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The impact of discrimination on trust in government institutions: A LASSO regression analysis in the Canadian context during COVID-19

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ABSTRACT

This study examines the effect of discrimination on public trust in government and public servants during the COVID-19 pandemic. Using Canadian survey data collected in 2020 (N = 36,674), we apply both logistic regression and ordinary least squares (OLS) regression to analyze how discrimination related to COVID-19 influenced trust in four public institutions. Prior to running these models, we used the Least Absolute Shrinkage and Selection Operator (LASSO) method for variable selection. The findings indicate that personal experiences of discrimination significantly reduce institutional trust, particularly when discrimination occurs online, in the workplace, or during interactions with the police. However, the results also show that a strong sense of belonging—whether to Canada, a specific province or territory, or a shared community (such as speakers of the same language)—is associated with higher levels of trust in institutions. These insights provide valuable guidance for policymakers and public officials.

1. Introduction

During recession periods, it can be challenging to maintain the public's trust in public administrations. The COVID-19 pandemic is one such example—the spread of infectious disease between villages, cities, provinces, and countries generated a systemic risk and a feeling of panic and anxiety about the future and about administrations' ability to effectively address current challenges (Fernandez and Shaw, 2020). In such situations, people need to have higher perceptions of safety and to trust the decisions implemented by the government. The prevalence of the virus in Canada has been well documented in Quebec with only 56 216 (5609) total cases (death) on July 9, 2020, which may be explained by the aging population living in long-term care and seniors' home and the lower adherence to public health guidelines due to culture factors, the government of Quebec has made a considerable effort by implementing social and political strategy to curb the pandemic and tend to promote consistent and transparent communication as well as a supportive behavior which has increased Quebecers' positive perception of the government (Généreux et al., 2022).

In addition, since the beginning of the pandemic, several studies have documented the prevalence of discriminatory practices towards marginalized groups, especially towards Asian people who have been severely impacted by the pandemic with an increasing rate of Asian hate crime in 2020 (Strassle et al, 2023). Accordingly, the study by Hou et al. (2020) found that the COVID-19 pandemic has strongly limited the ability of visible minorities to meet their financial obligations or essential needs. However, much of the literature has focused on the prevalence of discrimination in the healthcare system (e.g., communication barriers, and unequal access to healthcare services) that affects minority groups. Such unfair treatment is a principal contributor to psychological distress for disadvantaged groups. It can challenge their beliefs in the fairness and legitimacy of institutions, resulting in decreased trust. A study conducted by Badman et al. (2022), during the COVID-19 crisis, found that trust in public health institutions was fundamental to promoting public health compliance. As suggested by Etowa et al. (2022), despite the Health Canada Act that aims to reduce health inequalities, higher obstacles in accessing healthcare services have been faced among vulnerable groups in Canada (e.g., women, African, rural residents). This stream of COVID-19-related research has largely been conducted in the context of health

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systems. Thus, the significance of our study is that extends analysis while exploring discrimination in its various forms and how it can overlap within groups to better understand their impact on trust in institutions, outside of the healthcare system. In this light, our paper addressed the following research question: Does discrimination impact trust in government institutions?

This paper makes several useful contributions. First, the paper explores how discrimination might work under different contexts and for different groups of people using a methodological innovation based on the LASSO algorithm to further specify the model and eliminate bias. Second, the literature investigating discrimination and trust in institutions has been particularly focused on healthcare systems. Consequently, less attention has been paid to government institutions; as such, this paper fills a gap in current knowledge. Also, while there is a significant body of literature on the level of public trust during the COVID-19 pandemic, it is dominated by qualitative studies. However, the present study attempts to use quantitative data to explain how the perception of discrimination against marginalized groups in Canada during the first year of the pandemic worsened the public's trust in government institutions. Finally, this study produced valuable implications that can help decision-makers deal with discrimination issues to create social cohesion and fair Canadian institutions that treat everyone as equals.

The remainder of the paper is organized as follows: Section 2 presents the conceptual framework and related literature, Section 3 presents the empirical study, Section 4 describes the results, and the last section concludes the paper.

2. Conceptual framework and related literature

The COVID-19 pandemic and its severe effects have posed a major challenge to government institutions due to their essential role in curbing the pandemic by mobilizing all possible resources. As suggested by Huang (2020), positive perceptions such as transparency and authority toward them are even more critical in soliciting public support during a pandemic. In this regard, the government's responses toward the pandemic can offer a global view of people's trust in institutions. Institutional trust is essential to the stability and legitimacy of an institution. According to Kaasa and Andriani, (2022), public trust in institutions is an important asset, since it can prompt better governance and effective stability of the democratic system. However, institutional trust occurs when individuals perceive institutions as efficient, transparent, competent, and seek to satisfy their interests and expectations (Kaasa and Andriani, 2022). It is also recognized that trust is a resource for civil servants and administrations delivering public services at various levels of government (federal, provincial, municipal, and so on). This is in line with the OECD's (2020) report suggesting that public trust is enhanced when institutions providing public services demonstrate integrity, competence, and responsibility.

As pointed out in the literature review, trust in institutions is strongly affected by various individuals' socio-demographic characteristics (e.g., age, gender, income, province of residence, or religion), but the mixed results in the literature do not paint a cohesive picture of how this operates. However, Zhao and Hu (2017) suggested that highly educated people have a lower probability of trusting the government in China. In contrast, Habibov et al. (2017) suggested that well-educated people are more likely to report trust in financial institutions. Meanwhile, the UN (2021) report indicated that people with high income and high education levels display greater levels of trust in institutions. On another note, some research suggests that women trust government institutions more than men do (Bengtsson and Brommesson, 2022). The presence of such discrepancies between the results of these various studies highlights the need for increased attention to the question of the sociodemographic determinants of public trust.

Among the various determinants of trust, social discrimination emerges as one of the most important factors that erodes institutional trust. To study this relationship, we have based this paper on two perspectives: Experiential learning theory and social capital theory. Experiential learning theory posits that generalized trust is molded by personal life experience (Freitag and Traunmüller, 2009). As such, individuals who have suffered poverty, discrimination, unemployment, and social exclusion express higher levels of distrust (Glanville et al, 2013). Based on this theory, a study by Evangelist (2022) highlighted that discriminatory practices that take place within social interactions contribute to lowering people's generalized trust. The disproportionate experience of discrimination among people of color leads to differences in trust along racial lines (Douds and Wu 2018; Wilkes and Wu, 2019).

Social capital is defined as "features of social organizations, such as networks, norms, and trust, that facilitate action and cooperation for mutual benefit." (Putnam et al., 1994). According to this perspective, trust constitutes the cornerstone of social capital (Freitag and Buhlmann, 2009). It is also a key element of collective efficacy (Gibson et al., 2002). Furthermore, higher levels of social capital in the community may create resilient people with higher education levels (Putnam, 2000) and more effective government. Thus, investing in social capital strengthens communities, which may lead to reducing interpersonal threats such as discrimination and consequently increase the levels of trust towards institutions.

Discrimination was well-documented in North America long before the pandemic. Despite the growing developments witnessed in North American countries, racialized groups continue to experience discrimination in employment, healthcare, and the criminal justice system. This was held true for

racialized groups when the COVID-19 pandemic took place. However, the measures implemented by the government of Canada (lockdowns, isolation, and social distancing), in early 2020, to limit the risk of infection from the virus has exacerbated frustrations among individuals and disproportionately affected many vulnerable groups (e.g., immigrants, refugees, and indigenous people). Further, the prevalence of increased COVID-19 risk contributed to exacerbating certain groups' experiences of discrimination in Canada.

Separately from the question of policy impacts, during the early phase of the pandemic, some people and groups were victims of other kinds of stereotyping and discrimination (Edara, 2020). Specifically, following the outbreak of the virus in China, Chinese people have become targets for discrimination around the world, with an increase in racist violence toward Asian people in public places. According to the existing literature, hate crimes against people of Asian descent increased by 73% during the pandemic (Han et al., 2023). Trammell et al. (2021) also found that Asian students experienced more discriminatory practices than students from other ethnic groups. This is not surprising, given that global pandemics are known to lead to targeted discrimination (e.g., the 2014 Ebola virus led to discrimination against Africans).

In addition to experiencing discrimination, minority groups were more vulnerable to being infected by COVID-19. In terms of healthcare, immigrants and indigenous people were more likely to experience barriers in accessing the healthcare system (Usama et al., 2021). Hayward et al.'s (2021) study of 15 high-income countries indicated that migrants (foreign-born) had a higher risk of COVID-19 infection. However, Canadian provinces reported higher levels of racial discrimination in healthcare compared to the US (Cénat, 2024). In alignment with these studies, the Public Health Agency of Canada in 2020 reported that COVID-19 had a worse effect on racialized groups in Canada. This goes against the Canadian Charter of Rights and Freedoms, which forbids discrimination and sets out equal rights for all. In the same vein, the World Health Organization has recommended that governments increase attention to prevent discrimination during the COVID-19 pandemic, pointing out that the health emergency measures have caused social, economic, and political unfairness within the community (WHO, 2020).

All these disparities exacerbated the existing challenges faced by racialized groups, which are already known to create discrepancies in trust. According to the 2020 General Social Survey (GSS) on Social Identity, Black and Indigenous people in Canada exhibit higher distrust in the police. Policing is just one example of an area in which racialized people experience unfair treatment. However, it is an important one, particularly given that highly publicized instances of police abuse and racial injustice also emerged during the early years of the pandemic. The prevalence of these issues helped to create an environment of panic and instability which contributed to polarizing public sentiment (Hegland et al., 2022). This in turn had significant effects on the public's level of trust in government and public health institutions. The literature suggests that higher systematic exposure to police violence is associated with medical mistrust, which manifests as non-utilization of health services and is reflected in the established health inequities among adults and youth (Kerrison and Sewell, 2020; Alang et al., 2020; Alang et al., 2021).

Another area of public trust breakdown emerged in relation to COVID-19 vaccination. Several studies have found that a lack of trust in public health institutions can create a barrier to accessing healthcare services, especially for people of color. Bazargan et al. (2021) found that racial and ethnic discrimination resulted in a lower level of trust in the UK government and medical institutions and increased marginalized people's lack of access to vaccinations. Studies by Razai et al. (2021) and Jaiswal and Halkitis (2019) suggested that vaccine hesitancy is a consequence of a lack of trust in the government because of racial discrimination. As Liu and Li (2021) indicated, Black people display a lower level of trust in the effectiveness of vaccines and the healthcare system than whites. Outside the health settings, we shed light on the complexity of the dynamic between discrimination and trust in government institutions in the following sections.

3. Empirical design

3.1. Participant characteristics

This study aims to examine how discrimination influenced trust in government institutions in the context of the COVID-19 pandemic using survey data collected from Statistics Canada's crowdsourcing data impacts of COVID-19 on Canadian's Experiences of Discrimination- during the period January 1, 2020, until December 31, 2020 (statcan.gc.ca). Table 1 provides a brief description of the demographic characteristics of the participants. A total of 36.674 respondents (28.5% men; 71.5% women) participated in the survey, most of whom were aged 15 years or older and living in 10 provinces and three territories. Among this sample, 14.5% were visible minorities and 16.1% were immigrants or non-permanent residents.

3.2. Definition of variables

3.2.1. Trust in institutions

To define trust in institutions as a dependent variable, participants answered the question: "To what extent do you have trust in…?" Several types of institutions were mentioned in the survey. We analyzed those identified in our study: trust in the police, trust in the court system, trust in municipal law enforcement officers, trust in federal

government, trust in provincial or territorial government, and trust in local public administrations; measured on a 5-point Likert scale with 1 = no trust and 5 = very high trust. These variables were transformed into dummy variables, where 1 denotes trust and 0 denotes no trust.

3.2.2. Discrimination

Participants responded to two questions regarding their experiences with discrimination during the first year of the COVID-19 pandemic. The first question asked: "Since the beginning of the COVID-19 pandemic, have you experienced discrimination or been treated unfairly by others in Canada for any of the following reasons?" The reasons included Indigenous identity, ethnicity or culture, race or skin color, religion, language, accent, physical appearance, sex, age, and "other."

The second question asked: "Since the beginning of the COVID-19 pandemic, in what types of situations have you experienced discrimination or been treated unfairly by others in Canada?" The survey identified various contexts where discrimination could occur, such as in stores, banks, restaurants, schools, on social media, in the workplace, when looking for housing, with the police, within the court system, and others.

For analysis purposes, responses were coded as 1 if participants reported experiencing discrimination during the early stages of the COVID-19 pandemic, and 0 if they reported no such experiences.

3.2.3. Sense of belonging

Sense of belonging was measured by asking participants, "How would you describe your sense of belonging?" (1 = very weak, 2 = rather weak, 3 = rather strong, 4 = very strong). We had nine variables that assessed the individual's sense of belonging: people belonging to the neighborhood, village, province or territory, Canada, country of origin, groups of the same race or skin color, same ethnic or culture, same religion, and groups who speak the same language. We converted all variables to binary with 1 = higher sense of belonging and 0 = lower sense of belonging.

Table 1: Sample characteristics

Participants	Frequency (N)	Percentage (%)
Age		
15-34	7045	19.2
35-44	9498	25.9
45-54	7339	20.0
55 years and older	9506	25.9
Missing	3286	9.0
Gender		
Male	10443	28.5
Female	26231	71.5
Missing	36.674	0
Education		
Attend university	24008	65.5
Did not attend university	12613	34.4
Missing	53	0.1
Marital status		
Married/living in free union	25031	68.3
Never married/separated/divorced	11625	31.7
Missing	36.674	0
Province of residence		
Newfoundland and Labrador	465	1.3
Prince Edouard Island	288	0.8
Nova Scotia	1541	4.2
New Brunswick	1204	3.3
Quebec	5809	15.8
Ontario	16668	45.4
Manitoba	1424	3.9
Saskatchewan	795	2.2
Alberta	3117	8.5
British Columbia	5142	14.0
Territories	221	0.6
Missing	36.674	0
Visible minority		
Visible Minority	5330	14.5
Non-Visible Minority	30874	84.1
Missing	470	1.4
Immigrant Status		
Non-immigrants	30591	83.4
Immigrants or non-permanent residents	5904	16.1
Missing	179	0.5

The data is sourced from Statistics Canada's Survey-Impacts of COVID-19 on Canadians (statcan.gc.ca)

3.3. Descriptive statistics

The descriptive statistics are provided in Table 2. All variables of trust in institutions were a binary where 0 = lower trust and 1 = higher trust. The perception of discrimination was a dummy variable that took 1 if participants experienced discrimination in the early of the COVID-19 pandemic and 0 if not. Regarding the sense of belonging, 1 denoting participant reported a sense of belonging and 0 if not. Concerning sociodemographic characteristics, age was measured on a four-point scale (1 = 15–34; 2 = 35–44; 3 = 45-54; 4 = 55+). Sex represented a binary variable, with men = 1 and

women = 0. Education was measured as a binary variable, with 1 denoting respondents who had high education and 0 otherwise. Marital status was coded as 1 = married and 0 = never married, separated, or divorced. Disability was coded as 1 if the participants identified as having a disability and 0 if not.

3.4. Econometric specifications

This study assessed the impact of discrimination on trust in institutions during the first year of the COVID-19 pandemic using a research design that involved two steps. First, the binomial logit model is defined by Eq. 1.

$$P\ (Y = 1|X_i) = \frac{exp^{(X\beta)}}{1+exp(X\beta)} = \frac{1}{1+exp^{-(X\beta)}} \quad (1)$$

where, Y is a binary dependent variable (1 = trust, 0 = otherwise) that refers to trust in institutions (i.e., the federal government, the local public administration, the police, and the municipal law enforcement officers).

$$Log\left(\frac{P\ (Trust)}{1-P}\right) = \beta_0 + \beta_1 X_i + \beta_2 Y_i + \beta_3 Z_i + \beta_4 W_i + \varepsilon_i \quad (2)$$

where, X_i denotes discrimination based on many characteristics, such as language, accent, physical appearance, age, or in other situations. Y_i refers to discrimination in different situations (i.e., at stores, banks, or restaurants, at workplaces, at school, by police, and others). Z_i represents the sense of belonging to a neighborhood, village, province, or territory, Canada, country of origin, groups of the same race or skin color, same ethnic or culture, same religion, and groups who speak the same language. Control variables (W_i) included socio-demographic characteristics, such as age, gender, marital status, education, and disability. β_0 is the intercept term; β_1, β_2, β_3 and β_4 are the coefficients vectors of the estimated parameters; ε_i is the error term.

Table 2: Descriptive statistics

Variables	Observation	Mean	Standard deviation	Min	Max
Dependent variables					
Trust in the police	35.721	0.79	0.40	0	1
Trust in municipal law enforcement officers	35.721	0.75	0.43	0	1
Trust in the federal government	35.721	0.80	0.39	0	1
Trust in local public administration	35.721	0.77	0.42	0	1
Independent variables					
Language	34.898	0.03	0.16	0	1
Accent	34.898	0.02	0.15	0	1
Physical Appearance	34.898	0.07	0.26	0	1
Age	34.898	0.07	0.26	0	1
Other's situations	34.898	0.04	0.20	0	1
Discrimination in different situation					
At stores/banks/restaurants	34.341	0.35	0.47	0	1
At school	34.341	0.05	0.21	0	1
On the internet	34.341	0.34	0.47	0	1
At workplace	34.341	0.36	0.48	0	1
Searching for housing	34.341	0.04	0.21	0	1
By police	34.341	0.05	0.23	0	1
In the court system	34.341	0.02	0.14	0	1
Crossing the borders into Canada	34.341	0.02	0.13	0	1
In social gathering	34.341	0.16	0.36	0	1
In public places	34.341	0.32	0.46	0	1
In public transport	34.341	0.14	0.34	0	1
Other's situations	34.341	0.24	0.42	0	1
Sense of belonging					
Neighborhood	35.265	0.70	0.46	0	1
Village	35.308	0.73	0.44	0	1
Province or territory	35.357	0.75	0.43	0	1
Canada	35.308	0.87	0.33	0	1
Country of origin	22.631	0.78	0.41	0	1
People of the same race or skin color	31.987	0.71	0.45	0	1
People of the same ethnic or culture	32.138	0.74	0.43	0	1
People with the same religion	21.543	0.61	0.49	0	1
People with the same language	32.448	0.80	0.39	0	1
Socio-demographic variables					
Age	32.511	2.57	1.11	1	4
Gender	35.721	0.28	0.45	0	1
Education	35.673	0.65	0.47	0	1
Marital status	35.704	0.68	0.46	0	1
Disability	35.570	0.15	0.36	0	1

The data is sourced from Statistics Canada's Survey-Impacts of COVID-19 on Canadian's Experiences of Discrimination

As a robustness check, we perform an ordinary least square (OLS) regression to estimate the relationship between discrimination and trust in public institutions. The OLS equation is as follows:

$$Trust_i = \beta_0 + \beta_1 X_i + \beta_2 Y_i + \beta_3 Z_i + \beta_4 W_i + \varepsilon_i \quad (3)$$

where, trust is proxied by trust in the public institutions index. X_i describes the various types of discrimination. Y_i is a set of variables that represent discrimination in different situations. Z_i refers to the sense of belonging. W_i describes the personal and demographic characteristics of the respondents (details of all the variables mentioned above). β_0 is the intercept term; β_1, β_2, β_3 and β_4 are the coefficients vectors of the estimated parameters; ε_i is the error term.

3.5. LASSO model selection

Although we specified sufficient degrees of freedom to estimate a full model (N >> P), there were two potential concerns: first, we had a large set of variables, some of which were the most likely to explain the majority of the variation (sparsity), and second, the diversified set of variables about discrimination could increase the degree of multicollinearity among the independent variables, which might expose our regression to unstable coefficients and inflated standard errors. To avoid these two flaws, we used the LASSO model selection and chose the subgroups of the most relevant predictors. This method is a way to pick up the variables that significantly explain variations in the outcome variables. It helps to reduce the number of coefficients to construct a consistent model with more relevant covariates.

We used LASSO for each model to select the variables that were strongly related to the trust of each type of institution while considering economic theory to assess the determinants of institutional trust. As shown in Table 3, three techniques are commonly used in model selection: adaptive, minimum Bayes information criterion (min BIC), and cross-validation (CV). We evaluate the effectiveness of the model using two metrics: R-squared value and Root Mean Squared Error (RMSE). To do this, we select the model that minimizes the RMSE (a measure of the average squared difference between the predicted and actual values) and maximizes the R-squared (a measure of how well the model fits the data).

Table 3: LASSO results

	Model 1 Trust in the police	Model 2 Trust in municipal law enforcement officers	Model 3 Trust in federal government	Model 4 Trust in local public administrations
Variables	Adaptive	Min BIC	Min BIC	CV
Discrimination on grounds				
Language				×
Accent				×
Physical appearance		×	×	×
Age		×	×	×
Other's situation			×	
Discrimination in different situations				
At stores/banks/restaurants		×		×
At school				
On the internet	×	×	×	×
In workplace	×	×	×	×
When searching for housing				
by Police	×	×	×	×
In the court system				×
Crossing the border into Canada				×
While attending social gatherings				
In public places	×	×		×
In public Transport		×		
In any other situation	×	×	×	×
Sense of belonging				
Neighborhood	×	×		×
Village		×	×	×
Province or territory	×	×		×
Canada	×	×	×	×
Country of origin	×	×		
People of the same race or skin color		×		
People of the same ethnic or culture	×	×		×
People with the same religion	×	×		
People with the same language	×	×	×	×
Constant	×	×	×	×

x represents the variables selected by adaptive, the minimum Bayes information criterion (min BIC), and cross-validation (CV) model selection

4. Results and discussion

4.1. Logit estimation results

The results of logit regression are presented in Table 4. To avoid multicollinearity, we included the most relevant variables identified by the LASSO method in each model. As shown in Table 4, all models reported higher predicted probability and significant probability associated with the likelihood ratio. These models were thus globally significant. Results in Table 4 (column 3) reported that people who experienced discrimination based on their physical appearance (Odds Ratio [OR] = 0.76; 95% Confidence Interval [CI] = 0.67, 0.86), or for any other reason (OR = 0.73; 95% CI = 0.63, 0.85) were less likely to trust the federal government. An odds ratio lower than 1 indicates that everything else being equal, individuals who experienced discrimination based on their physical appearance are less likely to trust the federal government. This finding is in keeping with the work of Evangelist (2022), who suggests that discrimination against people of color contributes to racial differences in trust. Note that the survey from which our data is sourced did not pinpoint other types of discrimination. Further research may be required to better explore these situations.

The results reported in Table 4 (column 4) show that people who experienced discrimination based on their language and physical appearance were 0.83 and 0.93 times less likely to trust local public administration. This means that people who speak certain languages may face unfair treatment when making use of public services along the same lines as, and in many cases indistinguishable from, racial

discrimination. Such grounds of discrimination contribute to increasing some groups' wariness toward public institutions. As suggested by Evangelist (2022), an extensive set of grounds for discrimination, including language, are negatively related to trust in institutions, especially in the police. Moreover, the results reveal that people who reported being discriminated against at a store, bank, or restaurant were less likely to trust municipal law enforcement officers (OR = 0.79; 95% CI = 0.68, 0.93) and local public administrations (OR = 0.76; 95% CI = 0.68, 0.84). A study conducted by Douds and Wu (2018) showed that racial discrimination reduces the levels of generalized trust in the United States. Likewise, Yang and Liu (2021) reported that Black, Native, and Asian American workers have been disproportionately affected by higher rates of unemployment than white workers. The perception of racial discrimination was related to depressive symptoms, which led most individuals to exhibit institutional distrust.

The results also illustrate that experiencing excessive discrimination on the internet decreases the odds of trust by approximately 40% in the police, the municipal law enforcement officers, and the federal government and by 25% in the local public administration. This is especially relevant because the pandemic led to an increase in internet use in Canada, as people turned to online platforms to make their lives easier and adapt to the new realities of the pandemic. But this situation also increased the risk of discrimination and perpetuated existing inequalities. Furthermore, the results show that people who have been discriminated against at work were approximately 0.7 times less likely to report trust in all the institutions mentioned in our study. In this light, certain groups, such as visible minority groups and immigrants, are often targets of discrimination at work and exhibit lower levels of trust in institutions (Evangelist, 2022). We also argue that people are discriminated against by the police and in other situations are less likely to trust institutions. Trust in the police is mostly determined by how the police interact with community members. This is confirmed by Evangelist (2022). In keeping with this study, as shown in Table 5 (column 1), the odds of trust in the police decreased by 84% when individuals experienced discriminatory practices by the police compared to those who never experienced discrimination.

Empirical studies have discussed the institutional racism that appeared during the pandemic, including within the justice system (Willis et al., 2023; Clark, 2019). Discrimination that occurs in the judicial system can be damaging for the individuals directly affected as well as having deleterious effects on future generations. However, contrary to our expectations, the results in Table 4 (column 4) suggest that discrimination in the court system did not have a statistically significant impact. However, consistent with previous studies, people who were victims of discrimination in public places were significantly less likely to trust police and municipal law enforcement officers. However, individuals who are members of minority groups and experiencing homelessness, are more likely to be arrested in public places and are exposed to more acts of violence by police officers. This leads these groups to hold a negative perception of police and law enforcement and therefore leads to reporting lower levels of trust in other institutions as well. This finding is in line with a study conducted by Murphy and McPherson (2022), who examined the religious discrimination challenges faced by 398 Muslims living in Sydney, Australia. The authors found that Muslims, considered a stigmatized minority group, are highly distrustful of the police.

Moreover, the results reported in the fourth column of Table 4 suggest that people who experienced discriminatory practices at the Canadian borders (OR = 0.96; 95% CI = 0.45, 1.04), particularly at entry points such as airports were 0.96 times less likely to trust the local public institutions. For most minority groups, crossing the border can induce anxiety and frustration, since they are often discriminated against based on their language, color, and race. Such prejudicial treatment creates institutional distrust. As indicated in statcan.gc.ca, the proportion of people belonging to visible minority groups who experienced discrimination when crossing the border into Canada is six times higher than that observed among individuals who are not members of visible minority groups. This finding reinforces the expectation of a lack of trust in institutions.

This study provides evidence that a sense of belonging was positively and significantly related to trust in institutions. In keeping with these concepts, we found that individuals who felt a sense of belonging in Canada, their neighborhood, or their city, province, or territory were more likely to report trust in law enforcement, the federal government, and local public institutions. We also found that people who indicated a sense of belonging to their country of origin (OR = 1.21; 95% CI = 1.06, 1.37), with others of the same ethnicity or culture (OR = 1.17; 95% CI = 1.02, 1.35), with others of the same religion (OR = 1.13; 95% CI = 1.00, 1.28) were 1.21, 1.17 and 1.13 times more likely to trust the police, respectively. In addition, people belonging to those who speak the same language (OR = 1.28; 95% CI = 1.12, 1.48) reported higher trust in institutions except in the federal government. In this context, Wenning et al. (2022) found that having a strong sense of belonging to a community can help to grow a sense of security and social cohesion, which positively influences institutional trust.

Regarding gender, we found that, in response to the pandemic, men were less likely to trust institutions than women were. As stated by Bengtsson and Brommesson (2022), women trust government institutions more than men do. The results also indicated that older people generally expressed higher levels of trust in institutions than younger people did. The exponentiated coefficients for older people were 2.29 times more likely to

report trust in police. Ibrahim (2020) showed that older people in Canada displayed more positive perceptions of the police compared to younger people. The social movements that arose during the early COVID-19 pandemic intensified conflicts between young people and the police, particularly around protests. Bengtsson and Brommesson's (2022) study on trust in Swedish institutions during the COVID-19 pandemic further supports this result. The odds ratio greater than one for married people indicates 1.41 and 1.26 times more likely to trust police and law enforcement officers, compared to unmarried. Our findings highlighted that people with disabilities experienced higher levels of discrimination and, consequently, were significantly less trusting of institutions. This is consistent with the study of Reher (2020), who reported that people with disabilities display lower levels of political trust. In addition, well-educated people were more likely to trust the federal government and local public administration. However, higher education levels lead to improved knowledge about the political system and the administrative organization of the public sector (Bengtsson and Brommesson, 2022). However, this outcome was not observed with trust in the police. This can be explained by the fact that people with higher university degrees are more able to assess the performance of police officers and the effectiveness of their services, which can significantly affect their overall perception of these entities. In this sense, further study is required to determine the meaning of these mixed findings.

Table 4: Logit regression models explaining the impact of perceived discrimination on institutional trust

	Model 1	Model 2	Model 3	Model 4
Variables	Trust in the police	Trust in municipal law enforcement officers	Trust in federal government	Trust in local public administrations
Discrimination on grounds				
Language				0.83*(0.08)
Accent				1.12 (0.12)
Physical appearance		0.94 (0.08)	0.76***(0.05)	0.84***(0.05)
Age		0.89 (0.08)	0.90 (0.06)	0.93 (0.06)
Other's situations			0.73***(0.06)	
Discrimination in different situations				
At stores/banks/restaurants		0.79***(0.06)		0.76***(0.04)
On the internet	0.61***(0.05)	0.63***(0.05)	0.63***(0.03)	0.75***(0.04)
In workplace	0.70***(0.05)	0.72***(0.05)	0.68***(0.03)	0.66***(0.03)
By police	0.16***(0.03)	0.30***(0.05)	0.54***(0.06)	0.50***(0.06)
In the court system				0.77 (0.16)
Crossing the borders into Canada				0.70* (0.14)
In public places	0.65*** (0.05)	0.77** (0.07)		0.93 (0.05)
In public transport		0.85 (0.10)		
In any other situation	0.71***(0.06)	0.70***(0.06)	0.71***(0.04)	0.77***(0.04)
Sense of belonging				
Neighborhood	1.23***(0.07)	1.21***(0.08)		1.27***(0.05)
Village		1.27***(0.09)	1.38***(0.05)	1.72***(0.08)
Province or territory	1.93***(0.12)	1.76***(0.11)		1.57***(0.06)
Canada	1.41***(0.11)	1.29***(0.09)	4.84***(0.21)	1.64***(0.08)
Country of origin	1.21**(0.08)	1.10 (0.07)		
People of the same race or skin color		1.01(0.08)		
People of the same ethnic or culture	1.17**(0.08)	1.14(0.09)		1.04(0.04)
People with the same religion	1.13**(0.07)	1.09 (0.06)		
People with the same language	1.29***(0.09)	1.15**(0.08)	1.05 (0.04)	1.18***(0.05)
Socio-demographic characteristics				
Gender (male = 1 / women = 0)	0.79***(0.04)	0.87***(0.04)	0.88***(0.03)	0.92**(0.03)
Marital status (married = 1 / unmarried = 0)	1.41***(0.07)	1.26***(0.06)	0.99 (0.03)	1.05(0.03)
Age				
35-44	1.46***(0.09)	1.43***(0.09)	1.20*** (0.06)	1.01 (0.04)
45-54	1.84***(0.13)	1.50*** (0.10)	1.14*** (0.06)	1.03 (0.05)
55 +	2.29***(0.17)	1.80***(0.12)	1.20*** (0.06)	1.06 (0.04)
Attended university degree (Yes = 1 / No = 0)	0.83*** (0.04)	0.95 (0.05)	1.89*** 0.06)	1.36***(0.04)
Disability (Yes= 1 / No= 0)	0.63*** (0.04)	0.71*** (0.04)	0.73***(0.03)	0.71*** (0.03)
Constant	0.70*** (0.07)	0.73*** (0.07)	0.70***(0.05)	0.80*** (0.05)
N	12.530	12.346	27.976	26.432
R^2 Mc Fadden	0.15	0.12	0.13	0.10
Predicted probability	82.59 %	78.72 %	82.94 %	79.06 %
LR Chi2	1815.65	1566.12	3424.05	2896.66
Prob > Chi2	0.0000	0.0000	0.0000	0.0000

Standard errors in parentheses; ***: p < 0.01, **: p < 0.05, *: p < 0.1

4.2. Robustness check

Before running OLS regression, we followed two steps. As a preliminary step, we conducted PCA to construct the index of trust in public institutions, incorporating six items: trust in the police, trust in the court system, trust in municipal law enforcement officers, trust in the federal government, trust in provincial or territorial government, and trust in local public administration; measured on a 5-point Likert scale with 1 = no trust and 5 = very high trust. According to Kaiser's information criterion, we retain only the first component with an eigenvalue greater than unity and accounted for 57.643% of the total variance. We found the Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy to be good (0.828), and the Bartlett spherical value was significant ($p = 0.000 \leq 0.05$). Furthermore, the reliability of the six items was confirmed by Cronbach's alpha, which represents 0.852.

Table 5 presents some statistical properties of the trust in public institutions index. Following PCA, the index ranged from -2.72 to 2.14. To better interpret the trust index values, we use the min-max

method for normalization, which is defined in Equation 5. The purpose behind the rescaling was to standardize the index of trust to obtain a continuous variable ranging from 0 to 1. This is in keeping with the study of Mazziotta and Pareto (2022).

$$F_i^n = \frac{F_i - \min(F_i)}{\max(F_i) - \min(F_i)} * 100 \quad (4)$$

where, F_i^n : the normalized factor; F_i : the initial factor constructed by PCA; Min and max denote the minimum and maximum of F_i.

Table 5: Summary statistics of trust in public institutions index

	N	Mean	Standard deviation	Min	Max
Trust in public institutions index	35.721	0	1	-2.72	2.14
Normalized index	35.721	55.9	20	0	100

As presented in Table 6, based on the criteria of minimizing the mean square error and maximizing the R-squared value, we chose the adaptive LASSO estimator as our preferred model selection. Before running the OLS model, it is important to test the correlation between the variables. All variables of discrimination were negatively correlated with trust in public institutions, whereas the variables of the sense of belonging were positively related to institutional trust (Table 7). We then performed a variation inflation factor (VIF) analysis to test the multicollinearity problem. According to Hair et al. (2021), a VIF value above 5 indicates the presence of a collinearity issue. In our study, the highest VIF value was 2.05, which confirms no collinearity issue.

Table 6: LASSO results: Trust in public institutions index

Variables	Adaptive model
Discrimination on grounds	
Language	
Accent	
Physical Appearance	×
Age	
Other's situation	
Discrimination in different situations	
At stores/banks/restaurants	×
At school	
On the internet	×
At workplace	×
Searching housing	
By police	×
In the court system	×
Crossing the borders into Canada	
In social gatherings	
At public places	×
In public Transport	
Other's situations	×
Sense of belonging	
Neighborhood	×
Village	×
Province or territory	×
Canada	×
Country of origin	
People of the same race or skin color	
People of the same ethnic or culture	×
People with the same religion	×
People with the same language	×
Constant	×

x represents the variables selected by adaptive model selection

The results presented in Table 8 show that the estimated regression model performed acceptably with an R^2 of 0.25. This indicated that the explanatory variables explained 25% of the variance in the trust index. As stated earlier, people who experienced discrimination based on their physical appearance were less likely to trust institutions. Moreover, discrimination that appears in different situations such as at stores, banks, or restaurants, on social media, in the workplace, with the police, in public places, or in any other situations has undermined the levels of trust in public institutions. We also found that discrimination in Canadian courts became significant, which indicates that people who received unfair treatment in the justice system were more likely to report lower levels of trust in public institutions. The pandemic has had a disproportionate impact on access to justice for certain groups, especially marginalized people. Clark (2019) claimed that racism is prevalent in the justice system. These specific circumstances have negative implications on the public's level of trust in institutions. Further, we found that a sense of belonging was strongly positively associated with the levels of trust in public institutions at 1% level. The control variables, except for gender, remained the same regarding perceptions of institutions. These findings were confirmed by the OLS bootstrap (50) estimation.

5. Conclusion

The coronavirus (COVID-19) pandemic highlighted a sharp increase in racial injustice in all sectors (e.g., healthcare services, the justice system, and education), which considerably impacted public trust. However, the issue of trust is critical for government institutions as it plays an important role in times of crisis. The focus of our study is to examine the relationship between discrimination and institutional trust using a large sample of respondents (N = 36.674) living in all Canadian provinces. Two regression analyses were conducted (logit and OLS models), incorporating discrimination (the variables of interest) and sense of belonging as explanatory variables. These analyses considered several subgroups of participants, including groups based on age, marital status, higher education, and physical disability. Our intention was to better identify the most vulnerable groups that experienced high levels of discrimination during the first year of the pandemic and their perception of Canadian institutions. Our results show that all variables of discrimination were negative, as expected, suggesting that socially excluded groups experienced greater levels of discrimination during the early phase of COVID-19 and lower levels of trust in institutions (i.e., police, municipal law enforcement officers, the federal government, and local public administrations). In contrast, the variables measuring the sense of belonging are positively and strongly related to institutional trust. This finding supports the idea that reducing COVID-related discrimination in the general population further strengthens the efforts to prevent disease (Eaton and Kalichman, 2020) and reinforces public trust in institutions.

Table 7: Correlation matrix

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1	1																				
2	-0.202*	1																			
3	-0.201*	0.356*	1																		
4	-0.250*	0.351*	0.295*	1																	
5	-0.178*	0.228*	0.180*	0.210*	1																
6	-0.187*	0.185*	0.222*	0.190*	0.156*	1															
7	-0.119*	0.134*	0.129*	0.119*	0.119*	0.381*	1														
8	-0.208*	0.372*	0.434*	0.350*	0.180*	0.202*	0.120*	1													
9	-0.153*	0.204*	0.130*	0.192*	0.098*	0.102	0.091*	0.141*	1												
10	0.256*	-0.114*	-0.107*	-0.113*	-0.086*	-0.063*	-0.043*	-0.093*	-0.080*	1											
11	0.290*	-0.124*	-0.128*	-0.126*	-0.101*	-0.082*	-0.058*	-0.109*	-0.095*	0.650*	1										
12	0.336*	-0.124*	-0.132*	-0.156*	-0.111*	-0.102*	-0.062*	-0.135*	-0.098*	0.379*	0.490*	1									
13	0.307*	-0.137*	-0.145*	-0.165*	-0.104*	-0.124*	-0.091*	-0.148*	-0.111*	0.223*	0.306*	0.412*	1								
14	0.171*	-0.058*	-0.027*	-0.067*	-0.029*	-0.014*	-0.026*	-0.038*	-0.032*	0.224*	0.205*	0.206*	0.145*	1							
15	0.148*	-0.046*	-0.013	-0.054*	-0.027*	-0.011	-0.025*	-0.038*	-0.021*	0.240*	0.200*	0.172*	0.122*	0.516*	1						
16	0.171*	-0.070*	-0.044*	-0.088*	-0.053*	-0.029*	-0.034*	-0.058*	-0.039*	0.206*	0.199*	0.231*	0.166*	0.527*	0.417*	1					
17	0.015*	-0.039*	-0.031*	-0.037*	-0.029*	0.021*	0.016*	-0.020*	-0.036*	-0.042*	-0.025*	-0.045*	-0.041*	-0.064*	-0.075*	-0.080*	1				
18	0.119*	-0.097*	-0.082*	-0.094*	-0.050*	-0.059*	-0.054*	-0.086*	-0.067*	0.109*	0.081*	0.076*	0.064*	0.025*	0.030*	0.029*	0.039*	1			
19	0.173*	-0.073*	-0.042*	-0.133*	-0.070*	-0.042*	-0.033*	-0.096*	-0.022*	0.139*	0.102*	0.134*	0.074*	0.098*	0.090*	0.089*	0.005	0.037*	1		
20	0.042*	-0.047*	-0.013*	-0.006	0.031*	-0.0102	-0.005	0.015*	-0.003	-0.005	0.015*	-0.021*	0.053*	-0.050*	-0.101*	-0.061*	-0.006	0.059*	-0.109*	1	
21	-0.165*	0.165*	0.138*	0.161*	0.110*	0.086*	0.073*	0.122*	0.146*	-0.111*	-0.117*	-0.102*	-0.116*	-0.063*	-0.027*	-0.057*	-0.016*	-0.125*	0.050*	-0.113*	1
VIF	-	1.38	1.38	1.31	1.12	1.27	1.20	1.43	1.09	1.85	2.05	1.55	1.30	1.70	1.46	1.54	1.02	1.04	1.07	1,05	1.1

The correlation between trust in public institutions index and the explanatory variables: discrimination (DIS) and the sense of belonging (BEL); *: Statistical significance at the 0.05 level; 1: Trust in public institutions index; 2: Discrimination based on physical appearance; 3: Discrimination at stores, banks, restaurants; 4: Discrimination at school; 5: Discrimination at work; 6: Discrimination by the police; 7: Discrimination in the courts; 8: Discrimination in public places; 9: Discrimination in other situations; 10: Belonging to neighborhood; 11: Belonging to village; 12: Belonging to province; 13: Belonging in Canada; 14: Belonging to people with the same skin color; 15: Belonging to people of the same ethnic or cultural group; 16: Belonging to people with the same language; 17: Gender; 18: Marital status; 19: Age; 20: Education; 21: Disabilities

In summary, our findings provide valuable insight for governments, researchers, and scholars. However, understanding how anti-discrimination works is crucial to building public trust during outbreaks, which allows governments to respond appropriately to this issue. It is also recognized that times of crisis can be particularly stressful, which leads to exacerbating disparities and discrimination among people. This in turn leads to reduce the collective capacity to overcome the challenges. Furthermore, governments need to alleviate discrimination, especially during challenging times by implementing processes that dissuade public service providers from discriminating against citizens on the grounds of their gender, age, skin color, or ethnicity and to promote a more inclusive environment. Most importantly, anti-discrimination laws and civil rights protections play a crucial role in curbing the spread of discrimination during times of crisis and preserving human security by guaranteeing rights for everyone.

Table 8: OLS regression analysis: Trust in public institutions index

Variable	OLS (β)	OLS Bootstrap (50) (β)
Discrimination on grounds		
Physical appearance	-0.025***(0.006)	-0.025***(0.006)
Discrimination in different situations		
At stores/banks/restaurants	-0.027***(0.006)	-0.027***(0.006)
On the internet	-0.057 ***(0.005)	-0.057 ***(0.005)
In workplace	-0.045***(0.005)	-0.045***(0.005)
By police	-0.13***(0.012)	-0.13***(0.016)
In the court system	-0.053***(0.017)	-0.053***(0.018)
In public places	-0.028***(0.006)	-0.028***(0.006)
In any other situation	-0.038***(0.006)	-0.038***(0.006)
Sense of belonging		
Neighborhood	0.024***(0.004)	0.024***(0.004)
Village	0.028***(0.004)	0.028***(0.003)
Province or territory	0.071***(0.004)	0.071***(0.003)
Canada	0.080***(0.005)	0.080***(0.004)
People of the same ethnic or culture	0.014***(0.004)	0.014***(0.004)
People with the same religion	0.013***(0.003)	0.013***(0.003)
People with the same language	0.018***(0.004)	0.018***(0.004)
Socio-demographic characteristics		
Gender (men= 1 / women= 0)	0.014***(0.003)	0.014***(0.003)
Age 35-44	0.02***(0.004)	0.02***(0.004)
Age 45-54	0.03***(0.004)	0.03***(0.004)
Age 55+	0.04***(0.004)	0.04***(0.004)
Marital status (married = 1 / unmarried = 0)	0.018***(0.003)	0.018***(0.002)
University degree (Yes=1 / No= 0)	0.018***(0.003)	0.018***(0.003)
Disability (Yes= 1 / No= 0)	-0.041***(0.004)	-0.041***(0.004)
Constant	0.336***(0.007)	0.336***(0.007)
N	17.596	
R-squared	0.248	
F	298.70***	

Standard errors in parentheses; ***: p < 0.01; **: p < 0.05; *: p < 0.1

Compliance with ethical standards

Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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