

More Cops, Less Trust? Disentangling the Relationship between Police Numbers and Trust in the Police in the European Union

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Abstract This paper investigates the relationship between number of police officers per inhabitant and trust in the police in the EU. By compiling data sources from the Eurobarometer, the Eurostat and the Corruption Perception Index, we test whether the number of police officers per inhabitant is a robust predictor of trust in the police on the country level. While there is a strong negative correlation between the two variables that justifies stating that the police are trusted most in countries where the number of police is minimal, controlling for relevant covariates reveals that the correlation is technically spurious. In line with distributive justice theory, perceptions of corruption in the respective countries explain most of the variation in trust in the police, which completely levels the influence of number of police officers per inhabitant. Implications for research and policy are discussed at the end of the paper.

Introduction

Although research on police legitimacy and public trust in the police can be considered to be at the ‘(...) forefront of academic and policy discussion’ (Jackson and Gau, 2016, p. 49), there is little knowledge on the relationship between numbers of police officers (also referred to as ‘police strength’ or simply ‘police numbers’) and trust in the police. This is surprising given the media attention devoted to the allegedly positive effects of increasing the number of police officers on reducing crime (Dearden, 2019; Yglesias, 2019).¹

Since public trust in the police is responsive to variation in crime (Sampson and Bartusch, 1998; Schafer *et al.*, 2003), some researchers plausibly deduce that the absolute number of police officers per inhabitant should be positively correlated with trust in the police (Sindall and Sturgis, 2013). Other scholars, however, point out that the police are trusted the most in countries where the number of police is minimal (Van Dijk *et al.*, 2007; Kääriäinen, 2012, 2017). This discordance calls for a more nuanced disentangling of the relationship since it has important policy implications:

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¹ As a matter of fact, the allegedly negative effect of increasing the absolute number of police officers on crime rates is far from unequivocal as the systematic review by Lee *et al.* (2016) suggests.

knowing more about the potential outcomes of variation in police numbers is crucial because they constitute a large part of public security budgets in most developed countries. The recent provision of high-quality data on the number of police officers per 100,000 inhabitants by Eurostat makes it possible to test the direct and indirect effect of police numbers on trust in the police in the EU in a cross-sectional study with observational data.

In this paper, we do so by compiling various data sources and running ordinary least square (OLS) regressions on the effect of police officers per inhabitant on trust in the police, while controlling for relevant covariates. Since it is simple and widely understood, we rely on the classical mediation approach put forward by Baron and Kenny (1986), although we apply more sophisticated bootstrapping measures as robustness checks (Hayes, 2009).² Our analyses indicate that the substantial negative correlation between public trust in the police and the relative number of police officers in a country is fully mediated by perceived levels of corruption. Implications for both police practitioners as well as police researchers are discussed at the end of this article.

Theoretical outline

As Sindall and Sturgis (2013) implicate in one of the few empirical investigations on the matter, surprisingly little is known about how public trust in the police is affected by police strength. Seven years later, not much has changed on the international police science landscape concerning this highly relevant policy issue. Police numbers are consistently used to study changes in crime rates (Lee *et al.*, 2016), while other relevant correlations are vastly ignored. Some studies analyze the effect of police visibility rather than relative number and find some evidence that trust in the police might rise as a result of more ‘bobbies on the beat’ (Bennett, 1991; Skogan and Harnett, 1997; Tuffin

et al., 2006). Others find no significant or inconsistent effects of police numbers on confidence in the police (Hauser and Kleck, 2017). Positive effects of police numbers on perceptions of trust in the police are believed to largely assert indirect effects through crime reduction and overall police visibility (Sindall and Sturgis, 2013).

On the other hand, Kääriäinen (2017) interestingly points out that while trust in the legal system is quite high in the Nordic countries (Jackson *et al.*, 2013) there are fewer police officers per capita in Scandinavia than anywhere else in Europe (Lappi-Seppälä, 2012), implying that at the macro level of European countries the correlation might be the other way around.

Another explanation for the lack of studies in this particular research avenue might be the prominence of the process-based model of procedural justice theory. There is a vast corpus of literature suggesting that it is not instrumental concerns like fear of crime, police numbers, or police visibility that drive trust in the police but rather reliance on the police to follow ethical principles of conduct. The core theoretical concept of procedural justice theory revolves around the notion that perceived respectfulness and ethical behavior in police–citizen interaction are essential in establishing legitimacy of and public trust in the police (Tyler and Huo, 2002; Tyler, 2006, 2011). While some scholars consider procedural justice theory as the ‘silver bullet to good policing’ (Roché and Roux, 2017) others go so far as to emphasize that ‘(...) police organisations would do well to focus on procedural justice rather than crime fighting’ (Schaap, 2020, p. 9).

Despite the dominance of procedural justice theory in police trust and legitimacy research, there exist conceptual ambiguities (Tankebe, 2013; Jackson and Gau, 2016) as well as empirical discordances (Skogan, 2006; MacQueen and Bradford, 2015), especially when it comes to studies outside the UK or the USA (Sahin *et al.*, 2017;

² There has been extensive discussion, both in psychology and beyond, about which statistical method would be most suitable for identifying direct and indirect effects. MacKinnon *et al.* (2013) provide an overview.

Sato, 2017). These theoretical and empirical inconsistencies suggest that the process-based model as the dominant strand of research provides a rather limited perspective. Accordingly, some scholars rightfully indicate that a theoretical alignment on micro level interactions comes at the price of deflecting '(...) the attention away from the impact of social and political structures' (Roché and Oberwittler, 2017, p. 6), like, for example, distributive injustice and system-level malfunctions in terms of corruption. More specifically, the currently dominant focus on procedural justice '(...) downplays the importance of distributive justice: the outcomes of an encounter with the police' (Weitzer, 2017, p. 31), which may include bribes as an outcome of the interaction.³

A wealth of studies implies that perceived corruption of state authorities can play a decisive role in determining trust in the political authorities (Rose-Ackerman, 1999; Anderson and Tverdova, 2003; Smith, 2010) and the police (Kääriäinen, 2007; Schaap, 2018). Tankebe (2010, p. 299), for example, illustrates that '(...) police corruption yields a de facto form of discrimination in the distribution of "public goods"' indicating that the police may operate with little concern for the public interest (Rose-Ackerman, 1999). With corruption, justice outcomes are not distributed fairly with regard to social grouping, as wealthier groups capable of paying bribes are generally favoured.

While some scholars note that a universal definition of corruption is impossible (Holmes, 2020), most would agree that the so called 'rotten apple theory', which frames corruption as an individual problem of a few 'bad cops' rather than a structural problem, is fundamentally misguided (Newburn, 1999; Goldsmith, 2001). Transparency International (2020) defines '(...) corruption as

the abuse of entrusted power for private gain.' It includes behaviours such as public servants or police officers demanding or taking money or favours in exchange for certain services. This very broad definition has the advantage of providing an understanding of corruption comparable within and across the different countries of the EU. This is an important feature as the definition of corruption may differ in 'predatory' police systems and less aggressive ones. Furthermore, we use data from Transparency International in the following empirical analyses.

Given this brief outline of theoretical and empirical considerations, we argue that police size as a potential macro-level determinant of trust in the police needs to be considered together with other structural factors like corruption. Otherwise, the analysis might suffer from omitted variable bias. Thus, the two following research questions arise:

1. Is there a negative statistical relationship between police numbers and trust in the police in the European Union?
2. Does this relationship hold when controlling for structural factors like corruption?

Data and methods

To answer these questions, we compiled a dataset from three different sources.⁴ We created the dependent variable 'trust in the police' from the Standard Eurobarometer 2016 (European Commission, 2016). The survey is carried out each spring and autumn via face-to-face interviews in probability samples.⁵ We used the sample collected in May 2016 and conducted robustness checks with the November 2016 sample. Information on the number of police officers per inhabitant, as well as relevant controls were provided by Eurostat

³ There are scholars that understand corruption from both a distributive as well as a procedural justice perspective, for example, Smith (2010). Though we share this view conceptually, in macro-level analyses such as the present study, interactional processes cannot be considered.

⁴ Data sets, unreported results, and software code can be downloaded via: <https://osf.io/t4w89/>.

⁵ A detailed description of the fieldwork and overall survey design can be found here: <https://dbk.gesis.org/dbksearch/sdesc2.asp?no=6694&db=e&doi=10.4232/1.13438>.

(2019). Finally, we merged these data with aggregated data for perceived levels of corruption from the corruption perception index 2016, which is made available by [Transparency International \(2016\)](#). As units of analysis, our data set thus contains all 28 countries belonging to the EU in 2016, differentiating between England (including Wales), Scotland, and Northern Ireland. This results in $n = 30$ observations.

The dependent variable ‘trust in the police’ is based on the following Eurobarometer item: ‘I would like to ask you a question about how much trust you have in certain media and institutions. For each of the following media and institutions, please tell me if you tend to trust it or tend not to trust it.’ The item is measured dichotomously (1 = ‘tend to trust’ and 2 = ‘tend not to trust’). We computed the aggregated percentages of ‘tend to trust’ answers at the country level, which is the standard procedure used by the Eurobarometer to monitor its bi-annual results ([European Commission, 2016](#)).

The main independent variable is the number of police officers per 100,000 inhabitants in a country. The variable includes all personnel ‘(...) in public agencies as at 31 December whose principal functions are the prevention, detection and investigation of crime and the apprehension of alleged offenders’ ([Eurostat, 2020](#)). Hence, municipal police and community police officers are included, whereas support staff (secretaries, clerks, etc.) are excluded. We use Transparency International’s corruption perception index as a measure for structural corruption. The index lists countries according to the degree of corruption perceived in politics and administration on a scale from 100 (very clean) to 0 (highly corrupt). The index brings together 13 individual indices from 12 independent institutions and is based on data from interviews with experts, surveys, and other investigations. Previous research suggests that it is the

⁶ The homicide rate has been included as an indicator of crime levels in a multitude of preceding studies; see [Schaap \(2018\)](#); [Cao et al. \(2012\)](#); [Jang et al. \(2015\)](#); and [Stack et al. \(2007\)](#).

most often used national indicator of corruption ([Schaap, 2018](#)).

Further controls are intentional homicides per 100,000 inhabitants as a proxy for crime levels⁶ as well as the gross domestic product (GDP) per capita as a proxy for economic wealth. Both variables were logged due to their skewed distribution. Data for these controls also were obtained for the year 2016 from Eurostat.

[Table 1](#) gives an overview on descriptive statistics and their distributions for all variables used in the analysis.

We rely on classical mediation techniques and apply OLS estimation methods on aggregated data. Bootstrapping measures are used as robustness checks. Limitations and possible pitfalls of these methodological decisions are discussed at the end of this article.

The classical mediation analysis is based on three steps to identify a partial or fully mediated relation between two variables and a mediator ([Baron and Kenny, 1986](#)). In a first step, we regress the independent variable (police numbers) on the dependent variable (trust in the police). This correlation should be significantly different from zero. Then, we regress the mediator (perceived level of corruption) on the independent variable (police numbers). Again, this correlation should demonstrate a significant effect. Finally, we regress the dependent variable on both the independent variable and the mediator. If then the former relation between the independent and the dependent variable becomes insignificant due to the inclusion of the mediator, we can state that the previous correlation is spurious and there is a true mediation. All these regressions include the controls presented in [Table 1](#).

Before running those models, we tested all relevant OLS assumptions in a model containing all variables used in this analysis. Except for logged variables, all relations were linear. Residuals were normally distributed. Due to expectable issues

Table 1: Descriptive statistics

		Percentage of trust in the police	Police officers per 100,000 inhabitants	Corruption perception index	Intentional homicides per 100,000 inhabitants (ln)	GDP per capita (ln)
N	Valid	30	30	30	30	30
	Missing	0	0	0	0	0
Mean		68.400	349.667	65.700	0.101	3.613
Std. Deviation		14.153	103.451	14.997	0.583	0.3429
Skewness		-0.252	0.109	0.086	0.687	0.765
Kurtosis		-0.785	-0.137	-1.350	1.664	1.498
Minimum		39.00	137.00	41.00	-1.20	3.02
Maximum		94.00	585.00	90.00	1.72	4.64

Notes: Eurostat did not provide a measure for intentional homicides for the Netherlands. The missing value was imputed by data obtained from <https://www.indexmundi.com/facts/netherlands/homicide-rate>.

concerning heteroskedasticity, we computed both homoskedastic and heteroskedastic-robust standard errors in formal significance tests (Angrist and Pischke, 2009). We identified no statistical outliers beyond three standard deviations. Owing to the cross-sectional design of our study, there are still some issues regarding independence of observations and the temporal precedence of the variables, which we unfortunately cannot avoid given the data limitations.

Results

To provide a graphical picture of the relation between police numbers and trust in the police in European countries, we have plotted the bivariate correlation in Fig. 1.

Obviously, there is a strong negative correlation between those two variables ($b = -0.610$, $P < 0.001$, in a baseline model without covariate adjustment). Countries with relatively few police officers per 100,000 inhabitants like Finland and Denmark score highest on the trust variable, whereas countries with relatively high numbers of police officers like Cyprus only show a low percentage of citizens who tend to trust the police on average.

Table 2 shows the results of the mediation analysis and Fig. 2 gives a graphical representation in

the form of a path diagram of the three-step process outlined in the previous chapter. Our results indicate that the strong negative relationship between police numbers and trust in the police ($c = -0.386$, $P < 0.01$) is fully mediated by the effect of perceived corruption on trust in the police ($b = 0.752$, $P < 0.001$), resulting in a null-effect of the previous relation ($c' = 0.057$, n.s.). Police numbers also significantly predict perceived corruption ($a = -0.450$, $P < 0.001$). The former positive effect of GDP on trust in the police is levelled by the inclusion of our mediator variable.

Figure 2, hence, illustrates that countries employing more police officers are, on average, also countries scoring low on the corruption-index (indicating a highly corrupt state), and countries with much perceived corruption are characterized by little trust in the police. The negative statistical association between police numbers and trust is technically spurious. However, we will provide a sociological explanation for the more complex political processes in the 'Discussion' section.

To improve the reliability of our estimates and the validity of our overall research design, we conducted some robustness checks. An obvious limitation is the restricted number of observations. To achieve an increase in power, we applied

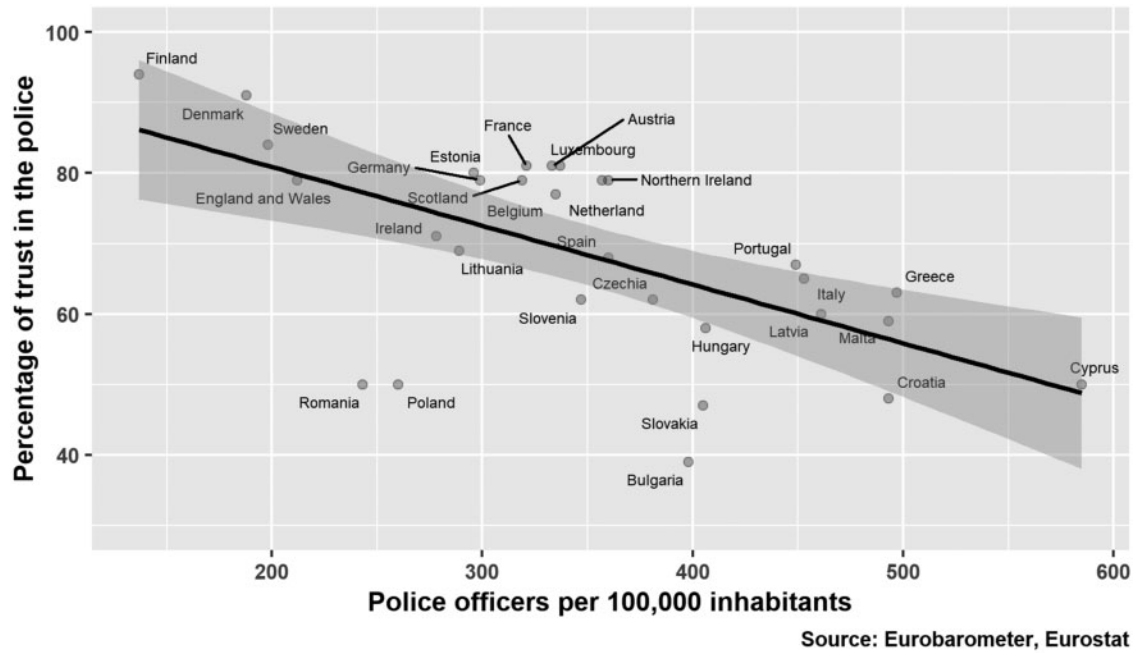


Figure 1: Bivariate correlation between trust in the police and police officers per 100,000 inhabitants.

Table 2: OLS models

Parameter	Model 1		Model 2		Model 3	
	Beta	S.E.	Beta	S.E.	Beta	S.E.
Intercept	-8.300	23.888	-13.647	21.129	2.073	18.151
Police officers per 100,000 inhabitants	-0.386**	0.017	-0.450***	0.015	-0.057	0.018
Intentional homicides per 100,000 inhabitants (ln)	0.158	3.163	0.128	2.798	0.065	1.306
GDP per capita (ln)	0.635***	5.714	0.644***	5.054	0.142	6.277
Corruption perception index					0.752***	0.174
Observations		30		30		30
F-statistic		17.004***		28.173***		24.147***
R ²		0.662		0.765		0.794
R ² _{adj.}		0.623		0.738		0.761

Notes: Two-tailed tests; S.E. = standard error, ln = logged values;

***P < 0.001,

**P < 0.01; standardized coefficients are displayed, dependent variable in Models 1 and 3 is trust in the police, dependent variable in Model 2 is the corruption perception index.

bootstrapping methods to replicate the estimates of the former analysis which is recommended for small sample sizes. We used the PROCESS macro

provided by Preacher and Hayes (2004) with 5,000 sampling iterations. We included all covariates that were used in the previous analyses without

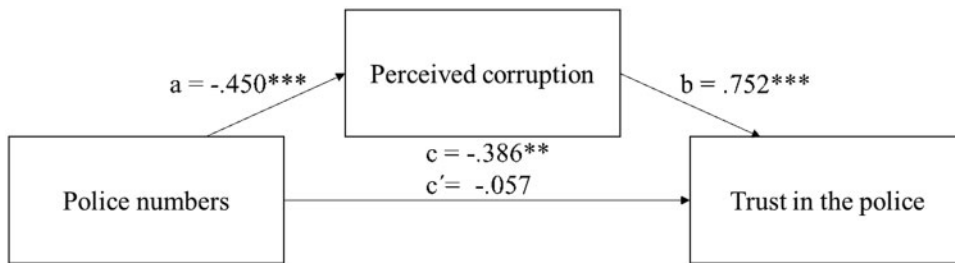


Figure 2: Graphical representation of mediation analysis for standardized coefficients; *** $P < 0.001$, ** $P < 0.01$.

bootstrapping and applied robust standard errors (HC3) to achieve conservative estimates in formal significance tests. We identified a somewhat weaker but significant effect of police numbers on trust in the police, $B = -0.052$, $P < 0.05$. After entering the mediator into the model, police numbers predicted the mediator significantly, $B = -0.065$, $P < 0.001$, which in turn predicted trust in the police significantly, $B = 0.705$, $P < 0.001$. Similar to the previous analyses, the former significant effects of police numbers as well as GDP were completely levelled by the inclusion of the mediator. Hence, our results are robust to this alternative estimation strategy.

Since Eurobarometer does not distinguish between Northern Ireland, Scotland, and England (including Wales), we had to use the same estimate for trust in the police in all three countries even though estimates on covariates differed among these three. We reran the regressions with UK as one single observation, which did not change the main results substantially.

As a third test, we used data from the November 2016 Eurobarometer survey and repeated the analyses. Again, there were no significant deviations from our prior results. Finally, since we included the controls in all models, the mediation could be due to these variables, which is why we also ran baseline models, including only the independent variable and/or the mediator in the exogenous part of the models. Results remained largely unchanged under these modeling specifications.

Discussion

Some previous research had suggested a positive relationship between police force size and public trust in the police (Sindall and Sturgis, 2013). Others indicate the contrary (Kääriäinen, 2017). We set out to disentangle the pathways between these variables, combining cross-sectional data from Eurostat, Eurobarometer 2016, and Transparency International. Using simple OLS and bootstrapping mediation analysis, we find that the pronounced negative correlation between police strength and trust on the country level is indeed mediated by perceived levels of corruption.

Implications

Several essential implications for further research endeavors can be derived from our results. The mediation analysis suggests that the substantial negative statistical relationship between trust in the police and the number of police officers, which was already found in previous research (Kääriäinen, 2012), is technically spurious. Future studies, especially those at macro-level, should include measures of distributive (in-) justice to prevent errors stemming from omitted variable bias.

The complete mediation of the correlation between trust in the police and police strength by perceived levels of corruption “confirms” our assumption stemming from distributive justice theory. Furthermore, research in business contexts has suggested that organizational growth might actually increase corruption (Nguyen, 2020), and our results provide some (correlational) evidence

that this finding might be transferred to police organizations as well. Whereas Ngyuen attributes this relationship to larger firms' higher 'ability to pay', this explanation is obviously inappropriate for public service institutions like the police. Since corruption is associated with governmental dysfunctionality and weak political administration (Rose-Ackerman, 1999, 2004; Wickberg, 2013), malfunctioning, 'weak' states could find themselves forced to rely on strong police forces, as evidenced by a high per capita number of police officers, to maintain public order. Accordingly, our results rather indicate that highly corrupt states tend to employ more police officers, who might also be considered as corrupt and untrustworthy by the public since they constitute a corrupt state's executive branch. Although it seems plausible that this reasoning applies even more to clearly repressive states, such as Belarus or North Korea, the available data do not allow for this inference. Since we rely exclusively on the macro-level of EU countries, these tentative findings need to be investigated in different settings to account for variation at meso- and micro-levels, as well as in longitudinal research designs or within-country case studies. Future research could also examine the impact of the distrust caused by perceived police corruption on (dis-) obedience.

From a methodological standpoint, trust in the police and police strength are highly correlated whereby the relationship apparently only goes through the mediator 'perceived levels of corruption'. Thus, the number of police officers per inhabitant might be used as an instrumental variable to estimate the size of the causal effect of corruption on trust in the police (Angrist and Pischke, 2009). However, instrumental variable approaches require substantial statistical power (Murray, 2006). Hence, using police strength as an instrument was not conceivable in our approach due to the low number of observations. Future studies might pursue this fruitful research avenue.

Our results also have practical implications. There is no apparent reason to believe that altering

the number of police officers per inhabitant has any evident effects on trust in law enforcement institutions at the country level. Instead, police strength only appears to be associated with trust in the police through its effect on perceived levels of corruption.

Anyway, our results do not support the notion that police forces should be kept 'small', and they cannot be used to argue for reducing police budgets. Notwithstanding, they suggest that fighting corruption and other forms of police misconduct is a promising approach to maintain, restore, or increase public trust in the police.

Limitations

This study has a number of limitations. The most glaring one might be the rather crude measurement of the dependent variable 'trust in the police'. Using a dichotomous category and then using percentages of 'tend to trust'-answers might well be correlated with more nuanced latent constructs (Frank *et al.*, 1996; Garcia and Cao, 2005; Cao *et al.*, 2012) but it obviously does not measure the concept of trust in the police very precisely. However, aside from the fifth round of the European Social Survey (ESS 5), which has been conducted in 2010, there are—to our knowledge—no data sources with more complex measuring instruments that could have been used in this analysis. Nevertheless, a general single indicator has the clear advantage of comparability across different countries (Cao *et al.*, 2012).

Furthermore, we want to stress that we ran regressions at the between-country level, so our inferences are not valid regarding the impact of increasing or decreasing the police force size on trust in the police at the within-country level (ecological inference fallacy).

By using multilevel modeling, we could have investigated variations in the dependent variables at more than one level. However, since we were only interested in differences at the country level, we confined ourselves to OLS methods.

Additionally, apart from other institutional trust variables, the Eurobarometer does not contain policing-related items (e.g., being approached, stopped, or contacted by police) that could explain a non-trivial amount of variance in the dependent variable. A multilevel analysis would be most useful, however, if respondents were asked about the quantity and quality of personal interactions with the police or how often police take bribes. This would also allow for a direct comparison of the impact of structural and interactional factors on different levels of analysis. These limitations represent fruitful opportunities for future studies to verify and revise our results, subject to adequate data being available.

On a final note, our results emphasize that not only interactional processes and procedural justice in general—which is still often understood as most important in generating trust and legitimacy—but also structural factors such as the integrity of power holders are essential in determining trust in the police. We hope that our analysis can contribute to enlarge the discussion of other influencing factors in police legitimacy and trust research—be it lawfulness, effectiveness, or distributive justice.

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