

# THE NETWORK EFFECT



## Using Science to Build Better Police Forces

BY

Marie Ouellet, PhD,  
Assistant Professor,  
Simon Fraser University,  
British Columbia; Sadaf  
Hashimi, PhD, Assistant  
Professor, University  
Nebraska Omaha; Jason  
Gravel, PhD, Assistant  
Professor, Temple  
University, Pennsylvania;  
and Dean Dabney, PhD,  
Professor, Georgia State  
University

**POLICE CHIEFS FACE COMMON, LONG-STANDING CHALLENGES, REGARDLESS OF GEOGRAPHY: HOW CAN WE KEEP OUR BEST OFFICERS? HOW CAN WE GET OFFICERS TO GENUINELY SUPPORT NEW POLICIES?** How can we reduce problematic behavior in the workplace? These questions may initially appear to be unrelated, but they all share a common root: the informal relationships that shape how policing works every day.

Over 40 years ago, sociologist Elizabeth Reuss-Ianni observed that informal social systems are key to effective policing. She noted that while most police leaders have a “gut feeling, these relationships matter ... they have no clear understanding of what makes [them] ... so critical ... or how they operate.”<sup>1</sup> Her observation still rings true today.

Ask any police chief, and they’ll tell you in their own words that relationships drive the job. Departments craft policy and meticulously deliver training, but officers learn their craft on the streets from one another. As one officer put it, “Culture eats policy for breakfast. You can have a perfectly worded policy, but it’s meaningless if it just exists on paper.”<sup>2</sup> Often, this culture is built through everyday interactions. A knowing glance during a roll call or a casual chat during a late-night shift can sink efforts for reform before the sergeant finishes rolling out a new policy briefing.

These informal relationships are powerful but hidden in plain sight. Officers depend on them daily, yet they rarely appear in official reports, policy memos, or training manuals. Supervisors have no systematic way of capturing them. Because these relationships aren’t documented or understood, they are difficult to change.

Yet, there is a way to bring these hidden dynamics into view: network science.

Using data already collected by departments—shift schedules, complaint logs, surveys, and call records—network

science maps out the informal connections between officers. It turns existing data into clear maps of how people connect, communicate, and influence each other within the department.<sup>3</sup>

The results of network science aren’t just abstract charts; they’re windows into how the department operates. Leaders can quickly spot important patterns, such as who is isolated, where groups are forming, and which officers hold influence over their peers. By seeing these hidden structures, leaders can address issues early, provide targeted support, and prevent problematic behavior before it escalates. It opens a data-driven path to improved retention, stronger policy buy-in, and fewer use-of-force incidents.

### WHAT IS NETWORK SCIENCE?

Network science looks at how people are connected and how these connections shape many facets of our lives. Whether it’s a rumor spreading through a tight-knit neighborhood, a breakthrough idea leaping across departments via a well-connected employee, or workplace stress concentrating



Photo courtesy of Fairfax County Police Department, VA

in isolated teams, the patterns of who is connected to whom—and how—directly shape what people believe, how they behave, and how they experience their environments. A person's position in a network can influence their likelihood of getting a job, adopting a new idea, or recovering from a crisis. In organizations, social ties shape who collaborates, who gets promoted, and who is more likely to burn out. Across all these domains, one truth holds: it's not just *who you are*, but *who you're connected to*—and how those connections are structured—that drives outcomes.

Network science isn't new to policing. Departments have long used it to map criminal networks, tracking how offenders connect, targeting key individuals, and disrupting illicit operations.<sup>4</sup> The idea in crime prevention is that by mapping the system of connections between criminals, officers can identify leaders, try to predict an organization's next move, or pinpoint vulnerabilities that can be exploited. But now, police leaders are recognizing they can use these same tools internally. Mapping officer

relationships can help address issues like officer retention, policy adoption, and misconduct.

Think about where a recruit goes for advice before approaching their field training officer: the veteran who informally mentors' younger officers, the officer on the watch everyone texts for quick answers, the one person who can bridge two units that rarely see eye to eye, or the officer who always seems to know what's happening before any memo drops. These individuals are essential, yet their roles can't be captured by looking at individuals alone. Their influence comes from their connections.

Even with strong policies and commanders, a department can still face challenges. Why? Because key players might be isolated, informal leaders may resist change, or factions within the department can erode trust between units. Network science offers solutions. Instead of blaming problems on a few "bad apples" or weak directives, it helps leaders see the bigger picture: how trust, influence, and communication flow—or break down—withing the agency.

Businesses, health care organizations, and government agencies already use network science to build better terms, spread good ideas, and make better decisions. Policing has fallen behind, with a few systems with link analysis functions standing as the rare exception. However, agencies no longer need to be in the dark or dependent on costly software to catch up.

Departments are now partnering with researchers to map their internal networks. This isn't about surveillance; it's about using the data departments already have to strengthen relationships and improve outcomes. By mapping informal relationships, police leaders can better understand and improve their departments from the inside out.

## WHAT DO POLICE NETWORKS LOOK LIKE, AND WHAT CAN BE LEARNED FROM THEM?

For the past five years, a team of researchers has used network science to turn routine department data, like patrol rosters, complaint logs, and anonymous surveys, into detailed maps of officer relationships across U.S.

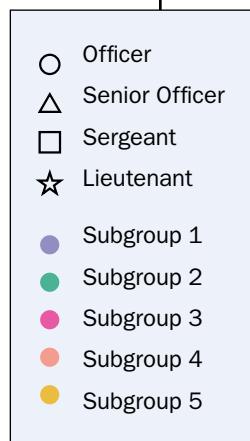


*Photo courtesy of Surrey Police Service, BC*

police departments. These maps show how officers connect, where informal groups form, and how these workplace relationships influence everything from teamwork to misconduct.

Figure 1 shows the friendship network of a small U.S. police department with 31 sworn officers. Each shape represents an officer who completed a survey about their workplace ties, including whom they consider their friends, whom they seek advice from, and whom they rely on for support. The shapes denote rank: circles for patrol officers, triangles for master officers, squares for sergeants, and stars for lieutenants. Lines between shapes indicate friendships. The color of the shape indicates informal subgroups—officers who form tight-knit groups of ties with one another and fewer ties to others. Last, the size indicates the number of friend “nominations” an officer received, with larger shapes representing officers who are more popular.

The network immediately shows a clear pattern: officers typically form friendships within their own rank. Patrol officers often form friendships with their fellow patrol officers. Sergeants stick with sergeants. Lieutenants with other lieutenants. While this rank-based clustering is expected in hierarchical organizations, overly strong divisions between ranks can cause issues. Senior officers disconnected from lower ranks might miss critical frontline insights or struggle to maintain morale. Lower-ranked officers without connections to leadership may feel unheard or misunderstood. However, sergeants can often bridge these gaps, connecting frontline officers and leadership.



**FIGURE 1. FRIENDSHIP NETWORK WITHIN DEPARTMENT**



The analysis shows some sergeants excel at connecting with officers, while others primarily align themselves with higher-ranking staff, highlighting variations in informal influence.

### Identifying Subgroups

Network maps allow departments to go beyond individual connections and uncover naturally occurring informal groups. By layering data onto these visuals and applying a method known as “community detection,” it’s possible to identify tightly knit clusters of officers—groups who are more connected to each other than they are to the rest of the department. These subgroups reveal hidden patterns in team dynamics. In Figure 1, each color represents one of these subgroups.

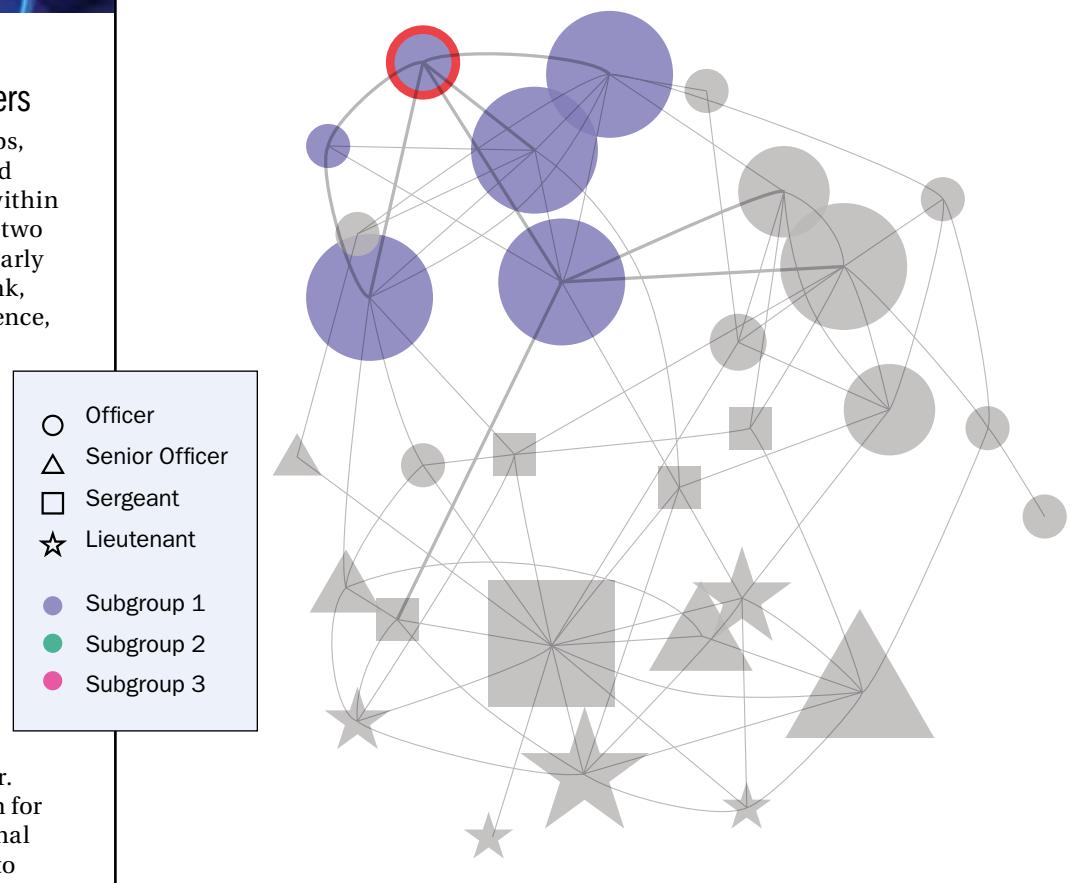
The map shows five distinct subgroups. Two of these—highlighted in purple and pink—are made up mostly of patrol officers. Both are strongly connected internally, but they function differently. In the purple subgroup there is limited integration between patrol officers and sergeants, suggesting weaker daily interactions with leadership. In

contrast, the pink subgroup includes one of the unit’s sergeants who is closely integrated with their patrol officers. This points to a stronger unit dynamic, where leadership is more directly involved in daily interactions.

Another group, colored green, includes mainly sergeants and lieutenants. Notably, it also contains one lower-ranking officer deeply embedded among command staff but disconnected from their rank peers. This reflects how factors like age, tenure, or past assignments—not just rank—can shape where someone sits in the network.

Also, it is possible to see signs of potential isolation. The orange group includes just two officers who are loosely connected to the pink cluster. And on the far right of the network is a lieutenant who appears completely disconnected—someone who neither nominated others as friends nor was nominated by anyone as a friend. This kind of separation could signal bigger concerns—disengagement, strained relationships, or even a lack of trust within the department.

**FIGURE 2. COHESIVE VS. BROKER ROLES**



## Cohesive Versus Broker Officers

In addition to revealing subgroups, network maps help us understand how individual officers operate within those groups. Figure 2 compares two officers who, on paper, appear nearly identical. They hold the same rank, have comparable years of experience, and even count each other as friends. But in network terms, their positions are very different.

The first officer, shown on the left side of Figure 2, has strong connections, but only within their rank and subgroup. Their friends also tend to be friends with each other. These observations are typical of most social networks: individuals tend to choose friends who are similar to them, and one's friends are often also friends with each other. Such tight-knit groups are known for quickly establishing strong internal norms and expectations unique to their subgroup. At the same time, these groups can be resistant to new ideas or behaviors that originate outside the group. And since everybody knows everybody else, anyone in the group attempting to adopt these new behaviors or ideas risks the judgment of everybody else. Therefore, network structure can strengthen group loyalty, but it can also create resistance to change.

The second officer, shown on the right side of Figure 2, is part of the same subgroup but plays a different role. This officer has additional ties that cut across ranks and subgroups. That's what is referred to as a broker in network science: someone who links people who wouldn't otherwise be connected. Brokers can act as gatekeepers, choosing to pass along information they receive from one part of the network to the other. Brokers are also less susceptible to peer pressure because their social world is not limited to a single circle of friends. This officer may get teased by members of subgroup 1 for conforming to a new directive or policy, while at the same time being respected for doing so by officers in other subgroups of their network. If the officer persists

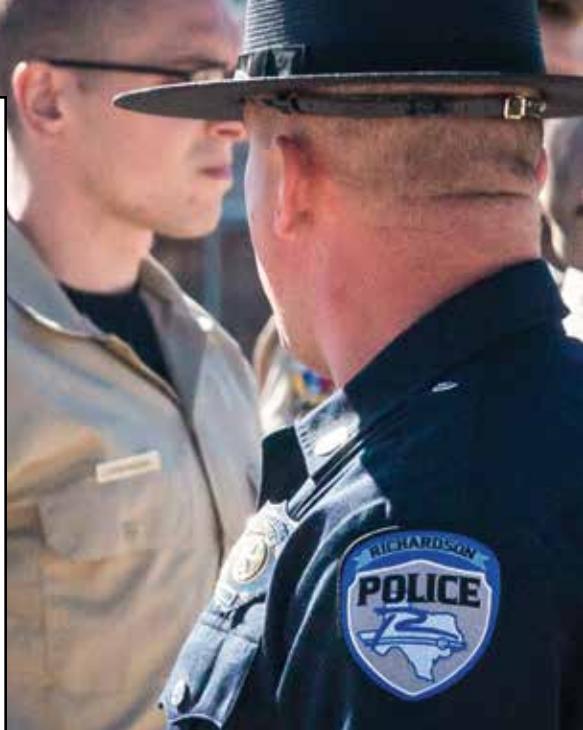
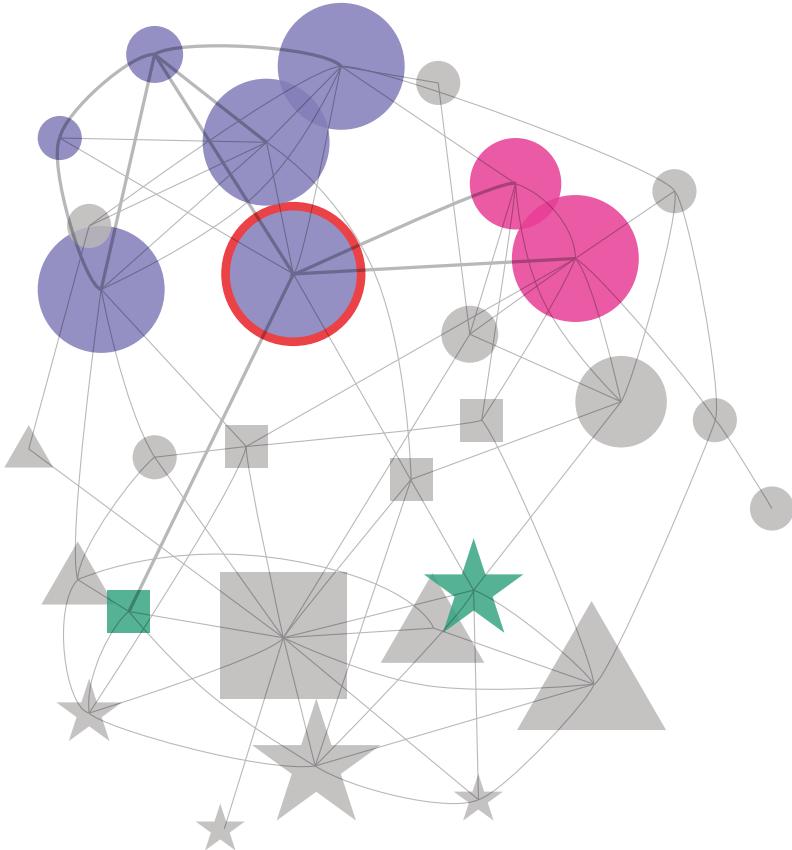
in conforming to the policy, other members of subgroup 1 may eventually start to follow suit, leading to widespread adoption of the policy. Of course, if a broker chooses not to adopt this behavior, the likelihood that any member of subgroup 1 will do so becomes extremely limited.

Understanding where tight subgroups and brokers exist in the department can offer powerful insights. For example, imagine a lieutenant struggling to implement a new directive. Mapping their connections can reveal whether they have access to informal influencers or can point to the key individuals they should engage to build buy-in to new policies. When confronted with spotty buy-in on the directive, it would be prudent to check in with the influencers to see what the sticking point is in order to swiftly get things back on track. Or consider an officer thinking about leaving: understanding who they turn to for advice or seeing whether they're isolated from the rest of the network could help flag risks early and guide retention efforts.

This example is from one small department, but the approach scales. Whether they're leading a team of 50 or a force of 5,000, mapping relationships can help police leaders identify isolated officers or teams, spot informal leaders who can drive change, and build peer support networks that reflect how people actually connect. It shows how new hires and transfers reshape department dynamics and where gaps in trust or communication might be holding things back.

## THE LINK BETWEEN NETWORKS AND BEHAVIORS

Researchers have also employed this mapping approach to investigate how workplace friendships develop over time and their relationship to workplace behaviors, such as the use of force. In one department-wide study, the authors mapped the workplace friendship networks of more than 1,500 officers and layered this with their behavioral data. They found that officers who were closely connected to peers with higher rates of firearm



*Photo courtesy of Richardson Police Department, TX*

use were significantly more likely to draw or fire their own weapons in response to a perceived threat, even after accounting for assignment, experience, and threat level.<sup>5</sup>

Why does this matter? Most strategies aimed at reducing firearm use tend to focus on individual training or department-wide policy reform, ignoring the influence of everyday peer interactions. That's why some departments are already rethinking how they address traumatic events like a shooting. For instance, many agencies' protocols reassign officers involved in a shooting to a "low-stress" unit as a supportive step. But this study showed that clustering high-use officers together can unintentionally reinforce the very behaviors the agency is trying to reduce. Network-informed strategies that consider unit composition and peer dynamics, such as adjusting officer pairings and unit assignments to break up high-risk clusters, can help avoid such unintended consequences.

## HOW POLICE DEPARTMENTS CAN INTEGRATE NETWORK SCIENCE

Network science opens the door for more proactive interventions. Early warning systems have traditionally focused on individual histories, such as complaints or past use-of-force incidents. A network approach adds a new layer by asking: Who is this officer connected to? Are high-risk behaviors concentrated in certain peer groups? And how can we prevent the next incident from occurring?

The following are three ways police leaders can begin putting network science into action:

### 1. Start with the Data: Build Network Maps

Most departments already have the data they need for mapping: patrol schedules, call logs, complaint histories, reports detailing collaborative incidents, training rosters, and academy files. These routine records can be used

to create simple network maps that reveal who trains together, who works the same shift, or who shows up in the same incident reports. What makes this step so valuable is that it doesn't rely on expensive new systems or hypothetical models. The same administrative records used everyday for operations and accountability can reveal hidden patterns in how officers are connected.

There is no need to map the whole department at once. Agencies can start small. For instance, a sergeant might map connections within their squad. An academy trainer might map who an officer is assigned to train with. A lieutenant might track movement between units to see who follows whom. A department could look at who is connected to a high-risk officer involved in multiple complaints.

This kind of network-informed approach helps departments act early—before small issues become big problems. It's scalable, whether looking at one officer with repeated complaints, a supervisor's team, or the entire department. Even without survey systems, agencies can still uncover key patterns by working with researchers or internal analysts to turn existing records into actionable insights.

### 2. Use Networks as Diagnostics: Identify Informal Leaders and Isolates

Once network maps are in place, leaders can spot patterns that might otherwise go unnoticed. With the



Photo courtesy of Grand Junction Police Department, CO

help of analysts or trained staff, departments can identify influential actors, isolated officers, or tightly knit clusters where behaviors, both positive and negative, tend to spread. These maps help answer critical questions about which officers may be isolated or lacking support, who at the agency serves as a bridge between teams or ranks, and who are serving as informal leaders and shaping norms.

Network centrality measures help quantify these patterns. For example, degree centrality, a common network metric, shows who has the most direct connections, those who many turn to in daily interactions. Betweenness centrality identifies brokers, officers who connect different parts of the department and can control or disrupt the flow of information, resources, or norms. Closeness centrality measures the speed with which an officer can reach others across the network, offering insight into how quickly behaviors or ideas might spread.

These metrics give departments a sharper picture of team dynamics. If a reform effort is losing momentum, the network can show why. Are trusted informal leaders on board? If not, that may be the missing link. These insights can also highlight officers who are overloaded with support demands or those at risk of becoming disconnected, prompting timely interventions like mentorship, training, or wellness checks.

### 3. Strengthen Early Warning Systems: Track Risk Through Networks

This approach also creates opportunities for more proactive interventions. Incorporating a network perspective

into early intervention systems shifts the focus beyond individual records—such as complaints or use-of-force incidents—to the broader relational patterns among officers. It allows for questions to be asked: Which officers frequently work together? Are high-risk behaviors concentrated within particular peer groups? Do close professional relationships reinforce risky practices?

This approach is already shaping post-incident protocols in some departments. For example, after a shooting or traumatic event, agencies are starting to consider social ties when deciding where to reassign officers. Instead of just moving them to low-stress units, they are also thinking about whether peers in those units might reinforce or challenge certain behaviors.

Network insights also enable departments to identify positive influences. Some officers are widely respected, deeply trusted, and known for using sound judgment under pressure. These individuals can be paired with recruits or high-risk officers, not just as mentors, but as social forces who set the tone for the team. These same officers can also help roll out new policies, bringing credibility and buy-in from the ground up.

### CONCLUSION

Who an officer texts, calls, or meets for coffee creates more than casual connections; it shapes the everyday lives of police officers and impacts the agency's culture. These relationships are built on trust, values, and influence. They guide how officers respond to tough calls, how change is accepted, and how officers come together. As one officer put it, "There's SOP—standard operating procedure—and then

there's AOP: actual operating practice." That second part doesn't live in a manual. It comes from peers.

Take Jim, one of the officers in the authors' network surveys. Jim is a midcareer officer who graduated from his police academy in 2009. He still works patrol, while one of his academy classmates is now the department chief. But that promotion didn't erase the bond. "I don't call him 'Chief,'" Jim said, "I call him brother." Another officer explained it this way:

*You don't want to keep calling your supervisor. When you're new, your friends become your guide. You pick up the phone: "Hey, is this right?" And they steer you in the right direction.*

Departments should view these informal connections as essential infrastructure, not just side conversations. Policies can establish expectations, but it's the peer network that decides whether those expectations are upheld. Some officers are deeply rooted within close-knit groups; others act as bridges across ranks and units, connecting those who seldom interact; and some remain completely isolated. To lead effectively, departments must map not only formal chains of command but also the informal lines of influence. ♦

#### NOTES:

<sup>1</sup>Elizabeth Reuss-Ianni, *Two Cultures of Policing: Street Cops and Management Cops* (Transaction Publishers, 1983).

<sup>2</sup>Emily Bazelon, "A Discussion about How to Reform Policing," *New York Times*, June 13, 2020.

<sup>3</sup>Marie Ouellet and Sadaf Hashimi, "The Role of Networks in Policing," *Annual Review of Criminology* Online First, September 23, 2025.

<sup>4</sup>Andrew Fox et al., "Incorporating Social Network Analysis into Policing," *Research in Brief, Police Chief* 81 (December 2014): 16; Timothy Crocker, "The Power of Social Network Analysis," *Police Chief Online*, February 14, 2018.

<sup>5</sup>Marie Ouellet, Sadaf Hashimi, Jason Gravel, and Dean Dabney, "The Influence of Workplace Friendships on Police Firearm Use," *Justice Quarterly* Online First, June 25, 2025.

#### IACP RESOURCES

- Leadership, Management, and Supervision

#### theIACP.org

- The Power of Mentorship
- The Importance of Mentorship Programs for Law Enforcement

[www.policechiefmagazine.org](http://www.policechiefmagazine.org)