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Dutch COVID-19 lockdown measures increased trust in government and trust in science: A difference-in-differences analysis

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ABSTRACT

Many governments have implemented strict lockdown measures to prevent the transmission of the new coronavirus (SARS-CoV-2). Compliance with these restrictions is vital and depends greatly on the level of trust in the institutions central to their development and implementation. The objectives of this study were to assess: (1) the effects of the Dutch lockdown measures imposed in March 2020 on trust in government and trust in science; and (2) whether these differ across social groups. We draw on unique data from the high-quality Longitudinal Internet Studies for the Social Sciences panel, which comprises a true probability sample of Dutch households (average participation rate: 80.4%). Our data were collected on an ongoing basis from December 2017 to March 2020 (n = 2219). Using the implementation of lockdown measures in mid-March as a natural experiment, we employed difference-in-differences analyses to assess the causal effect of the Dutch lockdown measures on trust in government and trust in science. We estimated that the imposition of the measures caused an 18% increase (95% confidence interval (CI):15%–21%) in trust in government and a 6% increase (95% CI: 4%–8%) in trust in science. The impact on trust in government was greater among the participants aged 65 and older and those with poor self-assessed health, although the relevant CIs were wide and, in the case of self-assessed health, included the null. No differential effects were observed for trust in science. Our study indicates that the strict public-health measures imposed in the Netherlands during an acute phase of the COVID-19 pandemic generated trust in the institutions involved in drafting and implementing them, especially among those with a higher risk of serious health outcomes. This suggests that, to prevent a major public-health crisis, people appreciate firm government intervention during the acute phase of an infectious disease pandemic.

1. Introduction

Governments around the world have implemented strict lockdown measures during the COVID-19 pandemic (arising from the new coronavirus, SARS-CoV-2) to prevent further transmission of the virus (Hale et al., 2020). The specific measures adopted are commonly based on recommendations from scientific advisory boards about their probable efficacy, but part of their success depends on the extent to which people abide by them. Trust in the institutions primarily responsible for drafting and implementing such measures - in the current pandemic, government and science - likely increases compliance with them. Generally speaking, those who trust their government are more likely to support its policies and regulations and comply with them (Hetherington and Husser, 2012; Levi and Stoker, 2000). Similarly, if people trust scientific institutions and scientists, they are also more likely to view their findings and policy advice as legitimate and credible (Gauchat, 2011; 2012; cf. Nadelson et al., 2014). Indeed, studies on a wide range of health crises and debates, like the Ebola outbreak (Tsai et al., 2020; Vinck et al., 2019), the 2009 influenza A (H1N1) pandemic (van der Weerd et al., 2011), and the issue of HPV and child vaccination (Keelan et al., 2010; Salmon et al., 2005), suggest that trust in government and science is vital to whether or not people comply with measures through which governments and scientists aim to mitigate health crises and reduce risk. Recent research suggests that this is also relevant during the current pandemic: COVID-19 mortality is lower in European countries characterized by greater trust in institutions (Oksanen et al., 2020), and people with more trust in science are more likely to comply with specific harm-reduction measures (Plohl and Musil, 2021).

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Trust in institutions is, however, impacted at times of crisis. Research on a wide range of emergencies rooted in different domains, such as the economy (Bennurb, 2016), politics (Bovens and Wille, 2008), and public health (Lee, 2009; van der Weerd et al., 2011), indicates that they often underlie a setback in institutional trust; at the same time, it is suggested that trust may remain stable or even increase if the government response is perceived to be adequate. Some recent (working) papers suggest that COVID-19 lockdown measures have had a positive effect on trust in government and science (in New Zealand and several European countries), although these studies are: mostly correlational, likely to suffer from selection bias (Amat et al., 6 April 2020; Bol et al., 2020; Esaiasson et al., 2020; Sibley et al., 2020), and contested (Schna, 2020). What is, therefore, required is empirically rigorous evidence on how strict lockdown measures introduced during the COVID-19 pandemic have affected institutional trust.

Complemented with information from December 2017, December 2018, and December 2019, we draw on high-quality, longitudinal data from a probability sample of the Dutch population (Schepenzenzeel, 2009). Using the mid-March implementation of lockdown measures in the Netherlands as a natural experiment, we employ difference-in-differences (DID) analyses to assess the causal impact of the restrictions on trust in government and trust in science. More specifically, we study the combined effect of the complete set of lockdown measures implemented in the country between March 12 and March 15. These restrictions included: the closure of schools, restaurants, gyms, and other related businesses; strong advice to work from home and stay 1.5 m apart from anyone not from the same household; and a requirement to self-quarantine in the case of symptoms (a more detailed description of the first phase of the pandemic in the Netherlands and the Dutch lockdown measures can be found in the Methods section). Our study only examines the short-term effects of these restrictions on trust in government and trust in science, since our data cover the period up to two weeks before and two weeks after the implementation of the lockdown measures.

Beyond studying the overall effects of the Dutch COVID-19 lockdown measures on trust in government and science, it is also important to assess whether they have had a differential impact across social groups. Some groups are disproportionately affected by either health threats or the measures taken to combat them, which may explain why some people have responded differently to the lockdown restrictions than others. In particular, those to whom health crises pose the greatest (perceived) risk (see e.g., Brewer et al., 2007) or the economically disadvantaged (see e.g., Bavel et al., 2020) are likely to react in different ways than the average citizen. Moreover, it is also suggested that those with greater animosity toward or mistrust of establishment institutions, will be more skeptical of public-health measures during a crisis and are therefore less likely to comply with them (see e.g., Bavel et al., 2020; Salmon et al., 2005; Tsai et al., 2020).

Three characteristics of the COVID-19 crisis and the consequential Dutch lockdown measures are arguably most likely to have a similar heterogeneous impact to that described above. First, the risk of being severely affected by COVID-19 is substantially higher with an older age and poor health (CDC Covid-19 Response Team, 2020). Consequently, it is these citizens who may have the most to gain from these lockdown measures. It is therefore our expectation that the restrictions are more likely to have a positive impact on trust among these groups. Second, lockdown measures have major consequences for the economy, causing many economic activities and businesses to be put on hold (McKee and Stuckler, 2020). This will particularly affect those in a poor financial position, as they are less equipped to bear this economic burden (Bonaccorsi et al., 2020; McKee and Stuckler, 2020). It may also be more difficult for this group to abide by, e.g., social distancing or quarantine measures (Bavel et al., 2020), possibly increasing opposition towards those measures. We therefore anticipate that a positive impact on trust is more likely among those with a higher net household income and level of education. Third, groups known to have less affinity with official institutions are also expected to be both less receptive to any far-reaching measures they impose and less willing to accept the public and private consequences. As less-educated citizens are more likely to question the legitimacy of, and feel more distant from, such institutions (Noordzij et al., 2020; Noordzij et al., 2019), it is our expectation that the effect of lockdown measures on trust is likely to be less positive in this group.

We used a triple differences (difference-in-differences-in-differences (DiDiD)) specification to test our expectations that the effect on trust in government and science of the lockdown measures imposed in the Netherlands would be more positive among those aged 65 or older, as well as those with poor self-assessed health, a higher household income, and a higher level of education.

2. Methods

We used data obtained from the Longitudinal Internet Studies for the Social sciences (LISS) panel (administered by CentERdata at Tilburg University in the Netherlands). The panel is a true probability sample, and was established by drawing a random sample of 10,150 private households from the population register by Statistics Netherlands. These households were approached via letters, telephone calls, and/or home visits (Schepenzenzeel, 2009). To reduce non-responses and selection bias, great effort was made to recruit as many of these households as possible: they were contacted up to 15 times, if necessary, and an extensive refusal conversion process was applied in an attempt to maximize cooperation. Ultimately, 5176 households joined the panel (Schepenzenzeel, 2009).

Every household member aged 16 and older was asked to take part, producing a panel comprising 8026 active members (82% of all of those eligible). CentERdata has recruited a total of four refreshed samples since the panel was established, some of which oversampled difficult-to-reach groups to improve representation (CentERdata, 2020). If required, CentERdata provides participants with an internet connection and a computer for use to complete questionnaires, and makes a special effort to contact inactive panel members. Monetary compensation is paid for participation. In 2019, these efforts produced an average individual response rate of 80.4% (CentERdata, 2020). The LISS panel complies with all relevant ethical regulations (CentERdata, 2020).

Our questionnaire, which we designed as part of a broad research project on various political attitudes and behaviors (van der Waal et al., 2020), was delivered to CentERdata in December 2019. This was three months before SARS-CoV-2 hit the Netherlands, and the survey was fielded from March 2 to March 31, 2020. In detail, the questionnaire was sent out to 3042 LISS panel members aged 18 or older. Of this group, 2205 had participated in a related project two months earlier (at that time, they had been randomly selected from all the LISS panel members). The other contributors were recruited from a new random sample drawn from the remaining panel members. The number invited to participate was determined a priori to ensure an adequate sample size (based on the average panel-member response rates). No changes could be made to the random sample once selected. The response rate was 80.1%, limiting the role that selection bias might play. We excluded 38 people who completed the survey in 10 min or less (which is arguably not enough time to provide valid answers), leaving us with a final sample of 2398 participants.

2.1. COVID-19 prevention measures in the Netherlands

The first positive COVID-19 case in the Netherlands was reported on February 27, 2020. Carnival festivities had ended only two days earlier, and were later identified as likely superspreader events, leading to a huge increase in infections in one of the country’s southern provinces. On March 2, only 18 cases (0 deaths) had been reported in the Netherlands (National Institute for Public Health and the Environment, March 2, 2020) and the only measure in place was contact tracing (official channels were still saying there was no need for other
restrictions). On March 12, after a sustained increase in the number of positive cases, and despite repeated calls for adherence to general hygiene measures like frequent hand-washing and not shaking hands, the government decided national lockdown restrictions were required to prevent further transmission of the virus. The prime minister, the head of the outbreak-management team (i.e., the scientific advisory board for COVID-19 prevention), and the minister for healthcare held a joint press conference and announced: (1) the prohibition of public and private events (100 attendees or more); (2) a request for everyone to work from home wherever possible; (3) limitations on visits to the elderly or those with medical conditions; and (4) a stay-at-home order in the event of respiratory problems or a fever. There was a further press conference on March 15, when it was announced that these measures would be complemented with an urgent request for social distancing of at least 1.5 m and the closure of schools, restaurants, gyms, and other related businesses. Restrictions on entering the country were also imposed on people from outside the EU undertaking non-essential travel. This marked the start of the lockdown in the Netherlands, which was to initially remain in place until April 6, 2020.

2.2. Data collection in March 2020

Fig. 1 shows the number of participants who completed our survey for each day of data collection. On the first day (March 2), 264 people finished the questionnaire. This number was between 34 and 165 on the remaining 29 days. The control group was taken from those who began the survey before 15:15 h Central European Time (CET) on March 12, corresponding to the start of the press conference when the first lockdown measures were announced (n = 1034). The treatment group (n = 1185) comprised those who began the questionnaire after 18:00 h CET on March 12, corresponding to the time when the additional restrictions came into effect (less than an hour after the end of the press conference where these measures were announced). We excluded those who began the survey between these two time-points (n = 179; 7.5%). The data were then linked to the pre-treatment levels of trust in government and science of the same participants in December 2019 (n = 2190; 99%), December 2018 (n = 1934; 87%), and December 2017 (n = 1899; 86%).

2.3. Variables

Trust in government was measured with a question that is commonly used in political science (e.g., Bol et al., 2020). This asks participants how much they trust the (Dutch) ‘government’ on a scale from 0 to 10. The scale ranges from (0) ‘no trust at all’ to (10) ‘complete trust’. Trust in science was measured with answers to the same question for ‘science’ in December 2017, December 2018, and December 2019, and for ‘scientists’ in March 2020. These items are very similar to those used in recent research (Achterberg et al., 2017), which demonstrate that they measure the same underlying construct, labeled as ‘trust in scientific institutions’: they have near identical factor loadings (0.90 and 0.89, respectively) and are part of a reliable scale. That trust in science and trust in scientists are very similar empirically and theoretically is also indicated by the detailed reliable scale for ‘trust in science and scientists’ developed and validated by Nadelson et al. (2014), which incorporates items on both.

For the subgroup analyses, we categorized age into either ‘65 years or older’ and ‘younger than 65’, reflecting the prevailing messages in the Dutch media, i.e., that those older than 65 are at particular risk of severe illness from COVID-19 (NOS Nieuws, March 12, 2020). Self-assessed health was measured by asking the participants ‘How would you describe your health, generally speaking?’ The answer categories were ‘poor’, ‘moderate’, ‘good’, ‘very good’ or ‘excellent’. We dichotomized this variable into a single-item measure of self-assessed general health - poor or moderate versus good, very good or excellent self-assessed health - which is an often-used and valid indicator (e.g., DeSalvo et al., 2006). Income level was measured as net household income in Euros and divided into tertiles corresponding to: €2273 or less; €2275 – €3700; and €3701 or more. Three retirees whose reported net monthly household income was improbably high (€47,000, €146,652, and €178, 677), and 20 participants who declared a monthly household income of 0.00 (which is implausible given the Dutch welfare system), were categorized as missing. Level of education was measured as the participant’s highest attained education and classified according to the International Standard Classification of Education (ISCED): low (no education, primary education, secondary education - ISCED 0–2); medium (intermediate vocational education and higher secondary education - ISCED 3–4); and high (higher vocational education and university - ISCED 5–7). Those who said they were still attending school or college were categorized as missing.

Additional covariates included in the analyses were: gender (self-reported as male or female); cohabitation (living alone or with a partner); children living at home (whether or not at least one child was residing at home); and a non-Dutch background (whether or not at least one of the participant’s parents was born abroad).
2.4. Statistical analysis

We used DiD analyses to estimate the causal effects of the Dutch lockdown measures on trust in government and trust in science. To this end, we fitted the following ordinary least squares (OLS) regression model, using cluster standard errors to correct for auto-correlation and heteroscedasticity:

\[ Y_{it} = \beta_0 + \beta_1 \text{Treatment}_i + \beta_2 \text{Year}_t + \beta_3 (\text{Treatment}_i \times \text{Year}_t) + \mu_{it} \]  

(1)

Where \( Y_{it} \) is the outcome of interest (i.e., trust in government or trust in science) for individual \( i \) in year \( t \); \text{Treatment} is a dummy variable for whether the participant started the survey before March 12 or after March 15 (0 = control group, 1 = treatment group); \text{Year} indicates the survey year (e.g., 0 = December 2019, 1 = March 2020); and \( \mu_{it} \) is the error term. \( \beta_3 \) indicates the estimated causal effect of the COVID-19 lockdown measures on the outcome and is the key coefficient of interest in the analysis. In the sensitivity analyses, we controlled for the background characteristics (i.e., gender, age, cohabitation, children living at home, non-Dutch background, self-assessed health, household income, and level of education) by fitting the following OLS regression model:

\[ Y_{it} = \beta_0 + \beta_1 \text{Treatment}_i + \beta_2 \text{Year}_t + \beta_3 (\text{Treatment}_i \times \text{Year}_t) + \beta_4 X_{it} + \mu_{it} \]  

(2)

Where \( X_{it} \) is a vector of the covariates included in the model.

To assess whether the effects of the Dutch lockdown measures on trust in government and science differed across the social groups, we extended the previous equation to allow for the following triple differences specification:

\[ Y_{it} = \beta_0 + \beta_1 \text{Treatment}_i + \beta_2 \text{Year}_t + \beta_3 (\text{Treatment}_i \times \text{Year}_t) + \beta_4 \text{Subgroup}_1 + \beta_5 (\text{Subgroup}_1 \times \text{Treatment}_i) + \beta_6 (\text{Subgroup}_1 \times \text{Year}_t) + \beta_7 (\text{Subgroup}_1 \times \text{Treatment}_i \times \text{Year}_t) + \beta_8 X_{it} + \mu_{it} \]  

(3)

Where \( \text{Subgroup}_1 \) indicates the subgroup of interest for a specific analysis (e.g., participants aged 65 or older versus those younger than 65); and \( X_{it} \) is a vector that includes all the other subgroups and covariates. To assess whether the effect of the lockdown measures was heterogenous across the social groups, the three-way interaction “Subgroup \_Treatment \_Year” was included in the model. The corresponding coefficient, \( \beta_7 \), indicates the estimated differential effect of the lockdown measures.

Lastly, we calculated the relative effects (i.e., percentage change) by dividing the estimated effect sizes by the counterfactual level of trust of the treatment group in March 2020 (i.e., DiD estimate/(\( Y_{\text{Mar20}} \times Y_{\text{Dec19}} \))). To estimate the relative effect for each subgroup, we used the counterfactual level of trust in that specific subgroup as the denominator.

3. Results

We assessed the validity of our DiD estimation strategy by first testing the critical parallel trends assumption, which Fig. 2 confirms visually: trends in trust in government and science between December 2017 and December 2019 (i.e., pre-treatment) were similar in the treatment and control groups. To test this formally, we estimated regression equation (1) isolated to the pre-treatment period (i.e., 2017–2019), including time as a continuous variable. The results confirmed that the parallel trends assumption was not violated: the estimated interaction term between treatment and time was 0.03 (95% CI: –0.05 to 0.11) for trust in government and –0.05 (95% CI: –0.12 to 0.01) for trust in science. Similar results were obtained when we included time as a categorical variable in the regression model (see Supplementary Material, tables S1–S13 for the full details of these results, as well as those discussed below). Moreover, the estimated coefficients attenuated even further towards the null after adjustment for background characteristics (obtained by estimating regression equation (2)).

3.1. Impact of the lockdown measures

Fig. 2 shows that between December 2019 and early March 2020 there was a sharp decrease in trust in government in the control group and a sharp increase in the treatment group. Our DiD approach (calculated from fitting regression equation (1)) enabled us to estimate that the causal impact of the lockdown measures was 0.92 (95% CI: 0.77 to 1.07). This is a substantively large effect, corresponding to an 18% increase in trust in government. For trust in science, the estimated impact of the lockdown restrictions was 0.42 (95% CI: 0.28 to 0.56), corresponding to a 6% increase. Although still substantial, this estimated rise in trust in science was much lower than that in government. This may be due to a ceiling effect: across all the time-points considered, the participants reported much greater trust in science than in the Dutch government (Fig. 2).

Fig. 2. Trends, per treatment and control group, in trust in government and science from December 2017 to March 2020, using data from the Dutch LISS panel (age 18+). Note: The y-axis represents the mean level of trust measured on a scale ranging from 0 to 10. The x-axis lists the four periods of data collection. The grey lines represent the trend in trust in science and the black lines the trend in trust in government. The solid lines represent the treatment group and the dashed lines the control group. The error bars show the 95% CIs. The means and 95% CIs are predictions calculated from fitting regression equation (1) using all four periods of data collection.
3.2. Differential impact of the lockdown measures

The effect of the Dutch lockdown measures on trust in government was greater among the participants aged 65 or older than in those younger than 65 (\(b = 0.32\), 95% CI: 0.00 to 0.64); this was also the case for the participants with moderate or poor self-assessed health compared to those who assessed their health to be good, very good or excellent (\(b = 0.41\), 95% CI: −0.10 to 0.93). Although the confidence intervals were wide and, in the case of self-assessed health, included the null, the substantial difference in effect sizes suggests that the extent to which the lockdown measures boosted trust in government was larger among those at higher risk of serious health outcomes due to COVID-19 (Figs. 3 and 4). The estimated effect sizes correspond to a 23% increase in trust in government for the participants aged 65 or older compared to 16% for the younger age group, and a 31% increase in trust among those with moderate or poor self-assessed health versus 17% for the healthier respondents. For trust in science, the estimated differential effects were much less pronounced: 0.09 (95% CI: −0.20 to 0.39) when comparing the participants aged 65 or older to their younger counterparts, and 0.13 (95% CI: −0.40 to 0.66) in the comparison of those with moderate/poor self-assessed health to the participants whose self-assessed health was better.

The comparison of the income groups for trust in government did not reveal any clear differential impact between the participants in the highest income tertile and those in the lowest (\(b = −0.17\), 95% CI: −0.57 to 0.22), or between the participants in the middle-income group and those in the lowest income tertile (\(b = 0.14\), 95% CI: −0.26 to 0.54). This suggests that the impact of the lockdown measures in the Netherlands was most evident in the middle-income group and least pronounced among those in the highest income tertile (Fig. 5). Contrasting these groups produced an estimated differential effect of 0.32 (95% CI: −0.06 to 0.69). For trust in science, the differences between the subgroups were again less pronounced: −0.16 (95% CI: −0.54 to 0.22) when comparing the middle to the low-income participants, and −0.10 (95% CI: −0.46 to 0.26) in the comparison of the high and low-income contributors.

The impact of the lockdown measures on trust did not differ between the participants educated to different levels: for trust in government, the estimated differential effect was −0.13 (95% CI: −0.58 to 0.32) when contrasting those with a medium to low education, and −0.28 (95% CI: −0.70 to 0.14) in the high to low-education comparison. For trust in science, the estimated effect was −0.11 (95% CI: −0.52 to 0.31) in the medium to low-education comparison, and −0.21 (95% CI: −0.59 to 0.18) in the high to low-education comparison.

3.3. Relative increases in trust in government and science

Fig. 6 offers an overview of the relative impact of the Dutch COVID-19 lockdown measures on trust in government and science. Our analyses revealed that the restrictions had substantial effects among all the subgroups considered. This was especially the case for trust in government, where the impact was most pronounced among the participants with poor self-assessed health.
Our study demonstrates that the COVID-19 lockdown measures introduced by the Dutch government in March 2020 had substantial positive effects on trust in the institutions central to their development and implementation: government (18%) and science (6%). This is an important insight, as compliance with these measures – crucial for stopping the spread of SARS-CoV-2 – likely depends on this institutional trust (Oksanen et al., 2020; Plohl and Musil, 2021). Our results suggest that the positive effect on trust in government is greater among groups at the highest risk of serious health outcomes: those aged 65 or older and those with moderate or poor self-assessed health, although the relevant CIs were wide and, in the case of self-assessed health, included the null. Our findings indicate that people appreciate firm government intervention during the acute phase of an infectious-disease pandemic to prevent a major public-health crisis. Moreover, our results suggest that the positive impact of the lockdown measures on trust in government and science should be interpreted as confidence in institutions that take action at times of crisis, not as a result of the crisis itself (as argued by Schraff, 2020), as is, for example, observed in response to national security emergencies like terrorism (Dinesen and Jaeger, 2013; Hetherington and Nelson, 2003): trust among those in the control group (surveyed during the emergent COVID-19 crisis, but before implementation of the lockdown) decreased compared to the linear trend in preceding years, but increased in the treatment group (surveyed after the lockdown measures were implemented) compared to a similar linear trend in the preceding period. Clearly, therefore, a firm government response was vital for reassuring Dutch citizens that adequate public-health strategies were being adopted to stop the spread of the new virus during the first phase of the pandemic.
Although we observed a substantial positive effect for both government and science, the estimated increase in trust in the latter was much lower than in the former. There are probably two main reasons for this. First, because baseline levels of trust in science are substantially higher than in government, there is likely a ceiling effect that limits the extent to which they can increase. Second, whereas the drafting and employment of the Dutch lockdown measures was informed by advice from a scientific advisory board (and were also explicitly communicated as such to the public), it was, in fact, the government that not only had the power to decide whether and when to implement the restrictions, but was also most prominent in communications about them. It is likely, therefore, that the government was evaluated more positively on the basis of this performance.

What do our findings on the Dutch case imply for institutional trust in other contexts? Both the type of measures imposed and the institutional context are relevant here. First, when it comes to the lockdown, the restrictions introduced by the Dutch government in mid-March 2020 were roughly similar in their degree of stringency to those imposed in other north-west European countries, e.g., in relation to social distancing, school closures, the prohibition of gatherings, and the cancellation of public events (Hale et al., 2020). The Dutch government was less restrictive in terms of imposing stay-at-home orders than (mostly southern European) countries in which people were only able to go out for very limited reasons, but stricter than other (mostly northern European) countries where the only restriction was a recommendation to stay at home (Hale et al., 2020). As our analyses suggest that the positive effect of lockdown measures on institutional trust should be interpreted as trust in bodies that take action at times of crisis, it is reasonable to expect that similar increases will have occurred in other countries. We can only speculate about whether such increases would be greater or weaker than the effects we observed, as this will also depend on both the level of action that citizens expect/demand from their government and baseline levels of institutional trust: while a positive evaluation of significant government intervention is only likely in societies sympathetic to this approach, an already high level of trust will also mean there is a ceiling on the extent to which it can increase.

Second, the potentially negative effects of the Dutch lockdown measures on economically vulnerable groups may have been mitigated by the country’s moderate level of economic liberalization (Thelen, 2014) and accessible health-care system (Schafer et al., 2010), as well as the financial relief designed to support entrepreneurs and companies during the pandemic (Government of the Netherlands, March 17, 2020). In countries with a less generous welfare state, such as the US, strict lockdown measures may have affected institutional trust less positively, or even negatively, among low-income groups.

4.1. Strengths and limitations

Our use of participants from a probability sample of Dutch households and the DID analyses mean that our study is a significant improvement on earlier research in terms of representativeness and causal identification. However, some limitations need to be acknowledged.

First, our sample suffered from a minor underrepresentation of younger age groups, less-educated citizens, and those with a non-Dutch background. To the extent that the change in institutional trust caused by the lockdown measures is different in these groups, our effect estimates may be slightly biased.

Second, since our data collection was designed for different purposes, it has not been specifically powered to detect differential effects in the subgroups considered in this study. Most notably, only 12% of the participants reported moderate or poor self-assessed health, reducing the power to detect any differential impact for this subgroup. Consequently, we have refrained from making inferences solely grounded on p-values or confidence intervals, instead basing them on what we deemed to be a substantively large effect given the magnitude of the point estimate. Evidently, however, the relatively major uncertainty surrounding these point estimates requires careful consideration.

Third, our study focused on the two institutions primarily responsible for implementing lockdown measures in the first phase of the COVID-19 pandemic, as well as on specific social groups upon which we expected the restrictions to have a differential impact. We did not have data available to study trust in relevant institutions other than government and science. Nevertheless, confidence in, e.g., the health-care system, official bodies like the World Health Organisation, or regional governments involved in implementing lockdown measures, may also be impacted. Similarly, a lack of data prevented us from studying the effect of the lockdown on migrants and migrant workers, who may be even more vulnerable to the consequences of the pandemic and lockdown restrictions (e.g., Liem et al., 2020).

Fourth, our findings pertain to the short-term effect of Dutch lockdown measures implemented during an acute phase of the crisis. Our analysis does not cover subsequent months, when the number of infections fell and the restrictions were eased, or when a stringent lockdown was reintroduced in the fall of 2020 after a rise in the number of cases. Follow-up research is therefore required to assess whether and to what extent the increase in trust in government and science endured after March 2020. In this respect, both the effectiveness of (a set of) lockdown restrictions and their wider societal impact (e.g., the social, psychological, and economic consequences (Block et al., 2020) are relevant. If measures are effective at mitigating the crisis by substantially reducing the number of infections, it may be the case that citizens no longer perceive them to be necessary and legitimate, reducing their motivation to comply. Consequently, institutional trust might fall in the long-term, depending on both the degree to which measures are relaxed, but also on the extent to which they are adequately reimposed during virus upsurges.

In addition, the adverse consequences of prolonged lockdown measures (Block et al., 2020) may undermine institutional trust after the initial acute phase. This is especially relevant when these effects (e.g., rising unemployment, economic uncertainty, loneliness) are perceived as causing a decline in health and quality of life that is comparable to, or greater than, the risks of COVID-19 itself. This could also mean that effects across subgroups change as lockdown measures continue. For instance, although we did not observe a weaker positive effect on trust among low-income groups or groups with a low level of education, the more economically vulnerable may eventually become less trusting once the negative economic effects of the lockdown measures become clear (depending on the financial relief provided by governments). Similarly, younger age groups may become less trusting if they perceive the measures to be detrimental to their future prospects and mostly for the benefit of older citizens.

In conclusion, this study provides empirically rigorous evidence that the lockdown measures implemented in the Netherlands in March 2020 during the COVID-19 pandemic had substantial short-term positive effects on trust in the institutions involved in drafting and implementing them: science and government.

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Declaration of competing interest

The authors declare that they have no competing interests.
Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.socscimed.2021.113819.

Authors’ contributions

JOG, WdK and JvdW conceived the study. All authors contributed to the data collection. JOG conducted the statistical analysis. KN reviewed the statistical analysis. All authors contributed to writing the manuscript. All authors read and approved the final manuscript.

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