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The Network Structure of Police Misconduct

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Abstract

Conventional explanations of police misconduct generally adopt a microlevel focus on deviant officers or a macrolevel focus on the top-down organization of police departments. Between these levels are social networks of misconduct. This study recreates these networks using data on 16,503 complaints and 15,811 police officers over a six-year period in Chicago. We examine individual-level factors associated with receiving a complaint, the basic properties of these misconduct networks, and factors related to officer co-naming in complaints. We find that the incidence of police misconduct is associated with attributes including race, age, and tenure and that almost half of police officers are connected in misconduct ties in broader networks of misconduct. We also find that certain dyadic factors, especially seniority and race, strongly predict network ties and the incidence of group misconduct. Our results provide actionable information regarding possible ways to leverage the co-complaint network structure to reduce misconduct.

Keywords

police misconduct, social networks, complaints, policing, deviance

Explanations of police misconduct are generally divided into two theories: "bad apples" and "bad institutions." At the individual level, bad-apple theories stress that police misconduct is related to officer-level factors, such as age, race, gender, education, temperament, and experience (Paoline and Terrill 2007; McElvain and Kposowa 2008). From this perspective, misconduct happens because specific individuals violate the primary function of policing itself; such officers are seen as "deviants" and believed to represent a small fraction of police. At the organizational level, the bad-institutions approach focuses on top-down features of the department, including authoritarian police culture; organizational features of police departments, such as officer diversity and hiring practices; and the racist and racialized history of policing (Silver et al. 2017; Huff, White, and Decker 2018; Ray, Ortiz, and Nash 2018). Some scholars have even argued that policing is designed as a means to control marginalized groups and maintain white supremacy (Soss and Weaver 2017).

In between the individual level and the larger organizational level reside the social networks in which officers work and socialize. As with other deviant behavior, police misconduct is most likely a learned behavior acquired from others while "on the job." Social networks are central to the learning of deviant behaviors in various organizational contexts, including business (Baker and Faulkner 1993), peer groups and schools (Haynie 2001; Haynie and Osgood 2005), and street gangs (Fleisher and Krienert 2004). Ethnographic accounts find that the socialization of police occurs less in formalized settings, such as the academy, and more through informal interactions with colleagues in the squad car, on the beat, and in the precinct house (Getty, Worrall, and Morris 2014). Nevertheless, few if any studies have analyzed the network structures that emerge within departments in the course of routine policing, despite the potential for such networks to influence and contribute to misconduct.

This study investigates three questions related to networks of police misconduct. First, which individual-level factors determine whether an officer receives a complaint? Second, what are the basic properties of police misconduct networks? And third, which officer attributes—such as race, gender, and tenure as an officer—are associated with the formation of a deviant tie within such networks?

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To answer these questions, we investigate networks of police misconduct in Chicago, Illinois. Rather than focusing only on high-profile instances of abuse or misconduct, we aim to understand the structure of misconduct across the entire police department by investigating all incidents of alleged misconduct. Drawing on publicly available data, we recreate "misconduct networks" by linking individual officers who were named together in complaints during a six-year period. The resulting misconduct networks include 9,225 unique officers named in 16,503 complaints.

We first examine the receipt of civilian-facing and department-facing complaints among all officers in the Chicago Police Department (CPD), estimating the marginal effect of gender, race and ethnicity, age, and tenure on the count of complaints received. Then, we analyze the structural properties of the co-complaint networks. Our results reveal large network structures of misconduct and uneven levels of involvement among officers: although most officers have a few misconduct ties, a smaller number of officers are embedded in structures of misconduct and abuse that contain a large number of officers. We then model the influence of officer attributes on the probability that any two officers will be connected in an instance of misconduct. Our results show that the incidence of police misconduct involving more than one officer is significantly associated with individual-level attributes, including gender, race, and tenure. We also find that certain dyadic factors are strongly associated with observed patterns of co-misconduct. In particular, pairs of officers that differ greatly in seniority are less likely to be co-named in misconduct complaints, while pairs of black officers are more likely to be co-named. Understanding how officer attributes and inclusion in networks contribute to police misconduct may provide new insights for police reform.

Individuals, Institutional Culture, and Networks

Individual Factors

Earlier work on police misconduct has focused on individual characteristics of officers to explain the incidence of misconduct, including age, race, gender, education, experience, and a range of social and psychological factors. Several themes emerge from prior research. Female officers are less likely to engage in misconduct (Lersch 1998a), less likely to use weapons or cause injury during use-of-force situations (Rabe-Hemp 2008), and receive fewer complaints as compared to their male peers (Lersch 1998a; Rabe-Hemp 2008; Schuck and Rabe-Hemp 2014; Porter and Prenzler 2017). Tenure is associated with misconduct, with younger and less experienced officers receiving more complaints—especially use-of-force complaints—than older and more experienced officers (Chappell and Piquero 2004; McElvain and Kposowa 2008). Psychological factors also appear relevant: in some research, officer misconduct is associated with antisocial behavior and personality factors, such as low self-control (Donner and Jennings 2014; Donner, Fridell, and Jennings 2016) and an "authoritarian personality" (Henkel, Sheehan, and Reichel 1997).

Findings on the association between the race and ethnicity of an officer and misconduct are mixed. Some studies have found higher rates of complaints among black officers (Reiss 1968; Cohen and Chaiken 1972; Fyfe 1981; Kane and White 2009). In part, these findings may stem from the unique situation black officers find themselves in "on the job." Unlike their white counterparts, black officers are faced with the dilemma of having to choose or vacillate between their racial identities and their identities as police officers—they must choose between acting "black or blue" (Weitzer 2000; Bolton and Feagin 2004). Weitzer (2000) and others (Alex 1969; Leinen 1984; Moskos 2008) find that black officers become decidedly more "blue" once joining the force and may even become "hard-liners," acting more aggressively toward black civilians to demonstrate their commitment to their blue identities. Other research finds either no difference between black and nonblack officers or that black officers receive fewer complaints on average than their white counterparts (Brandl, Stroshine, and Frank 2001; Wolfe and Piquero 2011). Several studies also note that black officers are more rarely implicated in serious misconduct, such as use of force or involvement in shootings (Fyfe 1988; Terrill and McClusky 2002; Terrill 2005; McElvain and Kposowa 2008). Rather than acting more harshly to prove their "blue" identities, these studies instead contend that black officers engage in less abusive and more supportive actions precisely because of their shared experiences and understanding of the communities that they police (Decker and Smith 1980; Sun and Payne 2004).

Ecological and contextual factors can shape the effect of race on misconduct. In particular, nonwhite officers are more likely to be assigned to high-crime communities, where they might encounter situations that place them in direct conflict with civilians more often (Kane 2006). High-crime communities tend to display more legal cynicism and mistrust in the police, and accordingly, residents in such areas may avoid the police or file complaints against the police at higher rates (Sampson and Bartusch 1998; Kirk and Papachristos 2011; Desmond, Papachristos, and Kirk 2016; Ba 2017; Faber and Kalbfeld forthcoming). In some situations, then, what may be perceived as a racial effect might, in fact, be a larger set of institutional, historical, and political factors that generate massive inequalities in police contact across neighborhood, racial, and class dimensions (Kohler-Hausmann 2013).

Organizational Characteristics and Police Culture

Police departments in the United States vary tremendously in size, recruitment practices, training, and education, and such organizational features can influence rates of police misconduct. Research suggests that the size of a police

department—most often measured as the number of officers—can have both positive and negative effects on reported police misconduct (Eitle, D'Alessio, and Stolzenberg 2014). The presence of oversight and accountability mechanisms within departments is associated with lower levels of misconduct. For example, Jennings and Rubado (2017) found a significant drop in homicides when department policy required officers to file reports every time they drew their weapons. Such effects appear larger when the oversight and accountability processes are seen as fair by officers themselves (Wolfe and Piquero 2011). Increasingly, evidence suggests that departmental commitment to professionalism, education, and continued training are associated with lower levels of misconduct (Kane and White 2009).

As in the individual-level research, evidence is mixed on whether department racial and ethnic diversity is associated with misconduct. On the one hand, several studies find that greater racial and ethnic diversity among officers—especially greater percentages of black officers—is associated with fewer complaints, fewer instances of abuse and misconduct, and less racial profiling (Cao, Deng, and Barton 2000; Nicholson-Crotty, Nicholson-Crotty, and Fernandez 2017). The extent of police diversity may even impact police-involved shooting. Legewie and Fagan (2017) find fewer police shootings of black civilians in departments with a greater percentage of black officers. On the other hand, some studies have found no relationship between the percentage of black officers in a department and rates of civilian complaints, misconduct, and even police-involved shootings (Cao et al. 2000; B. Smith 2003).

Police culture is commonly associated with patterns of police abuse and misconduct. Research suggests that police culture is unified by a unique worldview that includes a strong sense of solidarity and in-group protection of department members (Kappeler, Sluder, and Alpert 1998). Police culture also focuses intensely on safety and, in particular, the real and perceived risks associated with the job of policing (Moskos 2008). According to Sierra-Arévalo (2016), this preoccupation with safety and danger is associated with an "us-versus-them" mentality that stresses the protection of in-group members (Skolnick and Fyfe 1993).

Police organizations and culture are also distinctive in their hierarchical structure and bureaucratization. Officers are constrained by the chain of command and are expected to follow orders and to implement new initiatives at the direction of their superiors. Incentives to conform to authority are high: an officer's performance review, compensation, and promotion are tied to following orders (Moskos 2008; Sierra-Arévalo 2018). Uniforms, ranks, chains of command, and even police jargon translate into precise practices that privilege an "authoritarian personality," which itself has been associated with aggressive behaviors (Henkel et al. 1997; Skolnick 2010). Several studies have documented a department's or an officer's commitment to "traditional police culture" as a correlate of inappropriate police behavior ranging from rudeness to the excessive and illegal use of force (Westley 1970, Van Maanen 1978, Terrill, Paoline, and Manning 2003). From this perspective, a "blue code of silence" develops that privileges conformity to—and punishes deviance from—police culture (Skolnick 2002). At an extreme, the primacy of police culture has been associated with a reduced likelihood that an officer will report a colleague's sexual misconduct or alcohol and drug abuse (Klockars et al. 2000; Rabe-Hemp and Braithwaite 2012).

Networks

Between the microlevel theories of atomized individuals and the macrolevel theories of organizational culture lies a "meso-level" explanation of police misconduct: an officer learns to engage in misconduct from other officers in his or her social network. Criminologists and sociologists have long recognized that deviance is a group behavior, that such behavior is learned, and that learning takes place within peer networks (Sutherland 1947; Haynie 2001).[1] Individuals are exposed to and learn deviant behaviors and norms as part of group processes, such as socialization, fear of ridicule, status seeking, and conformity, and such network learning can occur in a variety of contexts, such as in school, in the workplace, and through informal peer associations (Haynie 2001, 2002; Haynie and Payne 2006; Payne and Cornwell 2007; McGloin and Shermer 2009). A growing body of research has used formal network models to assess how various aspects of network structure influence patterns of deviance. This research demonstrates that the structure of social networks—and an individual's placement within that structure—can affect a range of behaviors, including bullying, self-harm, and self-reported delinquency, and even the probability of being a victim of gun violence (Green, Horel, and Papachristos 2017).

Police misconduct easily fits within such a network context. (Chappell and Piquero 2004; Roithmayr 2016). Police officer networks are shaped by larger organizational and cultural forces as well as individual behaviors. For example, the hierarchical organization of policing means that police officers typically do not choose with whom they work or their work assignments but are assigned partners instead. Thus, one of the most important relationships in the policing work environment—the person with whom an officer patrols and whom they entrust with their safety—is largely determined by someone higher up the chain of command. Likewise, most police work is divided into geographical units that include beats, districts, areas, or zones. An officer's assignment to a geographical unit thus shapes his or her potential network partners as well as the civilians encountered in the officer's daily routines.

[1]For an extended review of some of the basic underlying principles of a networked approach to criminology, see Papachristos (2011).

Officers also learn social norms informally from officers within their networks (Alpert and Dunham 2007). Early in police socialization, older, more experienced officers will tell new recruits that "real policing" is not learned in the academy (Skolnick and Fyfe 1993; Moskos 2008). Ethnographic research shows that officer networks provide information about rules of behavior, model the behavior to be learned, and provide positive (or negative) reinforcement of behaviors. Field training officers (FTOs), who are responsible for "on-the-job training" of new recruits, have been found to exert substantial influence on behavior; one study found that roughly one-quarter of the variation in new police officers' allegations of misconduct was attributable to FTOs (Getty et al. 2014). Savitz (1970) documented the dynamic nature of informal social learning among officers: as recruits graduate from the rules of behavior taught at the police academy to those modeled in departments, officers' attitudes become more permissive to match the views of their departmental colleagues. Even small changes in informal situations can have a profound impact on behavior and attitudes. In a network study of police training, Conti and Doreian (2010) found that seating patterns among recruits and the development of friendships could be more consequential in their impact on attitudes surrounding race and diversity than formal training protocols. It is within the informal networks that emerge through routine police activity that misconduct may be learned and adopted and the culture of the "blue brotherhood" develops.

Importantly, officers with whom one might engage in misconduct are a subset of larger professional and personal networks. As mentioned earlier, police networks in the workplace are highly constrained by organizational hierarchies, and as such, policies and rules beyond any single officer's control determine possible pools of partners and coworkers —some of whom might be possible co-complaint recipients. In this sense, police networks are perhaps even more structured than, say, peer networks in a school. Officers, of course, have agency within such structures and might very well make careful considerations of engaging in misconduct with only certain others, such as long-time partners or those with whom they also have a strong personal relationship. Unfortunately, our lack of noncomplaint ties precludes us from differentiating whether or not the observed complaint ties derive purely from other work-related networks or the mechanisms driving misconduct more broadly (e.g., social learning, imitation). Future research should give more serious consideration to collecting and analyzing other types of ties as well as information on the opportunity structure for misconduct. In the present study, we are interested in the observed patterns of misconduct within the reported complaints during the time period.

Studying Police Misconduct in Chicago

The closed nature of policing makes studying police behavior, especially deviant and informal behavior, difficult. Police officers are generally forbidden from talking with the press or researchers without the explicit permission of superiors. Even when researchers obtain permission to interview police or administer surveys, police often display mistrust toward researchers who ask sensitive questions about the behavior and attitudes of fellow officers. The police "code of silence" does not look kindly upon "rats" or "snitches," and officers fear that their answers will be reported back to their superiors (Skogan 2015).

One approach to studying misconduct is to examine formal complaints filed against police officers (Lersch 1998a; Terrill and McClusky 2002; Kane and White 2009; Rozema and Schanzenback 2018). Most departments allow for civilians and officers to file complaints relating to officer conduct. Such complaints often contain detailed information about the nature of misconduct and the officers involved.

The use of complaint data is not without limitations. First, complaints suffer from potential underreporting problems, with some researchers suggesting that only one-third of all people who believe they were mistreated by police filed a complaint (Walker and Bumphus 1992). Relatedly, the process of filing a complaint itself can be intimidating or complicated and can discourage individuals from filing, as can the fear of interacting with the police for people who are undocumented or have criminal records (Ba 2017). Second, complaints are not a straightforward measure of misconduct. Indeed, past research has interpreted complaint data in at least three ways. One approach interprets complaints as a civilian's perspective on police behavior. However, a behavior a civilian believes to be misconduct may not necessarily be a behavior that violates any law, rule, or regulation. A second approach suggests that complaint data might represent officer "activity" rather than misconduct per se (Lersch 2002). For example, several studies observe that officers placed in high-crime areas employing proactive policing strategies are more likely to receive complaints, even if those complaints cannot be linked to actual misconduct (Lersch 1998b; Terrill and McClusky 2002). As Terrill and McClusky (2002:145) note, "The surest way not to receive a complaint is to do little or no police work; or, to avoid probing or dealing with situations where conflict is likely (e.g., chasing drug dealers)." A third interpretation is that complaints indeed measure misconduct, although not necessarily extensively.

Limitations notwithstanding, the premise of our study is that complaints are a reasonable proxy for police misconduct. While complaint data likely underestimate the true extent of misconduct and plausibly capture both officer activity and civilian perceptions, there is evidence that complaints do in fact capture instances of problematic police behavior and misconduct (Terrill and Ingram 2016), including a relationship between civilian complaints and future civil litigation (Rozema and Schanzenback 2018) and a strong correlation between civilian-filed complaints and

complaints filed by the internal affairs office within police departments (Lersch and Mieczkowski 2000).

Data

This study uses two sources of data: complaints filed against officers in the CPD from January 2010 to June 2016 and roster data on all officers who were active in the CPD during this time period. The complaints and roster data are part of a larger data set obtained by the Invisible Institute through a series of Freedom of Information Act and litigation requests and subsequently made available to the public.[2]

The roster data contain the date of appointment to the CPD and the date on which that appointment ended, date of birth, gender, and race and ethnicity for each of the 15,811 officers who were active for at least part of 2010 through 2016. Table 1 summarizes the officer-level attributes. Gender has two values: male (76.5 percent) and female (23.5 percent). Race and ethnicity have five values: white (53.2 percent), black (23.7 percent), Hispanic (20.2 percent), Asian and Pacific Islander (2.6 percent), and Native American and Alaskan Natives (0.3 percent). Due to the small proportion of officers in the latter two categories, we collapsed these into a single category, "Hispanic and other."[3] We combined the roster and complaints data to calculate a count of civilian complaints and department complaints received by each officer.

Each complaint identifies the officers involved in an incident of alleged misconduct and includes a complaint category indicating the type of behavior to which the complainant objects (e.g., use of force or verbal abuse). While the full data cover a longer time span, in order to restrict the co-complaint networks to a manageable size, our study analyzes the 16,503 complaints from 2010 to 2016 that named at least one officer who was assigned to a district unit. We categorized each complaint as either civilian facing (63.0 percent) or department facing (37.0 percent) according to whether the event was related to an interaction with a civilian or a department-related matter. Examples of civilian-facing complaints include allegations of verbal abuse, use of force, or illegal search, while department-facing complaints include allegations of tardiness, drug abuse, lost weapons, and other operations and personnel violations.

To map networks of police misconduct, we generate a network tie between officers who are named together as participants in the alleged misconduct in the same complaint. In network parlance, the "actors" are the officers who are "tied" through a complaint. Officers who were named in a complaint but who were not co-named alongside another officer during the time period under study are isolates in the network.[4] Officers who were not named in a complaint are not included in the misconduct networks.

Table 1. Officer Attributes of the Chicago Police Department, 2010 to 2016.

Attribute	Value
N	15,811
Gender	
Male	77%
Female	23%
Race and ethnicity	
White	53%
Black	24%
Hispanic and other	23%
Tenure	
Mean year appointed (25th percentile, 75th percentile)	1997 (1991, 2005)
Age	
Mean age (25th percentile, 75th percentile)	47 (39, 55)

In the present analyses, we constructed a civilian-facing complaint network and a department-facing complaint network for each of the city's 22 police districts, totaling 44 distinct co-complaint networks. We construct the networks in this way because districts play a central role in organizing officer interactions. In Chicago, officers are paired with partners and assigned to beats based entirely on their district of service. Although individual officers sometimes move across districts during the course of their careers, their daily interactions and assignments are entirely determined by their district assignments. On rare occasions, officers work directly with officers from different districts, for example, when working within a special unit, such as the gang unit. Although a total of 29,413 complaints were filed during 2010 through 2016, 11,202 of these complaints did not name an officer, and a further 1,708 either did not have a civilian- or department-facing classification or named an officer who was assigned to a special unit. The 12,910 complaints that did not identify an officer in a district unit or specify whether the conduct was civilian or department related were excluded from the analysis, leaving 16,503 complaints in the final analysis.

Method

Our analysis unfolds in three stages. First, we undertake individual-level analysis to estimate the marginal effect of

[2]See http://invisible.institute/police-data.

[3]Collapsing the race and ethnicity categories is necessary due to the sparsity of within-group ties for Asian and Pacific Islanders and Native American and Alaskan Natives, of which there are often zero within a Chicago Police Department district, which does not permit estimation of a race homophily term in our network models.

[4]In this study, co-complaints are analyzed as unweighted edges. An alternative approach would be to model valued edges where co-complaint ties are weighted according to the frequency of co-complaints in which an officer pair was co-named.

gender, tenure, and race and ethnicity on the frequency of civilian-facing and department-facing complaints received by each officer in the CPD, for all officers who were active during 2010 through 2016. Second, we present descriptive statistics on the civilian-facing and department-facing co-complaint networks to examine the extent to which misconduct is a networked phenomenon and, if so, to understand the basic structural properties of the district-level networks. Third, we investigate the officer covariates that predict co-complaint ties between officers in each district-level civilian and department co-complaint network. The second and third stages include only officers who received a complaint while assigned to a district unit; officers who did not receive a complaint are excluded from the co-complaint analysis.

Individual-Level Complaint Analysis

We use a Bayesian negative binomial model (Bürkner 2017) to estimate the marginal effects of gender, race and ethnicity, age, and tenure (measured as the year of appointment to the CPD) on the frequency of civilian-facing complaints received per year. The outcome variable in the negative binomial model is a count of civilian complaints received for each officer in the period 2010 to 2016. We include all CPD officers who were active for at least part of the 2010-to-2016 period, including those who did not receive a compliant within this period, using the length of time that each officer was at risk of receiving a complaint as an offset. This enables the estimation of a rate of complaints per year. We then estimate the same model for department-facing complaints. The model gauges how the frequency of complaints differs across officers according to their attributes. For example, we can use the model to assess whether male officers typically receive more civilian-facing complaints than female officers.

Co-complaint Analysis

For the co-complaint analysis, we estimate a Bayesian exponential random graph model (BERGM) for each district-level civilian and department co-complaint network. Under the BERGM framework (Caimo and Friel 2011), we treat the observed network as one realization, out of many possible realizations, of an unknown stochastic process (Robins et al. 2007). We specify a set of model terms that capture features of this process (Krivitsky 2012). For instance, we may specify an edges term, which counts the frequency of edges in the network—essentially, the intercept of the model. The aim is to estimate a coefficient for each of the terms in the model, which guides how frequently the feature represented by that term should occur in the network, in such a way that the probability of realizing the observed network is maximized. To continue the edges example, in a sparse network we would expect the parameter estimate for an edges term to be negative and large in magnitude. The parameter estimates can be interpreted as structural- and individual-level tendencies underlying tie formation in the network.

We use the BERGMs to evaluate whether certain network structures and features, such as the frequency of pairs of black officers connected by a co-complaint, are observed more often than would be expected by chance alone. Statistical inference for BERGMs is based on modeling the frequency of various network statistics in the observed co-complaint network. Following Caimo and Friel (2011), we estimate the model

$$\pi(y|\theta) = \frac{1}{z(\theta)} \exp\left\{\theta_1 + s_1(y) + \theta_2 s_2(y) + \ldots + \theta_k s_k(y)\right\},$$

where θ_k represents parameter estimates for the $s_k(y)$ sufficient statistics and $z(\theta)$ is a likelihood normalizing constant. Table 2 summarizes the statistics we include in $s_k(y)$, which include a count of isolates, edges, and covariate-specific statistics for race and ethnicity, gender, tenure, and weeks at risk of receiving a complaint. A positive estimate for θ_k indicates that the frequency of the network feature denoted by s_k in the observed data is greater than would be expected by chance conditional on the other parameters in the model.

Results

Officer Attributes and Complaints

Figure 1 shows the conditional marginal effects of gender, race, and the interaction of age and tenure on the predicted count of civilian and department complaints received by each officer per year.[5] Among the 15,811 officers who were active during 2010 through 2016, 6,792 officers received at least one civilian complaint, and 6,348 received at least one department complaint. The mean rate of complaints was 0.21 civilian and 0.13 department complaints per year. Male officers received approximately 0.13 more civilian complaints than female officers per year (incidence rate ratio [IRR] = 2.18, 95 percent credible interval [CI] = [2.05, 2.33]). This difference is considerably less pronounced in department complaints, with males receiving 0.02 more department complaints per year than female officers (IRR = 1.20, 95 percent CI = [1.13, 1.28]). While male and female officers receive a similar number of department-facing complaints, male officers engage in deviant behaviors more than twice as often as their female counterparts according to civilian evaluators (D. Smith et al. 2019).

The rate of civilian complaints is similar by officer race. For example, male officers of mean age (47 years) and mean tenure (appointed in 1997) receive approximately 0.26 civilian complaints per year, with negligible difference between white and black officers (IRR = 0.98, 95 percent CI = [0.92, 1.04])

[5]Coefficient estimates, standard errors, and 95 percent highest-density intervals are presented in Table A1 in the appendix.

Table 2. Summary Statistics for the District Co-complaint Networks by Complaint Type.

Statistic (s_k)	Description
Structural	
Isolates	Count of officers without co-complaint ties
Edges	Count of co-complaint edges
Node covariates	
Race factor	Count of co-complaints involving each officer by race and ethnicity
Gender factor	Count of co-complaints involving each officer by gender
Tenure	Count of co-complaints involving each officer by years since appointment
Weeks at risk	Count of co-complaints involving each officer by weeks at risk of receiving complaints
Dyadic covariates	
Race match	Count of co-complaint ties between officers in the same race-and-ethnicity group
Gender match	Count of co-complaint ties between officers of the same gender
Tenure difference	Count of co-complaint ties between officers by difference in their year of appointment

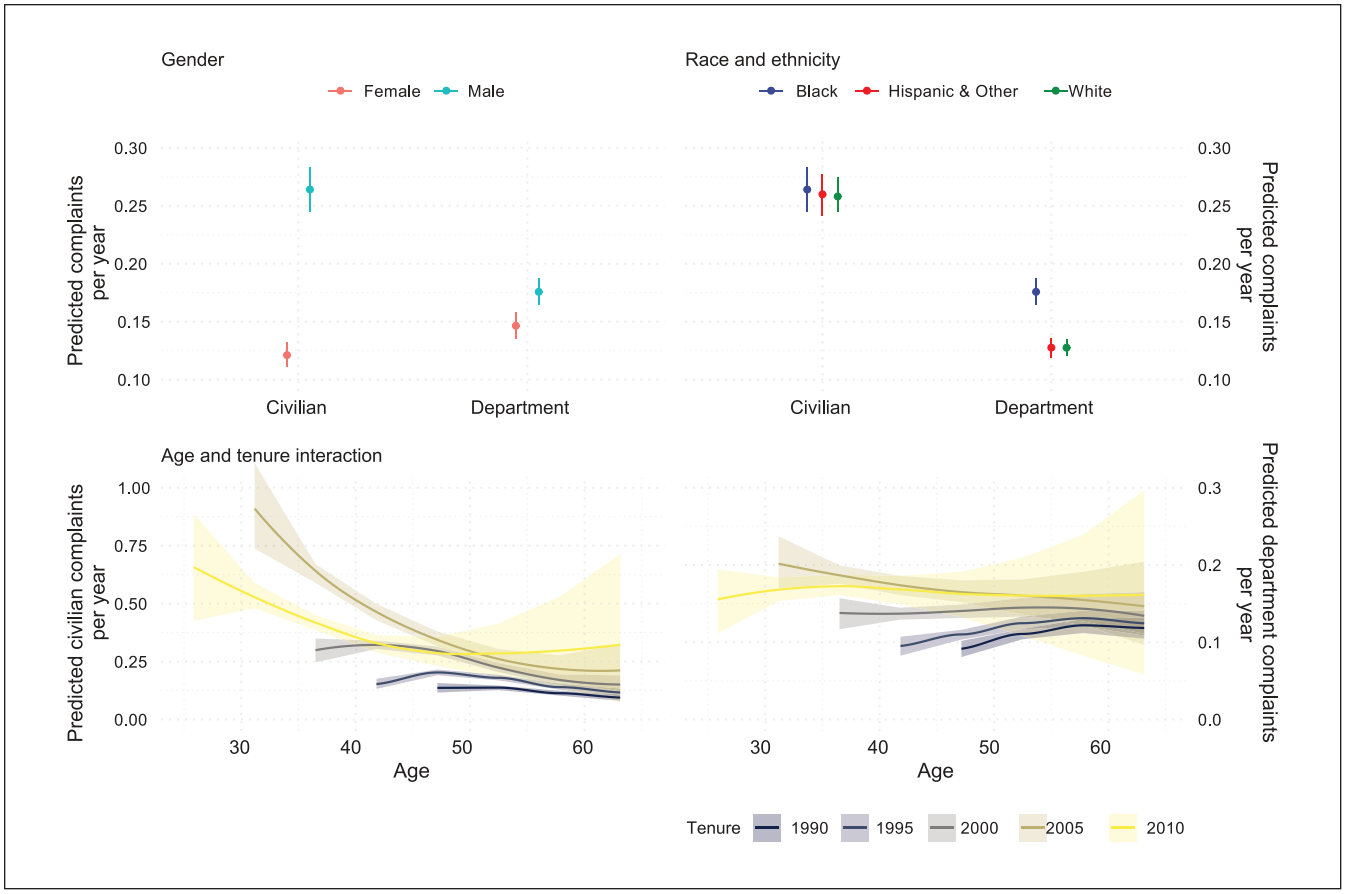

Figure 1. Predicted civilian complaints and department complaints per year by gender, race, and the interaction of age and tenure. For gender, race is set to white and age and tenure are set to their mean values. For race and ethnicity, gender is set to male and age and tenure are set to their mean values. For the age–tenure interaction, gender is set to male and race to white. Ninety-five percent credible intervals are reported.

and Hispanic and black officers (IRR = 0.90, 95 percent CI = [0.91, 1.07]). However, white officers (IRR = 0.72, 95 percent CI = [0.68, 0.77]) and Hispanic officers (IRR = 0.72, 95 percent CI = [0.68, 0.78]) receive 0.05 fewer department complaints per year than black officers, indicating that black officers are more likely to receive complaints from their colleagues pertaining to internal matters. That black officers receive more departmental complaints but about the same

level of civilian complaints suggests that black officers are perhaps subjected to a greater degree of scrutiny within the workplace.

Age and tenure are both strongly associated with civilian complaint receipt. Figure 3 indicates a strong age curve in the receipt of civilian complaints, with older officers receiving substantially fewer complaints for civilian-facing misconduct. A white male officer appointed in 2005 who is 35 years old is expected to receive 0.70 (95 percent CI = [0.66, 0.76]) civilian complaints per year. A comparable officer age 45 is expected to receive 0.39 (95 percent CI = [0.35, 0.42]) civilian complaints, 0.31 fewer than his counterpart. Moreover, holding age constant, officers with longer tenures receive fewer civilian complaints on average. An important exception to this pattern is the cohorts appointed to the CPD in the years immediately preceding the 2010-to-2016 study period. Holding age constant, such recently appointed officers typically receive fewer civilian complaints than officers appointed around 2005. For instance, a white male officer age 35 who was appointed in 2010 is expected to receive 0.41 (95 percent CI = [0.38, 0.44]) civilian complaints, compared to 0.70 (95 percent CI = [0.66, 0.76]) for an officer with otherwise identical characteristics who was appointed in 2005.

Figure 1 shows that the frequency of department complaints is more stable by officer age and tenure. Holding age constant, officers with longer tenure receive fewer department complaints, on average. A 45-year-old white male officer who was appointed in 2000 is expected to receive 0.14 (95 percent CI = [0.13, 0.15]) department complaints per year compared to 0.11 (95 percent CI = [0.10, 0.11]) for an officer with the same characteristics who was appointed in 1995. Among officers with more than 15 years' experience (appointed in or before 1995), the number of department complaints marginally increases with age. However, overall, the influence of age on complaints relating to internal conduct is modest compared to civilian-facing complaints.

To summarize, several patterns emerge when considering the association between officer-level attributes and the frequency of civilian and department complaints.[6] Male officers receive more than twice as many civilian-facing complaints and around 1.2 times as many department complaints as female officers. In total, male officers received 2.2 complaints during the study period, on average, 66% of which related to civilian-facing conduct. By contrast, female officers received 1.3 complaints, 49% of which related to civilian-facing conduct. Thus, both the frequency and mix of complaints differ by gender: females receive fewer complaints overall, and a smaller share of these complaints relate to civilian-facing conduct. Age is an important factor, with the frequency of civilian-facing complaints declining with age. By and large, tenure is negatively associated with the receipt of civilian and department complaints, although younger officers who were recently appointed typically receive fewer complaints than somewhat more experienced officers of the same age. Finally, there is support for individual-level race effects in departmental complaints. Black officers receive more department complaints than white and Hispanic officers, despite receiving a similar number of civilian-facing complaints.

Descriptive Overview of Co-complaint Networks

Receiving a complaint itself does not mean that an officer is necessarily in a misconduct network—approximately 14.5 percent of the officers who received at least one complaint were not co-named with another officer. While other networks unobserved in our data might influence these officers, we now turn our analyses toward instances of co-complaints in which two or more officers were jointly named in alleged misconduct—and misconduct complaints frequently implicate pairs or groups of officers. Figure 2 shows the distribution of the number of officers named in a complaint by complaint type. Ignoring for now the district assignments of officers, approximately 45 percent of civilian-facing complaints and 55 percent of department-facing complaints name only a single officer. Thus, the majority of civilian-facing complaints and more than 4 in 10 department-facing complaints name dyads or groups of officers. A sizeable portion of all complaints thus appears to be networked or group based.

The main organizational feature possibly impacting network structure in the CPD is the district, the geographic unit to which officers are assigned and from which their possible partners will be drawn. Table 3 shows a breakdown of the district-level complaint networks by individual characteristics, including age, race and ethnicity, and tenure, and by network features, including size of the largest connected component. In total, 6,792 unique officers are members of the civilian-facing networks, and 6,348 officers are in the department-facing networks. This corresponds to 43.0 percent and 40.1 percent of the 15,811 CPD officers who were active for at least part of 2010 to 2016, respectively. The mean number of officers in a district co-complaint network is 495 for civilian complaints and 351 for department complaints.

Roughly consistent with the overall demographic population of CPD (Table 1), white officers make up just over one-half of each network (54 percent), on average, with substantial variation across districts. Black officers represent approximately 20 percent of the civilian complaint networks and 24 percent of the department complaint networks, on average. Hispanic and other officers represent 27 percent and 25 percent of the civilian and department networks, respectively. The mean tenure is 4 years in the civilian networks and 3.8

[6]We reestimated the negative binomial regression with district-level total crime as a control variable. As a consequence of adding total crime to the model, 5,547 officers who were not part of a district unit during 2010 to 2016 were dropped. The marginal effects of race and ethnicity, gender, tenure, and age remained largely unchanged after controlling for total crime.

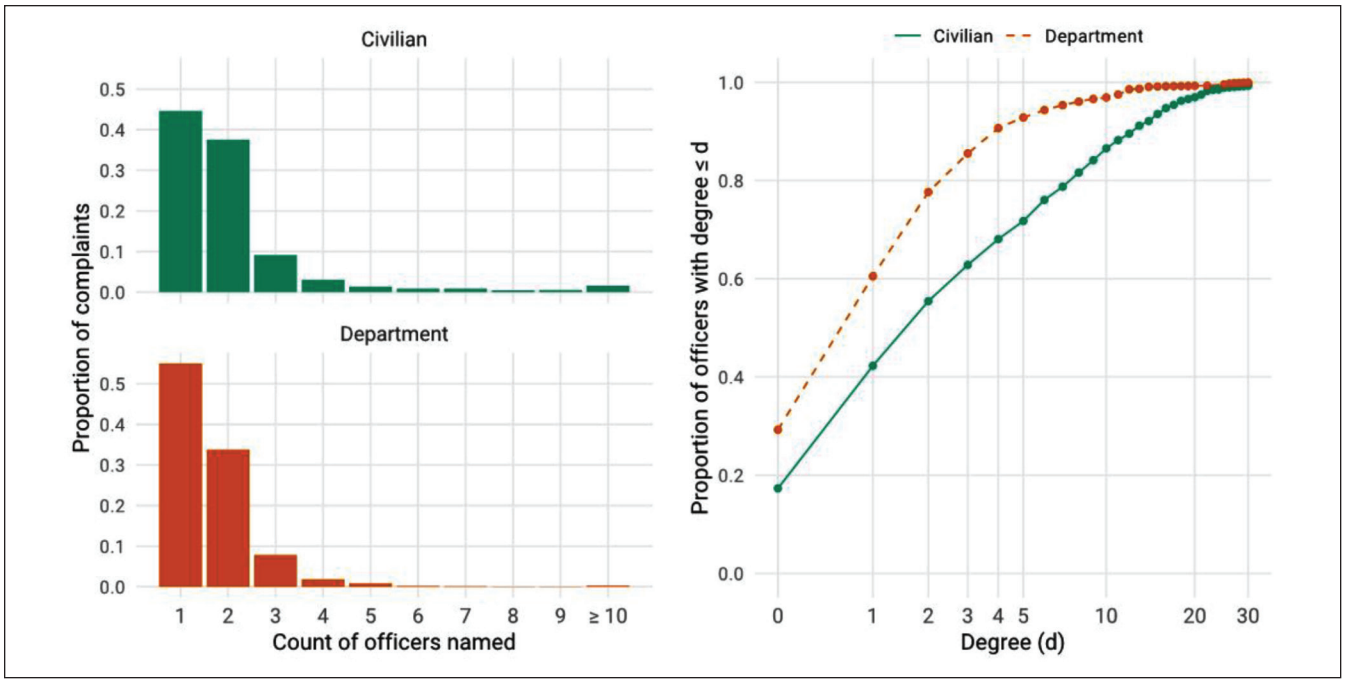

Figure 2. Left: Count of officers named per complaint by complaint type. Right: Empirical cumulative distribution of degree in the district-level complaint networks. The lines show the mean proportion of officers with degree ≤ *d* (log scale) in the civilian-facing and department-facing networks.

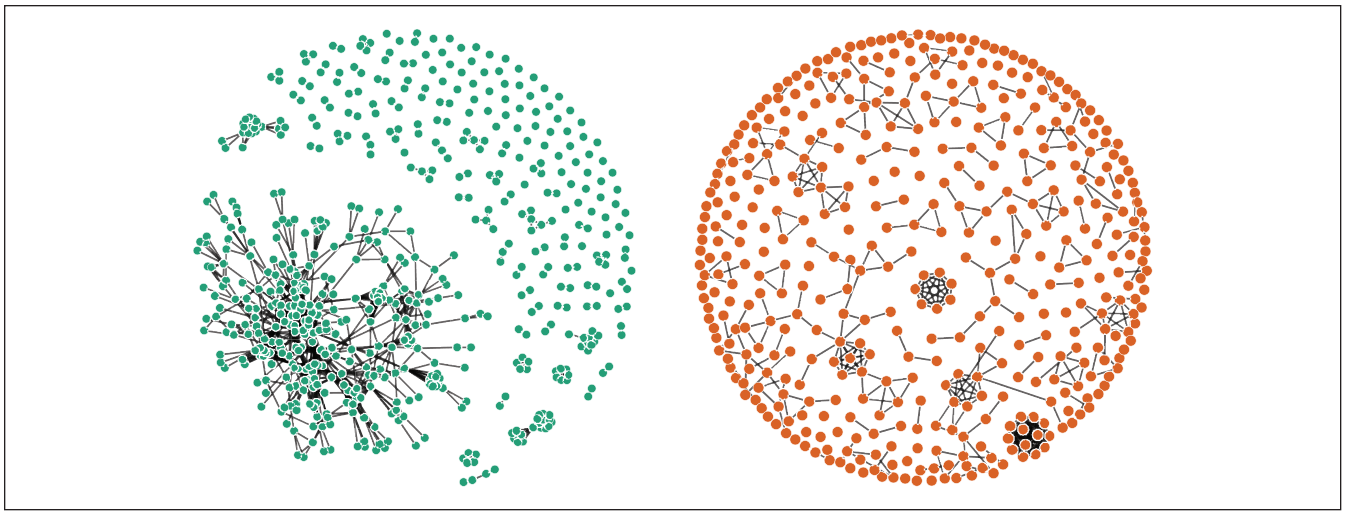

Figure 3. Civilian-facing and department-facing co-complaint networks for district 5. Edges denote that two officers have been named together in at least one complaint.

years in the department-facing networks. The vast majority of officers with civilian complaints are male (86 percent), somewhat higher than the proportion of males in the CPD (77 percent). Female officers make up a greater proportion of the department-facing co-complaint networks (21 percent) than the civilian-facing networks (14 percent).

Figure 2 also shows the degree distribution in the civilian-facing networks. Supporting the finding that civilian complaints primarily name dyads or groups, around 83 percent of officers were co-named alongside at least one other officer during 2010 to 2016, and 17 percent were named only in isolation. For officers named in at least one department complaint, 71 percent were co-named alongside another officer; 29 percent did not receive a department co-complaint.

Both the civilian-facing and department-facing police misconduct networks exhibit heavy-tailed degree distributions, with substantial variation in the number of officers with whom an officer engages in misconduct. Figure 2 shows that

Table 3. Summary Statistics for the District Co-complaint Networks by Complaint Type.

	Civilian		Department	
Variable	*M*	*SD*	*M*	*SD*
Mean officers	495	211	351	130
Proportion male	0.86	0.02	0.79	0.04
Proportion white	0.54	0.10	0.52	0.13
Proportion black	0.20	0.13	0.24	0.17
Proportion Hispanic and other	0.27	0.08	0.25	0.09
Mean tenure in years	4.04	0.16	3.76	0.16
Proportion named only in isolation	0.17	0.08	0.29	0.09
Size of largest connected component	190	157	67	67

the majority of officers have received co-complaints with fewer than three of their peers: 55 percent of officers have been named alongside two or fewer other officers in civilian complaints, and 78 percent have been named alongside two or fewer colleagues in department complaints. Thus, the majority of officers with complaints have relatively few unique co-recipients. At the same time, a small proportion of officers have a much larger number of co-recipients. Approximately 13 percent of officers have 10 or more unique co-complaint recipients for civilian complaints compared to 3 percent for department complaints. The top 1 percent of officers received a civilian co-complaint with 26 other officers and a department co-complaint with 14 other officers, on average.

The descriptive results begin to demonstrate the networked nature of police misconduct, with more than half of all complaints occurring in groups of two or more officers. Importantly, these microconfigurations of officers link together, forming more complex networks of alleged officer co-misconduct within each of the 22 police districts. For illustration, Figure 3 shows the civilian-facing and department-facing co-complaint networks for a single police district. Larger network structures emerge as officers are connected through co-complaints during the observation period, particularly in the civilian-facing network. The civilian-facing networks might be a product of the grouped nature of police work, in which officers are usually in pairs during civilian interactions, while departmental-facing activities are conceivably more solitary in nature. The heavy-tailed degree distribution indicates that a small proportion of officers are responsible for much of the observed connectivity of the co-complaint networks. Such high-activity officers are important points of connection within the larger social structure of police misconduct in Chicago.

Officer Attributes and Co-complaints

Our final analyses shift the focus to the processes influencing the co-naming of officers in the misconduct networks. Specifically, to what extent do officer characteristics affect the odds that two officers have a co-complaint tie in the misconduct network?

Beginning with the influence of gender on co-complaints, Figure 4 shows there is little difference in the probability of male officers and female officers being named in co-complaints. The gender homophily parameter suggests a small and consistent trend toward officers being co-named alongside other officers of the same gender. Across all districts and after accounting for the number of males and females in each network, the average odds of a civilian co-complaint tie between same-gender officers are 1.40 times greater than for opposite-gender pairs. The corresponding odds are 1.37 for department co-complaints. However, although the odds associated with same-gender homophily are greater than 1 in all but one district for civilian and department co-complaints, the 95 percent CI includes 0 in all but two districts, indicating considerable uncertainty that is largely attributable to the relatively small number of female officers in the district co-complaint networks.

Tenure differences have a strong effect on the probability of a network tie, though tenure itself does not. Figure 5 shows the influence of tenure, measured as year of appointment, on civilian and department co-complaints. Pairs of officers with a greater tenure differences are co-named in complaints less often than would be expected by chance, given the frequency of such pairs within the network. In the civilian-facing networks, the odds of a co-complaint that names two officers with a one-standard-deviation difference in tenure, which is equal to approximately 6.3 years, is 0.69 on average. The effect of tenure is larger still in the department-facing networks, where a co-complaint between officers with a one-standard-deviation difference in tenure, equal to approximately 7.5 years, has odds of 0.62 on average. At still longer tenure differentials, pairs of officers are even less likely to be co-named in complaints, a result that is consistent for both complaint types and across all police districts.

Figure 6 shows estimates of the influence of race on the odds of co-complaints by district. As shown in the Figure 1 at the individual level, white, black, and Hispanic officers receive a similar number of civilian complaints, with black officers receiving more department complaints, on average. However, in several districts, black officers are less likely than Hispanic officers to be named in co-complaints; the CI for this finding excludes 0 in 36 percent of districts (8 of the 22) for civilian-facing complaints and in 41 percent of districts (9 of the 22) for department-facing complaints. Indeed, black officers are, overall, less likely to be tied to other officers in the misconduct network. The odds of a black officer being co-named in a civilian complaint is 0.76, on average, relative to a Hispanic officer. The equivalent odds for department-facing complaints is 0.66. We find little difference between white and Hispanic officers in the odds of being named in co-complaints. Taken together with the individual-level results, this suggests that while black officers are more likely to be named in department-facing complaints, they are less likely to be co-named in such complaints alongside another officer.

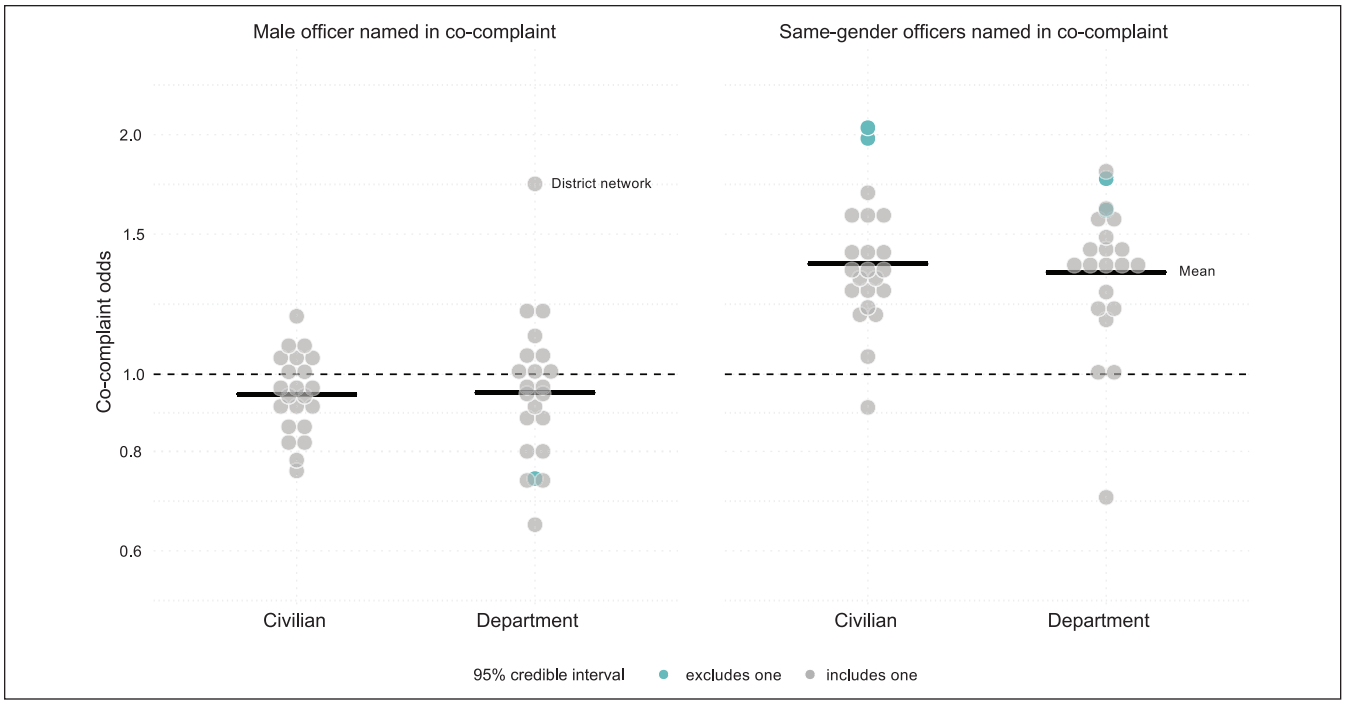

Figure 4. Influence of gender on the odds of receiving civilian-facing and department-facing co-complaints in each police district. Each point represents the estimated odds within a police district co-complaint network. The color of each point indicates whether the credible interval for the estimated odds includes or excludes 1. The horizontal line represents the mean odds across all districts.

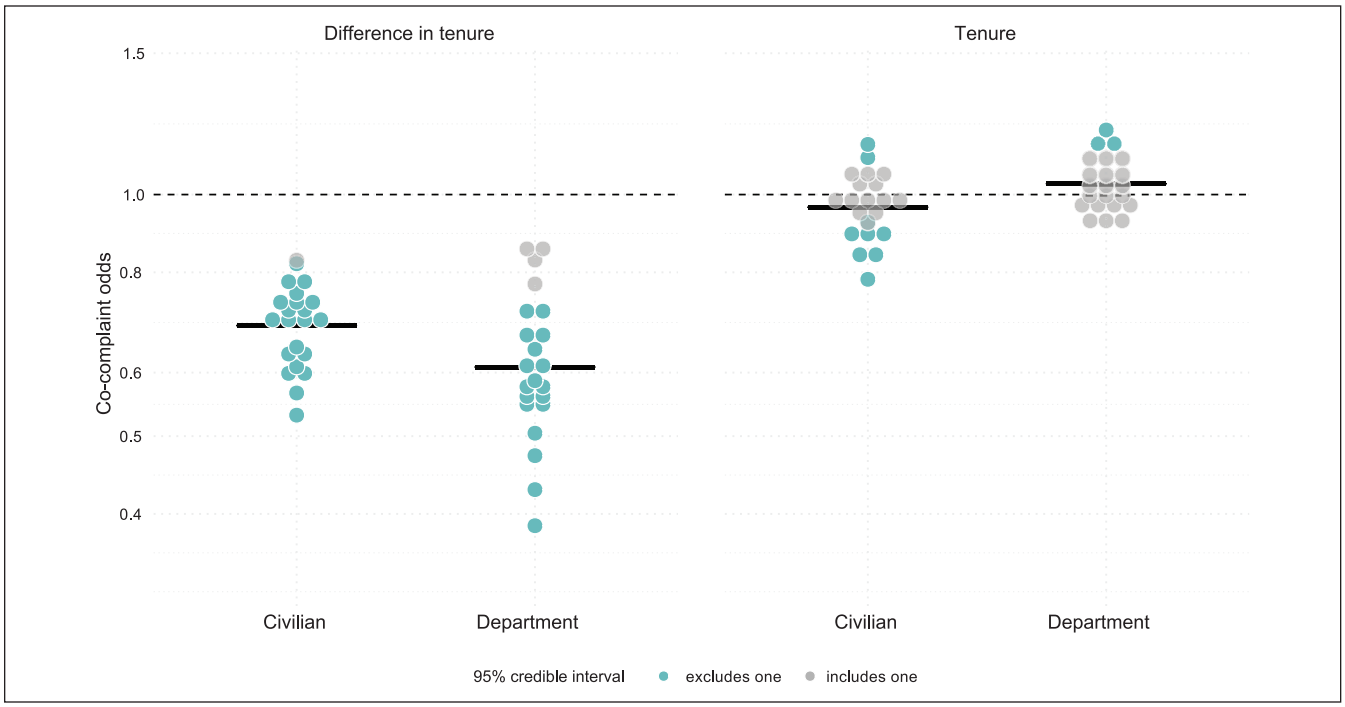

Figure 5. Influence of tenure and the difference in tenure, measured in years, on the odds of receiving a civilian-facing and department-facing co-complaint in each police district.

The probability of homophilous co-complaint ties also varies for white, black, and Hispanic officers. Figure 7 shows estimates of the influence of race on the probability of same-race-and-ethnicity co-naming by district for both complaint types. In contrast to Figure 6, which relates to the probability of black and white officers being named in a

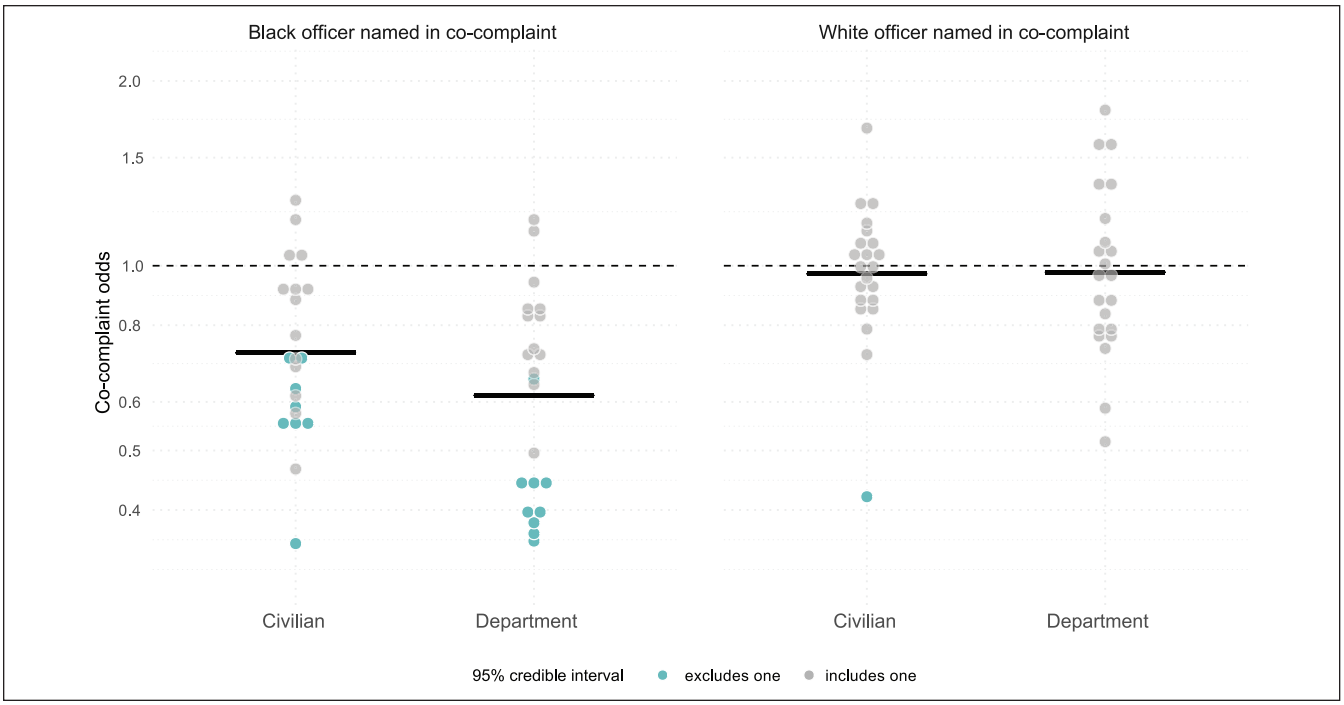

Figure 6. Influence of race and ethnicity on the odds of receiving a civilian-facing and department-facing co-complaint in each police district (reference category: Hispanic).

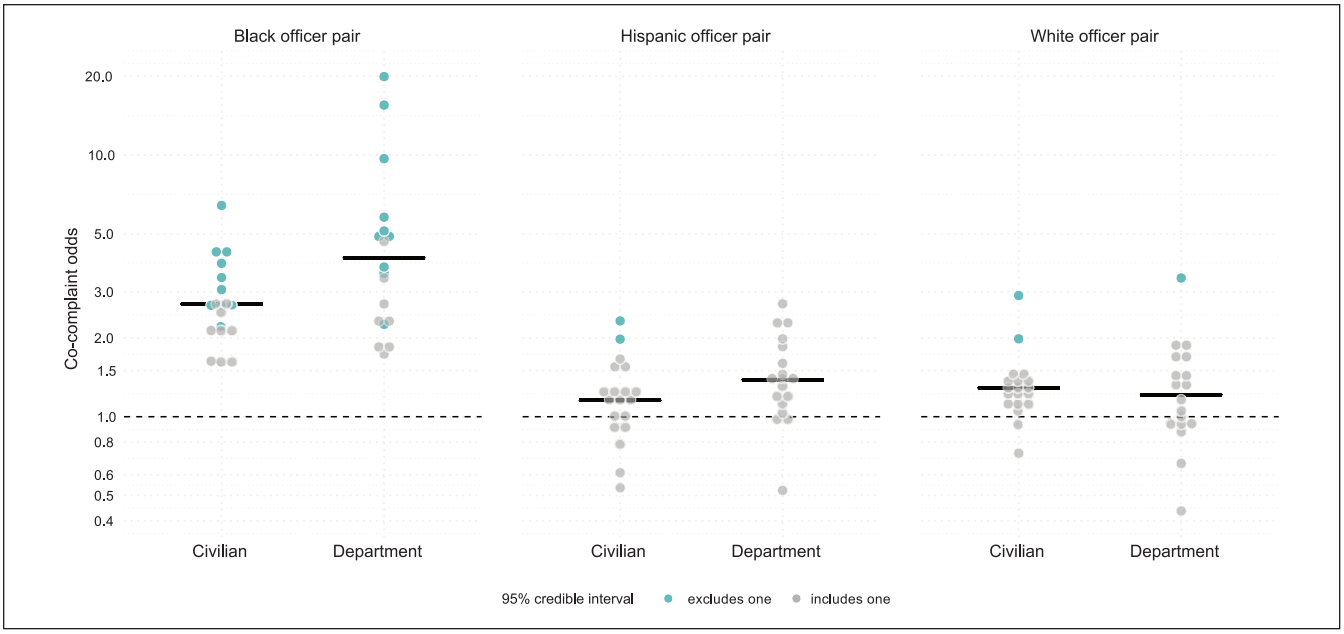

Figure 7. Influence of homophily by race and ethnicity on the odds of receiving civilian-facing and department-facing co-complaints.

co-complaint regardless of the race of the officers with whom they are co-named, the estimates in Figure 7 refer to the racial and ethnic composition of dyads—namely, the probability of receiving a co-complaint tie with an officer of the same race. For department-facing co-complaints, the odds of Hispanic officer co-naming is 1.48 on average, although the CI includes 1 in all districts. In most districts, white officer pairs and Hispanic officer pairs are no more or less likely to receive civilian-initiated co-complaints than would be expected if officers were named in co-complaints randomly.

However, Figure 7 shows that when a black officer is named in a co-complaint, it is more likely to be alongside a

fellow black officer for both civilian- and department-facing conduct. This is true even though black officers are less likely to form a co-complaint tie in general (Figure 6). For civilian-initiated complaints, the credible interval does not include 0 in 10 of the 19 districts (approximately 53 percent) in which the parameter could be estimated.[7] For department-initiated co-complaints, the CI for black co-complaints do not include 0 in 10 of the 18 districts (approximately 56 percent) in which the parameter could be estimated. The odds that a civilian-facing co-complaint names a pair of black officers is 2.88 times greater than the probability of that co-complaint naming a racially heterogenous officer pair, on average. For department-facing complaints, the odds of black co-naming are 5.34 times greater than heterogenous co-naming. Simply put, black officers are considerably more likely to receive co-complaints alongside other black officers both from civilians and, especially, from within the department itself. Taken together, Figures 6 and 7 show that black officers are less likely to be named in co-complaints overall, but when one black officer is co-named in a complaint, the officer(s) with whom he or she is named is considerably more likely to be black than would be expected by chance.

Discussion and Conclusion

This study set out to examine some of the possible factors associated with police misconduct in Chicago. Broadly, our results can be grouped into four key claims. First, police misconduct appears to be a networked phenomenon. Of the 6,792 Chicago police officers who received a civilian-facing complaint, 83 percent received at least one complaint alongside another officer, while 71 percent of the 6,348 officers who received a department-facing complaint did so alongside one or more of their colleagues. Furthermore, 55 percent and 45 percent of all civilian-facing and department-facing complaints, respectively, name more than one officer. These patterns of co-misconduct string together in various dyadic and extradyadic patterns to form larger networks that vary in size and connectivity across geographic police districts.

Second, levels of individual misconduct within networks are highly skewed, with a small number of officers receiving large numbers of co-complaints. Roughly 58.3 percent of the 15,811 police officers who were active for at least one year during 2010 to 2016 received at least one complaint from either a civilian or a fellow officer. The majority of officers receive relatively few complaints and tend to engage in misconduct with a small number of their fellow officers. However, a small proportion of officers have a much larger number of complaints and a larger number of co-complainants: approximately 13 percent of officers have 10 or more unique co-complainants, and the top 1 percent of officers have received a civilian co-complaint with 26 other officers and a departmental co-complaint with 14 other officers, on average. Coupled with the first key finding, this heavy-tailed degree distribution indicates that these high-activity officers are likely responsible for much of the observed connectivity of the misconduct networks within police districts.

Third, there is significant age, gender, and racial variation in the receipt of civilian-facing and department-facing complaints. Age is strongly associated with misconduct, with younger officers more likely to have received both types of complaints than older officers, but especially complaints from civilians. Male officers receive 0.13 more civilian-facing complaints and 0.02 more department-facing complaints per year than female officers. Our finding on female officers and civilian complaints appears to confirm previous research showing that female officers receive fewer complaints and are less likely to be involved in use-of-force situations with civilians (Lersch 1998a; Rabe-Hemp 2008).

In terms of race, white officers are marginally more likely than black or Hispanic officers to have received at least one complaint. Similar to female officers, however, black officers are more likely to receive departmental complaints than civilian complaints. As with gender, these findings also suggest that black officers might be experiencing greater scrutiny or discrimination on the job. Unfortunately, we lack sufficient data to explain the difference between civilian and departmental complaints for both black and female officers.

Fourth, experience and race affect the probability that officers are tied to other officers in misconduct networks. One of the largest effects in our models suggests that officers who are different in terms of their tenure are less likely to engage in misconduct together. While we lack the data needed to explore why this is the case, one hypothesis is that older officers might mitigate some of the inexperience or tendencies of younger officers, suggesting that pairing officers of different tenure might be given greater policy consideration.

With regard to race, black officers receive a similar number of civilian complaints and more department complaints, on average, but are less likely to form a co-complaint tie overall. When black officers are co-named in a complaint, however, that co-complaint is more likely to be with a fellow black officer. While the data do not allow us to fully interrogate this finding, or more fully explore mechanisms driving homophily in co-misconduct, several possible explanations emerge from prior research. For one, pairs of black officers might very well be disproportionately deployed to black communities where, as described earlier, they are more likely to find themselves in conflictual encounters with civilians (Kane 2006). Since the 1960s, police departments have assumed that black officers deployed in black neighborhoods

[7]In some districts, there are too few black officers to estimate the race homophily parameter.

might prove more effective in improving police–civilian relationships, although recent research casts doubt on this assumption (Ozkan, Worrall, and Piquero 2016).[8]

Another possibility is that pairs of black officers might be more likely to elicit co-naming on misconduct complaints, perhaps because discriminatory bias is somehow activated by pairs of black officers but not by black individual officers. More simply put, pairs of black officers might be viewed differently by civilians—an idea consistent with a more general bias where groups of men of color are more likely to be perceived as threatening or dangerous than individual men of color (Young 2006; Welch 2007). For example, a black civilian might feel more betrayed by a pair of black officers engaging in force against the civilian than by a racially heterogenous pair of officers that included a black officer or no black officers (Levin and Thomas 1997). Alternatively, a white civilian might be more likely to feel unfairly treated by a pair of black officers than he or she would feel if engaged in an encounter with a racially heterogenous pair that included a black officer or no black officers (Weitzer 2000).

A final possibility might arise from the fact that individuals are more likely to form a risky network tie with people whom they trust (Mouw and Entwisle 2006; Schaefer, Rodriguez, and Decker 2014; C. Smith and Papachristos 2016). In the context of vulnerability to race discrimination on the job, black officers might be more likely to engage in misconduct with colleagues they trust more on the basis of that shared vulnerability, thus producing stronger homophily among black officers than among their white counterparts.

Limitations

Three data limitations warrant caution in making definitive interpretations of our results. First, while we have full data on officers named in a complaint, we lack comparable data on the networks of officers who do not engage in misconduct or receive a complaint. Such data would provide an essential look at the positive and nondeviant officers in the department, including those who are connected to the same officers in their professional networks and likely exposed to similar deviant behaviors but who do not engage in misconduct.

Related to the first limitation, our network data pertain only to reported deviant behaviors and not to the broader set of connections (both formal and informal, positive and negative) in an officer's professional and personal networks. Importantly, we lack data on the pool of potential partners within districts, regardless of whether or not they received a complaint. Such information would provide insights into the pairing of officers more generally as well as insights into pairings that do or do not lead to problematic behavior.

Finally, the data do not allow us to resolve issues around whether complaint data represent actual or perceived misconduct or some other factor, like frequency of interaction with civilians. Differentiating between civilian-facing and department-facing complaints begins to disentangle perceptions of misconduct from civilians, who may not understand all of the technical rules and regulations governing police conduct, and one's fellow officers, who clearly would. Our study found 4,088 officers who received both types of complaint. In those cases, both civilians and police officers flagged the same "problem" officers.[9]

Implications

This study carries significant implications for policing policy and practice by focusing attention not just on individuals but also on larger collective patterns of misconduct. Thus, while our analysis clearly finds evidence of high-misconduct officers, we are also able to situate and analyze such individuals within the larger clusters of officers whose interactions might contribute to the emergence or diffusion of misconduct. Such a networked approach might be useful when considering assignments, patrol, promotions, and whether or not an officer is suitable for certain types of duties or activities. Such information might also help identify possible "good apples," officers who can model for others ways of remaining resilient and productive members of the department. Future research should begin to explore the utility of such an approach by investigating how such events unfold over time; how they relate to other outcomes of interest, such as the use of force or involvement in shootings; and how such analytics might be used for informing decisions.

Several of our findings also point to actionable steps that could be implemented at a command or local level. Our findings on race and departmental complaints, for instance, call for attention to be directed to sources of workplace biases and discrimination. Providing supervisors, line staff, and monitoring agencies with the most relevant training and resources is a crucial first step, as is ensuring that existing policies and practices are followed uniformly. Relatedly, paying attention to the pairings of officers can also possibly mitigate misconduct complaints from civilians. Our findings suggest that pairing officers with greater differences in experience can be beneficial. Coupled with the information on complaint history—and prior research on FTOs (Getty et al. 2014)—this might suggest an even stronger role for experience and capacity for mentorship in the pairing of partners.

Our results also suggest that care should be given when pairing officers and when deciding where to send them. Prior

[8]Kuykendall and Bums (1980) document the practice of disproportionately assigning black officers to black neighborhoods in Chicago back to the Great Migration.

[9]In addition, Rozema and Schanzenback (2018) find a strong association between high levels of complaints and civil litigations using the same data as we do, suggesting a correlation between actual misconduct and at least those officers with high volumes of complaints.

research—including experimental research—finds that both black and white civilians prefer mixed-race pairings of officers, on the theory that mixed pairs might mitigate biases of entirely white officers or "hard-liner" black officers (Levin and Thomas 1997). Attention to the staffing of patrol in high-crime communities—including the racial, gender, and experience composition of pairs of officers—becomes an immediate and actionable measure. Such attention is even more important given the dire need for increased diversity in police departments. Our findings suggest that simply increasing the percentage of officers from underrepresented groups is not enough. Officers themselves must work in contexts that are healthy, safe, and fair, both within the department house and in their patrol cars.

More generally, our results shed new light on police misconduct in a big-city police department like CPD. We show that police misconduct, like deviance more generally, is a networked phenomenon. Beyond individual bad apples and bad institutions, officer networks appear to play an important role in the emergence and possibly even persistence of misconduct. Future research should more fully consider the role such networks play in shaping the informal and formal socialization of officers and police behavior more broadly. The structure of policing networks is shaped by long-standing formal arrangements as well as the underlying culture and informal practices of policing. Changing the structure of these networks at large is therefore an incredibly difficult challenge. Nevertheless, as policy makers and police agencies hopefully continue to pursue policing reform, analyses such as those engaged here can provide some actionable information that can be used to observe, understand, and potentially do something about the typical patterns of co-misconduct, thus providing at least one useful starting point for policy consideration.

Appendix

Table A1. Coefficient Estimates for the Negative Binomial Models, Regressing the Count of Civilian Complaints and Department Complaints Received on Gender, Race and Ethnicity, and a Smooth Term for the Interaction of Tenure and Age.

	Civilian Complaints		Department Complaints	
	Incidence Rate Ratio (*SE*)	95% HDI	Incidence Rate Ratio (*SE*)	95% HDI
Intercept	0.06 (0.01)	[0.03, 0.09]	0.11 (0.02)	[0.08, 0.15]
Gender (reference: female)				
Male	2.18 (0.07)	[2.04, 2.31]	1.20 (0.04)	[1.12, 1.27]
Race (reference: black)				
White	0.98 (0.03)	[0.92, 1.05]	0.73 (0.02)	[0.69, 0.77]
Hispanic and other	0.99 (0.04)	[0.92, 1.07]	0.72 (0.03)	[0.68, 0.78]
Tenure–age smooth[a]	Yes (Figure 1)		Yes (Figure 1)	
Observations	15,811		15,811	

Note: HDI = highest density interval.
[a]The tenure–age smooth cannot be summarized with a single coefficient estimate interaction and is instead shown graphically in Figure 1.

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