Communicating safety precautions can help maintain in-person voter turnout during a pandemic¹

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Abstract

Scholars have linked cost and life stress to lower voter turnout with clear implications for voting during the COVID-19 pandemic. We ask whether COVID-19 reduces turnout intention and how election agencies can mitigate this effect. We use a series of six survey and conjoint experiments implemented in samples totalling over 28,000 Canadian respondents collected between July and November of 2020 to show that: 1) priming people to think about COVID-19 reduces turnout intention, especially among those who feel most threatened by the disease; 2) safety measures for in-person voting, such as mandatory masks and physical distancing, can improve safety perceptions and willingness to vote in-person, and 3) providing people information about safety precautions for in-person voting mitigates the negative effect of priming COVID-19. These studies illustrate the importance of both the implementation and communication of measures by election agencies designed to make people safe – and feel safe – while voting in-person.

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The emergence of the novel coronavirus SARS-CoV-2 (and the disease it causes, COVID-19) has dramatically influenced formal political activities such as the meeting of parliaments and committees and the conduct of general elections. It has also changed the nature of political campaigns. Turning out to vote has also been affected. Scholars and commentators have closely followed elections taking place during the pandemic in the United States, Canada, and France, among other countries, to study the potential impacts of in-person voting on public health (e.g., Berry et al. 2020; Cotti et al. 2020; Zeitoun et al. 2020). Some research has found that in-person voting increases the risk of being infected by COVID-19, ultimately leading to more cases and deaths (Bertoli et al. 2020; Cotti et al. 2020; Cassan and Sangnier 2020; Flanders et al. 2020, but see Berry et al. 2020; Zeitoun et al. 2020).

Irrespective of whether in-person voting facilitates the spread of the virus in practice, people are surely concerned about the risk of lining up to cast a ballot in an enclosed space proximate to others. Consequently, the pandemic has clear implications for voter turnout. The rational choice model of turnout (Downs 1957; Riker and Ordeshook 1968) posits that citizens base their decision to vote on its perceived costs (direct and decisional) and benefits. The cost of voting is typically acknowledged by scholars as being low (Blais 2000; Blais et al. 2019). However, public policies that increase the cost of voting at the margins – like voter registration or identification laws, or situational factors such as longer wait times and greater distance to polling stations – have been found to reduce turnout. Moreover, life stressors have also been linked to lower turnout in observational (see Pacheco and Fletcher 2015, for example), and experimental settings (Hassell and Settle 2017). The COVID-19 pandemic offers a unique, if deeply tragic, opportunity to observe how voter turnout adapts in the face of the very real risks posed by a disease.

In this paper, we argue that the health risks posed by COVID-19 increase both the perceived cost of voting and stress, thereby decreasing turnout. We first ask whether priming people to consider COVID-19 reduces turnout intention. We use large-scale survey data from nine waves of the Media Ecosystem Observatory (MEO) fielded from June 15-August 31, 2020 to answer this question. We conducted both a within-subjects experiment (Study 1; N=12,660) and a between-subjects experiment (Study 2, N=7,023) and find that priming respondents to think about COVID-19 reduces their self-reported intention to vote if an election were held tomorrow, especially among those who feel most threatened by COVID-19.

These findings highlight the importance of identifying interventions that could help mitigate the threat of COVID-19 to voter turnout. Accordingly, we ask two further research questions: 1) Are there safety precautions that can be taken by election administration agencies that will make citizens feel safer at the polls and more likely to vote in-person? 2) How do the effects of such measures compare to other socio-political factors known to influence voter turnout?

Here, we focus on safety measures that can be implemented at in-person polling stations by election administration agencies, such as mandatory masks, physical distancing, and numerical limits. Using three conjoint experiments contained in the MEO surveys, we show that these safety measures all significantly improve people's perception of the safety of in-person voting and their

likelihood of casting an in-person ballot (Studies 3 and 4). We illustrate further that these effects exceed those of other socio-political context-level factors expected to influence turnout intention, like weather, polling station distance, and electoral competitiveness (Study 5).

Finally, we explore whether exposure to information about in-person safety measures we use in Studies 3-5 mitigates the dampening effect of COVID-19 on turnout intention we found in Studies 1 and 2. We find some evidence that this is the case with a series of pre-post experiments contained in three further waves of the MEO (Study 6). Taken together these studies illustrate the challenge the COVID-19 pandemic poses to democratic participation and the importance of both the communication and implementation of measures by election administration agencies designed to make people safe, and feel safe, while voting in-person. They also provide more general evidence of how the costs of voting matter for voters' turnout decisions.

1. Cost of Voting and COVID-19

Following the canonical rational choice framework, citizens will choose to vote if the benefits outweigh the costs (Downs 1957; Riker and Ordeshook 1968). There are two components to these costs. First, there are decision costs that are related to the time needed to gather sufficient information to make a choice. Second, there are direct costs related to losses incurred on election day. For example, citizens must travel to the polls and then return home, which takes time that could have been otherwise dedicated to other tasks (Blais 2000; Downs 1957). Most scholars agree that the cost of voting is small, while direct costs matter more to citizens than decision costs (Blais 2000; Blais et al. 2019).

Although the claim that voting should be responsive to its costs seems rather obvious, it has extremely important implications: public policy or features of the socio-economic environment that reduce (increase) the costs of voting should improve (reduce) turnout on the margin. Scholars have identified a number of such factors. Implementing election day registration or pre-registration modestly increases turnout by reducing the number of administrative steps needed to cast a ballot (Braconnier et al. 2017; Holbein and Hillygus 2016). Internet voting may also improve turnout by making it easier to vote (Goodman and Stokes 2017), though certain other policies, like early voting and longer polling hours, do not appear to have this effect (Burden et al. 2014; Quinlan 2015).

The reverse is also important: increasing the cost of voting reduces turnout at the margin. Reducing the number of polling stations available, thereby increasing the distance to polling stations, has been found to decrease turnout (Haspel and Knotts 2005; McNulty et al. 2009). For example, Brady and McNulty (2011) show that the consolidation during California's 2003 gubernatorial recall election in Los Angeles County was associated with a decrease in turnout. Similarly, longer wait times have been linked to lower turnout (Pettigrew 2017; Stewart 2012), as have stricter voter identification laws, albeit with modest effect sizes (see Highton 2017 for a review). Costs matter to turnout.

There are a variety of mechanisms through which the COVID-19 pandemic may affect the costs of voting. For example, some governments have consolidated polling stations as a safety

precaution: fewer polling stations means fewer workers are placed at risk of infection. The Wisconsin Elections Commission (WEC) allowed the County and Municipal Clerks the power to consolidate polling places for the Wisconsin presidential primaries in early April 2020. Indeed, some estimates suggest that this consolidation reduced turnout by 8.5 points, primarily in urban areas (Morris and Miller 2021).

Second, COVID-19 may heighten the costs of voting by exposing people to possible infection as they gather to vote indoors with others. Studies have found that in-person voting is associated with an increase in COVID-19 cases (Bertoli et al. 2020; Cassan and Sangnier 2020; Flanders et al. 2020). For instance, the Wisconsin Department of Health Services, using a contact-tracing analysis, identified 71 new cases of COVID-19 due to in-person voting in April 2020. Cotti and colleagues (2021) estimate that the primary caused approximately 700 new cases in the three following weeks. Even more importantly for our purposes scholars have observed a link between COVID-19 caseload and lower turnout (Brouard and McAvay 2020; Noury et al. 2020; Giommeni and Loumeau 2020; Picchio and Santolini 2021; Vázquez-Carrero et al. 2020; but see Frank et al. 2020; Santana et al. 2020). For instance, Fernandez-Navia et al. (2021) find in the 2020 Spanish regional elections that municipalities that reported COVID-19 cases the day before the election recorded turnout between 2.6 and 5.1 percentage points lower than those that did not.

Although research is not unanimous on this point, in-person voting may well increase the risk of contracting the virus, raising the potential costs for citizens (Berry et al. 2020; Cassan and Sangnier 2020; Flanders et al. 2020; Zeitoun et al. 2020). And, at a minimum, citizens may *perceive* there to be a risk associated with in-person voting that otherwise would not exist outside of a pandemic. This is important, because as Blais and his colleagues argue (2019), perceptions of voting costs may matter as much, if not more, than objective indicators of these costs. The spread of disease is likely to dissuade some voters from going to the polls.

2. Risk, Psychological Stressors, and Turnout

The COVID-19 pandemic not only increases the cost of voting by posing a health risk to citizens, but it can also trigger psychological and physical responses among citizens – very real costs in of themselves – that also have effects on voter turnout. Scholars have shown that indicators of personal health and wellness are associated with people’s propensity to vote in elections. People who are in poor health are less likely to vote than those who are healthy (Gagne et al. 2020; Mattila et al. 2013; Pacheco and Fletcher 2015; Rapeli et al. 2019). This might be particularly true for people with poor mental health. For instance, Ojeda and Pacheco (2017) demonstrate that depression is associated with decreased turnout over time, but find physical health factors matter less.

Health is not the only life stressor posited to affect voter turnout. Scholars have shown a number of other factors reduce voter turnout like widowhood (Hobbs et al. 2014), broken family environments (Pacheco and Plutzer 2007), early parenthood (Pacheco and Plutzer 2006), divorce (Sander and Plutzer 2005), and economic hardship (Pacheco and Plutzer 2007, 2008). There are some caveats to this research: some of these effects vary across demographic groups (Pacheco and Plutzer 2007) or are substantively small in size. Part of this may be because life stressors are mostly

demobilizing for non-habitual voters. Hassell and Settle (2017), for instance, find that triggering people to think about life stressors reduces vote intention, but primarily among people who are less disposed to voting at the baseline.

COVID-19 has imposed a cascade of life stressors on all citizens everywhere. It has brought on death, economic collapse, and an erosion in social and family life as individuals maintain distance to keep others safe from exposure. Scholars studying the psychological impacts of the COVID-19 pandemic have found that it has indeed increased stress, anxiety, and distress (Brooks et al. 2020; Petzold et al. 2020; Shanahan et al. 2020). Most importantly for our purposes here, people are more likely to have situational anxiety related to voting in-person than in normal times because they perceive added risk to indoor, in-person activities involving large numbers of people.

The COVID-19 pandemic, therefore, offers a unique opportunity for scholars to study the cost of voting in extreme situations. The real or perceived costs associated with casting a ballot in-person during a pandemic—such as contracting or transmitting the virus to others – are much higher than what we usually study in this body of work, like people’s distance to polling stations, wait times, or stricter voter identification laws. And even though caseloads have fallen in some countries at the time of writing, the unfortunate reality is that COVID-19 will be omnipresent for several years to come, especially where vaccination rates are low and as no variants of COVID-19 emerge. We need a stronger understanding of how perceived health risk affects turnout in order to maintain democratic participation through this period. More importantly, COVID-19 is unlikely to be the only extreme event that heightens risks associated with in-person voting moving forward. We will have other pandemics, for instance. It is essential to learn how to maintain democratic participation in the face of sharply higher costs – or perceived costs – of voting because democracy cannot be put on pause during a health crisis.

Are there policies or procedures that can help address this issue? To help identify possible solutions to this problem, we ask and answer several research questions. Our principal goal here is not to adjudicate between the exact mechanisms causing turnout declines, but to understand what interventions might reduce turnout declines. We begin with the description and results of Studies 1 and 2 that test for whether priming COVID-19 reduces turnout intention. We then describe the design and results of our three conjoint experiments (Studies 3-5), and finally we test whether information related to these safety precautions can dampen the effects of COVID-19 priming on turnout intention.

3. Data

Our data come from the Media Ecosystem Observatory (MEO), an ongoing survey of Canadians during the COVID-19 pandemic. These data were collected between July and November, 2020 by the online panel provider Dynata, which provides opt-in, non-probability sample. Each wave of the survey has a sample size of between 1,500 and 2,500 adult Canadian citizens with quotas set on age (i.e. 18/34, 35/54, 55+), gender (i.e. male, female), language (i.e. English and French), and region (i.e., Atlantic, Quebec, Ontario, West) to match population characteristics found in the 2016

Canadian census. The sample characteristics of each wave can be found in Table A1 of the Appendix as well as a comparison to population benchmarks.

4. Study 1 and Study 2: Priming Experiments

Irrespective of whether there are observed risks to in-person voting owing to COVID-19, people are likely to perceive the existence of such risks. Inducing people to think about COVID-19 should then reduce their intention to vote by bringing those potential costs to the forefront. We conduct two experiments to test our first hypothesis:

H1 (Study 1 and 2): Priming people to think about COVID-19 reduces turnout intention.

4.1 Study 1 and 2 Design

First, we implement a within-subjects experiment, Study 1, in waves 9 through 13 of the MEO (N=12,660). At the beginning of a 25 minute survey focusing primarily on COVID-19 attitudes and behaviours (i.e., immediately after the consent form and quota-based demographics such as province, age, and gender), we asked respondents to report their likelihood of voting if an election were held tomorrow (response categories: certain, likely, unlikely, and certain not to, rescaled from 0-1). Towards the end of the survey, we ask respondents their likelihood of voting tomorrow “considering the current situation with COVID-19.” Respondents were thus primed to consider COVID-19 both by the extensive content of the survey and the explicit priming text. We expect respondents to significantly reduce their vote turnout intention between the first and second iteration of those questions.

The within-subject experiment gives respondents a strong prime for COVID-19. We felt this was necessary because the high salience of the topic would leave a lot of respondents pre-treated, even at the start of the survey. The downside is that there might be other elements of the survey that are eliciting a change in turnout intention unrelated to COVID-19. Consequently, we also conducted a second study (Study 2) with a between-subjects design in waves 16 to 19 of the MEO (N=7,023). At the very beginning of the survey, immediately after the consent form and quota-based demographics, respondents were asked to report their likelihood of voting if an election were held tomorrow (rescaled from 0-1). One group received a prime asking them to consider “the current situation with COVID-19.” The other group received no such prime. We expect individuals in the treatment condition (with a prime) to have lower turnout intention than those in the control.

We conduct tests for heterogeneous treatment effects. We should see stronger effects among those who feel most threatened by COVID-19:

H2 (Study 1 and 2): The negative effect of COVID-19 priming on turnout intention should be larger among respondents who perceive COVID-19 to be a serious threat to their health.

For our within-subject experiment, we regress changes in election turnout intention on COVID-19 threat perceptions² and demographic characteristics that may be associated with changes in turnout intention and threat perceptions, like age, education, income, urban/rural residence, gender, and region of residence. For our between-subjects experiment, we estimate the same model but with election turnout intention on the left-hand side, and interactions of our covariates with the treatment conditions on the right-hand side.

We expect small effect sizes from these experiments for three reasons. First, some respondents might expect precautions to be taken by election administrators to protect people while voting in-person, though, even still, 54% of respondents in Study 1 reported they were of the opinion voting in-person is either very or somewhat unsafe and only 9% reported that in-person voting is very safe. Second, the availability of mail-in voting might lead to small effects because this alternative is accessible, available, and safe for Canadians who want to vote. We do not have expectations of large effect sizes and what we do observe may be conservative owing to the simplicity of the treatment and the fact that many respondents are likely to be pre-treated to consider COVID-19 by the social and political context before entering our survey.

Figure 1. Pre-post change in turnout intention (left); Marginal effect of prime on turnout-intention (right). Note: 95 and 90% confidence intervals, one-tailed. Wave 9: June 15-18, 2020; Wave 10: June 22-29, 2020; Wave 11: June 29-July 6, 2020; Wave 12: July 7-13, 2020; Wave 13: July 14-21, 2020; Wave 16: August 10-12, 2020; Wave 17: August 17-24, 2020; Wave 18: August 24-31, 2020; Wave 19: August 31-September 8, 2020. All = pooled estimate.

² “How serious of a threat do you think the coronavirus (COVID-19) is to yourself?” (Response categories: Very serious, somewhat serious, not very serious, not at all serious). Covariate descriptions can be found in Table A2 of the Appendix.

4.2 Study 1 and 2 Results

The results of our within-subjects experiment (Study 1) are shown in the left panel of Figure 1. We provide the wave-specific estimates as well as a pooled estimate. Across all waves featuring the within-subjects experiment, respondents reduced their turnout intention by an average of 4 points (0.04 on a 0-1 scale) between the pre and post-test ($p < 0.001$, one-tailed), which is approximately 0.22 standard deviations on our election turnout measure. This effect is remarkably stable across all five waves of this experiment and is consistently significant at the $p < 0.001$ level (one-tailed), providing strong support for H1.

We also see a priming effect with our more conservative between-subjects design (Study 2), shown in the right panel of Figure 1. Again, we provide the wave-specific estimates as well as a pooled estimate. On average, across the waves with our between-subjects experiment, turnout intention was 2 points lower in the treatment condition compared to the control ($p = 0.002$, one-tailed), which is approximately 0.07 standard deviations in our outcome. The point estimate is relatively consistent across all waves, though it misses conventional levels of statistical significance in wave 16 ($p = 0.09$, one-tailed) and is null in wave 18. Priming people to consider COVID-19 reduces their intention to vote in the next election, providing some support for H1. These effects are small to modest, but this should not be surprising since the current environment already strongly primes COVID-19 when respondents answer our survey.

Figure 2. Predicted pre-post change in turnout intention by threat perception (left); Predicted marginal effect of COVID-19 prime on turnout intention (right). Note: 95% confidence intervals, two-tailed.

COVID-19 threat perception appears to moderate the priming treatment in both studies. The full estimates are provided in Table A3 for the within-subjects experiment, and Table A4 for the between-subjects experiment. The left panel of Figure 2 displays the predicted change in turnout intention across COVID-19 threat perception after controlling for education, income, age, urban/rural residence, gender, and region. COVID-19 threat perception is significantly associated with changes in turnout intention in support for H2 ($p=0.01$). The treatment effect increases 48% from those that see the COVID-19 threat as “not at all serious” for themselves (-0.031 , $p<0.001$) to those that perceive COVID-19 to be a “very serious” threat to their personal health (-0.046 , $p<0.001$). It is also worth noting that we observe stronger treatment effects among less educated and younger voters, suggesting that these effects are strongest among those less inclined to vote.

This moderation effect is even stronger for an item that assesses people’s perceptions of the safety of in-person voting. We ask respondents in these waves whether such voting was very safe, somewhat safe, somewhat unsafe, or very unsafe. Figure A1 of the Appendix displays the marginal effects plot of this covariate, and the estimates can be found in Table A3.

The right panel of Figure 2 shows the same for the between-subjects experiment. The marginal effect of the treatment condition is insignificant for those who think the personal threat of COVID-19 is “not at all” or “not very” serious, and increases to -3 points for those who think it is a “very serious” threat, in support of H4 ($p<0.001$). The interaction term is significant ($p<0.05$) supporting our expectation. Priming COVID-19 reduces election turnout intention especially among those that perceive a high level of personal threat from COVID-19.

Using the survey itself to prime COVID-19 or including an explicit prime at the beginning of the survey ensures our moderating variables are measured post-treatment, which could lead to biased estimates of heterogeneity (Montgomery et al. 2018). We repeat our within-subjects experiment in two waves of respondent re-contacts from waves 9 through 12 ($N=5,000$). Within-subject treatment effects for these respondents are moderated by perceived treat (and election safety perceptions) measured in prior waves. These results are provided in Figure A2 of the Appendix.³

We also leverage our panel data in two further ways. First, we estimate a fixed effects specification where we examine whether within respondent change in in-person safety perceptions are associated with within-respondent changes in pre-post treatment effects. We find this to be the case, further mitigating the threat of unobserved heterogeneity in our heterogeneous effects analysis. Second, we estimate a lagged dependent variable model where we regress past values of in-person election safety perceptions on current turnout intention, controlling for covariates, and, crucially, past values of turnout intention. We find a strong link between in-person safety perceptions and turnout intention even with these design, helping us mitigate the threat of endogeneity in an observational context. These results can be found in Table S1 of the supplementary materials.

³ We relax our assumption of linear heterogeneous effects to ensure the robustness of our findings. These results can be found in Figures S1-S3 in the Supplementary Information. There is some sign of non-linearity in these effects, but, regardless, we see strongest effects among those who perceive a high level of risk from COVID-19.

5. Study 3-5: Election Safety Conjoints

If COVID-19 has the potential to reduce voter turnout among those who feel threatened by the disease, it is imperative to know if there are public safety measures that may assuage these concerns. Operating in a Canadian context, we worked with Elections Canada to identify a number of different measures actively under consideration to be implemented in the next federal election, such as: 1) controls on the numbers of people allowed into a polling station; 2) social distancing measures to keep people at least 2 metres apart; 3) requiring everyone to wear a mask; and the provision of 4) single-use pencils; and 5) hand sanitizer.

5.1 Study 3-5 Design

Conjoint experiments are particularly useful in these circumstances, as they allow for a more fine-grained understanding of people's preferences when the choice situation is complex and multidimensional, such as in-person voting when multiple different packages of safety measures are possible. We implement Study 3 in wave 16 of the MEO (N=2,499), fielded from August 10-12, 2020.

We begin by informing respondents that they will be provided with several possible scenarios related to the administration of in-person voting:

In the following section we are going to provide you with several hypothetical scenarios related to the administration of in-person voting in the next federal election. Please read carefully. We will ask you some questions about each scenario.

We then provide each respondent with three such scenarios where each measure is independently randomized:

Imagine the following measures were in place for in-person voting in the next federal election:

- *[Strict limits on the number of people allowed into a polling station at a time/No limits on the number of people allowed into a polling station].*
- *[Social distancing measures to keep people at least 2 meters apart/No social distancing measures in place].*
- *[Requirement to wear a mask when inside the polling station/No requirement to wear a mask while inside the polling station].*
- *[Hand sanitizer is provided/Hand sanitizer is not provided].*
- *[Single-use pencils are provided/Single-use pencils are not provided].*

After each scenario, respondents were asked: "How safe or unsafe do you think it would be to vote in-person at a polling station with these measures in place?" (Response categories: very safe, somewhat safe, somewhat unsafe, very unsafe); and "How likely would you be to vote in-person at a polling station with these measures in place?" (Response categories: very likely, somewhat likely, not

very likely, not at all likely). We expect each of these safety measures to improve both safety perceptions and in-person voting likelihood:

H3: Safety perceptions/in-person voting likelihood is higher in in-person voting scenarios with...

- *Numerical limits (A)*
- *Social distancing measures (B)*
- *Mask requirements (C)*
- *Hand sanitizer provided (D)*
- *Single-use pencils provided (E)*

The benefit of the above design is that the attributes correspond directly to measures Elections Canada are considering for implementation in the next Canadian federal election. The drawback is that citizens may expect that these safety precautions would be in place in theory and so this design may elicit a strong response from respondents surprised by the absence of a safety measure in the control condition (i.e. someone who is informed there was “*No social distancing measures in place*”).

We implemented a second conjoint experiment (Study 4) in wave 22 of the MEO (N=2,503). We aim to replicate Study 3 but with a modestly different task: respondents were asked to imagine a given situation when they arrive to vote at their polling station. We provided respondents with three scenarios each, where five measures are independently randomized:

Imagine that it is election day. You arrive at your designated polling station and observe the following:

- *There are [many/few] people inside the polling station*
- *[Hand sanitizer is readily available for public use/Hand sanitizer containers are empty]*
- *[Very few people are wearing masks/Almost everyone is wearing a mask]*
- *Voters are [given brand new pencils to mark their ballots/reusing pencils left from previous voters]*
- *People are [crowded together in line/spaced apart in line by at least 2 metres]*

Two questions are asked after each scenario: “Would you proceed to vote at this polling station?” (Response categories: definitely, probably, probably not, definitely not) and “How safe or unsafe do you think it is to vote in this polling station?” (Response categories: very safe, somewhat safe, somewhat unsafe, very unsafe).

One drawback of conjoint experiments is that the treatment effects can only be generalized to situations with the attributes used in the vignette. If other factors are introduced to the decision situation, we could expect differences in treatment effects. Studies 3 and 4 notably lack features of the political context that may influence voter turnout. If these factors are introduced to the vignettes, the treatment effects for our safety precautions may well be crowded out.

To account for environmental and contextual effects, we conduct a third and final conjoint, Study 5, in wave 24 of the MEO (N=1,481) fielded from October 6-14, 2020. In this study we introduce other environmental characteristics, like month of the election, weather on election day,

the day of the week, the proximity of the polling station, and the competitiveness of the local and national races, in addition to the safety-related attributes we use for Study 4. Respondents are given the following vignette three times:

Imagine that it is election day in [August/November/February/May] and it is being held [in the middle of the week/on a weekend].

Your local race for Member of Parliament is [neck-and-neck/ not very close], while the national race between the Liberals and Conservatives is [too close to call/ likely to be a landslide].

Your designated polling location is [very far from/ very close to] where you live. [It is pleasant outside/ It is {raining/snowing} outside].

At this location there are [many/few] people inside the polling station and they are [crowded together in line/ spaced apart by at least 2 metres]. In addition, [hand sanitizer is readily available for public use/ hand sanitizer canisters are empty] and voters are [given brand new pencils to mark their ballots/ reusing pencils left from previous voters. [Very few people are wearing masks/ Almost everyone is wearing a mask].

We then ask respondents “How likely would you be to vote at your designated polling station?” (Response categories: very likely, somewhat likely, not very likely, not at all likely).

We estimate the effects of each measure on perceptions of safety (Study 3 and 4) and vote likelihood (Study 3 through 5). The estimates can be interpreted as the causal effect of each attribute averaging across the distributions of all other attributes in the model, i.e. the average marginal component effect (AMCE). This will tell us which of these measures improves safety perceptions and the likelihood of in-person voting the most.

We expect the effect sizes of these studies to be considerably larger than those of Study 1 and 2 for a number of reasons. First, respondents are likely to have expectations about the administration of in-person polling locations: many are likely to assume that certain (but not all) of the presented policies will be in place if they have to go vote in-person. At the time of fielding, hand sanitizer provision, social distancing, numerical restrictions, and mask mandates were relatively commonplace in environments like grocery stores or malls. Hence, respondents are likely to be repelled by scenarios where those expectations are not met. Second, respondents were asked if they would vote at the polling station highlighted by the vignette. Participants reporting that they would not continue to vote might think they could cast their ballot either by mail or at another polling station.

It is important to acknowledge what these conjoint do and do not do. They do not provide a test of the effects of individual safety precautions on turnout or turnout intention for a given election. They do provide valid and robust estimates for what respondents expect they would do when faced with situations where in-person polling stations fail to meet their expectations about safety if election administration agencies abandon visible and widely accepted safety precautions at polling locations.

Figure 3. AMCEs for Study 3 (top-left), Study 4 (top-right), and Study 5 (bottom). Note: 95 and 90% confidence intervals. Respondent-clustered standard errors.

5.2 Study 3-5 Results

The AMCEs for Study 3 are displayed in the top-left panel of Figure 3. All safety measures significantly improve perceptions of safety and the likelihood of in-person voting at the $p < 0.001$ level in support of H3, but there are some differences in effect sizes. The effects of single use

pencils (6 and 5 points on 0-1 scales) and hand sanitizer (9 and 8 points, respectively) are smaller than the effects of limits on the number of people, social distancing, and mandatory masks, which range from 12 to 14 points. These results demonstrate that measures can strongly improve the likelihood of voting in-person, particularly by limiting the number of individuals, practicing social distancing, and making masks mandatory.⁴

It is possible that Study 3's effects are inflated by respondents taken aback by the complete absence of precautions taken in the baseline conditions. Study 4, in contrast, draws respondents' attention to the conditions in one specific polling location. The AMCEs for Study 4 are presented in the top-right panel of Figure 3. Again, all measures improve safety perception and vote intention ($p < 0.001$) with very similar effect sizes in support of H3. The effects of single use pencils (10 and 7 points) and hand sanitizer (11 and 9 points) still trail social distancing and mask usage (effects ranging from 11 to 14 points). People, however, are perhaps less concerned about the number of people in a polling station (8 and 6 points), so long as they are spaced apart.

How do these effects compare to other environmental and political characteristics that may influence turnout intention? The AMCEs for Study 5 are shown in the bottom panel. Respondents were not responsive to any of these other characteristics on average, with the exception of a competitive local race, which is signed in the wrong direction.⁵ In support of H3, all but one safety-related attribute remains significant at the 0.001 level (number of people significant at 0.01 level), although with perhaps more muted effect sizes.

It is also worth noting that the effects we observe here are additive. We can create a 0-5 index based on the total number of safety measures implemented in a given vignette. Going from vignettes with the worst possible conditions for safely voting to the best possible conditions increases likelihood of voting by 0.26 on a 0-1 scale. As a point of comparison, moving from the minimum to the maximum in a respondent's self-reported political interest increases the likelihood of voting by 0.37 on this scale, while moving from the minimum to the maximum in a respondent's level of education increases the likelihood of voting by 0.14 on this scale. These are sizable effects. Respondents are very attentive to safety-related characteristics of polling locations in comparison to other attributes of the context such as the month of the election, the weather on election day, the day of the week, proximity to the polling station, and the competitiveness of the race, and even other individual level determinants of participation, such as political interest and education.

6. Study 6: Exposure to safety precaution information

The conjoint experiments tell us whether in-person voting safety measures increase in-person vote intention in hypothetical scenarios. But they do not tell us whether information about these

⁴ These results are not due to demand effects. Figures S4-S6 in the supplementary information illustrate the stability of our estimates across the three vignettes for each study.

⁵ This result can be explained by theory that posits that political competition can have two effects on citizens. On the one hand, it can serve as a motivation for participation. On the other hand, political conflict and competition can trigger negative emotions reducing their likelihood to engage with politics (Settle et al. 2017). Hence, a close local race might trigger anxiety among the respondents resulting in a negative effect of this variable on the intention to vote.

measures counteract the depressive effects of COVID-19 on turnout intention that we identified in Study 1 and 2.

6.1 Study 6 Design

To address this question, we implemented Study 6, a pre-post test experiment, in waves 25 through 27 of the MEO (N=4,530) fielded from October 14 to November 5, 2020. As in Study 1 and Study 2, respondents were asked at the beginning of the survey to report their likelihood of voting in a federal election if one was held tomorrow. However, at the end of the survey one group received the following information before the post-test turnout intention question: “Elections Canada is likely to have in place multiple measures designed to keep citizens safe when casting a ballot in the next federal election such as a limit on the number of people allowed in the polling station at the same time, a requirement to wear masks, and physical distancing guidelines designed to keep individuals at least 2 metres apart.” The other group did not receive this information. We test the following hypothesis:

H4: The negative effect of COVID-19 priming should be smaller among those given information about the likely safety measures in place for in-person voting.

We expect the pre-post reduction in turnout intention to be smaller among those in the treatment condition. In short, exposure to information about what measures Election Canada intends to implement should attenuate the pre-post decrease in turnout. We do not expect that it will increase turnout intention.

Figure 4. Pre-post change in turnout intention in the control condition (left panel); Effect of safety information on change in turnout (right panel). Note: 95 and 90% confidence intervals, one-tailed. Wave 25: October 14-21, 2020; Wave 26: October 21-28, 2020; Wave 27: October 29-November 4, 2020. All = pooled estimate.

6.2 Study 6 Results

The results for Study 6 are displayed in Figure 4. The left panel presents the estimated change in turnout for those in the control condition, while the right panel presents the difference in this change for those in the treatment condition. We provide the wave-specific estimates as well as a pooled estimate. On average across all three waves we observe a 3 point decrease in turnout intention, which is approximately 0.2 standard deviations in our outcome measure ($p < 0.001$, one-tailed). The turnout reduction is reduced by one third the treatment condition in support of H4 (1 point, $p = 0.02$, one-tailed). This effect is not consistent across our waves, however. It is statistically significant in wave 25 ($p = 0.01$), marginally significant in wave 26 ($p = 0.08$), and non-significant in wave 27. It appears that providing information about in-person safety measures may attenuate turnout decline, but not completely.

7. Discussion

Voter turnout has long been a central focus of political science research. Scholars have identified both costs and life stressors as important factors in shaping turnout and the propensity to vote. All things being equal, we should expect fewer people to vote when its costs are increased by changes in public policy or the socio-political environment (e.g., Blais 2000; Blais et al. 2019, Downs 1957; Riker and Ordeshook 1968). We should also anticipate lower turnout among people in poor physical or mental health or who are experiencing a high degree of stress (Gagne et al. 2020; Hassell and Settle 2017; Mattila et al. 2013; Pacheco and Fletcher 2015).

Both of these theories have clear expectations for voter turnout in the midst of a pandemic. COVID-19 has heightened life stress to high levels in the general public through death, economic collapse, and social decline (Brooks et al. 2020; Petzold et al. 2020; Shanahan et al. 2020). We should expect citizens to be less likely to vote under these conditions. The spread of the SARS-CoV-2 virus also heightens the risk of activities and events that require individuals to gather indoors with others. Voting in-person is one such risk-laden activity, and indeed there has been some research showing that in-person voting during Wisconsin primaries and the Municipal elections in France contributed to the spread of COVID-19 (e.g., Berry et al. 2020; Cassan and Sangnier 2020; Cotti et al. 2020; Flanders et al. 2020; Zeitoun et al. 2020). Notwithstanding evidence of these risks, people may well perceive in-person voting to be a costlier activity than normal, and adjust their behaviour accordingly.

We provide evidence with large-scale survey experiments in Study 1 and 2 that priming respondents to think about COVID-19 reduces their intention to vote in the next election (H1). This is particularly true among respondents most personally threatened by COVID-19 (H2). The effects we observe are small, but it is important to note that we observe them even though the information environment is pre-treating our respondents by priming COVID-19 often and at a high volume, leading to conservative effect. The effects we observe here are also broadly similar to those found in real-world, non-experimental settings (Fernandez-Navia et al. 2021; Noury et al. 2021; Picchio and Santolini 2021; Vázquez-Carrero et al. 2020), though we caution that we cannot draw a

straight line between these estimates and our own, owing to different study designs and measurement strategies.

The advantage of our survey-based approach is that we can be confident we are observing a causal effect of COVID-19 priming on turnout intention and we can experiment with ways to reduce the effects we observe here (i.e., communication of safety precautions). The drawback is that we are not observing actual turnout, nor the direct causal effects of COVID-19 cases or mortality on this outcome. Future work should both explore these relationships in the field, ideally in ways that allow for clear causal identification, and tease out the precise mechanism by which COVID-19 affects turnout.

Public health threats pose important challenges for maintaining civic engagement. Finding ways to solve this challenge is imperative. Here, we find that the implementation and communication of in-person voting safety measures can also mitigate these negative effects. Our conjoint experiments (Studies 3-5) show that people readily change their beliefs about the safety of in-person voting, and their willingness to vote in-person, in response to the safety measures implemented by election administration agencies at polling stations (H3).

These effects are large and exceed other characteristics of the socio-political context that might influence turnout, like electoral competitiveness, and cumulatively rival individual-level factors like political interest and education. However, it is important to note that these conjoint experiments do not aim to estimate “real world” effects of safety precautions on turnout. Respondents are asked, in the context of a specific vignette, whether they would be willing to walk out of the polling station given the presence or absence of certain safety measures. Instead, they illustrate the potential costs of failing to meet people’s expectations about safety measures in place at polling stations. Future research aiming to understand the real world marginal effects of these interventions will be important for practitioners interested in estimating the costs versus benefits of various interventions. Future work could seek to exploit variation in the implementation of safety measures to examine effects on turnout directly.

Finally, in Study 6 we find some evidence that providing people information about safety measures for in-person voting counteracts the effect of priming COVID-19 on turnout intention that we found in Study 1 and 2 (H4). These effects, however, are modest, as we would expect when most respondents likely have baseline expectations that such precautions will inevitably be in place at polling stations.

Our findings highlight the importance of in-person voting safety measures in preserving electoral participation in the midst of pandemic. Of course, mail-in ballots may partially alleviate threats to voter turnout from the pandemic (Thompson et al. 2020; Yoder et al. 2020) and the public’s view of this voting method is thus deserving of more research in Canada and cross-nationally. However, the ease and accessibility of mail-in ballots will vary across national and sub-national contexts, as will the willingness of citizens to cast ballots by mail. Over the course of fielding our surveys, the share of Canadians in this panel preferring to vote by mail has fluctuated from 19% in April of 2020 to as high as 34% in April 2021 but falling back to 20% by July of 2021.

Even during a pandemic, a large majority of Canadians prefer to vote in person, while roughly 1 in 5 report they will *definitely not* vote by mail. Voting by mail is also preferred by older and more educated respondents.

We see the limitations of mail-in ballots in practice as well. Several provinces have held elections during the pandemic, most notably British Columbia (BC). Only 31% of British Columbians voted by mail as the second COVID-19 wave was developing (Elections BC 2020b), while a voter turnout of 53.9% was the lowest in recorded BC history (i.e., since 1928, see Elections BC 2020a). Mail-in ballots can't be the whole solution, especially in contexts where the norm of voting by mail is less entrenched. Bolstering in-person voting matters as well.

Not all voters will be aware of precautions taken by election administration agencies to protect voters nor will everyone expect them to be in place. Communicating information about these measures appears to be a simple, low cost way of counteracting the effects of COVID-19 on voter turnout. Many voters, however, will expect these measures to be in place and to be adequately implemented. Our experiments suggest that failing to do so may reduce electoral participation.

Although we are beginning to enter the twilight of the COVID-19 pandemic in the developed world, many more elections will be conducted in the midst of the pandemic as nations struggle to vaccinate their populations and wrestle with the emergence of deadly variants. In the face of high costs – perceived or real – some potential voters will opt out of elections. Reducing those costs should be top of mind for election administration agencies and others interested in maintaining high levels of voter turnout. Our findings illustrate that during pandemics, or other public health crises that heighten the health risks of in-person voting, electoral agencies would be well advised to set up and actively and robustly communicate policies specifically aimed at protecting voters at the polls.

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Appendix

Figure A1. Effect of election safety perception on pre-post change in turnout intention. Note: Controlling for COVID-19 threat perception, age, education, income, urban density, gender, and region. 95% confidence interval.

Figure A2. Effect of prior wave COVID-19 threat perception on pre-post change in turnout intention controlling for age, education, income, urban density, gender, and region (left). Effect of prior wave election safety perception on pre-post change in turnout intention controlling for COVID-19 threat perception, age, education, income, urban density, gender, and region (right). Note: 95% confidence intervals. N=4,571, fielded July 22-August 9, 2020 using Dynata. Quotas set on re-contacts in an identical fashion as for Study 1.

Table A1. Sample characteristics

Wave	N	Start	End	Female	18/34	35/54	55+	Atlantic	Quebec	Ontario	West	French
9	2,552	15-Jun	18-Jun	50.7	25.3	33.9	40.8	6.9	23.1	38.6	31.5	20.5
10	2,548	22-Jun	29-Jun	50.8	27.0	33.3	39.7	7.2	23.4	38.1	31.3	20.6
11	2,495	29-Jun	06-Jul	51.3	27.3	34.0	38.7	6.9	23.5	38.0	31.7	20.4
12	2,539	07-Jul	13-Jul	52.3	23.3	35.5	41.3	6.9	23.1	38.2	31.8	20.7
13	2,526	14-Jul	21-Jul	53.4	24.8	35.0	40.2	6.9	23.4	38.2	31.5	20.5
16	2,500	10-Aug	12-Aug	51.2	27.1	33.6	39.3	7.0	23.3	38.2	31.6	20.0
17	1,513	17-Aug	24-Aug	50.2	26.9	33.7	39.5	7.1	23.4	38.4	31.1	20.7
18	1,508	24-Aug	31-Aug	51.5	26.7	33.9	39.4	7.0	23.3	38.5	31.3	20.4
19	1,502	31-Aug	08-Sep	51.2	26.8	33.8	39.5	6.8	23.2	38.3	31.7	20.3
22	2,503	21-Sep	28-Sep	50.3	27.3	34.3	38.4	6.8	23.5	38.0	31.7	20.3
24	1,481	06-Oct	14-Oct	51.1	26.2	17.5	26.7	7.0	22.8	38.5	31.8	19.7
25	1,523	14-Oct	21-Oct	46.1	33.6	38.3	33.9	7.0	22.5	38.7	31.8	19.2
26	1,495	21-Oct	28-Oct	51.5	40.2	44.3	39.5	7.0	23.7	37.9	31.4	20.6
27	1,512	29-Oct	04-Nov	51.5	27.1	33.7	39.3	6.9	23.5	38.3	31.3	20.6
Population				51.4	27.3	34.1	38.6	6.8	23.4	38.6	28.5	20.6

Table A2. Study 1 and 2 covariate descriptions

Variable	Description
Vote intention	Not at all likely, not very likely, somewhat likely, very likely
COVID-19 threat perception	Not at all serious, not very serious, somewhat serious, very serious
In-person voting safety perception	Very unsafe, somewhat unsafe, somewhat safe, very safe
Age	Age in years
Income	0=None, 1=\$1-30,000, 2=\$30,001-60,000, 3=\$60,001-90,000, 4=\$90,001-110,000, 5=\$110,001-150,000, 6=\$150,001-200,000, 7=More than \$200,000; don't know coded as missing
Education	0=High school or less; 1=College or some university; 2=Bachelor's degree or higher
Urban/rural	0=Rural place; 1=Small town, 2=Large town, 3=Mid-sized city, 4=Large city
Gender	1=Female
Region	1=Atlantic, 2=Quebec, 3=Ontario, 4=West

Table A3. Estimates for Study 1 heterogeneous effects analysis

DV = Pre-post change in turnout intention	1		2	
	Coef	SE	Coef.	SE
COVID-19 threat perception	-0.005**	0.002	0.002	0.002
In-person voting safety perception			0.023***	0.002
Education	0.004*	0.002	0.004*	0.002
Income	0.002	0.001	0.001	0.001
Age	0.001***	0.000	0.001***	0.000
Urban/rural	-0.004***	0.001	-0.003**	0.001
Female	0.005	0.003	0.008**	0.003
Quebec	-0.008	0.007	-0.008	0.007
Ontario	0.003	0.007	0.005	0.007
West	0.009	0.007	0.009	0.007
Constant	-0.073***	0.010	-0.113***	0.011
R ²	0.008		0.018	
N	11262		11262	

* p<0.1, ** p<0.05, *** p<0.01.

Table A4. Estimates for Study 2 heterogeneous effects analysis

DV = Turnout intention	Coef.	SE
Treatment	0.025	0.036
COVID-19 threat perception	0.026***	0.005
Threat * Treatment	-0.014**	0.007
Education	0.041***	0.006
Education * Treatment	-0.004	0.008
Income	0.014***	0.003
Income * Treatment	0.002	0.004
Age	0.003***	0.000
Age * Treatment	0.000	0.000
Urban/rural	0.006*	0.003
Urban/rural * Treatment	-0.004	0.005
Female	-0.023***	0.009
Female * Treatment	-0.002	0.012
Quebec	0.059***	0.018
Ontario	0.023	0.018
West	0.013	0.018
Quebec * Treatment	-0.049*	0.025
Ontario * Treatment	-0.017	0.024
West * Treatment	-0.009	0.025
Constant	0.586***	0.026
R ²	0.085	
N	6365	

* p<0.1, ** p<0.05, *** p<0.01.

Supplementary Information

Communicating safety precautions can help maintain in-person voter turnout during a pandemic

Figure S1. Non-linear specification. Predicted pre-post change in turnout intention by threat perception (left); Predicted marginal effect of COVID-19 prime on turnout intention (right). Note: 95% confidence intervals, two-tailed.

Figure S2. Non-linear specification. Effect of election safety perception on pre-post change in turnout intention. Note: Controlling for COVID-19 threat perception, age, education, income, urban density, gender, and region. 95% confidence interval.

Figure S3. Non-linear specification. Effect of prior wave COVID-19 threat perception on pre-post change in turnout intention controlling for age, education, income, urban density, gender, and region (left). Effect of prior wave election safety perception on pre-post change in turnout intention controlling for COVID-19 threat perception, age, education, income, urban density, gender, and region (right). Note: 95% confidence intervals. N=4,571, fielded July 22-August 9, 2020 using Dynata. Quotas set on re-contacts in an identical fashion as for Study 1.

Figure S4. Estimates for Study 3 broken down by vignette. 90 and 95% confidence intervals.

Figure S5. Estimates for Study 4 broken down by vignette. 90 and 95% confidence intervals.

Figure S6. Estimates for Study 5 broken down by vignette. 90 and 95% confidence intervals.

Table S1. Panel data robustness checks

	Fixed Effects		LDV	
	Coef.	SE	Coef.	SE
In-person voting safety perception	0.014**	0.004		
COVID-19 threat perception	0.008	0.005		
In-person voting safety perception t_{-1}			0.012***	0.003
COVID-19 threat perception t_{-1}			0.009***	0.002
Education			0.005	0.003
Income			0.004**	0.001
Age			0.000*	0.000
Female			-0.004	0.004
Quebec			-0.003	0.008
Ontario			-0.000	0.007
West			-0.008	0.007
Vote intention t_{-1}			0.801***	0.016
Constant	-0.074***	0.011	0.115***	0.018
R ²	0.01		0.659	
N	17712		4571	
N (Groups)	12644			

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Note: Robust standard errors. The outcome variable in the fixed effects model is pre-post change in turnout intention (-1 to 1), and the outcome variable in the lagged dependent variable model (LDV) is pre-treatment vote intention, rescaled 0-1 where 1 means the respondent is certain to vote. Model 1 shows that within-respondent change in in-person voting safety perception is significantly associated with changes in the pre-post change in turnout intention at the 0.01 level. Predictions from this model suggest that we should observe within-respondent, pre-post reductions on the order of 0.06 points among those who perceive in-person voting to be very unsafe, which weakens to 0.02 points for those who perceive it to be very safe. However, because this is a fixed effects specification we must account for the fact we are using only within-respondent variation in our treatment and outcome (see Mummolo & Peterson, 2018). We express our effects in terms of fixed effects residualized treatment and outcomes. Within-respondent over time, a one standard deviation decrease in in-person vote safety perceptions is associated with a 0.06 standard deviation decrease in vote intention change. That is, declining safety perceptions between contact and re-contact periods are associated with stronger pre-post reductions in turnout intention within-respondents. Our LDV model predicts that moving from respondents with perceptions that in-person voting is very safe to very unsafe at $t-1$ is associated with a 0.04 point reduction in turnout intention ($p < 0.001$) controlling for demographics, COVID-19 threat perceptions and past values on turnout intention.

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