A comparative study of police organizational changes during the COVID-19 pandemic: responding to public health crisis or something else?

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Abstract  Police organizations—like many other social institutions—were forced to make changes in response to the COVID-19 pandemic. This exploratory study uses data from 28 countries to examine how the strength of the pandemic (e.g. infection rates and death rates) and governmental restrictions are related to these changes. The analyses of the data suggest the way in which police organizations responded to the pandemic was complicated. Infection rates are generally not as strongly related to changes as are death rates. Governmental restrictiveness is strongly related to some changes. Additional research is needed to tease out additional factors that potentially explain these changes as well as multivariate effects of these factors.

Introduction

When the World Health Organization declared the COVID-19 a pandemic on 11 March 2020 (WHO, 2020), it called on countries ‘to take urgent and aggressive action’. Many governments declared a state of emergency and enacted a variety of measures designed to protect public health, ranging from restricting public gatherings and closing non-essential businesses, to imposing the stay-at-home orders and lockdowns. Within a month, more than 3.9 billion people in over 90 countries were asked or ordered by their governments to stay at home to prevent the spread of COVID-19 (Sandford, 2020).

As first responders, the police found themselves in crisis mode. On the one hand, police officers had to protect themselves by wearing personal protective equipment (PPE) and limiting public unnecessary contacts, while still providing essential police services. Beyond the usual police responsibilities, the police were charged with enforcing newly enacted COVID-19 measures, often with a lack of clear guidelines and adequate police training (e.g. Warren et al., 2020). As a result, police agencies changed their internal operations and...
how they interact with the public (e.g. Alexander and Ekici, 2020; Lum et al., 2020; Maskály et al., 2021; Warren et al., 2020).

However, no study—of which we are aware—has systematically explored the degree to which police organizational and operational changes are primarily related to the severity of the COVID-19 health threat or other factors, such as governmental restrictions on citizens and restrictions on governmental powers. This study seeks to explore if the changes police organizations made during the initial stages of the COVID-19 pandemic are proportionate to the severity of the health threats during this period. Using a sample of 28 countries, we assess the degree to which three types of factors—the severity of the health crisis, the restrictiveness of the COVID-19 measures, and the restrictions on governmental powers—are associated with police organizational and operational changes.

**Empirical research on changes in police organizations during the COVID-19 pandemic**

The COVID-19 pandemic forced governments to quickly react to the growing public health crisis. Countries typically authorized police agencies to enforce these rules, often with limited training or instruction (e.g. Matarazzo et al., 2020; Warren et al., 2020). Police agencies around the world were entrusted—and often expected—to issue fines and make arrests for violations of the COVID-19 restrictions (e.g. Warren et al., 2020). Simultaneously, crime rates and calls for service seem to have decreased, at least temporarily (e.g. Faull and Kelly, 2020; Hodgkinson and Andresen, 2020; Lersch, 2020; Lum et al., 2020; Maskály et al., 2021; Mohler et al., 2020; Ashby, 2021). Police agencies adapted to these changes, while trying to protect staff from exposure to COVID-19.

Organizations were immediately concerned with the acquisition of PPE for employees and teaching the officers how to properly utilize it. Even police agencies in the Global North (e.g. Canada, USA) struggled to secure PPE early in the pandemic (e.g. Jennings and Perez, 2020). Indeed, one study found that barely one-half (53%) of the agencies rated their ability to provide PPE for employees as ‘excellent’ or ‘good’ (Lum et al., 2020). Similarly, Maskály et al. (2021) found that respondents from 75% of countries in their international sample reported not only that the use of PPE changed in response to COVID-19, but also that, as expected, its use dramatically increased during the pandemic.

However, obtaining PPE alone does not protect police officers. Some agencies also provided officers instructions or training on the use of the equipment for personal safety (Lum et al., 2020; Interpol, 2020; PERF, 2020). In Maskály et al. (2021) study, respondents from about two-thirds of the countries in the sample indicated the use of PPE was regulated by the official rules. However, it seems that cultural norms (e.g. linking the wearing of masks and gloves with feminine jobs) may have interfered with officers’ appropriate use of PPE (e.g. Alcadipani et al., 2020).

Another popular strategy employed by some organizations to minimize exposure to COVID-19 was limiting their unnecessary contacts with the community. Many agencies minimized in-person proactive activities, such as community policing or problem-solving efforts (e.g. Alexander and Ekici, 2020; Lum et al., 2020; Maskály et al., 2021), directed patrols (e.g. Maskály et al., 2021), use of special operations teams (e.g. Maskály et al., 2021), and traffic stops (e.g. Alexander and Ekici, 2020; Maskály et al., 2021). According to the National Police Foundation (2020), cancelling in-person community-oriented policing activities has been ubiquitous in the USA. Organizations consistently reported the number of traffic stops decreased during the early peak of the pandemic, although this could have been due to decreased traffic volume as well (Ashby, 2021; Lum et al., 2020; Maskály et al., 2021; Mohler et al., 2020).
An overview of US police agencies’ responses to the COVID-19 pandemic by the Police Executive Research Forum (PERF) (2020) identified limiting response to certain calls for service and employing alternative reporting strategies (e.g. by phone, online). Indeed, empirical studies from the USA and internationally confirmed this was a frequent strategy (e.g. Alexander and Ekici, 2020; Lum et al., 2020; Maskály et al., 2021). Similar trends were seen in other types of reactive enforcement strategies as well. PERF (2020) noted several examples of agencies discouraging arrests for less serious offenses. This was supported by a study from Lum et al. (2020), indicating that the US and Canadian police agencies had reduced the use of arrests for minor crimes. Maskály et al. (2021) further documented this trend internationally, with more than two-thirds of countries reporting reduced arrests for minor crimes and about one-half reporting deceased arrests for serious crimes too.

Finally, the changes to police organizations in response to the pandemic also affected their operations. Both the PERF (2020) and Vera Institute of Justice (2020) provided recommendations for operational changes in response to the pandemic. The earliest empirical study of these changes found that most agencies suspended in-person training and transitioned civilian staff to remote work (Lum et al., 2020). A subsequent study found most police agencies modified personnel scheduling, assigned officers to work remotely and separately, and suspended in-person training, regardless of its type (Alexander and Ekici, 2020). This trend was not isolated to the Global North, as Maskály et al. (2021) found in their study of 28 countries from different parts of the world that most police organizations reported decreasing in-person training (86%) and increasing remote work (63%).

**Empirical research on factors related to police changes during the COVID-19 pandemic**

It is reasonable to assume that police agencies would change their operation and organization in response to a health threat caused by the COVID-19 pandemic. Because the strength of the measures introduced across the world varied greatly, from Sweden’s limited measures to complete lockdowns in Italy and France. It is possible that additional factors may have shaped the governmental and police agency responses to the pandemic. Yet, we could not find any empirical study that has systematically examined the potential factors that may have affected how police agencies changed in response to the COVID-19 pandemic. In the absence of such sources, we will rely on Roche’s (2020) study to develop the arguments for this study.

Roche’s (2020) study explored the factors related to governmental decisions to impose measures restricting citizens’ movement during the COVID-19 pandemic. Roche (2020) begins by analyzing notable variations in the constraints imposed by European Union governments on their citizens. Combining the Frontex’s measure of COVID-19 restrictions with the use of emergency powers in a country, Roche creates the ‘total exception score’ for each country, thus measuring the level of restrictiveness of governmental measures. He then tests the hypothesis that the governmental restrictions are related to the countries’ COVID-19-related health threat. In the absence of consistent measures of COVID-19 infections across the countries, Roche relied on the ‘pressure of the disease’ being measured through the death rates and robustness of the health care system. The underlying assumption being that these restrictive measures were introduced to protect the population from risk of infection and death. Thus, the more powerful the impact of COVID-19 on a country, the more restrictive the government measures should be. However, the results of Roche’s study (2020) show that this is not the case. Specifically, about three-quarters of the countries with the strictest governmental restrictions had some of the lowest death rates. Similarly, the relation between governmental restrictiveness and robustness of the health care system is also quite weak (Roche, 2020).
Roche (2020) next explores the effect of political culture of the elites—the measure of the depth of democracy—as an alternative explanation for the strength of the governmental restrictions. Among the World Justice Project indicators, Roche uses the constraints on the government. The results reveal a very clear negative relation between the strength of the governmental restrictions and the political culture of the elites (i.e. the adherence to the rule of law). Countries that less strictly adhere to the rule of law are also the ones that have introduced more restrictive measures in the first wave of the pandemic.

Applying Roche’s (2020) logic to our study—exploring the reasons for the organizational and operational changes in police agencies—we proffer two competing arguments. First, police agencies could have changed—like other aspects of society—based on public health concerns. As the COVID-19 infection and death rates increased, the concerns about the appropriate protection against the disease amplified. Many countries closely adhered to the WHO (2020) recommendations including: mask wearing, physical distancing, avoiding crowds, and avoiding closed and close-contact settings. Therefore, we might expect that the stronger the health threat of COVID-19, the more extensive changes police organizations would make to protect the health and lives of both police officers and citizens.

Second, it is possible that police organizational and operational changes were driven primarily by other factors, including the strength of the government’s restrictions or constraints on the governmental power. Because the police are part of society, the imposition of more restrictive governmental measures should be positively related to the changes in police operations and organizations. In essence, as part of the larger social fabric, the police would adhere to governmental restrictions the same as any other social institution would. However, it is possible that governmental restrictions and police operational and organizational changes are both caused by the severity of the COVID-19 health threat. Yet, as Roche’s (2020) study has demonstrated, the severity of the perceived health threat is not a strong a predictor of governmental restrictiveness as other non-COVID-19 measures are. Applying this logic in our search for alternative explanations for the extent of police organizational changes, the police agencies in less democratic governments—which are more likely to suspend the rule of law—may use the pandemic as an opportunity to make organizational and operational changes as well, maybe even at the cost of reducing accountability and transparency—or more sinisterly to reduce these factors.

**Current study**

One finding that has emerged from early research examining the effects of the COVID-19 pandemic on police operations around the world is the amount of variability in organizational changes made in response to the pandemic. While some more ubiquitous changes were made by police organizations (e.g. augmented use of PPE), many other changes seem to be more idiosyncratic (e.g. Lum *et al.*, 2020; Maskály *et al.*, 2021). This study seeks to contribute to our understanding of the police organizational changes by exploring the role of factors potentially associated with these changes. Specifically, we are interested in assessing whether these organizational changes were driven primarily by indicators of the strength of the pandemic, the restrictiveness of the governmental response, or the strength of democracy.

**Methods**

**Survey**

The data for this study were collected through a survey administered to police executives around the world. Based on the PERF’s recommendations for police agencies (2020) and the results of the
early systematic data collections from other researchers (Lum et al., 2020), we designed our questionnaire and refined it through expert feedback. Because of the comparative nature of the study, we solicited feedback from police executives in different countries (e.g. Croatia, South Korea, UK, and USA).

The questionnaire asks about the magnitude of potential changes, the valence of those changes, and whether those changes were made as a result of organizational policy. To ease the understanding of the findings, we will group similar items together, although the items may have not appeared consecutively in the questionnaire. The grouping of the items is described in more detail below. Most of the questions in the questionnaire featured Likert-type scales. A fuller description of the questionnaire can be found in the work of Maskály et al. (2021).

As the governments in many countries developed lockdown rules at the national level (e.g. Roche, 2020), our unit of analysis is the nation state. Because we could not capture the diversity of responses across police agencies within each country in our questionnaire, we instructed the respondents to answer questions as they pertain to ‘their’ police agency.

Data

The data were collected through a digital survey using a restricted link—and associated password—that was sent to police executives in the early summer of 2020 through two primary means. First, the survey was distributed to member states of the United Nations Office on Drugs and Crime (UNODC). Second, we reached out to professional organizations that represent police executives in various countries (i.e. Police Chief’s Associations in the USA, The European Union Agency for Law Enforcement Training in Europe [CEPOL], and the National Police Chiefs Council in the UK).

We received the data from 28 countries. Figure 1 shows that our data come from most of the major regions of the world, including a fair number of countries from the often-understudied Global South. If multiple submissions were received for a country (M = 5; Mdn. = 1; Q1 = 1; Q3 = 3; SD = 10.67; Range = 1–53), we averaged all the responses. This point estimate was then rounded to the closest whole number, so that the results could be presented with the response anchors that were available for individual responses. The rounding did not substantively change average values of the variables in the study. It is important to understand the heterogeneity in the responses we received here. Some come from organizations from decentralized developed Western democracies, whereas others come from centralized police organizations in countries in transition—and everything in between. These differences may affect the ability and resources of the countries to respond to the pandemic. Ultimately, the data are a convenience sample.

Dependent variables

The dependent variables relate to the organizational changes implemented by police agencies. Specifically, we tap into potential organizational and operational changes made in response to the COVID-19 pandemic. The descriptive statistics for each item from the survey are presented in Table 1.

The first set of variables asks whether things have changed using a point Likert scale ranging from 0 (did not change at all) to 4 (completely changed). Latent factors were created using all items which yielded factor scores, which were then used in subsequent analyses (Allen and Yen, 2002). The analysis yielded seven factors: organizational risk reduction ($x = 0.87$), organizational information sharing ($x = 0.72$), organizational risk mitigation ($x = 0.75$), complaints and investigations ($x = 0.72$), crime suppression strategies ($x = 0.91$), crime prevention strategies ($x = 0.91$), and reactive policing ($x = 0.87$). The specific items that went into each construct are presented in Tables 3 and 4.
The second set of dependent variables asks about the valence of the change, that is, whether things increased or decreased (i.e. valence of changes). These items were measured on a 5-point Likert scale from -2 (significantly decreased) to 2 (significantly increased). The descriptive statistics for the valence of change variables are presented in the right column of Table 1. We could not develop latent factors for these variables due to low-reliability coefficients (i.e. \( \approx 0.35 \)) and problems with model convergence. Closer examination of the data shows that agencies may have simultaneously seen significant increases in some activities and significant decreases in similar items, hence indicating no change overall. For example, a country could have seen a significant increase in complaints (+2), but a significant decrease in internal investigations (-2), which nets a score of zero on the metric. This score is indistinguishable from a country who had no change in both metrics (0). When we attempted to create an additive index for these variables, more than 70% of countries received a value of zero.

Independent variables

One of the assumptions we test here is that changes in police organizations were directly proportional to the health threat of the pandemic in an area. Logically, it makes sense that harder-hit areas would require more substantial changes in police operations to stave off the spread of the virus. Using data from the Worldometer (2020)\(^1\) COVID-19 tracking data, we estimate the peak infection rate per 100,000 persons per country between the start of the pandemic and 1 July 2020, when data collection began. Additionally, because of the differences in the estimates of the dark number of actual COVID-19 cases (i.e. those who were infected but never tested), we also include the peak death rate per 100,000 people during the same period.

Changes within police organizations also could have been driven by the restrictiveness of the governmental measures implemented to control the COVID-19 pandemic. Again, one might assume that governmental restrictiveness is proportional to the risk of infection; however, some research

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\(^1\) Worldometer has been widely used and cited as a data source in a number of academic publications.
## Table 1: Descriptive statistics

| Absolute change | Valence of change |
|-----------------|-------------------|
| **M (SD)**      | **Range**         | **M (SD)** | **Range** |
| Reassigned personnel to address staffing needs | 1.54 (1.07) | 0–4 | 0.10 (1.17) | -2–2 |
| Police officers working remotely | 1.82 (1.06) | 0–4 | 0.85 (1.14) | -2–2 |
| Use of vacation time | 1.86 (1.38) | 0–4 | 0.00 (1.17) | -2–2 |
| Shift briefings or roll calls | 2.07 (1.24) | 0–4 | -0.25 (1.02) | -2–2 |
| Police training | 2.29 (1.49) | 0–4 | -1.45 (0.73) | -2–2 |
| Use of civilians (non-sworn) personnel | 1.11 (1.22) | 0–4 | - | - |
| Data collection and reporting by the police agency | 1.04 (0.98) | 0–4 | - | - |
| Use of PPE | 2.67 (1.18) | 0–4 | 1.37 (1.12) | -2–2 |
| In person citizen contacts at the front desk | 2.27 (1.27) | 0–4 | - | - |
| Field training | 2.31 (1.35) | 0–4 | - | - |
| Public access to police facilities | 2.24 (1.13) | 0–4 | - | - |
| Use of physically separated working locations for special units | 1.72 (1.24) | 0–4 | - | - |
| Internal investigations of allegations of misconduct | 1.00 (1.17) | 0–4 | -0.05 (0.71) | -2–2 |
| Handling of citizen complaints against the police | 1.00 (0.96) | 0–4 | - | - |
| Activities of special ops. (e.g. narcotics, gangs, traffic, and vice) | 1.54 (1.14) | 0–4 | -0.28 (0.83) | -2–2 |
| Activities of special operations (e.g. cybercrime, online fraud) | 1.35 (1.29) | 0–4 | - | - |
| Use of SWAT/tactical teams | 1.28 (1.02) | 0–4 | -0.67 (0.69) | -2–2 |
| Officer-initiated activities | 1.64 (1.25) | 0–4 | -0.35 (1.04) | -2–2 |
| Problem-solving and community-policing activities | 2.00 (1.17) | 0–4 | -0.50 (0.95) | -2–2 |
| Use of directed patrols or extra patrols | 1.92 (1.19) | 0–4 | 0.35 (0.93) | -2–2 |
| Ways in which citizens could report crime | 1.39 (1.21) | 0–4 | - | - |
| Handling of calls for service | 1.28 (0.98) | 0–4 | - | - |
| Traffic stops | 1.83 (1.27) | 0–4 | - | - |
| Enforcement of laws dealing with minor crimes | 1.60 (1.26) | 0–4 | - | - |
| Taking people into custody | 1.96 (1.10) | 0–4 | - | - |
| Number of citizen complaints about non-COVID-19 policing | - | - | -0.05 (0.85) | -2–2 |
| Number of CFS overall | - | - | -0.35 (1.09) | -2–2 |
| Number of CFS handled in person | - | - | -0.40 (1.00) | -2–2 |
| Number of family violence CFS | - | - | 0.11 (0.99) | -2–2 |
| Number of traffic stops | - | - | -0.37 (1.01) | -2–2 |
| Number of business alarms | - | - | -0.45 (0.83) | -2–2 |
| Number of traffic crashes | - | - | -0.78 (0.65) | -2–2 |
| Number of burglaries | - | - | -0.95 (0.91) | -2–2 |
| Number of felony arrests | - | - | -0.35 (0.99) | -2–2 |
| Number of misdemeanour arrests | - | - | -0.75 (0.91) | -2–2 |
| Number of arrests for family violence | - | - | 0.11 (0.99) | -2–2 |
| Number of arrests for domestic violence | - | - | -0.10 (0.97) | -2–2 |
| Organizational risk reduction (factor score) | 0.00 (0.93) | -2.07–1.48 | - | - |
| Organizational information sharing (factor score) | 0.00 (0.85) | -1.24–2.50 | - | - |
| Organizational risk mitigation (factor score) | 0.00 (0.86) | -1.46–1.94 | - | - |
(e.g. Roche, 2020) raises serious questions about this assumption. To assess this, we use the Oxford Stringency Index from the Oxford Coronavirus Government Response Tracker (Oxford University, 2021). This measure is an amalgamation of various indicators, not all of which are relevant to police organizational changes. Therefore, to create an index that would more closely relate to the extent to which the governments restricted the movement of their citizens, we also collected data from government statements and newspapers about the specific actions taken in countries during this same period. We created our additive stay-at-home index (emergency declaration, lockdown, stay-at-home order, school closure, and closure of non-essential businesses; \( \alpha = 0.76 \)) and a border closure index (air, land, and sea; \( \alpha = 0.73 \)). Countries were given a value of zero if these changes were not made, 1 if there was minimal restriction, and 2 if there was substantial restriction for each activity.

Finally, as we are interested in examining the potential role that governmental adherence to the rule of law has on changes in police operations, we include two distinct measures. The first is the World Justice Project’s (WJP) measure of Constraints on Governmental Power, which is a measure that encompasses six sub-domains and is summarily described as a measure of ‘the extent to which those who govern are bound by the law’ (World Justice Project, 2020). The second is the World Governance Indicators (WGI) measure of Rule of Law, which is described as measuring, ‘...perceptions of the extent to which agents have confidence in and abide by the rules of society...’ (Kaufman and Kraay, 2020). Both indicators have consistently been used in comparative research in a multitude of disciplines, including policing (Maskály et al., 2021). The descriptive statistics for these variables, as well as the inter-item correlations, can be found in Table 2.

Table 1: Continued

|                              | Absolute change          | Valence of change          |
|------------------------------|--------------------------|---------------------------|
|                              | \( M \) (SD) | Range | \( M \) (SD) | Range |
| Complaints and investigations (factor score) | 0.00 (0.76) | −0.83–2.42 | 0.00 (0.83) | 0.00–0.83 |
| Crime suppression strategies (factor score) | 0.00 (0.95) | −1.22–2.19 | 0.00 (0.95) | 0.00–0.95 |
| Crime prevention strategies (factor score) | 0.00 (0.93) | −1.61–1.78 | 0.00 (0.93) | 0.00–0.93 |
| Reactive policing (factor score) | 0.00 (0.96) | −1.58–1.83 | 0.00 (0.96) | 0.00–0.96 |

Table 2: Correlations among independent variables

|                              | 1  | 2  | 3  | 4  | 5  | 6  | 7  |
|------------------------------|----|----|----|----|----|----|----|
| COVID19 infections (1)       | 5.15 (4.91) | 0.05 | 0.07 | 0.04 | 0.38 (0.52) | 0.15 |
| COVID-19 deaths (2)          | −0.71* | 0.01 | 0.01 | 0.08 | 0.00 | 0.00 |
| Oxford stringency index (3) | −0.05 | 0.16 | 0.15 | −0.04 | 0.00 | 0.00 |
| Additive social restrictiveness index (4) | −0.07 | 0.16 | 0.15 | −0.04 | 0.00 | 0.00 |
| Additive border closing index (5) | 0.29 | 0.30 | 0.08 | 0.18 | −0.17 | 0.51 |
| WJP-governmental powers (6)  | 0.20 | 0.25 | 0.15 | 0.29 | −0.17 | 0.90* |
| WGI-rule of law (7)          | 0.20 | 0.25 | 0.15 | 0.29 | −0.17 | 0.90* |

Bold values are the mean and standard deviation for these variables rather than correlation coefficients.

* = \( p < .05 \).
Analytic plan
As we have data from only 28 countries, we are limited in the analyses we can conduct. The analyses proceed in two stages. First, we examine the association between the absolute change in the latent variables and independent variables. Additionally, we disaggregate the effect of the composite estimates by looking at the relationship between the independent variables and the individual items. Second, we examine the relationship between the independent variables and the valence of change for item.

Results
Effect of the pandemic on absolute change in organizations
We begin by looking at how the peak infection and death rates are related to changes in police organizations. The results, presented in Tables 3 and 4, show a positive relationship between infections and organizational risk reduction ($\rho = 0.34, P < 0.10$) and organizational risk mitigation ($\rho = 0.33, P < 0.10$), but not organizational information sharing ($\rho = 0.13, P > 0.10$). The death rate is strongly correlated with risk organizational mitigation ($\rho = 0.50, P < 0.05$), but not organizational risk reduction ($\rho = 0.34, P < 0.10$) and organizational information sharing ($\rho = -0.01, P > 0.10$). By showing the correlation between these independent variables and the items that make up these constructs, we see a complex picture develop. Whereas organizations changed their use of PPE based on the rate of infections ($\rho = 0.32, P < 0.10$), but not the rate of death ($\rho = 0.14, P > 0.10$), the death rate was associated with the organizations’ shift to remote working and use of physically separated working environments. It seems that agencies made risk reduction measures based primarily on the perceived level of the virus in the community, while they make risk mitigation measures when either the infection rate is higher and/or the death rate is higher.

Looking at the other types of changes that organizations made based on the strength of the pandemic, it is notable that none of the other changes made by police organizations were statistically related to the strength of the pandemic. In fact, the only other item that is statistically related to the strength of the pandemic is the relationship to the use of SPeical Weapons and Tacticts (SWAT)/Tactical teams and the death rate ($\rho = -0.31, P < 0.10$). However, this finding is counterintuitive as risk-averse police organizations would not want to deploy these officers when death rates are high, unless there was a compelling reason to do so (e.g. to deal with anti-COVID-19 restriction protests).

Effect of governmental restrictiveness on absolute change in organizations
If, as might seem logical, there was a relationship between the governmental restrictions and police organizational changes, we should see substantively similar results between the two measures. However, the data reveal a different story. The result that the COVID measures are weakly correlated with the measures of governmental restrictiveness is seemingly a predictable result, given Roche’s (2020) findings.

Our results show that governmental restrictiveness, measured through the Oxford Government Stringency Index, was not significantly correlated to any of the seven dimensions of police organizational changes. Similarly, our stay-at-home index was not related to any of the seven dimensions of police organizational changes. On the other hand, the strongest relationships we note from our data are the relationships between our second measure of governmental restrictiveness, namely border closings, and reactive policing strategies ($\rho = -0.59, P < 0.05$), complaints and internal investigations ($\rho = -0.47, P < 0.05$), and crime prevention strategies ($\rho = -0.34, P < 0.10$). However, it should be noted that these
**Table 3**: Bi-variate effect of pandemic measures on dimensions of organizational change

| Measure                                                                 | Peak rate of COVID-19 infections | Peak rate of COVID-19 deaths | Oxford gov. stringency index | Stay-at-home index | Border closing index | WJP gov. powers | WGI rule of law |
|------------------------------------------------------------------------|----------------------------------|-------------------------------|------------------------------|-------------------|--------------------|-----------------|-----------------|
| Police training                                                       | 0.09                             | 0.34†                         | -0.11                        | -0.28             | 0.21               | -0.05           | -0.19           |
| Use of PPE                                                            | 0.32†                            | 0.14                          | -0.13                        | -0.23             | -0.21              | -0.28           | -0.33†          |
| Field training                                                        | 0.08                             | -0.05                         | -0.34†                       | -0.08             | -0.43*             | -0.25           | -0.26           |
| Public access to police facilities                                    | 0.33†                            | 0.32†                         | -0.24                        | 0.11              | -0.18              | -0.12           | -0.18           |
| In person citizen contacts at the front desk                          | 0.29                             | 0.21                          | -0.26                        | -0.08             | 0.06               | -0.14           | -0.19           |
| Shift briefings or roll calls                                          | 0.30                             | 0.13                          | -0.01                        | 0.13              | 0.08               | -0.14           | -0.12           |
| Use of civilians (non-sworn) personnel                                | -0.05                            | -0.04                         | 0.33†                        | 0.03              | -0.16              | -0.29           | -0.29           |
| Data collection and reporting by the police agency                     | 0.08                             | -0.08                         | -0.09                        | -0.15             | -0.26              | -0.42*          | -0.33†          |
| Reassigned personnel to address staffing needs                         | 0.19                             | 0.33†                         | 0.14                         | 0.50*             | -0.52*             | -0.22           | -0.16           |
| Police officers working remotely                                      | 0.24                             | 0.51*                         | -0.14                        | -0.01             | 0.12               | -0.16           | -0.13           |
| Use of physically separated working locations for special units        | 0.24                             | 0.45*                         | -0.04                        | 0.03              | -0.01              | 0.07            | 0.13            |
| Use of vacation time                                                   | 0.19                             | 0.12                          | 0.16                         | -0.32†            | -0.04              | -0.23           | -0.22           |

*P < .05; †P < .10.
relationships—as most of these relationships—are negative. The more restrictive the governmental response is in a country, the fewer organizational changes are expected in police organizations.

When we disaggregate the results and look at the relationships between individual items, we see that the relationships in the aggregate are largely being driven by a relatively small set of items (Table 4). However, the items driving the relationship seem to be different, based on the governmental restrictiveness measure employed. There are only two items that are significantly related to two of these measures and none are consistently related to all three. Field training is least likely to see changes in countries with higher scores on the Oxford Stringency Index ($\rho = -0.34$, $P < 0.10$) and with our border closings measure ($\rho = -0.43$, $P < 0.05$). Apart from that, the pattern of results largely appears to be distinct for changes in police organizations. This may suggest that, while the measures are meant to capture the same construct (i.e. triangulate), in fact, each is capturing a distinct phenomenon. This could also indicate these restrictions were not imposed based on the empirical data, but rather some other factors (i.e. temporal discounting). We also wish to highlight the relationship between our border closing index and the changes in reactive policing tactics. Countries with more border closing saw the least changes in their reactive policing tactics, which was the strongest relationship observed in this study.

**Effect of constraints on government powers on changes in police organizations**

The final two columns of Tables 3 and 4 present the results for linking the constraints on governmental power with changes in police organizations. The results suggest that those governments who score higher on the WJP measure see decreases in changes to information sharing ($\rho = -0.36$, $P < 0.05$) and complaints and investigations ($\rho = -0.33$, $P < 0.10$). The WGI measure was also negatively associated with information sharing ($\rho = -0.31$, $P < 0.10$). When we disaggregate the results, we largely see that the same indicators are significantly associated with each of these measures, including data collection and reporting ($\rho_{\text{WJP}} = -0.42$, $P < 0.05$; $\rho_{\text{WGI}} = -0.33$, $P < 0.10$), internal misconduct investigations ($\rho_{\text{WJP}} = -0.58$, $P < 0.05$; $\rho_{\text{WGI}} = -0.56$, $P < 0.05$), and problem-oriented policing and community policing activities ($\rho_{\text{WJP}} = -0.32$, $P < 0.10$; $\rho_{\text{WGI}} = -0.31$, $P < 0.10$). The WGI indicator is associated with changes in PPE usage ($\rho = -0.33$, $P < 0.10$) and arrests for minor crimes ($\rho = -0.36$, $P < 0.05$), but the WJP measure is not. None of the remaining changes are associated with either measure here.

**Effect of strength of the pandemic on valence of change**

Next, we examine the effect of the pandemic-related measures by looking at the valence of the changes made by police organizations. The results are presented in Table 5. Some of the effects were consistent with what we would expect during a pandemic (e.g. use of PPE is related to both the infection rate and the death rate: $\rho_{\text{infection rate}} = 0.47$, $P < 0.05$; $\rho_{\text{death rate}} = 0.43$, $P < 0.05$), while others are counterintuitive (e.g. number of traffic stops and peak rate of infections: $\rho = 0.34$, $P < 0.10$).
### Table 4: Bi-variate relationships absolute change for other types of indicators

| Complaints and Investigations | Peak rate of COVID-19 infections | Peak rate of COVID-19 deaths | Oxford govt. stringency index | Stay-at-home index | Border closing index | WJP gov. powers | WGI rule of law |
|------------------------------|----------------------------------|-------------------------------|--------------------------------|--------------------|----------------------|----------------|----------------|
| Internal investigations of allegations of misconduct | 0.01 | 0.08 | −0.24 | −0.13 | 0.23 | 0.18 | −0.14 | −0.06 | −0.29 | −0.47* | −0.58* | −0.33† | −0.56* | −0.29 |
| Handling of citizen complaints against the police | 0.14 | 0.02 | 0.09 | 0.03 | −0.54* | −0.01 | 0.04 |
| Activities of special operations teams | −0.09 | −0.06 | −0.30 | −0.24 | −0.23 | −0.12 | −0.02 | 0.03 | −0.31† | −0.27 | −0.28 | −0.29 | −0.20 | −0.19 |
| Activities of cyber-crime operations | −0.01 | −0.14 | −0.04 | 0.10 | −0.15 | −0.05 | −0.04 | −0.10 | 0.08 | −0.18 | −0.17 | 0.01 | −0.04 | 0.07 |
| Use of SWAT/tactical teams | −0.12 | −0.31† | −0.10 | 0.03 | −0.32† | −0.07 | −0.03 | −0.14 | 0.02 | −0.16 | −0.21 | 0.13 | 0.07 | 0.08 |
| Officer-initiated activities | 0.24 | 0.17 | 0.13 | 0.15 | −0.31† | −0.26 | −0.14 | 0.15 | −0.25 | −0.34† | −0.13 | 0.05 | 0.04 | −0.09 | −0.25 | −0.13 | −0.12 |
| Problem-solving and community-policing activities | 0.13 | 0.15 | −0.22 | 0.02 | −0.23 | −0.07 | −0.14 | −0.12 | −0.07 | −0.35† | −0.13 | 0.05 | 0.04 | −0.09 | −0.25 | −0.13 | −0.12 |
| Use of directed patrols or extra patrols | 0.12 | 0.13 | −0.19 | 0.16 | −0.47* | 0.07 | 0.03 | −0.17 | 0.08 | 0.35† | 0.06 | 0.04 | 0.04 | −0.09 | −0.25 | −0.13 | −0.12 |
| Ways in which citizens could report crime | 0.24 | −0.02 | 0.14 | −0.07 | 0.02 | −0.01 | −0.14 | −0.06 | 0.15 | −0.35† | −0.25 | −0.15 | −0.14 | −0.14 | −0.09 | −0.25 | −0.13 | −0.12 |
| Handling of calls for service | 0.02 | 0.07 | −0.37* | −0.01 | −0.46* | 0.01 | 0.47* | 0.09 | 0.08 | −0.13 | −0.26 | −0.49* | 0.01 | 0.14 |
| Traffic stops | −0.13 | −0.13 | 0.12 | 0.03 | −0.17 | 0.09 | 0.08 | −0.13 | −0.26 | −0.49* | 0.01 | 0.14 |
| Enforcement of laws dealing with minor crimes | 0.09 | 0.08 | 0.19 | 0.09 | −0.45* | −0.30 | −0.36* | 0.17 | 0.09 | −0.13 | −0.26 | −0.49* | 0.01 | 0.14 |

**Notes:** Rates are per 100,000 based on the single highest rolling 7-day average value prior to 01 July 2020; All dependent variables range from 0 (no change) to 4 (completely changed).

*P < 0.05.

†P < 0.10.
Table 5: Bivariate relationships with valence of change

|                                    | Peak rate of COVID-19 infections | Peak rate of COVID-19 deaths | Oxford stringency index | Stay-at-home index | Border closing index | WJP gov. powers | WGI rule of law |
|------------------------------------|----------------------------------|------------------------------|-------------------------|--------------------|---------------------|-----------------|-----------------|
| Fx of in-person shift briefings/   | -0.30                            | -0.43*                       | -0.14                   | -0.18              | -0.09               | -0.20           | -0.19           |
| roll calls                         |                                  |                              |                         |                    |                     |                 |                 |
| Fx of in-person training           | 0.09                             | -0.11                        | 0.19                    | 0.02               | 0.07                | 0.06            | 0.03            |
| N of officers temporarily          | 0.07                             | 0.27                         | -0.48*                  | 0.28               | 0.28                | 0.08            | 0.32            |
| reassigned                         |                                  |                              |                         |                    |                     |                 |                 |
| N of police officers working       | 0.14                             | 0.34†                        | -0.12                   | 0.50*              | 0.37*               | 0.21            | 0.27            |
| remotely                           |                                  |                              |                         |                    |                     |                 |                 |
| Number of officers using vacation  | -0.06                            | 0.22                         | -0.21                   | 0.47*              | 0.13                | -0.07           | 0.16            |
| time                               |                                  |                              |                         |                    |                     |                 |                 |
| Fx of use of PPE                   | 0.47*                            | 0.43†                        | -0.26                   | 0.40*              | -0.21               | -0.07           | 0.01            |
| N of citizens complaints for non-  | 0.18                             | -0.10                        | -0.11                   | -0.29              | -0.46*              | -0.23           | -0.47           |
| COVID-19 policing                  |                                  |                              |                         |                    |                     |                 |                 |
| N of internal investigations       | 0.44*                            | 0.10                         | 0.04                    | -0.01              | -0.46*              | 0.40*           | 0.22            |
| N of calls for service overall     | 0.09                             | -0.25                        | 0.26                    | 0.28               | -0.22               | -0.15           | -0.09           |
| N of calls for service handled in  | 0.18                             | -0.01                        | 0.03                    | -0.30              | -0.21               | -0.30           | -0.24           |
| person                             |                                  |                              |                         |                    |                     |                 |                 |
| N of family violence calls for     | 0.23                             | 0.29                         | -0.32†                  | 0.13               | 0.19                | -0.19           | -0.23           |
| service                            |                                  |                              |                         |                    |                     |                 |                 |
| N of traffic stops                 | 0.36†                            | 0.14                         | 0.03                    | -0.09              | -0.09               | 0.05            | 0.01            |
| N of business alarms               | -0.02                            | 0.14                         | 0.31†                   | 0.42*              | 0.26                | -0.10           | 0.01            |
| N of traffic crashes               | -0.30                            | -0.19                        | 0.01                    | 0.20               | 0.02                | 0.18            | 0.07            |
| N of burglaries                    | -0.07                            | -0.10                        | 0.12                    | 0.32†              | 0.04                | -0.01           | -0.03           |
| N of arrests for serious crimes    | 0.30                             | 0.19                         | 0.21                    | -0.10              | -0.24               | 0.34†           | 0.14            |
| N of arrests for minor crimes      | 0.29                             | 0.04                         | 0.38*                   | -0.36†             | -0.10               | 0.11            | -0.09           |
| N of arrests for family violence   | 0.48*                            | 0.21                         | 0.37*                   | 0.11               | -0.30               | 0.02            | -0.08           |
| N of arrests for domestic violence | 0.20                             | 0.18                         | 0.14                    | 0.31               | 0.25                | -0.12           | -0.08           |
| N of directed patrols or extra     | 0.34†                            | 0.07                         | -0.17                   | 0.07               | -0.13               | 0.08            | -0.02           |
| patrols                            |                                  |                              |                         |                    |                     |                 |                 |
| N of officer-initiated activities  | 0.43*                            | 0.17                         | 0.12                    | -0.03              | -0.17               | 0.04            | 0.02            |
| Fx of in-person problem solving    | 0.03                             | 0.17                         | -0.24                   | 0.21               | 0.16                | -0.19           | -0.12           | COP |
| or COP                             |                                  |                              |                         |                    |                     |                 |                 |
| N of deployments for spec. ops.    | -0.05                            | 0.21                         | 0.22                    | 0.22               | 0.58*               | 0.10            | 0.13            |
| teams (e.g. narcotics)             |                                  |                              |                         |                    |                     |                 |                 |
| N of deployments for SWAT/tactical | 0.07                             | 0.19                         | -0.14                   | 0.36†              | 0.37*               | -0.09           | -0.03           |
| teams                              |                                  |                              |                         |                    |                     |                 |                 |

Dependent variables ranged between -2 (significantly decreased) and +2 (significantly increased).

* P < 0.05.
† P < 0.10.
of arrests for minor crimes ($\rho = 0.38, P < 0.05$), family violence ($\rho = 0.37, P < 0.05$), and the number of business alarms ($\rho = 0.31, P < 0.10$) also increased.

Both the stay-at-home index and the border closing index are related to items from most domains. Looking at the stay-at-home index, we see that as governments imposed more restrictive measures on their citizens’ movements, there were more police officers working remotely ($\rho = 0.50, P < 0.05$), using vacation time ($\rho = 0.47, P < 0.05$), and using the PPE ($\rho = 0.40, P < 0.05$). Given that these officers could not travel for a holiday, these findings may suggest that parents were forced to adjust their working conditions to deal with the added familial responsibilities brought on by measures ostensibly designed to address the spread of the virus. Likewise, it is also interesting to note that these stay-at-home orders seem to have had a palpable increase in the number of business alarms ($\rho = 0.42, P < 0.05$) and burglaries ($\rho = 0.32, P < 0.10$), while they had a negative effect on the number of arrests for minor crimes ($\rho = -0.36, P < 0.10$).

**Effect of constraints on governmental power with valence of change**

Finally, looking at the number of the last two columns of Table 5, we see the results for the valence of change associated with the WJP and WGI measures. The results show that these two measures are unrelated to the valence of change in police organizations in all but three instances. We see that higher scores on the WJP measure are associated with a greater number of internal investigations during the pandemic ($\rho = 0.40, P < 0.05$). We also see that higher scores on the WJP measures are also associated with less change in arrests for serious crimes ($\rho = 0.34, P < 0.10$). Note, these findings do not mean there was an increase in these activities during this period, but rather that countries scoring higher saw fewer reductions in these domains. The only remaining indicator is that countries with higher WGI scores saw fewer complaints about non-COVID-19 policing ($\rho = -0.47, P < 0.05$).

**Discussion**

This study adds to the literature that seeks to describe the changes brought on by the COVID-19 pandemic by examining how various national indicators are associated with the degree of change and the valence of change in various domains of policing. The results suggest the relative strength of the first-wave of the pandemic was associated with some changes in police organizations, but not as consistently as one might expect. For example, the number of police officers working remotely and the use of physically separated working environments are significantly—and positively—associated with the peak rate of deaths, but not the peak rate of infections. We see similar trends when looking at the valence of the change. This is striking because, logically speaking, higher rates of infection are likely associated with higher death rates. Ergo, it seems that higher peak death rates may represent a more visible—and thus prescient—indicator of the need for change than the peak number of cases. More deaths may be harder to ignore.

The results here are especially interesting given the additional stressors that were simultaneously driving organizational changes in police organizations. Specifically, the protests surrounding the deaths of Breonna Taylor and George Floyd in the USA—among others—at the hands of the police during the pandemic and the related protests likely drove some organizational changes, as we see in Table 4. However, when we look at the number of deployments for these teams, in Table 5, we see there is no statistical relationship between the strength of the pandemic and the deployment of SWAT/Tactical teams and special operations teams. This suggests the usage was likely driven by external factors (e.g. mass gatherings) that forced some organizations to retain more operational
capacity than they otherwise would have during the pandemic.

The more restrictive the governmental response to the pandemic, the more departments continued to use these tools to address community crime problems. There is the distinct possibility that these tools were used by governments lacking legitimacy to make changes in the eyes of their citizens. However, given that the protests addressing issues of racial justice were happening at the same time as many citizens were simultaneously protesting the oppressive COVID-19 lockdown measures imposed by the government, it remains unclear what these teams were actually policing. Subsequent research should examine why these SWAT/Tactical teams were deployed.

Likewise, we see there is a perception that the strength of the pandemic and governmental responses had seemingly independent effects on various crime problems. Notably, there was no relationship between measures of the pandemic’s strength and business alarms or burglaries. However, evidence suggests that, as governments implemented more restrictive policies on the citizenry, there was an uptick in perceived number of burglaries, presumably to unoccupied buildings rather than homes. This finding is largely consistent with the theoretical notions of routine activities theory and crime pattern theory, in the same way that in other contexts crime decreased (e.g. one cannot steal from shops forced to remain closed). However, these findings point to an important issue for consideration in responding to the pandemic: are governments considering the second and third-order effects of these public health policies on crime? Governments have definitively considered the second and third-order effects of these public health policies on the economy in many countries. Governments likely made the protection of life and health their paramount concern, which is justifiable. However, there are real consequences for these decisions both in terms of property crime and crimes against persons.

The measures of the constraints on governmental power also yielded some interesting results. Notably, police organizations from countries that score lower on the WJP and WGI measures tended to change in ways that are generally seen as undesirable. In other words, some agencies used the pandemic as cover to reduce transparency and accountability to their communities, often while being given more power to deprive citizens of their rights and otherwise restrict their freedoms. This is a troublesome confluence of events that may well serve to exacerbate tensions in some countries and undo years of progress for more open and democratic policing.

Fully disentangling the complex relationships between how police organizations changed in response to the pandemic will certainly take additional research. There are two key issues. First, a key limitation of our method is that it did not capture why organizations made these changes. It could be that, although all police agencies were responding to the same health threat, the reasons behind the changes in their operation and organization may be only partly the same. Additionally, we know nothing about how effective these changes were or how the agencies keep changing their response as the pandemic evolved. Second, it remains unclear exactly how the organizations changed on these measures. In other words, while we know that things changed and we now know the valence of these changes, there are still multiple ways to make each of these changes. For example, an agency could have seen a great deal of change in training due to the pandemic, but this could mean that training was wholly suspended or transitioned to an alternative modality—or any number of other possibilities. These important differences are not captured in this data. Future research should consider these issues in order to shed additional light on this topic.

Finally, this research is the start of a conversation. While we have data from 14.4% of the countries accounting for 35.8% of the world’s population, adding other countries may change the substantive conclusions drawn here. Most notably, assuming the trends remain the same, additional countries would make more of these factors become statistically significant at the bivariate
level. While this is potentially useful, we would suggest that there are three things that future research should address. First, it is necessary to examine these effects in multivariate space because there is likely a great deal of shared variance in the explanatory power of the independent variables included here. With 28 countries, it was not feasible for us to use multivariate statistics. Second, it may be just as important to look at what is happening within these countries. It may be necessary to look at the effects of the pandemic at different levels (i.e., country, regional, and locally) to fully understand how the COVID-19 pandemic affected police organizations. Third, the data show police organizations are capable of adjusting to the pandemic, but it still remains to see whether these changes were effective—broadly defined—and sustainable for the duration of the pandemic and potentially beyond.

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