Communism’s Lasting Effect? Former Communist States and COVID-19 Vaccinations

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Abstract
Historical cultural practices that no longer exist can have modern day effects. Because communism has been linked with distrust of government, it was hypothesized that (a) historical communism would be negatively associated with COVID-19 vaccination rates, and (b) trust in government would mediate the association. Two studies assessed these hypotheses. Study 1 tested the hypotheses among European, Asian, and African countries, while Study 2 focused on East and West Germany within Europe. All samples except Africa found support for an association between historical communism and lower COVID-19 vaccination rates. However, trust in government did not mediate the association in Study 1, though a significant indirect effect did emerge within Germany in Study 2. Associations held controlling for GDP and age of population. Together, the studies suggest that historical communism in Europe and Asia is associated with real-world behavior today, and that trust in government might be partly responsible for the effect within Germany but less likely within Europe as a whole.

Keywords
communism, COVID-19, vaccinations, culture

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Introduction

Culture builds on what came before, so earlier influences can maintain an effect on a given population even after those initial influences no longer exist. For example, people today from regions that were historically raided for the slave trade in Africa show more distrust of others (Nunn & Wantchekon, 2011). Regions that historically farmed rice, which requires coordination and cooperation, have tighter social norms in modern times compared to areas that farmed wheat, which does not require the same level of coordination and cooperation (Talhelm & English, 2020). And the industrial revolution has been found to influence personality traits today (Obschonka et al., 2018). Such evidence suggests that there can be lasting effects of cultural practices that no longer exist today.

Growing research suggests that historical communism also produces such lasting effects in modern times. For example, there is less civic participation in post-communist countries (Pop-Eleches & Tucker, 2013), and weaker support for democracy (Pop-Eleches & Tucker, 2014). The transition from communist to post-communist states often included rapid privatisation, which negatively affected mortality rates of working age males (Azarova et al., 2017). Citizens of European post-communist states also report less life satisfaction than their European counterparts, and this happiness gap has been linked to higher corruption and lower government performance (Djankov et al., 2016).

With increased perceptions of corruption in post-communist countries (Karklins, 2016), it might not be surprising that post-communist countries lack trust in their institutions (Epperly, 2019; Macek & Marková, 2004). Epperly demonstrated this lack of trust using data from the European Social Survey where this trust gap was evident up to 2010 (the most recent data used), suggesting a modern deficit. Other research has found that distrust is related to support for popularist parties (Betz, 1994), and in Germany, the Alternative for Germany (AfD) is one such party where its strongest support is in former communist East German states (Schultheis, 2021). Taken together, there appears to be link between former communist states and distrust.

Although associated with distrust, such historical effects of communism might not be due to communism per se. In other words, this link might not be due to communism as a political ideology. There are alternative routes that might explain how communism is related to distrust. For example, poor institutional performance (rather than communism as a political system) might be responsible for increased distrust in former communist states (Epperly, 2019). Although the exact mechanism(s) for the association between communism and distrust is debatable, countries who were historically communist are associated with modern day distrust.

A lack of trust in institutions might lead to an aversion to coronavirus SARS-CoV-2 (COVID-19) vaccination efforts by governments. This seems to
have been the case for other public health crises, with lower trust in government being associated with less compliance to public health measures during the Ebola epidemic in Liberia (Blair et al., 2017) and lower intention to get vaccinated during the H1N1 pandemic in the Netherlands (van der Weerd et al., 2011). More specifically to COVID-19, anecdotally some who have lived through communism have had adverse reactions to apparent similarities between communism and new rules imposed as a result of the COVID-19 pandemic (Robinson, 2020). Indeed, a lack of trust in government is associated with lower willingness to get vaccinated against COVID-19 in Germany (Schmelz, 2021), and more globally a lack trust in medical institutions and experts has been associated with lower intention to receive a COVID-19 vaccination among participants from 12 countries (Kerr et al., 2021). And a survey of over 13,000 people from 19 countries found that trust in government predicted acceptance of getting a COVID-19 vaccination if it was recommended by their employer and safe (Lazarus et al., 2021). Indeed, COVID-19 infection rates seem to go down globally when trust in government is high, possibly because of an increased compliance to public health measures (Bollyky et al., 2022). Lastly, preliminary work suggests that (a) lack of trust in institutions from Soviet communism is associated with vaccine distrust (Costa-Font et al., 2021), and (b) communism is negatively associated with self-reported COVID-19 vaccination rates (Berniell et al., 2021).

Taken together, research suggests that elevated distrust in government that is present in former communist countries might influence COVID-19 vaccination rates. Importantly, extant work has predominantly been at the individual-level of analysis where data points represent individual people. Although individual-level data can sometimes generalize to the cultural-level (where data points represent cultures or groups of people), this is not always the case, and doing so can result in making an ecological fallacy (sometimes called Simpson’s paradox; Kievit et al., 2013). For this reason, it is important to test hypotheses at different levels of analysis. The current work was at the cultural-level of analysis.

The current studies aimed to assess the primary hypothesis of whether (a) regions that were once communist show lower COVID-19 vaccination rates. As well as the secondary hypothesis that such an association will be driven by (b) distrust in the government. Two studies tested these hypotheses: Study 1 included countries from Europe, Asia, and Africa to test a broad range of historical communist countries, while Study 2 focused specifically within Germany, which was split between communist and non-communist rule. For simplicity, region is used to refer to countries in Study 1, but states (Bundesländer) of Germany in Study 2. All tests were done at the cultural-level of analysis using these regions.
Materials and Methods

Communist States

Few communist states exist today (i.e., China, Cuba, Laos, North Korea, and Vietnam), and not all report vaccination rates (i.e., Cuba). Consequently, these countries were not included in the analyses. However, there are considerably more former communist states, and most of these are within Europe, and to a lesser extent Asia then Africa.

All regions that could be classified as former communist states were included in the initial sample, but those which did not have vaccination data available were eliminated. The included regions and their comparisons are presented in Table 1.

When comparing former communist states to non-communist states, the comparison group selected can influence the results. For the hypotheses in question, a valid comparison would be regions that are similar to the communist states, but not communist themselves. In Study 1, European former communist states (Eastern Europe) were compared to European non-communist states (Western Europe). Similarly, former communist states in Asia were compared to non-communist states in Asia. For Africa, because there were fewer former communist states, countries that shared a land border with a former communist state were used as a comparison. In Study 2, former communist federal states within Germany (Eastern Germany) were compared to non-communist federal states within Germany (Western Germany).

In Study 1, all former communist states were coded as 1 with the remaining regions that had vaccination data coded as 0. However, given that Germany was split between communist and non-communist rule, it was coded as 0.5 in the analyses in Study 1. For Europe, the final sample included 21 former communist regions, 22 non-communist regions, and one split. For Asia, the final sample included 12 former communist regions and 31 non-communist regions. For Africa, the final sample included 6 former communist regions and 20 non-communist regions.

For Study 2, German federal states that were once part of the communist German Democratic Republic (East Germany) were coded as 1, while the remaining states (West Germany) were coded as 0. However, because Berlin was split between communist and non-communist rule, it was coded as 0.5.

Trust in Government

For Study 1, trust in government scores came from the Organization for Economic Co-operation and Development (OECD) surveys completed between 2010–18 as the proportion of those who indicated “yes” they have confidence in their national government (OECD, 2021c). Data were available
Table 1. Inclusion List.

| Study 1 | Europe | Former-communist | Non-communist | Split |
|---------|--------|------------------|---------------|-------|
|         | Albania, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czechia, Estonia, Hungary, Kosovo, Latvia, Lithuania, Moldova, Montenegro, North Macedonia, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, and Ukraine | Andorra, Austria, Belgium, Denmark, Finland, France, Greece, Iceland, Ireland, Italy, Liechtenstein, Luxembourg, Malta, Monaco, Netherlands, Norway, Portugal, San Marino, Spain, Sweden, Switzerland, and the United Kingdom | Germany |
| Asia    | Afghanistan, Armenia, Azerbaijan, Cambodia, Georgia, Kazakhstan, Kyrgyzstan, Mongolia, Tajikistan, Turkmenistan, Uzbekistan, and Yemen | Bahrain, Bangladesh, Bhutan, Brunei, Cyprus, India, Indonesia, Iran, Iraq, Israel, Japan, Jordan, Kuwait, Lebanon, Malaysia, Maldives, Myanmar, Nepal, Oman, Pakistan, Palestine, Philippines, Qatar, Saudi Arabia, Singapore, South Korea, Sri Lanka, Syria, Thailand, Turkey, and United Arab Emirates | |
| Africa  | Angola, Benin, Democratic Republic of Congo, Ethiopia, Mozambique, and Somalia | Burkina Faso, Burundi, Central African Republic, Congo, Djibouti, Eswatini, Kenya, Malawi, Namibia, Niger, Nigeria, Rwanda, South Africa, South Sudan, Sudan, Tanzania, Togo, Uganda, Zambia, and Zimbabwe | |
| Study 2 | Mecklenburg-Western Pomerania, Saxony-Anhalt, Thuringia, Brandenburg, and Saxony | Bremen, Saarland, Hamburg, North Rhine-Westphalia, Schleswig-Holstein, Lower Saxony, Rhineland-Palatinate, Hesse, Bavaria, and Baden-Wuerttemberg | Berlin |

Note. In analyses, former communist regions were coded as 1 and non-communist regions were coded as 0. Split regions were historically part communist and part non-communist and were coded as 0.5.
for 27 European regions (9 communist, 1 split, and 17 non-communist). There were only four regions from Asia and none from Africa with trust data, so due to the small sample sizes, hypothesis (b) that trust mediates the association between communism and COVID-19 vaccination rates wasn’t tested among those samples.

For Study 2, average responses to the extent to which participants trust their government taken from a recently published study were used (Schmelz, 2021). This measure was found to predict willingness to get vaccinated in the original study. Responses from participants from each German state were averaged to give a value for each state.

**Controlled Factors**

**Wealth.** Wealth of a country might influence access to vaccinations, and consequently vaccination rates. Indeed, wealth (as measured by Gross Domestic Product; GDP) is associated with COVID-19 vaccination rates globally (Basak et al., 2022). For this reason, GPD was included in analyses.

For Study 1, GDP per capita in current U.S. dollars was used as an indicator of the region’s wealth. The most recent data available from the World Bank (World Bank, 2020) was used, and when not available, values from the OECD (OECD, 2021b) were used. For Study 2, GDP in € million from 2019 for each German state was used (Deutschland.de, 2021).

**Age.** The age of the population might influence vaccination rates. Older age has been associated with increased vaccinations of other viruses besides COVID-19, like influenza (Bish et al., 2011). More specifically to COVID-19, COVID-19 vaccinations have been prioritized for certain age groups, with older populations typically among the first to be eligible for vaccines (Castro & Singer, 2021). For these reasons, age of the population was included in analyses.

For Study 1, the median population age for each region was obtained from an online database that uses official sources (Mathieu et al., 2021). For Study 2, an age estimate was calculated from the most recent German census (Zensusdatenbank, 2021). The census provides the number of people whose age falls within a given bracket (e.g., under 10, 10 to 19, etc.). These scores were converted to a scale with a value given to each bracket (i.e., under 10 = 1, 10 to 19 = 2, 20 to 29 = 3, 30 to 39 = 4, 40 to 49 = 5, 50 to 59 = 6, 60 to 69 = 7, 70 to 79 = 8, and 80 or more = 9) and the Mean was then taken. Though imprecise for a specific age estimate of a given region, it can distinguish between older and younger populations, which was the purpose of including age in the analyses.
**Vaccination Rates.** COVID-19 vaccination rates were the percentage of people in a population who have received at least one dose of a COVID-19 vaccine, taken from an online database (Mathieu et al., 2021). Data were collected on December 29, 2021. Because some regions do not update their vaccination rates on a daily basis, the most recent vaccination rates available were used.

**Results**

**Study 1**

Table 2 contains descriptive statistics for all key variables in Study 1.

To test hypothesis (a) of whether regions that were once communist show lower COVID-19 vaccination rates, linear regressions with communism, GDP, and age of population predicting vaccination rates were run separately for European, Asian, and African countries, which found a significant effect of communism in the predicted direction for European countries, $\beta = -0.65$, $p < 0.001$ (see Figure 1), as well as for Asian countries, $\beta = -0.29$, $p = 0.02$ (see Figure 2), but not for African countries, $\beta = 0.14$, $p = 0.52$ (see Table 3). To test hypothesis (b) of whether trust in government mediates the communism association within Europe, the PROCESS tool in SPSS was used with 5000 bootstrap samples (Hayes, 2017); however, the indirect effect was not significant, $\beta = 0.02$, 95% CI $[-0.10, 0.17]$.

**Study 2**

Table 4 contains descriptive statistics for all key variables in Study 2.

Consistent with hypothesis (a), a linear regression found a significant effect of communism on vaccination rates within Germany, $\beta = -0.88$, $p = 0.008$ (see Figure 3 and Table 5).

To test hypotheses (b) of whether trust in government mediates the communism association within Germany, once again the PROCESS tool was used with 5000 bootstrap samples, which found a significant indirect effect, $\beta = -0.27$, 95% CI $[-0.57, -0.03]$.

**Discussion**

The current studies suggest that historical communism is associated with COVID-19 vaccination rates today in Germany, Europe as a whole, and Asia, such that historical communist regions have lower COVID-19 vaccination rates. However, the association did not emerge in Africa.

The strongest association between communism and COVID-19 vaccinations emerged in Europe, while it was weaker in Asia. Why this association varied might be due to the substantial differences between the histories of the
|                | Europe | Asia | Africa |
|----------------|--------|------|--------|
|                | Communist | Non-Communist | Communist | Non-Communist |
| N              | 21      | 22   | 12     | 31    | 6    | 20    |
| Vaccination    | Mean (SD) | Min, Max | Mean (SD) | Min, Max | Mean (SD) | Min, Max |
|                | 49.05 (13.88) | 24.60, 71.10 | 77.18 (5.68) | 68.30, 90.30 | 36.52 (26.05) | 53, 84.10 |
| GDP            | Mean (SD) | Min, Max | Mean (SD) | Min, Max | Mean (SD) | Min, Max |
|                | 12279.75 (6978.54) | 1766.20, 190512.70 | 62741.91 (45165.01) | 50880.9055.70 | 3333.32 (2782.07) | 10509.50 |
| Age            | Mean (SD) | Min, Max | Mean (SD) | Min, Max | Min, Max | Min, Max |
|                | 41.74 (2.18) | 18.60, 38.70 | 42.45 (2.74) | 37.30, 47.90 | 27.93 (5.88) | 18.60, 38.70 |
| Trust\(^a\)    | Mean (SD) | Min, Max | Mean (SD) | Min, Max | Mean (SD) | Min, Max |
|                | 38.94 (8.53) | 29.48, 84.63 | 39.17 (18.92) | 27.31, 47.77 | 59.17 (18.92) | 29, 84.63 |

Note. In all cases, communist refers to former communist countries. There were nine communist regions and 17 non-communist regions with trust data.

\(^a\)There were nine communist regions and 17 non-communist regions with trust data.
various countries in question, which can include different economic conditions before communism (de Melo, 2001). Differences were also present during communist rule. For example, varying interpretations of Marxism-Leninism contributed to the Sino-Soviet split, which saw a deterioration in political relations between the Soviet Union and China during the cold war. There are likely to be a number of differences that could potentially account for the differing results. Assessing potential explanations is an area for future research.

More specifically to Africa, vaccination rates in general were quite low. The Mean vaccination rate among African countries was 12.90% and 13.00% for former communist and non-communist countries, respectively, while Europe and Asia were significantly higher (from 36.52% to 77.18%). It is possible that communism does have an association within Africa countries as well, but that the low vaccination rates are restricting the range and preventing a noticeable association from emerging. Various factors are likely contributing to the low vaccination rates that are more practical and less psychological in nature, such as early supply issues, logistics of delivery and storage, and lack of health care workers (e.g., Massinga Loembé & Nkengasong, 2021). Future research might benefit from attempting to replicate this (null) finding once those practical matters are resolved. However, it is also possible that African communist states are somewhat unique. Benin, for example, underwent a coup d’état in 1972 led by Mathieu Kérékou with no mention of communism. In fact, in 1973 Kérékou was

![Figure 1](image.png)

**Figure 1.** Means of vaccination rates for non-communist, communist, and split (parts communist and parts non-communist) regions within Europe in Study 1.
explicit that “we do not want communism” (as cited in Le Vine, 2004). It wasn’t until 1974 that he declared a Marxist-Leninist ideology. This was relatively short-live, however, as this ideology was disavowed in the late 1980s, and in 1996 Kérékou was elected president of Benin under a democratic system. Such short-lived movements that are not driven by

**Figure 2.** Means of vaccination rates for non-communist and communist regions within Asia in Study 1.

**Table 3.** Regression Analyses of Communism on Vaccination Rates in Study 1.

| Region   | B     | SE B   | β     | Adjusted R² | p     |
|----------|-------|--------|-------|-------------|-------|
| Europe   |       |        |       |             |       |
| Communism| -23.67| 5.26   | -.65  | <.001       |       |
| GDP      | .00   | .00    | .17   | .25         |       |
| Age      | 1.73  | .70    | .24   | .02         |       |
| Asia     |       |        |       | .50         |       |
| Communism| -16.04| 6.69   | -.29  | .02         |       |
| GDP      | .00   | .00    | .26   | .09         |       |
| Age      | 1.61  | .57    | .40   | .01         |       |
| Africa   |       |        |       | .04         |       |
| Communism| 4.21  | 6.36   | .14   | .52         |       |
| GDP      | -.002 | .00    | -.22  | .42         |       |
| Age      | 2.50  | 1.31   | .51   | .07         |       |

Note. B = unstandardized beta; SE B = standard error for B; β = standardized beta.
In terms of why communism might lead to lower COVID-19 vaccination rates, mixed support was found for trust in government mediating the association. Within Germany, results were consistent with predictions, but not within Europe as a whole. However, these results should be interpreted with caution. For one, mediation is inherently confirmatory, so the statistically significant mediation finding does not preclude other explanations (Fiedler et al., 2011). Although the effect did not emerge in Europe as a whole, there are several reasons that might account for why this was the case: (1) several countries were lacking data on trust, which might have influenced the results by decreasing power to detect such an effect; (2) the multifaceted nature of trust (e.g., trust in government, trust in science, etc.) might be important; and (3) trust is not the driving force or is only one of several factors. Point 1 is not of theoretical interest and relates to data availability, so it won’t be considered further.

For point 2, it is important to consider that trust is multifaceted (e.g., trust in others, government, science, etc.). Trust in government was determined to be of importance in the current studies because of the potential link with communism and vaccination rates (i.e., a lack of trust in government might lead to a lack in trust in government efforts, such as vaccination drives), but other facets of trust might also be important or even more so. Some research

|                  | Communist | Split       | Non-communist |
|------------------|-----------|-------------|---------------|
| N                | 5         | 1           | 10            |
| Vaccination      |           |             |               |
| Mean (SD)        | 67.98 (3.28) | 75.00       | 76.97 (4.57)  |
| Min, Max         | 63.10, 72.00 | 71.60, 87.00 |               |
| GDP              |           |             |               |
| Mean (SD)        | 75281.00 (31156.72) | 153,291.00 | 290606.50 (250839.10) |
| Min, Max         | 46567.00, 128097.00 | 33623.00, 711419.00 |               |
| Age              |           |             |               |
| Mean (SD)        | 5.12 (.04) | 4.79        | 4.86 (.08)   |
| Trust            |           |             |               |
| Mean (SD)        | 3.94 (.14) | 4.43        | 4.23 (.13)   |
| Min, Max         | 3.76, 4.12 | 4.06, 4.39  |               |

Note. In all cases, communist refers to former communist states.

*a* There was only 1 split region.

*b* Age was a scale from 1–9 (see Materials for details).
has assessed various types of trust. For example, Kerr et al. (2021) found that trust for a variety of institutions and people were associated with self-reported acceptance of a COVID-19 vaccine among participants from 12 countries, including trust in the World Health Organization and national science representatives, and general trust in government was only significant in some of the countries assessed. This finding might suggest that trust in science might be of importance. A study that assessed 126 countries found that trust in science was related to vaccine confidence in general (Sturgis et al., 2021). In addition, even trust in government institutions (e.g., judiciary systems, healthcare, education, etc.) shows variability (OECD, 2021a), so solely assessing trust in government on a broad level might be limiting conclusions. Future research might benefit from taking a more multifaceted look at trust.

Figure 3. Means of vaccination rates for non-communist, communist, and split (parts communist and parts non-communist) regions within Germany in Study 2.

Table 5. Regression Analyses of Communism on Vaccination Rates in Study 2.

|                | B     | SE B  | β     | Adjusted R² | p     |
|----------------|-------|-------|-------|-------------|-------|
| Germany        |       | .61   |       |             |       |
| Communism      | −10.75| 3.36  | −.88  | .008        | .03   |
| GDP            | −.00  | .00   | −.47  | .03         |       |
| Age            | −3.32 | 11.82 | −.08  | .78         |       |

Note. B = unstandardized beta; SE B = standard error for B; β = standardized beta.
For point 3, there are several alternative mechanisms that are worth considering further. One is economic success. In Germany, former communist states tend to be worse off economically, and citizens tend to view the former communist East as having worse living standards (Wike et al., 2019), which might translate into less access to vaccinations and lower vaccination rates. However, the results of the current studies held controlling for GDP, so economic success seems less likely to be a factor in this case.

Another potential factor is anti-vaccine sentiment in general. It could be that former communist states are anti-vaccine states, and the COVID-19 vaccine association is the result of a general anti-vaccine sentiment. However, at least in Germany, voluntary vaccination rates for influenza are nearly twice as high in former communist East Germany than they are in West Germany (Rehmet et al., 2002). Former communist East Germany is vaccinated in general, but not for COVID-19, so general anti-vaccine attitudes are not likely to be driving the communist divide in vaccination rates.

An additional possibility relates to a history of vaccine mandates. A closer look at Germany can be illustrative here. On the one hand, communist East Germany has had higher levels of vaccination rates for various types of vaccines than West Germany because vaccines were mandated under communist rule in the East but not in the West. This might suggest that modern-day East Germany would be more willing to get vaccinated for COVID-19 because of a pre-existing precedent to get vaccinated. Consistent with this expectation, between 2008 and 2011 East Germany had higher vaccination rates than West Germany for tetanus, diphtheria, pertussis, measles, and influenza (Poethko-Müller & Schmitz, 2013). However, East Germany has lower, not higher, COVID-19 vaccination rates, which implies that vaccination history is not a major contributor in this case. On the other hand, mandates can threaten one’s sense of freedom and lead to psychological reactance (i.e., an unpleasant state that results when freedom is threatened), which has been shown to decrease intentions to get a COVID-19 vaccine (Sprengholz et al., 2021). Reactance can lead to efforts to counter the source of the threat to freedom, which can manifest as protests. Indeed, anti-COVID-19 vaccine protestors’ signs are often explicitly about freedom: “Frieden, Freiheit, kein Diktatur” (Peace, freedom, no dictatorship; Connolly, 2022). And draw on sentiment reminiscent of the fall of communism, with chants used during the fall of the Berlin wall present at protests: “Wir sind das Volk” (We are the people). These protests are often organized by the AfD, which has its strongest support in East Germany, and further suggests that reactance might be a contributing factor.

A further possibility is religion. At least within Europe, Orthodox Christianity might be an important factor that is related to the negative association between communism and COVID-19 vaccinations. Eastern Europe tends to be higher in Orthodox Christianity than the rest of Europe, and
Orthodox Christians tend to prefer old ideas (Djankov & Nikolova, 2018), so it might be difficult to shift to a new vaccine for COVID-19 that was quickly developed. Somewhat consistent with this, more broadly religiosity in general (and not just Orthodox Christianity) is associated with vaccine skepticism in at least some parts of the world (Rutjens et al., 2022). However, Orthodox Christianity is unlikely to be a cross-cultural mechanism explaining the association between communism and COVID-19 vaccinations, as Orthodox populations tend to be largest in Europe (PEW Research Centre, 2017). Nonetheless, this remains an avenue for future research.

A final aspect worth mentioning in more detail relates more broadly to why communism is associated with vaccination rates. This association might have emerged because of something about the regions before communism was established, what living under communism was like, or the transition to another political system. These are not mutually exclusive routes. The current studies did not set out to test which might be responsible, so this is an area for future research. One potential avenue to assess whether the transition from communism to another political or social system could be to test whether similar effects are observed among regions that transitioned from other forms of authoritarian rule. If such an effect emerges, it suggests the transition is an important factor.

It is worth noting the correlational nature of the data. Although communism is associated with lower COVID-19 vaccination rates, there remains the possibility that third variables account for this finding. While it makes theoretical sense that communism is having a lasting effect in modern times, and the results of the current studies are consistent with this idea, the data is correlational, so this is an area for future research.

Importantly, the current studies are meant as a starting point in establishing whether a historical communism is related to COVID-19 vaccinations and if trust in government is a potential mediator. In that regard, historical communism is associated with COVID-19 vaccination rates in Germany, Europe as a whole, and Asia, such that historical communism is associated with lower vaccination rates. Within Germany, but not Europe as a whole, trust in government was found to mediate this association.

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Note

1. As an alternative approach, instead of running multiple regression models, a single regression model was run that included dummy variables with Europe (the largest sample) as the comparison (\(d_{\text{asia}}: 0 = \text{Europe and others}, 1 = \text{Asia}; d_{\text{africa}}: 0 = \text{Europe and others}, 1 = \text{Africa}) and interacted them with communism. Of the interactions, only \(d_{\text{Africa}} showed a significant interaction, indicating that Europe showed the predicted pattern with lower vaccinations with communism, but Africa showed no effect. The overall main effect of communism was significant and in the predicted direction. These analyses mirror those presented in text.

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