Network Analysis: Multiplexity

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Trust Thy Crooked Neighbor

By: Eric Alarcon

Overview

- Purpose
  - The purpose of this study was to examine the role of multiplexity in organized criminal networks. Specifically in chicago during the prohibition era.
  - Took a look at 3 different types of networks which were:
    - Criminal network, Personal network and legitimate network.
- Methods
  - The methods used to collect data was by creating the Capone Database.
  - Sample
    - 1,030 Individuals
    - 3,726 mutual dyads between them.
  - Variables
    - Dyads, Informal and formal social network, homophily
- Findings
  - Organized crime is an extension of the American dream.
  - Multiplexity is rare.
  - Ethnic homophily.

Benefits/Significance

- **Effects on future research**
  - This provided an view of organized crime as well as its network structure.
  - How organized crime was able to have such a lasting impact on chicago during the prohibition era.
  - This can help future researchers but realizing how these organized crime organizations get started up and the best way to combat them.
- **Detecting the undetectable**
  - Studying criminal behavior is difficult because of the hidden aspect of it.
  - The capone database provided an extensive view of not only crime, but highly organized crime
- **Understanding Multiplexity**
  - This research provided an in depth look of networks and how they interact with each other.
  - Such as the relationship between criminal and personal networks, which tend to be most frequent.

The Corner and the Crew

Overview

- **Impact of social space on network**
- The gang is the neighborhood, membership is more than just living there
- Turf is essentially venerated places that are important for group identity, thus warranting violent defense
- Geographic adjacency puts groups in contact and makes it easy to encroach on protected locations
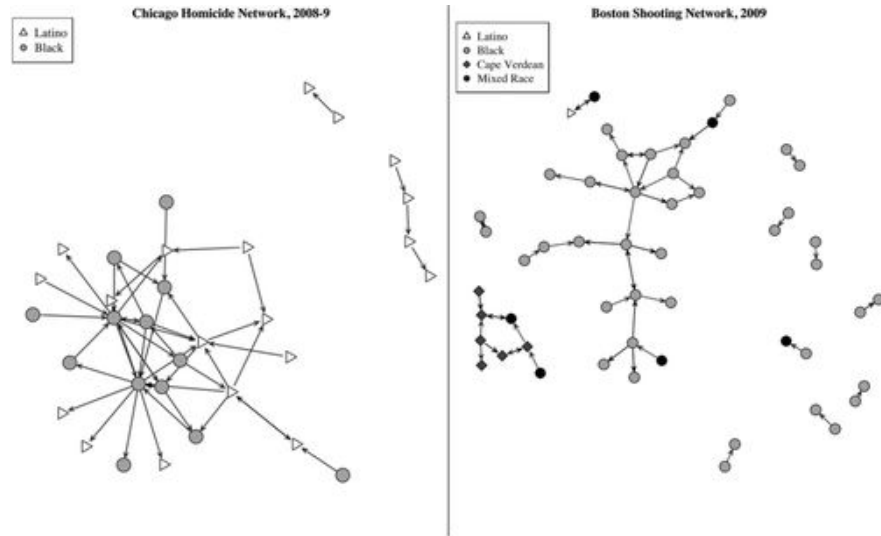
Terms

- Corner - Neighborhood Structural conditions/utilization of space
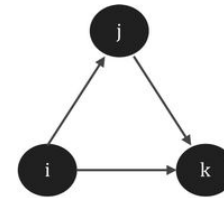- Crew-Interactions between and/or within gangs that amplify gang violence

Methods

- Data from Chicago (fatal) and Boston (fatal and non-fatal) gang violence from 2005-2009
- Secondary data of turf approximations
- Coded groups based off of primary race and size
- Gangs as nodes, violent acts as edges
- Mapped this with regards to geography
- Spatial indicators (concentrated disadvantage)
  - % housing vacant
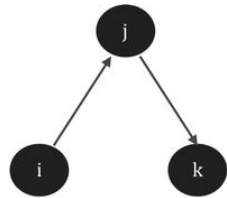 - Residential stability (% 5+ years)

Findings

- Presence of Racial homophily (B->B, L->L) [Chicago]
- Geography better predictor than past conflict if only one exists [Chicago]
- Social pecking order (Transitive triad) not supported
- Past conflict better predictor than geography (busing) [Boston]
- Reciprocity remains important

Transitive Triad

Two-Path

Multiplex Network Ties and the Spatial Diffusion of Radical Innovations: Martin Luther's Leadership in the Early Reformation

Becker, S., Hsiao, Y., Pfaff, S., & Rubin, J. (2020)

Overview

- **Question:**
  - What factors contributed to the dissemination of Martin Luther's Protestant ideals (the Reformation movement)
    - More specifically, the interested factors being the direct influence of Luther and spatial diffusion
- **Methods:**
  - **3-part Network simulation:**
    - Spatial Diffusion via Trade Routes
    - Diffusion via 'The Infectious Luther' but No Spatial Diffusion
    - Interdependent Processes of the Infectious Luther and Spatial Diffusion
  - **Goal:**
    - Empirical data demonstrated that 68 cities adopted the Reformation movement so the simulation tried to duplicate this finding
      - Simulated networks were fixed and supported by historical sources

- **Results:**
  - **Spatial Diffusion via Trade Routes:**
    - An average of 13 cities adopted Reformation movement
  - **Diffusion via 'The Infectious Luther' but No Spatial Diffusion**
    - An average of 40 cities would adopt the Reformation Movement
  - **Interdependent Processes of the Infectious Luther and Spatial Diffusion**
    - Roughly 68 cities would adopt the movement with the reasonable estimation of Luther's influence

Benefits/Significance

Future Research:

- Neither Luther's personal network nor the trade network alone were enough to explain the dissemination of Reformation
  - Luther's infectious leadership to influence his direct network and the diffusion via trade routes are dependent one another for Reformation to spread.
  - Research needs to focus on the multiple dimensions (multiplexy) of networks
- Luther activated the idea of "simple contagion"
- The use of letters were an important way for Luther to spread his messages (with other purposes as rally supporters, sustain friendships, create conversations between persons who have never met, and more)
  - How cellphones and the Internet have enhanced this ability would be interesting to evaluate in similar studies.
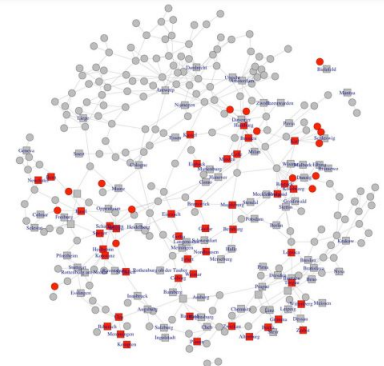

Figure 7. Plot of Trade Network and Reformation Adoption
Note: Gray nodes are cities that did not adopt the Reformation; red nodes are cities that adopted the Reformation (see the online version of the article for color figures). The lines between nodes indicate trade routes. Square nodes are cities that Luther influenced (also labeled by text); circle nodes are cities Luther did not influence.

Discussion Questions

Discussion Questions

- **Smith et al. (2016):**
  - Criminality and personal networks are tightly connected. Resulting in some of the most frequent interactions between networks. Why is that? Could it simply be the criminality brings people closer together? Or could it be an issue of having no choice but to trust someone that is untrustworthy for one's own survival?
  - Since capone had the highest and strongest ties to criminal, political and legitimate business. With over 1,300 ties, he was in a egocentric network revolving around him. If he was caught much earlier or killed, would one of his close associates be able to take his place? Or would the whole network structure collapse?
- **Papachristos (2013):**
  - Is there a realistic way to identify a social pecking order based on network embeddedness?
  - Would identifying venerated locations and mapping violent offenses be more effective than running strictly off of turf approximations?
  - Racial homophily has some support on violence being directed externally towards other gangs. Do you think internally within a heterogenous gang that the same effect may be present?
- **Becker et al. (2020):**
  - The researchers established that Martin Luther's direct influence (i.e., influence to direct network) and the spatial diffusion (followers then disseminating those ideas via trade and travel) worked simultaneously with another to achieve the spread of Reformation. Do you believe (if at all) that spatial diffusion is reliant on the followers? In other words, do these disciples need to hold a certain social status or possess some other characteristic for people to internalize these new ideas?
    - Researchers discussed the idea of "charisma" to illustrate the effectiveness of Luther.
  - Would Martin Luther have been successful if not for his diverse personal network/social structure? Is an infectious leadership style more indicative of whether the spread of information will be successful?