DOI: 10.1111/1745-9133.12459

CRIMINOLOGY & Public Policy

RESEARCH ARTICLE

SOCIAL TRANSMISSION OF POLICE MISCONDUCT

Network exposure and excessive use of force

Investigating the social transmission of police misconduct

Marie Ouellet[1] | **Sadaf Hashimi**[2] | **Jason Gravel**[3] | **Andrew V. Papachristos**[4]

[1]Georgia State University

[2]Rutgers University

[3]University of Pennsylvania

[4]Northwestern University

Correspondence
Andrew V. Papachristos, Institute for Policy Research, Northwestern University, 2040 Sheridan Road, Evanston, IL 60208.
Email: avp@northwestern.edu

Research Summary: In this study, we investigate how a police officer's exposure to peers accused of misconduct shapes his or her involvement in excessive use of force. By drawing from 8,642 Chicago police officers named in multiple complaints, we reconstruct police misconduct ego-networks using complaint records. Our results show that officer involvement in excessive use of force complaints is predicted by having a greater proportion of co-accused with a history of such behaviors.

Policy Implications: Our findings indicate officers' peers may serve as social conduits through which misconduct may be learned and transmitted. Isolating officers that engage in improper use of force, at least until problematic behaviors are addressed, seems to be critical to reducing police misconduct and department-wide citizen complaints. Future studies should be aimed at investigating how social networks shape police misconduct and the ways network analysis might be used to diffuse intervention strategies within departments.

KEYWORDS
complaint records, network analysis, police misconduct, use of force

On the morning of October 5, 2018, the city of Chicago held its breath as a jury decided whether Chicago police officer Jason Van Dyke was guilty of murdering 17-year-old Laquan McDonald. The case hinged on police dashcam video footage that showed Van Dyke, and his partner, arriving on an active scene surrounding a knife-wielding McDonald (Davey & Smith, 2015). Within 6 seconds of

exiting his car, Van Dyke commanded McDonald to drop the knife; when McDonald failed to comply, Van Dyke shot McDonald 16 times, continuing to fire his weapon after McDonald was already laying on the ground. The shooting itself happened 4 years earlier, 2 months after Michael Brown was shot in Ferguson, MO, and a month before Tamar Rice was shot in Cleveland, OH, but the video was released only after litigation filed by an investigative journalist. The release of the video sparked protests across the city and the nation, leading to the firing of the Chicago Police Superintendent, the failed reelection of the Cook County State's Attorney, and a massive inquiry into the patterns and practices of the Chicago Police Department (CPD) (Davey & Smith, 2015; Department of Justice, 2017). Van Dyke was charged with first-degree murder. The city braced for the verdict, with residents and police fearing an acquittal might lead to protests and unrest similar to those after the acquittal of Los Angeles police officers in the beating of Rodney King (Sastry & Bates, 2017). It took the jury only 1 day to reach a verdict: Van Dyke was found guilty of second-degree murder and 16 counts of aggravated battery with a firearm—one count for each shot that hit McDonald. This was the first time in 50 years a Chicago police officer was convicted in the shooting of a citizen (Smith, Williams, & Davey, 2018). Van Dyke was acquitted of the charge of "official misconduct"—defined as "knowingly perform[ing] an act he knows he is forbidden by law to perform" (Illinois Compiled Statutes, 720 ILCS 5 § 33.3).

Police misconduct has a direct negative impact on citizens resulting in the tragic loss of life, massive racial disparities in criminal-justice–related outcomes, and negative health consequences for neighborhoods and populations experiencing first- or even second-hand police abuses (Bor, Venkataramani, Williams, & Tsai, 2018; Sewell & Jefferson, 2016; Tyler & Wakslak, 2004). Police misconduct, abuse, and violence also rattles the foundation of trust between residents and police (Sunshine & Tyler, 2003). The police–citizen relationship is one of the most distinctive features of police officers' jobs as their daily duties mandate interaction and cooperation with the public, often in unpredictable settings. When residents become cynical of the police, they tend to withdraw from contacting the police (Desmond, Papachristos, & Kirk, 2016) and, instead, may either seek out informal ways to police themselves or else leave some public safety matters unattended (Pattillo, 1998; Venkatesh, 2006). Police simply cannot do their jobs effectively without a working relationship with the community. Cynicism and mistrust of the police can stymie or hinder public safety efforts and, instead, keep crime rates higher in the same communities where fair and just policing practices are most needed (Baumer, 2002; Bobo & Thompson, 2006; Kirk & Papachristos, 2011). For example, in a recent study in Milwaukee, scholars demonstrated that highly publicized instances of police abuse cause residents to shy away from calling 911—even for serious crimes such as robbery or assaults (Desmond et al., 2016). Understanding and doing something about police misconduct and abuse, then, becomes a significant policy issue not simply for repairing trust in the police but also for ensuring fair and just policing practices.

Explanations of police misconduct and abuse often begin by focusing on personality traits or characteristics of *individual officers*, including race, ethnicity, gender, education, temperament, and even psychological disposition (e.g., Brandl, Stroshine, & Frank, 2001; Chappell & Piquero, 2004). Taking such an individual approach often requires seeking out "problem officers" within a police department—the proverbial "rotten apples" approach. In a rotten apples approach, Jason Van Dyke, not the more than seven other officers at the scene of the shooting, in particular, or the CPD, in general, is the source of the abuse and misconduct. And, indeed, before the murder of McDonald, Van Dyke had more than 20 documented complaints filed against him, many of them for excessive "use of force"; one complaint against Van Dyke resulted in a $350,000 city payout to the complainant (McLaughlin, 2015; Wald, 2018). With other explanations, *organizational* characteristics are prioritized, such as a unique police worldview, hypermasculinity, and the "noble cause of public safety" as the main drivers of police misconduct and abuses (e.g., Crank & Caldero, 2000; Delattre, 2002; Hebert, 1998; Kappeler, Sluder, & Alpert, 1998; Klockars, 1980). In contrast to the "rotten apples" approach, in this "rotten barrel"

perspective, the pervasive nature of police corruption, mismanagement, and biases is underscored, which might indicate larger scale police reform. In the Chicago context, the legacy of systematic—and often consciously organized—police abuse spans decades and contributes to a highly racialized criminal justice system (Department of Justice, 2017; Taylor, 2013). The fact that the other officers at the Van Dyke shooting did nothing—while others are accused and awaiting trial for tampering with evidence—is indicative of larger systematic problems. In a report on police accountability in Chicago, the Police Accountability Task Force (2016, pp. 7 and 13) summarized the larger organizational and cultural situation in Chicago: "CPD's own data gives validity to the widely held belief the police have no regard for the sanctity of life when it comes to people of color … . The community's lack of trust in CPD is justified."

Although important findings on both the individual and organizational factors associated with police misconduct have come from empirical studies, the results have been inconclusive and, at times, inconsistent. Findings from studies on the "rotten apple" perspective have shown that individual-level correlates associated with misconduct in one context may not be found in another. Likewise, findings from studies of organizational characteristics have shown that organizational effects associated with police misconduct are not necessarily the same across departments nor are the various forms (and seriousness levels) of misconduct (e.g., corruption vs. mismanagement). Yet, if we consider police misconduct as a form of *deviance*—a type of behavior that diverges from the expressed mission of police institutions—then, like other forms of deviance, it is likely a behavior learned through social relationships. The importance of social networks in the learning of deviant behavior is at the center of many core criminological theories (e.g., Akers, 1998; Sutherland, 1947) and when applied to the context of police misconduct is consistent with the findings from a long line of research that highlight how police subculture shapes police behavior. Still, little is known about these transmission processes within the police context, and whether problem behavior can be learned and passed on through exposure to more deviant colleagues (Roithmayr, 2016). A focus on these processes allows for us to move beyond debates about "rotten apples" and "rotten barrels" and to hone in on the mechanisms that facilitate misconduct.

In the current study, we examine the role of deviant colleagues in facilitating exposure to, and the propensity to accrue, use of force complaints. By using an extensive data set of complaints filed against Chicago police officers, we investigate the prevalence of repeated misconduct complaints and, in particular, the degree to which use of force complaints are concentrated around a small group of individuals (i.e., problem officers). Specifically, we use a series of frailty models for recurrent event data to test the effect of exposure to peers with a history of excessive use of force on the likelihood of use of force complaints. Consistent with research on deviance in other settings, we hypothesize that social networks and exposure to the behavior of other officers in one's network plays an important role in the social transmission of police misconduct.

Although Chicago is a unique setting given its unique history and size, it provides an ideal research setting for studying exposure to deviance. The CPD represents one of the largest law enforcement agencies within the United States. It is also the site of one of the largest inquiries into the prevalence and persistence of misconduct within a department (e.g., Department of Justice, 2017) and, thus, provides an ideal research setting for producing vital insights into a problem that persists across the country. Understanding exposure to misconduct in social networks is likely to yield practical knowledge that can be used to curtail the spread of these behaviors in various organizational settings. Such findings might also be applied to other forms of deviant (occupational or nonoccupational) networks. Our results indicate that being tied to officers with a history of use of force complaints elevates the risk of being involved in subsequent use of force complaints, which provides some support for the social transmission of severe police misconduct (e.g., Roithmayr, 2016).

1 | BACKGROUND: APPLES, BARRELS, AND NETWORKS

Research on police misconduct can be (broadly) classified into two groups: studies in which officer attributes are emphasized as correlates of misconduct (i.e., "rotten apples") and studies in which departmental or even institutional attributes are emphasized as a key to understanding misconduct (i.e., "rotten barrels"). Study findings from both perspectives have led to the identification of a host of risk factors associated with misconduct ranging from a general focus on individual-level correlates of an officer (e.g., gender, race, age, and rank; Bloch & Anderson, 1974; Wolfe & Piquero, 2011) to organizational and occupational factors set forth by police administrators (e.g., Hickman, Piquero, & Piquero, 2004; Kappeler et al., 1998; Weisburd, Greenspan, Hamilton, Williams, & Bryant, 2000; Wolfe & Piquero, 2011), to police culture and socialized behaviors (e.g., Chappell & Piquero, 2004; Herbert, 1998; Ingram, Terrill, & Paoline, 2018).

Studies in which individual-level predictors of officer misconduct, or traits that are conducive to a preferred policing style or orientation, are examined have produced some mixed findings. For instance, on the one hand, researchers have found that minority officers received significantly fewer misconduct complaints when compared with their White colleagues (Wolfe & Piquero, 2011) or, alternatively, that race/ethnicity did not play a role in the receipt of filed complaints (Brandl et al., 2001). On the other hand, Cohen and Chaiken (1972) and Kane and White (2009) have found that Black and Latino officers were more likely than White officers to engage in misconduct. Several scholars have also found that the association with race and ethnicity might be confounded by the differential assignment of minority officers to high-crime neighborhoods, exposing them to greater opportunities for misconduct and use of force (Fyfe, 1988; Terrill & Mastrofski, 2002; Terrill & Reisig, 2003; Worden, 1995).

When compared with their male counterparts, female officers tend to be less aggressive in their role. Findings from prior research indicate that female officers are less likely to be involved in use of force complaints (Waugh, Ede, & Alley, 1998) or to use physical force (Bazley, Lersch, & Mieczkowski, 2007; Rabe-Hemp & Schuck, 2005) and weapons (Hoffman & Hickey, 2005) in police–citizen encounters. Moreover, female officers initiate fewer citizen encounters, make fewer arrests (Bloch & Anderson, 1974; Morash & Greene, 1986), are subject to fewer citizen complaints (Brandl et al., 2001; Chappell & Piquero, 2004; Greene, Piquero, Hickman, & Lawton, 2004), and are less likely to be the subjects of excessive force complaints (Adams, 1999; Brandl et al., 2001). The mechanism behind why female officers are less likely to use physical force or are involved in use of force complaints is unclear. Scholars have suggested that female officers may rely on inherently different experiences, talents, and skills compared with male officers (Horne, 1980; Rabe-Hemp & Schuck, 2005). Yet, in a study of 1,545 officers dismissed or forced to leave the New York Police Department for reasons of misconduct, Fyfe and Kane (2006) found that officer gender was a nonsignificant attribute in predicting misconduct.

Officer tenure and rank have also been found to impact officer attitudes and behaviors that lead to misconduct. High-complaint officers are significantly more likely to be younger, less experienced, and more likely to receive departmental disciplinary action (Brandl et al., 2001; Donner & Jennings, 2014; Greene et al., 2004). This has been attributed to younger officers' heightened activity; "younger officers initiate more contact with the public, conduct a higher proportion of preventative patrolling, and record more crime reports," which leads to a greater probability of receiving complaints (Adams, 1999; Brandl et al., 2001, p. 523). Furthermore, higher ranking officers have also been found to have lower rates of criminal or serious misconduct offenses (Kane & White, 2009).

In organizationally oriented studies, researchers have conceived of misconduct and deviance as the product of a "police worldview" or subculture generated by organizational practices and the unique

nature of policing as a profession (e.g., Kappeler et al., 1998; Wilson, 1968). Broadly speaking, in accordance with such a perspective, police misconduct is learned through this unique policing subculture, in which a set of common beliefs, values, and norms among officers is prescribed (Crank, 1998; Herbert, 1998; Ingram et al., 2018; Kappeler et al., 1998; Wilson, 1968). Police work comprises a set of demands and expectations in which loyalty is emphasized and a sense of brotherhood is encouraged that is designed to overcome resistance while creating an environment where the interests of officers who violate the law are protected (e.g., code of silence; Skolnick, 1966; Wilson, 1968). Such a worldview is further driven by the real and perceived dangers of policing, and thus, a polarized "us" versus "them" mentality is facilitated across the daily practices of officers (Alpert & Dunham, 1997; Barker, 1977; Herbert, 1998). These many aspects of police work may lead to the development of a hypermasculine culture in which socialized behaviors that are compatible with other members in the organization are encouraged (Harris, 2000; Messerschmidt, 1993; Schuck, 2014). In this police subculture, an in-group mentality is bred, in which officers learn, and exchange, cultural knowledge and constructs that are favorable to their group identity (Chappell & Piquero, 2004, p. 93). Thus, in parallel with the behaviors and attitudes that are formed and shaped by the subculture, criminal and deviant behavior is likely to be transmitted through these occupational groups and in association with other like-minded individuals (Reiss & Farrington, 1991; Warr & Stafford, 1991; Weerman, 2003).

To determine the importance of police subculture, Savitz (1970) examined how recruits from the Philadelphia Police Department advanced from the police academy to the streets. During their first 3 years on the job, Savitz (1970) found that new officers were socialized into their occupational role and that greater exposure to the police subculture facilitated more permissive responses toward deviant police behavior. Newer officers frequently adopted the "cynical" beliefs of older more experienced officers. Police officers themselves have also been found to direct such cynicism against their own police organizations and to consider their deviant behavior or misconduct as an adaptation for the sake of the "noble cause of public safety and justice" (Wolfe & Piquero, 2011, p. 335). In other words, officers can consider departmental policies to be a hindrance to "good police work." For example, in a sample of 483 Philadelphia police officers, Wolfe and Piquero (2011) found that officers who perceived their agency as engaging in fair management practices (e.g., engaged in distributive outcomes through pay and promotions) held fewer beliefs that were favorable to noble-cause corruption, and showed lower levels of adherence to the code of silence within their department. Officers who were associated with a greater percentage of deviant peers that favored minor forms of police misconduct showed greater adherence to the code of silence, as well as stronger beliefs that supported corruption for a noble cause.

Both individual and organizational perspectives of police misconduct bring forward compelling but incomplete explanations of police misconduct. Without a doubt, organizational and cultural dimensions of police work influence patterns of misconduct. For example, officers have almost no say in their assignments or partners, let alone in the political priorities of a police chief or mayor. And, still, individual officers vary in their responses to police culture with some engaging in misconduct while others do not. For all their differences, the "rotten apples" and "rotten barrels" perspectives are similar in their weaknesses: Both perspectives acknowledge the fact that behaviors are learned, modified, and adopted through the formal and informal interactions of individuals within organizations but have not tested this premise in the same way as criminologists have approached other deviant behaviors. Particularly, those studying peer influence, have persistently noted the importance of considering the social contexts from which deviance emerges—and the same logic might apply to understanding the importance of networks in the learning of police deviance.

1.1 | Importance of networks

This study focuses on a police officer's network to capture a conceptual middle ground in this "individuals versus organizations" debate. Elements of police culture clearly facilitate and potentially even perpetuate police misconduct, but police agencies do not teach misconduct so transparently. Police do not, for example, learn how to make false arrests at the academy. Rather, individual officers learn different forms of misconduct through interactions (formal and informal) with their fellow officers—a proposition consistent with social learning theories more generally (e.g., Akers, 1998), the findings of empirical studies of networks and deviance in organizations more specifically (e.g., Baker & Faulkner, 1993, 2003), as well as insights gleaned from police ethnographies on the informal socialization "on the job" (Manning, 1977; Moskos, 2008; Reiss, 1973; Westley, 1970). Chappell and Piquero (2004) underlined this point in a study of how police officers' perceptions of peer behavior affected misconduct complaints. In their study of Philadelphia police officers, Chappell and Piquero (2004) found that officers who perceived their peers as likely to rationalize deviant behaviors (e.g., excessive use of force) were more likely to have misconduct complaints filed against them.

Despite understanding that police subculture may facilitate deviant behavior, formal network methods have rarely been applied to examine whether social networks impact police misconduct.[1] Our assertion that police deviance is socially transmitted through peer networks embodies a core theme of criminological research on crime and delinquency (Brandl et al., 2001; Harris, 2010; Roithmayr, 2016). Through various mechanisms, it is a firmly established fact that much of crime is committed in the company of others (Reiss & Farrington, 1991; Warr & Stafford, 1991; Weerman, 2003). The role of social relations in shaping offending patterns has a long theoretical history (Akers, 1998; Matsueda, 1982; Sutherland, 1947; Warr, 2002), and has been supported by the findings of numerous empirical studies (Conway & McCord, 2002; Haynie, 2001, 2002; McGloin, Sullivan, & Thomas, 2014). In a growing area of research, scholars have begun to apply formal network models and methods as a way to measure the direct link between an individual's social connections and the social influence processes that condition deviant outcomes (for reviews, see Bouchard & Malm, 2016; Gravel & Tita, 2017; Haynie & Kreager, 2013; Papachristos, 2011).

In a recent theoretical essay, Roithmayr (2016) explicitly drew on a similar networked-logic to argue that police excessive use of force may spread between officers through a process of social contagion, much like violent victimization has been shown to diffuse in networks of offenders and their associates (Green, Horel, & Papachristos, 2017; Papachristos, Braga, & Hureau, 2012; Papachristos, Braga, Piza, & Grossman, 2015). Police officers may learn to employ excessive use of force once they have learned—by observing other officers engaged in the behavior—how to identify situations in which it can be applied to achieve a goal, such as subduing a citizen resisting arrest. The learning of such behavior through observations is particularly likely to occur if "a police officer observes another officer using excessive force and obtaining a positive reward—say, approval by the officer's colleagues or the reward of reducing risk by shortening the duration of an encounter with a resistant civilian" (Roithmayr, 2016, p. 429). This perspective is consistent with research findings more broadly by Sierra-Arévalo (2016), who emphasized that certain behaviors that are adopted in the name of the "danger imperative," although not necessarily in line with departmental policy, are often learned through informal means of socialization.

The adoption of deviant behavior by police officers and the social mechanisms that drive their adoption indicates that informal networks may play an important role in the diffusion of behaviors in a police department. In this study, we seek to establish whether the necessary condition for social contagion—the link between exposure and subsequent behavior adoption—can be established in the context of police misconduct (Burt, 1987; Valente, 1996; 2005). Our objective is to assess whether exposure to

officers with a history of excessive use of force increases one's own likelihood of engaging in similar behavior. We measure social networks through co-involvement of officers in misconduct complaints where officers are linked by virtue of being named in the same complaint. Our main hypothesis is that officers are at a heightened risk of use of force complaints if their network has a high concentration of colleagues with a history of such behaviors (measured as the proportion of co-complainants with prior use of force complaints). The overall objective is to test whether exposure to excessive use of force behaviors in misconduct networks can affect an officer's propensity for the same behavior.

2 | DATA AND METHOD

The study relies on complaint records filed with the CPD from 2007 to 2015. These data were retrieved by the Invisible Institute, a nonprofit organization, who obtained the records through a series of FOIA and litigation requests.[2] Each record was coded according to a series of indicators and has since been made publicly available on the Invisible Institute's website.[3] The complaint records include detailed information on all the officers named in the complaint (e.g., gender, race/ethnicity, date of birth, tenure, rank, and unit within the CPD), as well as details of the complaint itself, including the date and a short description. The complaint records cover the period 2000 to mid-2016; however, we focus on complaints made from January 1, 2007 to December 31, 2015, the years for which information was most complete at the time of this writing. These data comprise 11,686 officers who were involved in at least one of 30,450 complaints. Important for the current study, 76% of officers (n = 8,914) were involved in multiple complaints, which allowed for us to examine how exposure to deviant peers influences misconduct patterns over time.

These data are well suited for the analysis of misconduct networks on excessive use of force. Use of force complaints represent more visible forms of misconduct, albeit not without its caveats (discussed in the Limitations section) and have been found to be reliable measures of misconduct (McCluskey & Terrill, 2005, p. 513). Our interest in the use of force allows for us to exploit variation in the types of misconduct across officers, specifically, involvement in repeated misconduct complaints. Our focus on the social transmission of misconduct required that we retain officers who had at least two separate incidents over the observation period to examine how behavior in one period influenced behavior in the next. Thus, we achieved a final sample of 8,624 officers named in more than one complaint over the observation period (2007–2015). This excludes officers who had missing information on key covariates, were only named in complaints with more than 15 co-accused, and complaints for which there were no details on the nature of the incident. Because officers were involved in multiple complaints (M = 6.19 complaints per officer; standard deviation [SD] = 5.17), this resulted in a study sample of 43,718 officer-complaint observations. Table 1 presents summary statistics for the sample and covariates used in the ensuing analyses.

2.1 | Use of force

Use of force represents an important social issue. Implications incurred from use of proper or improper force are high, undermining police legitimacy (Westley, 1970), increasing legal cynicism, and diminishing cooperative behaviors, on the part of citizens, that are needed to help police effectively carry out their daily duties (Bayley, 2002; Decker, 1981; Desmond et al., 2016; Reiss, 1968; Skolnick & Fyfe, 1993). For each officer-complaint observation, we generated a dichotomous measure of whether the officer was involved in a use of force complaint (1 = use of force, 0 = non–use of force). Complaints were classified as use of force if the complaint entailed excessive force (use of a firearm,

TABLE 1 Summary statistics

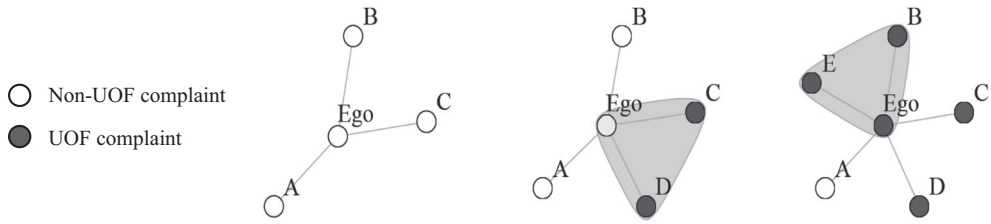
Variables	Mean	SD	Minimum	Maximum
Officer				
Use of force (1 = Yes)	0.18	0.39	0	1
Gender (1 = Male)	0.86	0.34	0	1
Race				
White	0.52	0.50	0	1
Black	0.24	0.43	0	1
Hispanic	0.21	0.41	0	1
Other	0.03	0.17	0	1
Tenure	11.29	6.74	0	56
Rank (1 = Officer)	0.79	0.41	0	1
Special unit (1 = Yes)	0.15	0.36	0	1
N solo complaints	1.57	2.26	0	34
N prior UOF complaints	1.23	1.90	0	22
Incident year	2010.67	2.37	2007	2015
Misconduct Network				
N co-accused	2.24	3.09	0	14
Female (%)	0.14	0.27	0	1
Same race (%)	0.43	0.44	0	1
Tenure (mean)	7.80	6.69	0	64
Exposure to UOF	0.39	0.34	0	1
No. Observations: 43,718				
No. Officers: 8,624				

Note. SD = standard deviation; UOF = use of force.

use of conductive energy device), unnecessary physical contact, or involved an act that resulted in injury/death. The most frequent categories were excessive force that resulted in an injury (59%), excessive force that did not result in an injury (19%), followed by unnecessary physical contact (12%) and use of a firearm (8%). Of the unique officers in our sample, 52% ($n = 4{,}523$) received at least one use of force complaint over the study period.

2.2 | Misconduct networks

A key feature of complaint records is that they provide details on all officers accused of the incident. This allows us to examine each officer's misconduct network (i.e., all other officers accused of misconduct with the officer) across their history of complaints and detect whether changes in these networks are associated with subsequent misconduct patterns. An officer's misconduct network includes all co-accused officers who were named in the same complaint with the focal officer, creating a network in which officers are linked to each other through complaints. These misconduct networks represent a particular type of social network more accurately described as "behavioral networks" similar to co-offending networks (e.g., Papachristos, Wildeman, & Roberto, 2015), needle-sharing networks (Koester, Glanz, & Barón, 2005), and sexual networks (Bearman, Moody, & Stovel, 2004). Presence in the network requires at least some involvement in the behavior and captures only relationships between individuals that are recorded (in our case, involvement in police misconduct). A network based on citizen complaints represents only a fraction of the social ties between officers, so



Complaint	Complaint 1 Failure to provide service	Complaint 2 Arrest, improper procedures	Complaint 3 Use of Force
Number of officers accused in current complaint	4	3	3
Number of officers in ego's misconduct network with a UOF complaint ($t - x$)	—	0	2
Number of officers in ego's misconduct network ($t - x$)	—	3	4
Ego's network exposure	—	0%	50%

FIGURE 1 Hypothetical example of an officer's network exposure to use of force complaints[a]

Note. UOF = use of force

[a]Shaded regions in figure represent officers who were named in the current complaint

we are likely underestimating the true network and emphasizing only relationships with a potentially negative influence. We discuss the implications of this limitation in the Discussion section.

Of the officers in our sample, 95% (n = 8,194) were named in at least one complaint with two or more officers. On average, complaints had 1.89 officers (SD = 1.58), with 56% involving more than one officer. Because some complaints may only involve a single officer, we include a measure of the number of individuals named on the complaint and a measure of the number of times an officer was named in a prior solo complaint as covariates in our models.

We measure exposure to peers with a history of excessive use of force as the proportion of co-complainants who have previously been accused of a use of force complaint. An officer's exposure at time t is thought to influence his or her behavior at time $t + 1$.[4] It differs from the other network measures in that it is calculated before the complaint. We first identify the number of unique individuals that an officer had been named in a complaint with prior to the current event. Then, for each unique co-complainant, we identify whether they had been named in any use of force complaint prior to the current event. Lastly, this information is used to calculate the proportion of officers in their network who have been named in a use of force complaint.[5] Thus, the likelihood of an officer being named in a use of force complaint at time t is a function of his or her network exposure (i.e., the proportion of officers in their network with a prior use of force complaint) at time $t - x$. A positive and statistically significant effect would suggest a social influence mechanism in which an officer's likelihood of becoming involved in a use of force complaint increases as the proportion of contacts with a history of use of force in his or her personal misconduct network increases.

Figure 1 provides a visual demonstration of how we measure an officer's exposure to use of force. The figure represents a hypothetical officer's ("ego") exposure to use of force from his or her first complaint (Complaint 1) until the last complaint (Complaint 3). The ego represents the focal officer, and the officer's ego network by nodes A through E. White nodes represent officers who have not been named in any use of force complaints, and black nodes represent officers who have been named in a prior use of force complaint(s). Because officers' network exposure is calculated from previous complaints, an officer's network exposure is only available after his or her first complaint. In Complaint

2, the ego's network exposure is 0% as none of the officers in his or her ego-network were named in a use of force complaint at $t - x$ (i.e., Complaint 1). In Complaint 3, the ego-network exposure increases to 50% based off changes to his or her exposure in Complaint 2. In Complaint 2, the ego's misconduct network consisted of four other officers (i.e., Officers A, B, C, and D). Of these, two officers had been named in a prior use of force complaint (i.e., Officers C and D). Thus, for each complaint, an officer's misconduct network has the potential to remain stable (i.e., reoffend with the same officers) or grow (offend with new officers). The degree to which an officer is exposed to use of force depends on whether officers in his or her ego-network have engaged in this behavior.

To avoid confounding network exposure with an individual's prior behavior, we also include a lagged measure of the cumulative number of use of force complaints an officer has been named in at the time of the complaint.[6] Because officers observed earlier on in the study are less likely to have been exposed to peers with a history of use of force, as compared to officers observed later on, we also control for the year of the complaint in our models.

2.3 | Tenure co-accused

We look at how other dimensions of police ego-networks may structure officer misconduct patterns, including the impact of being named in complaints with more experienced officers. We measure the experience level within an officer's misconduct network by creating a continuous measure of the mean years of service with the CPD for all the co-complainants at the time of the incident. Although some scholars have suggested officers with greater experience may have more to lose from being named in a complaint and may have acquired the necessary experience to diffuse situations from escalating to force (e.g., Brandl et al., 2001), others have suggested length of service is associated with increased cynicism and misconduct (Chappell & Piquero, 2004; Donner & Jennings, 2014). Here, we examine how being named in a complaint with more tenured officers influences the likelihood of being involved in use of force complaints. In this way, we aim to capture a mentorship relationship that has traditionally been viewed as the tendency for recruits to be paired with veteran officers once they graduate from the academy (Asch, 1968; Edmundson, 1999; Muir, 1977). More experienced officers can serve as mentors to newer officers, enhancing their familiarity with the community and administrative areas, thus, guiding recruits on the culture and practices of law enforcement (Edmundson, 1999; Muir, 1977). Alternatively, in other contexts, mentors may (formally or informally) socialize recruits to conduct the same types of unethical behaviors (Manning, 1977; Skolnick, 1966).

2.4 | Heterogeneity of co-accused

We also examine how the gender and racial/ethnic composition of the misconduct network influences the likelihood of being involved in use of force complaints. We measure gender as the proportion of co-complainants who were female at the time of the complaint. We measure race/ethnicity as the proportion of co-complainants who shared the same race as the officer at the time of the complaint. The findings from previous studies have highlighted that cross-race interactions are unequally distributed across police networks (Haarr, 2005). Here we examine whether the distribution of cross-race interactions influences the likelihood of being involved in use of force complaints.

2.5 | Additional covariates

Our models also include additional individual-level controls for gender, race/ethnicity, and length of service. An officer's gender (female, male) and race (White, Black, Hispanic, and other) are all dummy

coded and included as static variables. We also include an officer's tenure, measured as the number of years from the officer's appointment date to the complaint date, along with tenure-squared to control for a potential nonlinear effect of tenure as continuous dynamic variables in all models.

Complaints are not likely to be randomly distributed across officers but related to their degree of exposure to citizens and high-crime neighborhoods. We control for this with two dummy indicators of an officer's exposure based on his or her rank (0 = rank above a police officer[7]; 1 = police officer) and unit (0 = nonspecialized unit, 1 = specialized unit[8]) within the police department. We assume that officers with higher ranks within the CPD are less likely to be exposed to the public and more likely to face higher costs associated with complaints. In contrast, officers who belong to specialized units, such as gang units, narcotics units, and special weapons and tactics, are more likely to be exposed to opportunities for complaints. Officers within these units do not respond to service calls; rather, they are tasked with seeking out problematic activity. Previous investigations of the CPD have suggested that these units, which have involved "jump out squads" tasked with seeking arrests, often create situations conducive to increased involvement in use of force, (i.e., suspects fleeing; Department of Justice, 2017, p. 31). Furthermore, officers who belong to these units may be self-selective, with younger, highly active officers more likely to select into these units (see Moskos, 2008, p. 137).

Lastly, we control for the year the complaint was made to the department. During the period we analyzed, a complaint could be initiated remotely, yet for a complaint to be investigated, the complainant was required to sign an affidavit in person at an oversight agency in the city. On December 19, 2011, the location of the oversight agency where complainants could sign an affidavit moved from the South Side to the Near West Side of Chicago. The new location was not only less accessible by transit, but also it represented a shift from a neighborhood with a large proportion of Black residents to a neighborhood with a large proportion of White and Hispanic residents, thus, differentially influencing the convenience of filing complaints (Ba, 2017). These administrative and location changes not only impacted how complaints were filed, but also they impacted the rates at which complaints were sustained through a civilian's willingness, and decision, to file a complaint and/or subsequently to complete his or her complaint against the police (for a discussion on this, see Ba, 2017). Our measure for the year the complaint occurred is aimed at, at least partially, controlling for this policy change.

3 | ANALYTIC STRATEGY

A key element of our research design is that officers can experience the event—involvement in a use of force complaint—more than once. Recurrent event data are a special type of event history data that allow for multiple events and record the timing of transitions between events (Therneau & Grambsch, 2000). To model dependence between events, we extend the hazard models to include a frailty component. The frailty component is analogous to a random effect, accounting for unobserved variability within individuals over time (Therneau & Grambsch, 2000).

Officers are identified as entering the risk set after their first recorded complaint and remain at risk of use of force complaints even after having been involved in a use of force complaint. The risk intervals between events capture the number of days between complaints (Andersen & Gill, 1982). Rather than resetting an officer's time at risk to zero after experiencing an event, it preserves the number of days and picks up from the last date, allowing for officers to enter the risk set at different time points for different durations. Because some officers were named in more than one complaint on the same day, we only counted this as a single event, taking the values for the most serious complaint and maximum value across the covariates. In addition, because our models include both use of force and non–use of force complaints, officers may be censored after entering the risk set for a non–use of force complaint.

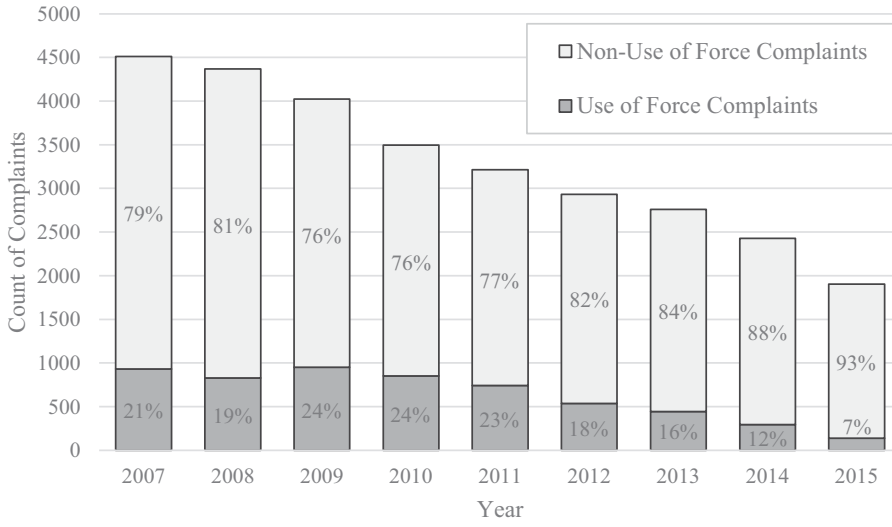


FIGURE 2 Distribution of police misconduct complaints, 2007–2015

Use of this approach allows for us to include information from all complaints and not just those in which the officer "failed" (i.e., use of force complaints).

Another important component of estimating recurrent event models concerns the unknown starting times for a subset of officers. These officers may have already been accused of a complaint at time t when the period began, and thus, we do not know the exact time when officers were first accused of a complaint. We address this in our models in two ways. First, we treat all officers in the window period as if they had first experienced the event in time t and not $t - x$. Second, we include a continuous variable that indicates the number of years the officer has been with the force (i.e., *tenure*). Officers appointed prior to 2007, the beginning of our observation period, may have already experienced the event. Including the number of years an officer has been on the force should effectively control for the effect of extra exposure time. All models were estimated using the survival package (Therneau, 2015) in the R software for statistical computing (R Core Team, 2018).

4 | RESULTS

Figure 2 shows the distribution of misconduct complaints over time. From 2007 to 2015, our sample includes 29,634 recorded complaints made to the CPD. In Figure 2, these are disaggregated into use of force and non–use of force complaints. Complaints made to the CPD gradually decreased over the study period, from a high of 4,511 complaints in 2007 to a low of 1,904 complaints in 2015. Despite this drop, the proportion of use of force complaints stays stable from 2007 to 2012, representing approximately 20% of all complaints each year. In 2013, however, this starts to drop with use of force complaints representing only 7% of all complaints by 2015. This drop may be attributed to administrative changes and to civilian oversight on police performance (Ba, 2017).

Figure 3 (left) shows the distribution of complaints across officers in the final sample (n = 8,624) from 2007 to 2015. Because this only includes repeat officers, all officers received at least two complaints. Nearly one half (48%) received five or more complaints. Figure 3 (right) shows the distribution of officers who received at least one use of force complaint (n = 4,523). Nearly one half (48%) of officers who received a use of force complaint, were named in repeated use of force complaints. Officers

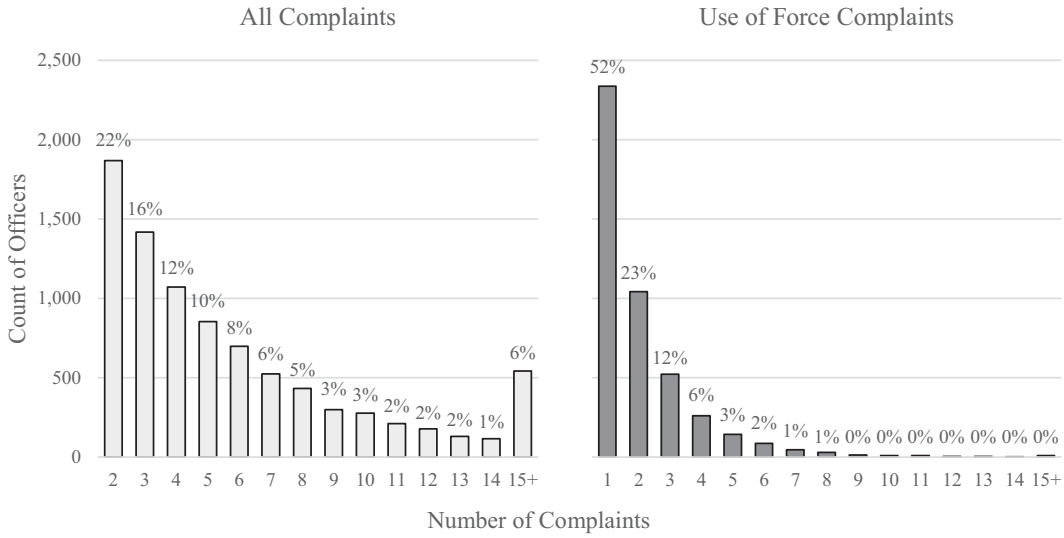


FIGURE 3 Frequency of misconduct complaints across officers, 2007–2015[a,b]

[a]All complaints: Percentages represent the number of complaints received by the officers in our sample (n = 8,624)

[b]Use of force complaints: Percentages represent the number of complaints received by the officers in our sample who had at least one use of force complaint (n = 4,523)

with five or more use of force complaints represent 4% of our overall sample but contribute 29% of person-complaints for use of force.

Table 2 presents the results from the frailty models. Model I serves as our baseline, with examination of officer characteristics associated with use of force complaints. Results show that officer characteristics, including gender, tenure, and rank are all associated with recurrent use of force complaints. Male officers were more likely to be involved in multiple use of force complaints. In contrast, officers who had served with the CPD over a longer period were less likely to be named in use of force complaints. Our square term for years of service, however, is positive and significant, which indicates a curvilinear relationship. We interpret this as a reflection of how officers progress in their careers, with officers who have been with the department for longer periods less likely to be on routine patrol duties that may expose them to opportunities for complaints. Figure 4 plots the hazard ratio at different values of tenure for an average male, White police officer (not in a specialized unit) along with the probability density function for the tenure variable. As seen in Figure 4, the hazard associated with tenure drops dramatically until about 10 years on the job and begins to level off in the subsequent decade, which indicates that use of force is much more likely in the early part of an officer's career. Officer race/ethnicity are not significantly associated with use of force complaints.

Unsurprisingly, given the trend shown in Figure 2, complaints made against officers in later years are negatively associated with use of force complaints. Another significant control variable is the number of prior solo complaints. Each additional past solo complaint increases the likelihood of future use of force complaints by 7% in Model I, indicating that officers who are named in many complaints by themselves have a greater likelihood of engaging in more serious offenses. As is commonly found in research on offender versatility (e.g., Gottfredson & Hirschi, 1990; Guerette, Stenius, & McGloin, 2005), this result may indicate that police officers who engage in any complaint are likely to escalate into use of force complaints. On the other hand, our results highlight a decrease in the likelihood of future use of force complaints as officers accumulate past complaints for the same type of misconduct.

TABLE 2 Frailty models assessing the influence of colleagues accused of misconduct on officer use of force complaints[a]

Variables	Model I HR	Model I 95% CI	Model II HR	Model II 95% CI
Officer				
Gender (1 = Male)	1.79***	1.60–1.99	1.19*	1.03–1.38
Race (ref = White)				
Black	1.05	0.96–1.15	1.02	0.94–1.11
Hispanic	1.09	0.99–1.20	1.09	0.99–1.19
Other	1.02	0.82–1.26	1.02	0.83–1.24
Tenure	0.85***	0.84–0.87	0.87***	0.85–0.88
Tenure^2[b]	1.35***	1.28–1.42	1.30***	1.24–1.36
Rank (1 = Officer)	0.92	0.84–1.01	0.90*	0.82–0.98
Special unit	0.93	0.83–1.04	1.04	0.94–1.15
N solo complaints	1.07***	1.05–1.09	1.05***	1.03–1.07
N prior UOF complaints	0.93***	0.91–0.95	0.93***	0.92–0.95
Incident year	0.38***	0.37–0.39	0.38***	0.37–0.39
Misconduct Network				
N co-accused			0.91***	0.90–0.92
Female (%)	–		0.57***	0.48–0.67
Same race (%)	–		1.02	0.95–1.08
Tenure (mean)	–		1.00	0.99–1.00
Exposure to UOF[c]	–		1.66***	1.52–1.81
Theta	0.85		0.67	
N observations	43,718		43,718	
N officers	8,624		8,624	
LL	–61,256.46***		–61,432.89***	
AIC	128,536.06		128,134.01	

Note. AIC = Akaike information criterion; HR = hazard ratio; CI = confidence interval; LL = log-likelihood; UOF = use of force.

[a]HR = exp(*b*).

[b]Tenure squared was divided by 100 to facilitate interpretation.

[c]Proportion co-accused with prior use of force complaint.

*$p < .05$. **$p < .01$. ***$p < .001$ (two-tailed).

As we mentioned earlier, repeat use of force misconduct, although not necessarily rare, is uncommon in our sample, despite a few unusually persistent officers. Even though we do not have information regarding the outcome of these misconduct complaints (i.e., whether the complaint was sustained), this finding may demonstrate that repeated serious misconduct such as excessive use of force may be more likely to be met with discipline leading to the deterrence of problem officers. We are, however, cautious in this assessment given past reports on the lack of, or lax, discipline that officers received for involvement in use of force complaints (Department of Justice, 2017, pp. 36–37). The findings for all three of these control variables remain significant across all subsequent models.

In Model II, we introduce the effects of officers' misconduct networks. Our results show that officers' co-complainants exerted a positive effect on the probability of being involved in recurrent use of force complaints. Being paired with a larger proportion of female officers had a negative

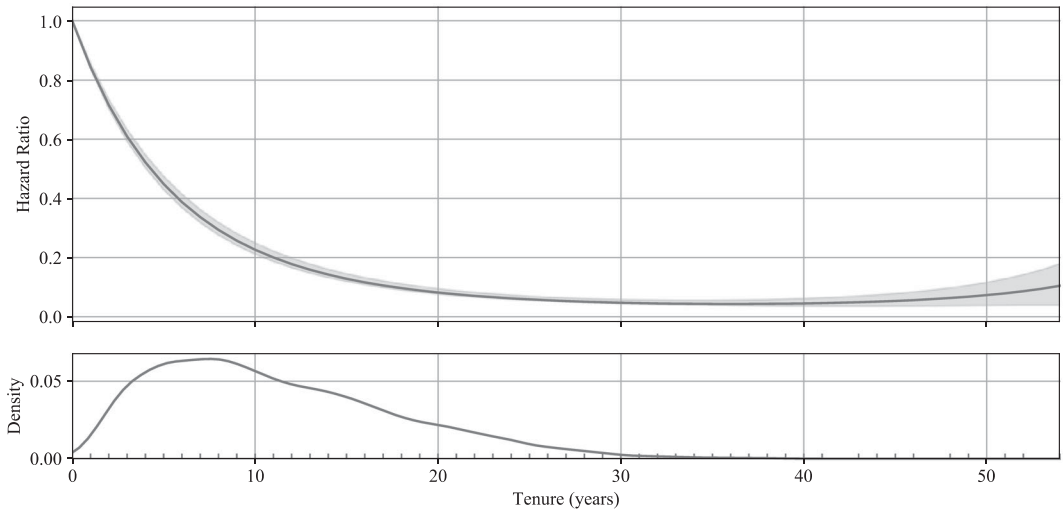


FIGURE 4 Hazard ratios for average officer[a] over values of officer tenure (top) with variable probability density function (bottom)

[a]Simulated using average values of continuous variables and the following values for categorical variables: male, White, police officer, and not member of a special unit

and statistically significant impact on an officer's likelihood of receiving use of force complaints. Consistent with our individual-level results, the proportion of an officer's network who share the same race/ethnicity as the officer had no statistically significant association with subsequent use of force complaints. Similarly, the mean years of service of officers' co-complainants had no statistically significant relationship with use of force complaints.

In support of our main hypothesis, exposure to colleagues with a history of use of force is positively and significantly associated with use of force complaints (hazard ratio = 1.66, 95% confidence interval = [1.52–1.81], $p < .001$). Compared with an officer in a network with no officers previously involved in use of force, an officer with an average proportion (39%) of officers with a history of use of force in his or her immediate network is 26% more likely to be involved in a future use of force complaint. Conversely, officers whose misconduct networks consist of fewer officers who were previously involved in use of force are less likely to become involved in use of force complaints. Figure 5 shows the hazard ratios at different values of exposure to use of force (left) and percent female officer for an average male, White police officer (not in a specialized unit) along with the probability density function for each variable. Being named in a use of force complaint increases as an officer's exposure to colleagues with prior use of force complaints increases. In contrast, being named in a use of force complaint increases as an officer's exposure to female colleagues decreases.

5 | DISCUSSION

In prior studies of police misconduct, scholars have primarily analyzed the individual- or departmental-level correlates of deviance. The findings of these studies have led to important debates on whether patterns in misconduct can be traced to a few individual officers or whether misconduct is a product of larger departmental issues. In this article, we present one of the first studies to use formal network analyses to investigate how misconduct may be socially transmitted across deviant officers. In addition

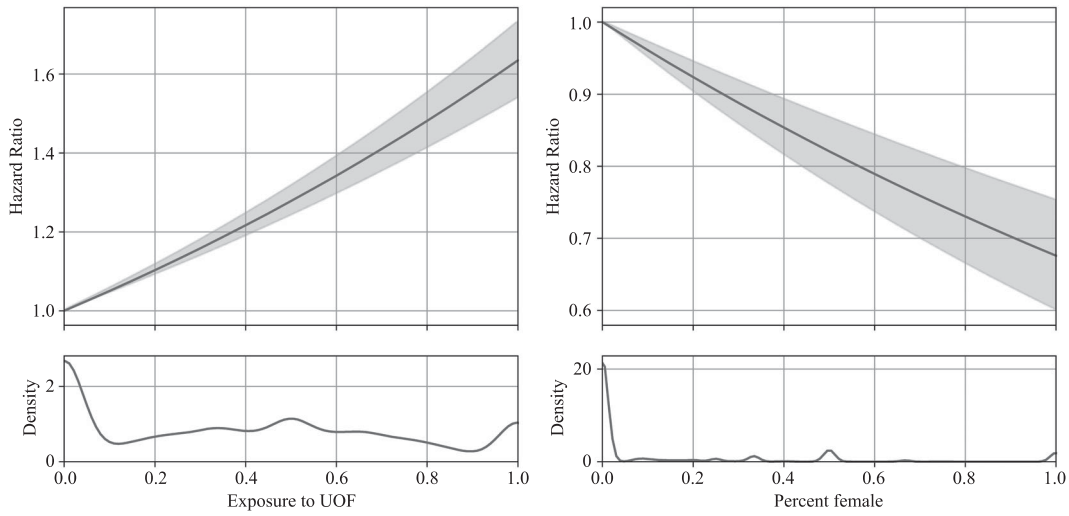


FIGURE 5 Hazard ratios for average officer[a] over values of exposure to use of force (left) and percent female in complaint network (right) with variable probability density function (bottom)

Note. UOF = use of force

[a]Simulated using average values of continuous variables and the following values for categorical variables: male, White, police officer, and not member of a special unit

to confirming the importance of several individual-level attributes—such as gender, tenure, and history of use of force—our results highlighted the importance of exposure to police misconduct in one's network as a predictor of subsequent use of force behavior. Officers who were embedded in networks with a greater proportion of colleagues previously named in use of force complaints were more likely to be named in subsequent use of force complaints. These findings held even after controlling for officers' characteristics and for the opportunity of being named in future use of force complaints.

The finding that networks matter for understanding police misconduct echoes research findings on the role of peers in structuring patterns of delinquency and crime patterns more broadly. Specifically, the results are consistent with Conway and McCord's (2002) finding that co-offending with more serious offenders increases one's own likelihood of being involved in more serious offenses. The authors contended that deviance is learned and passed on through impromptu social contexts where co-offenders converge. Notably, police officers are distinct from general offenders in several fundamental ways, the least of which is their sworn role as public servants charged with helping maintain public safety. And unlike the informal nature of peer groups, policing is not an impromptu social context. Police officers share long-standing relationships that are highly controlled by police organizations themselves. Many officer relationships are directly tied to other structural features, including their graduating class, the unit they are assigned to, the partners with whom they are assigned, and the geographic areas where they patrol. The combination of such contextual factors leads to conditions for more repetitive and stable interactions. In the context of social learning, being embedded in stable relationships may condition processes associated with the transmission of deviant behavior.[9] Officers may rely on what they have heard or observed when making challenging decisions—much of which may be learned through their colleagues (Roithmayr, 2016).

Our findings are also consistent with a long line of ethnographic and empirical research findings that have highlighted the role of social forces in structuring officer behavior, especially informal socialization. In his ethnography of the Baltimore Police Department, Moskos (2008) argued that officer

behavior is often structured by an informal police code of conduct than by formal regulations and policies. When describing the police subculture, Moskos (2008, pp. 104–105) stated, "[T]he code also states that to enter and back down from a conflict is a loss of face. Nobody wants to be 'punked', least of all the police. Police play by these street rules with the assumption that any sign of weakness on their part will make future interactions much more difficult and dangerous. Police, simply, cannot afford to lose confrontations." These social pressures to react or retaliate may be influenced, and further exacerbated, by officers' exposure to deviant colleagues. Such an interpretation is also consistent with Roithmayr's (2016) recent exposition on the possible learning dynamics involved in police use of force.

Police subculture may also help attenuate officers' perceptions of the risks associated with engaging in misconduct. Officers who are named in complaints may receive criminal sanctions, suspension, lack of promotion, and even termination of one's career. With the risk of potentially career-ending behavior in the mix, how does an officer's misconduct network change the equation with regard to adopting these risks? We argue that not only do police officers learn patterns of deviance through their colleagues but that these networks alter the perception of informal and formal risks associated with misconduct, thereby neutralizing behaviors that otherwise would be considered deviant, or against academy-learned theory and training. The likelihood of being sanctioned, either from formal bodies or informally through your peers, may be reduced (or perceived to be reduced) in situations in which officers are surrounded by a larger proportion of officers who have previously engaged in deviant behavior. Rather than be shunned for inappropriate behavior, engaging in similar behaviors may increase solidarity and loyalty between officers. For example, officers that accept money or rewards (e.g., bribes) to ignore some type of violation, officers that drink on the job together, or increasingly aggressive officers that get promoted with their behaviors misconstrued as greater engagement on the job, signs of leadership, courageous, and a "tough" on crime stance (Barker, 1977; Savitz, 1970). Fellow officers may be tolerant and less likely to hold others accountable for their actions if, they, themselves have previously engaged in serious misconduct (Chappell & Piquero, 2004; Savitz, 1970) and may choose to sanction those that do not participate in such behaviors (Barker, 1977).

5.1 | Limitations

First, the number of complaints likely underestimates the full scope of deviance within a police department. The discrepancy between complaint records and the "true" prevalence of misconduct primarily stems from the fact that the latter only requires that a misconduct event takes place, whereas the former is related to the likelihood the event is reported. The additional burden of reporting introduces the potential for both false positives (cases in which a victim misreports an incident) and false negatives (cases in which misconduct occurs but is not reported). This is important given that the probability a citizen will report a complaint may vary across neighborhoods and populations. Ideally, we would have characteristics of the complainants that would allow for us to control for this,[10] as well as information on the outcome of the complaint (sustained or not).[11] The lack of information on outcomes, however, coupled with the heavy critiques levied against the CPD for the lack of integrity in the systematic application of their discipline system and investigation of complaints (see Department of Justice, 2017), precluded us from controlling for the outcomes from complaints. That said, in a recent study in which scholars used similar complaint data in Chicago, the results showed a strong relationship between citizen complaints and future civil rights litigations (Rozema & Schanzenbach, 2018), which indicates that misconduct complaints may be good proxies for officer behavior, particularly among repeat offenders.

Second, we do not have information on officers' beat or other geographic assignments. In previous studies, researchers have emphasized that differential assignment of officers to higher crime

neighborhoods may explain variation in complaints (e.g., Terrill & Reisig, 2003). As a sensitivity analysis, we attempt to control for this by including information on the level of crime and concentrated disadvantage for the area where the complaint occurred. Information on crime levels was obtained from the Chicago Police Crime Summary, in which the number of Index crimes detected for each police beat within the past year is reported.[12] Our measure of concentrated disadvantage was modeled from Sampson, Raudenbush, and Earls (1997), in which we relied on census track data to conduct principle component analysis on percent unemployed, below the poverty line, receiving food stamps, single female household, Black, and 18 years old or younger (Appendix, Table C).[13] Although complaint records provided information on the police beat where the incident occurred, concentrated disadvantage was measured at the census-tract level. We obtained district-level measures of concentrated disadvantage by merging census tracts that overlapped 50% or more with the associated district.[14] Furthermore, because some complaint records lacked information on the location of the incident, our final sample only included 40,773 police-complaint observations.[15] Results regarding the effect of network exposure remain robust to the inclusion of these controls (see Appendix, Table A). In addition, concentrated disadvantage was also positively associated with use of force complaints, showing officers who received complaints in areas with greater concentrated disadvantage were more likely to have use of force complaints lodged against them.[16]

Third, we only capture an officer's misconduct network, not the broader social structure (and partnerships) in which an officer is embedded. Ideally, we would have access to nondeviant officers (those who were not named in any misconduct complaints) in addition to the full set of deviant officers (named in at least one misconduct complaint), allowing for us to disentangle what initially leads officers into misconduct, and how deviant and nondeviant partnership structures offending.[17] Our interpretation is therefore limited to the extent to which their *known deviant* colleagues (with at least one formal misconduct complaint) have engaged in excessive use of force. Officers operate within established institutions and are typically assigned to partners, or units, and/or communities in which they are more likely to interact with some officers more than others. These structural constraints on the interactions between officers may lead to a limited set of colleagues playing a prominent role in their socialization in the force. Thus, our measure of exposure to deviant peers may be exaggerated if they have a high number of nonproblematic partnerships that are not captured in our data set.

Finally, the results of the study are based on one agency and lack organizational-level indicators of change, limiting external validity. The CPD represents a case study in which high levels of misconduct led to a major inquiry by the Department of Justice, an overhaul of the complaint oversight body, and the appointment of a new police superintendent. Chicago, in many ways, has similar patterns to other large cities that have been under consent decrees such as Los Angeles, Cleveland, Miami, Newark, Baltimore, and New Orleans. The high levels of impunity of officers in Chicago may shape how these social norms are transmitted between officers in the CPD, as well as potentially enable a subculture in which officers are predisposed to act in ways that they would not have had they been employed in another sector where punishment was more certain or officer cynicism was low. Lacking information about changes in organizational-level indicators over time may be an important limitation given that misconduct has been attributed to the organization size of the department, the percentage of officers relative to supervisors, the internal operations of the agency, and the training or hiring process (Huff, White, & Decker, 2018; Kappeler et al., 1998). On a larger scale, political culture, policy, or enforcement objectives, which often go unmeasured, are reflected in the structural makeup of the organization and may have an impact on the prevalence of misconduct over time. Nonetheless, comparative research is readily invited to be aimed at assessing the importance of officer networks within and across different police organizational contexts. Opportunities for collecting social network data within police departments are plentiful but require a desire and commitment by police departments

to engage in such a research process. Future investigations may be designed to collect network data using information on police partnerships, the units they are assigned to, and even academy classes, allowing for researchers to tease out how various relationships structure officer behavior.

6 | CONCLUSION AND POLICY IMPLICATIONS

Our study is one of the first to include formal network methods as a way of measuring how social relationships within an entire police department impact the likelihood of misconduct. Similar to the ways that networks have been shown to influence criminal behavior in other contexts, our findings highlight one way social networks may shape deviance within police departments: through exposure to deviant officers. Although our study design does not allow for us to pinpoint the exact mechanism through which misconduct diffuses through police networks, we can determine that networks might play a role in shaping how behavioral scripts influence police work through interactions between colleagues in the field (Fagan & Geller, 2015; Roithmayr, 2016; Sierra-Arévalo, 2016; Skolnick, 1966). Our study findings give further credence to the theory of social contagion of police excessive use of force brought forward by Roithmayr (2016) and others. Future research in this vein should be focused on gathering and analyzing network data depicting the informal social structure of police departments as well as on trying to pinpoint precise mechanisms of contagion such as learning, imitation, and so on. As bounded organizations, police departments are ideal settings to collect and study social networks. Such data would enable researchers to consider not only the content of social networks but also the structural features of these networks.

The finding that officers' misconduct networks influence their involvement in use of force complaints carries significant policy implications. The finding that being named on a complaint with female officers reduces the future likelihood of use of force complaints indicates that greater exposure to female officers in an officers' network could lead to a reduction in misconduct incidents. Schuck (2014) suggested that female officers are less likely to internalize hypermasculine values prevalent in police culture during the occupational socialization process and that the growing place of women in police departments may disrupt the traditional masculine culture of policing. Our findings reveal that female officers may not only be less likely to be involved in use of force complaints themselves, but their association with male officers may also reduce their likelihood of future use of force complaints among other officers. In other words, female officers may have a beneficial social influence in police networks—even in misconduct networks.

Similarly, the effect of tenure is consistent with prior findings in which officer age and experience have been considered. In multiple studies, scholars have found that younger, less experienced officers are more likely to make arrests and to be involved in disciplinary action (Brandl et al., 2001; Crank, 1993; Sherman, 1980). In contrast, and consistent with our findings, officers who are more experienced, and have been on the force over a longer period, are less likely to be named in use of force complaints. Perhaps the tendency for "youth" to make more arrests and resort to improper use of force is centered on hypermasculine values in which a "kick ass" reputation is encouraged (Toch, 1995), a scenario that may be aggravated if newer officers with more physical prowess are also those who are more likely to be called to a scene. When a lack of experience and pressure to perform are combined, new officers may be inclined to overcompensate (e.g., prove themselves) to impress their peers and mitigate fear and safety concerns as they become socialized into police (sub)culture on the job. Findings such as this highlight the importance of adequate academy training as well as the important role of field training officers (FTOs) in socializing recruits to the department's set of values, principles, and code of ethics (see Getty, Worrall, & Morris, 2016). Importantly, our findings on the length of such risk (e.g., Figure 4)

further demonstrate that such socialization may continue well into the first decade on the job—such a focus on "youth" is thus not just on the newest recruits. It is imperative that departments monitor FTOs, recruits, and officers with due attention placed on *which* officers are conducting the training, their rank, and their overall status and reputation across the department and in the community.

The most salient policy implication of this study relates to the social influence of officers with a history of use of force complaints. Not only are officers with a history of being named in use of force complaints more likely to be involved in future similar complaints, but also they seem to also influence others in being named in use of force complaints. Many early warning systems have been designed to account for the former (history of complaints) but have not been designed to consider the latter (the social networks of officers involved in misconduct). Police departments seeking to curb use of force complaints may want to consider how assigning officers with such histories of use of force could impact the behavior of other officers. For example, temporarily removing officers named in use of force complaints from the field until problematic behaviors are addressed might limit the negative consequences of exposure. Likewise, the significance of our exposure parameter indicates that departments might also limit the number of officers with histories of use of force complaints from working as partners or in the same unit. These findings raise options for expanding already implemented prevention mechanisms. In previous studies, scholars have shown that early warning systems, which first identify potentially problematic officers and then divert them into non-disciplinary programs, such as counselling and retraining, can be effective measures for reducing civilian allegations of misconduct (e.g., see Walker, Alpert, & Kenney, 2001). The CPD currently has multiple early warning systems in place, some of which include measures to reassign problematic officers (e.g., see Police Accountability Task Force, 2016). We recommend expanding these early warning systems to account for officers' network characteristics, particularly to account for clustering of problematic behaviors. If early problematic behaviors are detected, restructuring assignments may reduce the negative social influence we find in this study.[18]

Individual incidents of police misconduct and violence—even those like the shooting of Laquan McDonald—represent more than a debate between bad apples and bad barrels. Officer Jason Van Dyke fired the 16 shots that killed McDonald, and he had a history of abusive behaviors. Yet, his act occurred among a department with a long history of abuse, misconduct, and a lingering code of silence that kept many of the other officers on the scene from acting in accordance with the fundamental police mandate to "protect and serve." The use of a network approach to police misconduct can provide new ways to help us understand the social contexts that can lead to such tragic events. What is more, detecting and doing something about the types of network effects that facilitate police misconduct can possibly help repair the severely damaged relationship between the police and the community in cities like Chicago. Legal authorities, especially the police, shape the behavior and reaction of the communities they police, and in return, the public's reactions to the police impacts their ability to maintain social order efficiently and effectively and to combat crime. Tankebe (2009, p. 261) explained that "what poor police treatment of citizens does is to weaken moral identification with police institutions." Ultimately, being treated fairly by those in positions of power and authority impacts the public's view of legitimacy, group conformity, and its level of voluntary cooperation with, and in support of, legal societal norms (Tyler, 2004; Tyler & Huo, 2002).

Police misconduct diminishes the public's willingness to cooperate and engage with the police (Desmond et al., 2016), exacerbating attitudes that resemble legal cynicism (Kirk & Papachristos, 2011) and, thus, indirectly affecting perceptions of police legitimacy. Our findings call for innovations in the management and facilitation of police services, heightened levels (and expectations) of professionalism, and greater accountability (e.g., meaningful departmental discipline; e.g., Kelling & Coles, 1996; Silverman & O'Connell, 1999). Although such efforts should be applied across the recruitment

and training phases of police careers, based on the findings from our study, we also suggest that interventions must move beyond a focus on individual officers and, instead, incorporate methods to detect and dissipate the effects of deviant police networks *within* police departments. Therefore, a call for greater transparency and accountability across agencies is raised so that officers are monitored and placed through training programs such as integrity testing that can insulate, identify, and then correct the behaviors of officers with a propensity for wrong-doing (e.g., Macintyre & Prenzler, 1999). A step further would be to isolate highly problematic officers that seem to be unresponsive to sanctions from their larger network of peers and provide interventions that account for the influence of both community-level and organizational correlates of misconduct.

Some of the policy recommendations and implications of our findings—such as increases to transparency and oversight— call for investments from cities and police departments. In some cases, like Chicago, such requirements are being wrapped into consent decrees and overseen by the court. Changes in the cultural aspects of the police worldview are also needed to help address the ways in which norms and learning unfold within departments and are likely to necessitate changes not readily discussed here. But many of the network interventions described earlier—such as the allocation of current officers by experience or history of use of force—do not require large-scale policy changes; these sorts of changes can be done at the management level within willing police departments. The sorts of data analyzed here can readily be gathered and analyzed from within management systems. The biggest challenge to this sort of network approach is the willingness of departments to dive into their own data (or build positive working relationships with researchers) to affect change.

ENDNOTES

[1] In important studies, however, scholars have examined the role of officer social networks in facilitating racial integration within police academies (e.g., Conti & Doreian, 2010; Doreian & Conti, 2012).

[2] For detailed information on these data, see Ba (2017) and Rozema and Schanzenbach (2018).

[3] Available at https://invisible.institute/police-data (Accessed September 8, 2018).

[4] Also see Fujimoto and Valente (2012) and Papachristos et al. (2015) for additional applications of network exposure models.

[5] We also estimated network exposure in our models as two direct effects: (1) the number of unique co-accused in an officer's network previously accused of use of force; and 2) the number of unique co-accused in an officer's network. The results were substantively similar to those reported in the article.

[6] As a sensitivity analysis, we also ran all models without this lagged variable. All substantive results remained the same as those reported in the article.

[7] Rank above police officer: Sergeant (12%), Detective (6%), Field Training Officer (2%), Lieutenant (2%), Captain (0.53%), ET (0.53%), Commander (0.35%), Agent (0.02%), and Chief (0.07%).

[8] Specialized units include gang-related units (53%), narcotics units (41%), special weapons and tactics (SWAT) (4%), and mobile strike force units (2%). We also estimated models using dummy variables for each specialized unit rather than classifying them into a single group; however, none of these variables were significantly associated with use of force complaints.

[9] Such a proposition is consistent with the core idea of social learning and differential association theory in that the frequency, duration, intensity, and priority of a tie relates to the probability of transmission. Relatedly, a foundational element of learning theory is instrumental conditioning and imitation, in that one's attitudes and behaviors are interconnected; thus, delinquency is learned and, thereby, repeated, with persons that predominantly comprise or control one's network and, in return, provide a source of reinforcement (see Akers, 1985, 1998; Cressey, 1955; Sutherland, 1947).

[10] Complaint records included information on complainant race for only a fraction of the incidents. When we focused only on use of force complaints, we found information on victim race was only available for 47% of all officer-complaint

observations. The results of a descriptive analysis of these complaints showed that 77% were made by Black citizens; however, the lack of information precluded us from including it in our models.

[11] Information on the complaint outcome was provided for less than half of all complaints. Of the 43,718 police-complaint observations, only 5% were reported as sustained, likely capturing a process issue rather than a reflection of guilt.

[12] Available at http://gis.chicagopolice.org/website/clearMap_crime_sums/viewer.htm?SUMTYPE=BEAT&SUMCATA=INDEX_&SUMTIME=365 (accessed on August 2, 2017).

[13] All variables load above 0.4 except for percent residents aged 18 years or younger (0.35). We selected a one-factor solution that resulted in an eigenvalue of 5.05.

[14] It should also be noted that officer-complaint records are nested within police beats, which are nested within police districts. We attempted to control for this by nesting officer-complaints within beats and districts in our frailty models; however, they did not converge. This does mean that there is a potential for biased standard errors and false-positives. We thus urge caution in the interpretation of these results.

[15] To effect model comparisons, we also reestimated the original model (Table 2, Model II) with only 40,773 police-observations. The log-likelihood of this model was –57,585.33 ($p < .001$) and Akaike information criterion (AIC) 120,129.53, which indicates that adding in measures of crime and collective disadvantage did not improve model fit.

[16] When we control for crime count and concentrated disadvantage, our results show that Hispanic officers are significantly more likely to be involved in recurrent use of force complaints. We attribute this, however, as an artefact of the data, rather than as capturing a significant relationship. According to bivariate analyses, individuals with missing data on this measure seem to be slightly different from individuals who have complete data. Hispanic officers were more likely to be recorded on complaints that had missing data on the police beat in which the incident occurred ($p < .01$), whereas White officers were more likely to be listed on complaints that had recorded data for the police beat ($p < .01$). Furthermore, Hispanic officers who had a use of force complaint, were *less* likely to be excluded ($p < .01$), whereas White officers with a use of force complaint were *more* likely to be excluded ($p < .01$).

[17] This limit characterizes much of the literature on co-offending in which scholars have relied on arrest data that only capture "deviant" peers rather than others in one's interpersonal networks.

[18] The CPD currently has multiple early warning systems in place and a history of adopting innovative and cutting-edge programs to identify problematic officers. In prior investigations of the CPD, however, scholars have suggested that although problem officers are easily identifiable, and often well known, there has been a failure to implement systematically diversion programs to correct officer behavior (Police Accountability Task Force, 2016). As with any early warning system, the effectiveness will be contingent on distinguishing between symbolic gestures of adoption versus commitment and buy-in from all levels of department in their implementation.

REFERENCES

Adams, K. (1999). What we know about police use of force. In *Use of force by police: Overview of national and local data*. Washington: National Institute of Justice.

Akers, R. L. (1985). *Deviant behavior: A social learning approach*. Belmont: Wadsworth.

Akers, R. L. (1998). *Social structure and social learning*. Los Angeles: Roxbury.

Alpert, G. P., & Dunham, R. G. (1997). *The force factor: Measuring police use-of-force relative to suspect resistance*. Washington: Police Executive Research Forum.

Andersen, P. K., & Gill, R. D. (1982). Cox's regression model for counting processes: A large sample study. *The Annals of Statistics*, *10*, 1100–1120.

Asch, S. H. (1968). *Police authority and the rights of the individual*. New York: Arco.

Ba, B. (2017). *Going the extra mile: The cost of complaint filing, accountability, and law enforcement outcomes in Chicago*. Retrieved from https://pdfs.semanticscholar.org/a7f1/6203f84304f725d8c5ee61a36db913fcd661.pdf

Baker, W. E., & Faulkner, R. R. (1993). The social organization of conspiracy: Illegal networks in the heavy electrical equipment industry. *American Sociological Review*, *58*, 837–860.

Baker, W. E., & Faulkner, R. R. (2003). Diffusion of fraud: Intermediate economic crime and investor dynamics. *Criminology*, *41*, 1601–1634.

Barker, T. (1977). Peer group support for police occupational deviance. *Criminology*, *15*, 353–366.

Baumer, E. P. (2002). Neighborhood disadvantage and police notification by victims of violence. *Criminology*, *40*(3), 579–616.

Bayley, D. H. (2002). Law enforcement and the rule of law: Is there a tradeoff? *Criminology & Public Policy*, *2*, 133–154.

Bazley, T. D., Lersch, K., & Mieczkowski, T. (2007). Officer force versus suspect resistance: A gendered analysis of patrol officers in an urban police department. *Journal of Criminal Justice*, *35*, 183–192.

Bearman, P. S., Moody, J., & Stovel, K. (2004). Chains of affection: The structure of adolescent romantic and sexual networks. *American Journal of Sociology*, *110*, 44–91.

Bloch, P. B., & Anderson, D. (1974). *Policemen on patrol: Final report*. Washington: Police Foundation.

Bobo, L. D., & Thompson, V. (2006). Unfair by design: The war on drugs, race, and the legitimacy of the criminal justice system. *Social Research: An International Quarterly*, *73*, 445–472.

Bor, J., Venkataramani, A. S., Williams, D. R., & Tsai, A. C. (2018). Police killings and their spillover effects on the mental health of black Americans: A population-based, quasi-experimental study. *The Lancet*, *392*, 302–310.

Bouchard, M., & Malm, A. (2016). Social network analysis and its contribution to research on crime and criminal justice. In *Oxford Handbooks Online*. Retrieved from https://www.oxfordhandbooks.com/view/10.1093/oxfordhb/9780199935383.001.0001/oxfordhb-9780199935383-e-21

Brandl, S. G., Stroshine, M. S., & Frank, J. (2001). Who are the complaint-prone officers? An examination of the relationship between police officers' attributes, arrest activity, assignment, and citizens' complaints about excessive force. *Journal of Criminal Justice*, *29*, 521–529.

Burt, R. S. (1987). Social contagion and innovation: Cohesion versus structural equivalence. *American Journal of Sociology*, *92*, 1287–1335.

Chappell, A. T., & Piquero, A. R. (2004). Applying social learning theory to police misconduct. *Deviant Behavior*, *25*, 89–108.

Cohen, B., & Chaiken, J. M. (1972). *Police background characteristics and performance*. New York: Rand Institute.

Conti, M., & Doreian, P. (2010). Social network engineering and race in a police academy: A longitudinal analysis. *Social Networks*, *11*, 30–43.

Conway, K. P., & McCord, J. (2002). A longitudinal examination of the relation between co-offending with violent accomplices and violent crime. *Aggressive Behavior*, *28*, 97–108.

Crank, J. P. (1993). Legalistic and order-maintenance behavior among police patrol officers: A survey of eight municipal police agencies. *American Journal of Police*, *12*, 103–126.

Crank, J. P. (1998). *Understanding police culture*. Cincinnati: Anderson.

Crank, J. P., & Caldero, M. A. (2000). *Police ethics: The corruption of noble cause*. Cincinnati: Anderson

Cressey, D. R. (1955). Changing criminals: The application of the theory of differential association. *American Journal of Sociology*, *61*, 116–120.

Davey, M., & Smith, M. (2015). Chicago protests mostly peaceful after video of police shooting is released. *The New York Times*. Retrieved from https://www.nytimes.com/2015/11/25/us/chicago-officer-charged-in-death-of-black-teenager-official-says.html

Decker, S. (1981). Citizen attitudes toward the police—A review of past findings and suggestions for future policy. *Journal of Police Science and Administration*, *9*, 80–87.

Delattre, E. J. (2002). *Character and cops: Ethics in policing*. Washington: American Enterprise for Public Policy Research.

Department of Justice. (2017). *Investigation of the Chicago Police Department*. Retrieved from https://www.justice.gov/opa/file/925846/download

Desmond, M., Papachristos, A. V., & Kirk, D. S. (2016). Police violence and citizen crime reporting in the Black community. *American Sociological Review*, *81*, 857–876.

Donner, C. M., & Jennings, W. G. (2014). Low self-control and police deviance: Applying Gottfredson and Hirschi's general theory to officer misconduct. *Police Quarterly*, *17*, 203–225.

Doreian, P., & Conti, N. (2012). Social context, spatial structure and social network structure. *Social Networks*, *34*, 32–46.

Edmundson, J. E. (1999). Mentoring programs help new employees. *FBI Law Enforcement Bulletin*, *68*, 16–18.

Fagan, J., & Geller, A. (2015). Following the script: Narratives of suspicion in *Terry* stops in street policing. *University of Chicago Law Review*, *82*, 51–88.

Fujimoto, K., & Valente, T. W. (2012). Social network influences on adolescent substance use: Disentangling structural equivalence from cohesion. *Social Science and Medicine*, *74*, 1952–1960.

Fyfe, J. J. (1988). Police use of deadly force: Research and reform. *Justice Quarterly*, *5*, 165–205.

Fyfe, J. J., & Kane, R. (2006). *Bad cops: A study of career-ending misconduct among New York City police officers*. Washington: Department of Justice. National Institute of Justice.

Getty, R. M., Worrall, J. L., & Morris, R. G. (2016). How far from the tree does the apple fall? Field training officers, their trainees, and allegations of misconduct. *Crime & Delinquency*, *62*, 821–839.

Gottfredson, M. R., & Hirschi, T. (1990). *A general theory of crime*. Stanford: Stanford University Press.

Gravel, J., & Tita, G. E. (2017). Network perspectives on crime. In H. N. Pontell (Ed.), *Oxford research encyclopedia of criminology and criminal justice*. New York: Oxford University Press.

Green, B., Horel, T., & Papachristos, A. V. (2017). Modeling contagion through social networks to explain and predict gunshot violence in Chicago, 2006 to 2014. *JAMA Internal Medicine*, *177*, 326–333.

Greene, J. R., Piquero, A. R., Hickman, M. J., & Lawton, B. A. (2004). *Police integrity and accountability in Philadelphia: Predicting and assessing police misconduct*. Washington: Department of Justice.

Guerette, R. T., Stenius, V. M. K., & McGloin, J. M. (2005). Understanding offense specialization and versatility: A reapplication of the rational choice perspective. *Journal of Criminal Justice*, *33*, 77–87.

Haarr, R. N. (2005). Factors affecting the decision of police recruits to "drop out" of police work. *Police Quarterly*, *8*, 431–453.

Harris, A. P. (2000). Gender, violence, race, and criminal justice. *Stanford Law Review*, *52*, 777–808.

Harris, C. J. (2010). *Pathways of police misconduct: Problem behavior patterns and trajectories from two cohorts*. Durham: Academic Press.

Haynie, D. L. (2001). Delinquent peers revisited: Does network structure matter? *American Journal of Sociology*, *106*, 1013–1057.

Haynie, D. L. (2002). Friendship networks and delinquency: The relative nature of peer delinquency. *Journal of Quantitative Criminology*, *18*, 99–134.

Haynie, D. L., & Kreager, D. A. (2013). Peer networks and crime. In F. T. Cullen & P. Wilcox (Eds.), *The Oxford handbook of criminological theory*. New York: Oxford University Press.

Herbert, S. (1998). Police subculture reconsidered. *Criminology*, *36*, 343–369.

Hickman, M. J., Piquero, N. L., & Piquero, A. R. (2004). The validity of Niederhoffer's cynicism scale. *Journal of Criminal Justice*, *32*, 1–13.

Hoffman, P. B., & Hickey, E. R. (2005). Use of force by female police officers. *Journal of Criminal Justice*, *33*, 145–151.

Horne, P. (1980). *Women in law enforcement*. Springfield: Charles C. Thomas.

Huff, J., White, M. D., & Decker, S. H. (2018). Organizational correlates of police deviance: A statewide analysis of misconduct in Arizona, 2000–2011. *Policing: An International Journal*, *41*, 465–481.

Illinois Compiled Statutes, 720 ILSC 5, § 33.3.

Ingram, J. R., Terrill, W., & Paoline, III, E. A. (2018). Police culture and officer behavior: Application of a multilevel framework. *Criminology*. Epub ahead of print. https://doi.org/10.1111/1745-9125.12192

Kane, R. J., & White, M. D. (2009). Bad cops: A study of career-ending misconduct among New York City police officers. *Criminology & Public Policy*, *8*, 737–769.

Kappeler, V. E., Sluder, R. D., & Alpert, G. P. (1998). *Forces of deviance: Understanding the dark side of policing*. Prospect Heights: Waveland Press.

Kelling, G. L., & Coles, C. M. (1996). *Fixing broken windows: Restoring order and reducing crime in our communities*. New York: Free Press.

Kirk, D. S., & Papachristos, A. V. (2011). Cultural mechanisms and the persistence of neighborhood violence. *American Journal of Sociology*, *116*(4), 1190–1233.

Klockars, C. B. (1980). The dirty Harry problem. *The ANNALS of the American Academy of Political and Social Science*, *452*, 33–47.

Koester, S., Glanz, J., & Barón, A. (2005). Drug sharing among heroin networks: Implications for HIV and hepatitis B and C prevention. *AIDS and Behavior*, *9*, 27–39.

Macintyre, S., & Prenzler, T. (1999). The influence of gratuities and personal relationships on police use of discretion. *Policing & Society: An International Journal*, *9*, 181–201.

Manning, P. K. (1977). *Police work: The social organization of policing*. Cambridge: MIT Press.

Matsueda, R. L. (1982). Testing control theory and differential association: A causal modeling approach. *American Sociological Review*, *47*, 489–504.

McCluskey, J. D., & Terrill, W. (2005). Departmental and citizen complaints as predictors of police coercion. *Policing*, *283*, 513–529.

McGloin, J. M., Sullivan, C., & Thomas, K. (2014). Peer influence and context: The interdependence of friendship groups, schoolmates and network density in predicting substance use. *Journal of Youth and Adolescence*, *43*, 1436–1452.

McLaughlin, E. C. (2015). Chicago officer had history of complaints before Laquan McDonald shooting. *CNN*. Retrieved from https://www.cnn.com/2015/11/25/us/jason-van-dyke-previous-complaints-lawsuits/index.html

Messerschmidt, J. (1993). *Masculinities and crime: Critique and reconceptualization of theory*. Lanham: Rowman & Littlefield.

Morash, M., & Greene, J. R. (1986). Evaluating women on patrol: A critique of contemporary wisdom. *Evaluation Review*, *10*, 230–255.

Moskos, P. (2008). *Cop in the hood: My year policing Baltimore's Eastern District*. Princeton: Princeton University Press.

Muir, W. K. (1977). *Police: Street corner politicians*. Chicago: The University of Chicago Press.

Papachristos, A. V. (2011). The coming of a networked criminology? In J. MacDonald (Ed.), *Measuring crime & criminality: Advances in criminological theory*. New Brunswick: Transaction.

Papachristos, A. V., Braga, A. A., & Hureau, D. M. (2012). Social networks and the risk of gunshot injury. *Journal of Urban Health*, *89*, 992–1003.

Papachristos, A. V., Braga, A. A., Piza, E., & Grossman, L. S. (2015). The company you keep? The spillover effects of gang membership on individual gunshot victimization in a co-offending network. *Criminology*, *53*, 624–649.

Papachristos, A. V., Wildeman, C., & Roberto, E. (2015). Tragic, but not random: The social contagion of nonfatal gunshot injuries. *Social Science & Medicine*, *125*, 139–150.

Pattillo, M. E. (1998). Sweet mothers and gangbangers: Managing crime in a black middle-class neighborhood. *Social Forces*, *76*, 747–774.

Police Accountability Task Force. (2016). *Recommendations for reform: Restoring trust between the Chicago Police and the communities they serve*. Retrieved from http://www.chicagopatf.org/

R Core Team. (2018). *R: A language and environment for statistical computing*. Austria: R Foundation for Statistical Computing. Retrieved from http://www.R-project.org/

Rabe-Hemp, C. E., & Schuck, A. M. (2005). Violence against police officers: Are female officers at greater risk? *Justice Quarterly*, *10*, 411–428.

Reiss, A. J. (1968). Police brutality-answers to key questions. *Society*, *58*, 10–19.

Reiss, A. J. (1973). *The police and the public* (Paperback). New Haven: Yale University Press.

Reiss, A. J., & Farrington, D. P. (1991). Advancing knowledge about co-offending: Results from a prospective longitudinal survey of London males. *Journal of Criminal Law & Criminology*, *82*, 360–395.

Roithmayr, D. (2016). The dynamics of excessive force. *The University of Chicago Legal Forum*, 407–436.

Rozema, K., & Schanzenbach, M. M. (2018). *Good cop, bad cop: Using civilian allegations to predict police misconduct* (Northwestern Institute for Policy Research Working Paper WP-18-21). Evanston: Northwestern Institute for Policy Research.

Sampson, R. J., Raudenbush, S. W., & Earls, F. (1997). Neighborhoods and violent crime: A multilevel study of collective efficacy. *Science*, *277*, 918–924.

Sastry, A., & Bates, K. G. (2017). When LA erupted in anger: A look back at the Rodney King riots. *NPR*. Retrieved from https://www.npr.org/2017/04/26/524744989/when-la-erupted-in-anger-a-look-back-at-the-rodney-king-riots

Savitz, L. (1970). The dimensions of police loyalty. *American Behavioral Scientist*, *13*, 693–704.

Schuck, A. M. (2014). Gender differences in policing: Testing hypotheses from the performance and disruption perspectives. *Feminist Criminology*, *9*, 160–185.

Sewell, A. A., & Jefferson, K. A. (2016). Collateral damage: The health effects of invasive police encounters in New York City. *Journal of Urban Health*, *93*, 42–67.

Sherman, L. W. (1980). Causes of police behavior: The current state of quantitative research. *Journal of Research in Crime and Delinquency*, *17*, 69–100.

Sierra-Arévalo, M. (2016). American policing and the danger imperative. https://doi.org/10.2139/ssrn.2864104

Silverman, E. B., & O'Connell, P. E. (1999). Organizational change and decision making in the New York City Police Department: A case study. *International Journal of Public Administration*, *22*, 217–259.

Skolnick, J. H. (1966). *Justice without trial*. New York: Wiley.

Skolnick, J. H., & Fyfe, J. J. (1993). *Above the law: Police and the excessive use-of-force*. New York: Free Press.

Smith, M., Williams, T., & Davey, M. (2018). 'Justice for Laquan!' demonstrators chant, as Chicago officer is convicted of murder. *The New York Times*. Retrieved from https://www.nytimes.com/2018/10/05/us/van-dyke-guilty-laquan-mcdonald.html

Sunshine, J., & Tyler, T. R. (2003). The role of procedural justice and legitimacy in shaping public support for policing. *Law & Society Review*, *37*, 513–548.

Sutherland, E. H. (1947). *Principles of criminology* (4th ed). Chicago: Lippincott.

Tankebe, J. (2009). Self-help, policing, and procedural justice: Ghanaian vigilantism and the rule of law. *Law & Society Review*, *43*, 245–270.

Taylor, F. G. (2013). The Chicago police torture scandal: A legal and political history. *CUNY Law Review*, *17*, 329.

Terrill, W., & Mastrofski, S. D. (2002). Situational and officer based determinants of police coercion. *Justice Quarterly*, *19*, 101–134.

Terrill, W., & Reisig, M. D. (2003). Neighborhood context and police use of force. *Journal of Research in Crime and Delinquency*, *40*, 291–321.

Therneau, T. M. (2015). *A package for Survival analysis in S*, version 2.38. Retrieved from https://CRAN.R-project.org/package=survival

Therneau, T. M., & Grambsch, P. M. (2000). *Modeling survival data: Extending the Cox model*. New York: Springer-Verlag.

Toch, H. (1995). The ''violence-prone'' police officer. In W. A. Geller & H. Toch (Eds.), *And justice for all: Understanding and controlling police abuse of force*. Washington: Police Executive Research Forum.

Tyler, T. R. (2004). Enhancing police legitimacy. *The ANNALS of the American Academy of Political and Social Science*, *593*, 84–99.

Tyler, T. R., & Huo, Y. J. (2002). *Trust in the law: Encouraging public cooperation with the police and courts*. New York: Russell-Sage Foundation.

Tyler, T. R., & Wakslak, C. J. (2004). Profiling and police legitimacy: Procedural justice, attributions of motive, and acceptance of police authority. *Criminology*, *42*, 253–282.

Valente, T. W. (1996). Social network thresholds in the diffusion of innovations. *Social Networks*, *18*, 69–89.

Valente, T. W. (2005). Network models and methods for studying the diffusion of innovations. In P. Carrington, J. Scott, & S. Wasserman (Eds.), *Models and methods in social network analysis*. Cambridge: Cambridge University Press.

Venkatesh, S. A. (2006). *Off the books: The underground economy of the urban poor*. Cambridge: Harvard University Press.

Wald, J. (2018). Chicago cop Jason Van Dyke's record was a warning sign. *The Marshall Project*. Retrieved from https://www.themarshallproject.org/2018/10/28/warning-signs-were-clear-before-laquan-mcdonald-s-murder

Walker, S., Alpert, G. P., & Kenney, D. J. (2001). *Early warning systems: Responding to the problem police officer*. Washington: National Institute of Justice.

Warr, M. (2002). *Companions in crime: The social aspects of criminal conduct*. Cambridge: Cambridge University Press.

Warr, M., & Stafford, M. (1991). The influence of delinquent peers: What they think or what they do? *Criminology*, *29*, 851–866.

Waugh, L., Ede, A., & Alley, A. (1998). Police culture, women police and attitudes towards misconduct. *International Journal of Police Science & Management*, *1*, 288–300.

Weerman, F. M. (2003). Co-offending as social exchange: Explaining characteristics of co-offending. *British Journal of Criminology*, *43*, 398–416.

Weisburd, D. L., Greenspan, R., Hamilton, E. E., Williams, H., & Bryant, K. A. (2000). *Police attitudes toward abuse of authority: Findings from a national study*. Washington: National Institute of Justice.

Westley, W. A. (1970). *Violence and the police: A sociological study of law, custom, and morality*. Cambridge: MIT Press.

Wilson, J. Q. (1968). *Varieties of police behavior: The management of law and order in eight communities*. Cambridge: Harvard University Press.

Wolfe, S. E., & Piquero, A. R. (2011). Organizational justice and police misconduct. *Criminal Justice and Behavior*, *38*, 332–353.

Worden, R. E. (1995). Police officers' belief systems: A framework for analysis. *American Journal of Police*, *14*, 49–81.

AUTHOR BIOGRAPHIES

Marie Ouellet is an assistant professor in the Department of Criminal Justice and Criminology at Georgia State University. Her research is focused on co-offending, illicit networks, and criminal groups. Her recent work has been published in *Criminology, Journal of Research in Crime and Delinquency, and Social Networks*.

Sadaf Hashimi is a doctoral student in the School of Criminal Justice at Rutgers University. Her research is primarily focused on peer influence and crime, violence prevention, and the consequences of criminal justice contact.

Jason Gravel is a postdoctoral fellow at the University of Pennsylvania Injury Science Center. Through his research, he seeks to understand the role social networks play in facilitating criminal behavior, the organization of street gangs, and urban violence. His recent work has been published in *Journal of Quantitative Criminology, Justice Quarterly, Crime and Delinquency*, and *Injury Prevention*.

Andrew V. Papachristos is a professor of sociology at Northwestern University and a faculty fellow at the Institute for Policy Research. His research is aimed at understanding how the connected nature of cities—how their citizens, neighborhoods, and institutions are tied to one another—affect what we feel, think, and do.

How to cite this article: Ouellet M, Hashimi S, Gravel J, Papachristos AV. Network exposure and excessive use of force: Investigating the social transmission of police misconduct. *Criminol Public Policy*. 2019;18:675–704. https://doi.org/10.1111/1745-9133.12459

APPENDIX

TABLE A Correlation matrix ($N = 43{,}718$ officer-complaint observations)

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1 Use of force	1	—														
2 Male	0.06	1	—													
3 White	0.00	0.06	1	—												
4 Black	−0.02	−0.12	−0.58	1	—											
5 Hispanic	0.01	0.03	−0.54	−0.29	1	—										
6 Other	0.01	0.04	−0.18	−0.10	−0.09	1	—									
7 Tenure	−0.10	0.01	0.00	0.10	−0.08	−0.05	1	—								
8 Rank	0.03	−0.03	−0.13	0.07	0.07	0.03	−0.36	1	—							
9 Special unit	0.00	0.08	0.02	−0.03	0.01	−0.02	−0.10	0.09	1	—						
10 *N* solo	0.01	0.01	−0.09	0.13	−0.03	0.01	0.20	0.01	−0.07	1	—					
11 *N* prior UOF	0.07	0.13	0.02	−0.04	0.02	0.00	−0.05	0.06	0.07	0.49	1	—				
12 Incident year	−0.10	−0.03	−0.02	0.00	0.02	0.01	0.21	0.04	−0.05	0.21	0.23	1				
13 *N* co-accused	−0.10	0.08	0.06	−0.09	0.02	−0.01	−0.05	−0.05	0.21	−0.20	−0.03	−0.11	1	—		
14 % Female	−0.07	−0.79	−0.08	0.13	−0.03	−0.03	0.02	0.02	−0.10	0.00	−0.11	0.03	−0.09	1	—	
15 % Same race	−0.01	0.03	0.24	−0.06	−0.16	−0.15	−0.10	0.03	0.03	−0.21	0.01	−0.03	0.15	−0.03	1	—
16 Tenure (mean)	−0.07	0.02	0.06	−0.06	−0.01	−0.01	0.13	−0.03	0.06	−0.21	−0.01	0.11	0.33	−0.03	0.39	1
17 Exposure to UOF	0.05	0.09	0.02	−0.05	0.03	−0.01	−0.12	0.06	0.05	0.07	0.39	0.25	−0.02	−0.08	0.04	0.01

Note. UOF = use of force.

TABLE B Correlation matrix ($N = 40{,}773$ officer-complaint observations)

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1 Use of Force	1	—																
2 Male	0.06	1	—															
3 White	0.00	0.06	1	—														
4 Black	−0.02	−0.12	−0.59	1	—													
5 Hispanic	0.01	0.03	−0.54	−0.29	1	—												
6 Other	0.01	0.04	−0.18	−0.10	−0.09	1	—											
7 Tenure	−0.09	0.01	0.00	0.10	−0.09	−0.05	1	—										
8 Rank	0.02	−0.03	−0.13	0.07	0.07	0.03	−0.36	1	—									
9 Special unit	0.00	0.08	0.02	−0.03	0.01	−0.02	−0.10	0.09	1	—								
10 *N* solo	0.01	0.01	−0.09	0.14	−0.03	0.01	0.21	0.00	−0.06	1	—							
11 *N* prior UOF	0.07	0.13	0.02	−0.04	0.02	0.00	−0.05	0.06	0.07	0.49	1	—						
12 Incident year	−0.10	−0.03	−0.02	0.00	0.02	0.01	0.22	0.04	−0.05	0.22	0.23	1	—					
13 Crime count	0.01	0.01	−0.07	0.10	−0.02	−0.01	−0.09	0.00	0.04	0.00	0.03	0.01	1	—				
14 Concentrated disadvantage	0.01	0.02	−0.09	0.12	−0.01	−0.03	−0.19	0.01	0.14	−0.02	0.07	−0.04	0.23	1	—			
15 *N* co-accused	−0.11	0.08	0.06	−0.09	0.02	−0.01	−0.04	−0.05	0.21	−0.20	−0.03	−0.12	0.01	0.14	1	—		
16 % Female	−0.07	−0.79	−0.08	0.13	−0.03	−0.03	0.02	0.02	−0.10	0.01	−0.12	0.03	−0.01	−0.03	−0.09	1	—	
17 % Same race	−0.01	0.03	0.24	−0.06	−0.17	−0.15	−0.10	0.03	0.03	−0.21	0.01	−0.03	0.02	0.05	0.14	−0.03	1	—
18 Tenure (mean)	−0.08	0.02	0.06	−0.06	−0.01	−0.01	0.14	−0.02	0.06	−0.20	−0.01	0.12	−0.05	−0.05	0.32	−0.03	0.38	1
19 Exposure to UOF	0.05	0.09	0.02	−0.05	0.03	−0.01	−0.12	0.06	0.05	0.07	0.39	0.25	0.05	0.09	−0.02	−0.08	0.04	0.01

Note. UOF = use of force.

TABLE C Summary statistics for measure of concentrated disadvantage

Variables	Mean	SD	Minimum	Maximum
Single female households (%)	0.22	0.13	0.04	0.43
18-year-old or less (%)	0.23	0.07	0.08	0.31
Receiving food stamps (%)	0.18	0.11	0.05	0.37
Black (%)	0.42	0.37	0.01	0.97
Below poverty line (%)	0.23	0.09	0.09	0.43
Unemployed (%)	0.13	0.06	0.05	0.29
Concentrated disadvantage	0.00	2.30	−3.25	4.47

Note. SD = Standard deviation.

TABLE D Frailty models assessing the influence of colleagues accused of misconduct on officer use of force complaints with controls for beat and district-level indicators[a]

Variables	HR	95% CI
Officer		
Gender (1 = Male)	1.19*	1.03–1.39
Race (ref = White)		
Black	0.99	0.91–1.08
Hispanic	1.10*	1.01–1.20
Other	1.02	0.83–1.25
Tenure	0.88***	0.86–0.89
Tenure^2[b]	1.28***	1.22–1.34
Rank (1 = Officer)	0.91*	0.83–0.99
Special unit	1.04	0.94–1.15
N solo complaints	1.06***	1.04–1.08
N prior UOF complaints	0.94***	0.92–0.96
Incident year	0.38***	0.37–0.40
Crime count (beat-level)	1.05	0.97–1.12
Concentrated disadvantage (district-level)	1.02*	1.00–1.03
Misconduct Network		
N co-accused	0.91***	0.90–0.92
Female (%)	0.57***	0.48–0.67
Same race (%)	1.01	0.95–1.08
Tenure (mean)	1.00	0.99–1.00
Exposure to UOF[c]	1.69***	1.54–1.85
Theta	0.65	
N observations	40,773	
N officers	8,430	
LL	−57,593.98***	
AIC	120,122.16	

Note. AIC = Akaike information criterion; HR = hazard ratio; CI = confidence interval; LL = log-likelihood;; UOF = use of force.

[a]HR = exp(*b*).

[b]Tenure squared was divided by 100 to facilitate interpretation.

[c]Proportion co-accused with prior use of force complaint.

*$p < .05$. **$p < .01$. ***$p < .001$ (two-tailed).