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Threat of COVID-19 pandemic, conditional cooperation and health-protective behaviour: Evidence from a global survey

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Abstract

Why do some people 'cooperate' by adhering to anti-pandemic government guidelines and mandates, while others opt to behave in more selfish ways? This study addresses this question by focusing on the concept of 'conditional cooperation'. Data were drawn from the Global Behaviors and Perceptions in the COVID-19 Pandemic, a large online survey ($N = 98{,}310$) consisting of respondents from 63 countries fielded during the weeks of March and April of 2020. Two-level mixed effects models were fitted. Adjusting for controls, people's compliance behaviours were significantly related to the mechanism of conditional cooperation. More specifically, those who perceived others to be more cooperative were more likely to engage in social distancing behaviour during the COVID-19 pandemic. In contrast, subjective assessment of the infection rate was negatively associated with it. In addition, at the macro (country) level, physical mobility index negatively predicted health-protective or disease-avoidant behaviour, a relationship that fluctuated partly as a function of the level of perceived infection. A major implication of this study is that cross-nationally individual decisions to contribute to the provision of public good during a global public health crisis

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hinge critically on both subjective and objective measures of others' willingness to cooperate.

KEYWORDS
conditional cooperation, COVID-19, preventive behaviour, public health, social dilemma

1 | INTRODUCTION

The outbreak of a novel Coronavirus (COVID-19) has called for, among others, social distancing as an effective means of preventing the viral transmission. At the behest of international health organizations, domestic government bodies, and national political leaders, social distancing mandates have been almost universally endorsed and imposed—however, often at the cost of infringing on individual rights and freedom (Anderson et al., 2020). As a result, conflicts between state authorities and citizens regarding COVID-19-related mandates have flared up across countries (Howard, 2022). For the sake of public safety and well-being, adhering to official protocols on minimizing human contact is both urgent and unavoidable. Yet, 'rational egoists' (Ostrom, 2000) or narrowly self-interested individuals prefer to not abide by such guidelines but exercise their freedom via physical mobility. And therein lies the inherent contradiction: short-term individual interests run counter to long-term collective ones. As such, the current pandemic presents a quintessential case of *social* (public goods) *dilemma* (Harring et al., 2021; Johnson et al., 2020).

What are the conditions under which people contribute to, rather than defect from, the provision of public goods such as contagion prevention? Cooperation is unlikely to the extent that a significant number of people shirk their responsibility, thereby encouraging others to opt for free riding (Dawes & Messick, 2000; Simpson & Willer, 2015; Van Lange et al., 2013). When do individuals cooperate despite incentives to defect? That is, why do some choose to comply with social distancing and other health-protective measures by forgoing the benefits of non-compliance? This study's main objective is to explore these questions by focusing on the concept of 'conditional cooperation' (Fischbacher et al., 2001). By applying this idea to the current pandemic context, the present research empirically tests whether people are more likely to cooperate—that is, engage in prosocial COVID-19 responses such as social distancing—to the extent that they believe a critical proportion of others (compatriots) are similarly engaged. This idea complements previous research on the psychological predictors of health behaviour focusing on social norms and perceived threat (Champion & Skinner, 2008; Trifiletti et al., 2022). Using a large-scale, global survey conducted in the spring of 2020, this paper cross-nationally demonstrates conditional cooperation to be a central mechanism underlying when and why some citizens commit themselves to prosocial compliance behaviour (staying home, avoiding social gatherings, etc.).

Findings presented below contribute to the extant scholarship in several ways. First, evidence on cooperation and social dilemma typically comes from experimental (lab-based) study designs consisting of relatively small, often non-representative, samples (Simpson & Willer, 2015). As a result, external validity remains in question. In contrast, the present study uses weighted data on more than 98,000 respondents in dozens of nations across Africa, Asia, Europe, Middle East the Americas to provide a broader generalization of the determinants of COVID-19-induced cooperative, or disease-avoidant, behaviour. Second, the literature largely consists of macrolevel findings from which microlevel interpretations are drawn (e.g., Barrios et al., 2021; Dincer & Gillanders, 2021; Kavanagh et al., 2021; Maloney & Taskin, 2020). That is, individual-level social distancing behaviours are often inferred from aggregate data showing regional variations in the post-pandemic physical mobility. By using micro-survey data, the current work avoids the potential pitfalls associated with such cross-level inferences, that is, ecological fallacy (Saunders et al., 2016).

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Third, prior research using microlevel surveys, while informative, is limited in two important ways. Although the novel Coronavirus has ushered in a pandemic, that is, a *global* healthcare crisis, most findings come from single-country studies (e.g., Hills & Eraso, 2021; Liu & Mattke, 2020; Oosterhoff & Palmer, 2020; Shook et al., 2020; for an exception, see van Bavel et al., 2020). As a result, we lack comprehensive knowledge on the common, or generalizable, predictors of social distancing and related health-protective behaviour transcending national borders. This study serves to bridge that gap. Relatedly, the existing case studies do not conceptualize the outcome (behavioural compliance to curb the COVID-19 spread) as a *multilevel* phenomenon. Willingness or failure to contribute to public good during the Coronavirus crisis, however, is a product of both individual and contextual processes (Coroiu et al., 2020). More specifically, decisions to avoid large gatherings, wear a mask, adhere to shelter-in-place orders, and so on are shaped by personal factors as well as environmental ones. Based on hierarchically nested data, this article offers a nuanced investigation of how individual-level *and* country-level measures independently as well as interactively explain why some choose to abide by government guidelines/mandates to prevent the spread of COVID-19. In doing so, it underscores the theoretical import of *conditional cooperation* (for review, see Thöni & Volk, 2018) operationalized across multilevel units of analysis.

1.1 | Individual level hypotheses

According to a seminal study (Fischbacher et al., 2001:397), conditional cooperators are characterized as those 'who are willing to contribute more to a public good the more others contribute'. In a series of economic games, the authors show how a player's contribution hinges powerfully on what other players do or are willing to do (Andreozzi et al., 2020; Balliet & Van Lange, 2013), a finding that has been replicated and confirmed by subsequent research primarily within the laboratory setting (Thöni & Volk, 2018). In fact, social actors can be broadly grouped into 'fair-minded conditional cooperators' or selfish non-cooperators (Burton-Chellew et al., 2016). Conditional cooperation can be theorized in connection with the concept of social norms, that is, the informal 'rules we live by' that can powerfully shape human behaviour and decision-making (Bicchieri et al., 2023). When choosing a particular course of action, people often base their decision on what others do (i.e., descriptive norms) or what others approve of (i.e., social norms). As such, the notion of conditional cooperation is related to the Theory of Planned Behaviour (TPB) (Ajzen, 1991), according to which social norms, along with intention and attitude, play a critical role in shaping people's willingness to engage in, among others, health-protective behaviour. A related study shows that intentions to adopt health-protective behaviours are significantly shaped by 'perceived behavioural control' (PBC), the degree to which individuals perceive the targeted behaviour to be easy or difficult to perform (Trifiletti et al., 2022). Importantly, the same study also finds that risk perception is intricately connected with the likelihood of engaging in protective behaviour during the COVID-19 pandemic (for meta-analysis, see Bish & Michie, 2010; Brewer et al., 2007).

For the main purpose of this study, previous discussion implies that, first, social distancing behaviour would be influenced by the perception of what others do and approve of (i.e., norms). Second, risk perception would motivate people to comply with its guidelines. To the extent that the majority of others are believed to engage in a certain action and/or approve of it, a person is thus more likely to follow suit (Bicchieri et al., 2023). Based on this reasoning, it is hypothesized that *a person who believes that others are more cooperative, that is, willing to contribute to public health safety, would be more engaged in disease-avoidant behaviour* (Hypothesis 1). Aside from normative intentions, perceived risk of or susceptibility to Coronavirus infection would matter greatly (Trifiletti et al., 2022). That is, the higher the subjective vulnerability, the greater the willingness to practice health-protective behaviour. In contrast, according to the logic of conditional cooperation, an individual who assesses the total number of COVID-19 infections in the country to be higher may be less willing to do so since the number of infections can be a proxy for others' unwillingness to cooperate. These two opposing views, then, lead to the following alternative hypotheses: a person who subjectively estimates the national level of infection to be higher would be *more* engaged in disease-avoidant behaviour (Hypothesis 2a). Conversely, such an individual would be *less* likely to engage in disease-avoidant behaviour (Hypothesis 2b).

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1.2 | Contextual level hypotheses

The previous two hypotheses are formulated at the individual unit of analysis, that is, based on respondents' own perception and understanding, valid or not. That is, they are rooted in the perception of generalized, that is, second order, beliefs (Fetzer et al., 2020; Gozgor, 2021) along with the subjective estimate of the Coronavirus infection rate. But also relevant in this context is the *objective* gauge of physical mobility at the aggregate level. Net of personal understanding of others' intention to cooperate (willingness to exercise disease-avoidant behaviour), does living in a country with a higher degree of or greater relative mobility—that is, where citizens are objectively less cooperative and thus physically more mobile—discourage individuals from participating in contagion prevention? Conditional cooperators, as previously defined, are (less) more likely to contribute to collective well-being insofar as they believe others are similarly (un)committed. If so, all else equal, we can anticipate that in a country with a higher mobility rate, individual adherence to disease-avoidant behaviour would be lower (Hypothesis 3), since physical movements could serve as an objective indicator of others' unwillingness or refusal to cooperate (i.e., comply with stay-at-home orders).

Finally, potential interaction effects can be expected between the objective physical mobility measure (a country-level proxy for conditional cooperation), as expressed in Hypothesis 3, and the two individual-level predictors mentioned in Hypotheses 1 and 2, that is, the second-order normative beliefs and subjective infection estimate, respectively. More specifically, we can conceptualize the individual-level predictors as potential moderators. On the one hand, it is anticipated that the negative relationship between the objective country-level physical mobility and individual compliance with health-protective behaviour would be weaker among those who perceive others to be more cooperative (Hypothesis 4). To unpack the argument, all things equal, an individual who lives in a country where others are physically more mobile would be more likely to consider (correctly or not) them to be more selfish and, consequently, less willing to personally engage in social distancing. But this association may not be homogeneous but heterogeneous depending on one's *subjective* understanding of others' intentions, that is, normative beliefs, independent of the *objective* index of physical mobility. That is, to the extent that one (correctly or not) believes others to be generally cooperative, then the negative effect of the mobility scale on individual prosocial behaviour could potentially diminish in magnitude. In this way, the perception of others' normative beliefs may play a 'buffering' role.

On the other hand, the focal relationship can be expected to be stronger (weaker) among those who estimate the total number of viral infections to be higher (lower) in their country (Hypothesis 5). The reasoning here is the mirror image of the one previously stated. Again, holding other factors constant, in a 'more physically mobile' country one may be more prone to view others as unwilling to comply with social distancing guidelines. Moreover, a relatively higher assessment of the overall infection rate would signal greater personal vulnerability to the novel Coronavirus. Hence, the magnitude of the negative association between relative mobility at the country level and social distancing at the individual level ought to become amplified (not diminished) in the context of greater risk perception (Trifiletti et al., 2022), that is, subjective understanding of the national-level viral infection. Hence, whereas Hypothesis 4 tests the buffering role of normative beliefs, Hypothesis 5 investigates the possible 'exacerbating' effect of existential threat proxied by the proportion of COVID-19 cases.

2 | DATA AND METHODS

2.1 | Participants and procedures

To test above hypotheses centered on the idea of conditional cooperation, data were drawn from Global Behaviours and Perceptions in the COVID-19 Pandemic ('GB&P COVID-19'), a cross-national online survey originally comprising information on almost 110,000 respondents from over 170 countries. This global project was designed and

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conducted by an international group of researchers primarily located in the United States and the United Kingdom. GB&P COVID-19 was launched on March 20th, when there were some 240,000 confirmed cases in the world with about 9,900 related deaths. The online survey continued for 2 weeks until April 7th, when those numbers increased four- and five-fold, respectively. Data analysed for the present study capture global public attitudes in the initial and accelerating phases of the COVID-19 pandemic, during which political leaders everywhere sought to effectively implement anti-Coronavirus policies. Methodological details of GB&P COVID-19 are discussed in a National Bureau of Economic Research (NBER) Working Paper (Fetzer et al., 2020).

Raw data files and related documentations are publicly available at an open-source repository (https://osf.io/3sn2k/). A detailed discussion of the complete survey instrument can be found at https://osf.io/zgfjc. The Principal Investigators obtained exempt IRB review E-2065 from the Massachusetts Institute of Technology (MIT). Case weights provided in the dataset were used to convert the data to be representative of age, gender, education and income between survey respondents and the general population in each country, based on information from the United Nations statistical agency and the Gallup World Poll. However, the probability of selection could not be accounted for. As a result, data are not nationally representative as those more concerned with the COVID-19 pandemic may have been more likely to participate in the survey (see Fetzer et al., 2020 for more detail). At the national level, the sample size varies from as few as 82 (Luxembourg) to 11,608 (Brazil). Excluding countries with the size of less than 100, as recommended (Fetzer et al., 2020), and with the listwise deletion of cases with missing values, the analytic sample consists of 98,310 individuals from 63 low- and high-income countries across almost every continent of the globe.

2.2 | Measures

2.2.1 | Protective behaviour

The outcome variable, *Protective behaviour*, is constructed using the following three-item survey question: 'To what extent do the following statements describe your behaviour for the past week? (1) I stayed home; (2) I did not attend social gatherings; (3) I kept a distance of at least two meters to other people. Numerical values for each of the items, ranging from 100 ('Applies very much') to 0 ('Does not apply at all'), were averaged and then standardized as *z*-scores with the mean of 0 and the standard deviation of 1 into a composite index (Cronbach's $\alpha = 0.69$). Given this operationalization, the estimated coefficient refers to the corresponding change in the outcome measured in terms of standard deviation for each unit increase in the covariate.

2.2.2 | Main predictors: Normative beliefs and perceived infection

There are two proxies to gauge conditional cooperation: *Normative beliefs* and *Perceived infection*. The former is operationalized using these four questions: (1) 'How many of 100 people in your country do you think believe that (1) participation at social gatherings should be cancelled because of the Coronavirus right now; (2) one should not shake other people's hands because of the Coronavirus right now (3) all shops in your country other than particularly important ones, such as supermarkets, pharmacies, post offices, and gas stations, should be closed because of the Coronavirus right now; and (4) there should be a general curfew in your country (with the exception of grocery shopping, necessary family trips, and the commute to work) because of the Coronavirus right now?' Original answers to these four items were first averaged, with relatively high internal consistency (Cronbach's $\alpha = 0.85$), and then transformed into z-scores to create an index. The latter variable, *Perceived infection*, is measured according to respondents' answers to the following question: 'Without looking it up, what is your estimate of the number of people in your country who are currently infected?' Given the skewed distribution, original values were transformed using the natural log.

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2.2.3 | Individual and contextual (country-level) confounders

To minimize the likelihood of spurious relationships between individual-level measures of conditional cooperation (*Normative beliefs* and *Perceived infection*) and the outcome (*Protective behaviour*), a set of individual-level and country-level confounders is adjusted for in the models. They include, at the individual level, the survey respondent's *Age* (in years), gender (*Male* = 1), living arrangement (*Married* = 1), *Education* (in years), *Household income* (logged), and *Self-rated health* ('How would you describe your health these days?' e.g., 1 = 'Poor' 4 = 'Very healthy'). Also included are daily fixed effects to control for time-varying sources of unobserved heterogeneity, as the survey had been conducted during a two-week period. In addition, for more conservative estimation, the following variables are added: *Political trust*, *Pandemic anxiety* and *Personal beliefs*.

Confidence in the government has been shown to directly impact people's willingness to engage in prosocial Covid-19 responses (Woelfert & Kunst, 2020). Hence, the analysis adjusts for *Political trust* ('How much do you trust your country's government to take care of its citizens?' e.g., 1 = strongly distrust, 3 = neither trust nor distrust, 5 = strongly trust). The extent of worries and concerns caused by the pandemic would be another critical factor. *Pandemic anxiety* is thus included to control for this, an index consisting of several items: '*I am nervous when I think about current circumstances*,' '*I am calm and relaxed*' (reverse-coded), '*I am worried about my health*,' '*I am worried about the health of my family members*,' and '*I feel stressed about leaving my house*'. Original answers (e.g., 5 = 'Strongly applies,' 1 = 'Does not apply at all') were converted to factor scores using the principal component analysis (all items load onto a single latent factor; Bartlett's test of sphericity $p < 0.001$ and KMO test = 0.71). Finally, as another critical confounder, *Personal beliefs* is measured based on the same four questions used for *Normative beliefs* but with binary coding (Yes = 1; 0 otherwise). Including both measures simultaneously does not pose a multi-collinearity problem ($r = 0.197$, $p < 0.01$). Adjusting for this confounder offers a more conservative test of the hypotheses since personal beliefs about social distancing and related government policies would significantly shape what one believes about others with respect to the same issues.

At the contextual level, to assess the overall level of physical movement, *Mobility index* is calculated using cross-national data provided by the Google Community Mobility Reports (available at https://www.google.com/covid19/mobility/). They contain information on how visitors to (or time spent in) categorized places change compared to the baseline days, which are represented by a series of 'normal' values for that day of the week prior to the Coronavirus outbreak (i.e., median value from the 5-week period between January third and February sixth, 2020). For each country, the scores for five categories (retail, grocery, parks, transit, work) are averaged for the period during which the online survey was conducted. The following aggregate variables are included for a stringent test of the relationship between country-level mobility and cooperative or health-protective behaviour among citizens: *Social capital*, *Govt. stringency*, *Globalization*, *HDI* and *Covid mortality*. As controls, they serve to eliminate alternative interpretations for the parameter estimate for *Mobility index*, including, for example, that the decision to comply with restrictive measures is driven by the strictness of government policy (*Govt. stringency*) or the degree of border openness (*Globalization*).

Social capital consists of three macro indicators: generosity among population (based on Charities Aid Foundation 2015), trust among population (based on World Values Survey 2013), and E-participation Index (based on United Nations, Department of Economic and Social Affairs 2016). It is part of the Global Competitiveness Index created by the World Economic Forum (https://www.weforum.org/reports/the-global-competitiveness-report-2020). Data on *Govt. stringency* come from the Oxford COVID-19 Government Response Tracker (OxCGRT) maintained by researchers at the University of Oxford (https://covidtracker.bsg.ox.ac.uk/), which records the strictness of government policies restricting people's behaviours or physical mobility during the COVID-19 pandemic. Finally, *Globalization* is based on the multidimensional globalization index provided by the KOF Swiss Economic Institute (https://kof.ethz.ch/en/), combining a list of indicators of cross-border interconnectedness (e.g., volumes of trade, foreign direct investments, number of embassies, and proportion of immigrants).

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TABLE 1 Descriptive statistics.

	Mean/proportion	SD	Min	Max
Outcome measure				
Protective behaviour	0	1	−4.13	0.88
Individual-level covariates ($N = 98{,}310$)				
Normative beliefs	0	1	−3.38	1.95
Perceived infection	8.66	2.17	0	17.15
Male	44%		0	1
Age	39.36	13.07	18	110
Married	57%		0	1
Education	16.44	4.81	0	25
Household income (ln)	9.38	2.98	0	20.03
Self-rated health	3.11	0.72	1	4
Political trust	2.98	1.5	1	5
Personal beliefs	3.52	.76	1	4
Pandemic anxiety	0	1	−3.35	2.19
State-level covariates ($N = 63$)				
Govt. stringency	0	1	−3.02	1.51
Mobility index	0	1	−1.71	2.13
Globalization	0	1	−2.12	1.46
COVID mortality	6.8	1.68	2.82	10.95
HDI	0	1	−2.54	1.24
Social capital	0	1	−1.94	2.33

Note: Except for *COVID mortality*, which has been log-transformed due to skewed data distribution, values for the other country covariates have been standardized (as *z*-scores).
Source: Global Behaviors and Perceptions in the COVID-19 Pandemic (https://osf.io/3sn2k/).

Human Development Index (*HDI*) combines national data on health, education and material security. It is the geometric mean of three normalized indices based on life expectancy, years of completed schooling, and standard of living (GNI per capita). Data are provided in the Human Development Reports 2020 by the United Nations Development Programme. Finally, *Covid mortality* consists of the natural log-transformed numbers of Coronavirus infection for each country averaged across the duration of the survey (retrieved from COVID-19 Data Repository maintained by the Center for Systems Science and Engineering at Johns Hopkins University). Descriptive statistics for all the variables are summarized in Table 1. Key individual-level covariates at the country level, along with sample size, are summarized in Table 2. Table 3 provides country-by-country distribution of the six contextual variables (*Mobility index*, *Social capital*, *Govt. stringency*, *Globalization*, *HDI* and *Covid mortality*).

2.3 | Modelling strategy

Using the latest version of HLM 8 (Raudenbush et al., 2019), two-level random intercept and coefficient models were estimated, given the hierarchically nested structure of the GB&P COVID-19 data (with 97,653 individuals clustered across 61 countries). Estimating multilevel models is necessary to address the problem of data dependence and, more importantly, to partition the variance in the outcome measure (*Protective behaviour*) into individual-level

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TABLE 2 Description of key individual-level covariates across countries.

Country	Sample size	Male	Age	Education	Income
Argentina	907	0.56	37.9	18.14	10.78
Australia	949	0.33	43.38	16.93	9.35
Austria	1,089	0.47	39.55	16.72	7.96
Bangladesh	112	0.66	33.13	18.15	10.64
Belgium	576	0.45	38.23	15.78	8.12
Bolivia	182	0.56	39.59	18.02	9.12
Brazil	11,608	0.38	33.78	17	8.39
Bulgaria	333	0.34	37.24	15.77	7.78
Canada	2,845	0.36	43.69	16.8	9.74
Chile	549	0.43	39.38	18.02	14.44
China	403	0.61	32.19	16.61	9.82
Colombia	1857	0.52	36.32	17.57	15.28
Czech Republic	263	0.46	34.22	17.55	10.27
Denmark	508	0.48	40.37	13.44	10.03
Dominican Republic	554	0.45	37.1	17.99	10.78
Ecuador	303	0.57	38.33	18.04	7.88
Estonia	161	0.39	35.78	16.84	7.68
Finland	795	0.45	41.54	15.04	8.67
France	2,788	0.46	38.48	8.66	8.19
Germany	10,207	0.51	39.17	16.32	8.09
Greece	353	0.43	39.8	16.43	7.11
Guatemala	144	0.34	35.99	18.44	8.47
Hungary	239	0.41	37.92	17.15	12.52
India	997	0.62	34.17	17.9	11.21
Indonesia	1,607	0.43	28.26	15.15	13.66
Ireland	711	0.51	41.58	17.82	8.89
Israel	407	0.42	41.65	16.22	9.3
Italy	1866	0.53	39.4	17.29	8.28
Japan	579	0.58	44.41	17.68	13.35
Kenya	389	0.54	33.43	16.85	10.54
Malaysia	533	0.41	39.36	15.98	8.78
Mexico	3,332	0.44	39.94	18.65	9.73
Morocco	382	0.51	34.91	14.15	8.99
Netherlands	1,424	0.43	40.67	17.61	8.09
New Zealand	363	0.31	43.66	15.99	9.39
Nigeria	243	0.64	34.35	15.7	11.57
Norway	303	0.52	40.51	13.61	12.42
Panama	117	0.56	46.79	18.15	8.07
Peru	2045	0.58	38.06	16.38	8.53
Philippines	750	0.31	32.51	15.96	10.63
Poland	487	0.44	36.22	17.36	8.82

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TABLE 2 (Continued)

Country	Sample size	Male	Age	Education	Income
Portugal	558	0.31	39.29	16.83	6.78
Qatar	1,276	0.3	31.54	16.07	9.28
Romania	809	0.35	38.65	17.36	8.84
Russia	3,408	0.6	35.04	15.34	10.74
Saudi Arabia	103	0.5	37.39	17.14	9.28
Singapore	418	0.44	40.14	16.66	8.95
Slovakia	610	0.47	34.88	17.22	7.59
South Africa	549	0.3	42.34	14.86	10.56
South Korea	295	0.65	43.48	17.21	14.78
Spain	2,328	0.5	43.63	18.66	8.08
Sweden	5,867	0.31	45.89	15.31	10.49
Switzerland	4,204	0.44	41.7	12.25	9.04
Thailand	309	0.36	35.24	14.61	10.96
Turkey	2,868	0.47	32.68	16.92	7.61
Ukraine	1,456	0.28	30.25	14.66	9.13
United Arab Emirates	183	0.38	33.43	16.22	9.38
United Kingdom	11,285	0.49	43.5	17.25	9.13
United States	11,476	0.39	41.9	17.42	9.93
Uruguay	243	0.59	43.8	17.53	11.29
Venezuela	661	0.54	52.46	17.74	14.73

Source: Global Behaviors and Perceptions in the COVID-19 Pandemic (https://osf.io/3sn2k/).

(L1) and country-level (L2) units of analysis. All L1 and L2 variables were grand mean-centered to properly examine potential L2 contextual effects of *Mobility index*, net of L1 compositional effects (in Models 2 and 3 in Table 4). For the cross-level interaction models, slopes for the L1 term (*Normative beliefs* for Model 4 in Table 4; *Perceived infection* for Model 5 in Table 4) are randomly varied across the L2 units (countries), a critical requirement to generate unbiased point estimates and reliable *t*-ratios (Heisig & Schaeffer, 2019).

3 | RESULTS

3.1 | Multilevel findings to test Hypotheses 1 and 2a/2b

Table 4 summarizes the initial findings for hypothesis testing. According to the unconditional model (Model 1), random-effects ANOVA ($\sigma^2 = 0.923$; $\tau = 0.254$, $p < 0.001$) reveals the presence of significant data clustering. The intraclass correlation (ICC) indicates that 22% of the variance in the outcome (*Protective behaviour*) can be explained by between-country differences. Having confirmed this, we first proceed with the bivariate analysis in Model 2. Adjusting for country random intercepts, the coefficient for *Normative beliefs* is positive and statistically significant, giving tentative support for Hypothesis 1 that 'a person who subjectively estimates the national level of infection to be higher would be less engaged in disease-avoidant behaviour'. Turning to Model 3, the parameter estimate for *Perceived infection* turns out to be positively, not negatively, significant, confirming Hypothesis 2a (disconfirming Hypothesis 2b) that 'a person subjectively estimates the national level of infection to be higher would be *more* engaged in disease-avoidant behaviour'.

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TABLE 3 Distribution of country-level variables.

Country	Mobility index	Govt. stringency	Globalization	Social capital	COVID mortality (ln)	HDI
Argentina	−1.45	95.06	67.90	47	2.66	0.83
Australia	.77	60.32	82.00	66.5	2.42	0.94
Austria	−0.72	95.24	89.10	67.7	3.08	0.91
Bangladesh	0.14	86.90	51.30	50.8	1.41	0.61
Belgium	−0.50	85.71	90.70	55	4.81	0.92
Bolivia	−1.69	69.05	59.20	46.3	0.73	0.70
Brazil	−0.26	76.18	60.60	44.3	3.80	0.76
Bulgaria	−0.28	80.95	80.70	46.1	1.52	0.82
Chile	−0.51	71.01	77.80	52.4	1.03	0.85
Colombia	−1.39	56.63	65.10	48.4	1.47	0.76
Czech Republic	0.22	85.71	85.70	47.1	1.26	0.89
Denmark	1.28	95.24	89.30	77.1	2.84	0.93
Dominican Republic	−1.25	76.76	67.00	50.4	1.81	0.75
Ecuador	−1.71	85.85	61.70	49.3	2.68	0.76
Egypt	0.05	91.34	66.80	45.5	3.00	0.70
Estonia	0.71	70.84	83.90	56.5	0.68	0.88
Finland	1.04	90.48	87.70	73.8	1.50	0.93
France	−1.39	95.34	87.40	56	6.99	0.89
Germany	0.51	72	88.70	67.2	5.77	0.94
Greece	−0.65	65.84	82.40	47	3.08	0.87
Guatemala	−0.53	100	63.30	52.4	0.69	0.65
Hungary	0.22	85.93	85.00	49.5	1.90	0.85
India	−0.77	92.49	62.30	50.9	2.54	0.65
Indonesia	0.60	71.17	63.40	73.4	4.03	0.71
Ireland	−0.12	64.38	84.60	67.4	2.18	0.94
Israel	−0.49	95.59	77.10	53.1	0.98	0.91
Italy	−1.57	95.24	83.40	53.3	8.59	0.88
Japan	1.93	64.25	78.80	44.4	4.00	0.92
Kenya	0.88	74.88	55.90	55.1	0.54	0.58
Luxembourg	−0.95	80.95	83.60	61.8	2.40	0.91
Mexico	0.54	34.95	72.50	46.4	1.75	0.77
Morocco	−1.27	81.86	70.60	35.5	2.83	0.68
Netherlands	0.62	82.71	91.20	73.3	5.42	0.93
New Zealand	0.83	77.31	56.10	73.2	0.36	0.53
Nigeria	0.81	72.66	86.30	52	0.72	0.95
Norway	−0.27	79.61	53.80	77.5	2.33	0.56
Pakistan	−1.21	78.91	73.00	49.6	2.06	0.80
Panama	−1.62	90.48	70.40	51.9	1.64	0.76
Peru	0.83	82.98	56.10	42.3	3.39	0.53
Philippines	−1.18	85.71	67.40	59.3	3.59	0.71

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TABLE 3 (Continued)

Country	Mobility index	Govt. stringency	Globalization	Social capital	COVID mortality (ln)	HDI
Poland	−0.18	82.03	81.50	47.1	3.14	0.87
Portugal	−1.09	80.99	84.90	53.9	3.28	0.85
Romania	−0.21	81.97	79.80	46.8	1.61	0.82
Saudi Arabia	−0.10	91.17	66.10	55.1	0.57	0.86
Singapore	1.51	40.62	83.80	63.7	1.10	0.94
Slovakia	−0.12	80.95	83.70	50.9	0.00	0.86
South Africa	0.54	100	70.10	54.7	0.79	0.71
South Korea	2.13	80.95	79.30	42.5	4.95	0.91
Spain	−1.57	95.24	85.80	58.6	7.74	0.89
Sweden	1.65	42.88	90.10	70.6	3.56	0.94
Switzerland	0.25	80.95	91.30	72.4	4.17	0.95
Thailand	0.74	66.53	72.50	59	1.44	0.77
Turkey	0.22	80.27	71.60	42	3.89	0.81
United Arab Emirates	.24	72.68	74.10	61.9	1.17	0.87
United Kingdom	0.24	51.97	90.00	66.6	5.71	0.92
United States	0.84	76.19	82.50	65.8	6.53	0.92
Uruguay	−0.32	64.29	73.50	52.9	0.07	0.81
Vietnam	0.93	91.91	64.50	58.3	0	0.69

Note: The list of countries in Table 2 varies slightly from that in Table 3 due to missing data at the country level.
Source: Global Behaviors and Perceptions in the COVID-19 Pandemic (https://osf.io/3sn2k/).

TABLE 4 Multilevel models estimating bivariate relationships between the outcome and the main predictors.

DV = Protective behaviour	Model 1		Model 2		Model 3		Model 4 (Hypothesis 1)		Model 5 (Hypothesis 2a/2b)	
	Coef.	(SE)	Coef.	(SE)	Coef.	(SE)	Coef.	(SE)	Coef.	(SE)
Intercept	−0.031	(0.064)	−0.058	(0.059)	0.054	(0.064)	−0.015	(0.058)	0.038	(0.058)
Normative beliefs			.182***	(0.024)			0.123***	(0.021)		
Perceived infection					0.061***	(0.014)			0.034**	(0.011)
Individual controls				No		No		Yes		Yes
Time fixed effects				No		No		Yes		Yes
Country variance (τ)	0.254***		0.213***		0.239***		0.188***		0.194***	
ICC (%)	21.5		19.2		20.8		18.5		18.8	
Sample size (L1/L2)	98,310/63		98,310/63		98,310/63		98,310/63		98,310/63	
Deviance (−2LL)	271,304.492		268,431.874		270,164.360		260,636.391		261,557.905	

Note: Robust standard errors (SEs) in parentheses. Time fixed effects are the daily dummies ranging from March 20 to April 6, 2020.
Abbreviation: DV, dependent variable.
*p < 0.05; **p < 0.01; ***p < 0.001 (two-tailed tests).
Source: Global Behaviors and Perceptions in the COVID-19 Pandemic (https://osf.io/3sn2k/).

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3.2 | Test of Hypothesis 3 for the contextual effect of mobility index

The bivariate findings shown in Models 2 and 3 may be spurious, however, due to potential confounding. To address this issue, the set of individual background variables described in the previous section, along with daily fixed effects to control for time-varying unobserved heterogeneity, are included in the analysis. The main finding in Model 4 provides additional evidence in support of Hypothesis 1: adjusting for confounders and the time trend reduces the coefficient size for *Normative beliefs* by about a third (from $ß = 0.182–0.123$, $p < 0.001$). Yet, it remains robustly significant. Moving onto Model 5, there is a similar result with respect to Hypothesis 2a. Net of controls, the parameter estimate for *Perceived infection*, which becomes roughly halved (from $ß = 0.061–0.034$, $p < 0.01$), indicates that higher subjective assessment of COVID-19 cases is positively associated with social distancing behaviour. As a sensitivity analysis, both predictors are included simultaneously in Model 1 in Table 5, after controlling for *Mobility index*. The estimated coefficients for *Normative beliefs* and *Perceived infection* are consistent with those shown in Table 4.

3.3 | Evaluation of the indirect effects of mobility index (Hypotheses 4–5)

To assess Hypothesis 3 (that '*in a country with a higher measure of domestic physical mobility of citizens*, *individual adherence to disease-avoidant behaviour would be lower*), we proceed with Model 2 that additionally incorporates country-level covariates (*Social capital*, *Govt. stringency*, *Globalization*, *HDI*, *Covid mortality*). This is critical because while the proposed mechanism in this hypothesis is conditional cooperation—that one is more likely to cooperate to the extent that others are also willing (i.e., by staying home and not exercising physical mobility)—other explanations are possible. Conditioning on these macrolevel as well as microlevel (respondent-level) covariates to account for alternative mechanisms, robust evidence emerges confirming the above hypothesis, as indicated by the estimated coefficient for *Mobility index*. That is, adjusting for a multitude of factors that may potentially confound the focal relationship across individual and contextual units of analysis, living in a country with a higher mobility rate since the onset of the pandemic is associated with reduced social distancing behaviour.

Having confirmed the direct link between *Mobility index* (a country-level proxy for conditional cooperation) and *Protective behaviour*, the next task is to investigate possible interaction effects. Is the relationship between *Mobility index* and *Protective behaviour* contingent on *Normative beliefs* and *Perceived infection*, respectively, as anticipated by Hypotheses 4 and 5? First, to evaluate Hypothesis 4, the key result is examined in Model 3 in Table 5. Contrary to expectation, the cross-level interaction term (*Mobility index* × *Normative beliefs*) is not statistically significant, though the coefficient sign appears in the expected direction. According to Hypothesis 4, the negative association between *Mobility index* and *Protective behaviour* would be weaker among people who perceive others to be more compliant with anti-Coronavirus behavioural guidelines. As it turns out, however, *Normative beliefs* does not play the anticipated buffering role, based on which Hypothesis 4 is rejected.

Finally, to evaluate the validity of Hypothesis 5, Model 4 is examined. Contrary to what we saw in the previous model, there is a significant cross-level interaction between *Mobility index* and *Perceived infection*. That is, the magnitude of the relationship between objective country-level mobility and individual-level social distancing behaviour is not homogeneous but varies across the subjective assessment of infection rate. According to the analysis, *Mobility index* continues to have a significantly negative association with the outcome ($ß = -0.268$, $p < 0.001$), while *Perceived infection* is consistently positively associated with it ($ß = 0.041$, $p < 0.05$). With these direct effects, the sign for the interaction term ($ß = -0.033$, $p < 0.05$) points out that the negative link between *Mobility index* and *Protective behaviour* becomes stronger among individuals who perceives the level of Coronavirus infection to be higher in their country, that is, those with a higher risk perception. Based on this finding, Hypothesis 5 is validated.

To visualize this contingent association as specified in Hypothesis 5, while holding constant all other individual- and country-level covariates at their respective mean value (based on Model 4 in Table 5), Figure 1 is drawn consisting of three lines corresponding to the minimum, mean, and maximum for the cross-level moderator (*Perceived*

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TABLE 5 Results after adjusting for individual- and country-level covariates.

	Model 1 (Hypotheses 1 & 2a/2b)		Model 2 (Hypothesis 3)		Model 3 (Hypothesis 4)		Model 4 (Hypothesis 5)	
DV = Protective behaviour	**Coef.**	**(SE)**	**Coef.**	**(SE)**	**Coef.**	**(SE)**	**Coef.**	**(SE)**
Intercept	0.026	(0.055)	.048	(0.058)	.050	(0.044)	0.053	(0.057)
(*Individual-level*)								
Normative beliefs	0.121***	(0.021)	0.121***	(0.021)	0.163***	(0.034)	0.119***	(0.022)
Perceived infection	0.033**	(0.012)	.033**	(0.011)	.032**	(0.01)	0.041*	(0.019)
(*Country-level*)								
Mobility index	−0.129*	(0.049)	−0.168***	(0.057)	−0.134**	(0.042)	−0.268***	(0.054)
Social capital			0.061	(0.052)	0.031	(0.047)	0.091*	(0.042)
Govt. stringency			0.047	(0.041)	0.094***	(0.028)	0.018	(0.041)
Globalization			0.150	(0.109)	0.086	(0.071)	0.109	(0.103)
HDI			0.027	(0.094)	0.051	(0.069)	0.042	(0.104)
COVID mortality			−0.019	(0.029)	−0.023	(0.025)	−0.001	(0.024)
(*Cross-level*)								
Normative beliefs × Mobility index					0.063	(0.042)		
Perceived infection × Mobility index							−0.033*	(0.015)
Individual controls	Yes		Yes		Yes		Yes	
Time fixed effects	Yes		Yes		Yes		Yes	
L2 variance (τ)	0.161***		0.127***		0.083***		0.145***	
ICC (%)	16.2		13.4		9.3		15.1	
Random slopes					0.069***		0.017***	
Sample size (L1/L2)	98,310/63		98,310/63		98,310/63		98,310/63	
Deviance (−2LL)	260,285.833		260,271.123		258,442.459		259,081.079	

Note: Robust standard errors (SEs) in parentheses. All models adjust for the individual controls and daily fixed effects.
Abbreviation: DV, dependent variable.
*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$ (two-tailed tests).
Source: Global Behaviors and Perceptions in the COVID-19 Pandemic (https://osf.io/3sn2k/).

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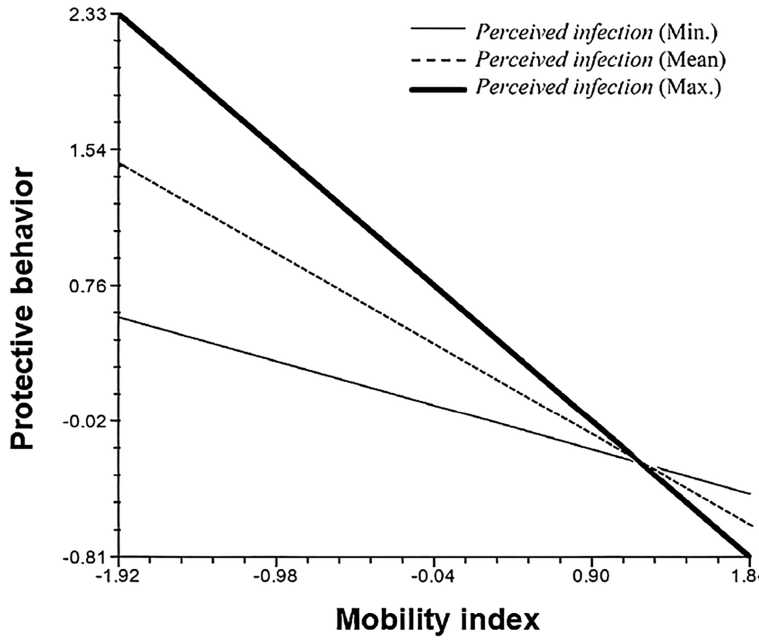


FIGURE 1 Contingent relationship between mobility index and protective behaviour as moderated by perceived infection. Values on *x*-axis are shown as *z*-scores. The graph is based on Model 5 in Table 3.

infection). Values on the x-axis for *Mobility index* have been converted to z-scores. As the graph illustrates, the slope increases progressively from the minimum to the maximum, meaning that the hypothesized strength of the negative relationship between *Mobility index* and *Protective behaviour* grows in proportion with the degree of *Perceived infection*. At the general level, the relationship between country-level physical mobility and anti-COVID-19 social distancing behaviour is negative, as shown by the three downward slopes. Yet, more importantly, its underlying magnitude is the strongest among those who estimate the overall infection rate to be the highest in their country (represented by the dark solid line), that is, those who perceive their co-nationals to be the least cooperative in the pandemic context.

4 | DISCUSSION

Why do some people cooperate in contributing to the provision of public health safety, while others act selfishly by rejecting government COVID-19 guidelines? A voluminous and growing literature has provided various answers to this question, from group identity and mutual reciprocity to coordinated punishment (see Van Lange et al., 2013). Among them is the notion that most of us are conditional cooperators: self-interested actors who are nevertheless willing to act in a cooperative fashion insofar as others are similarly inclined (Fischbacher et al., 2001). Put another way, we are subject to social norms, that is, the expectations stemming from and concerning what others do and approve of, explicitly or not (Bicchieri et al., 2023). The present study was carried out to test whether and to what extent this concept of conditional cooperation can increase our understanding of cross-national variation in protective, that is, prosocial, behaviour during one of the biggest global public health crises in modern history: the COVID-19 pandemic. It is shown that perception of others' (second-order) beliefs and intentions has a powerful impact on whether the perceiver decides to personally engage in social distancing and other behaviours that would add to the provision and maintenance of public health.

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Across countries, as the present study demonstrates, individual compliance with pandemic-related guidelines is partly explained by the understanding of others' potential cooperation measured subjectively (at the respondent level) as well as gauged objectively (at the country level). First, subjective understanding of what compatriots believe matters greatly. To the extent that people think a higher percentage would agree that social gatherings should be cancelled, physical contacts should be avoided, non-essential stores should be closed, and that a general curfew should be imposed, then they themselves are more inclined to engage in protective behaviour or prosocial cooperation (as anticipated by Hypothesis 1). In addition (in support of Hypothesis 2a), evidence confirms the expectation that a person's subjective 'estimate of the number of people in your country who are currently infected' is *positively* associated with cooperative behaviour.

Initially, it was alternatively hypothesized that a higher estimate may signal more selfish behaviour on the part of others, thereby disincentivizing the focal actor to comply with disease-avoidant behaviour. But the empirical analysis did not support this notion. Rather, believing that more people are infected encourages and motivates stricter adherence to social distancing and other protective measures, a finding consistent with prior research (Bish & Michie, 2010; Brewer et al., 2007; Champion & Skinner, 2008; Trifiletti et al., 2022). In other words, when an individual perceives others to be more willing to comply with social distancing mandates, that person indeed behaves in a manner consistent with conditional cooperation. To the contrary, when a person believes that a significant proportion of the population is infected in the country—that is, others are being 'less cooperative'—there is a stronger, not weaker, tendency to be more vigilant against the viral transmission. One plausible interpretation is that the perceived prevalence of infection is, first and foremost, a proxy for existential threat. Hence, to the extent that a person thinks, correctly or not, the overall rate of infection is high, s/he is more likely to practice disease-avoidant behaviour for the sake of sheer survival.

In addition, a cross-level interaction between *Perceived infection* and *Mobility index* emerged. Multilevel modelling initially brought to light that even after adjusting for a host of multilevel confounders, there is a significant contextual effect of the overall within-country physical movements, consistent with Hypothesis 3. Specifically, living in a country with a lower proportion of cooperative others (gauged by higher average mobility since the COVID-19 outbreak) is associated with reduced protective behaviour at the individual level. Moreover, as stated in Hypothesis 5, this relationship becomes amplified among those who perceive a higher number of Coronavirus infections in their country. At the time of the survey (late March to early April of 2020), for example, with the score of 2.13 South Korea ranked number one on the *Mobility index*, while Ecuador had the lowest score of −1.71 (in terms of standard deviation from the mean). In other words, on average, citizens of Ecuador were more engaged in protective behaviour against the pandemic in comparison with South Koreans. In fact, at the country level, *Mobility index* scores and the national averages of *Protective behaviour* were highly correlated (see Figure 2).

A central message here is that people are less likely to comply with COVID-19 guidelines and mandates in the context of greater domestic mobility. As one perceives others to be defying government orders or exercising their freedom by physically moving around and consequently getting infected, a reported general tendency is not to personally adhere to disease-avoidant behaviour. And this tendency increases among those who believe that their country is more threatened by the potentially lethal Coronavirus, as measured by the number of infected cases. Thus, the country-level objective measure (*Mobility index*) and the individual-level subjective measure (*Perceived infection*) are found to operate differently. Concerning the macro indicator based on aggregate mobility data, people are disincentivized to act responsibly for the sake of public health safety. To the contrary, when it comes to the subjective perception of overall infection—that is, in the face of greater risk perception (Trifiletti et al., 2022)—they are incentivized to protect themselves by complying with the recommended and required protocol. As such, the expectation that *Perceived infection* would exacerbate the negative impact of *Mobility index* on *Protective behaviour* is empirically borne out.

Using unique data covering 61 countries across multiple continents, this study showed that a person's decision related to the COVID-19 social dilemma is embedded in and determined by the perceived context of others' normative convictions and commitments. In short, consistent with prior research based on laboratory experiments, people

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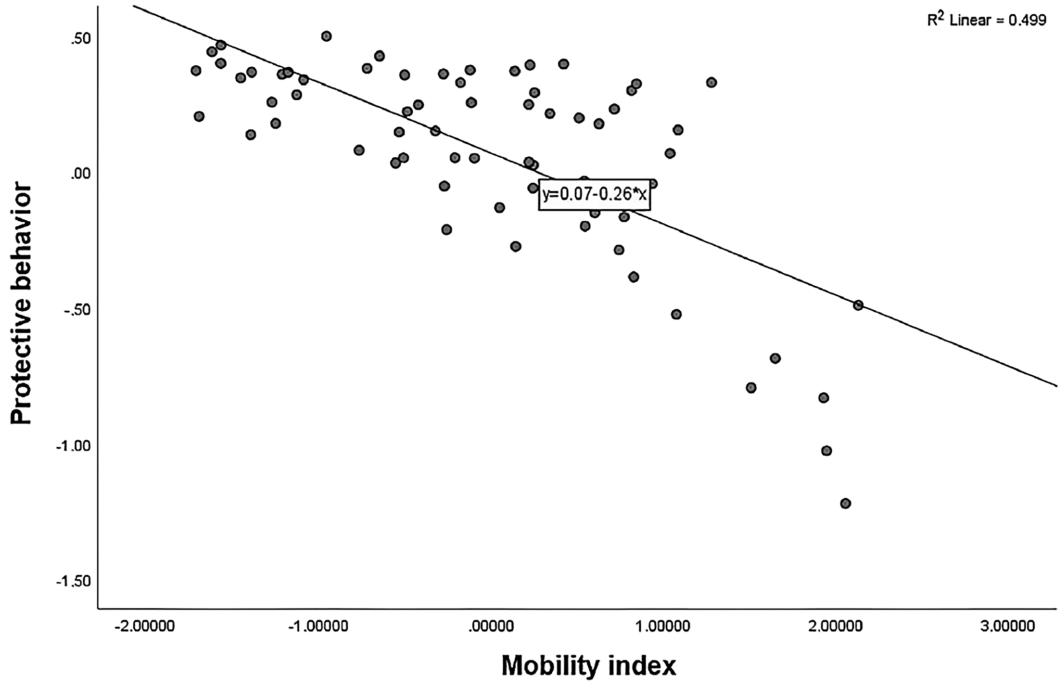


FIGURE 2 Country-level scatterplot for the relationship between mobility index and protective behaviour. Each dot represents a country. The fitted line is based on the OLS regression.

are found to indeed act as *conditional cooperators* (Balliet & van Lange, 2013; Fischbacher et al., 2001). If avoiding or containing the virus transmission through social distancing is a public good—and if people are, by nature, conditional cooperators—then the natural course of action in resolving the social dilemma would be to enhance people's perception of others' willingness to cooperate. Everyone has a critical threshold—a minimum number of cooperators—necessary to determine the likelihood of contributing to a public good, ranging from protesting in a pro-democracy rally and recycling used products to adhering to social distancing guidelines.

Costs of 'defection,' then, vary inversely with the belief that a significant number of others exceeding the personal threshold are willing to forgo their self-interests for the sake of preserving collective well-being. It should be noted that there may be between-country differences in terms of potential for or tendency toward cooperation and trust that may affect prosocial responses to the COVID-19 pandemic (Romano et al., 2021; see also van Bavel et al., 2022). Future studies can advance the scholarship by probing how individual and contextual measures of conditional cooperation interact with macro indicators of tendency toward interpersonal cooperation and trust. Incorporating such cross-societal cultural characteristics may provide further light on one of the most imperative issues facing humanity today: why some individuals choose (not) to act in prosocial ways that help contain the spread of a deadly virus, with far-reaching implications for potential pandemics and other public health emergencies in the future.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT

De-identified data analysed for this study are publicly available at the following repository: https://osf.io/3sn2k/ (Global Behaviors and Perceptions in the COVID-19 Pandemic). They are also available from the corresponding author on reasonable request.

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ETHICS STATEMENT

All procedures performed in studies involving human participants were in accordance with the ethical standards of the Institutional Review Board at Massachusetts Institute of Technology (E-2065) and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

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REFERENCES

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50*(2), 179–211. https://doi.org/10.1016/0749-5978(91)90020-T

Anderson, R. M., Heesterbeek, H., & Klinkenberg, D. (2020). How will country-based mitigation measures influence the course of the COVID-19 epidemic? *The Lancet*, *395*(10228), 931–934.

Andreozzi, L., Ploner, M., & Saral, A. S. (2020). The stability of conditional cooperation: Beliefs alone cannot explain the decline of cooperation in social dilemmas. *Scientific Reports*, *10*(1), 13610.

Balliet, D., & van Lange, M. (2013). Trust, conflict, and cooperation: A meta-analysis. *Psychological Bulletin*, *139*(5), 1090–1112. https://doi.org/10.1037/a0030939

Barrios, J. M., Benmelech, E., Hochberg, Y. V., Sapienza, P., & Zingales, L. (2021). Civic capital and social distancing during the Covid-19 pandemic. *Journal of Public Economics*, *193*, 104310.

Bicchieri, C., Dimant, E., Gelfand, M., & Sonderegger, S. (2023). Social norms and behavior change: The interdisciplinary research frontier. *Journal of Economic Behavior & Organization*, *205*, A4–A7.

Bish, A., & Michie, S. (2010). Demographic and attitudinal determinants of protective behaviours during a pandemic: A review. *British Journal of Health Psychology*, *15*(4), 797–824. https://doi.org/10.1348/135910710X485826

Brewer, N. T., Chapman, G. B., Gibbons, F. X., Gerrard, M., McCaul, K. D., & Weinstein, N. D. (2007). Meta-analysis of the relationship between risk perception and health behavior: the example of vaccination. *Health Psychology*, *26*(2), 136–145. https://doi.org/10.1037/0278-6133.26.2.136

Burton-Chellew, M. N., Mouden, C. E., & West, S. A. (2016). Conditional cooperators and confusion in public-goods experiments. *Proceedings of the National Academy of Sciences*, *113*(5), 1291–1296.

Champion, V. L., & Skinner, C. S. (2008). The health belief model. In K. Glanz, B. K. Rimer, & K. Viswanath (Eds.), *Health behavior and health education: Theory, research, and practice* (pp. 45–65). New York: Jossey-Bass.

Coroiu, A., Moran, C., Campbell, T., & Geller, A. C. (2020). Barriers and facilitators of adherence to social distancing recommendations during COVID-19 among a large international sample of adults. *PLoS One*, *15*(10), e0239795.

Dawes, R., & Messick, D. M. (2000). Social dilemmas. *International Journal of Psychology*, *35*(2), 111–116.

Dincer, O., & Gillanders, R. (2021). Shelter in place? Depends on the place: Corruption and social distancing in American states. *Social Science & Medicine*, *269*, 113569.

Fetzer, T. R., Witte, M., Hensel, L., Jachimowicz, J., Haushofer, J., Ivchenko, A., et al. (2020). Global behaviors and perceptions at the onset of the COVID-19 pandemic. National Bureau of Economic Research.

Fischbacher, U., Gächter, S., & Fehr, E. (2001). Are people conditionally cooperative? Evidence from a public goods experiment. *Economics Letters*, *71*(3), 397–404.

Gozgor, G. (2021). Global evidence on the determinants of public trust in governments during the COVID-19. *Applied Research in Quality of Life*, *17*, 559–578. https://doi.org/10.1007/s11482-020-09902-6

Harring, N., Jagers, S. C., & Löfgren, Å. (2021). COVID-19: Large-scale collective action, government intervention, and the importance of trust. *World Development*, *138*, 105236.

Heisig, J. P., & Schaeffer, M. (2019). Why you should always includea random slope for the lower-level variable involved in a cross-level Interaction. *European Sociological Review*, *35*(2), 258–279.

Hills, S., & Eraso, Y. (2021). Factors associated with non-adherence to social distancing rules during the COVID-19 pandemic: A logistic regression analysis. *BMC Public Health*, *21*(1), 352.

Howard, M. (2022). Are face masks a partisan issue during the COVID-19 pandemic? Differentiating political ideology and political party affiliation. *International Journal of Psychology*, *57*(1), 153–160.

Johnson, T., Dawes, C. T., Fowler, J. H., & Smirnov, O. (2020). Slowing COVID-19 transmission as a social dilemma: Lessons for government officials from interdisciplinary research on cooperation. *Journal of Behavioral Public Administration*, *3*(1). https://doi.org/10.30636/JBPA.31.150

Kavanagh, N. M., Goel, R. R., & Venkataramani, A. S. (2021). County-level socioeconomic and political predictors of distancing for COVID-19. *American Journal of Preventive Medicine*, *61*(1), 13–19.

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Liu, Y., & Mattke, S. (2020). Association between state stay-at-home orders and risk reduction behaviors and mental distress amid the COVID-19 pandemic. *Preventive Medicine*, *141*, 106299.

Maloney, W., & Taskin, T. (2020). *Determinants of social distancing and economic activity during COVID-19: A global view*. Washington, DC: World Bank.

Oosterhoff, B., & Palmer, C. A. (2020). Attitudes and psychological factors associated with news monitoring, social distancing, disinfecting, and hoarding behaviors among US adolescents during the COVID-19 Pandemic. *JAMA Pediatrics*, *174*(12), 1184–1190.

Ostrom, E. (2000). Collective action and the evolution of social norms. *Journal of Economic Perspectives*, *14*(3), 137–158.

Raudenbush, S., Bryk, A., & Congdon, R. (2019). *HLM 8 for Windows (Computer software)*. Skokie, IL: Scientific Software International, Inc.

Romano, A., Sutter, M., Liu, J. H., & Balliet, D. (2021). Political ideology, cooperation and national parochialism across 42 nations. *Philosophical Transactions Royal Society B*, *376*, 20200146. https://doi.org/10.1098/rstb.2020.0146

Saunders, C. L., Elliott, M. N., Lyratzopoulos, G., & Abel, G., (2016). Beyond the ecological fallacy: potential problems when studying healthcare organisations. *Journal of the Royal Society of Medicine*, *109*(3), 92–97.

Shook, N. J., Sevi, B., Lee, J., Oosterhoff, B., & Fitzgerald, H. N. (2020). Disease avoidance in the time of COVID-19: The behavioral immune system is associated with concern and preventative health behaviors. *PLoS One*, *15*(8), e0238015.

Simpson, B., & Willer, R. (2015). Beyond altruism: Sociological foundations of cooperation and prosocial behavior. *Annual Review of Sociology*, *41*, 43–63.

Thöni, C., & Volk, S. (2018). Conditional cooperation: Review and refinement. *Economics Letters*, *171*, 37–40.

Trifiletti, E., Shamloo, S. E., Faccini, M., & Zaka, A. (2022). Psychological predictors of protective behaviours during the Covid-19 pandemic: Theory of planned behaviour and risk perception. *Journal of Community & Applied Social Psychology*, *32*, 382–397. https://doi.org/10.1002/casp.2509

van Bavel, J. J., Baicker, K., Boggio, P. S., Capraro, V., Cichocka, A., Cikara, M., … Drury, J. (2020). Using social and behavioural science to support COVID-19 pandemic response. *Nature Human Behaviour*, *4*(5), 460–471.

van Bavel, J. J., Cichocka, A., Capraro, V., Sjåstad, H., Nezlek, J. B., Pavlović, T., … Boggio, P. S. (2022). National identity predicts public health support during a global pandemic. *Nature Communication*, *26*(13), 517. https://doi.org/10.1038/s41467-021-27668-9

van Lange, P. A., Joireman, M., Parks, J., & van Dijk, E. (2013). The psychology of social dilemmas. *Organizational Behavior and Human Decision Processes*, *120*(2), 125–141.

Woelfert, F. S., & Kunst, J. R. (2020). How political and social trust can impact social distancing practices during COVID-19 in unexpected ways. *Frontiers in Psychology 11*, 572966. https://doi.org/10.3389/fpsyg.2020.572966

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