A Global Study of Police Administrators' Perceptions of the Effectiveness of Organizational Changes During the COVID-19 Pandemic

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Abstract

This study expands the developing body of literature examining the effect of the policing organizational and operational changes brought on by the COVID-19 pandemic. Using data from 250 police administrators from 29 countries worldwide, we explore police executives' perceived effectiveness of various organizational and operational changes made to keep their officers and the community safe. Specifically, we look at organizational and operational changes, changes recommended by public health experts (i.e., the World Health Organization), officers' adherence to the new rules and regulations, and the effect of COVID-19 death and infection rates. The results largely show that police administrators' perceptions of effectiveness were in-line with risk avoidance and risk mitigation strategies. However, not all variables exerted the anticipated effect. The implications for police administrators and further research are discussed.

Keywords Police organizational changes · Police operational changes · COVID-19 · Pandemic · Effectiveness · Police chiefs · Police administrators · Survey

Introduction

The COVID-19 pandemic, declared by the World Health Organization in the spring of 2020 (WHO, 2020), leads governments worldwide to impose restrictions regulating the behavior of their citizens. To limit the spread of COVID-19, governments instructed the citizens to modify their social interactions. Within a month since the beginning of the pandemic, more than one-half of the world's population was instructed by their governments to stay at home (Sandford, 2020). The governments expected voluntary compliance with the new restrictive rules and entrusted the police and the military to enforce their violations. As a result, citizens either voluntarily or involuntarily adjusted their behavioral patterns—including the way they socialize, shop, travel, and even commit crimes—which in turn, resulted in changes in crime patterns (e.g., Ashby, 2020; Lersch, 2020).

To protect their employees as they go about fulfilling their tasks, police agencies reacted to the pandemic as well (e.g., Alexander & Ekici, 2020; Lum et al., 2020a; Maskály et al., 2021a, 2021b; Warren et al., 2020). They not only distributed personal protective equipment (PPE) to their employees and (re)trained them on how to use it but also developed methods of reducing the risk of exposure to COVID-19 by limiting police interactions and police-citizen interactions. These changes seem to be organizational (e.g., in-person training and roll-calls or briefings were abolished) and operational (e.g., in-person community policing was discouraged, self-initiated police activities were minimized; Alexander & Ekici, 2020; Lum et al., 2020a; Maskály et al., 2021a; Warren et al., 2020). Extant research (e.g., Alexander & Ekici, 2020; Lum et al., 2020a; Maskály et al., 2021a, 2021b) primarily focused on capturing the nature and extent of these changes across various police agencies, but the question of how effective police executives *perceived* these changes were at protecting their staff remains unanswered.

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The present study explores police administrators' evaluations of the effectiveness of the pandemic-related changes in their police agencies. As the pandemic was evolving, police administrators had to make the decisions on the fly, based on their intuitive perceptions, and, probably, without relying on hard evidence that might not have been available at the times when they had to make these decisions. Consequently, studying their perceived effectiveness can give us a glimpse of how the decisions are made at the top of the police hierarchy in rapidly changing times, be it a health pandemic, flood, or earthquake. Based on a sample of police administrators from 29 countries, we seek to determine the factors that may be driving police administrators' perceptions of the effectiveness of these operational and organizational changes in keeping their officers, and thus indirectly the public, safe from contracting COVID-19.

Studying Police Organizational and Operational Changes during the COVID-19 Pandemic

Some organizations and NGOs—such as the Police Executive Research Forum (2020) and Vera Institute of Justice (2020)—offered suggestions regarding changes that police agencies might consider and provided brief examples of police agencies that have made specific changes in their organizations and operations in response to the pandemic. The same issue has been addressed by scholars across the world, including Australia (e.g., Drew & Martin, 2020), Brazil (e.g., Matarazzo et al., 2020), Canada (e.g., Jones, 2020), Denmark (e.g., Hartmann & Hartmann, 2020), Peru (Hernandez-Vasquez & Azanedo, 2020), United Kingdom (e.g., Reicher & Stott, 2020; Stott et al., 2020), USA (e.g., Jennings & Perez, 2020; Kugler et al., 2020; Papazoglou et al., 2020; White & Fradella, 2020), and Vietnam (e.g., Luong et al., 2020). Nevertheless, only a handful of scholarly articles systematically and empirically measured such changes within police organizations and the perceptions about them (e.g., Alexander & Ekici, 2020; Lum et al., 2020a; Maskály et al., 2021a). While these studies are valuable in demonstrating the nature and extent of the changes within police organizations, *none* of the existing studies of which we are aware asked about the evaluations of the effectiveness of these changes.

Organizational Risk Reduction

Some of the immediate reactions to the start of the COVID-19 pandemic included an increased reliance on personal protective equipment (PPE) and a provision of (re)training and instructions to the police officers on using the PPE use, as well as on maintaining social distancing during the police-citizen contacts (e.g., Maskály et al., 2021a, 2021b). The most common forms of PPE issued by the North American police agencies were face masks, gloves, and disinfectants (Lum et al., 2020b). An early survey of US and Canadian police agencies, conducted in April of 2020, indicated that only about one-half of the surveyed police agencies rated their ability to provide PPE for their employees as "good" or "excellent" (Lum et al., 2020a). In most police agencies, first-line supervisors were in charge of "regularly inspecting, monitoring, and supervising the use of PPE" (Lum et al., 2020a, p. 2; Lum et al., 2020b). By May of 2020 (Lum et al., 2020b), over 80% of North American police agencies participating in the survey provided formal training to their employees on preventing the spread of COVID-19. In addition, about the same percentage of the North American police agencies acknowledged that they have enough PPE for their employees to cover 30 days or longer (Lum et al., 2020b). A comparative study found that PPE use has increased both in the Global North and the Global South (Maskály et al., 2021a).

Another way police agencies dealt with organizational risk reduction was by introducing modifications to police training and field training. In the April 2020 survey, about one-half of the surveyed police agencies in the USA and Canada either suspended in-person training and offered no alternatives or suspended in-person training while offering online alternatives (Lum et al., 2020a). A month later, the percentage of North American police agencies that suspended in-person training increased to two-thirds (Lum et al., 2020b). Similarly, Alexander and Ekici (2020) found in their June 2020 survey of Illinois police agencies that over 80% of the survey agencies suspended their police academies and in-service training. A similar result was found in a study of police agencies globally (Maskály et al., 2021a).

Most police agencies also tended to restrict public access to the police facilities during the pandemic (e.g., Alexander & Ekici, 2020). This restriction included physical access to the front desk and the suspension of citizen ride-along programs, citizen academies, and in-person police-community forums (Alexander & Ekici, 2020). For North American police agencies, rhis practice was in effect relatively early in the pandemic (e.g., Lum et al., 2020a) and a couple of months later (e.g., Alexander & Ekici, 2020).

Organizational Risk Mitigation

While risk reduction strategies that police agencies employed were primarily conducted to reduce the likelihood that police officers would be infected with the COVID-19 virus, risk mitigation strategies are designed to reduce the likelihood that exposure to the COVID-19 would affect the police agency broadly and systematically. Systematic risk mitigation strategies that police agencies included assigning

police officers and civilians to work remotely (e.g., Alexander & Ekici, 2020; Lum et al., 2020a, 2020b), in physically separated work areas (e.g., Maskály et al., 2021a), by limiting staff access to the police facilities (Alexander & Ekici, 2020), or by reassigning personnel to address staffing needs (e.g., Maskály et al., 2021a).

The use of vacation time was not a clear-cut issue. Maskály et al. () found that police administrators reported equally, with approximately one-third of respondents per category, no change, a decrease in the use of vacation time, and an increase in the use of vacation time. Most of the North American police agencies in the study by Lum et al. (2020b) study reported no significant changes in the police officer using sick leave.

Crime Prevention Strategies

To reduce risk and police officers' exposure to COVID-19, most of the police agencies included in various studies have also reduced officer-initiated activities, problem-solving and community-policing activities, and police-initiated pedestrian/traffic stops (e.g., Alexander & Ekici, 2020; Lum et al., 2020a, 2020b). This was the case both for police agencies in the USA and Canada (e.g., Alexander & Ekici, 2020; Lum et al., 2020a, 2020b) and police agencies in several other countries across the world (Maskály et al., 2021a). Lum et al. (2020a) reported police administrators in North America developed formal policies limiting the number of pedestrian/traffic stops. Indeed, Ashby's (2020) analysis of police-initiated traffic stops vividly showed that the number of traffic stops decreased in nine out of ten large US cities.

The effect of COVID-19 on proactive problem-solving and community-policing activities seems to be quite strong; over 80% of the countries in the study by Maskály et al. (2021a, 2021b) reported completely changing how they delivered these services. Similarly, Alexander and Ekici (2020) found that over 80% of the police agencies in their Illinois survey lessened their community-policing activities. However, Lum et al. reported in the second wave of their North American survey (2020b) that about one-third of the police agencies had adopted official policies geared toward proactively increasing their presence in certain communal places (e.g., grocery stores, hospitals) in response to COVID-19 challenges.

Reactive Policing

PERF (2020) issued guidance to the police agencies to limit the number of calls for service handled in person and discourage police officers from arresting the citizens charged with committing less serious crimes. Extant research showed that the calls for service typically decreased in 2020 compared to the prior years (e.g., Ashby, 2020; Lersch, 2020;

Lum et al., 2020a, 2020b), although the pattern is not uniform across all types of calls. Police agencies responded by providing official guidelines or informal instructions on how to respond to the calls for service during the pandemic, decided to change significantly the way their police officers respond to the calls for service, and started to rely more on online or remote ways of responding to the calls for service (e.g., Alexander & Ekici, 2020; Lum et al., 2020a, 2020b).

Starting from the first empirical study of North American agencies (Lum et al., 2020a), studies have consistently shown that the police agencies formally or informally instructed police officers to reduce the number of arrests for minor offenses. About three-quarters of the US police agencies in both waves of Lum et al. study (2020a, p. 1, 2020b) issued formal guidance to their employees to "reduce their use of physical arrests for minor offenses." In addition, about two-thirds of the agencies reported that jails or holding facilities have also restricted the types of arrestees they were willing to house, typically being unwilling to take new arrestees for misdemeanors and sick arrestees (Lum et al., 2020a). From a worldwide perspective, police administrators in about one-half of the countries reported that they changed how they enforce the laws dealing with minor crimes, two-thirds indicated a reduction in the number of arrests for minor crimes, and a reduction—although to a lesser extent—in arrests for serious crimes (Maskály et al., 2021a).

In addition, to minimize the risk of infection to both the police officers and citizens, many police agencies have also changed how they carry out arrests (PERF, 2020). Maskály et al. (2021a) noted that the police administrators from about three-quarters of the countries in their study adjusted how their employees were taking people into custody.

Current Study

While police agencies worldwide responded to the COVID-19 pandemic, only a handful of empirical studies empirically measured the extent and nature of these changes (e.g., Alexander & Ekici, 2020; Lum et al., 2020a, 2020b). At the same time, the focus of these studies is on capturing these changes but not on assessing how effective these changes have been in reducing and mitigating the risk of COVID-19 exposure. A key question that remains about the changes made by police organizations due to the pandemic is how effective are these changes perceived to be at keeping their officers safe from contracting COVID-19? There is no evidence about how effective these organizational changes were at keeping police officers—and thus indirectly the public—safe from contracting COVID-19. In this study, we assess factors related to police administrators' perceptions of the effectiveness of organizational changes protecting their subordinates from becoming infected with COVID-19.

We intentionally chose to study the perceived effectiveness of the organizational changes for several reasons. First, during the COVID-19 pandemic, the guidelines issued by governments and health services about proper behavior kept changing, sometimes rapidly, and the information was not readily available. If administrators wanted to rely on the objective information in their policy decision-making, they were put in a situation where all relevant information was not available at the time of the decision, being forced to instead rely on intuition. Second, given that the organizations in our sample ranged from very small (i.e., less than ten officers) to very large (more than 100,000 officers), it would not be easy to develop an objective criterion to compare across departments. After all, one officer dying in a small organization of 10 police officers would have a greater impact than one in a very large department of 1,000 police officers. Similarly, 10% being infected in a large department would likely have a much stronger effect in large organizations. Even converting the numbers to rates is problematic as it makes too many assumptions.[1]

Methods

Survey Instrument

We expanded upon the recommendations from the Police Executive Research Forum (PERF, 2020) and early data collection efforts (e.g., Lum et al., 2020a), our survey instrument incorporated and expanded upon these ideas to collect data from police administrators around the world. Further, we planned to distribute the questionnaire in different countries to obtain the breadth of experiences. We pilot tested the survey instrument with police administrators from Croatia, South Korea, the United Kingdom, and the USA. Based on the feedback from these administrators, we made small changes to the wording of the items such that administrators around the world equally understood them.

The instrument contains several questions across nine domains: operational changes, complaints and internal investigations, reactive policing strategies (i.e., calls for service, taking people into custody, and traffic enforcement), changes in COVID-19 policing strategies, and change in proactive policing strategies. Additionally, the survey asked police administrators to indicate the potential consequences of the pandemic-related changes on various facets within the police

organization and how these changes may affect various facets of the police-community relationship.

Data

The data collected from this study were electronically distributed to police administrators using a restricted link—and associated password—in the summer and early autumn of 2020. The survey was distributed to all United Nations Office of Drugs and Crime (UNDOC) member states. Additionally, we reached out through various professional organizations for police administrators in various countries (i.e., Police Chief's Associations in the USA, The European Agency for Law Enforcement Training in Europe [CEPOL], and the National Police Chiefs Council in the United Kingdom). We received responses from police administrators from 29 different countries around the world. Earlier iterations of this research reported on the country-level effect of these changes, as many of the countries represented have centralized police organizations (i.e., one police organization for the entire country). However, we noted that there were often quite distinct responses from police administrators within the same country. In a country with de-centralized policing—like the USA—this is to be expected. However, this same level of variation remains in smaller geographic countries with centralized systems.

We ultimately obtained 250 completed surveys. We removed 96 responses from the sample because of extensive missing data (i.e., > 65% missing). We compared the 250 responses included in the analyses here against those trimmed from the sample and found no significant differences in the answered items. Given that we are not sure how many persons the survey was distributed to, as the links were sent through contacts, it is not possible to calculate the response rate.

A map of the countries represented in the sample and the lowest reported effectiveness rating is presented in Fig. 1. The average number of surveys per country was 8.61 (SD 22.98) and ranged between 1 and 99. However, due to the fact that there were some countries with only a singular response, we collapsed countries into nine regions: North America ($n = 99$), Latin America ($n = 7$), United Kingdom/Ireland ($n = 16$), Western Europe ($n = 10$), Eastern Europe ($n = 98$), Africa ($n = 10$), the Middle East ($n = 2$), Asia ($n = 4$), and Oceania ($n = 4$).

The inherently nested nature of the data (i.e., multiple responses from the same country/agency) presents a methodological challenge that needs to be addressed. Specifically, it made it necessary to account for the autocorrelation among the responses. The autocorrelation in the responses presents a problem for traditional regression approaches (Raudenbush & Bryk, 2001), so we were left with two potential solutions. First, we could have included a fixed-effect for the response

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[1] It assumes that the effect seen in smaller organizations is linear when making the rates comparable, which is problematic given the different levels of risk that people in large organizations are exposed to (i.e., roll call could become a super spreader event) and the lack of resources available to smaller organizations (i.e., financial constraints and difficulty bidding for PPE).
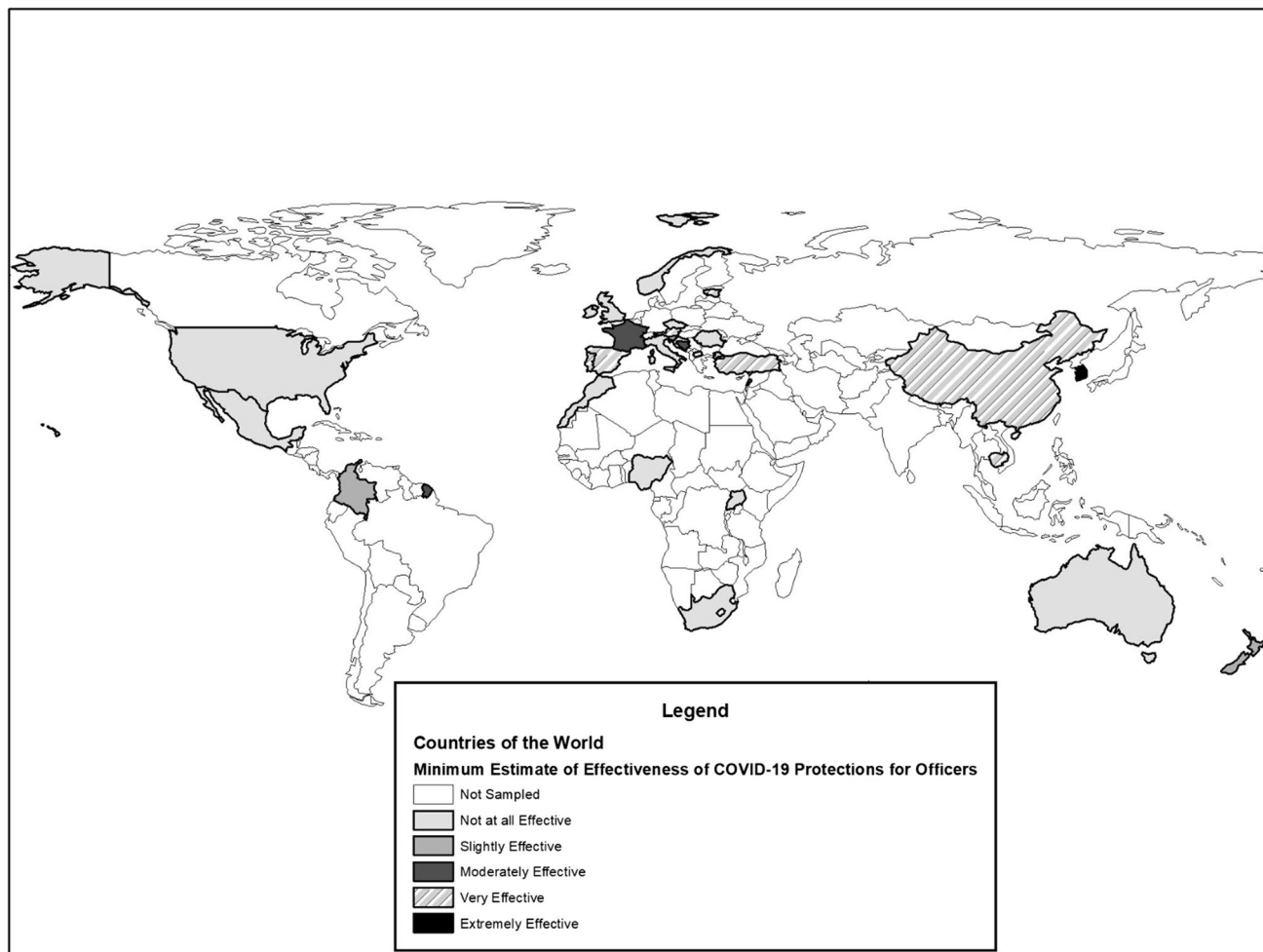
Fig. 1 Choropleth Map of Countries included in sample shaded by lowest reported score of effectiveness of changes made to protect subordinates from COVID-19

region and used cluster-adjusted standard errors. Second, we could use a mixed-effects—or multilevel—model that includes fixed-effects (i.e., variables at the individual level) and random-effects (i.e., variables at the regional level). We chose to employ the latter strategy of estimating a series of mixed-effects models with a random intercept that accounts for the response's region.[2] Specifically, we estimate a series of mixed-effects ordered logistic regression models.[3] This

decision to estimate the models at the regional level was based on a series of Moran's I analyses looking for the spatial concentration of the values on the dependent variable. There is significant clustering of similar values (Moran's $I = 0.737$). Using a series of assumptions to create similar groups, we determined that the most effective empirically (Moran's $I = 0.27$) and a defensible solution is that presented above, which is based on shared cultural, historical, and political traditions of the countries—while minimizing the spatial autocorrelation of the responses between regions. All models were estimated in Stata 16.1.

Dependent Variable

The dependent variable in this study is a single item that asked police administrators to indicate: "How effective do *you* think the organizational changes made due to the pandemic have been in minimizing the risk of your officers contracting COVID-19?" This variable was measured on a

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[2] This decision was made because including eight additional variables in the model would be more likely to result in potential problems of overfitting the model by including too many variables (Agresti & Finlay, 2008; Hocking, 2003).

[3] Ordered logistic regression models require that the proportional odds assumption is met (Long & Long, 1997). This assumption requires that the slopes for a parameter are equal across response categories. There is no way to test for this assumption in a mixed-effect model. Therefore, we estimated single-level models with and without the fixed effect for country included and looked for violations of the proportional odds assumption using the *omodel* package (Wolfe & Gould, 1997).

Table 1 Descriptive statistics

	M	SD	Min–Max
Effectiveness of org. changes to protect staff from COVID-19	3.15	1.12	1–5
Changes to in-person training	1.74	1.04	1–5
Changes in N CFS handled in person	2.39	1.14	1–5
Changes in ways in which citizens could report crimes	2.57	1.27	1–5
Changes in N officer-initiated activities	2.31	1.19	1–5
Change Fx in-person COP	2.34	1.09	1–5
Change in N arrests for minor crimes	2.50	1.07	1–5
Change in N warnings for COVID-19 violations	3.26	1.30	1–5
Change in N fines for COVID-19 violations	2.91	1.42	1–5
Changes to FTO training	3.53	1.37	1–5
Change in public access to police facilities	2.95	1.45	1–5
Change in N of personnel working remotely	3.43	1.18	1–5
Change to social distancing of workforce	2.81	1.45	1–5
Changes in the use of PPE	4.11	1.13	1–5
Officers adhered to new organizational rules	3.76	1.27	1–5
Member of the agency died of COVID-19	0.11	0.31	0–1
Peak infection COVID-19 infection of agency personnel	3.28	1.86	1–8
Number of Countries per Region ($n=9$)	3.22	2.05	1–7
Number of responses per Country ($n=250$)	8.63	22.98	1–99

N in questions refers to changes in the number of activities, FX in questions refers to the frequency of changes

five-point Likert scale: (1) not at all effective, (2) slightly effective, (3) moderately effective, (4) very effective, and (5) extremely effective. Overall, the mean perceived effectiveness of the administrators' effectiveness was 3.14 (SD 1.07).

Independent Variables

There are four groups of independent variables that are included in this study. The first group of independent variables included organizational and operational changes that police administrators largely had the ability to directly influence. There are ten independent variables included in this group. Five of these variables (i.e., changes to in-person training, changes in ways in which citizens could report crimes, changes in FTO training, change in public access to police facilities) were measured on a five-point Likert scale: (1) did not change at all; (2) slightly changed; (3) somewhat changed; (4) mostly changed; (5) completely changed. The other five variables in this group were measured on a different five-point Likert scale: (1) significantly decreased; (2) slightly decreased; (3) no change; (4) slightly increased; (5) significantly increased. The descriptive statistics for each variable are shown in Table 1.

The second group of independent variables includes changes suggested by both the World Health Organization and the Centers for Disease Control to minimize the spread of COVID-19. Specifically, using the five-point Likert scale ranging from significantly decreased to significantly increased, administrators were asked about the number of personnel who were working remotely. Additionally, using the five-point Likert scale that ranged from "no change" to "completely changed," administrators were asked to report on changes to the use of social distancing of work units to prevent the spread of infection and changes in the use of personal protective equipment (PPE).

The third group of independent variables consisted of a single item that asked police administrators to report: "How often have your officers adhered to the organizational changes that have been made in response to the COVID-19 pandemic?" The administrators' responses were measured on a five-point Likert scale: (1) never; (2) rarely; (3) sometimes; (4) often; (5) always.

The final group of independent variables asked administrators to report on the direct effects of COVID-19 on the police agency. Administrators were first asked if any member of their police agency had died from COVID-19. Second, the administrators were asked to report the peak number of officers who were either infected or were self-isolating due to exposure to COVID-19. This question was measured on an eight-point Likert scale: (1) no exposure; (2) 1% of personnel; (3) 2–3% of personnel; (4) 4–5% of personnel; (5) 6–10% of personnel; (6) 11–15% of personnel; (7) 16–24% of personnel; and (8) 25% or more of the organization. Given the wide disparity in the size of the police organizations included in the sample, it was more appropriate to ask about the percentage of officers rather than the actual number of

officers. For example, an agency with 150,000 officers may not even notice 100 officers infected or self-isolating. In contrast, an agency of 25 officers will acutely feel the effects of two officers self-isolating. The pairwise correlations between all variables in the study are presented in Table 2.

Analytic Plan

The modeling strategy proceeds in five stages. The first stage (Model 1) estimates an unconditional model that includes the dependent variable and region. This model allows us to estimate the intraclass correlation coefficient (ICC), which determines the percentage of the dependent variables accounted for by the region variable alone (Raudenbush & Bryk, 2001). It also permits us to calculate the design effect, which estimates the amount that a researcher would need to weight the standard errors to minimize the effect of autocorrelation (Snijders and Bosker, 2011). The second stage (Model 2) enters the first group of independent variables (i.e., those things that police administrators had a strong likelihood of controlling). The third stage (Model 3) of the analysis adds the variables capturing the recommendations from the WHO and CDC to minimize the spread of COVID-19. The fourth stage of the analysis (Model 4) then adds information about perceptions of officers adhering to the organizational changes that were made. After all, it is unlikely that any change will effectively reduce exposure to COVID-19 if the officers are not complying with the changes. The fifth—and final—stage (Model 5) adds information about COVID-19 deaths and peak COVID-19 infection rates in the organization. The police administrators' perceived effectiveness is likely directly influenced by COVID-19 exposure and deaths from the disease (Table 3).[4]

Results

We first estimate the unconditional model to determine if the use of the mixed-effects model is necessary. Model 1 indicates that the ICC value is 0.09, which yields a design effect value of 3.46. The design effect value suggests that if a single-level model were estimated, the standard errors would need to be almost 3.5 times larger to reduce the over-efficiency of the inferences drawn from the model. The log-odds results from all models are shown in Table 2.

Next, in Model 2, we add the first group of independent variables, which are things most easily changed by police

administrators. The results indicate that most of these independent variables significantly affect the administrators' perceptions of the effectiveness of the changes designed to protect their personnel. Specifically, we see that nine—all but one—of these variables significantly affect administrators' perceptions of effectiveness. We see that the more that field training was changed ($b = 0.21$, $p < .001$), the more effective the administrators felt the changes made were in protecting their personnel. Similarly, the more officers issued fines to citizens violating the COVID-19 laws/regulations; the more effective the administrators felt that their strategies were ($b = 0.21$, $p < .001$). The effect for issuing fines to community members was 2.5 stronger than increasing the number of warnings issued for these violations ($b = 0.06$, $p < .05$). This result is potentially counterintuitive given that these situations would bring officers into closer contact with potentially infected community members, thus infecting the officers. This seems to be the logic in making more changes to public access to police facilities—likely limiting access—which was also positively associated with perceptions of effectiveness ($b = 0.15$, $p < .001$). Further, we see that police administrators felt that the degree of change in in-person training was also positively associated with perceived effectiveness ($b = 0.18$, $p < .001$).

However, the results from Model 2 are not all positively associated—in the mathematical sense—with perceptions of effectiveness. For example, we see those police agencies that saw more changes in how citizens could make crime reports decreased perceived effectiveness ($b = -0.08$, $p < .001$). This result is counterintuitive as most of the recommendations and changes proposed were to enhance the number of remote reporting options for citizens, which would decrease contact with the community. This is the same logic that we see applied to the number of calls for service (CFS) handled in-person ($b = -0.06$, $p < .05$), the number of in-person community-oriented policing (COP) activities ($b = -0.13$, $p < .001$), and the number of officer-initiated activities ($b = -0.15$, $p < .001$). The results largely suggest that police administrators felt that limiting exposure to the public was an effective strategy for mitigating the risk of exposure to their personnel.

In Model 3, we add in the recommended changes proposed by the WHO and the CDC, which again were designed to reduce the risk of transmission of the COVID-19 virus. With this model, we see that the more the use of PPE changed, the more effective police leaders felt their responses were ($b = 0.28$, $p < .001$). However, counterintuitively the number of people working remotely ($b = -0.07$, $p < .05$) and the social distancing between personnel ($b = -0.10$, $p < .001$) were both negatively associated with administrators' perceptions of effectiveness. The variables that were also included in Model 1 were substantively unchanged in Model 2, with two important caveats. After

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[4] Out of an abundance of caution, we estimated a series of linear regression models to determine if there were issues of multicollinearity in the models. The results found that all VIF values in all models were less than or equal to 2.47.

Table 2 Pairwise correlations between variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Perceptions of Effectiveness (1)	–																	
Changes to in-person training (2)	– 0.01	–																
Changes in N CFS handled in person (3)	– 0.07	**0.35**	–															
Changes in ways in which citizens could report crimes (4)	0.04	**– 0.21**	**– 0.12**	–														
Changes in N officer-initiated activities (5)	0.04	**0.28**	**0.36**	**– 0.21**	–													
Change Fx in-person COP (6)	– 0.04	**0.28**	**0.46**	**– 0.25**	**0.60**	–												
Change in N arrests for minor crimes (7)	**– 0.12**	**0.27**	**0.40**	– 0.02	**0.25**	**0.29**	–											
Change in N warnings for COVID-19 violations (8)	**– 0.19**	– 0.02	**0.23**	0.01	**0.44**	**0.33**	– 0.03	–										
Change in N fines for COVID-19 violations (9)	**0.22**	0.03	**0.16**	– 0.02	**0.45**	**0.31**	0.01	**0.75**	–									
Changes to FTO training (10)	**0.20**	**– 0.26**	**– 0.16**	**0.36**	**– 0.17**	**0.19**	**– 0.12**	0.04	0.08	–								
Change in public access to police facilities (11)	**0.19**	**– 0.15**	– 0.07	**0.18**	0.05	0.02	**– 0.22**	**0.28**	**0.23**	**0.33**	–							
Change in N of personnel working remotely (12)	0.07	**– 0.14**	– 0.04	0.01	0.05	– 0.03	**– 0.21**	**0.46**	**0.36**	**0.12**	**0.17**	–						
Change to social distancing of workforce (13)	– 0.01	– 0.10	0.04	**0.23**	– 0.01	– 0.01	– 0.08	**0.33**	**0.22**	**0.38**	**0.34**	**0.32**	–					
Changes in the use of PPE (14)	**0.19**	**– 0.14**	**– 0.13**	**0.27**	**– 0.17**	**– 0.15**	**– 0.18**	0.10	– 0.08	**0.37**	**0.21**	0.07	**0.44**	–				
Officers adhered to new organizational rules (15)	**0.40**	0.03	– 0.07	**– 0.16**	– 0.06	**– 0.13**	– 0.02	**– 0.16**	– 0.08	– 0.01	**– 0.18**	0.03	**– 0.15**	0.09	–			
Member of the agency died of COVID-19 (16)	0.03	0.05	– 0.03	– 0.05	0.03	0.04	– 0.01	0.09	0.09	– 0.04	0.06	– 0.01	**– 0.12**	– 0.06	0.07	–		
Peak infection COVID-19 rate of agency personnel (17)	**– 0.12**	0.09	0.02	– 0.01	**0.12**	– 0.01	– 0.05	**– 0.12**	**– 0.13**	– 0.07	**– 0.12**	– 0.04	0.01	0.07	0.03	– 0.04	–	
Region (18)	0.05	– 0.02	0.07	– 0.01	**0.18**	**0.19**	– 0.01	**0.37**	**0.48**	0.05	**0.22**	**0.17**	– 0.02	**– 0.19**	– 0.08	– 0.01	**– 0.42**	–

N in questions refers to changes in the number of activities, FX in questions refers to the frequency of changes

Values in bold face are statistically significant $p < .05$

Table 3 Mixed-effects models estimating police administrators' perceptions of effectiveness at minimizing risk of COVID-19 exposure for line-level officers

	Model 1	Model 2	Model 3	Model 4	Model 5
Fixed-effects					
Changes to in-person training	–	0.18 (.03)***	0.15 (.03)***	0.17 (.03)***	0.18 (.03)***
Changes in N CFS handled in person	–	− 0.06 (.03)*	− 0.04 (.02)	− 0.04 (.03)	−0.01 (.03)
Changes in ways in which citizens could report crimes	–	− 0.08 (.02)***	− 0.11 (.02)***	− 0.06 (.02)**	− 0.04 (.03)
Changes in N officer-initiated activities	–	− 0.15 (.03)***	− 0.14 (.03)***	− 0.17 (.03)***	− 0.15 (.03)***
Change Fx in-person COP	–	− 0.13 (.03)***	− 0.17 (.03)***	− 0.10 (.03)***	− 0.09 (.03)***
Change in N arrests for minor crimes	–	− 0.03 (.03)	− 0.01 (.03)	− 0.01 (.03)	− 0.02 (.03)
Change in N warnings for COVID-19 violations	–	0.06 (.03)*	0.03 (.03)	0.08 (.03)*	0.09 (.03)**
Change in N fines for COVID-19 violations	–	0.21 (.03)***	0.23 (.03)***	0.21 (.03)***	0.20 (.03)***
Changes to FTO training	–	0.21 (.02)***	0.17 (.02)***	0.17 (.02)***	0.21 (.02)***
Change in public access to police facilities	–	0.15 (.02)***	0.15 (.02)***	0.18 (.02)***	0.19 (.02)***
Change in N of personnel working remotely	–	–	− 0.07 (.03)*	− 0.10 (.03)***	− 0.15 (.03)***
Change to social distancing of workforce	–	–	− 0.10 (.02)***	− 0.11 (.02)***	− 0.16 (.02)***
Changes in the use of PPE	–	–	0.28 (.03)***	0.25 (.03)***	0.23 (.03)***
Officers adhered to new organizational rules	–	–	–	0.38 (.02)***	0.41 (.03)***
Member of the agency died of COVID-19	–	–	–	–	− 0.27 (.13)*
Peak infection COVID-19 rate of agency personnel	–	–	–	–	− 0.15 (.02)***
Random-effects					
Region of World	1.10 (.06)***	0.36 (.18)*	0.40 (.20)*	0.46 (.20)***	1.41 (0.43)***
χ^2 (df)	–	414.85 (10)***	522.46 (13) ***	798.30 (14)***	882.36 (16)
Intraclass correlation coefficient (ICC)	0.09	0.10	0.11	0.12	0.31

N in questions refers to changes in the number of activities, FX in questions refers to the frequency of changes

$p < .05$; **$p < .01$; ***$p < .001$

considering these additional factors, the changes in the number of CFS handled in person, and the number of warnings issued for COVID-19 law/regulation violations are no longer significant. Also noteworthy, the effects of a few variables were augmented after including these other variables. Specifically, we see that the effect of issuing fines for COVID-19 law/regulation violations increased by about 9.5%, and the negative effect of the frequency of in-person COP activities was augmented by 30.8%.

In Model 4, we add in the administrators' perceptions that their subordinates adhered to the organizational and operational changes made in response to the pandemic. The results suggest that administrators who report their officers adhered to the regulations were more likely to assess these changes as being effective ($b = 0.38$, $p < .001$). This means that for each unit of adherence reported by the administrators, the odds of higher effectiveness increased by 46.2%.[5] The effects from the other variables in the model remain substantively unchanged. Interestingly, we see that the ICC value in Model 4 is 33% stronger than in the unconditional model. This

would suggest that, after accounting for the various factors included in the models, the similarity between the effectiveness ratings in each region becomes stronger.

Finally, in Model 5, we add the effect of the pandemic on the administrators' perceptions of effectiveness. The results here clearly indicate that police administrators' perceptions of effectiveness were driven by the effect of COVID-19 on their agency. Having personnel who died due to COVID-19 exerts a strong negative effect on perceptions of effectiveness ($b = -0.27$, $p < .001$). Similarly, the peak infection rate or isolation due to a COVID-19 exposure was also negatively related to effectiveness ($b = -0.15$, $p < .001$). At first glance, some may interpret these results that the perceptions of effectiveness were reduced more by personnel dying, but this is only partly true. Recall that the COVID-19 infection/isolation scale was on an 8-point scale, whereas the COVID-19 death measure was dichotomous. This means that overall, the infection rate can exert a much stronger effect as the infection rate has more variability than does the dichotomous measure of death. Interestingly, these two measures are not strongly or significantly correlated with one another ($r = 0.0347$, $p = 0.66$).

There are four other important things to note from Model 5. First, the effects of the variables entered in prior models

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[5] This value is derived by transforming the log-odds reported in Table 3 into an odds ratio value by e^b.

remain substantively unchanged. Second, the effects of some variables are augmented, others diminished, after including the effects of the COVID-19 pandemic on the police administrators' personnel. Curiously, the results from the number of personnel working remotely and changes to social distancing practices are still significant and negative. Again, this contradicts the theoretical explanation for the other effects noted in the models. Third, we see that the effect of changes to how citizens could report crime is no longer significant after including indications of COVID-19. Fourth, the ICC for perceptions of effectiveness becomes even stronger in this final model. The ICC value is 2.44 times larger after including all the variables than the baseline model and 1.58 times stronger than in Model 4. Taken together, this would suggest that the effect of the pandemic largely drove perceptions of effectiveness.

Sensitivity Analyses

Given that approximately 40% of the sample came from North America, we re-estimate the results for Model 5, excluding these administrators. The model results are substantively similar to those presented for Model 5, with four exceptions. After excluding the administrators from North America, the frequency of in-person community policing is augmented, changing from -0.15 to -0.25. This suggests that administrators in North America were inconsistent with the amount of change to in-person community policing than were administrators from other regions. Looking at the data further, we see that administrators from Asia, Latin America, and the United Kingdom/Ireland were the least likely to report changes in the frequency of their in-person community policing activities. However, we do not know what the baseline levels of community policing were in these administrators' agencies in the first place. Second, the effect of the coefficient of public access to police facilities becomes non-significant when North American administrators are excluded. This is largely due to the heterogeneity within of how administrators responded to the pandemic. It may be that some police organizations took advantage of the pandemic to isolate themselves from the community further or were unable to change the access based on legal mandates.

Third, the effect of social distancing of the workforce is reduced by 50% after excluding administrators from North America. The data suggest that social distancing of the workforce was not universally possible outside of North America, the United Kingdom, and Western Europe. It is unclear why this is the case, and there is no data in our survey that can shed light on the reason for this. Finally, when the North American administrators are removed from the sample, the effect of an agency member dying of COVID-19 is augmented by 88.9%, from -0.27 to -0.52. Subsequent analysis of the data suggests that 3% of the administrators in North America reported having a member of the organization die due to COVID-19, compared to an average of 18% of the administrators from other regions.

Discussion

The COVID-19 pandemic forced police agencies to quickly adjust to the evolving "new normal." Indeed, prior research has demonstrated that police agencies saw systematic and widespread transformations in response to the COVID-19 pandemic (Alexander & Ekici, 2020; Lum et al., 2020a; Warren et al., 2020). While the nature and extent of the changes may not be uniform across the world (e.g., Maskály et al., 2021a), the fact remains that police administrators were put in the position where they were forced to react to the pandemic and implement changes quickly. This study adds to the growing body of literature by asking police administrators about how they perceive these changes to protect police officers and citizens from getting infected.

The results paint a complex picture of the factors that affected administrators' perceptions of the changes' effectiveness to keep officers and the community safe. Some of these factors are logically consistent. For instance, the fact that an officer died or the infection/self-isolation rate is high are clear indicators that the changes implemented did not have the intended effect. Similarly, administrators' perceptions of the degree to which their staff adhered to the changing rules and regulations should logically be related to the indications of perceived effectiveness. After all, it is unreasonable to think that failing to adhere to strategies trying to reduce and mitigate the risk of infection would be effective for protecting subordinates.

Not all of the findings are logically consistent and require further research to explain. For example, the CDC and WHO—among others—consistently recommended that the most effective way to reduce the transmission of the virus was to stay away from others. However, we see that some administrators implemented social distancing among workgroups. As more officers were permitted to work remotely, it reduced the administrators' perceived effectiveness of these strategies. We posit three potential explanations for these findings.

First, the very nature of police work requires the physical presence of officers in the community and their interaction with community members, at least to some extent. Further, given the sensitive nature of the information and the required tools necessary for certain officers to perform their jobs (e.g., detectives, tactical teams), it may be more difficult to distance these personnel. Both factors could have directly affected administrators' perceptions of effectiveness.

Second, these two findings could be an indirect indicator of the police agencies' ability to implement these strategies in the first place. Recall that these data were collected worldwide and required high-speed internet access, which is also necessary for remote work. It is not as ubiquitously available in more industrialized Western countries. Additionally, prior research has found that some police administrators reported difficulties implementing these sorts of remote working strategies due to legal constraints that prevented implementing these sorts of strategies (Maskály et al., 2021a).

The third explanation for the contradictory findings of social distancing may come from factors largely outside the control of police administrators. While police administrators can, to some extent, control the behaviors of their staff while at work, they cannot control what their personnel—and their families—do at home. An officer could theoretically be perfectly protected from exposure to COVID-19 by following all of the rules and regulations put in place by police administrators. However, when that officer goes home, the administrators' ability to control their behaviors is significantly mitigated—if not eliminated. The fact that police executives—similar to employers—can only exert limited control over their subordinates' behavior off-duty, this off-duty behavior could be confounding the effects noted here. Future research should examine the actions of police officers and compare that to the perspective of police executives.

This third explanation paints a potentially bleak relationship for the classic conceptualization of police administrators operating based on intuition. Intuitively, the changes implemented by police administrators and their personnel's adherence to the new rules and regulations *should* have protected their subordinates. However, as other research has shown, senior police leader intuitive perceptions of effectiveness have been historically problematic. In the case of the COVID-19 pandemic, Maskály et al. (2021a, 2021b) reported that police administrators—often unwarrantedly—provide a rosy perception of the potential effects of the organizational and operational changes made in response to the pandemic. Ergo, it could well be that the administrators' perceptions of effectiveness are equally overly optimistic. This may be yet another piece of prima facia evidence that police administrators should widely adopt evidence-based strategies, whereby the effects of various strategies are subjected to robust empirical scrutiny (Weisburd & Neyroud, 2011).

The fourth explanation for these findings is that there are differences in the perspectives and baseline attitudes of police administrators. Particularly, some administrators may have been more reticent than others to impose wholescale changes within their organization due to the perceived seriousness of the pandemic. Those administrators who felt COVID-19 was no more serious than the flu may have been less willing to make these changes in the first place.

Likewise, these administrators may have been critical of those changes thrust upon them that they felt were unnecessary. The data used in this study were primarily looking at the organizational-level changes rather than the individual perspectives of the administrators; therefore, we cannot control for these differences here. Future research should further look to understand how the perspective of the executives plays into the decisions they make and their perspective of these changes.

We do not mean to be proverbial armchair critics. We recognize that police administrators needed or were forced—to make changes for the well-being of their staff and the public. However, it is unclear if the police administrators fully weighed these changes' potential second-and third-order effects. For example, reducing public access to police facilities was significantly related to administrators' perceptions of effectiveness; however, this does not account for this strategy's damage to police-community relationships. There is a strong argument about the potential erosion of police legitimacy stemming from community members in need of police assistance finding themselves prohibited from effectively accessing the services of the police. Police administrators must balance the effectiveness of their policies in protecting their personnel—and the public—from exposure to COVID-19 while not eroding their place as a legitimate authority in the eyes of the public. This need to balance the pushes and pulls of various factors seems to be an emerging issue in response to the pandemic and the unintended consequences of changes designed to mitigate exposure to COVID-19 at the expense of other problems. This situation may exacerbate the difficulties in securing the next generation of police officers for two reasons. First, applicants may feel unsafe going into the profession due to reports of officers becoming infected or dying due to COVID-19. Second, the regulations that police were expected to enforce during the pandemic may have alienated some members of the public, making policing no longer a viable career path.

Declarations

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