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The Greentown Project: Building Evidence to inform Intervention Design for Juveniles Caught-up in Local Criminal Networks

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Abstract

A small minority of juveniles are responsible for the majority of detected juvenile crime in Ireland. This situation presents significant policy concerns. The current paper, based on findings from a comparative analysis builds on a multi-step research design process to provide evidence-based knowledge to inform the design of a new targeted intervention. An initial social network analysis of national crime and intelligence data produced localized basic criminal network maps illustrating co-offending and intelligence relationships between adults and juveniles in specific Police sub-districts (Part 1). These network maps then provided an enquiry frame for interviews with members of the police forces in three case study locations (Part 2). A comparative analysis of the three studies (Part 3) identified diversity in network structure and inherent resilience. The analysis also identifies core similarities in juveniles' vulnerabilities and risks to recruitment. These factors are important considerations for an intervention seeking to disrupt networks and create safe "exit" environments for juveniles.

Keywords

criminal network, juvenile crime, intervention design, comparative analysis, Twinsight

The Greentown Project was established to better understand the circumstances of juveniles in Ireland who are involved in more serious and persistent crime (defined as young

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people between 12 and 18 years of age who have been detected for five or more offenses in any 1 year). This cohort of juveniles referred to as the right-hand side of the tail (Loeber & Farrington, 2012) are of particular policy concern as they are responsible for the lion's share (Schumacher & Kurz, 2000) of the crime committed by juveniles in Ireland (Redmond, 2016). The "Greentown" project aimed to explore potential contributing factors to atypical juvenile offending patterns (Redmond, 2016). Further this cohort of juveniles may benefit from targeted interventions (Schumacher & Kurz, 2000), but the type of interventions matters (Kim et al., 2013). Further Braga et al. (2019) suggest a need to understand "underlying crime-producing dynamics and conditions" (p. 3) to determine an appropriate intervention. The current paper presents a comparative analysis of three case studies and aims to provide an understanding of the contexts and criminogenic environment (Loeber & Farrington, 2012) of juveniles involved in more serious and persistent offending in Ireland to inform an appropriate targeted intervention design.

The complexity surrounding juveniles who fall within "the right-hand of the tail" is demonstrated throughout the extant literature (e.g., Loeber & Farrington, 2012; Schumacher & Kurz, 2000). However, while there is an abundance of literature on risk factors for juvenile offending, Basto-Pereira et al. (2015) synthesis review of longitudinal studies on risk factors for juvenile recidivism found no consistency between the risk factors identified in the 15 studies reviewed. They cited a lack of controlling for social marginalization as a possible explanatory factor. This is consistent with Mulder et al. (2011) findings that criminal environment was linked to the severity of recidivism. Jacobs et al. (2020) systematic review on ecological factors found that there was insufficient research to determine their impact on juvenile reoffending.

Research that considers the effect of co-offending relationships on juvenile crime trajectories has tended to focus on juveniles who co-offend with similarly aged peers (Ayling, 2011; Kleemans & van Koppen, 2020). The link between gang membership and higher rates of offending is well established. For example, Pyrooz et al. (2016) meta-analysis of 179 empirical studies found that higher levels of offending were linked to active gang membership when compared to post gang membership. While reduced, this relationship remained statistically significant after controlling for theoretical meditators including self-control, social learning, social bonds, unstructured routines, and general strain.

Sarnecki (as cited in Reiss & Farrington, 1991) identified that most "delinquents" are linked by their co-offending through one or more loosely structured networks, however Reiss and Farrington (1991) suggested that these networks are relatively unstable, and juveniles tend not to be linked to adults and "age-out" of crime. In contrast Bouchard (2020) suggests that adult-juvenile co-offending relationships may have a detrimental influence on juveniles' patterns of crime and their life course trajectories. While Kleemans and van Koppen (2020) suggest that children of organized crime offenders are likely to become involved in organized crime groups and there has been several studies on the intergenerational transmission of criminal behavior (Eichelsheim & Van de Weijer, 2018). Less however, is known about juveniles who are not related to organized crime offenders, for example a systematic review and synthesis map of child criminal exploitation found limited research in this area (Maxwell et al., 2019).

Lindquist and Zenou (2019) suggest that by studying co-offending networks we are studying those who commit most offenses. Quantitative social network analysis (SNA) is being increasingly utilized in criminology. SNA has evolved from simple diagnostics of overt degree centrality indicating actors who are "in the thick of things" to more covert conceptions of strategically important betweenness and brokerage centrality which are more discreet, involving "craftier" actors (Morselli, 2010, p. 390). Another contribution from SNA includes the demonstration of an inverse relationship between youth embeddedness and exit from crime networks using secondary data from the "Pathways to Desistance" Project (Pyrooz et al., 2013). Further, longitudinal social network designs of youth networks have demonstrated the potency of peer influence (Weerman, 2011) and peer attitudes (Megens & Weerman, 2012) in influencing individual delinquent behavior. These findings assist further in understanding the inner workings of network dynamics, but do not examine adult-child interactions. However, Warr (1996) has suggested that most delinquent groups contain an identifiable instigator, a person who is older, more experienced, and close to other members.

Quantitative and qualitative traditions in social network analysis have tended to examine network stories in parallel lanes; one of structures, processes, patterns and flows and the other of experience, relationships and lived reality. Grund and Densley (2012) attempted to close the narrative gap by bounding parameters of a London gang using quantitative data based on police records and then corroborating its internal workings via interviews with gang members "to confirm the accuracy of the police arrest records in mapping relationships and the gang's internal structure" (p. 392). However, while this triangulation serves to provide secondary support for network structure and relations, the connections between individual relational narratives and specific positioning on the network map was not demonstrated.

We propose that the problem of juvenile involvement with adults in crime networks is "wicked" (Rittel & Webber, 1973) with inherent complexity, uncertainty, and divergence (Head, 2008) and not amenable to change using conventional tools. Rittel and Webber, caution that a necessary part in unraveling the wicked problem is "the art of not knowing too early which type of solution to apply" (Rittel & Webber, 1973, p. 164). Law enforcement has benefitted from the identification of potential network vulnerabilities and opportunities for sabotage (Sparrow, 2008, pp. 27–28), due to structure (da Cunha et al., 2020), "cottage industry" chain dependencies of drugs networks (Malm & Bichler, 2011), and the disruptive effects of pulling levers (e.g., Braga et al., 2019). It is in this *applied* sense that we present our study, an attempt to craft and adapt new tools of enquiry to unpick complex knots (Sparrow, 2008, pp. 8–9) and identify points of vulnerability in criminal networks susceptible to interventions which can act to diminish their effects.

Current Study

Building on Grund and Densley's (2012) work, Twinsight methodology (Redmond, 2016) was designed to further connect quantitative and qualitative network analysis, to fill in the gaps and add to the depth of evidence-informed knowledge. As a first step, quantitative analysis was undertaken by the National Police Analysis Services

(Redmond, 2016). The second step involved using the network map (product of the quantitative analysis) as a framework for interviews with police members who had a depth of practice wisdom through their daily interactions over a prolonged period with the nodes (individuals) on the network map (Naughton et al., 2020). Participants were afforded the opportunity to refer to and pinpoint relational narratives to specific nodes and edges (co-offending and intelligence links). They can simultaneously "zoom out," to consider for example patterns of centrality across the network, and to "zoom in" to the nature of individual relationships or clusters of relationships.

The current paper focuses on a comparative analysis of findings from three case studies that used the Twinsight methodology in distinct police sub-districts in Ireland from 2012 to 2018. We aim to provide an understanding of the criminogenic environment (Loeber & Farrington, 2012) of juveniles involved in more serious and persistent offending in Ireland to inform a targeted intervention design.

Methods

Methodology is divided into three sections. Part I: Initial social network analysis of police crime and intelligence data. Part 2: Qualitative enquiry, builds on the findings from Part 1. Part 3: Comparative analysis of the findings from three case studies; the original (Redmond, 2016) and two replication studies (Naughton et al., 2020; O'Meara Daly et al., 2020) which used Twinsight methodology. While Twinsight methodologies (Part 1 and Part 2) are described in detail in the policy reports (Naughton et al., 2020; O'Meara Daly et al., 2020; Redmond, 2016) the methods are outlined here to provide the necessary technical context. The current paper focuses on a comparative analysis of the three distinct case studies which used Twinsight methodology. All primary studies received ethical approval by the host institutes research ethical committee and were sanctioned by national police management.

Twinsight

Part 1: Quantitative social network analysis. Locations for the case studies were selected based on two factors. First, they were representative (Yin, 2009) of police sub-districts with high concentrations of juvenile burglary, robbery and drugs for sale and supply detections, crimes hypothesized as indicative of requiring adult collaboration (Redmond, 2015; Reiss & Farrington, 1991). Second, there was buy-in from police management in the representative sub-districts (Redmond, 2015). The national police analysis services undertook social network analysis using crime and intelligence data. The resulting network map was manipulated to focus on between 44 and 56 nodes (weighted toward the inclusion of adult-juvenile co-offending links). The network map was reviewed and approved by local Police management as representative of offending behavior in their area. Nodes (adults and juveniles) were identified by a unique reference number, name (in the police version only), gender and age and links illustrating co-offending detections of burglary, robberies and drugs for sale and supply offenses, and intelligence data (See Table 1 for details of individual case studies

Table 1. The Number of Nodes Their Age Category, Gender, and the Number of Links (Edges) on Each Criminal Network Map.

		Number of nodes per age category			Gender of Nodes		Number of co-offending links	
Case study	Number of nodes	Under 18 years	18 to 25	26 years plus	Male	Female	Burglary	Drugs for sale/ supply
Greentown	43	9	20	14	39	3	31	17
Bluetown	56	21	30	5	54	2	78	–
Redtown	50	8	22	20	46	4	34	3

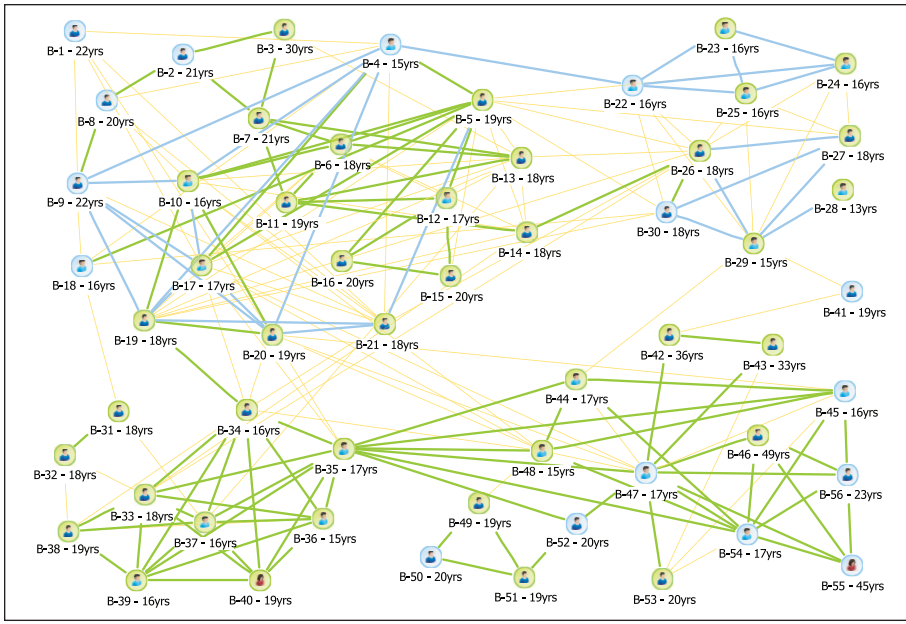


Figure 1. Bluetown network map: output from Step 1, quantitative social network analysis.

and Figure 1 for an example of a network map). Details of case study locations and data collection and analysis procedures are outlined in Table 2.

Part 2: Qualitative enquiry

Data collection. Network maps were used as a framework to guide semi-structured interviews with 16 (Greentown), 20 (Redtown), and 21 (Bluetown) members of the local police force from different grades and roles. Participants were purposively selected by senior officers for their experience, tacit local knowledge, age, and gender. Police officer roles included community police, detective units, intelligence officers,

Table 2. A Comparative View of the Location, Data Collection, and Analysis for the Three Case Studies.

	Greentown	Bluetown	Redtown
Location	Regional city	Dublin	Regional town
Approx. population size*	50 to 60,000	70 to 80,000	20 to 30,000
Data collection			
Year of crime data collection	2010 to 2011	2014 to 2015	2014 to 2015
Twinsight Methodology	√	√	√
Number of Police participants	16	21	20
Average interview length	62.19 minutes	53.86 minutes	60.29 minutes
Average interview time per network member	2.8 minutes	2.7 minutes	2.4 minutes
Average percentage of network members referred to by all participants	50%	36%	50%
Data analysis			
A priori codes (deductive coding)	×	√	√
Constant comparison (inductive coding)	√	×**	×**

*Range provided to maintain the anonymity of the Sub-District.
**Text that did not fit the a priori categories were inductively coded to an open category.

juvenile' officers, drugs unit, and regular beat patrol) within the local police force (see Table 2 for further details). A second anonymized researchers' version of the network map was created to ensure confidentiality but still facilitate the sharing of case sensitive information as it pertained to understanding the innerworkings of the network. Procedures were in place to ensure that researchers did not have access to the non-anonymized (police) version of the network map. For example, interviews were organized with an appropriate distance so that the non-anonymized version of the map was not seen by the researcher. Using unique reference numbers to identify specific nodes and links, interviews centered on contexts, transactions between individuals, sub-group/cluster activities, and the network as a whole. Interviews were participant-led, with interviewees choosing the nodes and links to discuss. Researchers aimed to ensure that participant narrative accounts were grounded in specific incidences avoiding overly opinion-based or generic responses. Although the network maps were based on the detection of crime within a specific timeframe, participants referred to events both preceding and post the temporal frame, providing a qualitative longitudinal perspective.

Data analysis. Audio-recorded interviews were transcribed verbatim and imported into NVivo software for coding. Greentown the original case study, used a constant comparative method (Maykut & Morehouse, 1994) to inductively guide data coding.

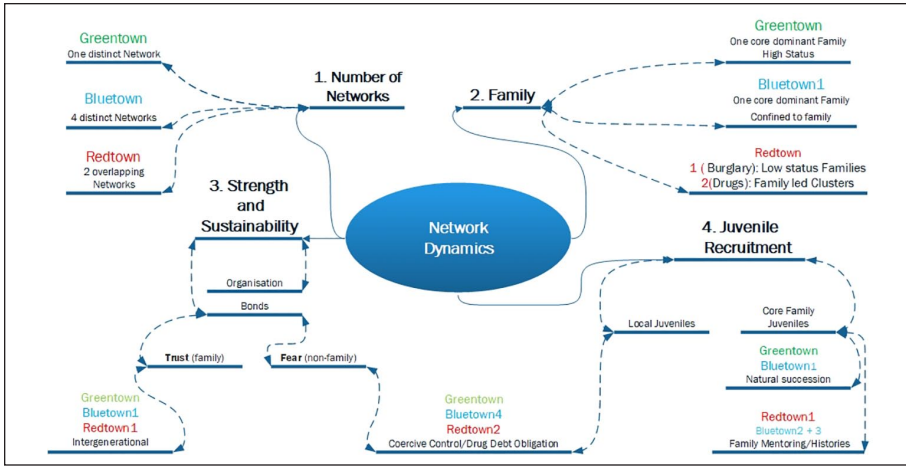


Figure 2. Schematic representation of four themes representing data from seven different networks.

The replication studies (Bluetown and Redtown) used an "a priori" framework of categories and sub-categories (Carroll et al., 2011) grounded in the initial Greentown analysis facilitating consistent coding between the three case studies. To ensure internal validity, the three authors independently coded the same transcript to the "a priori" coding framework. Individual coding was compared, agreement reached, and where necessary categories clarified. The coded data were analyzed using both case profile analysis to compile individual profiles (Naughton et al., 2020) and thematic analysis to develop patterns and themes that were both meaningful and relevant to the research question across the dataset (Braun & Clarke, 2006)).

The data analysis process was iterative and reflective, repeatedly returning to the original text to ensure context, to minimize the impact of researchers' biases and views on the interpretation of the data. To ensure validity, meetings between team members took place throughout the process where analysis, interpretations, and theme development were discussed in detail (full descriptions of the methodology can be found in Naughton et al., 2020; O'Meara Daly et al., 2020; Redmond, 2016).

Part 3: Comparative analysis. To facilitate the practical application of findings to inform an intervention design process the comparative analysis aimed to achieve an understanding of areas of convergence and non-convergence between the three case studies. Findings from the three studies were compared by the three authors, key findings for each study were written on sticky notes and placed on a Venn diagram. The Venn diagram identified where all three studies converged, two studies converged, or findings that were specific to only one study. Categories were synthesized to form themes relative to the development of the specific intervention, more specifically structure, resilience, and recruitment of the juveniles (and their contexts) within the criminal network (See Figure 2). Braga et al. (2019) suggests that it is essential to understand the

underlying contribution factors and dynamics to the offending behavior to inform intervention design. Therefore, a broader treatment of the problem is required because this is how it presents in reality. This requirement informed a comprehensive and holistic approach to the Results section.

Results

A detailed account of the three case studies, Greentown (Redmond, 2016), Bluetown (O'Meara Daly et al., 2020), and Redtown (Naughton et al., 2020) are available as policy reports. Findings from the comparative analysis are outlined in four interrelated themes that provide insights on the structure, organization, and processes within the criminal networks. Themes include Number of Networks, Family, Strength and Sustainability, and Juvenile Recruitment (See Figure 2). We will outline each in turn. All findings rely solely on the testimony of selected local police officers responding to an interview format using a local criminal network map as a framework for discussion.

Number of Networks

The Greentown network contained several semi-autonomous sub-networks with a high-status dominant crime family at the core. Bluetown (area with the largest population density) consisted of four distinct networks located in three distinct geographical areas within Bluetown. The four networks (Bluetown 1–4) differed in their organization and composition; a fifth network in a fourth geographically distinct area had dissipated by the time of data collection. The structure of the Redtown network differed depending on the type of crime. A focus on burglary related crime (Redtown 1) identified a network centered on three 16-year-old boys, their siblings, and peers. A focus on drug related crime (Redtown 2) identified the majority of the network members as low status and involved in the front-line distribution of drugs.

Family

Family was central to all seven networks (Greentown [1], Bluetown [1–4], and Redtown [1, 2]) but with varying levels of power and status. (1) High-status crime families who controlled the network (Greentown and Bluetown 1). (2) Mid-level family clusters involved in the sale and supply of illicit drugs (Redtown 2). (3) Low-status (or crime-prone) families as the source of the juveniles' pro-criminal norms (Redtown 1, Bluetown 2–4). The Greentown network presented a distinct pecking order. Individuals were categorized into two distinct groups (family or associate) based on their relationship to a core dominant family. Members of the "family" including juveniles appeared to have had relatively higher social capital in their local area than "associates," whose ties with the dominant family was similar to agents in a principal/ agent relationship. Similar to Greentown, Bluetown 1 also centered on a dominant high status crime family. However, unlike Greentown, which enlisted "associate" support for

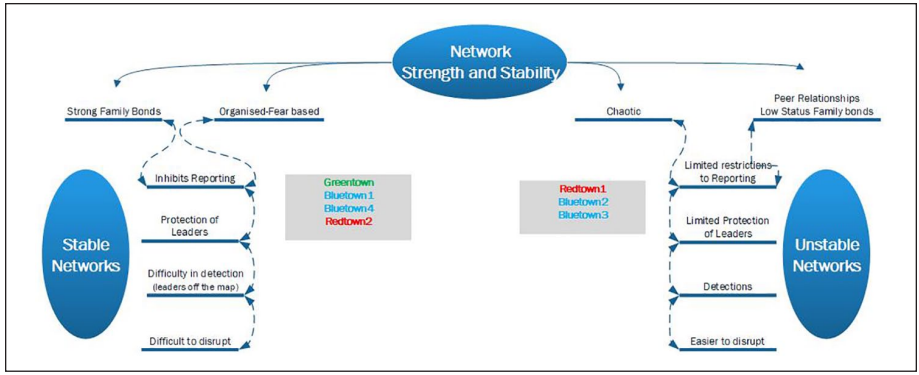


Figure 3. Factors contributing to the strength and stability of distinct networks.

network activity, membership of Bluetown 1 was confined to extended family. Redtown 2 contained several family clusters who may have exploited vulnerable local juveniles for criminal gain via sale and supply of illicit substances.

Most members (both juveniles, young adults, and adults) in the networks in Bluetown 2 to 4 and Redtown 1 had family histories of crime. Police participants described these families (in some cases multi-generational) as low status with adverse backgrounds.

Strength and Stability

Where higher status families were core to the network structure, this appeared to predict the presence of rich or exclusive clubs (da Cunha et al., 2020) and higher levels of stability and resilience (Spapens & Moors, 2020) than networks where collaborations rested on transactions between associates (See Figure 3) In Bluetown 1, which was confined to extended family, bonds between family members inferred bounds of loyalty within the network. This was also evident between high status family members in Greentown. In addition, the family core in Greentown presided over a culture of fear, intimidation, and myths about leader's omnipotence, which extended beyond the network itself into the wider neighborhood. This coercive culture inhibited reporting to law enforcement by network members but also from within the wider neighborhood. Such institutional reticence hampered the detection and criminal prosecution of network leaders.

A higher level of organization was evident where high status families were at the core of the network but also where drugs were the dominant criminal activity, as in Bluetown 4 and Redtown 2. Findings suggest that adults who did not feature on the network map (see below) may have exploited juveniles in these networks for criminal gain, particularly in illicit drugs activity. These individuals' absence may have been due to being outside the map's frame of focus or possibly because they simply avoided detection and thus were not recorded in the police data used to construct the network.

An expectation of loyalty among network members in more stable networks shielded leaders from detection by law enforcement. Juveniles from less stable networks also exhibited loyalty to their co-offenders. Police officers referred to the juveniles' fear of potential accusations of "*ratting*" as a disincentive to potential cooperation with law enforcement. However, findings suggest that the non-reporting due to an expectation of loyalty or fear of reprisal (as identified in Greentown) did not extend beyond the confines of the less stable networks themselves. Findings also identified the presence of intergenerational clusters within the less stable networks, for example, four generations of a family were known to the Police in the Redtown 1. However, these crime-prone families were described as relatively low-status and associated with multiple adversities and economic deprivation. When leaders were detected and incarcerated the crime rate dropped in the locality (Redtown 1), or indeed had disintegrated by the time of data collection (one geographical area in Bluetown).

Recruitment of Juveniles

This theme focused on factors that contributed to juveniles' vulnerability to joining local criminal networks. There were two pathways for the entry of juveniles into the criminal networks. Juveniles from high-status crime families within Greentown and Bluetown 1 networks were relatively sheltered from poverty and physical neglect. These juveniles were however integral to network sustainability and appeared to be nurtured for succession within the family-based criminal networks. The criminal networks tended to be geographically bound, each network tended to be composed of members who lived in close proximity or had strong connections to the area.

Findings suggest that young adults (aged 18 to 21) who had themselves progressed through the Greentown network from childhood, had gained a degree of status within the network and were responsible for the targeting, recruiting, and grooming of vulnerable local children for crime. Findings from all three case studies suggest mentoring of younger children in crime by older family members, in particular fathers, older brothers, and uncles. However, unlike Greentown, there was a paucity of evidence to suggest the targeted recruitment of local (non-family) juveniles into the other criminal networks.

Juveniles' vulnerabilities. Findings identified that the experiences of childhood adversity, family-based pro-criminal norms and proximity to other network members contributed to local children's engagement in the criminal networks. Findings suggest that some of the juveniles who featured in the three case studies were encouraged into crime from a very young age and were actively involved in criminal activity involving older family members. Indeed, initial expectations by families to commit crime may have been reinforced by peer groups and other members of networks.

Home life more generally was characterized by poor guardianship, multiple adversities, poverty, and for several juveniles, experiences of profound grief and trauma from parental absence, bereavement, or abuse. School exclusion was common, and the juveniles involved in the criminal networks were not, for the most part actively

involved in community/sporting organizations. Juveniles' visibility through network membership along with an increased risk of developing problematic substance misuse (linked to their childhood adversities, Hughes et al. (2017)) and associated drug debt obligations (Maxwell et al., 2019) may have contributed to their exploitation by local drug suppliers. A notable finding was the normalization of illicit substance use and supply by the juveniles. Their role as user-suppliers (Moyle, 2014) was a key factor in the juvenile's retention within the criminal networks which in turn may have contributed to their involvement in more serious and prolific offending.

Discussion

Repeating case studies using the Twinsight methodology assessed individual networks in three separate locations in Ireland. The three case studies provide nuanced accounts of how criminal networks may have enticed and retained local juveniles. Importantly comparative analyses disclosed both core similarities and significant divergences between networks.

Initial social network analysis of national crime detection data identified common criminal enterprises between juveniles and adults within all three case studies. Subsequent qualitative inquiry provided an understanding of the contexts of the individual members and the relationships between members within the network. The current findings suggest that certain factors (including chaotic family background, exclusion from school, problematic peer groups, pro-criminal norms, substance misuse) inferred a vulnerability on some local juveniles which facilitated their entry into the network. However, a "network effect," where participation in the network may also have an independent negative effect on offending patterns was also evident. As such, the current findings suggest that juveniles with similar traits/backgrounds (selection model) were enticed into the criminal network but also that the network in and of itself facilitated more severe and persistent offending behavior (social facilitation model). Findings, therefore, build on Pyrooz et al. (2016) meta-synthesis on the relationship between gang membership and offending, which concluded that an enhanced model, incorporating both selection and social facilitation models (Thornberry et al., 1993) best-explained gang members offending patterns. By identifying the negative influence of the juveniles' membership and interactions with adults within a criminal network, the findings add significantly to the literature, which tends to focus on juvenile co-offending relationships (Bouchard, 2020).

Given the malign influence of the network processes on the juveniles' offending behavior, disruption of the network is an essential precondition for any program which aims to facilitate effective intervention for the juveniles caught up in that network. Comparison between the three separate locations identified differences in the structure and dynamics of each network. This is relevant to future effective disruption strategies, which need to be cognisant of the structure and resilience capacity and capabilities of the network (Duijn et al., 2014).

Greentown found evidence of a dominant family and kinship network, which directly or indirectly governed compliance of network members and extended to

neighborhood residents who had no relationship with the network. Redtown found less evidence of clear hierarchical features apart from references to influential adults absent from the network; but did find juveniles and families severely disadvantaged by multiple adverse circumstances, the "*disadvantaged of the disadvantaged*" (Hourigan, 2011), making them vulnerable to exploitation (Maxwell et al., 2019). Bluetown found four relatively discrete networks. One network was family-based, two were based on peer relationships and a fourth network, centered around the sale and supply of drugs was resilient due to external criminal influences.

There were also several similarities between the three case studies. Concurring with findings from the extant literature all case studies reported juveniles who were, involved in redundant peer groups (McGloin & Piquero, 2010), excluded from school (Loeber & Farrington, 2012), and community/sporting groups in general. Network membership, therefore, may have provided much-needed psychosocial needs (a sense of meaning, propose, and belonging) (Mallion & Wood, 2020) and functioned as a source of what the juveniles perceived to be a much-valued yet maligned identity (McLean & Densely, 2020). Findings suggest that the dynamics within the networks cultivated and sustained pro-criminal norms, which shaped anti-social behavior and attitudes. Pro-criminal norms were underpinned in many cases by significant influence from the juveniles' own extended family. This concurs with Akers (1973) social learning theory that positions family and peer-groups as the most significant influential groups for juveniles in terms of pro-criminal attitudes and offending behavior.

Significant and persistent disadvantage was also a consistent feature between all three case studies, this builds on an emerging body of research that links offending behavior to high levels of childhood adversity (e.g., see Fox et al., 2015). Further, Maxwell et al. (2019) systematic map and synthesis review of child criminal exploitation, identified that experiences of multiple adversities within family and community increased susceptibility to child criminal exploitation, concluding that adults tend to target juveniles who have "limited social, economic and or emotional capital" (p. 49), for criminal exploitation.

Problematic illicit substance use and involvement in the sale and supply of illicit substances was also a common feature for juveniles across all three locations. Findings are consistent with Moyle (2014) classification of "user-suppliers" where the sale of drugs funded the juveniles' own habit, and Taylor and Potter (2013) "social suppliers" where the act of supplying peers with illicit substance (in a non-profit venture) is normalized.

Many of the juveniles across the three case studies (except for higher-status crime "family" juveniles) were described as "lower-status" (in terms of power). Individuals described as higher status tended to be far removed from the day-to-day criminal activities of the lower status juveniles and thus less prone to easy detection. Governance leverage was exercised through more proximal exploitation of network members lower in the pecking order, but also through debt, fear, and coercion. Findings are therefore consistent with existing literature, for example, Densley (2014) identified multi-level organization in the distribution of illicit drugs, lower-status (linked to age)

was associated with retail-level distributors who were accountable to the higher-status individual. Maxwell et al. (2019) identified the exploitation of juveniles in the sale and supply of illicit substance as an emerging issue in the distribution of illicit substance, which functioned to protect higher status adults from detection. Importantly findings from all three case studies identified that illicit substance misuse and adopting the role of "user-dealer" were risk factors for retention within the network and continual child criminal exploitation.

The situations highlighted by the existence of some of the more stable networks in the three case studies are not ephemeral; they have been in existence for many years. Consistent with McLean and Densely (2020) descriptions of street gangs and organized crime groups in Scotland, the networks at the focus of the current studies prospered in closed neighborhood environments, which had the effect of turning risk variables into longer-term cultural narratives and experience of a perverse normality. The network became part of the neighborhood story. Taken together the case study findings suggests that these powerful influences contrive to form a social eco-system of multiple layered adversities, which makes desistence a far more challenging and riskier affair for a young person than a cognitive shift toward simply *doing right*. Further, low social mobility means that young people are also stuck geographically. The network "pull and push" dynamics are existential threats with little opportunity without help for juveniles to "knife off" (Maruna & Roy, 2007) from potentially toxic eco-systems.

Policy Implications

The complex array of risks presented by the juveniles caught up in a criminal network are particularly difficult to "*nudge*" (Sparrow, 2008) and present challenges for law enforcement and future intervention in the area. While some general principles informed by evidence can assist in understanding how networks operate, the character of each network and its context will probably harbor distinctive properties, which have strategic and operational significance in terms of designing an intervention to lessen their influence. The authors recognize that advocating a case-by-case examination of each network before marshaling resources for intervention is anathema to the scaling-up imperative of evidence-based programs, but the authors think it necessary for tackling particularly complex problems similar to those identified in Greentown, Bluetown, and Redtown. Evident diversity in structure and stability from the three case studies using the same methodological technique indicates that a detailed *bespoke* examination of a particular network will be necessary to inform an effective disruption strategy.

Limitations and Strengths

The findings are based on interviews with local police and relies on their tacit knowledge and recall. While efforts were made to ground police narrative in evidence (in the form of specific incidences) to mitigate the possibility of institutional bias there are inherent limitations to the Twinsight methodology. Part 1, social network analysis was

limited by the data provided, a reliance on specified detection data potentially excluded individuals basis on age, crime-type, and offense date. In addition, individuals who may have an influential relationship in terms of crime with the juveniles may have been air-brushed because their crimes were not detected and thus did not feature in the police crime data used to construct the networks. Including a qualitative step (Part 2), however, unearthed important data on contexts, relationships, and relevant individuals not captured by the quantitative analysis (Part 1)

Interviewing other professionals would provide an alternative perspective, therefore a possible adaptation for future studies. However, for the current study given the confidential nature of the data and challenges surrounding the sharing of personal identifying information outside the statutory agency, data collection was confined to the interviews with members of the police force. The Twinsight methodology did however facilitate the disclosure of case sensitive data relating to on-going investigations which were pertinent to the dynamics of the network.

Qualitative research has tended to focus on individual juvenile (e.g., Naughton et al., 2019) or former (e.g., McLean & Densely, 2020) offender narratives. Individuals can only report on what they know, experience, perceive or speculate, so their reports tend to focus on egocentric networks, the wider meso and macro systems may be lost. Twinsight potentially provides a pragmatic and practical middle ground, which frames the analysis within an evidence-based framework but is also sufficiently sensitive to present individual narratives, albeit via a police officer with local craft knowledge. Importantly, Twinsight methodology offers a non-invasive and confidential perspective of juveniles' involvement in more serious and persistent offending, an area traditionally fraught with ethical challenges.

Capturing the expert and tactic knowledge of local police the current study concurs with but also adds to the emerging yet limited body of knowledge on child criminal exploitation. Future adaptation may include a means of identifying external influential individuals and using the findings to capture additional knowledge from community activists.

Conclusion

The findings highlight the benefits of building on the more traditional quantitative social network analysis for the examination of juvenile involvement in criminal networks. The Greentown case study and the two replication case studies capture the important variations that exist in criminal networks. This is particularly significant when the primary aim of the research is to provide evidence-based knowledge to inform an effective intervention program design for juveniles caught-up in criminal networks and mitigates the likelihood of unintended consequences during intervention for this complex societal challenge.

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