers in Québec city

AUTHOR: Yanick Charrette

One of Justin Trudeau's 2017 Canadian liberal party election promises was the implementation of cannabis legalisation. Following their electoral success, I started a research project with the ambition to observe how cannabis drug dealers will react and adapt to this law. This new bill would change the government's role in the cannabis market, going from agent of control to a pure competitor, a quite atypical role coming from the penal justice system. In the spring of 2018, using a respondent driven sampling technique, as a pre-legalization sample, I surveyed 85 cannabis dealers from the Saint-Roch neighborhood, known in Québec city for its sizable underground market. The legalisation bill was implemented on October 2018. A second post-legalization wave took place on spring 2019, and a third is expected for spring 2020. The interviews were driven by a questionnaire and a life-history calendar about what happened in the drug dealers' life in the previous year. Various questions about sociodemographic information were asked (e.g. residential status, education, hospitalisation). Then, questions about conventional work were asked, in terms of types of jobs, number of hours worked per week, and income. The following part is about the cannabis (and other drugs) market, gathering information at the monthly level, to see if there are any major changes in the market following the legalisation law. Information about prices, number of clients, number of transactions, and quantity sold were gathered. Open questions about dealers' perception of legalisation were asked (e.g. do you think cannabis legalisation will change something in your business?). Information about other types of crimes (predatory or market offenses) and their related income was surveyed. Participants were asked about various forms of judicial events (identity control, arrests, incarceration, probation) that occurred during the previous year. Finally, respondents were asked about his/her drugs consumption and violence (victimisation and perpetration). Moreover, as recruitment was carried out using respondent driven sampling, different algorithm can by used to infer Dealers' network based on the sampling referral chain. The main objective of this study is to see if there were changes in the criminal market following the legalisation in Canada regarding any form of displacement. Beyond this specific objective, the objective of this workshop is to discuss the possible avenues on different hypotheses that could be tested using this rich dataset and how to analyses these data. The whole questionnaire and some descriptive analyses will be shared with workshop participants to support the discussion.