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## Case Report

## Moralization of Covid-19 health response: Asymmetry in tolerance for human costs

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## ABSTRACT

We hypothesized that because Covid-19 (C19) remains an urgent and visible threat, efforts to combat its negative health consequences have become moralized. This moralization of health-based efforts may generate asymmetries in judgement, whereby harmful by-products of those efforts (i.e., instrumental harm) are perceived as more acceptable than harm resulting from non-C19 efforts, such as prioritizing the economy or non-C19 issues. We tested our predictions in two experimental studies. In Study 1, American participants evaluated the same costs (public shaming, deaths and illnesses, and police abuse of power) as more acceptable when they resulted from efforts to minimize C19's health impacts, than when they resulted from non-health C19 efforts (e.g., prioritizing economic costs) or efforts unrelated to C19 (e.g., reducing traffic deaths). In Study 2, New Zealand participants less favorably evaluated the quality of a research proposal empirically questioning *continuing* a C19 elimination strategy in NZ than one questioning *abandoning an elimination* strategy, although both proposals contained the same amount of methodology information. This finding suggests questioning elimination approaches is morally condemned, a similar response to that found when sacred values are questioned. In both studies, condition effects were mediated by lowered moral outrage in response to costs resulting from pursuing health-minded C19 efforts. Follow-up analyses revealed that both heightened personal concern over contracting C19 and liberal ideology were associated with greater asymmetries in human cost evaluation. Altogether, results suggest efforts to reduce or eliminate C19 have become moralized, generating asymmetries in evaluations of human suffering.

## 1. Introduction

Covid-19 (C19) has been a terrifying global health threat since its detection. In comparison to the familiar seasonal influenza, C19 is more contagious, insidious, deadly, and potentially overwhelming of health care systems (Resnick & Animashaun, 2020). Governments around the world have responded by implementing various restrictions, which had been relatively unprecedented in Western civilizations. Despite these restrictions' capacity to save lives (Alwan et al., 2020), prolonged regulation of human contact and economic activity is not without devastating health, welfare, and economic costs (Glover et al., 2020). Minimizing fatalities and health system burden, while simultaneously protecting people's social wellbeing and livelihoods appears unattainable. In the absence of effective and widely available vaccines or therapeutics, no country is well positioned to provide both sustained health

care and economic support for all. Because resources are finite, difficult trade-offs surrounding lives and livelihoods are inevitable. How do people evaluate such trade-offs? The current investigation sought to examine these psychological calculi.

We test the possibility that within the current C19 pandemic, not all human costs are perceived as equally tolerable. Because C19 is a salient threat, we contend that eliminating it has become moralized, perhaps even to the point of a sacred value (Tetlock, 2003; Tetlock, Kristel, Elson, Green, & Lerner, 2000). As a result, we hypothesized that people would exhibit asymmetries in their evaluations of human costs, such that the harmful by-products of C19 reduction or elimination efforts are viewed as more tolerable than those resulting from non-C19 efforts. Moreover, in line with extant work on sacred values, we anticipated that merely questioning the elimination strategy would elicit moral outrage, disapproval, and a desire to reaffirm one's moral commitments.

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## 2. Theoretical foundation

There is abundant evidence that C19 is a threat to public health. It can be deadly to the elderly and immunocompromised, but even non-vulnerable populations can experience long-term consequences, which are yet to be fully understood (Alwan et al., 2020; Rajgor, Lee, Archuleta, Bagdasarian, & Quek, 2020; Yelin et al., 2020). In contrast to many other health and safety risks, such as road accidents or non-communicable diseases, C19 is highly contagious. Although it can spread exponentially, it can also be controlled through decisive action and physical distancing (Walensky & del Rio, 2020). These features make C19 a quantifiable threat with tangible means to combat it.

However, combating C19 inevitably involves trade-offs, as every response carries negative externalities, known as *collateral damage* or *instrumental harm*. Collateral human costs that may result from failing to combat C19 and reduce its spread include increased cases, overwhelmed healthcare systems, health complications, and deaths (Alwan et al., 2020). Prioritizing control or elimination of C19 also carries collateral human cost (Glover et al., 2020). Those costs include unemployment or underemployment (Lewis & Hsu, 2020), extreme stress and substance abuse (Clay & Parker, 2020; Sprang & Silman, 2013; Stetka, 2020), and delayed cancer diagnoses (Kutikov et al., 2020), among others. Left unaddressed, these forces may generate ‘deaths of despair’ (Case & Deaton, 2020), whereby individuals perish from behaviors or worsened illnesses as a result of perceived bleak prospects (Milling, 2020; Pell & Lesser, 2020). Other costs include the public shaming of those who violate or question health-based policies (Tait, 2020), abuse of law-enforcement and government power (Gebrekidan, 2020; Hooton, 2020), and deterioration of human rights (Nay, 2020).

We hypothesized that as C19 is recognized as a formidable contemporary threat, efforts to combat it would be perceived as promoting the ‘greater good’ because they presumably reduce overall suffering (Kahane et al., 2018; Mill, 1861/2010). Those efforts would be not only lauded as necessary and beneficial, but they may also become *moralized* (Rozin, 1999; Rozin, Markwith, & Stoess, 1997; Rozin & Singh, 1999). Moralization is a process by which attitudes attain or increase in moral relevance (Feinberg, Kovacheff, Teper, & Inbar, 2019; Rhee, Schein, & Bastian, 2019; Rozin, 1999; Skitka, Hanson, Morgan, & Wisneski, 2021). This process can occur at a collective scale (e.g., societal attitudes towards smoking; Rozin & Singh, 1999) as well as among individuals wherein attitudes reflect core beliefs about issues of right and wrong (Skitka et al., 2021). Behaviors that inflict harm are especially likely to become moralized (Schein & Gray, 2018; Turiel, 1983), but particularly when that harm befalls vulnerable individuals (Rozin, 1999). Given the harm C19 inflicts on the elderly and immunocompromised, efforts to eliminate it may be especially likely to become moralized.

The moralization of C19 elimination efforts is evident in public depictions of C19 response strategies (see Luttrell et al. (2016) for benefits of framing arguments in moral terms). For example, New Zealand’s early health-minded elimination approach is lauded as *moral* for its efficacy (Mazey & Richardson, 2020). In contrast, herd-immunity approaches, such as that fronted by Sweden and the Great Barrington Declaration (Great Barrington Declaration, 2020), have been publicly condemned as *immoral* (BBC, 2020; Bergmann, 2020) and *unethical* (Resnick, 2020). Similarly, staying at home and complying with mask mandates are presented as matters of “*ethical duty* and commitment to the *common good*” (Brakman, 2020). Accordingly, the behaviors that compromise those goals and potentially exacerbate harm, such as failing to social distance or take health-based precautions, may elicit *moral outrage* (Davidson, Padula, Daly, & Jackson, 2020; Salerno & Peter-Hagene, 2013).

When attitudes, including those regarding C19, are held with strong moral conviction (known as *moral mandates*), they are perceived as objectively true and universally obligatory (Skitka, 2002; Skitka & Houston, 2001). Pursuit of any greater good often entails trade-offs (Tetlock, 2003), whereby tolerance for certain costs is requisite. Such

tolerance of costs is consistent with the theoretical underpinnings of utilitarianism (Bentham, 1789/1961; Mill, 1861/2010), whereby morality is a calculus of overall well-being. Strong moral convictions can justify nearly any means and their inevitable costs (see Skitka et al., 2021). Because one core feature of morality is the ardent belief that others should share one’s convictions (Haidt, 2003; Kant, 1786/2004), strongly held moral beliefs can lead to interpersonal intolerance, whereby individuals punish and ostracize those with whom their moral mandates differ (Skitka et al., 2021; Skitka, Bauman, & Sargis, 2005). If these convictions are elevated to the status of a sacred value, merely questioning their authority can stimulate moral outrage and a desire to reaffirm one’s moral convictions; a process known as moral cleansing (Tetlock, 2003; Tetlock et al., 2000). Thus, we hypothesized that the moralization of C19 control or elimination efforts would not only lead to a greater tolerance of the collateral damage associated with these pursuits, but also condemnation and moral outrage towards those who violated or even merely questioned the value of these efforts (correlates of sacred values; Tetlock, 2003).

### 2.1. Present study

Across two pre-registered experimental studies, we examined whether individuals would exhibit asymmetries in their assessment of human costs, such that harmful by-products of reduction or elimination efforts (henceforth labeled as Control-C19) are viewed as more tolerable than those resulting from non-C19 efforts (Study 1, USA). If Control-C19 efforts have risen to the level of a sacred value, merely questioning them should evoke strong moral outrage and opprobrium (Study 2, New Zealand; NZ). Thus, we also tested whether participants would experience moral outrage and disapproval towards scientists who questioned the value of elimination efforts in NZ.

However, not all individuals are equally likely to view C19 as threatening. Because morality is intimately intertwined with harm infliction (Schein & Gray, 2018; Turiel, 1983), we expected that those who perceived C19 as a greater threat would also more strongly moralize Control-C19 approaches. We therefore examined two factors that could influence the degree to which individuals exhibit human cost asymmetries: 1) *concern over C19* and 2) *political ideology*. Those who are especially concerned over contracting C19 should view C19 as a greater personal health threat. We also assessed participants’ ideology because some evidence suggests conservatives view C19 as a lesser threat than liberals (Calvillo, Ross, Garcia, Smelter, & Rutchick, 2020). To examine whether effects generalize across political contexts, we collected data from New Zealand (Study 2) which, in comparison to USA (Study 1), does not show obvious signs of C19 polarization.

We received ethical approval from the first author’s university and all participants were provided informed consent before participation. Our complete scenarios are provided in the Appendix. For both studies, anonymized data, pre-registrations, experimental materials (Qualtrics surveys), and analysis syntaxes are available at: [https://osf.io/m7dc2/?view\\_only=52993881b35143fe8be238358b6a9859](https://osf.io/m7dc2/?view_only=52993881b35143fe8be238358b6a9859)

The supplementary online materials (SOM) file contains additional analyses.

### 2.2. Study 1

We used three complementary contexts to evaluate people’s relative acceptance of human costs and examine the generalizability of our findings. Context A (*social cost*) examined tolerance for shaming and harassment, psychologically harmful behaviors (Daniels & Robinson, 2019) that are currently highly prevalent (Tait, 2020). Context B (*health cost*) assessed tolerance for deaths and illnesses resulting from a C19-related statistical modeling error that either *under-* or *over-*estimated the spread of C19 (see Ioannidis, Cripps, & Tanner, 2020; Kutikov et al., 2020; Niforatos, Melnick, & Faust, 2020; Rajgor et al., 2020). Context C (*human rights cost*) pinned one highly visible threat against another (i.e.,

road deaths and C19 deaths). We hypothesized that because health-based strategies have become moral mandates, participants would: 1) evaluate shaming in service of Control-C19 goals (vs. non-health related C19 goals) as more civil and less problematic; 2) view illnesses and a death as less problematic if they result from over-estimating the health threat of C19 than under-estimating it, and 3) be more tolerant of an officer abusing power to reduce deaths due to C19 than those due to reckless driving.

### 3. Participants and procedure

Study 1 was conducted in late July 2020. We recruited 500 participants from TurkPrime (Litman, Robinson, & Abberbock, 2017) in exchange for \$1.15. Participants were American residents who had completed at least 100 tasks with a minimum approval rating of 95%. We aimed to retain at least  $N = 75$  in each cell to achieve minimum power of 0.80 to detect an effect size of  $r = 0.21$ .<sup>1</sup> Thirteen participants were dropped following preregistered exclusion criteria, resulting in a final sample of 487 individuals ( $M_{age} = 38.9$ ,  $SD = 13.2$ , 56.6% men).

#### 3.1. Common procedures and measures for all three contexts

We conducted three experiments simultaneously by randomly assigning participants to one of six possible contexts (i.e., one of the three experimental contexts, and one of two conditions within each context; *Control-19-oriented* and *non-C19*). Descriptions of contexts, conditions, human costs, and measures are detailed in Table 1. Unless noted otherwise, items used a response scale from 1 (*strongly disagree*) to 7 (*strongly agree*). All participants indicated their agreement with the statement: "The case I just read was realistic". Exact cases are available in Appendix and complete materials are available online, as noted above.

#### 3.2. Individual-level moderators

Upon completing the variables in Table 1, we asked demographic and Covid-19 questions.<sup>2</sup> Demographic questions include age, gender, ethnicity, and political affiliation (i.e., *conservatism*; 1 = *very left-wing*, 9 = *very right-wing*). Last, we asked participants to indicate how concerned they would be if they contracted C19 (0 = *not concerned at all*; 100 = *extremely concerned*). Table A.1 (Appendix) shows correlations between the demographic characteristics and moderators.

## 4. Results

#### 4.1. Preliminary analysis: realism of the cases

To establish equivalence across conditions, we compared participants' perceived case realism between the Control-C19 and non-C19 conditions separately for each context. Independent samples *t*-tests showed no significant differences, indicating all cases were perceived as equally realistic ( $p$  values ranged from 0.15 to 0.86). All means were above 5 on a 7-point scale and significantly differed from the mid-point "4" (all  $p$  values < .01), indicating participants agreed, at least to some extent, the contexts were realistic.

<sup>1</sup> We decided to select  $r = 0.21$  (i.e., the estimated average effect size of social psychology research; Richard, Bond, & Stokes-Zoota, 2003) due to the novelty and lack of prior reference for our studied effects.

<sup>2</sup> We collected additional information for exploratory purposes. Those include general attitudes towards prioritizing health or economy, exposure to media, and compliance with C19 health mandates. This data is available on our OSF link.

#### 4.2. Main hypothesis tests

We first conducted a set of independent *t*-tests within each of the three contexts (per our pre-registration) to test our predictions about greater tolerance of costs resulting from Control-19 than non-C19 health efforts. Table 2 shows results for the key pre-registered dependent variables and moral outrage. Table 3 shows results for additional variables.

#### 4.3. Supplemental analysis 1: The mediating effect of moral outrage and the moderating role of perceived C19 health threat

We examined whether our effects were mediated by moral outrage. We tested the indirect effects using a structural equation modeling (SEM) framework with 5000 bootstrap samples to obtain bias-corrected confidence intervals of the indirect effects. We found consistent mediating effects of moral outrage (see Table 4).

We next examined whether those who perceived C19 as a greater personal health threat exhibited lessened moral outrage to collateral costs resulting from Control-C19 efforts. We tested the interaction between perceived C19 health threat and condition on moral outrage, which were all significant within Contexts A – C ( $ps$  in the range of <0.0001 to 0.0322, see SOM Table S1). Simple effects results shown in Table 5 revealed condition effects were only significant for individuals high in perceived C19 health threat ( $ps$  in the range of <0.0001 to 0.0013), and non-significant for individuals low in perceived threat ( $ps$  in the range of 0.15 to 0.87).<sup>3</sup>

#### 4.4. Supplemental analysis 2: The role of political ideology

We explored the moderating effect of participants' political ideology (see Table 6). Although not all interactions were significant, simple effects analyses nonetheless revealed our effects were more pronounced for participants low in conservatism (i.e., liberal) (Table 7).

#### 4.5. Study 1 Discussion

Our three experiments provided converging evidence in support for our hypotheses, such that participants exhibited asymmetries in their evaluations of identical human costs across all primary DVs. People were more likely to accept social (shaming), health (illnesses and deaths resulting from statistical errors), and human rights costs (police abuse of power) when those costs resulted from Control-C19, than non-C19 efforts. Furthermore, when costs were incurred for non-C19 reasons (versus Control-C19 reasons), participants exhibited significantly greater moral outrage (all contexts), stronger punitive intentions towards responsible parties (Contexts B and C), and diminished evaluations of the parties' competence (Contexts B and C). Intriguingly, in Context A, participants were more approving of harassment to Dr. Bloom following his challenge of a Control-C19 approach than when he challenged an economy-centered approach. Yet, participants also expected Dr. Bloom to experience greater suffering from this harassment when he challenged the Control-C19 than economic-based approach (see Table 2). These two patterns may suggest participants felt especially vengeful towards those challenging health-based strategies.

Supporting our theoretical contentions about moralization, moral outrage mediated all relationships between condition and harm acceptance (Table 4). In all three contexts, the net indirect effects were positive. These patterns are consistent with the interpretation that efforts aligning with reducing or controlling C19 reduced moral outrage, which in turn, dampened punitive motivations and increased harm acceptance resulting from those efforts. Finally, participants who showed greater

<sup>3</sup> We also reported a full integrative mediated moderation model testing whether the Condition x Perceived C19 Health Threat interaction operated through moral outrage (see SOM, Figure S1).

**Table 1**  
Study 1 Experimental Conditions and Measures.

<b>Context A - Social Cost:</b> Dr. Bloom faced online shaming, ridicule, and harassment. A disparaging tweet called his 'recklessness' embarrassing and claimed he should be 'ashamed to call himself a health practitioner'.		
Conditions	Core DVs	Additional DVs
<b>Challenge Lack of Restrictions.</b> A public health expert, Dr. Bloom, challenged a city's economy-oriented strategies and advocated for stricter mandates to save lives due to the health effects of C19.	<b>Acceptance of Shaming.</b> Public shaming of Dr. Bloom is: (-3 to +3; 0 = neutral): 1) wrong-right, 2) immoral-moral, 3) unjust-just, 4) unethical-ethical, 5) unreasonable-reasonable, 6) unnecessary-necessary. $\alpha = .98$ .	<b>Perceived Competence of Dr. Bloom.</b> Based on the comments above, Dr. Bloom is: 1) intelligent, 2) qualified to be a public health expert, 3) knowledgeable. $\alpha = .85$ .
<b>Challenge Health Restrictions.</b> A public health expert challenged a city's health-based strategies, advocated for looser mandates to open the economy, and wanted to save lives due to 'deaths of despair'.	<b>Civility of the Tweet.</b> How civil is the tweet against Dr. Bloom? 1 = <i>uncivil</i> ; 7 = <i>civil</i> . <b>Moral Outrage.</b> Dr. Bloom's comments on handling C19: 1) make me angry, 2) are morally wrong, 3) upset me. $\alpha = .93$ . Items are based on Reynolds et al. (2020).	<b>Severity of Emotional Suffering.</b> Indicate the extent to which Dr. Bloom is likely to experience the following emotions in response to such harassment: 1) anxiety, 2) humiliation, 3) psychological distress. $\alpha = .81$ .
<b>Context B - Health Cost:</b> As a result of the C19 modeling error and subsequent hospital mismanagement, 34 people were hospitalized and 1 person died.		
Conditions	Core DVs	Additional DVs
<b>OVER-estimate C19.</b> A modeling team led by J Wiles committed a major estimation error that OVER-estimated C19 threat, resulting in hospitals rejecting non-urgent, but potentially serious non-C19 patients.	<b>Punishment Intent (PI) - Demotion.</b> To which rank would you demote J? 0 = <i>fire J Wiles</i> ; 10 = <i>keep J Wiles' current rank</i> . Reverse-scored: higher scores indicated stronger PI.	<b>Perceived Competence.</b> Indicate the extent to which you agree that the modeling team: 1) did the best job they could; 2) did a good job, given the circumstances, 3) acted responsibly, 4) acted in good faith. $\alpha = .94$ .
<b>UNDER-estimate C19.</b> A statistical modeling team committed a major estimation error that UNDER-estimated C19 threat, resulting in hospitals being unprepared for sudden influxes of C19 patients.	<b>PI - Pay Deduction.</b> Note the pay grade to which you would reduce J Wiles' pay: \$165,000 (no change) to \$140,500; 6 point increments. Reverse-scored: 0 = low PI, \$24,500 = high PI. <b>Moral Outrage.</b> [Team's proclamations based on error]. $\alpha = .88$	<b>Severity of Modeling Error.</b> Based on the [human costs], how severe is this modelling error? 0 = not severe; 10 = extremely severe. <b>Instrumental Harm Acceptance.</b> [Despite the error], the government's decision to follow the team's advice was: 1) correct, 2) morally right, 3) necessary, 4) safe, 5) good. $\alpha = .92$ .
<b>Context C - Human Rights Cost:</b> The police officer inappropriately fined 15 people and detained one person.		
Conditions	Core DVs	Additional DVs
<b>Power Abuse to Reduce C19.</b> A police officer abused his power and inappropriately fined and detained people for violating stay-at-home orders. The officer wanted to reduce C19-related fatalities.	<b>PI - Demotion.</b> Would you demote the police officer? 0 = <i>dismissal from the police force</i> to 7 = <i>no formal discipline</i> . Reverse-scored: higher scores indicated stronger PI.	<b>Severity of Police Officer's Violations.</b> How severe are the police officer's violations? 0 = <i>not severe</i> ; 10 = <i>extremely severe</i> .
<b>Power Abuse to Reduce Road Deaths.</b> A police officer abused his power and inappropriately fined and detained people for violating traffic laws. The officer wanted to reduce road fatalities.	<b>PI - Pay Deduction.</b> Would you reduce officer's pay? \$65,000 (no change) to \$52,500; 6 pay grades in total. Reverse-scored: 0 = low PI, \$12,500 = high PI. <b>Moral Outrage.</b> [Police abuse of power]. $\alpha = .82$ .	<b>Instrumental Harm Acceptance.</b> Indicate agreement: 1) [The officer] did what had to be done to protect public health, and the officer's actions were 2) necessary, 3) justifiable, 4) in interest of public health and safety. $\alpha = .93$ . Items are based on Kahane et al. 2020.

**Table 2**  
Descriptive Statistics and Summary Results for Main Dependent Variables.

Contexts and Conditions	DV	N	M	SD	SE Mean	b	SE	t	df	Cohen's d	p	95% CI (LL, UL)
<b>Context A</b>												
Challenge Lack of Restrictions	Acceptance of Shaming	83	<b>2.27</b>	1.49	0.16	-1.20	0.25	-4.90	164	0.76	<.0001	-1.69 -0.72
Challenge Health Restrictions		83	<b>3.47</b>	1.67	0.18							
Challenge Lack of Restrictions	Perceived Tweet Civility	83	<b>2.34</b>	1.39	0.15	-0.98	0.24	-4.11	164	0.64	<.0001	-1.44 -0.51
Challenge Health Restrictions		83	<b>3.31</b>	1.66	0.18							
Challenge Lack of Restrictions	Moral Outrage	83	<b>2.18</b>	1.31	0.14	-1.54	0.24	-6.45	164	1.00	<.0001	-2.01 -1.07
Challenge Health Restrictions		83	<b>3.72</b>	1.73	0.19							
<b>Context B</b>												
OVER-estimate C19	Demotion	78	<b>3.95</b>	2.94	0.33	-1.52	0.50	-3.02	153	0.49	0.0029	-2.51 -0.52
UNDER-estimate C19		77	<b>5.47</b>	3.31	0.38							
OVER-estimate C19	Pay Deduction	77	<b>10.40</b>	9.52	1.08	-4.95	1.52	-3.23	153	0.53	0.0013	-7.95 -1.96
UNDER-estimate C19		78	<b>15.40</b>	9.37	1.06							
OVER-estimate C19	Moral Outrage	79	<b>5.08</b>	1.30	0.15	-0.57	0.19	-2.91	156	0.46	0.0041	-0.95 -0.18
UNDER-estimate C19		79	<b>5.64</b>	1.14	0.13							
<b>Context C</b>												
Power Abuse for C19	Demotion	81	<b>3.19</b>	1.60	0.18	-0.88	0.28	-3.16	161	0.50	0.0019	-1.42 -0.33
Power Abuse for Road Safety		82	<b>4.06</b>	1.92	0.21							
Power Abuse for C19	Pay Deduction	79	<b>3.29</b>	4.46	0.42	-1.77	0.66	-2.69	156	0.43	0.0077	-3.07 -0.48
Power Abuse for Road Safety		79	<b>5.06</b>	3.77	0.50							
Power Abuse for C19	Moral Outrage	81	<b>4.18</b>	1.62	0.18	-0.58	0.25	-2.30	161	0.36	0.0226	-1.07 -0.08
Power Abuse for Road Safety		82	<b>4.76</b>	1.57	0.17							

Notes. All results were statistically significant even after correcting for multiple tests (i.e., for Context A and C that each had 5 DVs, we use  $\alpha = 0.05 / 5 = .01$ ; for Context B with 6 DVs, we use  $\alpha = 0.05 / 6 = 0.0083$ ), except for moral outrage in Context C, which is not a pre-registered main DV.

**Table 3**  
Descriptive Statistics and Summary Results for Additional Variables.

Contexts and Conditions	DV	N	M	SD	SE Mean	b	SE	t	df	Cohen's d	p	95% CI (LL, UL)
<b>Context A</b>												
Challenge Lack of Restrictions	Perceived Competence	83	<b>5.66</b>	1.11	0.12	1.10	0.20	5.56	164	0.86	<.0001	0.71 1.49
Challenge Health Restrictions		83	<b>4.56</b>	1.42	0.16							
Challenge Lack of Restrictions	Severity of Emotional	83	<b>4.71</b>	1.32	0.15	-0.38	0.19	-2.04	164	0.32	0.0429	-0.75 -0.01
Challenge Health Restrictions	Suffering	83	<b>5.09</b>	1.07	0.12							
<b>Context B</b>												
OVER-estimate C19	Instrumental Harm	83	<b>4.85</b>	1.45	0.16	1.82	0.24	7.46	156	1.19	<.0001	1.34 2.31
UNDER-estimate C19	Acceptance	83	<b>3.03</b>	1.61	0.18							
OVER-estimate C19	Perceived Competence	83	<b>3.64</b>	1.54	0.17	0.74	0.24	3.08	156	0.49	0.0024	0.27 1.22
UNDER-estimate C19		83	<b>2.90</b>	1.48	0.17							
OVER-estimate C19	Perceived Severity	83	<b>7.19</b>	2.07	0.23	-0.20	0.36	-0.56	156	0.09	0.5780	-0.92 0.52
UNDER-estimate C19	of Error	83	<b>7.39</b>	2.48	0.28							
<b>Context C</b>												
Power Abuse for C19	Instrumental Harm	81	<b>4.08</b>	1.53	0.17	0.84	0.24	3.46	161	0.54	0.0006	0.36 1.32
Power Abuse for Road Safety	Acceptance	82	<b>3.24</b>	1.58	0.18							
Power Abuse for C19	Perceived Severity of	81	<b>6.44</b>	2.69	0.30	-0.66	0.40	-1.65	161	0.26	0.1010	-1.46 0.13
Power Abuse for Road Safety	Power Abuse	82	<b>7.11</b>	2.45	0.27							

Notes. For Context A and C, we reject the null if  $p < .01$ , and  $< .0083$  for Context B.

**Table 4**  
Mediating Effects of Moral Outrage (MO)

Indirect Effects	Estimates	Bias-corrected 95% CI (LL, UL)		Full Mediation
<b>Context A</b>				
Challenge Health Restrictions → MO → Shaming Acceptance	0.80	1.19	0.49	✓
Challenge Health Restrictions → MO → Perceived Tweet Civility	0.66	1.03	0.39	✓
<b>Context B</b>				
Under-estimate C19 → MO → Demotion	0.66	1.13	0.25	✓
Under-estimate C19 → MO → Pay Deduction	2.63	4.38	0.95	✓
<b>Context C</b>				
Power Abuse for Road Safety → MO → Demotion	0.34	0.68	0.05	
Power Abuse for Road Safety → MO → Pay Deduction	2.63	4.42	1.01	✓

concern over C19 and who more strongly identified as liberal were especially likely to moralize Control-C19 efforts and they were more likely to exhibit asymmetries in their tolerance for human costs.

Study 1's results, while converging, centered on participants' assessments of *incurred* human costs. In Study 2, we examined responses to merely *questioning* potential human costs.

#### 4.6. Study 2: New Zealand

We examined how individuals assess merely *questioning the human costs* from Control-C19 versus non-C19 efforts. If Control-C19 efforts have become elevated morally to the status of a sacred value, then questioning them – even through empirical research – should result in moral outrage, disapproval, and moral cleansing (i.e., reaffirmation of one's moral commitments; Tetlock et al., 2000). We conducted Study 2 in NZ which formally adopted the elimination approach. During the time of data collection (early to mid-October 2020), there were no documented cases of C19 community transmission and NZ was at the lowest alert level.

### 5. Methods

#### 5.1. Recruitment and participants

We used social media ad to recruit NZ residents 18 years old and above to participate in a study on NZ's response to Covid-19. For every response, we offered to donate \$1 on participants' behalf to a charity of

their choice or the current research project. Like in Study 1, we aimed to retain approximately 80 responses per condition. The final<sup>4</sup> sample size was 170; average age = 46.2, SD = 14.0; 72% women).

#### 5.2. Procedure

Participants were randomly assigned to evaluate one of two research proposals wherein researchers either hypothesized that human suffering resulting from elimination efforts outweighed those from abandoning elimination strategies, thereby questioning Control-C19, or vice versa (non-C19). Participants evaluated the proposal's quality, the societal value of the research, the researchers' prestige, along with other exploratory measures. Information contained in both proposals were presented in identical structure and were all based on established C19 findings reviewed in the introduction. The full description is available in the Appendix.

#### 5.3. Measures

Unless otherwise noted, all responses were on a scale from 1 (*strongly*

<sup>4</sup> We encountered challenges earlier in data collection. Although our results and conclusions remained largely unaffected, we report responses that are free of those challenges. Recruiting through social media meant that we could not control the sample size (see our pre-registration: <https://aspredicted.org/blind.php?x=hw2jr6>). Our anonymized data contains *all* responses. We made donations based on all complete responses.

**Table 5**  
Simple Effects of Conditions at Different Levels of Perceived C19 Health Threat.

Context	Perceived C19 Health Threat	Challenge Lack of Restrictions	Challenge Restrictions	b	SE(b)	t	p
A	Low	2.68	3.13	0.45	0.32	1.43	0.1549
	High	1.72	4.37	2.63	0.32	8.30	<.0001
	Perceived C19 Health Threat	Overestimate C19	Underestimate C19	b	SE(b)	t	p
B	Low	5.20	5.24	0.04	0.27	0.16	0.8742
	High	4.93	5.99	1.06	0.27	3.89	<.0001
	Perceived C19 Health Threat	Power Abuse for C19	Power Abuse for Road Safety	b	SE(b)	t	p
C	Low	4.34	4.42	0.08	0.36	0.21	0.8344
	High	4.04	5.21	1.17	0.36	3.29	0.0013

Notes. Values represent the estimated means of moral outrage. The *bs* coefficients represent the estimated simple slopes.

**Table 6**  
Moderating Effect of Political Ideology.

Context A and DVs	Ideology	Challenge Lack of Restrictions	Challenge Restrictions	b	SE(b)	t	p
Acceptance of Shaming*	Liberal	1.91	3.98	2.07	0.34	6.11	<.0001
	Conservative	2.67	2.98	0.31	0.34	0.91	0.3644
Perceived Tweet Civility*	Liberal	1.87	3.76	1.89	0.33	5.78	<.0001
	Conservative	2.84	2.88	0.03	0.33	0.10	0.9166
Context B and DVs	Ideology	Over-estimate C19	Under-estimate C19	b	SE(b)	t	p
Demotion Endorsement	Liberal	3.73	6.21	2.48	0.71	3.50	0.0006
	Conservative	4.18	4.79	0.61	0.71	0.87	0.3879
Pay Reduction	Liberal	10.38	16.98	6.58	2.15	3.06	0.0026
	Conservative	10.52	14.01	3.47	2.15	1.61	0.1089
Context C and DVs	Ideology	Power Abuse for C19	Power Abuse for Road Safety	b	SE(b)	t	p
Demotion Endorsement	Liberal	3.42	4.49	1.07	0.39	2.74	0.0069
	Conservative	2.99	3.64	0.65	0.39	1.64	0.1013
Pay Reduction*	Liberal	4.15	7.17	3.01	0.88	3.43	0.0008
	Conservative	2.54	2.92	0.37	0.88	0.42	0.6728

Note. Values represent the estimated means. Ideology labels are based on 1-item variable ‘conservatism’ (1 = very left-wing, 9 = very right-wing; liberal = -1 SD; conservative = +1 SD). Variables marked with (\*) indicate significant interaction effects.

disagree) to 7 (strongly agree).

5.3.1. Core Dependent Variables

**Perceived C19 Information Accuracy.** Participants noted the extent to which the information about C19 presented in the proposal was: -5 (completely inaccurate; wrong) to +5 (completely accurate; correct).

**Moral Outrage.** We asked participants to indicate the extent to which the research team’s questions/predictions elicited moral outrage. We used the same three items from Study 1 ( $\alpha = 0.84$ ).

**Research Team Prestige.** We asked participants to indicate the extent to which they agreed with the following prestige-oriented items (based on Cheng, Tracy, Foulsham, Kingstone, & Henrich, 2013): 1) I respect the research team, 2) This research team is competent, and 3) I value this team’s research effort. Cronbach’s  $\alpha = 0.89$ .

**Perceived Quality of the Research Proposal.** Participants evaluated the overall merit of the proposal using the following questions: “Based on what you know about research in general, indicate the extent to which you agree that this [proposal is:]” 1) easy to read, 2) clearly written, 3) free of grammar and spelling errors, 4) rigorous, 5) based on logical hypotheses, and 6) based on a thorough review of past research. Items 1 through 3 were averaged to form the *writing quality* indicator ( $\alpha = 0.73$ ) and items 4 through 6 were averaged to form the *methods quality* indicator ( $\alpha = 0.84$ ). The two indicators were positively correlated ( $r = 0.59, p < .0001$ ).

**Perceived Societal Value of the Research.** We asked participants to “Consider the implications that this research may have on New Zealand. Indicate the extent to which you believe that this study is:” 1) important

for NZ, 2) valuable for NZ, and 3) necessary for NZ. Cronbach’s  $\alpha = 0.97$ .

**Financial Support for the Research: Monetary Donation.** To explore<sup>5</sup> behavioral support for the research, we gave participants the option to allocate \$1 across two well-known NZ charities or the researchers’ account to continue studying questions related to C19. There was no deception; we made these donations.

**Research Team Integrity: Honoring Donations.** Participants evaluated the researchers’ integrity by indicating their agreement with the statement: “I trust that the researchers will honor their promise and make donations according to participants’ wishes”.

**Individual-level Covariates.** Upon completing the variables above, we asked a range of demographic and C19-related questions. We used the same covariates as in Study 1 (see Table A.2 Appendix). In addition, we assessed moral mandates at the end of the study.

**Moral Mandates.** We adapted Mullen and Skitka’s (2006) moral mandate measure to explore the extent to which C19 elimination in NZ was a central component of participants’ morality. Participants indicated their agreement with the following three items: 1) My attitude about elimination of C19 is closely related to my core moral values and convictions, 2) My attitude about elimination of C19 is closely related to how I see myself as a person, 3) I would really feel awful about myself if I did not defend my position on eliminating C19. Cronbach’s  $\alpha = 0.86$ .

<sup>5</sup> Donations variables were pre-registered as exploratory.

**Table 7**  
Descriptive Statistics and Summary Results for Dependent Variables.

DV	Elimination Condition	<i>N</i>	<i>M</i>	<i>SD</i>	<i>SE Mean</i>	<i>b</i>	<i>SE</i>	<i>t</i>	<i>df</i>	Cohen's <i>d</i>	<i>p</i>	95% CI (LL, UL)	
Perceived C19 Information Accuracy	Questioning	79	<b>-0.24</b>	3.33	0.38	-3.66	0.46	-8.00	159	1.26	<.0001	-4.56	2.75
	Continuing	82	<b>3.41</b>	2.40	0.27								
Moral Outrage	Questioning	87	<b>4.10</b>	1.70	0.18	1.65	0.25	6.56	170	1.00	<.0001	1.16	2.15
	Continuing	85	<b>2.45</b>	1.61	0.18								
Research Team Prestige	Questioning	88	<b>4.28</b>	1.31	0.14	-1.08	0.19	-5.63	171	0.86	<.0001	-1.46	-0.70
	Continuing	85	<b>5.36</b>	1.21	0.13								
Perceived Quality of the Research Proposal (Methods)	Questioning	85	<b>3.85</b>	1.26	0.14	-1.17	0.20	-5.98	167	0.92	<.0001	-1.56	-0.79
	Continuing	84	<b>5.02</b>	1.29	0.14								
Perceived Quality of the Research Proposal (Writing)	Questioning	86	<b>5.47</b>	0.89	0.10	-0.34	0.14	-2.37	169	0.36	.0189	-0.62	-0.06
	Continuing	85	<b>5.80</b>	0.97	0.11								
Perceived Societal Value of the Research	Questioning	87	<b>4.63</b>	1.83	0.20	-1.50	0.25	-6.06	168	0.93	<.0001	-1.99	-1.01
	Continuing	83	<b>6.13</b>	1.35	0.15								
Financial Support for the Research: Donation (\$)	Questioning	88	<b>0.22</b>	39.90	4.25	-13.87	6.39	-2.17	171	0.33	.0312	-26.47	-1.26
	Continuing	85	<b>0.36</b>	44.10	4.78								
Research Team Integrity	Questioning	87	<b>5.77</b>	1.16	0.12	-0.54	0.15	-3.52	170	0.54	.0006	-0.84	-0.24
	Continuing	85	<b>6.31</b>	0.80	0.09								

Notes. We again adjusted the critical  $\alpha$  to be  $0.05 / 8 = .0063$ . All results are significant based on this  $\alpha$  except for *writing* quality and financial support (concluded as ns).

## 6. Results

As with Study 1, perceived C19 health threat moderated the effect of condition on moral outrage ( $p < .0001$ ), such that the effect of condition was only significant among individuals high in perceived C19 health threat (+1SD),  $b = 3.18$ ,  $SE = 0.32$ ,  $p < .0001$  (vs. low perceived C19 health threat,  $p = .6750$ ). We observed the same interaction effects on all other DVs ( $ps$  in the range of  $<0.0001$  to  $0.0063$ ; yielding almost identical patterns, see SOM). One exception to this trend was *researcher integrity*, which was non-significant ( $p = .0571$ ). We also examined the same exploratory mediated moderation, which again revealed that the interaction effects on our key DVs indeed operated through moral outrage (for full results, see SOM), providing support for our moralization account. Finally, condition also interacted with political ideology (see Table 8).

### 6.1. Supplemental analysis 3: moral mandates

We observed rather strong and significant condition effects on moral mandates. When researchers *questioned* elimination, participants were *more likely to endorse elimination as a personal moral mandate* ( $N = 85$ ,  $M = 5.52$ ,  $SD = 1.34$ ), than when researchers questioned abandoning elimination ( $N = 88$ ,  $M = 4.87$ ,  $SD = 1.33$ ); Mean  $diff = 0.65$ ,  $t(171) = 3.19$ ,  $p = .0017$ , SE difference =  $0.20$ , 95% CI  $[0.25, 1.05]$ .

### 6.2. Study 2 discussion

Study 2 provided further support for our underlying premise that C19 health-minded approaches have been moralized, even to the point of a sacred value. Participants evaluated a research proposal empirically *questioning the elimination* strategy (i.e., the main strategy in NZ) as of lower value to society and of lower methodological quality compared to the proposal *questioning abandoning* the elimination strategy. Furthermore, participants also evaluated the research team as less competent, and were less likely to trust them in carrying out participants' donation wishes when they hypothesized greater harm resulting from continuing (vs. abandoning) an elimination strategy. Of note, C19 in NZ has been eliminated (Cousins, 2020). Last, participants donated less money to researchers proposing to test whether continuing

elimination produced greater harm than abandoning the strategy. However, with adjusted  $p$  from 0.05 to 0.001, we did not conclude statistical significance for financial support or perceived writing quality. As in Study 1, moral outrage mediated the relationship between condition and dependent variables, further supporting the moralization of the elimination strategy. When examining the moderating effect of C19 health concerns and political ideology, we observed identical patterns as in Study 1. Participants who reported greater concern over contracting C19 and who identified as liberal showed greater asymmetries in their evaluations.

Last, although unanticipated,<sup>6</sup> exposure to the elimination-challenging proposal caused participants to more strongly endorse elimination as their personal moral mandate. These effects are consistent with Tetlock et al.'s (2000) sacred value model, whereby merely questioning sacred values led to moral cleansing. Our findings suggest that empirically scrutinizing NZ's elimination strategy led NZ participants to reaffirm their commitment to elimination through heightened endorsement of moral mandates.

### 6.3. General discussion

We investigated whether the moralization of health-based C19 efforts (i.e., to reduce C19 deaths and illnesses, or eliminate the virus) would generate asymmetries in the evaluation of human costs. We hypothesized that because the health impacts of C19 remain an urgent, visible, and quantifiable threat, efforts to reduce that harm would become moralized as moral mandates (Rozin, 1999; Skitka & Houston, 2001). As such, the harmful by-products inherent in combating C19's health effects would be accepted as more tolerable than identical harm resulting from efforts unrelated to C19's health effects. Predictions were overwhelmingly supported. In Study 1 participants exhibited asymmetries in their tolerance for health, social, and human rights costs; identical costs (e.g., number of deaths, online harassment, or police abuse of power) arising from health-related C19 strategies were more readily accepted than those arising from either non-health-based strategies (e.

<sup>6</sup> We had included moral mandates as a potential and exploratory individual-level covariate.

**Table 8**  
Moderating Effect of Political Ideology.

DV	Ideology	Continuing Elimination Condition	Questioning Elimination Condition	<i>b</i>	<i>SE(b)</i>	<i>t</i>	<i>p</i>
Perceived Information Accuracy	Liberal	4.43	-2.05	-6.46	0.60	-10.84	<.0001
	Conservative	2.40	1.06	-1.34	0.60	-2.25	.0263
Moral Outrage	Liberal	1.73	5.09	3.35	0.33	10.16	<.0001
	Conservative	2.98	3.42	0.45	0.33	1.35	.1780
Research Team Prestige	Liberal	5.84	3.79	-2.04	0.27	-7.51	<.0001
	Conservative	4.91	4.62	-0.29	0.27	-1.06	.2906
Perceived Research Quality (Methods)	Liberal	5.39	3.38	-2.01	0.28	-7.17	<.0001
	Conservative	4.59	4.14	-0.45	0.28	-1.62	.1082
Perceived Research Quality (Writing)	Liberal	5.96	5.38	-0.58	0.22	-2.65	.0090
	Conservative	5.61	5.57	-0.04	0.22	-0.17	.8647

Notes. Values represent the estimated means. The *bs* coefficients represent the estimated simple slope. All interactions were significant (*ps* in the range of <.0001 to .0001), except for perceived research quality (writing).

g., economic), or from other unrelated efforts. Moreover, these effects were mediated by moral outrage, supporting that elimination efforts have become moralized.

Study 2 furnished additional evidence for the moralization of C19 health-targeted efforts. Indeed, participants in NZ evaluated a research proposal as less accurate, less methodologically sound, and less valuable to society when it posited the hypothesis that the suffering resulting from continuing an elimination approach in NZ outweighed that from abandoning the approach (compared to one forwarding the reverse hypothesis). Yet, both proposals contained the same amount of empirically validated information. Moreover, Study 2 participants evaluated the researchers as less competent and were less trustful they would honor participants' donation wishes when the researchers merely posited the empirical possibility the elimination approach led to increased suffering. These patterns are congruent with extant work on sacred values (Tetlock, 2003), whereby merely opening cherished beliefs up to scrutiny evokes moral outrage and motivates individuals to further demonstrate their moral commitments. In a similar vein, Study 2 participants who read the research proposal questioning the elimination strategy espoused heightened moral commitments to an elimination approach. Altogether, these patterns support that efforts to control or eliminate C19 have become moralized, leading individuals to overlook potential collateral costs from such efforts.

Our results also provide insight into the individual-level factors that may exacerbate the asymmetries we observed: 1) personal fear of contracting the virus, and 2) political ideology. Across our two studies, both those who more strongly feared contracting the virus and those who more strongly identified as liberal exhibited widened asymmetries, as well as greater moral outrage. Indeed, these greater asymmetries were mediated by heightened moral outrage. Of note, we observed these patterns in both the USA and NZ, suggesting they were not a relic of a particular political climate or a country that had yet to effectively contain the virus. Rather, these patterns may reflect deeper ideological differences, such as liberals' greater emphasis on avoiding harm (Graham, Haidt, & Nosek, 2009) or conservatives' greater valuation of personal liberties (Boaz, 1997). Irrespective of their origin, the divergent conceptualizations of morality observed here may undermine empathy for those proffering alternative responses to C19, thereby exacerbating political polarization in the US and beyond (Ditto & Koleva, 2011).

Although our findings lend support for the contention that elimination efforts have become moralized and that perceived threat contributes to this moralization, many other factors undoubtedly contribute to the asymmetries observed here. For example, it is possible that the salience of C19 drives moralization more strongly than perceptions of its harm (see Philipp-Muller, Wallace, & Wegener, 2020; Skitka, Wisneski, & Brandt, 2018). Alternatively, the moral language and media depictions surrounding C19 may amplify moralization, such as by

activating disgust. We leave these intriguing possibilities as open questions for future research. Our investigation was also limited by its examination of only a few types of human costs. However, there are numerous tragic costs that can result from both aiming to reduce the spread of C19 and failing to do so. Future studies might assess how individuals weigh these additional costs (Alwan et al., 2020; Glover et al., 2020).

When, for example, an effective vaccine becomes widely available, that our investigation cannot speak to the moral standing of C19-efforts, nor does it aim to. Behaviors, including C19-directed strategies, are often moralized out of necessity (Rozin et al., 1997; Rozin & Singh, 1999). Indeed, C19 continues to spread rapidly in many places around the world, with devastating consequences. It is perhaps unsurprising then that efforts to combat the pandemic have been moralized and elevated to the status of a sacred value. Nonetheless, C19 is an evolving threat. When, for example, an effective vaccine becomes widely available, the human costs resulting from C19 elimination strategies, such as 'deaths of despair', may exceed C19's direct health effects, and consequently, the trends observed here might reverse entirely. However, our findings among New Zealanders suggest the reluctance to consider the instrumental harm of C19 health-based efforts may persist after C19 elimination.

Indeed, our findings suggest potential human costs beyond C19's direct health effects may be relatively under-acknowledged, deprioritized, or granted less moral weight. Within our studies, we held suffering constant, revealing that even the loss of human lives is differentially weighted, depending on the cause. Our findings also reveal that empirical endeavors that might allow scientists to better understand costs resulting from C19 restrictions may be discouraged, unfunded, or dismissed. There are significant disagreements between the world's leading scientists on how C19 should be handled, given its severity and costs (see Alwan, 2020; Horton, 2020). Yet, the current findings identify and underscore a prominent obstacle in evaluating those costs dispassionately or through empirical scrutiny: moral outrage.

Without tempered discussions or comprehensive data, assessing the true calculus of human suffering will pose challenges for scientists, policy makers, and the general public alike. The current trade-offs facing decision-makers and individual citizens are difficult, unprecedented, and costly. Providing a nuanced understanding of how individuals evaluate these human costs can help guide an informed pathway towards weathering these ongoing difficulties and ultimately, minimizing human suffering.

#### Acknowledgements

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Appendix

Context A

Condition: *Dr. Bloom Challenges Lack of Restrictions.*

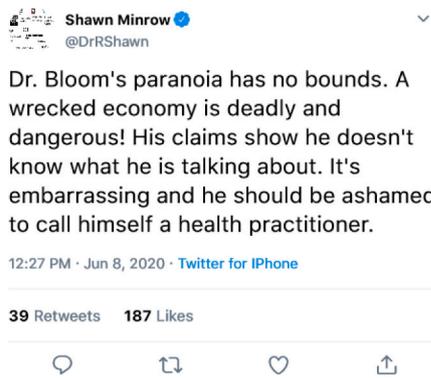
In response to Covid-19, the city of Ashland prioritized the economy and ensuring that life for most people is as normal as possible. Their case fatality rate from Covid-19 has been around 1%.

Dr. Bloom, Ashland's new public health expert, recently challenged the Council's 'business-as-usual' approach, and insisted that Ashland needs to do far more to protect its citizens against the devastating health effects of Covid-19.

Dr. Bloom concluded that Covid-19 may have far more serious health consequences than originally thought (i.e., illnesses and deaths that frequently result from Covid-19 complications).

Because of these risks, Dr. Bloom advocates for the city's continuing vigilance and stricter responses to Covid-19, such as strict physical distancing and wide-spread closures of public areas (including schools and businesses).

**CONSEQUENCES:** In response to his statement that the city needs to institute stricter Covid-19 controls, Dr. Bloom faced online shaming, ridicule, harassment, and calls for him to step down from his new post. A particularly vocal critic was another health expert:



Condition: *Dr. Bloom Challenges Health Restrictions.*

In response to Covid-19, the city of Ashland has implemented strict stay-at-home orders for some time. Their case fatality rate from Covid-19 has been around 1%.

Dr. Bloom, Ashland's new public health expert, recently challenged the Council's orders, and insisted that Ashland needs to do far more to protect its citizens against the economic devastation of Covid-19 mandates.

Dr. Bloom concluded that consequences of closing down the city for any longer may be far worse than originally thought and that economic downturn can lead to 'deaths or illnesses of despair' (i.e., illnesses and deaths that result when people cannot support themselves anymore).

Because of these risks, Dr. Bloom advocates for the city's reduced vigilance and loosened responses to Covid-19, such as by maintaining physical distancing and masking, but opening of some businesses and schools.

**CONSEQUENCES:** In response to his statement that the city needs to open up and prevent 'deaths or illnesses of despair', Dr. Bloom faced online shaming, ridicule, harassment, and calls to step down from his new post. A particularly vocal critic was another health expert:



Context B

Condition: UNDER-estimation.

J Wiles is statistician leading a modeling team tasked with making Covid-19 projections. Their task is to monitor Covid cases in the area, assess the capacity of the healthcare system, and estimate Covid growth. The objective of the team is to help the local city government decide how to handle Covid-19.

The modeling team's results suggested that the Covid-19 cases are largely contained (i.e., not growing) and that there is no need for strict stay-at-home orders. The local city government listened and did not lock-down.

However, another research team from a large university uncovered a major flaw in J Wiles' model. The university experts said that Wiles' projection didn't even try to model the transmission of disease, or the incubation period, or other features of Covid-19, as other so-called 'agent-based models' do.

They showed how Wiles' team UNDER-ESTIMATED the number of Covid-19 cases in the area and that the strict stay-at-home orders were actually necessary (i.e., the city would have NOT been able to handle Covid without such orders).

The local city government later adjusted their policy in accordance with the new information and they instituted stay-at-home orders. As a result, Covid-19 growth has been contained for the past 8 weeks.

CONSEQUENCES OF THE C19 MODELLING ERROR:

**UNDER-estimation.** Before the city adjusted its policy, the negative consequences of the modeling error that under-estimated Covid cases were the following:

1. The county did not lock down, when it should have.
2. Hospitals were not prepared to deal with a surge in Covid-19 patients.
3. 34 people ended up in the Intensive Care Unit (ICU) because they contracted Covid-19 and they were unable to receive prompt treatment.
4. 1 person died because she was unable to receive care on time.

Condition: OVER-estimation.

J Wiles is statistician leading a modeling team tasked with making Covid-19 projections. Their task is to monitor Covid cases in the area, assess the capacity of the healthcare system, and estimate Covid growth. The objective of the team is to help the local government decide how to handle Covid-19.

The modeling team's results suggested that the Covid-19 cases cannot be contained (i.e., prevent them from growing) and that the city must implement strict stay-at-home orders. The local government listened and locked-down.

However, another research team from a large university uncovered a major flaw in J Wiles' model. The university experts said that Wiles' projection didn't even try to model the transmission of disease, or the incubation period, or other features of Covid-19, as other so-called 'agent-based models' do.

They showed how Wiles' team OVER-ESTIMATED the number of Covid-19 cases in the area and that the strict stay-at-home orders were actually not necessary (i.e., the city would have been able to handle Covid with less strict rules).

The local city government later adjusted their policy in accordance with the new information and they relaxed stay-at-home orders. Covid-19 growth has been contained for the past 8 weeks.

CONSEQUENCES OF THE C19 MODELLING ERROR:

**OVER-estimation.** Before the city adjusted its policy, the negative consequences of the modeling error that over-estimated Covid cases were the following:

1. The county locked down, when it shouldn't have.
2. Hospitals rejected non-essential patients, in preparation for Covid-19 surge that never happened.
3. 34 people ended up in the Intensive Care Unit (ICU) because their conditions escalated and they were unable to receive prompt treatment.
4. 1 person died because she was unable to receive care on time.

Context C

Condition: Power Abuse to Reduce Road Deaths.	Condition: Power Abuse to Reduce Covid-19 Deaths.
<p>A police officer recently came under investigation for abusing his power, and for inappropriately citing and fining at least 15 cases for road traffic violations. Examples of violations are texting while driving and talking on a cell phone, speeding, etc. He even detained one person who argued with him. In retrospect, the body and car camera footage showed that in all 15 cases examined, it was not clear that the drivers broke the laws (i.e., the officer's actions were unauthorized).</p> <p>The police officer tried to defend himself. He said that he sees far too many people who are breaking the law, which can cause serious car crashes. He said that his department hasn't done much to enforce the rules.</p> <p>In the last three months, 10 people died on the roads and 20 ended up in intensive care, which is about average for a community of that size.</p> <p>He noted that he decided to be strict with these penalties in the interest of public safety and to deter people from endangering others' lives. Road deaths are a major problem in their city and harsher measures are necessary to save lives.</p>	<p>A police officer recently came under investigation for abusing his power, and for inappropriately citing and fining at least 15 cases for violation of stay-at-home and Covid-19 health orders. Examples of violations are not wearing masks, failing to socially distance, etc. He even detained one person who argued with him. In retrospect, the body and car camera footage showed that in all 15 cases examined, it was not clear that the citizens broke the laws (i.e., the officer's actions were unauthorized).</p> <p>The police officer tried to defend himself. He said that he sees far too many people who are breaking the social distancing and masking orders, which can cause spikes in Covid-19 cases. He said that his department hasn't done much to enforce the rules.</p> <p>In the last three months, 10 people died due to Covid-19 and 20 ended up in intensive care, which is about average for a community of that size.</p> <p>He noted that he decided to be strict with these penalties in the interest of public safety and to deter people from endangering others' lives. Covid-19 spread is a major problem in their city and harsher measures are necessary to save lives.</p>

Study 2

Simplified title: CONTINUING ELIMINATION.	Simplified title: QUESTIONING ELIMINATION.
<p>We are interested in understanding human suffering that can result from ABANDONING the ELIMINATION strategy for COVID-19 (C19) in New Zealand.</p> <p>We hypothesize that abandoning the elimination strategy may increase human suffering. Several recent findings have continued to show that the suffering that directly results from C19 (e.g., rates/speed of contagion, long-term health complications, deaths) may outweigh the suffering caused by continuing restrictions (e.g., severe financial distress, untreated medical conditions, rising inequalities, and even so-called 'deaths of despair').</p>	<p>We are interested in understanding human suffering that results from CONTINUING TO PURSUE the elimination strategy for COVID-19 (C19) in New Zealand.</p> <p>We hypothesize that continuing the elimination strategy may increase human suffering. Several recent findings have discovered that the suffering caused by prolonging restrictions (e.g., severe financial distress, untreated medical conditions, rising inequalities, and even so-called 'deaths of despair') may outweigh the suffering that directly results from C19 (e.g., long-term health complications, deaths).</p>
WHAT DO WE EXPECT TO FIND?	WHAT DO WE EXPECT TO FIND?
<p>Based on these findings, we anticipate that once everything is accounted for, the suffering from abandoning the elimination strategy is significantly more severe than suffering from continuing the elimination strategy. Our study seeks to test these predictions.</p>	<p>Based on these findings, we anticipate that once everything is accounted for, the suffering from continuing the elimination strategy is significantly more severe than suffering from abandoning the elimination strategy. Our study seeks to test these predictions.</p>
WHAT C19 INFORMATION MOTIVATES OUR RESEARCH?	WHAT C19 INFORMATION MOTIVATES OUR RESEARCH?
<p>Recent findings show that deaths by C19 are quite common among people over 65 years and those with predisposing conditions (e.g., cancer or serious heart disease). Depending on the country, a third or more of all C19 deaths are traced to long-term rest homes. Although the long-term effects of C19 are poorly understood, many non-vulnerable people (including children) continue to suffer.</p> <p>As a result, some scientists call for continuing the elimination strategy, which can protect everyone. Those strategies may require future lock-downs in case of community transmission. NZ borders would stay closed.</p> <p>If our predictions are supported, this would suggest that continuing the elimination strategy may help to reduce human suffering. Policy-makers may be able to use these findings to guide future decisions on how to proceed.</p> <p>* Statements pertaining to C19 are based on research reported in Lancet and NCBI. References are provided at the end of this study.</p>	<p>Recent findings show that deaths by C19 are remarkably uncommon among people under 65 years and those without predisposing conditions (e.g., cancer or serious heart disease). Depending on the country, a third or more of all C19 deaths are traced to long-term rest homes. Although the long-term effects of C19 are poorly understood, many non-vulnerable people (including children) recover.</p> <p>As a result, some scientists call for protecting the vulnerable people, but easing the restrictions to non-vulnerable populations. Those strategies would allow businesses to function normally, even if there is community transmission of C19. NZ borders would start to re-open.</p> <p>If our predictions are supported, this would suggest that discontinuing the elimination strategy may help to reduce human suffering. Policy-makers may be able to use these findings to guide future decisions on how to proceed.</p> <p>* Statements pertaining to C19 are based on research reported in Lancet and NCBI. References are provided at the end of this study.</p>

**Table 1A**  
Correlations and Descriptive Statistics for Demographic Variables in Study 1 (USA).

Variables	Mean	SD	N	2	3	4
1 Gender (1 = male)	0.56	0.50	492	-0.13	**	-0.05
2 Age	38.88	13.24	496		0.14	**
3 Ideology (Conservatism)	4.26	2.10	494			0.06
4 C19 Health Concern	57.55	30.52	493			-0.23

**Table 2A**  
Correlations and Descriptive Statistics for Demographic Variables in Study 2 (NZ).

Variables	Mean	SD	N	2	3	4
1 Gender (1 = male)	0.26	0.44	170	-0.02	0.21	*
2 Age	46.24	13.98	168		0.14	0.08
3 Ideology (Conservatism)	3.45	1.74	150			-0.41
4 C19 Health Concern	71.71	25.88	170			**

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