Is the unequal COVID–19 burden in Canada due to unequal levels of citizen discipline across provinces?

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Is the Unequal COVID-19 Burden in Canada Due to Unequal Levels of Citizens' Discipline Across Provinces?

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Abstract

The unequal burden from the COVID-19 crisis (e.g., in terms of infection and death rates) across Canadian provinces is important and puzzling. Some have speculated that differences in levels of citizen compliance with public health preventive measures are central to understanding cross-provincial differences in pandemic-related health outcomes. However, there has been no systematic empirical test of this hypothesis. In this research, we make use of an exceptionally large dataset including 23 survey waves (N=22,610) fielded in Canada across twelve months (April 2020 to April 2021) to answer the question: is there evidence of substantial cross-provincial differences in citizen compliance with basic public health measures designed to prevent the spread of infection? We find that regional differences in self-reported behaviour are few and very modest, suggesting that inter-provincial differences in COVID-19 related health outcomes have little to do with differences in citizen compliance, at least in the first year of the pandemic. These results have important implications. While it is crucial that we continue to study regional variations related to the COVID-19 burden, public officials from health agencies, pundits and politicians should be cautious when musing about the role of citizen compliance as the primary explanation of inter-provincial pandemic health outcomes.

Keyword: COVID-19; Preventive Measures; Compliance; Public Policy; Canada; Regionalism

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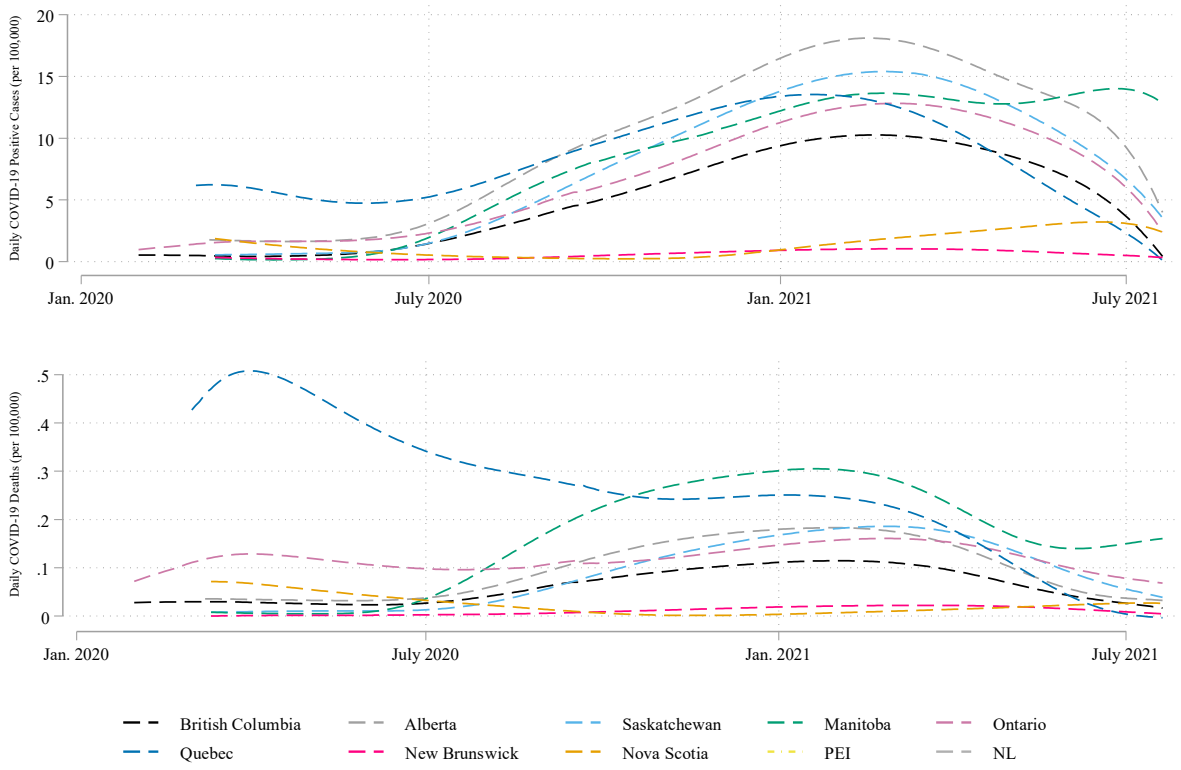
From the early stages of the COVID-19 pandemic, trends in daily infections, hospitalizations and casualties across Canadian provinces followed very different trajectories. During the first wave, the province of Quebec was most severely hit by the disease in terms of infections and deaths. According to data from Bignami and van Assche (2020), regional differences between Quebec and the rest of Canada were already clear as of May 31st. At that time, there were 228 cumulated positive COVID-19 cases per 100,000 people for the country as a whole. In Quebec, this ratio reached 534 while it was 200 in Ontario, 104 in the Prairies and about 55 in both British Columbia and the Atlantic provinces. Regional differences were even more pronounced when focusing on hospitalizations and mortality. For example, Quebec had a ratio of 52 cumulated deaths per 100,000 citizens compared to 16 in Ontario and 2 or 3 per 100,000 citizens in other provinces.

While such differences between Quebec and the rest of the country characterized the first wave, other regional differences have emerged and became just as pronounced during what has been labeled the 'second' and 'third' waves. Data from the Government of Canada (2021) on daily COVID-19 positive cases as well as COVID-19-related deaths (per 100,000 citizens) shown in Figure 1 visualize the regional differences that emerged over time. As mentioned, Quebec was the most hard hit province at the early stages, but things changed quite dramatically during the summer of 2020. In terms of COVID-19 positive cases, five provinces (BC, Alberta, Saskatchewan, Ontario and Manitoba) experienced a sharp increase beginning in July. Their slopes were so steep that by early 2021, all of these provinces but one (BC) reported a number of daily new cases that was higher than what was recorded in Quebec. In terms of COVID-19-related deaths, it is worth noting that Quebec was hit hardest during the first months of the pandemic, and that Manitoba

experienced a steady rise that was more important than in other provinces and reached a peak early 2021.

Figure 1. Regional variation in COVID-19 cases and deaths across Canadian provinces



Note: Local regression of daily entries with a kernel (epanechnikov) function and a bandwidth of 0.8. Source: Government of Canada, "COVID-19 daily epidemiology update."

Understanding what caused these regional differences and their variation over time is of utmost importance. Not only is such information crucial for more effectively managing the pandemic in the short- and medium-term in Canada, but also for learning and better preparing for future disease outbreaks.

While the regional differences were widely reported and discussed in the popular media, the sources of these gaps have not—to the best of our knowledge—been analyzed in a systematic

manner. In this paper, we examine one specific explanation offered to account for inter-provincial differences in pandemic-related health outcomes; namely, that the differences are due to different levels of citizen compliance with COVID-19 preventive measures. This potential explanation has been raised by several columnists, especially during the first wave of the pandemic, i.e., when Quebec was an outlier and journalists from both anglophone and francophone media blamed Quebecers' lack of discipline for rising infections—for examples, see articles published in the *Globe and Mail* (Andrew-Gee and Stone 2020), *Le Devoir* (David 2020), *The Gazette* (Bruemmer 2020), and *Le Journal of Montréal* (Robitaille 2020). Among the more prominent voices offering such an explanation was the Quebec minister of health, Christian Dubé. Speaking on one of the province's most popular television programs (*Tout le monde en parle* on September 27, 2020), he suggested "I think that we have a Latin side; we like to party."

The policies, guidelines and recommendations from government and public health agencies aimed at limiting social contacts were similar across provinces in the early stages of the pandemic (Breton and Tabbara 2020). The extent that social distancing measures are widely considered to be effective in limiting the spread of COVID-19 (Haug et al. 2020), hence, there are good reasons to believe that lower levels of compliance with such measures would result in higher numbers of COVID-19 cases, hospitalization and deaths. Although this real possibility has been raised in the public discourse, it lacks a rigorous systematic empirical investigation, which we provide here. We use the Imperial College London-YouGov dataset consisting of 23 waves (number of observations for Canada=22,610 respondents), gathered from April 2020 to April 2021. This large data source allows to compare citizens' self-reported levels of compliance with public health preventive measures in Canadian provinces, at different points in time during the pandemic. The

breakdown of the data by province sheds light on the differences between Quebec and the rest of Canada, but also allows assessing to what extent compliance varied between the other provinces.

Our findings reveal that differences in Canadian citizens' levels of self-reported compliance across provinces are few and very modest. This conclusion is robust to alternative specifications and consistent with tracking data of citizens' mobility during the pandemic. While it is crucial to understand what happened during the COVID-19 crisis, our results suggest that regional differences in pandemic health-related outcomes cannot be attributed to different levels of compliance with preventive measures, at least not in the early stages of the pandemic. We should thus focus on other explanations, and we conclude by discussing these venues for future research.

COVID-19 in Canada: A Multi-Level Challenge for Public Policies

Canada is a highly decentralized federation that is also characterized by a high level of regionalism. As Simeon and Elkins (1974) put it: "Canadian politics is regional politics; regionalism is one of the pre-eminent facts of Canadian life" (397). Hence, the COVID-19 pandemic should be understood there as taking place in a geographically large and culturally diverse setting. Regional variation in terms of political culture is of particular interest when examining government and citizen responses to the crisis. The seminal work by Simeon and Elkins (1974) and the more recent research by Henderson (2004) are striking for their analyses of political trust and efficacy, which vary substantially across regions within a country. Work in a similar vein by Montpetit et al. (2017) also shows consistently large cross-regional differences in political values and culture among Canadian citizens. Importantly, we know that variables like political values and trust are linked to citizens' levels of compliance with COVID-19 preventive measures and support for different

public policies aiming to better respond to the pandemic (Bargain and Aminjonov 2020; Lachapelle et al. 2021), to support for law compliance even in non-pandemic times (Marien and Hooghe 2011) and with risk perceptions more generally (Kiss et al. 2020).

All these studies draw attention to the presence of important regional differences in culture and values across Canada (see also Schwartz 1974; Grabb and Curtis 2005). Focusing on differences in political behavior, Gidengil et al. (1999) also found evidence of important regional differences, and concluded that these differences cannot be explained by sociodemographic compositional effects (for example, if education or age would substantially vary) across the country. What drives this variation in election outcomes between provinces are different political values, but also different basic priorities. Differences between Quebec and the rest of Canada, notably with the presence of the Bloc Québécois, are a key component of the regional divide in voting behaviour, but are far from the only ones (Nadeau and Bélanger 2012). For example, Bélanger and Nadeau (2005) showed that political trust (which, as mentioned above, varies across regions) is associated with higher levels of support for the Reform Party which was particularly popular in the prairies. Silver and Miller (2014) provide further evidence of cultural differences being key to explain regional differences in voting behaviour across the country. Using an impressive dataset of local amenities (like cafés, churches, etc.), they showed that the cultural meaning of these amenities (tapping cultural 'scenes' that, for example, are linked to self-expression) can account for differences in geographical voting patterns as well as in political attitudes (Miller and Silver 2015).

Such geographical differences, in turn, can be relevant for understanding how citizens across the country responded to the strikingly similar set of measures governments implemented in the early

stages to limit the spread of the COVID-19 virus. It is, however, worth noting that the literature is unclear about which territorial unit of analysis is most relevant and to what extent this choice affects observed differences in political attitudes and behaviours. For example, different levels of analysis have been put forward, such as the district or the municipal, provincial or regional level (see, among others, Cochrane and Perrella 2012; Henderson 2004; McGrane and Berdahl 2013; Mildenberger et al. 2016). Moreover, some have claimed that such provincial differences are at least as important as other variables like sociodemographics, while others have been more nuanced when attributing attitudinal and behavioural differences to geography alone (Anderson 2010; Héroux-Legault 2016).

Overall, Canada is thus characterized as a culturally diverse country with strong regionally-based heterogeneity in political values, preferences, and behaviours. Combined with the highly decentralized power sharing nature of Canadian federalism, this sometimes results in difficulties in coordinating public policies across levels of government, even around key issues such as a pandemic. The COVID-19 issue has been accurately described as a "complex intergovernmental problem" (Paquet and Schertzer 2020) and the challenges the federal structure poses for responding to the COVID-19 crisis in particular have become more apparent over time. Despite these challenges, it is worth noting that the public health recommendations (social distancing, etc.) from the different provincial governments were in fact quite similar, at least during the initial stages of the pandemic. For example, the state of emergency was declared by all ten provinces at around the same time between March 14-22nd. Moreover, by early March, all provinces were on the same page regarding key preventive measures like the closure of schools, bars, or restrictions on restaurants and for visits to long-term care facilities (Breton et al. 2021).

Provincial governments in fact played a very important role at the start of the pandemic, notably with their own public health officials at the provincial level and by providing COVID-19 tests (Adeel et al. 2020; Kennedy et al. 2021). The municipal level played a substantial role in the early stage of the pandemic as well. For example, the city of Montreal decided to send employees from its regional public health agency to the Pierre Elliott Trudeau airport (which is under the jurisdiction of the federal government) a few days after a state of emergency was declared. Even though the decision-making power was far from centralized, however, local governments appear to have responded to the pandemic in "remarkably consistent ways" during the first wave (Armstrong and Lucas 2020: 237; Armstrong et al. 2020).

Given the seemingly consensual nature of government officials' initial responses to the pandemic, it is rather puzzling that Canadian provinces followed such different trajectories in terms of public health outcomes. A number of explanations have been offered to explain these outcomes, including the timing of the March school break in Quebec, which has been shown to play a limited role (Godin et al. 2020). Given the similarities in the measures that different provincial governments took to limit the spread of the COVID-19 virus, another explanation – that was echoed by Quebec health minister Dubé – is that regional and cultural differences in compliance with governments' preventive measures are key to explaining the heterogeneity in health outcomes. However, a systematic analysis of this particular hypothesis to understand the causes of the regional differences is lacking. Among the few insights that we have, Mohammed et al. (2020: 122) showed that Quebecers were less likely than citizens from other provinces to wear a face mask in April and early May, but that this difference disappeared in late May and early June. Furthermore, Chan

(2020) used Facebook data to estimate mobility reduction across small geographical units (census divisions) using pre- and post-lockdown measures (February versus April 2020). Contrary to what one might expect, the highest levels of mobility reductions were found in Quebec, which is at odds with the observed regional differences in health outcomes during that time. Although it is not clear what is the cause or the consequence in this relationship (e.g., differences in mobility are likely endogenous to differences in health outcomes), it is inconsistent with the view that people in Quebec were less disciplined.

In this research, we systematically analyze regional differences in the extent to which citizens comply with preventive measures across Canadian provinces, and we do so for numerous behaviours that were similarly proscribed across the country. The next section describes the dataset used to examine the potential role of citizen compliance in the unequal burden of the COVID-19 pandemic across the country.

Data and Indicators

We use data collected by the Institute of Global Health Innovation (IGHI) at Imperial College London and the polling firm YouGov (Jones 2021). The two organizations sought to gain insight into citizens' perceptions and responses to the COVID-19 pandemic in 29 countries. Our focus is on Canada, where we make use of 23 waves of data.[1] Each wave consists of an online survey that collected answers from a fresh sample of about 1,000 respondents, implying the dataset has a cross-sectional time-series design. Quotas were used by YouGov to obtain a nationally representative sample in terms of age, gender and region, this last characteristic being very useful for studies of

[1] There were in fact 24 waves, but we excluded the one from late September because it did not include all the questions that we needed.

our kind. We also weight the data (based on national census for age, gender and region) to increase the sample's representativeness. The data were collected from April 2020 to April 2021, for a time span of twelve months. Of all publicly available datasets that include measures of compliance with preventive measures, this is, to our knowledge, the one with the highest number of waves and the longest time coverage. Table 1 provides an overview of the timing of the fieldwork and the number of observations per wave. Figure SM.1 in the Supplementary Materials shows the number of observations for each province – we excluded the three territories due to their insufficient number of observations.

Table 1. Overview of the dataset

Wave	Fieldwork dates	Number of observations
1 (2020)	02/04 to 06/04	1,005
2	29/04 to 03/05	1,002
3	15/05 to 20/05	1,002
4	03/06 to 09/06	1,001
5	09/06 to 22/06	1,001
6	24/06 to 08/07	1,005
7	14/07 to 22/07	1,001
8	22/07 to 05/08	975
9	06/08 to 18/08	1,001
10	20/08 to 27/08	981
11	02/09 to 09/09	904
12	02/10 to 11/10	1,002
13	14/10 to 27/10	1,000
14	28/10 to 11/11	1,001
15	11/11 to 24/11	1,003
16	16/12 to 30/12	960
17 (2021)	06/1 to 13/01	1,003
18	13/01 to 27/01	968
19	27/01 to 10/02	976
20	10/02 to 23/02	999
21	24/02 to 05/03	1,003
22	10/03 to 19/03	818
23	24/03 to 06/04	999

To measure citizens' compliance with preventive measures, we rely on three different indicators. First, we use a measure of compliance with preventive measures during the last week. This particular question asked respondents "Thinking about the last 7 days... how often have you taken the following measures to protect yourself or others from coronavirus (COVID-19)?" For each item the answer options were "Always; Frequently; Sometimes; Rarely; Not at all." We focus on 7 key preventive measures for which public health guidelines were very similar (or identical) across the provinces. For more information, see the Canadian COVID-19 Stringency Index, compiled and made publicly accessible by Breton et al. (2021). These items are:

- Avoided having guests to your home
- Avoided large-sized social gatherings (more than 10 people)
- Avoided crowded areas
- Worn a face mask outside your home (e.g. when on public transport, going to a supermarket, going to a main road)
- Washed hands with soap and water
- Covered your nose and mouth when sneezing or coughing
- Avoided contact with people who have symptoms or you think may have been exposed to the coronavirus

The items present a high internal consistency (Cronbach's alpha, α=.77) and we combine them into an index of self-reported measure of compliance with public health guidelines. As we do not have any theoretical expectation regarding the relative importance of the different items in the compliance scale, we assign each item the same weight (that is, 1/7) when computing the index, which is also in line with Al-Zubaidy et al. (2021) who attributed an equal weight to each behaviour. Descriptive statistics for each of the items are included in Table SM.1 of the online appendix.

Second, we rely on an indicator of citizens' level of willingness to isolate if they were advised to do so, based on the following question: "If you were advised to do so by a healthcare professional

or public health authority, to what extent are you willing or not to self-isolate for 7 days?" Answer choices included "Very willing; Somewhat willing; Neither willing nor unwilling; Somewhat unwilling; Very unwilling." There was a "don't know" option, chosen by about 3% of the sample, that we excluded. Third, we make use of a more specific and prospective question about self-isolation: "Thinking about the next 7 days… would you isolate yourself after feeling unwell or having any of the following new symptoms: a dry cough, fever, loss of sense of smell, loss of sense of taste, shortness of breath or difficulty breathing?" Answer choices were "yes", "no", or "not sure." We dichotomized those who answered yes against the others (including the 7% of not sure).

As mentioned, compliance with COVID-19 preventive measures is an index of 7 items. Each of the items were coded from 0 to 1 where 1 indicates the most disciplined ("Always"); the resulting additive index thus has a range between 0 and 7. Answers to the willingness to self-isolate question were recoded from 0 to 1 where 1 corresponds to being "Very willing." Finally, prospective self-isolation (if the respondent experiences one of the typical COVID-19 symptoms) is a dichotomous variable coded 1 when a respondent indicated they would self-isolate. The distribution of the variables is shown in Figure SM1 of the Supplementary Material.

As for many topics in social science, such as those on sexual/health behaviour (Catania et al. 1996) or illicit behaviours like shoplifting (Holtgraves et al. 1997), it is possible that these questions induce a form of social desirability bias. Although the literature on COVID-19 is mixed[2], it is possible that our three outcomes of interest are overestimated. While this is a limitation of self-reported measures of compliance, it would be a major concern only if the bias operates differently across provinces. However, there is little evidence of heterogenous effects. Daoust et al. (2020: 7)

[2] For example, Munzert and Selb (2020) do find evidence of a social desirability bias while others like Larsen et al. (2020) or Jenson (2020) do not.

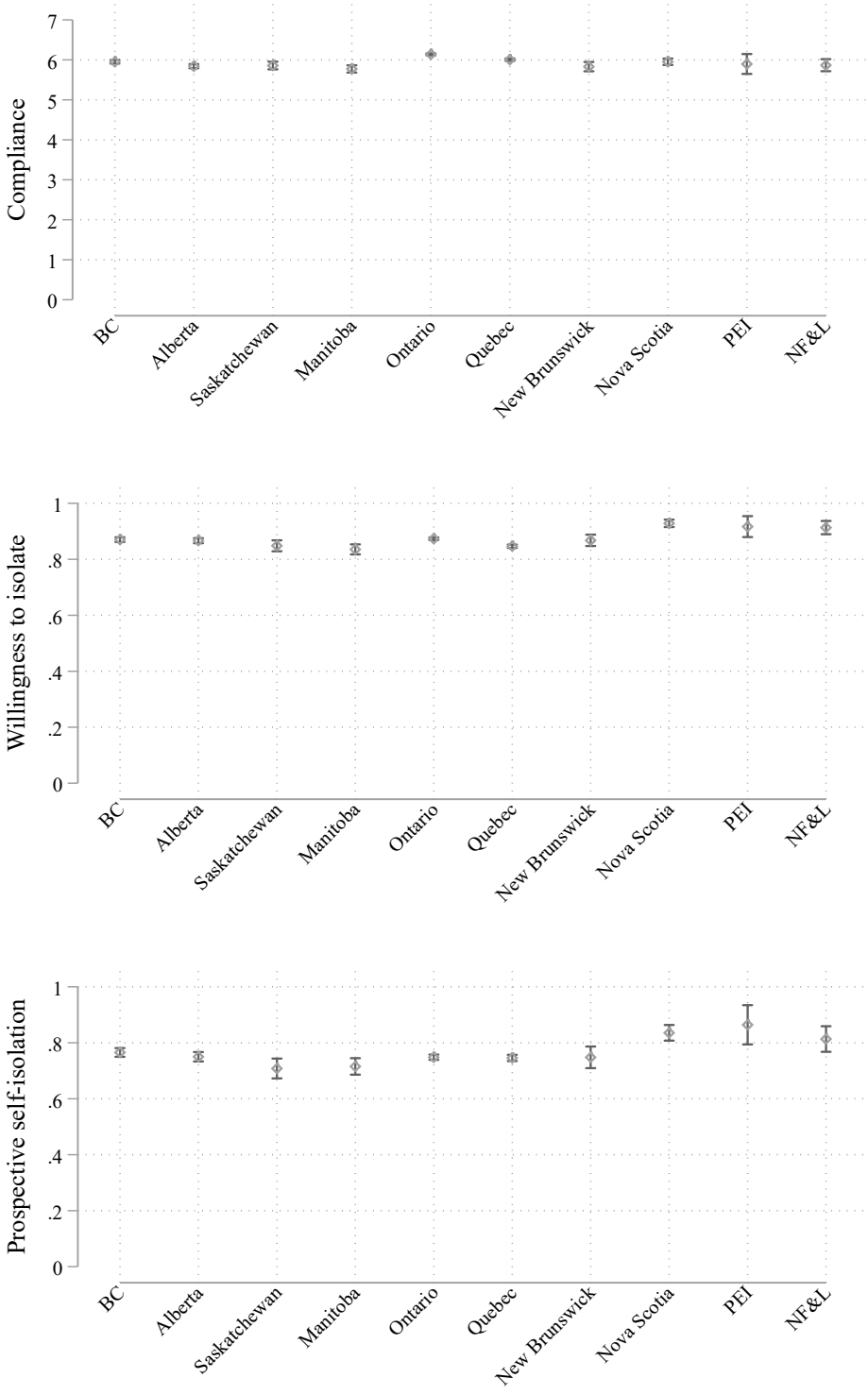
showed, using Canadian data from 2020, that the bias is very similar across different gender, levels of education, and ideology. In the same vein but using data from a set of twelve diverse countries, Daoust et al. (2021: 6) showed that the bias was homogenous across people of different age, gender and educational characteristics. Most importantly for our research, Daoust et al. (2020) provided a very reassuring test: comparing Francophone and Anglophone respondents, the authors concluded that "The Canadian experience with multiculturalism (with more than a quarter of the population speaking French at home) provided an opportunity to show that our results are robust and very similar across these different cultures." (page 7). All in all, we believe that, although imperfect, self-reported measures of compliance with COVID-19 preventive measures can be used for the purpose of our inquiry.

Results

The first test is very simple: we examine the mean levels of the three indicators across all ten provinces, with the confidence intervals estimated with the package *ciplot* in Stata. Results are shown in Figure 2. First, mean levels of compliance with COVID-19 preventive measures are remarkably similar across the country. On average, citizens from all provinces have a mean score of 6. There are no substantial differences, one way or another, between regions or between the provinces. Second, citizens' willingness to self-isolate is also very homogenous across the country. It is worth noting, however, that the Atlantic provinces are slightly more willing to self-isolate. Overall, the mean is .9 in the Atlantic provinces while it is .87 in the rest of the country – for a small difference of .03 on a 0 to 1 scale. Third, the prospect of self-isolating (e.g. would someone self-isolate if they were told to do so) is the indicator showing the greatest level of variation, although it is still quite limited. The mean across the country is .76, but it reaches .87 in Prince

Edward Island while Manitoba has the lowest mean at .72. All in all, findings show that the extent to which citizens are disciplined across the provinces range from almost identical to slightly different. These figures do not offer support for the expectation that regional and cultural differences in compliance explain the different trajectories of the COVID-19 pandemic across Canadian provinces.

Figure 2. Citizens' Discipline Across Canadian Provinces



Note: N=22,610. Mean levels of compliance are indicated. 95% confidence intervals included. BC: British Columbia; PEI: Prince Edward Island; NF&L: New Foundland & Labrador

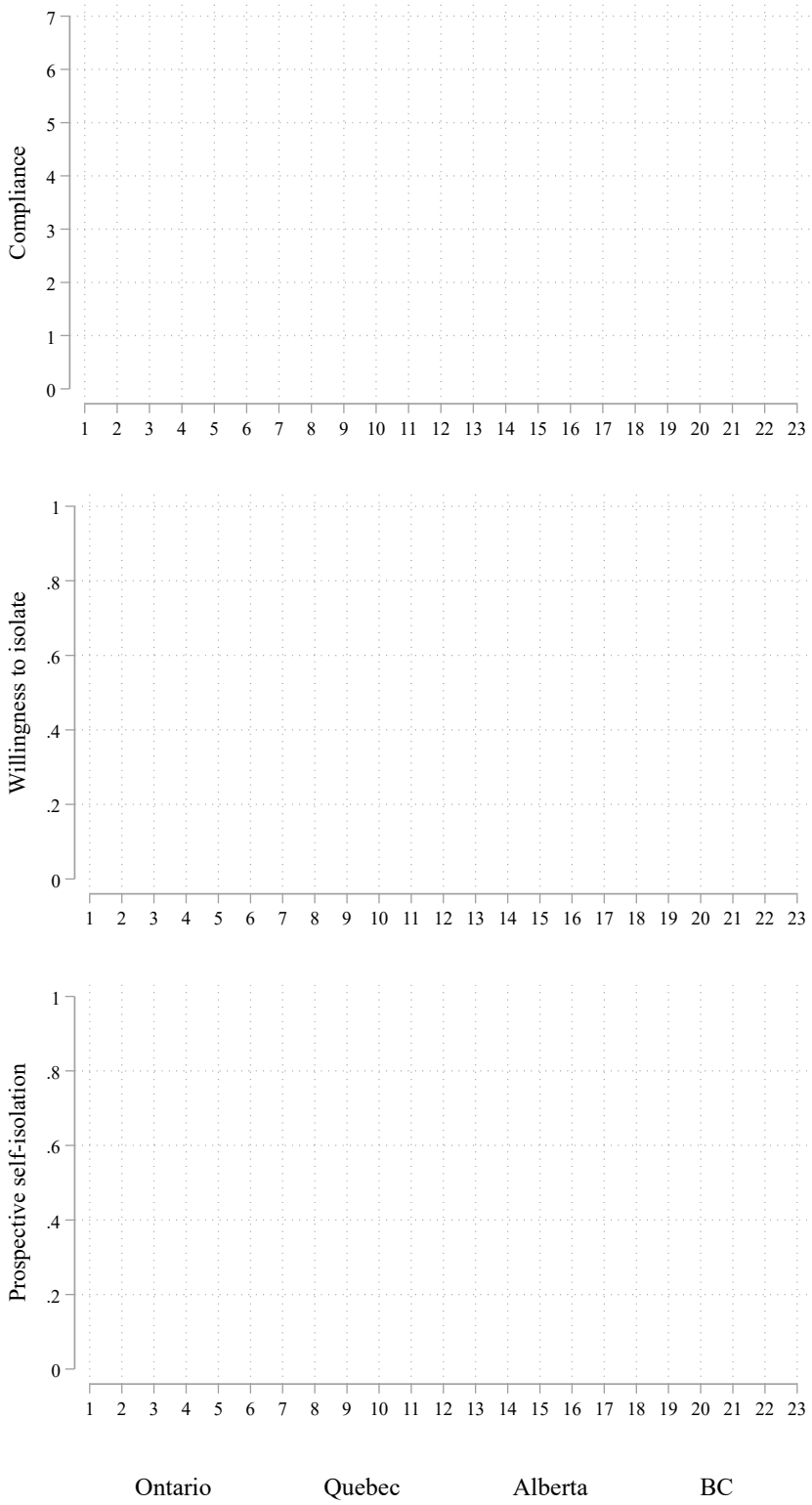
That said, it may be possible that differences across provinces varied over time. The scope of our dataset (24 waves across 12 months) allows us to unpack this possibility. Figure 3 shows the mean for our three indicators in each of the 24 waves. From April 2020 to April 2021, there was at least 1 wave per month and a maximum of 3 (the norm was 2 survey waves per month).[3] For the breakdown of levels of compliance over time, we only include data from four provinces because some provincial subsamples are too small in a given survey-wave. That is, we focus on the four most populous ones and those that make up the vast majority of COVID-19 cases in Canada. We do so because of the limited number of observations in each survey wave for the other six provinces.[4] The results, presented in Figure 3, show that there is a high degree of stability in citizens' self-reported level of compliance with COVID-19 preventive measures and their attitudes or prospective behaviour regarding self-isolation. Most importantly, this observation holds across each of the four provinces included in Figure 3. The differences overall are modest, but it is worth noting that Alberta, Quebec and BC display slightly lower levels of compliance (less than 0.5 point) than Ontario for the first nine waves of the dataset (from April to August 2020). However, citizens' levels of compliance increased and reached Ontario's ones at the end of the summer 2020. These over-time changes in compliance within provinces are not consistent with the "cultural explanation" mentioned previously – as political culture in the different provinces most likely did not change during these few months.

All in all, despite the highly regionalized nature of Canadian politics, values and political behaviours, our results are clear: we find no substantial differences in terms of citizens' levels of

[3] For the exact dates corresponding to each wave, see Table 1.
[4] For example, we included PEI when pooling all the surveys for Figure 2 and ended up with about 100 observations, but this number dramatically decreases when we break down the averages by wave.

compliance with COVID-19 preventive measures across provinces. Moreover, we fail to find such differences when looking at the averages across survey waves (Figure 2) and we find little indication of heterogeneity when exploiting changes in citizens' compliance over time. To increase confidence in our results, we conducted additional robustness checks.

Figure 3. Citizens' Levels of Compliance Across Provinces, Over Time



Note: Local regression of respondents' compliance, using a kernel (epanechnikov) function and a bandwidth of 0.8. For the exact dates of the waves listed on the x-axis, see Table 1.

First, it is worth recalling that results from Figures 2 and 3 are from bivariate analyses. As such, one might prefer to control for factors like age, gender, employment status, and having children at home, in case the social composition of people living in the provinces that we compare would mask the (lack of) differences. However, doing so does not alter our conclusions, as shown in Figure SM.2-3 (and Table SM.2-3) of the Supplementary Material. Second, while we merged all seven items tapping key preventive measures into a single index, we can look at each item discretely to verify if the lack of provincial variation is confirmed for each. Results from the individual analyses of the seven items are reported in Figure SM.4 of the Supplementary Material. Again, we find very modest and non-significant differences in the means across provinces.

Discussion and Implications

In this research, we test the hypothesis that regional differences in COVID-19 pandemic health outcomes are due to different levels of citizen compliance with the similar set of public health guidelines implemented across provinces in the first year of the pandemic. Canada is a regionally and provincially diverse country in terms of its culture, values, and behaviours. During the pandemic, this heterogeneity may have expressed itself in distinct provincial patterns of compliance with governmental health measures, leading to differences in health outcomes. To test whether Canadian provinces differed in complying behaviour, we relied on Imperial College London-YouGov data which, to our knowledge, is the most comprehensive in terms of time coverage among the publicly accessible datasets that measure compliance. This exceptional data source allowed us to study regional differences in compliance with COVID-19 preventive measures over a 12-month period.

We aimed to provide a clear answer to the important question of whether or not differences in citizen compliance with public health measures can account for provincial differences in pandemic-related health outcomes in Canada. That we have found little evidence of inter-provincial as well as cross-regional differences in self-reported behaviours suggests that we can rule out this potential explanation. Differences in compliance, where they exist, appear very modest. The implication is that for explaining cross-provincial differences in pandemic-related health outcomes, we need to look elsewhere.

The results of this study are important for several reasons. First and foremost, our findings suggest that the "cultural" hypothesis cannot explain the significant differences in the number of cases and deaths across Canadian provinces, at least in the early days of the pandemic. This finding is important on its own and in light of prominent political, popular as well as academic discourse. Indeed, several prominent voices publicly blamed differences in culture for the uneven burden of COVID-19 in Canada (Andrew-Gee and Stone 2020; Bruemmer 2020; David 2020; Robitaille 2020), yet we find at best very modest differences in self-reported compliance behaviour across the country. To be sure, other studies (e.g., Yossi Maarvi et al. 2021) argue that cultural variance across countries is crucial in understanding how susceptible a society is to the COVID-19 outbreak and more specifically conclude that "the more individualistic (vs. collectivist) a country was, the more COVID-19 cases and mortalities it had."[5] We do not deny that cultural differences in individualism and collectivism might vary across Canadian regions, and that such differences

[5] Interestingly, this result could have led to the conclusion that Quebecers, somewhat more collectivist (at least in terms of welfare state) than other Canadians, had higher levels of compliance in response to the health guidelines that were put in place.

correlate with particular types of behaviours (e.g. vaccine uptake) or public policies (e.g. regional bubbles), which in turn can affect health outcomes. However, examining data collected between April 2020 and April 2021, our study provides strong evidence to suggest that rates of behavioural compliance across Canadian provinces had little to do with the unequal burden of COVID-19 experienced in the early stage (roughly the first year) of the pandemic in Canada.

Second, our results are strengthened by corroborating data compiled by those obtained by other methods, including Google “travel histories” (Péloquin 2020; Rocha 2021). These data show that variations in mobility levels across provinces had been modest overall and had been directly related to the stringency of the measures implemented by various governments (Rocha 2021; Breton et al. 2021). These results therefore highlight the value of using different measures of compliance with public health guidelines in a complementary manner. Indeed, while analyses based on self-reported measures have their shortcomings, they also have their advantages in that they allow, for example, more detailed analyses of the profile of citizens who comply or do not comply with the measures put in place to limit the spread of COVID-19 (Daoust et al. 2020). We were also able to include more indicators than just mobility.

A third implication of our results follows from the first two. While the "cultural" hypothesis deserves to be examined, and existing data (like that examined here) make it possible to do so, this idea should be subjected to more careful empirical scrutiny before being touted in hot political commentary. For instance, at the beginning of the pandemic, before the very heavy toll of the first wave, Québec Premier François Legault, commenting on Google mobility data, praised the discipline of Quebecers by noting that Quebec is the North American state “where people respect

the order to stay home the most." (Péloquin 2020). A few months later, after a significant increase in cases at the beginning of the second wave, Health Minister Christian Dubé in a complete about-face blamed the province's "Latin spirit" for the increase in infections. Based on a rigorous review of policies and behaviours across Canada, Charles Breton of the Centre of Excellence on the Canadian federation concluded of Dubé's comments: "That was a convenient excuse... [but in fact] Quebeckers were compliant" (quoted in Rocha 2021). Although potentially "convenient," these kinds of excuses that blame citizens may also backfire insofar as they can damage citizens' levels of generalized trust, a disposition that other research has shown to play an important role in shaping patterns of collective action in response to the COVID-19 pandemic (Lachapelle et al., 2021). While not offering a definitive test of the cultural hypothesis, little variation found in self-reported compliance with public health measures in the early stages of the pandemic suggests more research to explain the different pandemic-related health outcomes across Canadian provinces is needed to unpack the different roles of and interactions between political culture, public policies, and citizens' level of compliance.

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